California Independent System Operator Corporation

August 22, 2023

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: California Independent System Operator Corporation
Docket No. ER23-___-000

Day-Ahead Market Enhancements and Extended Day-Ahead Market

Dear Secretary Bose:

Attached is the submittal by the California Independent System Operator Corporation of a tariff amendment to implement the Day-Ahead Market Enhancements and Extended Day-Ahead Market initiatives. Please contact the undersigned with any questions.

Respectfully submitted,

/s/ John C. Anders

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Docket No. ER23-___-000

Day-Ahead Market Enhancements and Extended Day-Ahead Market

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) submits this tariff amendment to enhance and extend its day-ahead market in the West.[1] This filing implements the most significant market enhancement for the CAISO and Western stakeholders since the CAISO established the Western Energy Imbalance Market (WEIM) in 2014. This market enhancement will increase reliability, decrease costs to ratepayers, optimize generation dispatch across a broader footprint, and help participants and the states they serve achieve clean energy policy objectives.

The proposed tariff revisions are the product of two intensive stakeholder efforts to evolve and expand access to wholesale energy markets in the West. First, the CAISO proposes a suite of tariff revisions resulting from its Day-Ahead Market Enhancements (DAME) initiative.[2] Second, pursuant to its Extended

[1] The CAISO submits this filing pursuant to section 205 of the Federal Power Act (FPA), 16 U.S.C. § 824d, and Part 35 of the Commission's regulations, 18 C.F.R. Part 35. Capitalized terms not otherwise defined herein have the meanings set forth in appendix A to the CAISO tariff, and references herein to specific tariff sections are references to sections of the CAISO tariff unless otherwise specified.

[2] Materials related to the DAME initiative are available on the CAISO website at https://stakeholdercenter.caiso.com/StakeholderInitiatives/Day-ahead-market-enhancements.

Day-Ahead Market (EDAM) initiative, the CAISO proposes tariff revisions to extend access to its day-ahead market to balancing areas[3] in the WEIM that elect to participate in the day-ahead market.[4] After an extensive public process, both sets of tariff revisions received wide support from stakeholders.

The CAISO respectfully requests the Commission issue an order by December 21, 2023 accepting the DAME and EDAM tariff revisions, with the effective dates described in section VI of this transmittal letter.[5] The CAISO further requests that the Commission extend the time period for comments to 30 days from the date of this filing and the time period for responses to comments to 20 days from the date comments are due given the significance and scope of this filing.

I. Introduction

The CAISO proposes two significant sets of tariff revisions that implemented together will transform and extend its day-ahead market framework, producing significant economic, environmental, and reliability benefits. First, the CAISO proposes critical enhancements to its day-ahead market to address the challenges caused by increasing system variability and uncertainty, which will improve market efficiency and reliability. Second, the CAISO proposes to extend participation in its enhanced day-ahead market to other balancing authorities in the West, expanding access to the broad benefits of a day-ahead market.

The DAME tariff changes establish two new products – imbalance reserves and reliability capacity – to address the growing magnitude of imbalances in the supply and load forecast between the day-ahead and real-time market. These net load imbalances have grown significantly in recent years because of the rapid growth in variable energy resource capacity, significant

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[3] By balancing area, the CAISO means a balancing authority area as defined in the North American Electric Reliability Corporation (NERC) Glossary of Terms. The CAISO also uses the term balancing authority, consistent with its meaning in the NERC Glossary of Terms, when referring to the responsible entity that maintains balance within the balancing area.

[4] Materials regarding the EDAM initiative are available on the CAISO website at https://stakeholdercenter.caiso.com/StakeholderInitiatives/Extended-day-ahead-market.

[5] Specifically, the CAISO requests that the Commission accept the DAME tariff revisions effective May 1, 2025. The CAISO also requests that the Commission accept the EDAM tariff revisions that address initial EDAM onboarding and implementation effective December 21, 2023, and it requests an effective date of May 1, 2025 for the balance of the EDAM tariff revisions. The CAISO respectfully requests waiver of the 120-day notice requirement for the DAME tariff revisions and the latter EDAM tariff revisions.

As discussed in section V.G of this transmittal letter, conforming tariff changes may be required for each affected balancing authority, and the tariff-owning entities within each affected balancing area. The CAISO intends to submit a separate filing to identify conforming tariff changes within its own balancing area.

weather-related uncertainty, and extreme climate events. This has increased the risk that the CAISO will not have sufficient online capacity and ramp capability available to efficiently and reliably balance the system in real-time.

To avoid these potential adverse outcomes, the CAISO currently uses the residual unit commitment (RUC) process to adjust the load forecast upon which the CAISO bases its capacity procurement. The DAME tariff changes will mitigate the need for this adjustment in RUC. They will help increase overall efficiency through the procurement of imbalance reserves and reliability capacity based on modeled variability and uncertainty.

The CAISO will procure imbalance reserves up and imbalance reserves down to meet the range of expected imbalances between the day-ahead and real-time net load forecasts. The extreme upper and lower range of expected imbalance reflects the range of upward and downward flexible reserves the CAISO foreseeably would need for a given interval if either extreme outcome occurred. The integrated forward market will co-optimize bids for energy, ancillary services, and both types of imbalance reserves in determining market awards, thus enhancing market efficiency.

Similarly, the CAISO will procure reliability capacity up much the same as the capacity it procures today in the RUC process, with the addition of reliability capacity down that represents new capacity procured to address scenarios where the day-ahead market awards too much energy relative to the day-ahead net load forecast. Procuring capacity in the downward direction works together with the upward capacity to inject more flexibility into the process and address potential oversupply in the real-time market.

The second major set of proposed tariff revisions establish the extended day-ahead market framework, which will enable other balancing areas in the West to participate in a day-ahead market. These tariff changes incorporate the enhancements proposed in the DAME initiative. Together, the tariff changes will support the optimal day-ahead commitment of a geographically diverse set of resources across an expanded market area, maximizing the use of available transmission capability and providing broad reliability, economic, and environmental benefits.

WEIM participants can join EDAM and settle all balancing area loads and resources in the day-ahead timeframe in addition to all imbalances between day-ahead positions and the real-time market. Similar to the WEIM, participants in EDAM must demonstrate they have sufficient supply to meet balancing and flexibility tests so the market can more efficiently optimize resources over the expanded market area. Before the day-ahead market runs, this test will review the demand obligations and supply options for each balancing area and determine whether each has sufficient supply to satisfy its forecasted demand

commitments, forecasted imbalance reserve requirements, and forecasted ancillary service obligations. The DAME tariff revisions will enhance the ability to assess whether participating balancing authorities have met these requirements. Balancing areas that pass the test will benefit from the diversity of resources available across the expanded market area, and be pooled together for purposes of the real-time resource sufficiency evaluation in the WEIM. Balancing areas that do not pass the test will be subject to a surcharge for such failure and may not be included in the real-time resource sufficiency evaluation pool.

The extended day-ahead market will optimize the transmission available to the market, including unsold and unscheduled firm transmission capability. It will also identify the most efficient resource commitments, energy transfers, and capacity transfers to meet forecasted demand and uncertainty across the footprint. A transmission customer that submits a self-schedule before the start of the day-ahead market will be assigned a higher market clearing scheduling priority to allow these transactions to clear ahead of other self-schedules and economic bids. Alternatively, the transmission customer may release its transmission rights to the market and receive transfer revenue that accrues across an interface due to energy or capacity price differences between balancing areas.[6] In any case, a transmission provider will adhere to the requirements of its open access transmission tariff (OATT) to release, hold, or prioritize transmission service.

If a transmission customer neither releases nor self-schedules use of its transmission rights by the close of the day-ahead market, the capacity will be available to the day-ahead market, with the transmission customer nonetheless retaining its right to later submit an intra-day self-schedule. The market will afford such balanced intra-day self-schedules a higher priority when so instructed by a transmission provider acting in accordance with its tariff. The market will seek to accommodate all self-schedules submitted after the close of the day-ahead market through re-dispatch. If the market is unable to accommodate the customer's schedule, the market will provide the balancing authority information regarding the infeasibility. The balancing authority would, in accordance with the transmission provider tariff, attempt to address the infeasibility. This approach to transmission availability respects transmission customers' rights under legacy contracts and the Commission's *pro forma* OATT, promotes market efficiency, and provides confidence in transfers between balancing areas that are relied upon to deliver energy, imbalance reserves, and reliability capacity in both normal and stressed system conditions. These market rules can help operationalize resource adequacy programs throughout the West in a coordinated and efficient manner.

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[6] Transfer revenue represents the separation in the marginal energy costs, imbalance reserve costs, and reliability capacity costs between two balancing areas participating in EDAM when a scheduling limit is reached.

The EDAM tariff changes will also account for greenhouse gas (GHG) emissions by adopting the WEIM resource-specific design to identify which resources serve demand in a GHG regulation area. This approach, with some enhancements, will allow resource scheduling coordinators to recover their cost of compliance with a state's carbon pricing policy. Using this method does not embed the cost of that state's policies in the price for demand outside of a GHG regulation area, and provides a mechanism to identify which scheduling coordinators are electricity importers into a GHG regulation area. In addition, EDAM will introduce a special market run in the day-ahead market – the GHG reference pass – that will use energy bids to optimize dispatch to serve the demand and create a reference schedule that informs the value of a GHG transfer that the market may attribute to a resource. Finally, the CAISO will include a GHG net export constraint to reduce the potential for secondary dispatch, preventing the attribution of GHG transfers to resources in balancing areas that are net importers and reducing the potential for secondary dispatch.

The CAISO will use its existing post-market settlements timelines and procedures with a few modifications to account for unique features of the extended day-ahead market settlement requiring additional provision. In particular, congestion revenue will be allocated to the balancing area where the constraint is modeled. Transfer revenue, similar to congestion revenue at an interface between two balancing areas, will be allocated equally between the two balancing authorities that made the transmission available or to the transmission customer. This ensures congestion revenue is allocated based on the location of the constraint and that transfer revenue is allocated to the market participant that made the transmission available to the market. The allocation of congestion and transfer revenue to the balancing authority will enable each transmission service provider to determine the most appropriate distribution of costs and benefits from participation in the day-ahead market.

With DAME providing an innovative pathway to manage rapidly changing system conditions, integrate incremental resources, and address significant operational challenges, and EDAM providing an enhanced day-ahead market that builds on the successful platform of the WEIM, a diverse array of Western market participants and customers will be well-positioned to realize significant and measurable reliability, economic, and environmental benefits.

II. Executive Summary

A. Day-Ahead Market Enhancements

1. Addressing Energy Imbalances Today

The CAISO's day-ahead market enhancements are driven by the need to address increasing differences in the load forecast net of variable energy resource production (*i.e.*, the net load forecast) used to optimize the day-ahead market compared to the net load forecast used for the real-time market. Two sets of forecasts drive the net load forecast – the gross forecast of load and the production forecast from wind and solar resources. Unless these forecasts for the day-ahead market perfectly match the forecasts for the real-time market, an imbalance is unavoidable. The net load forecast is a key value for the CAISO markets because it represents how much energy the market must procure from firm dispatchable resources to meet system needs.

Although some net load imbalances are to be expected, the magnitude of deviations has grown significantly in recent years. Major causes have been the rapid growth in variable energy resource capacity on the CAISO grid and more extreme weather-related uncertainty throughout the Western grid. Demand for electricity is highly dependent on weather and increasingly impacted by extreme weather conditions, which make it harder to forecast demand accurately. These same extreme weather conditions can also make it harder to forecast production from wind and solar resources.

Large net load imbalances have placed the CAISO at risk of not having sufficient online capacity or insufficient ramp capability in the real-time market. To avoid load shedding or and other harmful outcomes, the CAISO has had to increase its RUC load forecast, which results in RUC procuring more capacity than it otherwise would. These manual interventions have maintained system reliability, but they have come at the cost of inefficient unit commitment and higher overall costs.

2. Description of Imbalance Reserves and Reliability Capacity

To address the net load variability and uncertainty challenges facing the CAISO, the CAISO is proposing a suite of day-ahead market enhancements. The core of these day-ahead market enhancements is the establishment of two new bi-directional products called imbalance reserves and reliability capacity. Essentially, the CAISO will be procuring four new products: (1) imbalance reserves up; (2) imbalance reserves down; (3) reliability capacity down; and (4) reliability capacity up.

Imbalance reserves are a flexible reserve product to cover: (1) uncertainty in the net load forecast between the day-ahead market and real-time market; and (2) real-time ramping needs not covered by hourly day-ahead market schedules. The CAISO separately will procure imbalance reserves to address upward uncertainty and downward uncertainty, respectively. A resource receiving an imbalance reserves award must submit economic bids to the real-time market for its awarded capacity range. The imbalance reserve product will ensure the integrated forward market (IFM) schedules sufficient dispatch capability to meet net load imbalances between the day-ahead and real-time markets.

The CAISO will procure reliability capacity to meet positive or negative differences between cleared physical supply in the integrated forward market and the load forecast. This is similar to the existing RUC capacity product except the CAISO only procures RUC capacity to the extent the forecast exceeds cleared physical supply. With the bi-directional reliability capacity product, the CAISO will replace the existing uni-directional RUC capacity product it procures today with the reliability capacity up product as well as the ability to procure decremental capacity with the reliability capacity down product. As with imbalance reserves, a reliability capacity award will obligate the resource to provide economic energy bids in the real-time market for the quantity of its awards.

3. Bidding for the New Products and Eligibility for Awards

For both imbalance reserves and reliability capacity, suppliers will provide separate bids for the upward and downward products. Each bid will have a single price/quantity pair, subject to a $55/MWh cap on imbalance reserves bids and a $250/MWh cap on reliability capacity bids. Resources that are dispatchable on a 15-minute basis will be eligible to provide imbalance reserves. Eligibility for reliability capacity awards will be broader, with only certain types of demand response resources excluded from eligibility.

For each interval a resource submits bids for imbalance reserves, it must also provide an energy bid in the day-ahead market and must economically bid the portion of the energy bid that overlaps with the imbalance reserve bid. To facilitate the EDAM resource sufficiency evaluation, all eligible resources offering energy bids to the day-ahead market must submit bids for reliability capacity up at the same quantity as their energy bid plus ancillary service self-provision. This ensures all resources in the EDAM resource sufficiency evaluation are available for RUC, including excess supply that participants offered above their resource sufficiency evaluation requirements.

4. Impacts on Resource Adequacy Bidding

The CAISO will amend the bidding obligations for resource adequacy capacity to align with the new products. All resource adequacy capacity (system, local, and flexible) must bid for reliability capacity up, consistent with the existing obligation to submit RUC availability bids. A significant change is that resource adequacy capacity will be able to submit economic bids for reliability capacity up to the $250 bid cap and retain its RUC compensation.

The CAISO will not require resource adequacy capacity to submit bids for reliability capacity down. If resource adequacy capacity self-schedules its energy into the day-ahead market, it will have no obligation to submit imbalance reserves bids. If, however, resource adequacy capacity submits an economic bid to the day-ahead market and is eligible to provide imbalance reserves, it must submit bids for imbalance reserves up and imbalance reserves down for the capacity range covered by the economic bid for energy. Flexible resource adequacy capacity must bid its full range of resource adequacy capacity as imbalance reserves up and imbalance reserves down.

5. Enhancements to the Integrated Forward Market

The integrated forward market currently co-optimizes bids for energy and ancillary services. The CAISO will update the integrated forward market to co-optimize bids for energy, ancillary services, and imbalance reserves. This will enhance the efficiency of unit commitment by securing flexible reserves in a way that effectively considers the trade-offs between providing energy, ancillary services, and imbalance reserves.

The CAISO will model imbalance reserves procurement on how it procures the flexible ramping product. The CAISO will aim to meet the full procurement targets subject to a stepped demand curve, with each step of the demand curve based on the trade-offs between procuring the product and incurring the $247/MWh penalty price of violating contingency reserve requirements. The $247 penalty price, however, will only inform how each step of the curve is set. The CAISO separately will set a penalty price on imbalance reserves of $55, meaning the CAISO will not procure imbalance reserves above that price. This value is roughly comparable to the 80th percentile of historical operating reserves bids submitted to the CAISO and represents the costs the CAISO likely would incur if it had to procure additional spinning reserves instead of imbalance reserves.

The CAISO will consider potential transmission constraints when awarding imbalance reserves. The CAISO proposes two mechanisms to provide

flexibility in how it evaluates imbalance reserves for deliverability. The first is a configurable deployment factor that will determine what percent of imbalance reserves must be deliverable. The second is the flexible activation/deactivation of individual transmission constraints in the deployment scenarios. Under this approach, the CAISO would not necessarily enforce all constraints used in the energy market to evaluate deliverability of imbalance reserves. Instead, it would identify in the business practice manual the constraints it would enforce. Both measures address stakeholder concerns about potential excessive costs of procuring imbalance reserves and market performance. By including these implementation details in the business practice manual, the CAISO can adjust these parameters based on market simulation and observed market results.

The CAISO proposes to extend its current day-ahead market local market power mitigation measures to cover imbalance reserves because it will price the imbalance reserves product on a locational basis and imbalance reserves are fungible with energy. Consistent with the current design, the CAISO would mitigate imbalance reserves bids that provide counter-flow to an uncompetitive constraint (whether that constraint is in the base case or the cases of meeting modeled upward or downward uncertainty) to the higher of the competitive locational price or the default availability bid. The default availability bid is a simplified version of the existing default energy bid set, which is set at a static value of $55.

6. Enhancements to the Residual Unit Commitment Process

The CAISO proposes three major changes to the RUC. First, creating a reliability capacity down product makes RUC a bi-directional process that also can also address oversupply conditions. Second, the CAISO is changing the nature of a RUC award. Today, a RUC award is a firm obligation to provide energy in real-time. To provide greater flexibility for the real-time market to optimize procurement, a RUC award now would obligate the resource to submit an economic bid to the real-time market for its range of awarded reliability capacity. The real-time market would then consider all bids to determine the most economical solution. Third, the CAISO will implement a new RUC market power mitigation pass before procuring reliability capacity. The existing requirement for resource adequacy capacity to submit $0 bids into RUC has obviated the need for explicit RUC market power mitigation provisions. As discussed herein, the $0 bidding requirement is problematic for EDAM, and therefore the CAISO is proposing to remove it. However, its removal raises new possibilities for resources to exercise local market power in RUC, supporting the adoption of the new market power mitigation pass.

7. Financial Settlements Issues

a. Basic Settlement of Imbalance Reserves and Reliability Capacity

The CAISO will pay resources receiving an imbalance reserves or reliability capacity award the locational price of the product for the awarded direction. The CAISO also will amend the bid cost recovery mechanism to account for both the bid costs and revenues from the new products. This will ensure resources remain eligible for uplift payments where warranted. Resources will be subject to unavailability charges for both products. Reliability capacity will be subject to direct rescission for undispatchable capacity.

The CAISO will allocate the costs of procuring the new products based on a two-tiered cost allocation similar to existing allocation processes for other market products. The allocation processes follow cost-causation principles and assign costs to the maximum extent possible to the parties driving the incurrence of those costs, while protecting parties from unreasonably large cost allocations in extreme cases.

b. Transitional Measures for Resource Adequacy Capacity

During the stakeholder process, several parties noted that existing bilateral resource adequacy contracts might not specify the allocation of market payments for imbalance reserves and reliability capacity between the load serving entity and the resource adequacy resource. Resource adequacy capacity has been ineligible for RUC capacity payments since the beginning of the CAISO's nodal market, so resource adequacy contracts likely would not address RUC payments. Further, imbalance reserves are a new product so contracts may not have anticipated creation of such a product. To facilitate the transition to the new products, the CAISO will implement a three-year period during which the CAISO will apply optional gap-filling rules to allocate the market revenue from imbalance reserves and reliability capacity. However, for these transitional rules to apply, both the load serving entity and supplier must mutually elect for this settlement treatment.

c. Ramp Deviation Settlement

There is significant overlap between imbalance reserves awards in the day-ahead market and flexible ramping product awards in the real-time market. They both provide the CAISO with flexible ramping capabilities. In developing imbalance reserves, the CAISO was concerned about the potential for double payments to resources receiving an award for both products. To address this

concern, the CAISO will implement a ramp deviation settlement for imbalance reserves. Under this mechanism, the CAISO will settle a flexible ramping product award in the real-time market based on imbalances with the corresponding five-minute portion of the overlapping imbalance reserves award or forecasted movement embedded in the day-ahead market energy. Including the forecasted movement payments that are already embedded in the day-ahead price provides as complete an imbalance settlement as possible because forecasted movement is already settled explicitly in the flexible ramping product.

The CAISO also addresses a similar existing issue with convergence bidding and with the WEIM in which parties potentially can receive double payment between the forecasted movement payments embedded in the day-ahead market price and the explicit payment for forecasted movement through the flexible ramping product.

d. Impact on Congestion Revenue Rights from Displaced Congestion Revenue

Some stakeholders expressed concern regarding the impact imbalance reserves might have on congestion revenue rights settlement. These parties noted that both energy and imbalance reserves can compete for scarce transmission revenue. Sometimes, the IFM co-optimization could hold back scarce transmission capacity to ensure the deliverability of imbalance reserves instead of using that capacity for energy. In these scenarios, the locational price for imbalance reserves would reflect the scarcity of that transmission, but the locational price of energy in the day-ahead market would not. Because the CAISO settles congestion revenue rights based on congestion revenue from energy in the day-ahead market, some stakeholders expressed concern that implementing imbalance reserves could harm congestion revenue rights holders.

To address this potential concern, the CAISO proposes to calculate the energy market congestion revenue displaced from procuring imbalance reserves and add it to the total costs recovered through the two-tiered imbalance reserves cost allocation. For the CAISO balancing authority, the CAISO would add the displaced congestion funds recovered through that allocation to the pool of funds paid to parties holding congestion revenue rights with modeled flow over the transmission constraints with displaced congestion revenue. The CAISO also will adjust the notional value of congestion revenue rights, which represent the maximum settlement value, to reflect differences in the marginal cost of congestion for energy and imbalance reserves between the source and sink of the congestion revenue right. For EDAM entities, the CAISO would allocate the displaced congestion funds to the EDAM entity for further allocation pursuant to its OATT.

B. Extended Day-Ahead Market

Extending the CAISO's day-ahead market to other balancing areas results from a multi-year stakeholder effort across the West to build on the benefits of the WEIM, the CAISO's real-time market.[7] Since the Commission approved the WEIM framework in 2014, participating utilities have realized $4.20 billion in gross benefits from the WEIM.[8] Anticipating even greater benefits from a two-day optimization, WEIM participants requested the CAISO explore the feasibility of providing similar optimization services in the day-ahead timeframe.[9] The CAISO anticipates annual economic benefits of EDAM will range from $100 million to more than $1 billion in addition to the economic and other benefits the WEIM will continue to provide.[10]

The EDAM design offers a voluntary regional day-ahead market by leveraging the existing features of the CAISO's day-ahead market with targeted adjustments that recognize the unique challenges and needs of the balancing authorities that may participate in EDAM and their embedded and their associated utilities, generators, and customers, in the Western Interconnection.

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[7] *See, e.g.*, *Cal. Indep. Sys. Operator Corp.*, 147 FERC ¶ 61,231 (WEIM Authorization Order), *order on reh'g, clarification, & compliance*, 149 FERC ¶ 61,058 (2014) (WEIM Rehearing Order). These Commission orders authorized the implementation of the original WEIM market design, which the CAISO has subsequently enhanced and updated in a series of tariff amendments.

[8] Quarterly benefit metrics are available at https://www.westerneim.com/Pages/About/QuarterlyBenefits.aspx.

[9] Fifteen balancing areas that have already joined the WEIM participated in an EDAM feasibility assessment. *See* Public Comment Letter from WEIM Entities re Extended Day-Ahead Market (Sept. 16, 2019), available at http://www.caiso.com/InitiativeDocuments/PublicCommentLetter-EIMEntites-EDAM-Sep16-2019.pdf; Briefing on Extended Day-Ahead Market Initiative (Sept. 18, 2019), available at http://www.caiso.com/InitiativeDocuments/Briefing-ExtendedDay-AheadMarketInitiative-Presentation-Sep2019.pdf.

[10] *Extended Day-Ahead Market: Feasibility Assessment Update from EIM Entities* (2019) (EIM Entities Study), available at http://www.caiso.com/InitiativeDocuments/Presentation-ExtendedDay-AheadMarketFeasibilityAssessmentUpdate-EIMEntities-Oct3-2019.pdf; *The State-Led Market Study* (July 30, 2021), available at https://static1.squarespace.com/static/59b97b188fd4d2645224448b/t/6148a012aa210300cbc4b863/1632149526416/Final+Roadmap+-+Technical+Report+210730.pdf; *CAISO EDAM Benefits Study: Estimating Savings for California and the West Under EDAM Market Scenarios* (Nov. 4, 2022) (CAISO EDAM Benefits Study), available at http://www.caiso.com/Documents/Presentation-CAISO-Extended-Day-Ahead-Market-Benefits-Study.pdf; *Brattle EDAM Simulations: PacifiCorp Results* (Apr. 2023) (Brattle EDAM Study), available at https://www.brattle.com/wp-content/uploads/2023/04/Brattle-EDAM-Simulations-PacifiCorp-Results.pdf. The CAISO EDAM Benefits Study quantified capacity savings of $652 million annually in addition to operational savings of $543 million. The EIM Entities Study quantified operational savings but did not attempt to quantify capacity savings. The Brattle EDAM Study quantified gross benefits of $810 million and net benefits of $438 million annually.

The EDAM design also incorporates the enhancements to the day-ahead market proposed in the DAME initiative. Together these enhancements support the optimal commitment of a geographically diverse set of resources across the footprint of all balancing areas participating in EDAM, optimizing the use of available transmission capability, building upon the WEIM, and providing broad economic, reliability, and environmental benefits.

Under the extended day-ahead market design, load serving entities and resources in balancing areas that participate in the WEIM can choose to extend their participation to the day-ahead market processes. For the balancing authorities that join, the extended day-ahead market will settle all loads and resources in the day-ahead timeframe and all imbalances between day-ahead positions and the real-time market. The extended day-ahead market will optimize the transmission and resources offered into the market to identify the most efficient resource commitments and energy transfers to meet forecasted demand across the footprint. It will also optimize imbalance reserves and reliability capacity across a broader footprint. EDAM will also include mechanisms to harmonize greenhouse gas accounting methods and address the potential under-recovery of historical transmission revenues.

The CAISO will include readiness criteria in the EDAM implementation process that parallel those in the WEIM today to ensure the CAISO and participants are prepared for operation of the day-ahead market in each balancing area. Further, the CAISO will include transitional measures in EDAM similar to those in the WEIM to insulate participants from adverse reliability or market outcomes during the implementation process and throughout their initial participation. The CAISO will also monitor and issue public reports on the performance of the EDAM design and work with stakeholders to refine the design.

EDAM-related activities occur primarily within three timeframes – before the day-ahead market, within the day-ahead market, and after the day-ahead market.

1. Pre-Market Timeframe

In the pre-market timeframe, the extended day-ahead market activities center on preparing for the optimization of the day-ahead market by addressing transmission availability, accounting for legacy transmission contracts and transmission ownership rights, and ensuring each balancing area is resource sufficient. By accounting for the transmission capability necessary to support optimized unit commitment, and ensuring each balancing area has sufficient resources to support its own obligations, the pre-market activities support an effective and efficient resolution in the day-ahead market.

a. Transmission Availability

The proposed EDAM tariff revisions balance stakeholder interests by seeking to maximize the transmission capability each balancing authority makes available to the day-ahead market while respecting existing transmission service rights within all balancing areas. This allows participants to enjoy the widespread benefits of the extended day-ahead market. Specifically, the extended day-ahead market will allow each balancing authority that joins to transfer supply, imbalance reserves, and reliability capacity based upon the economic optimization of resources across a broad geographic area, without threatening the balancing authority's ability to meet its own obligations.[11] The extended day-ahead market accounts for the transmission capability necessary to support this optimized unit commitment in the day-ahead market and transfers between balancing areas, while recognizing that balancing authorities and the associated transmission service providers must conform to the terms and conditions of their amended OATTs required to accommodate this day-ahead market. With the support and input of stakeholders, the CAISO has developed a tailored approach that optimizes the transmission capability made available to support transfers to other balancing areas, while allowing all participating balancing authorities to continue fulfilling their obligations.

Prior to the start of the day-ahead market, a balancing authority participating in EDAM will provide information to the CAISO, including information gathered from transmission service providers in its balancing area, regarding any applicable transfer constraints and the amount of transmission capacity available. This will allow the extended day-ahead market to utilize all transmission capacity available to it, including unsold firm transmission capability available, while honoring existing and legacy rights. This allows transmission service providers and their customers located within the balancing areas to maintain their open access transmission offerings and rights, respectively, including network integration transmission service and firm point-to-point rights.

Recognizing and honoring existing and legacy transmission rights, EDAM provides three different avenues for customers to exercise their transmission rights prior to the day-ahead market. First, the transmission customer can use its rights for its own purposes by submitting a balanced self-schedule associated with registered transmission service rights into the day-ahead market, *i.e.*, a self-schedule representing the same quantity at the source location and the sink location. Self-schedules submitted before the day-ahead market are assigned a scheduling priority in the day-ahead market higher than a self-schedule not

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[11] Balancing authorities in the West are diverse and include large and small investor owned utilities, federal entities and power marketers, large and small municipal utilities, joint power agencies, and generation-only balancing areas. The EDAM design will accommodate all balancing authorities much as the WEIM does today.

associated with registered transmission service, and these transactions will clear ahead of self-schedules not exercising transmission rights and economic bids. The market will not adjust a self-schedule associated with registered rights to accommodate a self-schedule that is not associated with registered rights, maintaining this market scheduling priority.

Second, as an alternative to using its transmission rights, the transmission customer may elect to release its transmission rights for the market to optimize. In exchange for releasing its rights for optimization, transmission customers are eligible to receive an allocation of transfer revenues if transfer revenue accrues across an interface due to energy or capacity price differences between balancing areas, *i.e.*, revenue from price differences between balancing areas at the transfer location, the transmission customer would receive the transfer revenue. A transmission customer's release of transmission rights to the market allows the market to support optimized transfers in the day-ahead and real-time markets, thus lowering the risk of infeasibilities and the need to redispatch. A transmission customer that pursues this avenue cannot self-schedule released transmission in the day-ahead market or after the close of the day-ahead market.

Finally, a transmission customer may choose neither to release nor self-schedules its transmission rights by the close of the day-ahead market. In this case, the capacity will be available to the day-ahead market for optimization, allowing the market to establish a transfer that delivers lower cost resources from one balancing area to serve demand in another balancing area. Under this third option, however, the transmission customer does not lose its rights that it has today under the OATT. Instead, the transmission customer would retain its right to submit later an intra-day self-schedule associated with its rights. If instructed by an EDAM transmission service provider, the market will afford balanced intra-day self-schedules or schedule changes for registered firm OATT transmission rights a priority in the real-time market higher than other real-time self-schedules and higher than cleared day-ahead self-schedules not based on specific firm OATT transmission rights, including transfer schedules between balancing areas serving load. For all intra-day self-schedules associated with firm OATT rights, the market would redispatch the system through the real-time market to accommodate both the transfer optimized in the day-ahead market and the transmission customer's self-schedule submitted after the close of the day-ahead market. In the rare case the market cannot accommodate both transactions through redispatch, then the market will afford the transfer equal priority with demand in the balancing area and notify the applicable balancing authority of the associated schedules and the infeasibility. The balancing authority would, acting in accordance with applicable tariffs and good utility practice, determine how to resolve the infeasibility. Given the diversity of the Western Interconnection, each balancing authority and transmission service provider may have different means by which they can resolve the infeasibility, including by dispatching additional resources manually, adjusting the transfer limit, adjusting the transmission

customer schedule, or taking any combination of actions or additional actions to resolve the infeasibility and fulfill its balancing authority obligations.

By providing three avenues to honor customers' transmission rights, the extended day-ahead market provides an innovative pathway to promote regional markets and advance the interconnectedness of balancing areas in the West in a non-discriminatory manner. Together, and separately, these avenues respect transmission customers' rights, promote market efficiency and provide confidence in transfers between balancing areas that rely on them to deliver energy, imbalance reserves and reliability capacity in both normal and stressed system conditions. The CAISO and stakeholders discussed other options, including imposing restrictions on the availability of transmission to the market, but deemed these to be less efficient. For example, restrictions can create conditions where congestion occurs even though sufficient transmission capability is available; *i.e.*, transmission automatically "carved out" from the market may not be fully utilized. Similarly, providing a market scheduling priority for late-submitted transmission schedules higher than transfers between balancing areas would undermine confidence in market outcomes. If there is frequent use and exercise of particular transmission rights across discrete and specific paths or flowgates, the EDAM design does allow transmission service providers to request an adjustment to "carve out" the transmission right from the market under limited circumstances specified in the transmission service provider's tariff, which the CAISO would implement. Due to the inefficiencies created by such arrangements that limit the benefits of EDAM to ratepayers, the CAISO expects such carveouts to be rare. This transmission availability framework balances the interests of all stakeholders and is superior to the *pro forma* OATT because it enables balancing areas that may not be in a position to join an independent system operator (ISO) or regional transmission organization (RTO) at this time to nonetheless capture the benefits of a day-ahead market on behalf of their customers.

The extended day-ahead market will provide legacy transmission contracts and transmission ownership rights in an EDAM balancing area a market scheduling priority and settlement consistent with existing mechanisms in the CAISO tariff for these types of arrangements, while making the flow capability available to the market in the CAISO balancing area. These mechanisms provide legacy contract and ownership rights holders with a scheduling priority above other transmission through the day-ahead and real-time markets consistent with their contractual rights. They also provide financial protection from congestion costs associated with the scheduling of legacy rights in the market. Legacy contracts and ownership rights will also be eligible to make their transmission capacity available at interties between EDAM balancing areas in exchange for transfer revenue.

b. Resource Sufficiency

In addition to accounting for available transmission, activities in the pre-market timeframe will include evaluating the resource sufficiency of each balancing authority in the EDAM area, *i.e.*, the aggregate of the CAISO balancing area and all balancing areas participating in EDAM. This is a fundamental underpinning of the extended day-ahead market. Similar to the WEIM, the CAISO expects balancing areas participating in the day-ahead market to demonstrate they have sufficient supply to meet specific balancing and flexibility needs. The EDAM resource sufficiency evaluation or "RSE" embodies these same principles.

Under this structure, before the first run of the day-ahead market, each balancing authority participating in EDAM will be evaluated to determine if its resources are sufficient to meet its projected needs in the day-ahead time horizon. Specifically, the EDAM resource sufficiency evaluation will review the demand obligations and supply options for each balancing area and determine whether there is sufficient supply shown to satisfy the forecasted demand obligations in both the upward and downward directions, the forecasted imbalance reserve requirements, and the forecasted ancillary service obligations. Results of the resource sufficiency evaluation will be provided to each balancing authority on an advisory basis to assist the balancing authority in establishing its resource sufficiency prior to the binding run of the resource sufficiency evaluation at approximately 10:00 a.m. (*i.e.*, immediately prior to running the day-ahead market).

Balancing areas that pass the final binding EDAM resource sufficiency evaluation will be "pooled" together for the WEIM resource sufficiency evaluation. Balancing areas that do not pass the EDAM resource sufficiency evaluation will be assessed the applicable failure surcharge depending on the direction of the failure (upward or downward) and the time period (off-peak or on-peak). If the integrated forward market can satisfy the forecasted needs of the balancing authority to cure its deficiency, then the balancing area will be included in the pool. This pooling approach benefits eligible balancing areas by accounting for the diversity benefit of procured imbalance reserves through the day-ahead market. If balancing authorities do not cure the failure through the integrated forward market, then the balancing area will not be included in the pool, and the balancing authority will be evaluated individually for purposes of the WEIM resource sufficiency evaluation.

The proposed resource sufficiency evaluation recognizes and respects the unique circumstances of balancing areas in the Western Interconnection. In addition, the proposal includes an additional measure that will allow each balancing authority to manage its internal supply if there is a risk of resource

insufficiency approaching real-time. For example, if a balancing area is experiencing resource constraints due to a significant generation outage, the balancing authority needs a mechanism to allow it the balancing authority to limit the supply offered to support transfers to another balancing area. The net export transfer constraint is a voluntary, and optional, mechanism that will enable each balancing authority to preserve sufficient supply to meet its projected needs, while managing reliability conditions based on conditions and circumstances anticipated within its balancing area. A uniform assessment of resource sufficiency, together with a configurable mechanism for each balancing authority to manage its supply, provides an innovative pathway for incrementally advancing the interconnectedness of balancing areas in a just, reasonable, and non-discriminatory manner.

2. Within the Extended Day-Ahead Market

a. Optimizing Available Resources Across the EDAM Footprint

In the extended day-ahead market, all resources and load in a participating balancing area will submit an economic bid or a self-schedule in the day-ahead market based on their availability and operational circumstances. This differs from the load and resource participation model in the WEIM where a base schedule reflects the planned operation of loads and resources in the day-ahead timeframe, and only participating resources submit economic bids, *i.e.*, a base schedule in the WEIM is accounted for but not optimized by the market. The extended day-ahead market will optimize the transmission and resources offered into the market to identify efficient resource commitments and energy transfers to meet scheduled and forecasted load across the footprint.

Resources located outside of the EDAM area may fully participate in the day-ahead market if they are pseudo-tied or dynamically scheduled into an EDAM balancing area or are a designated network resource to serve load in an EDAM balancing area. Other contracted supply located outside of the EDAM area can self-schedule at the interties of non-CAISO balancing areas but cannot economically bid. This restriction results from non-CAISO balancing area concerns that non-source-specific supply that is not deliverable could displace physical internal generation. If the economically bid intertie supply does not perform, it could cause or exacerbate reliability conditions within the balancing area. This paradigm is consistent with the WEIM today. At the same time, designating a network resource to serve an EDAM balancing area enables economic bidding of the resource because the designation imposes specific transmission requirements that increase confidence the supply is deliverable. The added requirement that a designated network resource be source-specific

provides further confidence that the supply is not speculative. In any event, the CAISO will continue to allow economic bidding at its interties with non-EDAM balancing areas as it does today.

At the start of EDAM, the CAISO proposes to apply market power mitigation at the balancing area level similar to the WEIM today. The CAISO intends to evaluate the overall market power mitigation design in its existing Price Formation Enhancements stakeholder initiative. The CAISO will consider extending any design changes arising from that initiative to the extended day-ahead market and the WEIM.

The CAISO proposes to make virtual bidding an optional election for each balancing authority participating in EDAM, allowing the EDAM participant to choose whether to enable convergence bidding within its balancing area. This allows participants to gain day-ahead market experience prior to introducing convergence bidding, which is an unfamiliar and significant market design feature.

b. Harmonizing Greenhouse Gas Accounting in the Day-Ahead and Real-Time Markets

Under the existing Commission-approved greenhouse gas accounting design, the WEIM uses bid adders to identify which resources serve demand in California balancing areas using a resource-specific approach. When offering bids to serve demand in a state with carbon pricing policies, scheduling coordinators for resources located in balancing areas outside of California submit a two-part bid adder consisting of a GHG bid capacity (MW) quantity and a GHG price ($/MWh). The bid adder reflects the willingness of the resource's scheduling coordinator to make the resource's output available to serve demand within California balancing areas and reflects the cost of compliance with California's carbon pricing policies. The market optimization considers the GHG bid adder in addition to the energy bid to determine efficient dispatch and identify which resources serve demand in California balancing areas. If a resource outside of a California balancing area does not submit a GHG bid adder, the market does not consider or attribute the resource to serve California demand.

Resources within California balancing areas recover their costs of compliance with California's carbon policies through their energy bids. The CAISO will extend the current WEIM GHG accounting framework and resource-specific approach to EDAM with several enhancements. This design allows resources' scheduling coordinators to recover their cost of compliance with a state's carbon pricing policy, does not embed the cost of that state's policies in locational marginal prices for demand outside of a GHG regulation area, and

provides a mechanism to identify which scheduling coordinators are electricity importers into a GHG regulation area.

The geographic boundary used for GHG accounting purposes under EDAM (and the WEIM) will reflect state-level boundaries rather than balancing area boundaries. A state-level boundary more accurately represents the boundary of the GHG regulation area because carbon pricing policies are established on a state-by-state basis. Further, the GHG accounting framework for EDAM will allow resources to submit GHG bid adders associated with serving demand in multiple GHG regulation areas, which will allow EDAM to optimize procurement of resources to serve demand in California, Washington, and other states that adopt carbon pricing policies. The market will consider the bid adders in addition to energy bids in determining the most efficient dispatch for serving demand in a specific GHG regulation area. This framework will allow for resource-specific attribution of resources in one GHG regulation area to serve load in another GHG regulation area.

Attributing resources to a GHG regulation area creates the potential for secondary dispatch where resources outside of a GHG regulation area attributed to serve demand within a GHG regulation area are backfilled by higher emitting resources. EDAM will introduce a special market run in the day-ahead market – the GHG reference pass – that will use energy bids to optimize dispatch to serve the demand without GHG transfers into a GHG regulation area. This market run will create a reference schedule to inform the MW value of a GHG transfer the integrated forward market may attribute to a resource. The reference used in real-time will be the difference between the day-ahead market energy schedule and day-ahead market GHG award. The reference schedule for a balancing area that participates in the WEIM and not in EDAM will continue to be a self-submitted base schedule.

The CAISO also proposes to include a GHG net export constraint in EDAM to reduce the potential for secondary dispatch. Participating balancing authorities will not elect whether or not use this constraint. Instead, the CAISO will enforce this constraint to limit the attribution of GHG transfers to resources within a balancing area so they do not exceed a net export transfer schedule from the balancing area. This prevents the attribution of GHG transfers to resources in balancing areas that are net importers. Arguably, these balancing areas are relying on their internal supply (as well as some imports) to meet demand and do not have surplus supply to support demand in a GHG regulation area. This constraint will reduce the potential for secondary dispatch by not attributing a GHG transfer to a resource for which another resource will need to backfill to serve demand in the balancing area that is a net importer. The CAISO will not enforce this constraint when resources located in a balancing area outside of a specific GHG regulation area register that they have a commitment to serve demand within that GHG regulation area. EDAM will recognize this

supply as available to serve demand in the GHG regulation area. When an EDAM balancing area that overlaps with a GHG regulation area fails the resource sufficiency evaluation in the upward direction, EDAM will deactivate all net export constraints for that hour. By deactivating net export constraints, the CAISO will provide a greater pool of resources that may receive an attribution to serve demand in GHG regulation areas. Failure of the resource sufficiency evaluation in the upward direction signals a potential concern about scarcity of supply the CAISO believes outweighs the potential for secondary dispatch. Under the tariff revisions proposed in this filing, the CAISO will also enforce similar rules in the WEIM for each fifteen-minute market interval.

3. Post-Market Timeframe

The CAISO proposes to use its existing post-market settlements timelines and procedures for the extended day-ahead market, except when unique feature of the extended day-ahead market settlement necessitates an additional provision. Such EDAM-specific features primarily arise in the context of transfer and congestion revenues, GHG bid adders, and the RSE failure surcharge.

The extended day-ahead market will model internal transmission constraints, internal transmission limits, and transmission transfer limits between balancing areas. Congestion revenue will accrue when the market model identifies transmission constraints or limits internal to a balancing area. Differences in the marginal cost of congestion component of locational marginal prices will reflect the incremental costs to serve demand. The CAISO proposes to allocate the revenues from these binding transmission constraints to the balancing authority for the balancing area where the constraint is modeled, including any adjustment for congestion differences that may be associated with registered legacy contract rights or transmission ownership rights.

Transmission capability at interfaces between balancing areas will accrue transfer revenue when the transmission scheduling limit binds at a transfer location. The CAISO proposes to share this transfer revenue equally between the two balancing authorities that made the transmission available to facilitate energy transfers, unless a commercial arrangement dictates a different revenue sharing. In addition, the CAISO will allocate a portion of transfer revenue to transmission customers that make transmission available at an interface when they release transmission rights in advance of the day-ahead market. This allocation ensures market participants that make the transmission available to the market receive an allocation appropriate for the transmission made available to the market.

EDAM will use GHG bid adders to establish a marginal GHG cost and identify which resources outside of a specific GHG regulation area support demand in that GHG regulation area. The marginal GHG cost for a GHG

regulation area will be a component of the locational marginal price paid by load within that GHG regulation area. Scheduling coordinators for resources that receive an attribution to serve demand in the GHG regulation area based on their submitted GHG bid adder will receive a payment reflecting the product of their MW attribution and the relevant marginal GHG cost.

Balancing authorities that experience a resource sufficiency failure, other than a *de minimis* failure, will incur EDAM RSE failure surcharges. The CAISO will apply a tiered surcharge based on the amount of the failure. Having a tiered surcharge structure aligns the magnitude of failure with a reasonable charge for the shortfall. The CAISO will distribute the revenue arising from the EDAM RSE surcharges to the balancing areas that satisfied all of the resource sufficiency components in the applicable period. If no balancing area satisfied the resource sufficiency components in the applicable period, the CAISO will not assess the surcharge.

4. Offering Access to the Extended Day-Ahead Market

a. Onboarding and Costs Related to EDAM

As with the WEIM, the decision to participate in EDAM will be made at the balancing area level. Balancing authorities must be WEIM participants to join the extended day-ahead market. The balancing area-level functionality allows the CAISO to utilize available interchange information for operating the extended day-ahead market, while allowing each balancing authority to remain responsible for maintaining reliability and providing open access tariff transmission service in its balancing area.

The processes for joining the extended day-ahead market will largely resemble the processes for joining the WEIM, including initial implementation agreements, onboarding cost recovery mechanisms, and onboarding processes well before participation begins.

The CAISO proposes to recover its EDAM implementation costs through a deposit and incremental charge/refund true-up mechanism based on its cost of similar services. EDAM participants thereafter will pay an administrative fee based upon the CAISO's cost of service and the services necessary to support EDAM participation.

b. Historical Revenue Recovery for EDAM Transmission Service Providers

Although the extended day-ahead market will not affect EDAM transmission owners' costs to construct, own, and maintain transmission

facilities, releasing transmission to the EDAM markets may affect their recovery of such costs. To avoid under-recovery or any misallocation of costs, the extended day-ahead market will provide EDAM transmission service providers an opportunity to recover transmission revenues comparable to their historical cost recovery prior to participation in EDAM.

Specifically, the CAISO will allow transmission service providers to recover:

1. Historical transmission revenues from sales of short-term firm and non-firm transmission products under the transmission service provider's tariff, and for historical Wheeling Access Charge revenues for CAISO transmission owners;

2. A portion of revenues associated with new approved transmission builds that increase the transfer capability between EDAM balancing areas based on the proportional ratio of historical short-term sales to the overall historical transmission revenues; and

3. Revenues for use of the transmission system when wheeling through transfer volumes in an EDAM balancing area are greater than total import and export transfer volumes for the balancing area.

Recovery of these revenues will compensate transmission service providers for their expected, reduced transmission service revenues under EDAM compared to the revenues they earned prior to participation in EDAM. Due to their participation in EDAM, participating transmission owners are expected to sell fewer short-term transmission services because such services will be displaced by EDAM transfers. The CAISO will allocate these costs to gross load across the EDAM area because load, ultimately and primarily benefits from the optimized transfers that will occur with EDAM participation.

C. Severability

The CAISO developed the tariff changes associated with the DAME and EDAM initiatives through separate stakeholder processes and has combined them in this filing. The CAISO will also implement the DAME and EDAM changes through a combined software release. This promotes both efficiency and consistency because the CAISO will be able to test the software functionality fully and resolve any implementation issues that may arise from any of the proposed changes. Also, this allows market participants to manage a single implementation and participate in EDAM with the benefits of the day-ahead market enhancements, providing them similar efficiency.

The DAME and EDAM tariff revisions are severable from each other such that the Commission can approve DAME without approving EDAM; however, it cannot approve EDAM without approving DAME.[12] The DAME tariff changes represent the foundation of needed improvements to the efficiency of the day-ahead market in the face of increasing system variability and uncertainty. The EDAM design is built on this foundation. In other words, the extended day-ahead market requires the enhancements to the day-ahead market. However, DAME is not dependent on EDAM. The Commission can accept DAME as just and reasonable whether or not it is implemented concurrently with EDAM. The CAISO and market participants have worked collaboratively for several years, and the enhancements to the day-ahead market represent significant improvements that should move forward even if the Commission does not accept the EDAM tariff changes. Approving DAME will provide CAISO market participants with significant day-ahead market benefits regardless of the Commission's actions on EDAM.

Within the proposed DAME tariff changes, there are six individual elements that are severable from each other and the remaining DAME tariff revisions.

The first severable element of the DAME tariff provisions is the proposed local market power mitigation for imbalance reserves up. As explained in section IV.D.2.d of this transmittal letter, the mitigation measures established in new tariff section 31.2.3.2 will not trigger initially because of the interaction with the $55 penalty price embedded in the imbalance reserves procurement curve. For this reason, the CAISO could implement the new DAME structure with no mitigation for imbalance reserves. Therefore, the authority to conduct mitigation under this proposed section is severable from the core DAME tariff changes.

The second severable element of DAME is the proposed flexible implementation of imbalance reserves procurement, which allows the CAISO flexibility to enforce transmission constraints and apply a deployment factor, respectively, in the imbalance reserves deployment scenarios. This feature, discussed in section IV.D.3.d of this transmittal letter, permits the CAISO to fine-tune elements of imbalance reserves procurement based on its review of system and market performance. If the Commission were to find it is not just and reasonable for the CAISO to adjust these values in the business practice manual, then the CAISO proposal remains feasible because it: (a) enforces in the deployment scenarios all transmission constraints enforced in the integrated forward market; and (b) requires 100 percent deliverability in the deployment scenarios. The statements in new tariff section 31.3.1.6.3.1 that deployment scenario flows cannot exceed limits "on transmission facilities identified in the Business Practice Manual" and in new tariff section 31.3.1.6.3.1 that deliverability

[12] *NRG Power Marketing, LLC v. FERC*, 862 F.3d 108 (D.C. Cir. 2017).

in deployment scenarios is assessed "as adjusted by the applicable Deployment Factor" are severable.

The third severable element of DAME is the transition period for negotiated availability bids described in section IV.D.2.c of this transmittal letter and new tariff section 39.7.4.2. The CAISO is concerned it initially will not have a sufficient basis to approve a scheduling coordinator's cost-based justifications for a negotiated availability bid value. Without the transition period, the CAISO and scheduling coordinators would be unlikely to reach agreement during the initial period in which DAME is effective. The result would be scheduling coordinators filing for approval of their proposed value with the Commission through a filing under section 205 of the FPA, as outlined in new tariff section 39.7.4.1. The CAISO prefers not to offer the negotiated option when it is unlikely to address a scheduling coordinator's concerns. Nevertheless, if the Commission were to find the proposed transition period is not just and reasonable, the CAISO's overall DAME proposal remains feasible because scheduling coordinators would still have the option, outlined in new tariff section 39.7.4.1, to seek Commission approval of an individualized availability bid.

The fourth severable element is the proposed DAME transitional measures described in section IV.E.1 of this transmittal letter and new tariff section 11.2.6. The transitional measures provide load serving entities and resource adequacy resources a backstop if they cannot agree through bilateral negotiations on how to share the market revenue from imbalance reserves and reliability capacity. The transitional measures provide these entities additional time to resolve their contractual issues. Resolving those contractual issues, however, is neither a necessary nor indispensable element of the CAISO's DAME proposal, and thus the transitional measures are severable from other elements of the proposal.

The fifth severable element of DAME is the CAISO's proposal to charge congestion revenue "displaced" from the deployment scenarios as part of the imbalance reserves cost allocation process and allocate those displaced revenues to parties holding congestion revenue rights with modeled flow over the transmission lines. The CAISO discusses this element in section IV.E.3 of the transmittal letter. The CAISO does not expect imbalance reserves to displace significant congestion revenue from energy in the integrated forward market, but it included this element to assure holders of congestion revenue rights they would be unaffected by creation of the imbalance reserve product. Therefore, the tariff revisions in sections 11.2.1.9, 11.2.4, and 31.3.1.6.4, and the tariff appendix A definition of Notional CRR Value, to effectuate the displaced congestion revenue element of the proposal are severable.

The sixth severable element of DAME is the update implemented in proposed edits to tariff sections 4.12.2 and 4.17.4 regarding registration of

resource information in the CAISO master file for resource-specific system resources and distributed energy resources, respectively. As described in section IV.E.5 of this transmittal letter, these edits conform the master file rules for these resource types with the existing generally-applicable master file rules in Commission-approved tariff section 4.6.4. The CAISO should have updated these two sections when it last revised section 4.6.4. The CAISO now seeks to address that oversight. In any event, these revisions are not directly related to the DAME proposal and are severable from the other DAME tariff revisions.

There are four individual elements of the proposed EDAM tariff revisions that are severable from each other and from the remaining EDAM elements.

The first severable element of the proposed EDAM tariff revisions is the transmission revenue recovery mechanism described in proposed tariff section 33.26 and section V.D.1 of this transmittal letter. These changes constitute a way for transmission owners to recover revenue that may not otherwise accrue under EDAM because the transmission service provider will make transmission available to support transfers between balancing areas. There is no direct association between these changes and the other EDAM changes; although, this element is important to ensure transmission service providers continue to recover expected revenue from their transmission system, particularly in the early years of EDAM participation.

The second severable EDAM element pertains to cost recovery from transmission customers who receive a day-ahead schedule exceeding the transmission rights they hold. This proposal is found in proposed tariff section 33.23 and described in section V.B.1.c of this transmittal letter. This change is not directly related to other EDAM changes and is not a precondition to approval of EDAM, however, it is important to ensure transmission service providers recover the costs of using their transmission system.

The third severable element concerns the option to enable virtual bidding within a balancing area participating in EDAM. This proposal is found in proposed tariff section 33.30.7 and described in section V.C.1 of this transmittal letter. The CAISO recognizes both Commission precedent on virtual or convergence bidding and the desire of interested balancing authorities to gain experience with the day-ahead market first, before undertaking the major step of implementing a completely foreign feature like convergence bidding.

The fourth severable EDAM element concerns the GHG net export constraint, which is found in proposed tariff section 33.32.5 and described in section V.C.3.e of this transmittal letter. The net export GHG constraint limits the attribution of resources serving a GHG regulation area and reduces the risk of secondary dispatch. However, these tariff revisions are not necessary for EDAM and the other GHG enhancements to go into effect.

In conclusion, the CAISO respectfully requests the Commission accept all of the DAME and EDAM tariff changes. The Commission should sever DAME and EDAM only if it is unprepared to accept both in a concurrent order. The best path forward is to approve both DAME and EDAM concurrently because ratepayers across the West will benefit from sets of tariff improvements and because significant uncertainty and additional software configuration changes may result if approval of EDAM is delayed.

III. Background

A. The CAISO's Current Market Structure

The CAISO administers day-ahead and real-time wholesale electricity markets.[13] The day-ahead and real-time markets both operate inside the CAISO balancing area, while the WEIM provides other balancing areas in the Western Interconnection an opportunity to participate in the real-time market.[14] The day-ahead market (DAM) includes four sequential processes: (1) bid submission; (2) market power mitigation for the integrated forward market (IFM); (3) IFM; and (4) residual unit commitment (RUC) process. The real-time market (RTM) includes six sequential processes: (1) bid submission; (2) hour-ahead scheduling process (HASP); (3) real-time unit commitment (RTUC); (4) short-term unit commitment (STUC); (5) fifteen-minute market (FMM); and (6) real-time dispatch (RTD).

The CAISO below summarizes the key features of these market processes as currently in effect, focusing primarily on the day-ahead market.

1. Day-Ahead Market

a. Bidding to the Day-Ahead Market

Bidding to the day-ahead market opens a week ahead of the trading day and closes at 10:00 a.m. on the day before the trading day. Bids can be either

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[13] Tariff appendix A, existing definition of CAISO Markets. For the sake of clarity, this transmittal letter distinguishes between existing tariff provisions (*i.e.*, provisions in the current CAISO tariff), new tariff provisions (*i.e.*, tariff provisions the CAISO proposes to add in this filing), and revised tariff provisions (*i.e.*, existing tariff provisions the CAISO proposes to revise in this filing).

[14] The WEIM, formerly called the energy imbalance market (EIM), is generally addressed in existing tariff section 29, *et seq.* The term EIM is still used in WEIM-related provisions and defined terms in the existing tariff, the business practice manual, and in some other documents.

economic bids or self-schedules.[15] Scheduling coordinators for generation resources offer separate bids to supply energy, ancillary services, and RUC capacity.[16] Scheduling coordinators for load serving entities submit bids for load in the day-ahead market. This bid submission process includes the opportunity to bid for exports, imports, and wheeling through transactions.

Under the California resource adequacy (RA) program, described in more detail in section II.A.3.d of this transmittal letter, qualified RA capacity has specific obligations to submit market bids. Resources providing generic RA capacity within the CAISO balancing area must economically bid or self-schedule that capacity into the integrated forward market for energy and ancillary services. This applies all hours of the month the resource is physically available. Resources providing flexible RA capacity must submit economic bids for energy and ancillary services in the must-offer hours applicable to the category of flexible RA the resource is providing.[17] Resources providing generic or flexible RA capacity must participate in RUC, but their capacity is optimized at a zero dollar bid.

b. Integrated Forward Market and Associated Market Power Mitigation

The IFM is a financial market where bid-in supply clears against bid-in load and ancillary service requirements. The IFM co-optimizes procurement of energy and ancillary services for each operating hour of the trading day seeking to minimize overall procurement costs, while respecting transmission constraints and inter-temporal resource constraints such as minimum run time and start-up time.

Before issuing schedules for energy and ancillary services in the IFM, the CAISO first conducts a market power mitigation pass. This process identifies

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[15] A self-schedule is a market bid that indicates a quantity in megawatt-hours (MWh) but does not specify a price. This indicates the scheduling coordinator is a price-taker. Tariff appendix A, existing definition of Self-Schedule. Effectively, self-schedules are requests that the market schedule the transaction irrespective of the market price.

[16] As described further below, RUC capacity currently is capacity the CAISO procures to meet gaps between supply cleared in the market and forecast demand.

[17] Existing tariff section 40.10.3 describes the three categories of flexible RA capacity: base (category 1); peak (category 2); and super peak (category 3). Category 1 flexible RA must submit bids for all days in the 17-hour period running from 5:00 a.m. to 10:00 p.m. Category 2 flexible RA must submit bids for all days in a five-hour period specified in the relevant business practice manual. Category 3 flexible RA must submit bids in the five-hour period applicable for Category 2 on non-holiday weekdays.

and mitigates potentially uncompetitive energy bids to ensure market prices remain competitive. Nothing is scheduled or committed in the IFM market power mitigation pass. The IFM uses bids mitigated in the IFM MPM pass. The CAISO mitigates energy offers to the greater of *default energy bids* or the *competitive locational marginal price*.[18] Default energy bids are the CAISO's estimate of a resource's marginal cost. The competitive locational marginal price is the marginal price of energy minus the non-competitive congestion components at the location of the mitigated resource. The competitive locational marginal price represents the going rate for competitive energy at the relevant location, and it ensures resources are mitigated only to the extent needed to resolve market power for higher-priced bids.

After the mitigation run, the CAISO issues schedules for energy and ancillary services in the IFM using a clean bid set, which consists of bids mitigated through the market power mitigation process and the submitted bids that were not flagged for mitigation. The market optimization software schedules and prices resources in two successive runs. First, the scheduling run produces resource schedules. This involves clearing bids, enforcing the priorities of self-schedules, and potentially relaxing constraints.[19] Second, the pricing run follows the scheduling run and produces the locational marginal prices (LMPs) utilized in settlements. The LMP at each pricing node in the day-ahead market – including the pricing nodes at the interties that connect the CAISO balancing area with other balancing areas – equals the sum of a system marginal energy cost (SMEC) component,[20] a marginal cost of losses (MLC) component, and a marginal cost of congestion (MCC) component of the LMP calculation.[21]

There may be cases where effective economic bids are insufficient to produce a feasible solution, and the market must adjust submitted self-schedules.[22] In these cases, the market uses configurable market scheduling

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[18] If the resource's unmitigated energy bid were less than the default energy bid or the competitive locational marginal price, there would be no modification to the resource's bid.

[19] Existing tariff section 31.4 specifies the scheduling priorities in the day-ahead market. Existing tariff section 34.12 specifies the real-time market scheduling priorities.

[20] As described in section V.C.4 of this transmittal letter, the implementation of EDAM will include a marginal energy cost for each participating balancing area, which for the CAISO balancing area would be the same as the system marginal energy cost component noted here.

[21] Tariff appendix C, existing section A.

[22] Existing tariff section 27.4.3, *et seq.*; tariff appendix A, existing definition of Real-Time Dispatch; Business Practice Manual for Market Operations, section 6.6.5 (listing market parameter values that are calibrated based on values set forth in the tariff) (Market Operations BPM).

and pricing parameters to reach a feasible solution and set LMPs. The market parameters used in the market include penalty prices that apply when constraints enforced by the CAISO market are relaxed (or violated). The constraints include system energy-balance (*i.e.*, power balance) and intertie constraints.[23] The various constraints have different price values that represent the cost at which the software will relax a constraint if it cannot reach a feasible solution while enforcing the constraint. When the CAISO relaxes a constraint, the CAISO's market software calculates the scheduling run LMPs based on administratively determined relaxation prices, *i.e.*, the penalty prices.[24] Using penalty prices sets the priority level of the power balance constraint relative to other priorities within the market optimization.[25]

c. Residual Unit Commitment Process

The CAISO conducts the residual unit commitment after the IFM. RUC is a physical market process that procures capacity to meet the CAISO balancing area's load forecast.[26] RUC bases the need for incremental capacity on the difference between physical supply that clears the integrated forward market and

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[23] The system energy-balance constraint ensures that the physical law of conservation of energy (*i.e.*, the sum of generation and imports equals the sum of demand, including exports and transmission losses) is accounted for in the market solution. The shadow price of the system energy-balance constraint establishes the SMEC, which as explained above is a component of the calculation used to determine LMPs. Tariff appendix C, existing sections B-C; Market Operations BPM, section 6.6.5.4. The shadow price is the marginal value of relieving a particular constraint. Tariff appendix A, existing definition of Shadow Price.

[24] *See* existing tariff sections 27.4.3.2.2 – 27.4.3.2.2.4 and 27.4.3.3.2 – 27.4.3.3.4. The penalty prices are set forth in separate tables for the IFM, the RUC, and the real-time market, and reflect the hierarchical priority order in which the constraint associated with each penalty price may be relaxed in the IFM, RUC, or real-time market by the SCUC and SCED software. Market Operations BPM, section 6.6.5. Self-schedules for existing transmission contracts (ETCs), transmission ownership rights (TORs), and converted CAISO transmission service rights are not subject to adjustment pursuant to price relaxation. Existing tariff section 27.4.3.4.

[25] The market optimization software applies one set of penalty prices when the market parameters related to the soft energy bid cap (set at $1,000/MWh) are in effect, which is the case in most market intervals. The market applies a higher set of penalty prices when the market parameters related to the hard energy bid cap (set at $2,000/MWh) are in effect, which can occur when cost-based offers justify the use of the hard energy bid cap. *See* existing tariff sections 27.4.3.2, 27.4.3.3. 30.5.8, 30.7.12, 30.11, and 39.6.1.1; tariff appendix A, existing definitions of Soft Energy Bid Cap and Hard Energy Bid Cap.

[26] Existing tariff section 31.5, *et seq.*; tariff appendix A, existing definition of Residual Unit Commitment.

physical supply needed to meet the demand forecast.[27] Specifically, the CAISO determines the RUC procurement target for a trading hour based on the next day's hourly CAISO demand forecast less the energy scheduled in the day-ahead schedule, and accounting for other factors, as appropriate.[28] The CAISO subsequently selects and commits RUC capacity not already scheduled in the IFM based on the merit order of submitted RUC availability bids.[29] This process bridge any gaps between the IFM – a financial market – and the forecasted needs for physical resources in real-time. Without RUC, the CAISO could be short of power in the real-time or be forced to rely on less economic resources that can start up in the real-time market time horizon.

Resources receiving a RUC availability award generally receive a RUC availability payment in addition to payment for any energy awarded through the real-time market; although, the CAISO can rescind the RUC payment if the capacity is not delivered.[30] These general compensation rules do not apply to RA capacity. RA Capacity receiving a RUC award is ineligible for RUC compensation because being available in RUC is part of the resource's RA obligation. Any RUC compensation would thus be considered double compensation.

RUC has one significant limitation – it only procures capacity incremental to the capacity procured in the IFM. If the physical supply the CAISO procures in the IFM exceeds the demand forecast, RUC has no mechanism to address that potential oversupply. Instead, the CAISO's operators must issue exceptional dispatches to address these issues if they are not confident the oversupply concern is small enough to be managed in the real-time market processes. This issue particularly can occur with multi-stage generating resources. Multi-stage generating resource configurations committed in the IFM carry over to RUC as a fixed input. RUC can them commit the unit to a higher configuration but not a lower configuration. If there is an operational need for that resource to be in a lower configuration, the RUC process currently has no way of meeting that need.

Aside from exceptional dispatches, CAISO operators have one additional tool to manage RUC – in certain scenarios, they can manually adjust the load

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[27] RUC does not consider virtual supply, described in more detail in section III.A.3.b of this transmittal letter, in evaluating whether the IFM has procured sufficient resources to meet the demand forecast.

[28] Existing tariff section 31.5.3.

[29] Existing tariff section 31.5.5.

[30] Existing tariff section 31.5.7, *et seq.* For each settlement period and resource, scheduling coordinators receive RUC compensation equal to the sum of the RUC availability payment and a RUC bid cost recovery amount (if applicable). Existing tariff section 11.2.2.

forecast that is the basis of RUC procurement.[31] This covers adjustments relating to: anticipated demand response deployment; metered sub-system self-schedules; anticipated deviations from day-ahead forecasted output from variable energy resources; expected resource self-schedules in the real-time market; and expected deficiencies in ancillary services procurement.

2. Real-Time Market

a. Real-Time Market Processes

The fundamental mechanics of the real-time market are substantially similar to the day-ahead market. The first step of the real-time market is bid submission. Real-time market bidding opens after the posting of day-ahead market results at approximately 1:00 p.m. on the day before the trading day. Scheduling coordinators submit bids to supply energy and ancillary services. Load serving entities, however, do not bid to procure load in the real-time market. Instead, the CAISO procures supply to meet forecasted load.

The next step is the HASP, in which the CAISO provides MW hourly-block schedules to intertie resources. The RTUC and STUC are the next two processes, both of which involve providing commitment instructions to units.

The FMM and RTD are the two market optimization processes within the real-time market. Both the FMM and RTD include market power mitigation procedures. The FMM procures energy and ancillary services for a given fifteen-minute period and runs approximately 37.5 minutes prior to that period. The RTD procures energy and ancillary services for a given five-minute period and runs approximately 7.5 minutes prior to that period.

b. Imbalance Settlement

The CAISO settles awards between the real-time market processes and between day-ahead and real-time, on an imbalance basis. Effectively, an award in the FMM only settles at the FMM price to the extent it does not overlap with an existing day-ahead market award. Similarly, an award in RTD only settles at the RTD price if it does not overlap with an FMM award.

c. Differences in Market Optimization – LMP Formulation & Flexible Ramping Product

[31] Existing tariff sections 31.5.3.1 – 31.5.3.6.

Aside from the timing difference relative to the operating hour, the day-ahead market and real-time market optimization have two noteworthy differences.

First, the LMP for each pricing node in the real-time market includes the elements in the day-ahead market plus a component that represents marginal greenhouse gas cost and, for each pricing node within a WEIM balancing area. The real-time LMP also includes a WEIM bid adder component.[32]

Second, in addition to energy and ancillary services, the FMM and RTD also procure the flexible ramping product. The flexible ramping product allows the CAISO to enforce flexible ramping constraints in the real-time market.[33] The CAISO developed the flexible ramping product to manage the ramping capability needed to meet changes in net demand – both forecasted net demand changes and unexpected net demand changes – that had become more challenging with increased variability in demand and increased participation of variable energy resources in the real-time market. The flexible ramping product has two components.

The first component of the flexible ramping product compensates resources for ramping capability provided through the real-time market's energy scheduling and dispatch process, which the tariff designates as forecasted movement.[34] Each run of the real-time market's multi-interval optimization provides a binding energy dispatch or schedule for the upcoming market interval and nonbinding advisory schedules for the subsequent intervals. The forecasted movement represents the change in energy schedule between the binding schedule or dispatch for the upcoming market interval and the advisory schedule for the following market interval of that market run. The CAISO compensates or charges resources and demand for this forecasted movement at a flexible ramping up price or flexible ramping down price, depending on the direction of the total ramp relative to the forecasted movement of the resource or demand.

The second component of the flexible ramping product is the uncertainty awards component, which the CAISO issues to address the potential for errors in the advisory interval demand or supply forecasts that may materialize in a

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32 Tariff appendix C, existing section B.

33 Existing tariff section 44, *et seq.* In addition, existing tariff section 11.5.9 includes the flexible ramping product in the list of real-time market settlements and specifies that the CAISO will settle it pursuant to existing tariff section 11.25.

34 Existing tariff section 44.3; tariff appendix A, existing definition of Forecasted Movement.

subsequent market run when the interval is financially binding.[35] The CAISO determines the uncertainty requirement based on a statistical estimation of load and supply forecast error. The CAISO then procures additional ramping capacity through uncertainty awards in an amount up to the uncertainty requirement using a procurement curve that weighs the quantity procured against the costs. This procurement curve ensures the total cost of uncertainty awards will not exceed the expected cost of a power balance violation absent the uncertainty awards.

d. Managing Energy Imbalances from the Day-Ahead Market

The purpose of the real-time market is to update procurement based on how events unfold closer to real-time. Changes between the day-ahead market and real-time market in terms of both supply and demand are inevitable. The inevitable differences between the amount of energy scheduled in the day-ahead market compared to the real-time market are commonly called energy imbalances. A key function of the real-time market is to manage the energy imbalances that occur between the day-ahead and real-time markets.

Two key factors drive energy imbalances. The first is the difference in scheduling granularity between markets. The day-ahead market schedules energy in hourly time increments compared to 15-minute and five-minute energy schedules in the real-time market. These granularity differences cause imbalances because the real-time market schedules fluctuate within the hour, whereas the day-ahead market schedules are fixed for the hour. Because of these granularity differences, the real-time market can require faster, more granular intra-hour ramping capability compared to the ramp rate needed to simply transition from one hourly schedule to the next.

The second factor driving energy imbalances is net load forecast uncertainty. There is unavoidable uncertainty in the day-ahead net load forecast. The day-ahead net load forecast cannot predict with certainty the actual net load during the operating day. Any differences between the day-ahead forecast and what actually occurs results in imbalances.

3. Other Noteworthy Market Design Elements

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[35] Existing tariff section 44.2; tariff appendix A, existing definition of Uncertainty Award. Market participants do not submit separate bids for the flexible ramping product, but instead the CAISO uses energy bids for optimizing procurement of uncertainty awards. Existing tariff sections 27.4.1 and 34.9.

a. Congestion Revenue Rights

The CAISO market design includes congestion revenue rights (CRRs), which are financial instruments that market participants can acquire through a CAISO-administered allocation and auction process or through a secondary registration system.[36] The primary purpose of CRRs is to hedge day-ahead market congestion costs, allowing market participants to address congestion risk.[37] When transmission demand exceeds capacity, locational marginal prices vary depending on congestion levels. Congestion charges can change dramatically based on system conditions and patterns of supply and demand. As the Commission has recognized, CRRs give market participants a level of financial protection against the risks associated with unpredictable congestion charges.[38]

b. Convergence Bidding

In addition to submitting bids or schedules for physical resources and demand, CAISO market participants can also hedge their market positions and manage their exposure to the differences between day-ahead and real-time prices by submitting purely financial bids – called convergence bids or virtual bids in the CAISO tariff.[39] Such bids can be for virtual supply or virtual demand. If a market participant's convergence bid is cleared in the day-ahead market, it is automatically liquidated with the opposite buy/sell position at the real-time price. Convergence bids at both internal nodes and the interties settle at the average of the four fifteen-minute market prices for the hour.[40]

c. Bid Cost Recovery

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[36] *See* existing tariff section 36, *et seq.*; *see also* http://www.caiso.com/market/Pages/ProductsServices/CongestionRevenueRights/Default.aspx.

[37] Congestion revenue rights are not included in the extended day-ahead market. Instead, a transmission service provider participating in EDAM will account for congestion revenue under its tariff, which provides the opportunity for each transmission service provider to determine the appropriate settlement treatment for its transmission customers. *See* section IV.D.3 of this transmittal letter.

[38] *See, e.g.*, *Cal. Indep. Sys. Operator Corp.*, 149 FERC ¶ 61,093, at P 2 (2014) (citations omitted) ("CRRs are financial instruments that enable their holders to hedge variability in congestion costs. Entities acquire CRRs primarily to offset integrated forward market congestion costs reflected in the congestion component of locational marginal prices (LMPs).").

[39] *See* existing tariff section 30.9. The CAISO uses the terms "virtual" and "convergence" interchangeably in this filing to refer to those types of bids and transactions. Convergence bidding is an optional feature available for balancing authorities to enable in their balancing area as part of the extended day-ahead market. *See* section V.C.1 of this transmittal letter.

[40] Existing tariff section 11.3.

Scheduling coordinators for resources submit three-part bids, which include start-up, minimum load, and energy bid costs.[41] The CAISO's market optimization software considers the start-up and minimum load costs in optimizing for the least-cost commitment or dispatch of all resources. The market only uses the energy bid cost to set the LMP for a given market interval. This creates a risk that the rents from the difference between the LMP and the resource's energy bid costs will provide insufficient revenue to compensate its start-up and minimum load costs. Also, because of inter-temporal constraints (*e.g*., ramping rates, minimum run times, and minimum up times), a resource's energy or ancillary services bid may set the price in one interval in which the CAISO commits the resource, but that resource may not be infra-marginal in other intervals when it must run to meet those inter-temporal constraints because its bid is higher than the market clearing price.

The existing bid cost recovery mechanism addresses these risks by providing uplift payments to resources if their bid costs exceed their market revenue over the day. The CAISO recovers the costs of bid cost recovery payments through uplift payments allocated to a combination of measured demand and virtual bidders.[42] The CAISO calculates bid cost recovery separately for the day-ahead and real-time market.[43] Resources committed in the residual unit commitment process are eligible to receive real-time bid cost recovery.[44]

d. Resource Adequacy

California's RA program, which the CAISO administers in coordination with the California Public Utilities Commission (CPUC) and other local regulatory authorities in the CAISO balancing area, seeks to secure sufficient capacity to support the safe and reliable operation of the CAISO grid.[45] The CAISO's resource adequacy tariff provisions require load serving entities in the CAISO

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41 Existing tariff section 30, *et seq.*

42 Existing tariff section 11.8 *et seq.*

43 Bid cost recovery will be extended to other balancing areas as a feature of the existing day-ahead market.

44 Units committed in RUC are included in the real-time market bid cost recovery (as opposed to day-ahead market bid cost recovery) because (1) many commitments made in RUC are non-binding so the real-time market makes the binding commitment decision and (2) long-start and extra-long-start resources that do receive binding commitments in RUC are only committed to their minimum sustained operating level (PMin) so they can participate in the real-time market.

45 Existing tariff section 39, *et seq.*

balancing area to submit a year-ahead forward showing and month-ahead showings of the capacity procured to meet their share of the peak load plus any applicable reserve margin, as well as local and flexible capacity requirements. The extended day-ahead market includes a resource sufficiency test, not a resource adequacy requirement. Participating balancing authorities will remain responsible for meeting their own resource adequacy needs and will have the opportunity to participate in a resource adequacy program of their choosing. In other words, the CAISO will continue to administer its resource adequacy program, while other balancing authorities may or may not participate in a resource adequacy program.[46]

B. The Western Energy Imbalance Market Today

The existing WEIM is similar to the proposed EDAM in that it is not a separate market, but a broader geographical scope of the CAISO's real-time market.[47] Accessing the CAISO's real-time market through the WEIM enables balancing areas, transmission service providers, and resource owners in the West to take advantage of the CAISO's real-time optimization to balance supply and demand. WEIM participants have realized $4.20 billion in benefits since the WEIM began operation in 2014.[48] The WEIM enables an exponentially more efficient use of the Western transmission system. It also reduces costs for participants by lowering the amount of costly reserves utilities need to carry.[49] Utilities also can reduce their carbon emissions and use intermittent renewable resources more efficiently. When one utility area has excess hydroelectric, solar, or wind power, the CAISO can deliver it to customers elsewhere. Likewise, when the CAISO balancing area has excess solar energy, it can help meet demand outside of California that otherwise would be met by more expensive resources. The WEIM also increases reliability by providing additional operational visibility across electricity grids and improving the ability to manage transmission line congestion across the region's high-voltage transmission system.

Participation in the WEIM is voluntary both for balancing authorities and for individual resource owners within a participating balancing area.[50] A balancing authority's decision to participate in the WEIM does not involve

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[46] The interoperability of EDAM and the Western Resource Adequacy Program is discussed further in sections V.B.1 and V.B.2 of this transmittal letter.

[47] *See* WEIM Authorization Order, 147 FERC ¶ 61,231, at PP 7, 74 (establishing the WEIM).

[48] https://www.westerneim.com/pages/default.aspx.

[49] https://www.westerneim.com/Pages/About/HowItWorks.aspx.

[50] WEIM Authorization Order, 147 FERC ¶ 61,231, at PP 2, 8.

"joining" CAISO on either a full or limited basis, and the CAISO does not assume operational control over the transmission facilities in the participating balancing area. Likewise, the CAISO does not manage generator interconnections or transmission planning for WEIM participants. WEIM participants simply participate in the CAISO's real-time market to manage the dispatch of generation to meet demand in the real-time horizons and provide imbalance energy services to their customers.

The WEIM is governed by a five-member Governing Body that shares authority with the CAISO Board of Governors on rules specific to participation to the WEIM.[51] A committee of Western stakeholders nominates members of the WEIM Governing Body. These members bring a high level of professionalism and leadership, with work experience in public power, investor-owned utilities, and as state regulators. Additionally, the WEIM governance design includes a Body of State Regulators (BOSR) which provides a forum for Western state regulators to learn about the WEIM and WEIM-related stakeholder initiatives.[52] This body may express a common position in the CAISO stakeholder process or to the WEIM Governing Body on WEIM issues; and its members are not restricted from taking any position before the Commission or any other forum concerning WEIM matters or the CAISO.

C. DAME Stakeholder Process

The day-ahead market enhancements initiative began in 2019 and comprised six major phases leading to joint approval from the WEIM Governing Body and the CAISO Board of Governors on May 17, 2023. The six phases of the DAME stakeholder process were:

1. Initial Working Groups (June 2019 - August 2019)
2. Straw Proposal Development (February 2020 - July 2021)
3. Analysis and Straw Proposal Revisions (January 2022 - October 2022)
4. Final Proposal Development (December 2022 - January 2023)
5. Postponement and Extended Workshops (February 2023 - March 2023)
6. Revised Final Proposal and Addendum (April 2023)

The first phase of the process involved initial working group discussions with stakeholders about how to enhance the day-ahead market. This process began with a workshop on June 20, 2019, where the CAISO presented two potential revised day-ahead market formulations. Both proposed formulations would procure the imbalance reserves product, but one would procure the product based on the existing day-ahead structure in which IFM and RUC are

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51 https://www.westerneim.com/Pages/Governance/GoverningBody.aspx.

52 https://www.westerneim.com/Pages/Governance/EIMBodyofStateRegulators.aspx.

sequential market passes, and the other would procure the product in a revised market framework in which the IFM and RUC are integrated into a single market pass. The CAISO requested stakeholder feedback on the advantages and disadvantages of each formulation and discussed the options in a working group meeting on August 13, 2019.

The second phase involved developing a day-ahead market enhancement straw proposal. Based on feedback from the working group process, the CAISO published an initial straw proposal on February 7, 2020 that reflected the integrated IFM/RUC approach. Stakeholder opinion diverged on the initial design of the integrated IFM/RUC, and the CAISO published a revised straw proposal on June 9, 2020 that discussed alternative approaches to integrating the IFM/RUC. The CAISO continued to probe the feasibility of integrating the IFM and RUC, but it ultimately concluded this revised approach was not feasible. Accordingly, the CAISO published a second revised straw proposal on July 21, 2021 that maintained the sequential IFM and RUC passes.

The third phase involved further analysis of the problems spurring the initiative and incremental improvement of the imbalance reserve design. This step began with the CAISO's publication of an analysis report on January 24, 2022 that quantified market imbalances between the day-ahead market and real-time market. Based on this analysis the CAISO released revised straw proposals on April 27, 2022, and October 26, 2022, each of which refined the design of the imbalance reserve product.

The fourth phase involved developing the final proposal. The CAISO published a draft final proposal on December 1, 2022, followed by the final proposal on January 11, 2023. CAISO management intended to present the proposal for approval by the WEIM Governing Body and CAISO Board at their joint February 2023 meeting. However, CAISO management delayed bringing the initiative to the CAISO Board and WEIM Governing Body joint meeting to allow time for further refinements to address continued stakeholder concerns.

The fifth major phase involved a series of workshops held in February and March 2023 and March 2023, with stakeholders and the CAISO's Market Surveillance Committee.

The sixth and final phase involved revising the proposal to account for feedback from the additional workshops. The CAISO published a draft revised final proposal on April 6, 2023. On April 19, 2023, the CAISO posted an addendum to the draft revised final proposal addressing issues regarding the imbalance reserve demand curve. The CAISO published its revised final

proposal on May 1, 2023 (DAME Final Proposal),[53] leading to approval by the WEIM Governing Body and the CAISO Board of Governors on May 17.[54]

After the policy phase of the stakeholder initiative concluded, on June 2, 2023, the CAISO posted initial draft tariff revisions to implement DAME and then posted further revised versions of the DAME tariff language in July. The CAISO provided opportunities for stakeholder comments throughout this lengthy process and made numerous changes to the proposed DAME design and tariff language to address the comments.[55]

D. EDAM Stakeholder Process

Like the DAME stakeholder process, the EDAM stakeholder process started in 2019. The EDAM stakeholder process began with a feasibility assessment to explore extending participation in the day-ahead market to WEIM participants.[56] The CAISO discussed this feasibility assessment with stakeholders in October 2019. That same month, the CAISO published a paper and held a meeting with stakeholders to discuss the issues the CAISO proposed to address through a stakeholder initiative to extend participation in the day-ahead market to WEIM participants.[57] Over the next several months, the CAISO hosted a training course on its day-ahead market[58] and then began a series of

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[53] The DAME Final Proposal is available at http://www.caiso.com/InitiativeDocuments/RevisedFinalProposal-Day-AheadMarketEnhancements.pdf and is included in attachment C to this filing.

[54] *See* http://www.caiso.com/Documents/DecisiononDay-AheadMarketEnhancements-JointMotion-May2023.pdf. The materials provided to the CAISO Board of Governors and the WEIM Governing Body included a May 10, 2023 memorandum (as amended on May 15, 2023) regarding the DAME design (DAME CAISO Board of Governors and WEIM Governing Body Memo), available at http://www.caiso.com/Documents/DecisiononDay-AheadMarketEnhancements-Memo-May2023.pdf and provided in attachment D to this filing. The vote of the WEIM Governing Body and the CAISO Board of Governors is also included in attachment D.

[55] *See* https://stakeholdercenter.caiso.com/StakeholderInitiatives/Day-ahead-market-enhancements.

[56] See http://www.caiso.com/Documents/ISO-WesternEnergyImbalanceMarketEntities-HosExtendedDayAheadMarketStakeholderCall100319.html. The CAISO Board of Governors was also briefed on this topic during its September 2019 meeting. *See id.*

[57] *See* http://www.caiso.com/Documents/ExtendedDayAheadMarketIssuePaperCall101719.html.

[58] *See* http://www.caiso.com/Documents/TrainingCourseExistingDay-AheadMarketOverview.html.

technical workshops on the EDAM initiative.[59] The CAISO coordinated the schedules for the DAME and EDAM initiatives to help stakeholders manage their resources and engage in both of those interrelated initiatives.[60] After a pause, the CAISO restarted the EDAM stakeholder efforts in November of 2021.

During the next two years, the CAISO issued a series of papers and held a total of nearly 80 public meetings, workshops, and working group meetings to develop and refine the EDAM proposal.[61] The CAISO issued its final proposal for the EDAM design on December 7, 2022 (EDAM Final Proposal).[62] On March 30, 2023, the CAISO posted initial draft tariff revisions to implement the EDAM design and then posted further revised versions of the EDAM tariff language in May and June. The CAISO provided opportunities for stakeholder comments throughout this lengthy process and made numerous changes to the proposed EDAM design and tariff language to address the comments.[63] This high level of CAISO engagement and stakeholder participation indicates the importance of this effort and the willingness of participants in the West to build upon the collaboration and success of the WEIM, increase regional coordination, and support evolving state policy goals.

On February 1, 2023, the CAISO Board of Governors and the WEIM Governing Body approved the proposed design and the filing of the EDAM

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[59] *See* http://www.caiso.com/Documents/ExtendedDay-AheadMarketInitiativeTechnicalWorkshopSeriesKickingOff211-1220.html.

[60] *See id.*; http://www.caiso.com/Documents/UpdateDay-AheadMarketEnhancements-ExtendedDay-AheadMarketInitiativesCall041620.html.

[61] *See* https://stakeholdercenter.caiso.com/StakeholderInitiatives/Extended-day-ahead-market.

[62] The EDAM Final Proposal is available at http://www.caiso.com/InitiativeDocuments/FinalProposal-ExtendedDay-AheadMarket.pdf and is included in attachment E to this filing.

[63] *See* https://stakeholdercenter.caiso.com/StakeholderInitiatives/Extended-day-ahead-market. The design reflected in the EDAM Final Proposal was informed by over 1,500 pages of diverse stakeholder comments received across different proposal iterations, which are summarized in a stakeholder matrix document available at http://www.caiso.com/Documents/StakeholderCommentsMatrix-ExtendedDay-AheadMarket-FinalProposal-Feb2023.pdf.

proposal reflected in this tariff amendment.[64] Stakeholders, including state public utility commissioners, broadly supported this decision.[65]

IV. Proposed Day-Ahead Market Enhancements

A. Issues with the Current Day-Ahead Market Leading to this Filing

1. Drivers of Increased Net Load Imbalances between the Day-Ahead Market and the Real-Time Market

Some imbalances in the net load between the day-ahead market and real-time market are inevitable. The magnitude of those imbalances, however, has increased materially in recent years. In 2019, the CAISO published a comprehensive report titled *Price Performance Analysis* that summarized and analyzed price formation in the CAISO markets, including factors that contribute to differences in volumes and prices cleared in the day-ahead market compared to the real-time market.[66]

The report identified systematic imbalances in the net load in different market timeframes. The greatest magnitude of imbalance typically occurs between the IFM and fifteen-minute market (as opposed to between the fifteen-minute market and the five-minute market).[67] These imbalances can be as large

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[64] *See* http://www.caiso.com/Documents/ApprovedDecisiononExtendedDay-AheadMarket-JointMotion-Feb2023.pdf. The materials provided to the CAISO Board of Governors and the WEIM Governing Body included a January 26, 2023 memorandum regarding the EDAM design (EDAM CAISO Board of Governors and WEIM Governing Body Memo), available at http://www.caiso.com/Documents/DecisiononExtendedDay-AheadMarket-Memo-Feb2023.pdf and provided in attachment F to this filing. The vote of the WEIM Governing Body and the CAISO Board of Governors is also included in attachment F.

[65] *See* BOSR Advice to WEIM Governing Body on EDAM Design and Governance (Jan. 26, 2023), available at https://www.westerneim.com/Documents/BOSRAdvicetoWEIMGoverningBodyonEDAMMarketDesignandGovernance-Jan26-2023.pdf.

[66] CAISO Energy Markets Price Performance Report (Sept. 23, 2019) (Price Formation Report), available at http://www.caiso.com/Documents/FinalReport-PricePerformanceAnalysis.pdf.

[67] Although the residual unit commitment process occurs between the IFM and the FMM, RUC procures capacity, not energy, and RUC compensation is not based on imbalances from a prior market process. Thus, assessing day-ahead to real-time imbalances involves comparing IFM prices/volumes to FMM prices/volumes. For ease of reference, however, the CAISO's generally refers to imbalances between the day-ahead market and the real-time market rather than imbalances between the IFM and the real-time market.

as 6,000 MW in a single hour, which is significant considering the CAISO's historical peak demand is approximately 52,000 MW.[68] The report also explained these "net load differences . . . can be expected to lead to price divergence between markets" because "[f]or instance, when conditions of load and [variable energy resource] generation lead to higher net load levels in real-time, the market may be more exposed to higher prices since there is a need to dispatch higher levels of generation, which may come with higher bid prices."[69]

Several factors contribute to the large imbalances between the day-ahead and real-time market. The Price Formation Report explained large imbalances between the day-ahead and real-time market occur because of deviations between the forecast and actual events for both the net load and variable energy resource output. From the CAISO's start-up in 1998 through recent years, the CAISO balancing area consisted of a predictable generation fleet and a predictable load. Resources scheduled hourly in the day-ahead market had relatively predictable real-time load and ramping needs. Over the last 10 years, however, variable energy resources (*i.e.*, wind and solar resources) have become more prevalent. Although these resources are critical in meeting renewable energy and greenhouse gas emission goals, output from these resources is highly dependent on environmental conditions, making their output less predictable than traditional resources. Solar resources also have a daily production cycle that does not necessarily align with electricity demand patterns, requiring other resources to ramp up quickly when solar production is ramping down. These factors can create challenging conditions for system operators. Rather than the relatively predictable load conditions, system operators must manage the more unpredictable and variable net load differences.

Significant weather-related uncertainty throughout the Western grid has also exacerbated net load imbalances. Electricity demand is weather-sensitive, and extreme temperatures can lead to spikes in energy use due to cooling needs, which are difficult to forecast accurately. On the supply side, extreme weather impacts the generation of wind and solar power, and the output can change rapidly based on cloud cover, wind speed, and other atmospheric conditions. These factors create challenges for accurate forecasting and thus contribute to imbalances between the day-ahead market and the real-time market.

2. CAISO Operators Rely on Manual Interventions in RUC to Address Net Load Imbalances

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68 Price Formation Report at 54.

69 *Id.* at 59.

The persistent net load imbalances between the IFM and real-time market has required the CAISO to intervene manually in the RUC to ensure there is sufficient online capacity to mitigate the risk of load shedding or insufficient ramp capability in the real-time market. Specifically, the CAISO operators exercise the authority granted in existing tariff section 31.5.3 to adjust the RUC load forecast up to ensure that RUC procures additional capacity to address uncertainty between the day-ahead and real-time markets. These operator adjustments to the RUC forecast have increased in frequency and magnitude over the last several years in parallel with the increased magnitude of net load imbalances between the day-ahead and real-time markets.

The CAISO previously adopted both the flexible ramping product and flexible RA capacity constructs in part to address some of the same underlying factors driving net load imbalances. However, they have contributed only minimally to avoiding the need for manual interventions in RUC. In that regard, both the flexible ramping product and flexible RA capacity can only address net load imbalances with resources already committed in the IFM or that can be committed within the real-time market. Additionally, for much of its existence the flexible ramping product has been problematic because the market procured it on a WEIM balancing area level rather than at a nodal level. When transmission constraints materialized in real-time either within a WEIM balancing area or across WEIM balancing area boundaries, the capacity frequently would be stranded behind those transmission limitations.[70]

Thus, absent larger market changes, the CAISO expects its reliance on operator interventions to mitigate the operational risks posed by net load imbalances to increase.

[70] Both the Price Formation Report and the CAISO Department of Market Monitoring's 2021 Annual Report on Market Issues and Performance documented the phenomenon of stranding the flexible ramping product behind constraints. The CAISO largely addressed this deliverability concern through its February 1, 2023 implementation of nodal flexible ramping product procurement. *See* transmittal letter for CAISO tariff amendment to refine flexible ramping product, Docket No. ER22-2661-000, at 5-13 (Aug. 15, 2022). The Commission subsequently approved the CAISO proposal. *Cal. Indep. Sys. Operator Corp.*, 181 FERC ¶ 61,034 (2022).

3. The Status Quo of Relying on Out-of-Market Operator Interventions is Problematic and Unsustainable

Persistent and systematic out-of-market actions taken by CAISO operators signal a gap in the CAISO's market design. These out-of-market actions lead to less efficient and accurate pricing in the real-time market relative to the day-ahead market. The CAISO has identified at least three concrete ways relying on RUC adjustments to the demand forecast is problematic for the market.

a. Sub-optimal and Inefficient Unit Commitment

Addressing imbalances through manual grid operators' adjustments to the RUC demand forecast means the IFM does not co-optimize the procurement of this additional capacity with energy. Without such co-optimization, the CAISO is not sending a clear price signal regarding the value that capacity is providing to address uncertainty. Further, the energy price in the IFM is not reflecting the trade-off of providing energy as opposed to capacity to meet uncertainty. The result is the CAISO day-ahead market has sub-optimal and inefficient unit commitment and is producing less efficient economic energy and ancillary services schedules. The status quo thus presents higher system costs than would occur if the CAISO could specifically value resource commitments needed to meet net load uncertainty and co-optimize procurement of those resources with energy and ancillary services.

b. RUC Availability Payments Provide Insufficient Compensation

In theory, the current CAISO market sends needed price signals through the RUC clearing price and the RUC availability payment. In reality, however, the current RUC compensation methodology does not send effective price signals in many cases because the RUC clearing price does not account for the trade-off for the unit being scheduled for energy in the IFM compared to being scheduled as RUC capacity to address net load imbalances. Regardless of the price, the vast majority of capacity committed in RUC is RA capacity optimized at a zero dollar bid and ineligible for a RUC availability payment. However, there are costs to make resources available in the real-time market, *e.g.*, gas-scheduling costs, costs to set up a hydro system, opportunity costs from other market opportunities, and transmission costs for imports. RA resources do not recover these costs through market payments; they must recover these costs through their bilateral RA contract payments. This is an inefficient way to

compensate RA units for the unique availability obligations a RUC commitment imposes on them.

c. RUC Capacity is Not Necessarily Deliverable Where it is Needed

The RUC process does not ensure the incremental capacity procured to address net load imbalances between IFM and the real-time market will be deliverable to the locations driving the need for the manual adjustments in the RUC forecast. The CAISO's experience with the real-time market's flexible ramping product shows that procuring a product that is undeliverable where needed imposes additional system costs without addressing the underlying concerns driving procurement of that product.

B. Description of Key Day-Ahead Market Enhancements

To address the issues described above, the CAISO proposes to enhance its day-ahead market by introducing two new products – imbalance reserves and reliability capacity. Both products will be bi-directional, meaning there are four new products: (1) imbalance reserves up; (2) imbalance reserves down; (3) reliability capacity down; and (4) reliability capacity up. The CAISO will procure the new products based on bids submitted under the existing day-ahead market bid submission timeline.

The CAISO will update the IFM to co-optimize procurement of energy, ancillary services, and imbalance reserves. The CAISO also will expand the existing market power mitigation process preceding the IFM to include imbalance reserves. The RUC process will now procure the new bi-directional reliability capacity product instead of the uni-directional RUC capacity it procures today. The CAISO also will add a new market power mitigation process for RUC between the IFM and RUC. In summary, the new day-ahead market will involve these five sequential processes:

1. *Bid submission* – Includes bids for energy, ancillary services, imbalance reserves, and reliability capacity.
2. *IFM market power mitigation* – Mitigates potential exercise of market power in procurement of energy and imbalance reserves.
3. *IFM* – Issues day-ahead schedules for energy, ancillary services, and imbalance reserves.
4. *RUC market power mitigation* – Mitigates potential exercise of market power in procurement of reliability capacity.
5. *RUC* – Issues awards for reliability capacity.

1. Overview of Imbalance Reserves

a. Description of the Product – Imbalance Reserves

Imbalance reserves are a flexible reserve product designed to cover both uncertainty in the net load forecast between the day-ahead market and real-time market and real-time ramping needs not covered by hourly day-ahead market schedules. A resource receiving an imbalance reserves award must submit economic bids to the real-time market for its awarded capacity range. Imbalance reserves will ensure the integrated forward market schedules sufficient dispatch capability to meet net load imbalances between the day-ahead and real-time markets.

b. Procuring the Product – Imbalance Reserves

The CAISO will target the procurement of imbalance reserves up and imbalance reserves down to address, respectively, an uncertainty range above and below cleared physical supply. The CAISO will calculate the uncertainty range imbalance reserves will fill based on the historical uncertainty in the day-ahead load, solar, and wind forecasts. That uncertainty range only sets the procurement target. The CAISO will procure a quantity of imbalance reserves for any interval based on a demand curve that decreases procurement as costs increase by assessing the trade-off between the incremental cost and operational value of the reserves. Procurement also will evaluate whether a resource's reserve capacity would be deliverable if upward- modeled uncertainty occurs (called the upward deployment scenario) and if downward- modeled uncertainty occurs (called the downward deployment scenario).

c. Financially Settling the Product – Imbalance Reserves

Resources awarded imbalance reserves will receive a day-ahead payment at the product's locational price. The CAISO will settle ramping capability provided by imbalance reserve awards in the day-ahead market, subject to the ramp deviation settlement described in section IV.E.2.a of this transmittal letter, which considers how an imbalance reserves award in the day-ahead market relates to a flexible ramping product award in the real-time market. The market will recover the costs of imbalance reserves, including displaced congestion

revenue from the deployment scenarios,[71] from entities based on their contribution to the need for procuring the product.[72] The current bid cost recovery process will also account for imbalance reserves bid costs and revenues.

2. Overview of Reliability Capacity

a. Description of the Product – Reliability Capacity

The CAISO will procure reliability capacity to meet positive or negative differences between cleared physical supply in the IFM and the load forecast. This is similar to the existing RUC process except the CAISO currently only procures uni-directional RUC capacity if the forecast exceeds cleared physical supply. With the bi-directional reliability capacity product, the CAISO can also procure decremental capacity in RUC. As with imbalance reserves, a reliability capacity award will obligate the resource to provide economic energy bids in the real-time market for the quantity of its awards.

b. Procuring the Product – Reliability Capacity

Like today, RUC will continue to consider transmission constraints to ensure reliability capacity is deliverable to the aggregate of load in the day-ahead timeframe. Unlike imbalance reserves, RUC will not use a demand curve to procure reliability capacity for procurement. Instead, it will seek to procure the full reliability requirement subject to penalty prices when there is extreme scarcity.

c. Financially Settling the Product – Reliability Capacity

Settlement of reliability capacity will be similar to settlement of imbalance reserves but simpler. Resources awarded reliability capacity would receive a day-ahead payment at the product's locational price. The market will allocate the costs of reliability capacity to demand. As with imbalance reserves, the current bid cost recovery process will account for reliability capacity bid costs and revenues. Unlike the settlement of imbalance reserves, settlement of reliability capacity will not involve deviation settlements with any real-time market awards, nor will it account for displaced congestion revenues.

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[71] In section IV.E.3 of this transmittal letter, the CAISO describes in detail the concept of displaced congestion revenue.

[72] In section IV.D.7.c of this transmittal letter, the CAISO describes in detail the cost allocation methodology and its rationale.

3. Relationship Between the Products

Although imbalance reserves and reliability capacity are distinct products, they are related. The following figures provide a simple graphical representation of how imbalance reserves and reliability capacity relate to each other and to energy cleared in the day-ahead market.

Figure 1 below illustrates a simple scenario where IFM clears physical supply equal to the load forecast. The market will procure imbalance reserves to cover upward and downward uncertainty requirements. The day-ahead market would not need to procure reliability capacity in the RUC process.

Figure 1

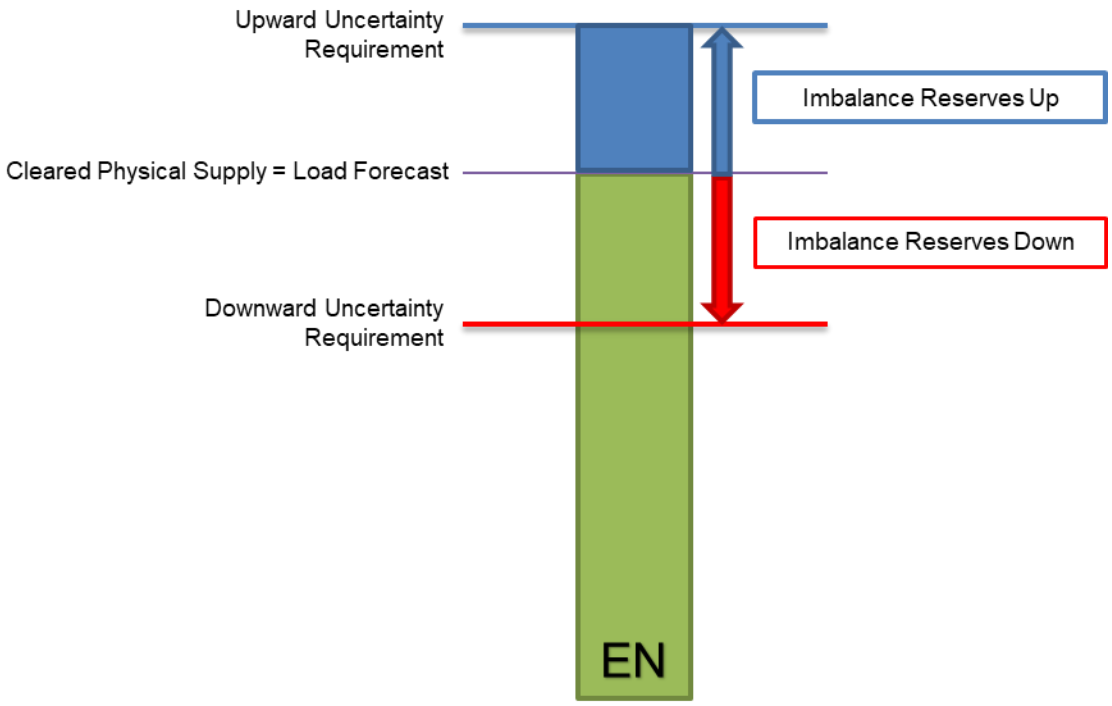


Figure 2 and

Figure 3 below represent more realistic scenarios where physical supply cleared in the IFM is greater than or less than the load forecast. As seen in Figure 2, when the IFM clears less physical supply than the load forecast, the CAISO would procure reliability capacity up to meet that difference.

Figure 3 presents a scenario where the IFM clears more physical supply than the load forecast, which results in procuring reliability capacity down to ensure the real-time market has sufficient decremental capacity.

Figure 2

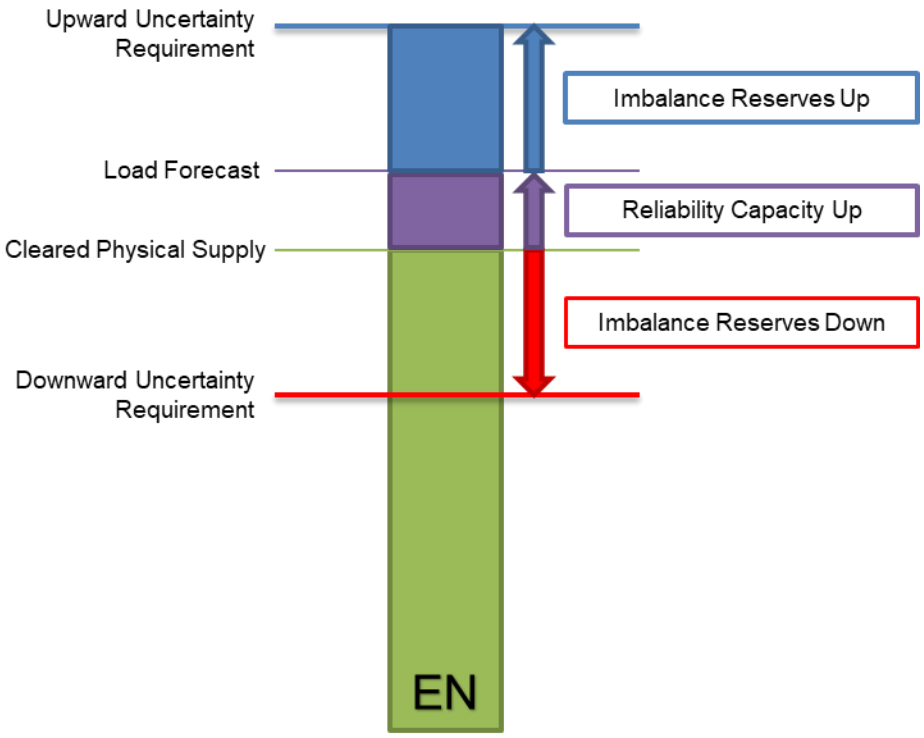
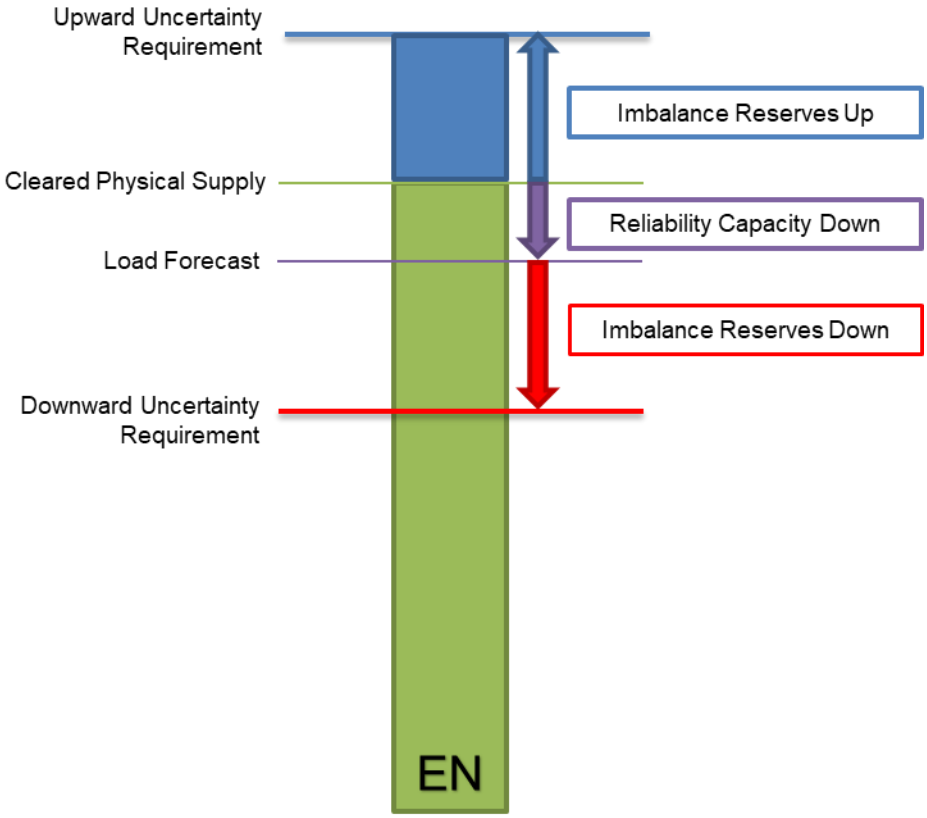

Upward Uncertainty Requirement
Load Forecast
Cleared Physical Supply
Downward Uncertainty Requirement
Imbalance Reserves Up
Reliability Capacity Up
Imbalance Reserves Down
EN

Figure 3



C. New Products Will Address Key Gaps in the Existing Market Structure

The new day-ahead market products will address the major issues the CAISO has identified with the existing day-ahead market and result in a day-ahead market that economically and reliably addresses net load variability and uncertainty. A more effective day-ahead market will in turn promote a more effective and efficient real-time market.

1. Benefits of the Imbalance Reserves Product

The CAISO expects the largest benefits will accrue from the new imbalance reserves product. Procuring flexible ramping capacity in the IFM through a co-optimization that also considers energy and ancillary services will obviate the need for CAISO system operators to adjust the RUC procurement

targets manually on a routine basis.[73] Resources receiving imbalance reserves awards will have capacity ranges capable of meeting all but the most extreme net load imbalances and ramping needs that materialize between the day-ahead and real-time markets. The CAISO expects co-optimized procurement of imbalance reserves will provide these specific benefits compared to relying on the status quo day-ahead market design:

1. Improved unit commitment
2. Enhanced market efficiency
3. Ability to meet real-time operational needs more effectively
4. Increased feasibility of IFM exports

a. Improved Unit Commitment

Co-optimizing imbalance reserve procurement with energy and ancillary services will help maximize the value of these reserves, resulting in more optimal unit commitment decisions and more optimal allocation of system ramping capability. In addition, marginal prices will now consider the opportunity costs of not providing the other products. For example, if a resource is economic for energy but instead is held back to provide imbalance reserves, the marginal prices will ensure that resource earns sufficient revenue from providing imbalance reserves to cover the opportunity cost of not selling energy. Thus, the resource will be indifferent to receiving an incremental energy schedule or imbalance reserve award.

b. Enhanced Market Efficiency

For both the overall system and individual resources, procuring flexible reserves using bids is more efficient. It compensates resources for these flexible reserves directly through market payments, rather than indirectly compensating them through an RA capacity contract.[74] Using bids allows the market optimization to consider costs when scheduling and committing units, leading to better economic outcomes. Marginal prices are a more appropriate mechanism to compensate resources for their availability than fixed contract payments because marginal prices will reflect when and where the reserves are most valued.

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[73] The CAISO will maintain the authority to make such adjustments but expects that its use of this authority will reduce significantly with implementation of imbalance reserves.

[74] As mentioned above, incremental capacity procured from manual RUC adjustments largely comes from RA capacity that receives no additional compensation from receiving the RUC award.

c. Meeting Real-Time Needs More Effectively

Co-optimizing imbalance reserves with energy will allow the market optimization to consider the full ramping needs of the system (for energy and uncertainty). Currently, there is no assurance the supply committed or scheduled in RUC is sufficient to meet faster ramping needs because RUC involves an hourly award. Imbalance reserves awards, however, require a resource to be 15-minute dispatchable, so the awarded capacity will meet the ramping needs that materialize in real-time more effectively.

Assessing imbalance reserves' deliverability to the nodes that drive the need for procurement of the product will help ensure the procured capacity is usable. This is an enhancement to the status quo because an adjustment in the RUC procurement target does not ensure the incremental RUC capacity procured will be deliverable to the location driving the need for that adjustment. The CAISO's experience with the flexible ramping product highlights the need to ensure ramping products evaluate a resource's ability to provide the product and meet the specific need based on resource characteristics and limitations on the transmission system.

d. Increased Feasibility of IFM Export Schedules

Procuring flexible reserves in the IFM will better ensure IFM export schedules are feasible. Relying on RUC adjustments to procure supply pushes the RUC procurement target farther away from the IFM solution, which can lead to export schedules cleared in the IFM not being feasible in RUC and thus being curtailed in the RUC process. Because the CAISO expects imbalance reserves will significantly reduce the use of RUC adjustments, it is less likely RUC will curtail export schedules cleared in the IFM.

2. Benefits of the Reliability Capacity Product

Imbalance reserves will improve RUC by allowing it to return to its intended purpose of ensuring the day-ahead market schedules sufficient supply to meet a balancing area's demand forecast. The reliability capacity up product, which effectively is the current version of RUC capacity, will accomplish this. Separately, the reliability capacity down product will inject more flexibility into the process by addressing potential oversupply in the real-time market. Oversupply may require manual operator interventions. Oversupply has increased during certain hours due to increasing system variability and uncertainty. Reliability capacity down will obviate the need for operator intervention in many cases. With the creation of the downward product, RUC can serve a broader purpose. It

will help the day-ahead market match demand forecasts rather than merely ensure sufficient supply.

3. Why are Both Products Necessary?

Imbalance reserves and reliability capacity have some similarities. The CAISO will procure both in the day-ahead market to augment energy and ancillary services awards, and awards of both products will trigger real-time market economic bidding obligations. However, the similarities end there. The CAISO needs both products because they serve different purposes, and the CAISO will procure them based on different resource characteristics and system needs. Imbalance reserves address circumstances where the actual real-time net load and associated ramping needs are different than the capacity the day-ahead market procured because net load is above or below the day-ahead forecast. RUC is necessary to procure incremental or decremental capacity to match the outcome of the day-ahead market to the forecast load. Reliability capacity is necessary regardless of any load or variable energy resource forecast uncertainty. RUC assumes the forecast is correct and procures to fill in the gaps. If the CAISO only procured imbalance reserves, there would be no assurance the day-ahead market would procure sufficient physical resources to meet expected demand in real-time. If the CAISO only procured reliability capacity, the CAISO would not have a market product to address net load imbalances and would continue to rely on manual adjustments in the RUC process.

D. Detailed Description of Major Day-Ahead Market Rule Changes

This section IV.D of the transmittal letter describes the principal design elements of the day-ahead market enhancements following the general market timeline from bidding through financial settlement.

1. Bidding for the New Day-Ahead Products and Limitations on Awards

a. Imbalance Reserves – Eligibility to Bid and Limitations on Awards

Suppliers will submit separate single segment price and quantity bids for imbalance reserves up and imbalance reserves down, and the market would use these bids to determine optimal imbalance reserve awards.[75] The imbalance

[75] New tariff section 30.5.2.9 addresses the rules on bidding for imbalance reserves.

reserve bid quantity (MW) must be greater than zero and will be limited to the resource's maximum 30-minute ramp capability.[76] Bids for imbalance reserve up and down bid are capped at $55/MWh. As detailed below in section IV.D.2.c of this transmittal letter, $55 is slightly above the 80th percentile of historical spinning reserve bids (based on data from the first half of 2022). If the CAISO did not procure imbalance reserves, it likely would have to meet the operational need by procuring spinning reserves. The $55 value represents the costs the CAISO likely would procure in foregoing procurement of a MW of imbalance reserves. The bid cap on bidding for imbalance reserves thus represents a design decision to limit bidding at the value of the product to the CAISO. The separate bids for the up and down product could have different hourly price/quantity pairs but only a single price/quantity pair in each hour. The market may schedule a resource to provide both forms of imbalance reserves in the same interval if the resource feasibly can provide both products.

Resource types identified in Figure 4 below are eligible to bid for imbalance reserves.[77] Generally, any resource type capable of adjusting their energy output on a 15-minute basis is eligible to provide imbalance reserves. In general, resources must be scheduled to be online to receive an imbalance reserves award. In addition, the CAISO can award imbalance reserves to offline resources if the resource has a start-up time of 15 minutes or less.[78] Even if a resource is eligible to bid for imbalance reserves, for each interval it submits imbalance reserve bids it must also submit an energy bid in the day-ahead market, and it must economically bid the portion of the energy bid that overlaps with the imbalance reserve bid.

After implementation, the CAISO intends to monitor the various eligibility rules to determine how they affect performance of the imbalance reserve product. Based on that analysis, the CAISO may reassess the rules. For example, the CAISO may consider allowing for longer start-up times or longer ramp horizons.

b. Reliability Capacity – Eligibility to Bid and Limitations on Awards

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[76] The market will enforce dynamic ramp capability constraints for resources with dynamic ramp rates.

[77] New tariff section 31.3.1.5.1 states the resource types eligible to submit imbalance reserves bids.

[78] New tariff section 31.3.1.5.2.

Suppliers would provide separate single segment price and quantity bids for reliability capacity up and down, and the market would use those bids to determine optimal awards. The reliability capacity bid quantity (MW) must be greater than zero and is limited to the resource's 60-minute ramp capability.[79] This ramp capability limitation matches the time granularity of the product and ensures awarded reliability capacity can meet the operational needs for which the CAISO has procured it. The CAISO will cap bid prices for the reliability capacity up and down product at $250/MWh, which matches the existing limits on RUC bids. The separate bids for the up and down product could have different hourly price/quantity pairs but only a single price/quantity pair in each hour. An award for the upward product and the downward product are mutually exclusive in the same interval.

The resource types identified in Figure 4 are eligible to bid for reliability capacity. In general, all resources currently eligible for the RUC process would be eligible to provide reliability capacity, including storage. Resources must submit an energy bid in the day-ahead market to qualify for reliability capacity, but the bids need not overlap with the economically bid portion of the energy bid.

Under EDAM, all eligible resources offering energy bids in the IFM (and thus included in the EDAM resource sufficiency evaluation) must submit bids for reliability capacity up at the same quantity as their energy bid plus ancillary service self-provision. This ensures all resources in the EDAM resource sufficiency evaluation are available for RUC, including excess supply that participants offered above their resource sufficiency requirements.

c. Special Considerations – Intertie Resources

Hourly intertie resources would be ineligible for imbalance reserves awards because they are not 15-minute dispatchable, but they would be eligible to provide reliability capacity because that product is based on a resource's 60-minute capabilities. Intertie resource that are 15-minute dispatchable and dynamic intertie resources would be eligible to provide both imbalance reserves and reliability capacity. Further, hourly exports to non-EDAM balancing areas can also provide reliability capacity up at CAISO interties, with the obligation to provide a decremental energy bid to dispatch down the export schedule in the FMM if needed.

Intertie resources also must register a resource identification code in the CAISO master file to be eligible to provide imbalance reserves or reliability capacity. Under existing rules, intertie resources can participate in the CAISO market with a transaction identification code. The additional information provided

[79] Revised tariff section 30.5.2.8 contains rules on bidding for reliability capacity.

through master file registration, such as ramp rates and capacity constraints, is necessary for the market to determine what imbalance reserves and reliability capacity awards are feasible. Any intertie resources receiving imbalance reserves and reliability capacity awards would have to submit an e-tag after RUC with a transmission profile equal to the sum of the IFM energy schedule, plus the imbalance reserves up and reliability capacity up awards.

The CAISO also proposes special rules for high-priority (PT) self-scheduled exports, which are exports supported by a resource with non-RA capacity bid into the day-ahead market. To maintain the tariff-defined export priorities and to indicate that economically-bid exports and lower-priority (LPT) export self-schedules that clear the IFM are at risk of curtailment in the real-time market, the CAISO proposes that the resources supporting PT exports must submit bids for reliability capacity up for the self-scheduled quantity.[80] The reliability capacity up bids will provide the market an economic signal of the PT export resource's willingness to be decremented. If the CAISO converts reliability capacity up on an export, it has the same effect as if the CAISO dispatched up a generator serving CAISO balancing area load.

If PT exports do not explicitly bid for reliability capacity up, the CAISO will consider them in the RUC scheduling run with reliability capacity up bids at penalty prices that maintain the merit order of their energy bids in the IFM. If there is no available physical supply capacity in the RUC above energy schedules to meet both the demand forecast and the economic and LPT exports that cleared the IFM, the CAISO will issue economic and LPT exports a curtailment indication for the real-time market in the form of reliability capacity up awards. Such awards created from these inserted bids will be ineligible for RUC compensation because the inserted bid is a tool the CAISO will use to enforce export priorities. The failure of PT exports to submit an actual bid for reliability capacity up reflects an unwillingness to have the export cut based on economics as reflected through the RUC optimization process. This unwillingness justifies its ineligibility for compensation.

d. Special Considerations – Variable Energy Resources

In general, variable energy resources (VERs) will be eligible to provide imbalance reserves and reliability capacity in both directions based on their registered resource parameters. Additionally, VERs will have to bid for a

[80] Revised tariff section 30.5.1(bb).

reliability capacity up quantity equal to their VER forecasted output.[81] This requirement is necessary to align with the EDAM resource sufficiency evaluation rule that all resource capacity in the EDAM resource sufficiency evaluation must bid into RUC as reliability capacity up. Because the EDAM resource sufficiency evaluation will consider VERs at their forecast, VERs must bid reliability capacity up into RUC at their forecast MW output.[82] If VERs do not bid reliability capacity up to their VER forecast, the CAISO will either: (1) generate a bid price of $0 (if the resource submitted no bid for reliability capacity up); or (2) apply the submitted bid price to the additional required quantity.[83]

To ensure day-ahead market awards to VERs are feasible, the CAISO proposes to apply a capacity constraint in the IFM such that the combined awards of energy, upward ancillary services, and imbalance reserves up cannot exceed the resource's VER forecast. The CAISO proposes to apply a similar constraint in RUC such that the IFM awards plus the reliability capacity up award would not exceed the resource's VER forecast.

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[81] Revised tariff section 31.5.1.2 ("A Scheduling Coordinator representing an Eligible Intermittent Resource must submit RUC Availability Bids for RCU at a quantity equal to their forecasted output based on the forecast referenced in Section 34.1.6").

[82] Independent of EDAM, this rule would be necessary to ensure RUC can consider all physical supply, including the supply forecasted for VERs not bid into the IFM.

[83] Revised tariff section 30.7.3.1 (stating that "to the extent the Scheduling Coordinator for an Eligible Intermittent Resource fails to submit a Bid for RCU up to the quantity of its forecasted output based on the forecast referenced in Section 34.1.6 the CAISO generates a bid for RCU up to the forecasted output").

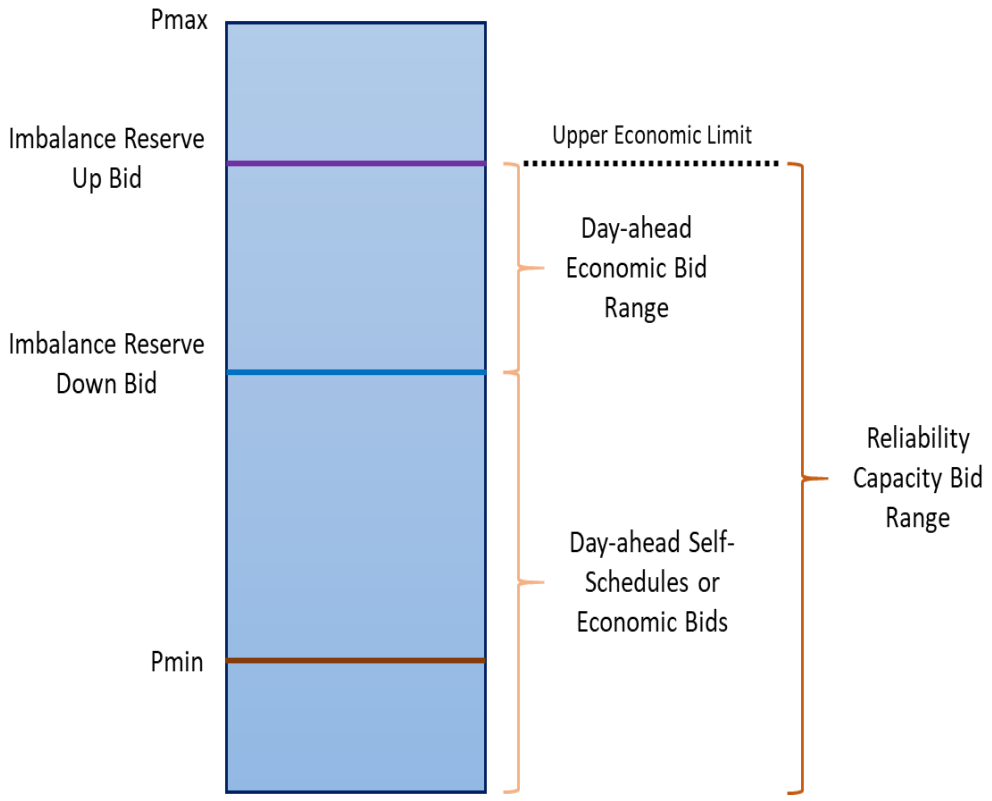
Figure 4

	EN	RCU	RCD	IRU	IRD
Non-Participating Load	Yes	Not Eligible	Not Eligible	Not Eligible	Not Eligible
Virtual Supply	Yes	Not Eligible	Not Eligible	Not Eligible	Not Eligible
Virtual Demand	Yes	Not Eligible	Not Eligible	Not Eligible	Not Eligible
Hourly Block Import	Yes	Eligible	Eligible	Not Eligible	Not Eligible
Hourly Block Export	Yes	Eligible	Eligible	Not Eligible	Not Eligible
15-Min Import	Yes	Eligible	Eligible	Eligible	Eligible
15-Min Export	Yes	Eligible	Eligible	Eligible	Eligible
Dynamic Import	Yes	Eligible	Eligible	Eligible	Eligible
Long-Start Generator	Yes	Eligible	Eligible	Eligible	Eligible
Short-Start Generator	Yes	Eligible	Eligible	Eligible	Eligible
Participating Load w/ 15-Min dispatch capability	Yes	Eligible	Eligible	Eligible	Eligible
Participating Load w/ Hourly dispatch capability	Yes	Eligible	Eligible	Not Eligible	Not Eligible
Variable Energy Resources (Wind/Solar)	Yes	Eligible	Eligible	Eligible	Eligible
Non-Generator Resources (Storage)	Yes	Eligible	Eligible	Eligible	Eligible
Hybrid Resource	Yes	Eligible	Eligible	Eligible	Eligible
Energy Storage Resource	Yes	Eligible	Eligible	Eligible	Eligible
60-Minute Proxy Demand Resource	Yes	Eligible	Eligible	Not Eligible	Not Eligible
15-Minute Proxy Demand Resource	Yes	Eligible	Eligible	Eligible	Eligible
5-Minute Proxy Demand Resource	Yes	Eligible	Eligible	Eligible	Eligible
Reliability Demand Response Resource	Yes	Not Eligible	Not Eligible	Not Eligible	Not Eligible

e. Combining the Rule Sets

To ensure a given resource's combined awards of energy, imbalance reserves, and reliability capacity are all feasible, the CAISO will limit the total awards to the resource's upper economic limit. This term refers to the highest operating level submitted in the resource's energy bid. Figure 5 below graphically demonstrates how these rules interact.

Figure 5



f. Obligations of Resource Adequacy Capacity to Bid for New Products

The CAISO also had to consider whether RA capacity obligations needed adjustment given the new day-ahead market products.

i. Imbalance Reserves Must-Offer Obligation

The CAISO concluded system and local RA capacity would not have an explicit must-offer obligation to submit bids for imbalance reserves. Specifically, system and local RA capacity self-scheduled to the CAISO market would have no obligation to submit imbalance reserves bids. However, RA capacity from resources eligible to provide imbalance reserves (*i.e.*, 15-minute dispatchable resources) would have a must-offer obligation to submit bids for imbalance

reserves on any portion of RA capacity that is bid economically to the IFM.[84] Flexible RA capacity is 15-minute dispatchable and must economically bid to the IFM under existing market rules. The CAISO is not changing these requirements. Therefore flexible RA capacity must submit imbalance reserves bids for their entire range of flexible RA capacity.[85]

These imbalance reserves must-offer requirements will maximize participation of RA capacity in the procurement of imbalance reserve, increasing the competitiveness of the product, improving congestion management, reducing concerns about physical withholding, and helping the CAISO balancing area pass the EDAM resource sufficiency evaluation. Importantly, the proposed tariff revisions will maintain the option for resources to self-schedule energy from generic RA. Without maintaining this option, the CAISO might lose RA capacity from resources that cannot and would not participate by bidding economically.

ii. Reliability Capacity Must-Offer Obligation

RA capacity currently required to provide RUC availability bids will now be required to bid RA capacity for reliability capacity up. Bidding for reliability capacity down will be optional for RA capacity.[86] Marking a change from current practice, the CAISO will not require RA capacity to offer into RUC with $0 availability bids. Instead, RA capacity can bid into RUC at any price between the bid floor and bid cap. This is an important change to facilitate the implementation of EDAM. It would distort the operation of EDAM if all RA capacity were bidding RUC capacity at zero dollars, while resources in the rest of the EDAM area were able to bid economically. Arguably, such a result would suppress RUC prices to the detriment of resources in those other balancing areas that lack an RA capacity contract to compensate them for the zero dollar RUC bidding obligation. Having RA capacity bidding to RUC at zero dollars also would allow EDAM balancing areas to benefit from RA capacity without having contributed to the costs of procuring that capacity.

iii. Real-Time Market Resource Adequacy Bidding

The CAISO proposes maintaining the existing real-time market must-offer obligation. Today, certain RA resources have an obligation to bid or self-schedule in the real-time market even if they do not receive an IFM schedule or binding RUC commitment. The CAISO enforces these obligations through its

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[84] Revised tariff section 40.6.1(5). RA capacity from resources that are ineligible to submit bids for imbalance reserves would retain their existing must-offer obligations and could not submit imbalance reserve bids.

[85] Revised tariff section 40.10.6.1(a).

[86] Revised tariff sections 40.6.1(4) and 40.10.6.1(d).

tariff and through mechanisms like bid insertion, which enable the market to generate real-time bids for eligible RA capacity that does not submit bids and is not on an outage. After operational experience with the new market products, the CAISO will review the existing real-time market obligations.

iv. Resource Adequacy Bid Generation

RA capacity with an obligation to submit reliability capacity up bids will be subject to bid insertion for reliability capacity up.[87] If the scheduling coordinator for RA capacity does not offer it as reliability capacity into the day-ahead market, the CAISO will extend the bid quantity to the required amount using the submitted bid price. If the resource submits no reliability capacity up bid, then the CAISO will insert a bid at the $55 default availability bid.[88] The RUC bid is a single segment, so the CAISO cannot fill the missing quantity at $55 when there is already a submitted bid price for part of the RA capacity.

The CAISO proposes not to generate bids for imbalance reserves even where RA capacity has a must-offer obligation to submit those bids. The CAISO made this decision to minimize the scope of rule changes for RA resources. RA capacity has an existing obligation to bid into for RUC, and the CAISO can generate such bids if necessary. For this reason, generating bids for reliability capacity up merely modifies an existing rule. The same, however, is not the case for imbalance reserves that are an entirely new product. The CAISO did not want to go this far in revising the existing RA rules outside of a dedicated RA policy stakeholder initiative. Implementing generated bids for imbalance reserves also would raise technical complications. For system and local RA, a resource's obligation to bid imbalance reserves is contingent on how it bids energy into the IFM. Generating imbalance reserves bids for flexible RA capacity would be more straightforward, but would it would constitute a notable change in RA policy because flexible RA capacity is not subject to generated bids today.[89]

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87 New tariff section 40.6.8(f).

88 The CAISO discusses the default availability bid in section IV.D.2.c of this transmittal letter.

89 The CAISO has identified a multi-year effort to develop enhancements to the RA program. *See* Policy Initiatives Roadmap 2023-2025, available at http://www.caiso.com/InitiativeDocuments/Final2023-2025PolicyInitiativesRoadmap.pdf.

2. Integrated Forward Market – Market Power Mitigation Pass

a. Rationale for Imbalance Reserves Mitigation

The current market power mitigation process in the day-ahead market applies only to the IFM. The CAISO proposes to adjust this existing mitigation run to consider imbalance reserves up. The CAISO would not mitigate bids for imbalance reserves down or bids for imbalance reserves up from non-EDAM intertie resources certified to provide imbalance reserves, consistent with current policy for energy bid mitigation under which interties are presumed competitive and thus not mitigated.[90]

The CAISO is proposing imbalance reserves mitigation because the existing energy bid mitigation alone would not mitigate potential exercises of market power for imbalance reserves bids.[91] Energy and the new imbalance reserve up product are fungible; the market will attempt to reorient energy and imbalance reserve schedules to avoid awarding resources with high priced imbalance reserve bids in favor of awarding them energy schedules. However, this reaction would force the market to schedule energy from a resource with higher bid costs, which would drive up the total production cost. In this way, suppliers could utilize their position on the grid to exercise local market power, driving up costs to the system and increasing their market payments above competitive levels. The CAISO is not proposing to mitigate bids for imbalance reserves down because mitigation applies in cases where a modeled injection would provide counterflow to a binding constraint. In the case of imbalance reserves down, there is no injection of energy to model.

b. Mechanics of the IFM Market Power Mitigation Pass

The CAISO will adjust the existing IFM market power mitigation pass to account for new ways energy bids may require mitigation and to mitigate bids for imbalance reserves up directly.

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90 *See, e.g.*, System Market Power Mitigation: Revised Draft Final Proposal, at 17 (Sept. 18, 2020) (stating that "the CAISO has not applied a system-level market power mitigation process to its market because it generally has access to large amounts of presumably competitive west-wide power through economic offers at its interties"). This CAISO document is available at http://www.caiso.com/InitiativeDocuments/RevisedDraftFinalProposal-SystemMarketPowerMitigation.pdf.

91 http://www.caiso.com/InitiativeDocuments/Appendix-C-Third-Revised-Straw-Proposal-Day-Ahead-Market-Enhancements.pdf.

In the market power mitigation pass for the IFM, the market will use unmitigated bids to clear bid-in load, bid-in supply, imports, exports, ancillary services requirements, and the imbalance reserve requirements. The market power mitigation pass would evaluate binding transmission constraints in the base scenario (cleared bid-in load), the imbalance reserve up deployment scenario, and the imbalance reserve down deployment scenario for competitiveness.[92]

The CAISO will mitigate energy bids from resources that can provide counter-flow to an uncompetitive constraint in the base scenario or the deployment scenarios. This is because energy marginal prices would have congestion contributions from binding constraints in the deployment scenarios.[93] Resources able to provide counter-flow to an uncompetitive constraint in the upward deployment scenario would also have their imbalance reserve up bid mitigated.

c. Consequences of Mitigation and Default Availability Bids

The CAISO will extend the existing mitigation consequences to imbalance reserve up bids requiring mitigation except that the CAISO will mitigate to the higher of the *Competitive Locational IRU Price* or *IRU Default Availability Bid* (instead of the higher of the default energy bid or competitive locational marginal price).[94]

The *Competitive Locational IRU Price* is the locational price without the non-competitive congestion components from binding constraints in the imbalance reserve up deployment scenario at the location of the mitigated resource.[95]

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92 Revised tariff section 39.7.2.2(B).

93 See the DAME technical description available at http://www.caiso.com/InitiativeDocuments/DraftTechnicalDescription-Day-AheadMarketEnhancements.pdf. The terms $\sum SF_{i,m,t}\,\mu^{(u)}{}_{m,t}$ and $\sum SF_{i,m,t}\,\mu^{(d)}{}_{m,t}$ represent how transmission constraints in the upward and downward deployment scenarios contribute to the LMP.

94 New tariff section 31.2.3.2. "IRU" refers to imbalance reserve up. "IRD" refers to imbalance reserve down.

95 Tariff appendix A, new definition of Competitive Locational IRU Price.

The *IRU Default Availability Bid* is a new concept similar to the well-established default energy bid but with several key differences.[96] Default energy bids are specific to each resource and designed to approximate a resource's variable costs of providing energy. The CASO offers five methodology options for calculating default energy bids.[97] The variable costs of providing energy can be approximated based on generally understood criteria such as generator performance data, fuel costs, and opportunity costs. However, costs related to a resource's ability to provide reserves are more nebulous. Estimating the variable costs of each resource to provide reserves is subject to significant uncertainty. For this reason, the CAISO proposes a static system-wide default availability bid for imbalance reserve mitigation that applies for all resources across all market intervals. This will provide a mitigation "floor" that balances the need to protect consumers against market power, while also protecting suppliers against excessive mitigation by forcing offers below their costs.

The default availability bid will be set at $55/MWh. As with the $55 cap on imbalance reserves offers, this value represents a high percentile value of historical spinning reserve bids, which is the existing market product most similar to imbalance reserves. Specifically, as reflected in Figure 6 below, the $55/MWh value is set at slightly above the 80th percentile of historical spinning reserve bids using historical data from the first half of 2022. Spinning reserve bids are a reasonable approximation of a resource's cost to provide imbalance reserves because the obligations of providing the product are similar. The CAISO will investigate the relationship between spinning reserve bid prices and prevailing gas prices to consider making the default bid scalable by gas prices. After the CAISO and its stakeholders gain experience with imbalance reserves, the CAISO will re-evaluate the default availability bid value with stakeholders and update it as appropriate.

Figure 6: Spinning Reserve Bid Prices (Jan. – June 2022)

Type	Spinning Reserve Bid Price ($/MWh)
50 Percentile	$1.90
60 Percentile	$5.00
70 Percentile	$21.70
80 Percentile	$50.00
90 Percentile	$100.00

96 New tariff section 39.7.4 covers Default Availability Bids.

97 Existing tariff section 39.7.1 describes Default Energy Bids.

As with energy bid mitigation, the CAISO will offer an option for scheduling coordinators to negotiate the default availability bid.[98] Under the negotiated rate option, the scheduling coordinator begins the process by proposing a value that "must represent the costs of providing the underlying product."[99] Once the parties agree on a rate, the CAISO will submit the negotiated default availability bid rate to the Commission through an informational filing. To ensure the negotiated rate remains reasonable, the CAISO will have authority to require a scheduling coordinator to renegotiate availability bids "that have become outdated, are possibly erroneous, or for which the Scheduling Coordinator has changed."[100]

The negotiated rate option initially will not be available to scheduling coordinators because imbalance reserves and reliability capacity are new products, and the CAISO would not have sufficient experience with the products to validate the reasonableness of proposed rates. The option will be available once the "the CAISO certifies through a market notice it has gained sufficient operational experience with Imbalance Reserves and Reliability Capacity to validate that proposed Negotiated Availability Bids correspond reasonably to the underlying costs of providing the products."[101] The CAISO expects this will take approximately one year but, to provide market participants certainty, the negotiated default availability bid option will be available no more than 18 months after the CAISO implements the new products.[102]

d. The CAISO Will Not Trigger Mitigation Initially

The combined effect of the $55 bid cap on imbalance reserves, and the $55 limit on the imbalance reserves procurement, described below in section IV.D.3.b of this transmittal letter, means that the proposed mitigation procedures initially would not be triggered. However, the CAISO anticipates adjusting those parameters over time. The CAISO concluded it was preferable to propose mitigation provisions now to provide a complete market design rather than wait to develop and propose mitigation when the CAISO adjusts those parameters.

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98 New tariff section 39.7.4.1.

99 *Id.*

100 *Id.*

101 New tariff section 39.7.4.2.

102 *Id.*

3. Integrated Forward Market – Procurement

a. Establishing Procurement Targets for Imbalance Reserves

The CAISO has modeled calculation of the imbalance reserve requirement based on its existing methodology for establishing flexible ramping product requirements in the real-time market.[103] The CAISO will use historical data to identify the load, wind, and solar forecast error between the day-ahead market and fifteen-minute market. Based on this historical data, the CAISO will conduct a set of statistical regressions to identify connections between the prevailing load, wind, and solar forecasts for each hour and the historical forecast errors. From this set of regressions, the CAISO will establish the imbalance reserves up and down requirements, which it sometimes refers to as the uncertainty requirements. The CAISO initially intends to set the up and down uncertainty requirements at the 97.5 percentile and 2.5 percentile levels of error, respectively. Consistent with the current approach for the flexible ramping product, the CAISO will specify these percentile levels in the business practice manual.[104] This will permit the CAISO to adjust these parameters after gaining operational experience. The CAISO will calculate a separate requirement for each EDAM balancing area based on historical data for the balancing area, but those separate requirements would reflect the EDAM diversity benefit.

b. Demand Curve for Procuring Imbalance Reserves

The regressions will only establish the imbalance reserves procurement targets, meaning that the targets represent the maximum potential procurement. The actual quantities the CAISO procures will be determined using a stepped demand curve with a penalty price set at $55/MW.[105] The CAISO will calculate separate demand curves for each hour in both directions for each EDAM balancing area.[106]

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[103] Procurement targets for the new imbalance reserve product are addressed in new tariff section 31.3.1.6.1.

[104] Existing tariff section 44.2.4.2; Market Operations BPM, section 7.1.3.1.5 and appendix N.

[105] New tariff section 31.3.1.6.2 describes the procurement curve. The $55 penalty price is the same as the default availability bid**.**

[106] The EDAM resource sufficiency evaluation would not use the imbalance reserve demand curve. Instead, the resource sufficiency evaluation will penalize any imbalance reserve

Using a demand curve represents the relationship between the price of imbalance reserves and the quantity the market will procure. It shows how the market's willingness to procure imbalance reserves changes with the price, helping to establish an appropriate price level while considering the expected cost of not procuring imbalance reserves. The imbalance reserve demand curve thus establishes the price of not fulfilling the imbalance reserve requirement for an hour. This allows the market to determine whether to meet all or some of the upward and downward uncertainty requirements. The market makes this determination by assessing the trade-off between the cost and the value of an incremental unit of imbalance reserves. If the imbalance reserve price is lower than the expected cost of not meeting the uncertainty requirement, the market will continue to procure imbalance reserves. Conversely, if the imbalance reserve price is higher than the expected cost of not meeting the uncertainty requirement, then the CAISO will not procure additional imbalance reserves to meet the balance of the uncertainty requirement.

The market uses penalty prices to establish the priority of different schedules and constraints and to set market prices when schedules or constraints need to be relaxed when there is insufficient supply to satisfy requirements. Setting the penalty price at $55 means the CAISO will not procure the product at any price above that level.[107] The CAISO bases this hard limit on procurement on the same rationale supporting a $55 bid cap for the product – it reflects the high end of the range of spinning reserves offers, which the CAISO would otherwise procure in lieu of imbalance reserves. The CAISO determined imbalance reserves are not worth more than $55/MWh because the CAISO likely will be able to meet the need at that price by procuring an alternative, *i.e.*, spinning reserves. The penalty price thus reflects the CAISO's decision that it should not procure imbalance reserves at a price greater than their value as determined based on historical spinning reserve prices. This procurement curve design also represents a comparable methodological approach to the approach the Commission approved for the Midcontinent Independent System Operator (MISO) for a similar product.[108]

The steps of the procurement curve below the penalty price will resemble that of the flexible ramping product demand curve. The CAISO will calculate demand curves by determining the imbalance reserve requirement that should be

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requirement relaxation at a high penalty price to ensure all economic imbalance reserve bids are used before incurring an imbalance reserve shortfall, which would result in failing the resource sufficiency evaluation in that direction.

[107] On its own, the $55 bid cap would not limit procurement above this level because congestion can drive the price above the bid cap, as seen in the energy market.

[108] *Midcontinent Indep. Sys. Operator, Inc.*, 181 FERC ¶ 61,160 (2022) (approving multi-step procurement curve capped at $31/MWh for MISO's ramp capability product).

relaxed at different price levels to ensure the cost of imbalance reserve awards does not exceed the expected cost of foregoing them. However, instead of the $1,000/MWh cost used in the flexible ramping product calculation, the avoidance cost of imbalance reserves will be set to $247/MWh, which is the lowest penalty price for violating contingency reserve requirements. Basing the curve on a penalty price lower than the flexible ramping product is appropriate because, unlike with the flexible ramping product, a 1 MW shortage of imbalance reserves is far less likely to violate the power balance constraint by 1 MW and trigger the $1,000 penalty prices, which is the basis for procuring the flexible ramping product. This design framework is consistent with the approach approved by the Commission for MISO.

By capping the demand curve values at the default bid price for imbalance reserve mitigation, market participants can gradually gain experience and adapt to the new market design. This approach allows for a smoother transition, reducing unforeseen issues or price spikes that could arise from a more aggressive initial implementation. However, the CAISO will monitor initial market performance closely to ensure the demand curve cap unintentionally does not stifle market efficiency or suppress price signals essential for maintaining system reliability. As the market matures and the CAISO gains more operational experience, it will be crucial for the CAISO periodically to review and adjust the demand curves to reflect the true value of imbalance reserves and the associated scarcity conditions. This process will involve ongoing collaboration between the CAISO, market participants, and other stakeholders to identify potential improvements and to make informed adjustments to market rules based on empirical evidence.[109]

c. Deployment Scenarios and Deliverability

The market will consider transmission constraints when awarding imbalance reserves in the IFM to ensure they are deliverable if deployed in real-time.[110] The CAISO proposes to use upward and downward deployment scenarios similar to those it currently uses to procure flexible ramping product at a nodal level. Under this approach, the CAISO awards the product only if it is simultaneously deliverable in three scenarios: (1) "base scenario" of meeting demand; (2) upward deployment scenario in which imbalance reserves up capacity is converted to incremental energy in real-time to meet net load; and (3) downward deployment scenario in which imbalance reserves down capacity is converted to decremental energy in the real-time to meet net load. Optimizing

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[109] If the CAISO revises the $55 penalty price upward, the market power mitigation measures would spring into effect under their own terms. Thus, any revision of the penalty price would impact the procurement curve and mitigation.

[110] New tariff section 31.3.1.6.3.1.

imbalance reserve procurement based on these three scenarios will help ensure scheduled day-ahead physical supply can meet the uncertainty requirements if deployed without violating transmission constraints.

The upward deployment scenario would ensure supply and imbalance reserves up awards are deliverable to the location where upward net load uncertainty may materialize. Conversely, the downward deployment scenario would ensure supply less imbalance reserves down awards are deliverable to the location where the downward net load uncertainty may materialize. The CAISO will model where uncertainty may materialize in both scenarios by using allocation factors derived from historical data about uncertainty at individual load and VER nodes.[111]

d. Flexible Enforcement of Transmission Constraints

The CAISO does not propose to enforce all transmission constraints in the deployment scenarios. Instead, it proposes a flexible activation/deactivation of individual transmission constraints in deployment scenarios in response to optimization performance, market performance, or operational experience. The CAISO will define the specific constraints it will enforce in the deployment scenarios in the relevant business practice manual.[112]

Simultaneously solving three distinct scenarios will place new computational stresses on the market optimization engine. This stress could increase the time needed to achieve a market solution. Limiting the transmission constraints considered in the deployment scenarios can limit the problems posed by delays in the software reaching a solution.

Market simulation or initial operational experience also may uncover that a few transmission constraints are disproportionately driving clearing prices for the products to unreasonably high levels. Where other market products or manual operation actions could address the operational needs posed on the other side of those constraints in a more cost-effective manner, it may be more prudent not to enforce those constraints in the deployment scenario.

Finally, this flexibility will enable CAISO to collaborate with EDAM balancing areas that may have lower frequency and quantity of binding constraints than the CAISO balancing area to identify the most critical constraints to enforce, so as not to reduce computational performance with negligible market impact.

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111 New tariff section 31.3.1.6.3.2.

112 New tariff section 31.3.1.6.3.1 (deployment scenario flows cannot exceed limits "on transmission facilities identified in the Business Practice Manual").

e. Deployment Factor

The CAISO proposes to implement a tunable parameter – the deployment factor – to control the proportion of imbalance reserve awards that must be deliverable in the deployment scenarios.[113] The deployment factor will be a percentage defined in the business practice manual separately for imbalance reserves up and imbalance reserves down.[114] This parameter will not adjust the percentage of the imbalance reserves procured. The CAISO would still look to procure 100 percent of imbalance reserves target, subject to the procurement curve. Instead, the deployment factor will determine how much of the reserves procured would have to be feasible in the scenario. For example, if the parameter is set to 50 percent, the market will still target procurement of the full imbalance reserve requirement subject to the demand curve, but only half of each imbalance reserve award supply injection and demand withdrawal will be modeled against transmission constraints in the deployment scenarios at each location.

The CAISO intends to set the deployment factor for both the up and down deployment scenarios at 100 percent, meaning the optimization would ensure all imbalance reserves are deliverable in the deployment scenarios. A value of 100 percent also will maximize the robustness of EDAM transfers. A deployment factor set at this value imposes a rigorous deliverability test and maximizes the feasibility of EDAM transfers because they are fully evaluated against physical transmission limits in the deployment scenarios. However, using a configurable parameter, rather than hardcoding the tariff to require 100 percent deliverability, addresses stakeholder concerns about potential excessive congestion costs resulting from the deployment scenarios and virtual arbitrage. Additionally, market simulation or operational experience might indicate a lower value is advisable. For these reasons, the CAISO has concluded that it needs flexibility to consider possible changes to the deployment factor. Any such changes will require changes to the applicable business practice manual and will be subject to stakeholder input through the Commission-approved business practice manual change management process.[115]

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113 *Id.* (deliverability in deployment scenarios assessed "as adjusted by the applicable Deployment Factor").

114 Tariff appendix A, new definition of Deployment Factor.

115 *See* existing tariff sections 22.4.3 and 22.11.

f. Specialized Constraint for Awarding Imbalance Reserves to Storage Resources

The CAISO's tariff and market systems contain various specific rules for storage resources given their unique operating characteristics. That approach is necessary to implement the proposed market products. Specifically, the CAISO proposes to enforce a constraint to ensure ancillary services schedules and imbalance reserves award for storage resources are feasible given the resource's expected state of charge.[116]

4. Residual Unit Commitment – Market Power Mitigation Pass

a. General Description of Reliability Capacity Mitigation

The CAISO currently does not have a RUC market power mitigation pass. The CAISO has reconsidered that approach and now proposes to include a distinct local market power mitigation pass before RUC to assess the competitiveness of bids for reliability capacity up.[117] If that mitigation pass detects the potential for exercising market power, it would mitigate reliability capacity bids. Any mitigated bids would be inputs to the process. Further, to aid in the performance and solution time of the overall day-ahead market, the CAISO proposes to limit the RUC market power mitigation pass to a 24-hour horizon, rather than RUC's optimization horizon that may extend past the trading day.

b. Need to Apply Mitigation

The CAISO and its stakeholders largely have considered RUC mitigation unnecessary in the past given the significant amount of RA capacity bidding into RUC at $0. Market power is not a concern under these circumstances RA resources cannot physically or economically withhold capacity. However, concerns about market impacts in EDAM have lead the CAISO to propose removing the current $0 bidding obligation in RUC for RA capacity. Even if that RA obligation remained in place, the CAISO is concerned that expanding RUC to other balancing areas whose RUC requirements would not be met by RA capacity with a $0 bidding obligation would undermine the current assumption that the RA bidding rules for RUC forestall attempts to exercise market power in RUC.

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116 New tariff section 31.3.1.6.5.

117 The new RUC market power mitigation pass is addressed in new tariff section 31.9.

c. Triggering Mitigation

The market power mitigation pass for RUC will use unmitigated reliability capacity bids to procure reliability capacity to meet the CAISO demand forecast. The CAISO will use load distribution factors to distribute the demand forecast to load nodes in the market footprint. The CAISO will enforce transmission constraints using the same shift factors from IFM. It will model reliability capacity awards as energy flows, and the market would evaluate whether binding transmission constraints are uncompetitive using a dynamic competitive path assessment. Resources that could provide counter-flow to uncompetitive constraints would have their reliability capacity up bids mitigated. The market power mitigation pass will not mitigate reliability capacity down bids. The market also will not mitigate the reliability capacity up bids of non-EDAM intertie resources certified to provide reliability capacity, consistent with existing rules that do not apply mitigation to imports because of the presumed competitiveness of interties.

d. Default Availability Bids as Consequence if Mitigation

The market power mitigation pass will mitigate a bid for reliability capacity up subject to mitigation to the higher of the: (1) default/negotiated availability bid; or (2) competitive locational reliability capacity up price.[118] The competitive locational price for reliability capacity is the locational price of reliability capacity minus the non-competitive congestion components at the location of the mitigated resource. The non-competitive congestion components will be derived as the marginal price of reliability capacity up minus the non-competitive congestion components from binding constraints in RUC at the location of the mitigated resource. The reliability capacity up mitigation will provide a mitigation "floor" to balance the need to protect consumers against market power while also protecting suppliers against excessive mitigation forcing offers below a resource's costs.

The CAISO proposes to apply the same $55 default availability bid it proposes for imbalance reserves to reliability capacity. Scheduling coordinators will have the same opportunity to request a negotiated default availability bid once the CAISO certifies it is prepared to enter into such negotiations. The $55 value is designed to be a conservative value that represents a high percentile value of historical non-RA RUC availability offers. Because the obligations of reliability capacity up are similar to the obligations of a RUC capacity awards, the CAISO believes it likely represents the upper bounds of resource's bid costs for the new product. Having the same default availability bid also produces system benefits and implementation efficiencies. Having the same value also makes it

[118] New tariff section 31.9.2.

easier for market participants to track the functioning of these new market power mitigation measures. The CAISO concluded because it can independently justify the $55 value for both imbalance reserves and reliability capacity, then it is appropriate to use the same value as the default bid for both products.

5. Residual Unit Commitment – Procurement

a. Establishing Procurement Targets for Reliability Capacity

If a balancing area's demand forecast is greater than the physical supply that clears the integrated forward market, the RUC process will procure reliability capacity up to provide upward dispatch capability and/or commit additional units.[119] If the balancing area's demand forecast is less than the physical supply that clears the integrated forward market, the RUC process will procure reliability capacity down to provide downward dispatch capability (but would not de-commit units).

b. Meeting the Procurement Targets

Energy schedules, imbalance reserve awards, and ancillary services awards will be fixed in RUC at their IFM schedules. With those fixed inputs, the RUC optimization will procure the needed reliability capacity for each balancing area based on submitted bids and subject to transmission constraints within balancing areas and across EDAM and external interties.[120]

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[119] The RUC procurement target is addressed in new tariff section 31.5.3.

[120] The processes the CAISO will use to procure to the RUC procurement target are addressed in new tariff section 31.5.5.

c. Transitioning Multi-Stage Generators Down

As part of incorporating the reliability capacity downward product in RUC, the CAISO proposes enhancing RUC regarding how it optimizes awards to multi-stage generating units, which are combined-cycle units and similar resources that operate in distinct operating configurations. Currently, RUC can keep a multi-stage generator in the same configuration or transition the unit to a configuration with a higher output range. When a multi-stage unit needs to be transitioned down to a configuration with a lower output range either to manage congestion or oversupply conditions, the CAISO must issue the resource an exceptional dispatch to move it to that lower configuration. Without creating an explicit functionality for RUC to transition a multi-stage resource to a lower configuration, the resource's ability to provide reliability capacity down would be limited to the downward range within the IFM-committed configuration. That outcome would unreasonably limit the ability of reliability capacity down to provide its anticipated benefits. Accordingly, the CAISO proposes to update RUC to allow it to issue reliability capacity down awards to a multi-stage generating unit that, if converted to energy in the real-time market, would require the resource to transition to a lower configuration than awarded in the IFM.[121] This change to RUC will help manage congestion in the RUC and avoid out-of-market actions by system operators.

d. CAISO Will Maintain Authority for Operators to Manually Adjust RUC Demand Forecast

Implementing imbalance reserves in the day-ahead market should greatly reduce RUC adjustments going forward. However, market operators will still have the authority to use RUC adjustments as needed. Although net load uncertainty is the main reason market operators use RUC adjustments, RUC adjustments can cover other operational risks, such as wildfire risks. Therefore, market participants should not expect the use of operator RUC adjustments in the CAISO balancing area to disappear.[122] The CAISO publishes the RUC load adjustment (MW) and RUC load adjustment reason on OASIS to provide

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[121] The CAISO is not, however, proposing that a reliability capacity down award would result in decommitting a multi-stage generating unit entirely. New tariff section 31.5.5.3 ("RUC shall not Shut Down resources scheduled through the IFM.").

[122] As reflected in new tariff section 33.31.2.4, the CAISO does not propose that its operators have this same authority over RUC load forecasts submitted by EDAM entities.

transparency. The CAISO will continue to do so after implementation of the proposed day-ahead market enhancements.[123]

6. Real-Time Market Obligations from Imbalance Reserves and Reliability Capacity Awards

Resources with awards for imbalance reserves and reliability capacity must provide economic energy bids for the full range of their reliability capacity and imbalance reserve awards in the real-time market.[124] For resources that fail to meet this requirement, the CAISO will insert generated bids in the real-time market at resources' existing default energy bids. Economic bids enable the real-time market to re-dispatch resources to meet real-time system conditions and imbalances. Real-time self-schedules do not allow the real-time market to re-dispatch the resource. Real-time must-offer obligations apply in the hours that a resource has a reliability capacity or imbalance reserve award.

Figure 7 below graphically illustrates the specifics of the minimum real-time market bidding obligations for such resources. A resource must submit economic bids above its day-ahead energy schedule by the amount of imbalance reserves up and reliability capacity up awarded. The resource need not submit additional bids up to its Pmax but may elect to do so. This ensures there are sufficient economic offers to allow the real-time market to dispatch the resource above or below its day-ahead energy schedule. Any portion of a resource's day-ahead energy schedule below the imbalance reserves down and reliability capacity down awards can be self-scheduled or economically bid. A resource cannot submit a self-schedule that exceeds its energy schedule less its imbalance reserves down and reliability capacity down awards. This ensures there are sufficient economic offers to allow the real-time market to dispatch the resource below its day-ahead energy schedule. A resource that can be committed in the real-time market can submit start up and minimum load bids to enable the market to re-optimize the unit commitment decision. This is not a requirement because the resource can elect to self-schedule a portion of its output.

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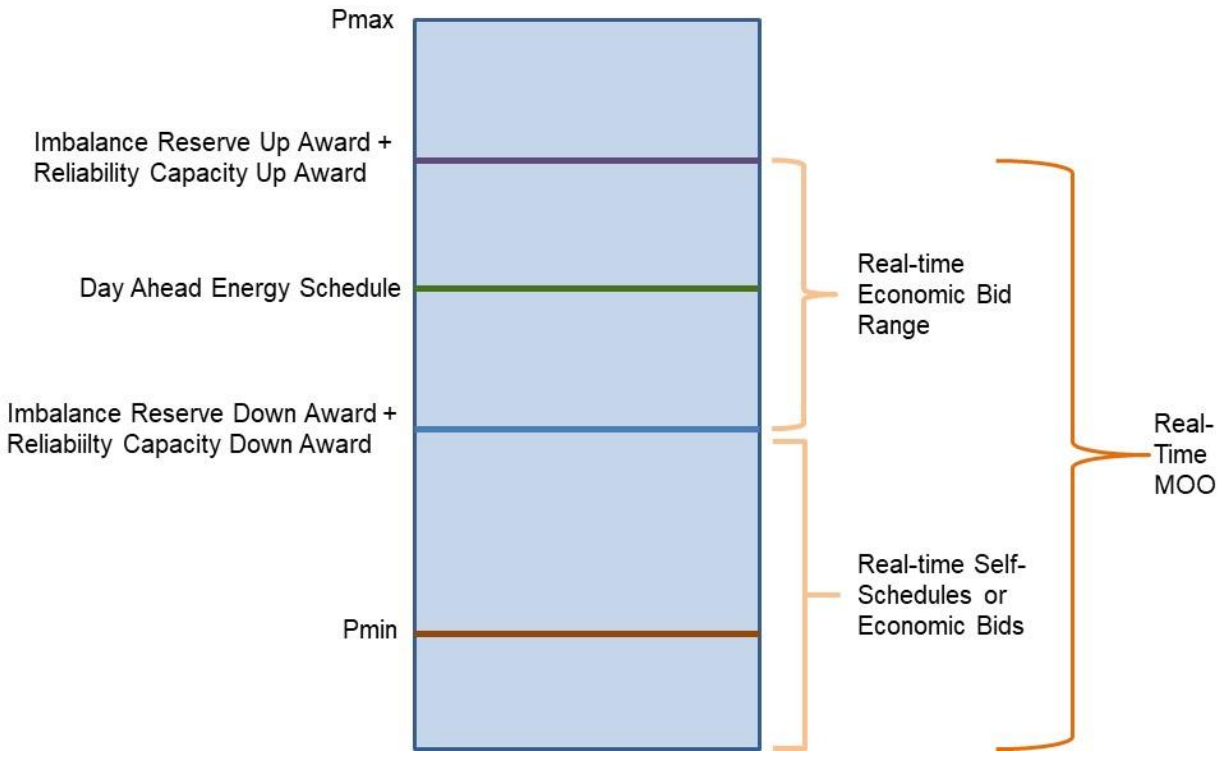
123 The CAISO thus proposes only conforming edits to section 31.5.3.1.

124 New tariff sections 31.3.4 (addressing bidding obligations from imbalance reserves) and 31.5.8 (addressing bidding obligations from reliability capacity).

Figure 7



7. Major Financial Settlements Design Elements of the Day-Ahead Market Enhancements

a. Paying Awards and Assessing Unavailability Charges

The CAISO will pay resources that receive an award for imbalance reserves or reliability capacity the locational price for the direction of the product. These payments are separate from settlement of any energy awards in the real-time market. For both products, the CAISO proposes unavailability charges if a resource is unavailable to provide the product. For both products, the CAISO will also subtract such charges from the procurement costs allocated as specified in section IV.D.7.c of this transmittal letter.[125]

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[125] New tariff section 11.2.1.8 and revised tariff section 11.2.2.2.3 ("RUC Availability Payments rescinded due to Undispatchable Capacity are subtracted from the RUC Compensation Costs allocated per Section 11.8.6.5.3").

The CAISO will consider a resource as having *unavailable imbalance reserves up* capacity to the extent the sum of its energy scheduled in the IFM, upward ancillary services, and imbalance reserves up award minus the five-minute portion of the imbalance reserves award exceeds the upper economic limit as adjusted for outages.[126] The CAISO will consider a resource as having *unavailable imbalance reserves down* capacity to the extent the resource's lower economic limit exceeds the energy scheduled in the IFM minus downward ancillary services minus the imbalance reserves down award plus the five-minute portion of the imbalance reserves award.[127] For both directions, the CAISO will charge back to the resource unavailable imbalance reserves capacity at the higher of the relevant locational price for reliability capacity or the FMM flexible ramping product price in the relevant direction.[128] The "higher of" formulation is necessary to create a stronger performance incentive than would be created through a straight payment rescission rule. Capacity that is not available in real-time reduces the available supply of real-time energy and flexible ramping product and drives up their price. This formulation charges resources commensurate with the harm they cause to the system when unavailable to provide their awarded imbalance reserves.

Unlike the proposed treatment for imbalance reserves, for reliability capacity the CAISO proposes a straight payment rescission for RUC capacity that goes on outage between day-ahead and real-time or fails to submit the required real-time market bids (*i.e.*, the resource has undispatchable capacity for reliability capacity).[129] Unavailable reliability capacity does not affect the price of the flexible ramping price in the same way as unavailable imbalance reserves. A resource will have *undispatchable reliability capacity up* in a settlement interval to the extent the resource's upper economic limit (as adjusted for outages) is less than the sum of energy from IFM, upward ancillary services, imbalance reserves

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126 New tariff section 11.2.1.8.1. The formulation includes the five-minute imbalance reserve quantity because the unavailability of that portion of the imbalance reserves award is accounted for in the proposed deviation settlement covered in section IV.E.2.a of this transmittal letter.

127 New tariff section 11.2.1.8.2.

128 New tariff sections 11.2.1.8.1 (for imbalance reserves up) and 11.2.1.8.2 (for imbalance reserves down).

129 The term "Undispatchable Capacity" is an existing defined term in the CAISO tariff and refers to ancillary services or RUC capacity "that is not available for use due to a derate or Outage of the resource." Tariff appendix A, existing definition of Undispatchable Capacity. The CAISO proposes to amend this definition for RUC capacity also to include cases where the resource fails to submit the required real-time market bids.

up award, and the reliability capacity up award.[130] A resource will have *undispatchable reliability capacity down* in a settlement interval to the extent the resource's lower economic limit exceeds the award for energy from the IFM minus downward ancillary services minus the imbalance reserves down award minus the reliability capacity down award.[131] For both directions, the CAISO will charge undispatchable capacity back to the resource at the relevant locational price for reliability capacity.

Resources that receive both a reliability capacity and imbalance reserve award in the same direction and are not available or only bid a portion of their combined award will have the unavailable capacity allocated first to reliability capacity and then to imbalance reserves.[132] This is consistent with the CAISO's existing approach of assessing unavailability charges in reverse order of the quality of the product. Because reliability capacity is a lower-priority product, the CAISO assesses its unavailability first before deeming any portion of imbalance reserves unavailable.

b. Bid Cost Recovery Implications of the New Products

The CAISO will include in the existing bid cost recovery mechanism the revenue and bid costs from both imbalance reserves and reliability capacity awards.[133] Similarly, the CAISO will continue to keep cost recovery payments from the integrated forward market and the RUC/real-time market separate because they have different cost allocations. The CAISO will include revenue and bid costs from imbalance reserve awards in the calculation of day-ahead bid cost recovery.[134] The CAISO will continue netting surplus revenues from the RUC process against revenue shortfalls in the real-time market. A revenue surplus would occur in the RUC when the marginal price of reliability capacity exceeds a resource's reliability capacity bid cost. Conversely, the CAISO will net any surplus revenues from the real-time market against revenue shortfalls in the residual unit commitment process.

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130 New tariff section 11.2.2.2.1. The reference to the "upper operating limit" in the phrase "the lower of the resource's Upper Economic Limit or upper operating limit," is how the proposed tariff revisions will account for the impact of outages.

131 *Id.* 11.2.2.2.1.

132 New tariff section 11.2.1.8.3

133 The exception for this is the bid cost recovery provisions for RA resources will not consider reliability capacity payments and bids because the CAISO presumes unrecovered RUC costs are accounted for in the bilateral RA capacity contract. Revised tariff section 11.8.3.

134 New tariff section 11.8.2.1.8 (accounting for imbalance reserves bid costs) and revised tariff section 11.8.2.2.1 (accounting for imbalance reserves revenue).

c. Allocating Costs of Procuring the New Products

The CAISO's proposed rules for settling the costs of procuring the new products follow cost causation principles and the two-tiered cost allocation approach the CAISO already uses for several settlements processes.[135] For the four products (imbalance reserves up, imbalance reserves down, reliability capacity up, and reliability capacity down), the CAISO separately calculates a tier 1 quantity and tier 1 price appropriate for each of the four products. A scheduling coordinator's allocation in tier 1 for the product is the product of the tier 1 quantity and the tier 1 price. Specifically, the CAISO proposes to allocate tier 1 imbalance reserves costs to generation resources, load, import, and exports based on deviations between their day-ahead market schedules and their availability in the real-time market.[136] Separately, the CAISO proposes to allocate tier 1 reliability capacity up costs to under-scheduled load and net virtual supply,[137] with tier 1 reliability capacity down costs allocated to over-scheduled load and net virtual demand.[138] The CAISO separately will calculate a tier 1 price calculated at the lower of two possible formulations of the average price of the product. These tier 1 prices are designed to avoid allocating excessive costs to individual parties in tier 1 and is consistent with the CAISO's other two-tier cost allocations. This design decision, however, means some costs potentially would not be recovered from tier 1. The CAISO will allocate any costs from procurement of that product not recovered through the tier 1 allocation in the second tier. For all four products, the CAISO will allocate tier 2 costs *pro rata* to metered demand in that hour.

The tier 1 allocation seeks to allocate as much of the total cost of procuring the product as possible to those entities driving the need for the procurement. The MW quantity in each calculation is a proxy of how much of that product the participant caused the CAISO to procure. Ideally, the CAISO would pursue a direct settlement by allocating the MWs of the procured product directly on a one-to-one basis based on how much of the product each entity in tier 1 caused the CAISO to procure. However, it is impossible to make a direct one-to-one connection. For example, the CAISO cannot make a direct connection between a specific wind resource's deviation between its day-ahead forecast and real-time output and the CAISO's need to procure a specific quantity

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135 Existing tariff sections 11.8.6.4 (IFM Bid Cost uplift allocation) and 11.8.6.5.3 (RUC Compensation Costs).

136 New tariff sections 11.2.1.9.1 (imbalance reserves up tier 1 quantity) and 11.2.1.9.2 (imbalance reserves down tier 1 quantity).

137 New tariff sections 11.8.6.5.3.1 (reliability capacity up tier 1 quantity) and 11.8.6.5.3.3 (reliability capacity up tier 1 price).

138 New tariff sections 11.8.6.5.3.2 (reliability capacity down tier 1 quantity) and 11.8.6.5.3.4 (reliability capacity down tier 1 price).

of imbalance reserves at a specific location because the requirements are determined on a system level, not an individual nodal basis. Also, it would be challenging to determine which loads and resources the CAISO should charge at each nodal location and in what proportion because demand does not bid to buy imbalance reserves. The CAISO therefore proposes the tiered cost allocation process so it can allocate costs in the first tier as closely as possible to what drove the need for the CAISO to incur those costs, while relying on the second tier to ensure full cost recovery for the new products in recognition that all metered demand receives system benefits from those new products.

d. Resource Adequacy Availability Incentive Mechanism

Although resources providing RA capacity will have specific obligations to submit bids for imbalance reserves and reliability capacity, the CAISO does not propose to amend the tariff provisions regarding the Resource Adequacy Availability Incentive Mechanism (RAAIM) to account for these obligations explicitly.

The CAISO considered updating RAAIM to assess bid submission for required amounts of imbalance reserves or reliability capacity. For example, consider a resource providing 100 MW of system RA capacity that submits an economic bid for energy to the day-ahead market for its 100 MW of RA capacity but does not submit the imbalance reserves bid that must accompany the economic bid. The CAISO could have treated the resource as unavailable for purposes of RAAIM because of that failure to submit the imbalance reserves bid.

The CAISO also could have proposed to update RAAIM to assess bidding in the real-time market in compliance with the performance obligations of an imbalance reserves or reliability capacity award. For example, consider a system RA resource that today has a real-time market must-offer obligation that can meet it by submitting either economic bids or self-schedules. Under the day-ahead market enhancements, if that resource submits its required bid for reliability capacity up and RUC awards the bid, then the resource would have a real-time market obligation to submit an economic offer that exists independent of its RA must-offer obligation in the real-time market. If that resource submits a self-schedule to the real-time market, the CAISO could treat the resource as unavailable in the real-time for purposes of RAAIM because the economic offer obligation was triggered indirectly from its status as RA capacity.

Updating RAAIM to account for either of these scenarios, however, would raise undue complication. In the first example, the unavailability is contingent on how the resource meets it must-offer obligation to the day-ahead market. If that same resource, instead had submitted a self-schedule for energy to the day-ahead market, there would be no imbalance reserves bidding obligation.

Configuring RAAIM to account for these conditional obligations would be challenging. In the second example, the CAISO would have to extend RAAIM to assess bidding not directly connected to the RA must-offer obligation, which is a notable expansion of RAAIM's scope. The CAISO concluded there was insufficient justification to confront these complexities and propose these changes.

Most RA capacity is already subject to generated bids that apply where the capacity fails to bid. Thus, RA resources typically incur RAAIM charges only because a unit is on outage, rather than because it failed to bid. Under the proposed new rules, if a resource is on outage it would be on outage for all products, not just for energy or reliability capacity. Also, receiving an imbalance reserves or reliability capacity award creates a must-offer obligation to submit economic bids to the real-time market. However, most RA capacity already has a must-offer obligation to bid into the real-time market, although generic RA can satisfy that obligation with self-schedules. Bid insertion applies to that must-offer obligation. Thus, most RA capacity already participates in the real-time market. Finally, RA capacity will be subject to generated bids for reliability capacity up under proposed revisions to tariff section 40.6.8(f). A reliability capacity up award based on such a generated bid will obligate the resource to submit economic bids to the real-time market. If the resource fails to meet the real-time market must-offer obligation triggered by the awarded reliability capacity, then the CAISO would generate real-time market bids at the default energy bid. Failure to deliver on those bids would subject the resource to the new no-pay rules. This generated bid framework further reduces the likelihood that RA capacity will be unavailable for the new products absent an outage, which still could cause the RA capacity to incur RAAIM. For all these reasons, the CAISO determined there was not justification for updating RAAIM to account for the new products.

e. Grid Management Charge

The market services charge of the grid management charge covers the cost of bidding and clearing the market. Because resources submit bids for imbalance reserves and reliability capacity, the market services charge would apply for imbalance reserve awards, and the CAISO would update the rate to account for these factors.[139] Suppliers may include this cost in their bids.

E. Additional Design Elements

This section IV.E of the transmittal letter describes additional design elements and other aspects of the proposed DAME tariff provisions.

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[139] Tariff appendix F, revised schedule 1.

1. Measures to Accommodate Long-Term Contracts

The CAISO proposes to introduce an optional three-year transitional settlement mechanism, referred to as DAME Transitional Measures, to allocate payments for imbalance reserves and reliability capacity that overlap with RA capacity between the scheduling coordinators for the resource and the load serving entity.[140] Both scheduling coordinators would need to opt in to the transitional measures. Absent the mutual election of the scheduling coordinators for the resource and load serving entity to opt in, the CAISO will allocate all market payments for imbalance reserves or reliability capacity that overlap with RA capacity to the resource's scheduling coordinator.

The optional transitional measures address the concern that existing bilateral RA contracts between load serving entities and suppliers may not address in explicit detail how to allocate the revenue paid to a resource for the new products between the load serving entity and supplier. RA capacity currently is ineligible for RUC capacity payments, so contracts would not necessarily address RUC payments under the market design enhancements. Further, imbalance reserves are a new product, so no contract would have addressed that directly. The transitional measures can serve as a backstop or "gap-filling" mechanism to navigate the transition if the parties cannot agree on implementing their existing contracts or would prefer the CAISO to handle the issue through these temporary settlement provisions.

To opt in, the scheduling coordinators for both the load serving entity and resource must notify the CAISO of their mutual election. If the scheduling coordinators complete the election within the first 60 days of the effective date of new market products, then the CAISO will apply the settlement measures retroactive to the tariff effective date. For elections completed after the 60-day period, the CAISO will apply transitional measures prospectively starting with the first day of the month after the month in which the election was complete. Performing retroactive settlement adjustments creates logistical and administrative burdens on the CAISO that increase as the period of retroactivity increases. The CAISO therefore needed to limit the retroactive settlement period to 60 days. For elections made after this period, the CAISO must wait to begin applying the transitional measures until the start of the next month because of the monthly nature of the RA program and the challenges to the CAISO systems of making mid-month adjustments to how it handles a given quantity of RA capacity. Once under the transitional measures, the scheduling coordinators can mutually agree to terminate the treatment before expiration of the three-year period and may opt back into transitional measures later in the three-year transition period. The election would apply to all RA capacity on RA supply plans

[140] New tariff section 11.2.6.

relating to that resource/load serving entity pair during the transitional period. The CAISO determined it was infeasible to tie the election to a specific MW quantity because the RA capacity shown for a resource/load serving entity pair can fluctuate over time for various commercial reasons, even if the quantity under contract remains static.

The CAISO will calculate an RA resource's overlapping RA capacity by comparing the resource's shown RA capacity against the resource's "stacked" awards for energy, ancillary services, imbalance reserves, and reliability capacity, arranged in priority of quality.[141] The CAISO creates separate "stacks" of the awards for all upward and downward products, with the lowest-quality products on the bottom. The CAISO will consider any portion of RA capacity that overlaps with either the imbalance reserve awards or reliability capacity awards, which are on the bottom of the stack, overlapping RA capacity potentially subject to the RA true-up mechanism. The CAISO will separately calculate the quantity of overlapping imbalance reserves up, imbalance reserves down, reliability capacity up, and reliability capacity down, and it will separately allocate payments for each of the four overlapping types of capacity.

The CAISO will calculate overlapping *imbalance reserves up* as RA capacity shown for the resource in the month minus energy and upward ancillary services.[142] The overlapping *reliability capacity up* is the same value minus any imbalance reserves up award. The CAISO will calculate overlapping *imbalance reserves down* as the energy schedule minus regulation down minus the RA capacity shown for the resource in the month. The overlapping *reliability capacity down* is the same value minus any imbalance reserves down award. If a resource has multiple RA contracts shown on multiple load serving entities' monthly RA plans, the CAISO will determine the portion of overlapping RA capacity associated with load serving entities that "opt in" to the RA true-up mechanism versus the load serving entities that opt out of the transitional measures by distributing the overlapping RA capacity to the contracted load serving entity in proration to the load serving entity's RA showing as compared to the resource's total RA showings.

For both types of imbalance reserves, the CAISO will calculate an opportunity cost component of the market payments for the overlapping capacity and provide that payment to the resource. The CAISO will allocate the balance

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[141] The order for the upward product in descending order of quality after energy is regulation up, spinning reserves, non-spinning reserves, imbalance reserves up, and reliability capacity up (*i.e.*, reliability capacity up is the lowest-quality product). The descending order of quality for the downward products is regulation down, imbalance reserves down, and reliability capacity down.

[142] The value is capped at the imbalance reserves up award. It would be illogical to determine the amount of overlapping capacity that exceeded the actual imbalance reserves award. The CAISO will perform this same capping in determining the overlap for the other three new products as well.

of the payments from the overlapping capacity to the load serving entity. For both types of reliability capacity, the CAISO will allocate payments to the load serving entity with the resource retaining no payment.

Finally, to facilitate bilateral settlement between suppliers and load serving entities, the CAISO will provide load serving entities information about the opportunity cost calculations for RA capacity not subject to the transitional measures. It will be up to the individual parties to determine how to use that information. The CAISO will continue to provide this information even after expiration of the three-year transition period.

2. Real-Time Market Ramp Deviation Settlement

The CAISO proposes a real-time market ramp deviation settlement to avoid potential double-paying resources receiving both an imbalance reserves award in the day-ahead market and a flexible ramping product award in the real-time market. The CAISO also proposes to extend this deviation settlement to WEIM market participants and convergence bidding entities to address a minor existing double payment concern in the current market design that could become more significant under the day-ahead market enhancements and the extended day-ahead market.

a. Ramp Deviation for Imbalance Reserves

Both imbalance reserves and the flexible ramping product compensate resources for providing the CAISO markets with flexible ramping capabilities. The two products have significant overlap in terms of what they seek to accomplish and how resources meet the requirements of the product. This overlap creates double-payment concerns regarding both opportunity costs and forecasted movement.

i. Double-Payment of Opportunity Costs

The CAISO pays resources that receive an imbalance reserve award in the day-ahead market the locational price of imbalance reserves for the corresponding interval. The locational price of imbalance reserves is based on two factors: imbalance reserve bids and any opportunity costs. Opportunity costs for imbalance reserves occur when the market holds a resource out of merit for energy or ancillary services to preserve its ramp capability to provide upward capacity to meet the uncertainty requirements in an interval. Similarly, opportunity costs for energy can occur when the market holds a resource out of merit for energy to preserve its downward capability to provide sufficient ramping to meet the load in a subsequent interval. However, the marginal clearing price

of the flexible ramping product is based only on opportunity costs; there are no bids associated with this product. Thus, a resource awarded both imbalance reserves and flexible ramping product could be paid opportunity costs from both products, even if its energy and ancillary service schedules did not change. This can be seen as an unwarranted double payment.

ii. Double-Payment of Forecasted Movement

In the day-ahead market, all hourly schedules are financially binding across the 24-hour horizon. There are no un-settled "advisory" intervals in the day-ahead market. There is no need to settle forecasted movement in the day-ahead market because the energy prices already reflect the opportunity cost of resources scheduled out-of-merit in previous hourly intervals. However, in the real-time market, only one market interval is financially binding over the optimization horizon. The market produces unsettled "advisory" prices for the remaining market intervals. If the market dispatches a resource for energy in the binding interval to provide ramp capability to meet the energy dispatch of an advisory interval, the resource can incur an opportunity cost if the binding interval price is less than its energy bid. If in this market run the resource incurs an opportunity cost, the advisory interval energy price will increase to reflect this tradeoff. However, the advisory interval energy price is not settled, and when it becomes binding in the next market run, the out-of-merit dispatch is unknown and the opportunity cost is not embedded in the binding energy price. To compensate the resource, the CAISO provides it a separate payment for forecasted movement at the marginal price of ramp capability.[143] This incentivizes the resource to follow its energy dispatch because the resource is indifferent to receiving an incremental energy schedule or a forecasted movement payment because it earns the same profit under both scenarios. However, a resource may receive compensation for forecasted movement both in the day-ahead market (embedded in the energy prices) and in the real-time market (as a side payment). This also can be seen as a double payment.

[143] *See* section 7.1.3.1.4 of the Market Operations BPM for numerical examples.

iii. Ramp Deviation Settlement to Address Double-Payment Concerns

Although imbalance reserves and the flexible ramping product are similar, the products are not identical. Thus, developing an imbalance settlement between the two products is not straightforward like the way the CAISO settles imbalance energy between day-ahead and real-time. In the case of energy, an energy award in the day-ahead market is effectively the same product as an energy award in real-time market. If a resource receives a day-ahead award for energy with the same MW award in the FMM and then RTD, it would be inappropriate to pay that resource once at the day-ahead price, a second time at the FMM price, and third time at the RTD price for the same MW quantity. To address this concern, the existing market only pays or charges that resource for energy in the real-time market that is incremental or decremental to the day-ahead market award. The proposed real-time market ramp deviation settlement aims to address this same concern for imbalance reserves and the flexible ramping product based on the principle that the five-minute ramp capability awarded to a resource in the IFM as either energy movement or imbalance reserves should only receive payment for flexible ramping product in the FMM to the extent the FMM award is incremental to the five-minute capacity procured in the IFM.

The mechanics of the ramp deviation settlement are as follows. The CAISO first must determine the portion of an imbalance reserves award that corresponds to a five-minute interval. The CAISO will determine this *five-minute imbalance reserve quantity* as "the five-minute ramp capable portion of the award measured as the MW quantity of the resource's ramp capability above the Day-Ahead hourly Energy schedule, in the case of IRU, or below that schedule, in the case of IRD."[144] This process breaks down the imbalance reserve award into the same time granularity as a flexible ramping product award. For resources with an award for imbalance reserves up and an upward award of flexible ramping product, the CAISO only settles any incremental award of upward flexible ramping product at the flexible ramp up price.[145] The CAISO compensates the non-incremental quantity of upward flexibility (*i.e.*, the quantity that corresponds to the award for imbalance reserves up) only as imbalance reserves up.

For forecasted movement, the CAISO also will apply a deviation settlement but through a different formulation. Forecasted movement in the FMM

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144 Tariff appendix A, new definition of Five-Minute Imbalance Reserve Quantity.

145 New tariff section 11.25.2.1.1 (for uncertainty awards).

will be subject to a deviation settlement with forecasted movement in the IFM.[146] This requires the CAISO to include in the tariff a concept of IFM forecasted movement, which does not exist today. The CAISO proposes this to be "the algebraic difference of the Day-Ahead Schedule between consecutive hours."[147] The CAISO will pay forecasted movement in the FMM the flexible ramp up price and charge the flexible ramp down price. Therefore, the CAISO proposes to pay a resource with an upward deviation in forecasted movement at the flexible ramp up price for the quantity of the deviation because the deviation provided additional ramping capability. However, the CAISO will also charge it at the flexible ramp down price for the quantity of the deviation because the upward movement increased flexible ramp down requirements. For similar reasons, the CAISO will pay a resource a downward deviation the flexible ramping down price for the quantity of the deviation and charged it at the flexible ramp up price for the quantity of the deviation. This aligns with the deviation settlement between the FMM forecasted movement and the RTD forecasted movement.

b. Ramp Deviation for WEIM Participants

The WEIM also procures flexible ramping product to commit and position resources to meet future load and supply variability and uncertainty. For WEIM participants, forecasted movement from base schedules equals forecasted movement in the integrated forward market. If resources already are scheduled to ramp in WEIM base schedules, then paying them an additional forecasted movement payment in the FMM for the same ramp constitutes a double payment. This is not a significant concern, but the CAISO nevertheless finds it prudent to address it. Therefore, WEIM participants would also be subject to a forecasted movement deviation settlement in the FMM. The CAISO will establish baseline forecasted movement for each resource on WEIM base schedules.[148] The CAISO will charge any deviations using the forecasted movement deviations rules described above for non-WEIM participants.

c. Ramp Deviation for Convergence Bidding

The existing IFM energy price, which is one-half of how virtual bids are settled, has embedded within it the settlement of forecasted movement. The real-time market price, which is the price at which virtual bids are liquidated, does not include forecasted movement. The CAISO settles forecasted movement separately through the flexible ramping product.

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146 New tariff section 11.25.1.2.

147 New tariff section 44.3.4.

148 New tariff section 44.3.6.

There is an existing discrepancy because the two prices that are the basis of settling virtual bids (*i.e.,* convergence bids) are based on different factors. In practice, this discrepancy has not had a material impact. However, the CAISO expects that is likely to change with the new market products. Creating an imbalance reserves product co-optimized with energy in the IFM means that the energy price now implicitly will include an opportunity cost of not providing imbalance reserves. This change in the energy price formation will increase the discrepancy in how convergence bidding is settled. Thus, the CAISO proposes to implement a forecasted movement deviation settlement at the FMM flexible ramping product prices for virtual supply and demand similar to what it has proposed for the WEIM.[149] The forecasted movement would be based on the difference in virtual awards between consecutive hours,[150] and then the CAISO would settle it in the same way it settles deviations for the physical market.[151]

3. Congestion Revenue from Deployment Scenarios

a. The Issue of Displaced Congestion Revenue

The CAISO's election to pursue the two-tiered cost allocation for imbalance reserves has implications on how the CAISO collects congestion revenue and settles congestion revenue rights. The CAISO's cost allocation proposal for imbalance reserves means that the CAISO will not collect congestion revenues to cover the marginal cost of congestion in the imbalance reserve deployment scenarios. Whenever a constraint is binding in the deployment scenarios, there could be a shortfall of congestion revenue collected on that constraint because the CAISO would not otherwise collect congestion revenue on the imbalance reserve flow. The imbalance reserve deployment scenario flow can "displace" energy flows over constrained transmission paths. The energy flow that does not occur would "displace" energy market congestion revenues that would otherwise go to those entities with a claim on congestion revenues, which for the CAISO balancing area would be CRR holders and measured demand. For EDAM balancing areas, the determination of the entities with a claim on congestion revenues would depend on individual transmission service provider tariffs.

The CAISO can demonstrate this dynamic of displaced congestion revenue with a simple example where the system has a single locally congested

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149 New tariff section 11.25.1.2.

150 New tariff section 44.3.5.

151 New tariff section 11.25.1.2.

area with the rest of the system facing no congestion. Consider the marginal energy offer is $20 outside the congested area and $90 inside, while the marginal imbalance reserves up offer is $5 outside the congested area and $7 inside. If the CAISO market uses a MW of the scarce transmission capacity into the congested area for imbalance reserves up instead of energy, then the CAISO would not collect the $70 in congestion revenue. That foregone $70 represents funds that, at least in the CAISO balancing area, would have gone first to CRR holders with CRRs over the transmission line leading into the congested area and then potentially to measured demand if those CRR holders were whole up to their notional value.

The CAISO does not expect the imbalance reserves deployment scenarios to displace significant energy congestion revenues because the trade-off between using transmission for energy as opposed to imbalance reserves depends on the relative difference between the marginal energy and marginal imbalance reserve offers inside and outside the constrained area. In the example above, the market would not use the scarce transmission for imbalance reserves because that would not minimize overall procurement costs. Using the transmission for energy avoids the $70 difference ($90-$20) in energy price, whereas using the transmission for imbalance reserves only avoids incurring the $2 difference ($7-$5) in imbalance reserves up price.

The CAISO expects that the relative differences in marginal energy offers inside versus outside congested areas generally will be higher than the relative differences in marginal imbalance reserves offers inside versus outside congested areas. The CAISO bases this expectation on the lower cost of providing imbalance reserves compared to providing energy. The CAISO expects to use the constrained transmission mostly used for energy. These are reasons the CAISO does not expect the imbalance reserves deployment scenarios will displace significant congestion revenue. Nevertheless, the CAISO acknowledges the possibility this will occur occasionally to the detriment of CRR holders (and congestion revenue recipients in EDAM balancing areas). The CAISO therefore proposes measures to address such displaced congestion revenues.

b. CAISO Proposal to Address Displaced Congestion Revenue

To address the concern of displaced congestion revenue, the CAISO proposes a mechanism to collect congestion revenue rent on imbalance reserve flows and redistribute it to entities entitled to congestion revenues, such as CRR holders. This mechanism will involve calculating displaced congestion revenue from imbalance reserve flows and redistributing it according to existing processes.

The CAISO will determine the displaced congestion revenue from imbalance reserve up flows by calculating and summing (Imbalance Reserve Up Flow) * (Shift Factor) * (Shadow Price of Transmission Constraint) for all binding constraints in the upward deployment scenario.[152] Similarly, the CAISO will determine the "displaced" congestion revenue from imbalance reserve down flows by calculating and summing (Imbalance Reserve Down Flow) * (Shift Factor) * (Shadow Price of Transmission Constraint) for all binding constraints in the downward deployment scenario. This methodology is the formalized way of identifying the $70 of congestion revenue displaced in the example above.

The CAISO will collect this displaced revenue through the proposed imbalance reserve cost allocation.[153] Congestion contributions to transmission constraints in an EDAM balancing area from resources in other EDAM balancing areas contribute to the congestion offset of the EDAM balancing area where the congestion occurs. For EDAM balancing areas, the CAISO will return the revenues to the balancing area to re-distribute to its participants according to its tariff processes. For the CAISO balancing area, the CAISO will allocate the revenue through its existing CRR settlements process.[154] The CAISO proposes to redefine the congestion revenue collection to fund the CRR notional value to include imbalance reserve deployment scenarios.[155] Additionally, the CAISO proposes to redefine the notional value of CRRs to add the marginal cost of congestion differences between source and sink for imbalance reserve deployment scenarios.[156] CRRs represent an entitlement to congestion revenue and, therefore, it is appropriate for their settlement to reflect this new form of congestion revenue.

4. Treatment of Metered Subsystems, Existing Transmission Contracts, and Transmission Ownerships Rights

The CAISO proposes to maintain its existing approach for existing transmission contracts (ETCs) and transmission ownership rights (TORs) in which the valid and balanced portion of ETC or TOR self-schedules will be

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152 New tariff section 31.3.1.6.4.

153 New tariff section 11.2.1.9.

154 Revised tariff section 11.2.4.

155 This proposal will not change the existing CRR nomination and auction processes to account for imbalance reserves. The CRR model will not withhold transmission capacity for the CRR nomination and auction processes.

156 Tariff appendix A, revised definition of Notional CRR Value.

exempt from cost allocations.[157] For both imbalances reserves and reliability capacity, as long as the ETC and TOR self-schedules meet the market participant's demand, the CAISO need not procure additional imbalance reserves or reliability capacity to serve load of those rights holders. Thus, the CAISO proposes to exclude the ETC and TOR self-schedules from the tier 1 and tier 2 cost allocations for both products up to the valid and balanced portion of ETC and TOR self-schedules.

The CAISO proposes one significant change for settlements with metered sub-systems (MSSs).[158] Currently, MSS operators must make an election on four options that govern how the MSS participates in the markets, including whether it opts in or out of participating in RUC.[159] The CAISO proposes to eliminate the RUC opt-out option because creation of a downward product in RUC would not align with an opt-out, and it would create difficulty in designing a resource sufficiency evaluation for EDAM if the CAISO had an internal load bubble that was not part of RUC. Otherwise, the new provisions largely will apply to MSSs just as they apply to other classes of market participant. The CAISO proposes to maintain the current settlement of MSS operator day-ahead energy schedules for those MSSs that have elected gross settlement or net settlement. For both reliability capacity tier 1 and reliability capacity tier 2 cost allocations, MSS operators will settle in a similar manner as non-metered subsystem resources, regardless of their net versus gross selection. An MSS operator that has elected to load follow to manage its own load variability will not receive a reliability capacity tier 1 or a reliability capacity tier 2 cost allocation because it faces other cost exposure in cases where the energy they provide to the market does not closely match its load. For both imbalance reserve tier 1 and imbalance reserve tier 2 cost allocations, MSS operators will settle in a similar manner as non-metered subsystem resources, regardless of their net versus gross selection. Finally, an MSS operator that has elected to load follow to manage its own load variability will receive imbalance reserve tier 1 and imbalance reserve tier 2 cost allocations based on its net portfolio uninstructed deviations.

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[157] ETCs and TORs represent scheduling and transmission rights that pre-dated CAISO operations and entitle holders to a "perfect hedge" against congestion charges, exempting such self-schedules from any congestion charges stemming from the congestion component of the locational marginal price. *See* existing tariff sections 11.2.1.5 and 11.5.7.1.

[158] MSSs are geographically contiguous systems that operate as a standalone electric utility within the CAISO balancing area and balance the own loads and resources within their territory.

[159] An MSS operator also can elect between: net settlements or gross settlements; to load follow or not to load follow with its generating resources; and to charge or not to charge the CAISO for their emissions costs.

5. Clarifying and Conforming Changes to Existing Tariff Provisions

Along with the tariff amendments directly necessary to implement the day-ahead market enhancement design elements discussed above, the CAISO proposes a range of clarifying and conforming changes to existing tariff language.

The CAISO proposes a set of conforming amendments to acknowledge the new products created through this filing. For example, the CAISO is amending existing tariff sections that refer generally to submission of bids for energy and ancillary services to include references to bids for imbalance reserves and reliability capacity or refer generically to "Bids" without reference to the specific products.

The tariff provisions for the day-ahead market heavily use the current defined term "CAISO Forecast of CAISO Demand." To acknowledge that other balancing areas will participate in the day-ahead market by virtue of the EDAM initiative, the CAISO is amending this defined term to refer generally to the "CAISO Forecast of BAA Demand" and updates existing references in tariff section 31.

In several instances, amending the tariff to implement the day-ahead market enhancements highlighted ambiguity and lack of clarity in certain existing tariff provisions that the CAISO is not changing substantively in this initiative. The CAISO is using this filing to improve and clarify these tariff provisions. For example, in tariff section 31.5.4, the CAISO proposes to delete references to several RUC procurement constraints that are no longer necessary. Similarly, in tariff sections 4.12.2 and 4.17.4, the CAISO proposes to reconcile tariff language covering master file parameter registration rules for resource-specific system resources and distributed energy resources, respectively, with the generally applicable master file rules stated in tariff section 4.6.4.[160]

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[160] *Cal. Indep. Sys. Operator Corp.*, 167 FERC ¶ 61,001, at PP 4, 35 (2019) (approving proposal requiring master file parameters to reflect "design capabilities . . . when operating at maximum sustainable performance over Minimum Run Time, recognizing that resource performance may degrade over time").

F. Major Issues of Stakeholder Discussion

1. Demonstrating the Need for the Imbalance Reserves Product

Throughout the stakeholder process, several parties questioned the need for the imbalance reserves product. These parties noted the proposed imbalance reserves product is unlike products in other ISO/RTO markets and suggested the CAISO does not need it. Some parties also commented that the role imbalance reserves are meant to play could be fulfilled by additional ancillary services procurement.

The CAISO does not agree imbalance reserves are an unnecessary product. As an initial matter, the CAISO notes that there is no single just and reasonable market design. All the CAISO needs to do is to demonstrate that its proposal is just and reasonable.[161] There is ample evidence this is the case. In its recent technical conference process on modernizing electricity market design, the Commission itself acknowledged ISO/RTO markets already have faced, or soon may face, challenges from net load variability and directed each ISO/RTO to submit informational reports on this issue.[162]

In response to these challenges, other ISO/RTO markets already have developed similar products. In 2014, MISO "developed the Ramp Capability products to provide additional operational and interchange scheduling flexibility to respond to variations in Load, and the variability of supply from intermittent sources, by maintaining sufficient ramp capability to respond to Load variations by ramping up or down to adapt to system changes."[163] Similarly, on July 6, 2023, the Southwest Power Pool (SPP) implemented its uncertainty reserve

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161 *See, e.g., New Eng. Power Co.*, 52 FERC ¶ 61,090, at 61,336 (1990), *aff'd sub nom. Town of Norwood v. FERC*, 962 F.2d 20 (D.C. Cir. 1992) (proposed rate design need not be perfect, it merely needs to be just and reasonable); *City of Bethany v. FERC*, 727 F.2d 1131, 1136 (D.C. Cir. 1984) (*City of Bethany*) (finding that, when determining whether a proposed rate was "just and reasonable" as required by the FPA, the Commission properly did not consider "whether a proposed rate schedule is more or less reasonable than the alternative rate designs"); *Louisville Gas & Elec. Co.*, 114 FERC ¶ 61,282, at P 29 (2006) (the just and reasonable standard under the FPA is not so rigid as to limit rates to a "best rate" or "most efficient rate" standard, but rather a range of different approaches often may be just and reasonable).

162 *Modernizing Wholesale Electricity Market Design*, 179 FERC ¶ 61,029, at PP 14-15, 19-20 (2022).

163 Transmittal letter for MISO tariff amendment on enhancement of demand curves for up ramp capability and short-term reserve products, Docket No. ER22-2891-000, at 2 (Sept. 20, 2022).

product,[164] which is designed to "determine the amount of upward flexibility that is necessary to address both forecasted and unforeseen changes in system needs, and to procure and price that upward flexibility consistent with least-cost principles . . . ."[165] In approving SPP's proposed product, the Commission identified that procuring a flexibility reserves product in the market "will more appropriately procure and price the system's projected flexibility needs within the market and reduce both the need for SPP operators to rely on out-of-market actions and the resulting make-whole payments."[166] Notably, the products in both SPP and MISO are procured in both the day-ahead market and real-time market timeframes. In this sense, the CAISO's proposal to add the day-ahead market imbalance reserves product to its existing real-time market flexible ramping product brings the CAISO into alignment with SPP and MISO. Further, the Commission has already recognized that products procured specifically to meet ramping needs are distinct from ancillary services.[167]

The CAISO acknowledges imbalance reserves would have attributes that are distinct from those existing products. For example, the CAISO understands those other products are not priced at a nodal level and are not procured based on distinct offers but instead are priced on opportunity costs. These incremental updates on designing a flexible reserves product, however, reflect the specific issues and opportunities seen in Western markets with the accelerated penetration, magnitude and diversity of variable energy resources, not yet seen to the same degree in other markets.

2. Granularity of Procurement and Accounting for Transmission Constraints

Throughout the stakeholder process and especially in the 2023 workshop process, some stakeholders urged the CAISO to adopt a zonal approach to imbalance reserves procurement, similar to the CAISO's procurement of ancillary services. Specifically, stakeholders raised concerns that the CAISO's proposal to model transmission constraints to ensure deliverability at a nodal level would increase costs and add unnecessary complexity because, among other reasons,

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164 *Sw. Power Pool, Inc.*, Notice of Effective Date, FERC Docket No. ER22-914-000 (June 6, 2023).

165 *Sw. Power Pool, Inc.* 180 FERC ¶ 61,088, at P 3 (2022).

166 *Id.* at P 17.

167 *Midcontinent Indep. Sys. Operator, Inc.*, 149 FERC ¶ 61,095, at P 45 (2014) (rejecting protest that a ramp capability product requires comparable settlement treatment to ancillary services).

nodal procurement would require accompanying market power mitigation measures.

Driven by the experience with undeliverable flexible ramping product in the real-time market, the CAISO's preferred approach throughout the process was to procure imbalance reserves nodally to maximize the product's deliverability. During the 2023 workshop process, the CAISO re-examined this question, and published a comparative matrix[168] highlighting the tradeoffs between two major options summarized as follows:

- Nodal approach – procuring imbalance reserves within the IFM (co-optimized with energy and ancillary services) using deployment scenarios to ensure the awards are transmission feasible if deployed as energy.
- Zonal approach – procuring imbalance reserves within the IFM (co-optimized with energy and ancillary services) using zonal procurement similar to ancillary services.

The CAISO considered these concerns, but it maintained the nodal procurement approach with two key revisions to address concerns about the relative costs of imbalance reserves procurement. First, the CAISO proposed the flexible activation/deactivation of individual transmission constraints in deployment scenarios. This will permit the CAISO to consider how specific constraints might drive clearing prices for imbalance reserves and would permit the CAISO and EDAM balancing areas to strike tradeoffs between deliverability and price impacts. Second, the CAISO proposed to use the deployment factor in the imbalance reserves deployment scenarios. Similar to the flexible activation of constraints, the ability to set the deployment factor and reevaluate it on an ongoing basis will permit the CAISO and parties to balance these competing factors.

3. Which Day-Ahead Market Process Should Procure Imbalance Reserves?

Some participants questioned if the CAISO should co-optimize imbalance reserves with energy in the IFM or procure them separately in RUC with reliability capacity. One stakeholder offered a specific counter-proposal for the CAISO to co-optimize procurement of imbalance reserves and reliability capacity in RUC using nodal procurement to respect transmission constraints. The stakeholder's rationale for shifting imbalance reserves to RUC was that it would limit price impacts of imbalance reserve procurement because imbalance reserves would not compete for scarce transmission with energy procured in the IFM.

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168 http://www.caiso.com/InitiativeDocuments/ComparisonMatrix-Day-AheadMarketEnhancements.pdf.

The CAISO considered this approach but determined it was inadvisable. By not co-optimizing energy and imbalance reserves procurement, the CAISO would lose efficiencies in unit commitment, scheduling, and prices. The stakeholder's suggested approach also would lead to inconsistent price formation and modeling with flexible ramping product because imbalance reserves bids no longer would be co-optimized with energy, whereas flexible ramping product awards would still be co-optimized with energy in the real-time market. For these reasons, the CAISO's proposal to co-optimize imbalance reserves with energy in the IFM is reasonable.

4. Hybrid Demand Curve

The stakeholder process considered multiple options on how to procure imbalance reserves to meet the requirements. At different points, the CAISO proposed various penalty price structures, ranging from demand curves to graduated penalty prices that relax the imbalance reserve requirement as the cost increases, as well as strict penalty prices that protect the full imbalance reserve requirement at higher costs.

The CAISO initially proposed in its Draft Revised Final Proposal published on April 6, 2023, to use the demand curve approach described in section IV.D.3.b of this transmittal letter for EDAM balancing areas, but it instead proposed a hybrid imbalance reserve demand curve for the CAISO balancing authority. Under this approach, the CAISO balancing authority would have met half of its the imbalance reserve requirements by a demand curve and half through high penalty prices. This was intended to address concerns of prioritizing low-priority exports over imbalance reserves for the CAISO balancing area's net load uncertainty, ensuring more predictable export volumes.

In the final stages of the stakeholder process, however, the CAISO updated its proposal and decided not to adopt a hybrid approach for the CAISO balancing area. Further evaluation of this approach revealed that a hybrid approach could lead to high prices that exceed the operational benefit of the product. Given the changes to the CAISO's proposal on export bidding in RUC that allow the market to signal exports may not be feasible in real-time, the demand curve approach reduces the CAISO balancing area's exposure to unpredictable export volumes. The CAISO thus concluded the demand curve approach was appropriate for the CAISO balancing area.

5. Limitations on Imbalance Reserves Awards

Early in the stakeholder process, the CAISO initially proposed limiting a resource's imbalance reserves award to its 15-minute ramp capability because imbalance reserves are procured to meet the actual potential 15-minute ramping needs in responding to uncertainty or ramping needs that materialize intra-hour in real-time. Because the CAISO procures to meet a 15-minute need, it seemed reasonable to limit awards to what a resource can provide in 15 minutes.

This proposal, however, raised stakeholder concerns that limiting awards in this way was too restrictive and would raise costs unnecessarily. In that regard, a portion of real-time net load uncertainty arises with longer lead times and correlate between hours.[169] Consequently, the CAISO concluded a 15-minute ramping restriction might be unnecessarily costly because it would require more resources to provide imbalance reserves and may excessively commit 15-minute resources relative to the real-time operational need. Accordingly, the CAISO extended the limitations on imbalance reserves awards from a resource's 15-minute ramp capability to its 30-minute ramp capability. The CAISO, however, maintained the proposed requirement that resources providing imbalance reserves must be 15-minute dispatchable.

6. Tunable/Configurable Parameters

As the stakeholder process came to completion, multiple stakeholders expressed concern about the difficulty of reaching final positions on the proposal without firmly understanding how the new products would work in practice. The CAISO runs a robust market simulation program before implementing most market design changes. However, these participants were concerned the market simulation would occur after finalization of the policy proposal and its submission to the Commission.

In general, the CAISO notes that significant market design changes often are presented for Commission approval prior to market simulation. Nonetheless, in response to these concerns, the CAISO committed to implementing a range of configurable market parameters in the software design to permit the CAISO to make implementation refinements readily based on experience during the market simulation period and during the initial stages of implementation. The CAISO developed this configurability to provide off-ramps and the ability to pivot quickly should the CAISO identify unintended adverse consequences. Consistent with

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169 http://www.caiso.com/InitiativeDocuments/DraftRevisedFinalProposal-Day-AheadMarketEnhancements.pdf, p. 10.

the FPA and the Commission's rule of reason, those parameters that significantly affect the CAISO's rates, terms, and conditions of service are defined in the proposed tariff provisions.[170] Examples include the imbalance reserve demand curve cap and the default availability bid values. Although the CAISO's systems would provide flexibility to adjust these values on short notice, the CAISO would specify the values in the tariff and would not be permitted to change them without Commission approval. The CAISO concluded the specific value of other parameters, such as the deployment factor, do not significantly affect terms of service and need not be included in the tariff under the rule of reason. To maintain the capability to address unforeseen issues quickly, the CAISO elected to define these other values in the business practice manual where possible.

These steps towards greater flexibility addressed stakeholder concerns but raised new concerns regarding transparency on how the parameters will be set at the start, how they will evolve or change, and what discretion the CAISO will have in making those changes. To address these issues comprehensively the CAISO provided a detailed matrix identifying how it intends to tune the configurable elements of the design, both during testing, implementation and after go-live.[171] The CAISO also committed to work with the Department of Market Monitoring to report on the performance of alternative parameters and settings before and after implementation of the day-ahead market enhancements.

G. Connection to EDAM

The proposed day-ahead market enhancements are critical not only for the CAISO balancing authority standing on its own but also for the expanded day-ahead market. The new products will help ensure EDAM participants, including the CAISO, can benefit from the footprint-wide diversity in the day-ahead market's optimization. The CAISO's proposed day-ahead market enhancements address the unique requirements of an EDAM design to ensure transfers determined in that market are both economic and reliable.

1. Benefits of Imbalance Reserves in EDAM

One of the key benefits of EDAM is to utilize diverse resources across multiple balancing areas to meet load and operational needs across the West more efficiently. Imbalance reserves will be an important component of EDAM's ability to drive these efficiency benefits. The CAISO commissioned the CAISO EDAM Benefits Study to estimate EDAM benefits. As part of that study, CAISO

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170 *See, e.g.*, *Cal. Indep. Sys. Operator Corp.*, 119 FERC ¶ 61,053, at P 38 (2007).

171 http://www.caiso.com/InitiativeDocuments/FlexibleParameterMatrix-Day-AheadMarketEnhancements.pdf.

requested a sensitivity study to elaborate on the role of imbalance reserves in the EDAM benefit calculation. The CAISO published this study on November 15, 2022 and held a public webinar to discuss the study results on November 18, 2022. The study results showed imbalance reserve are an important component in realizing the inter-regional dispatch efficiency goals of EDAM. The study found that without the imbalance reserve component, the potential EDAM benefit for the State of California would be about 60 percent lower, with other Western states benefits similarly compromised.

Several factors explain these benefits. First, pooled procurement of imbalance reserves across a wider geographic footprint will reduce EDAM balancing authorities' individual net load uncertainty requirements through the EDAM diversity benefit because the CAISO expects net load uncertainty would not materialize coincidently across the larger and more geographically diverse EDAM market footprint. Second, creating a common market product to address forecast net load uncertainty in the day-ahead timeframe will build confidence in energy transfers between balancing authorities scheduled in the day-ahead market through EDAM. EDAM participants can rely on other EDAM balancing areas to support their transfer obligations because of a common day-ahead market imbalance reserve product. Third, imbalance reserves will more efficiently utilize resource capacity by providing balancing areas access to resources across EDAM.

Besides reducing the overall reserves needed to address net load forecast uncertainty in the day-ahead timeframe, imbalance reserves will more efficiently select the resources to provide these reserves. It will provide EDAM balancing areas access to resources that can provide these reserves at a cost lower than their own resources. In addition, it will provide additional revenue opportunities to balancing areas with more efficient and flexible resources. Imbalance reserve transfers will be firm, ensuring a balancing area can access any imbalance reserves that come from another balancing area to meet its net load uncertainty. Finally, imbalance reserves establish a consistent treatment of uncertainty in the EDAM resource sufficiency evaluation. This ensures equitable evaluation of each balancing area's uncertainty needs.

2. Benefits of Reliability Capacity in EDAM

The rationale for procuring reliability capacity – ensuring physical supply is committed to cover differences in cleared physical supply and net load forecast – applies as much to the CAISO as it applies to other EDAM balancing areas. Using the reliability capacity product, as opposed to some other mechanism, to meet this need across the EDAM footprint will be beneficial. As with imbalance reserves, using a common product across the footprint can minimize the cost of ensuring there is enough physical supply in the EDAM footprint to meet each

balancing area's load forecast by creating a deeper pool of resources from which each balancing area can meet its obligations.

V. The Extended Day-Ahead Market

As a balancing authority, the CAISO fulfills its responsibility to balance supply and demand through its day-ahead and real-time markets, which are synchronized to determine the most economical commitment and dispatch of resources, taking into account system constraints. In recent years, the CAISO has worked to integrate resources located within its balancing authority, including variable energy resources, into the markets the CAISO utilizes to allocate transmission capacity, manage congestion, enable spot energy trading, and reliably operate the CAISO controlled grid. Consistent with the Commission's long-standing direction, the CAISO has worked to remove barriers to entry to the day-ahead market to allow participation by all resources technically capable of providing the products it procures. Simultaneously, the CAISO has advanced numerous initiatives to enhance its markets to reflect price formation and product enhancements, including extending its real-time market to other balancing authorities in the Western Interconnection.

In 2014, the Commission issued the WEIM Authorization Order[172] and the WEIM Rehearing Order,[173] accepting the CAISO's proposal to allow balancing authorities outside of the CAISO to participate voluntarily in the imbalance energy portion of the LMP-based real-time market the CAISO operates within its own balancing area. Since initiation of the WEIM, the CAISO has integrated 22 balancing areas into the advanced market system and established governance structure.[174] The extension of the day-ahead market through EDAM is a direct descendent of these collective efforts.[175]

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172 *See* WEIM Authorization Order 147 FERC ¶ 61,231 (accepting the CAISO tariff amendment to extend its real-time market to other balancing areas).

173 *See* WEIM Rehearing Order, 149 FERC ¶ 61,058 (order denying requests for rehearing and granting in part and denying in part requests for clarification of the WEIM Authorization Order).

174 *See* https://www.westerneim.com/Pages/About/default.aspx.

175 The EDAM framework builds upon the tariff framework developed for the WEIM. In essence, new tariff section 33 houses the majority of the EDAM-specific provisions and is numbered in parallel with other sections of the existing tariff, while other sections have been amended to account for EDAM-specific elements. This tariff framework supports the "applies to" test that defines the scope of joint authority by the WEIM Governing Body and the Board of Governors. *See* EDAM Governance Review Committee Final Proposal, available at https://www.westerneim.com/Documents/EDAM-Governance-Final-Proposal-WEIM-Governance-Review-Committee-Phase-3.pdf.

A. Participation Framework

A balancing authority can elect to provide customers the substantial economic, reliability, and environmental benefits of participating in the CAISO day-ahead market through the EDAM framework proposed in this filing.[176] Notably, the extended day-ahead market is not a new market, rather it takes advantage of the existing CAISO day-ahead market by adding new procedures to accommodate the voluntary participation of other balancing authorities by extension of that market without disrupting the current market structure.[177] Like the WEIM, participation in the extended day-ahead market is projected to provide substantial economic benefits for customers, stemming primarily from the availability of a broad pool of resources to serve load and savings from replacing existing manual processes with the CAISO's automated process. Also, EDAM will provide a wider range of tools to maintain reliability in the face of changing system conditions in the Western U.S. and significant public policy benefits by better integrating variable energy resources.[178]

Participation in the extended day-ahead market by a balancing authority is entirely voluntary, and a balancing authority can terminate its participation with a six-month notice and without exit fees. The primary prerequisite for balancing authorities to join the extended day-ahead market is that the balancing authority already be participating in the WEIM, or that the balancing authority will join the WEIM concurrently with its joining EDAM. A balancing authority that chooses to participate in EDAM will remain responsible for maintaining the reliability of its balancing area, including meeting operating reserve and capacity requirements, scheduling, curtailment of the transmission facilities under its operational control, and manually dispatching resources to maintain reliability. Functional separation of participants in EDAM will remain similar to the WEIM, with each participating entity retaining its associated functions.[179] Retaining these functions empowers participating entities to continue their organizational operation as they do today, while at the same time supporting their participation in a multi-balancing-area day-ahead market. This participation model complements the WEIM and allows

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176 See section II.B of this transmittal letter for a discussion of the benefits of EDAM participation, including estimated financial benefits ranging between $100 million and more than $1 billion annually.

177 In this regard, EDAM builds on the principles of the Commission-approved WEIM. *See* WEIM Authorization Order, 147 FERC ¶ 61,231, at P 74.

178 *See id.* at P 75.

179 *See* new tariff section 33.4(a)-(c); *compare* existing tariff section 29.4(a)-(b) *with* existing tariff appendix B.17, *pro forma* EIM Entity Agreement, section 2.1; *see also* new tariff sections 33.4.3, 33.4.5, and 33.4.7 (requiring the scheduling coordinator to be separate from other functions unless subject to the standards of conduct, similar to the WEIM).

for coordinated participation, including a balancing authority's continued participation only in the WEIM. This means the CAISO will simultaneously support three approaches for interested parties to participate in CAISO markets – real-time market participation only (*i.e.*, WEIM participation), day-ahead market and real-time market participation together[180] (*i.e*., WEIM and EDAM participation), and full participation with the CAISO when a transmission-owning utility becomes a participating transmission owner in the CAISO balancing area.[181]

1. Implementation, Procedures, and Fees

As in the WEIM, a balancing authority seeking to participate in the extended day-ahead market must enter into an implementation agreement that establishes the implementation date for participation in the day-ahead market, requires the CAISO to perform changes to its systems, and specifies the implementation fee so the CAISO can recover its costs.[182] These implementation activities include planning and project management, administrative management, full network modeling of resources, system integration and functional testing, metering and settlements, and operations readiness and training. The implementation process also includes system integration and functional testing, as well as training, market simulation and a period of parallel operations. The proposal also extends the readiness framework established for the WEIM with tailored updates and modifications for EDAM. This will allow the CAISO and participants to confirm they are prepared

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180 *See* new tariff sections 29.1(a)-(c), 29.11(a), 29.29, 29.31, and 29.34 (integrating participation in the day-ahead and real-time markets by establishing the relationship between tariff section 29 and tariff section 33).

181 The Valley Electric Association was the most recent utility outside the CAISO balancing area to join the CAISO as a participating transmission owner. *See Cal. Indep. Sys. Operator Corp.*, 137 FERC ¶ 61,194 (2011) (accepting Transition Agreement that sets forth the terms and conditions for Valley Electric Association to make the transition from the Nevada Power Company balancing area to the CAISO balancing area); *Cal. Indep. Sys. Operator Corp.*, Commission Letter Order, Docket No. ER12-2623-000 (Oct. 15, 2012) (accepting amendment to Transition Agreement); *Cal. Indep. Sys. Operator Corp.*, Commission Letter Order, Docket No. ER13-586-000 (Jan. 17, 2013) (accepting second amendment to Transition Agreement); *Cal. Indep. Sys. Operator Corp.*, Commission Letter Order, Docket No. ER17-695-000 (Feb. 15, 2017) (accepting third amendment to Transition Agreement).

182 *See* section V.A.1 of this transmittal letter.

for production operations, with the option for extension of the implementation date if necessary.[183]

The CAISO will recover its costs to facilitate a new balancing authority joining EDAM through an implementation fee based on its cost of service. For example, the CAISO will apply its fully burdened rate calculated based on the most recently published triennial cost of service study.[184] The actual onboarding costs per balancing area will vary depending on the size and complexity of the effort, and the CAISO will collect a $300,000 deposit from a balancing authority seeking to join the extended day-ahead market to cover the actual start-up costs incurred.[185] The CAISO estimated this deposit amount based on the costs the CAISO anticipates incurring for an average sized balancing area interested in EDAM participation. If the deposit exceeds the actual cost incurred, the CAISO will refund the excess amount including any interest accrued on the remaining deposit. If the actual cost of performing the onboarding service exceeds the deposit, additional deposits in $300,000 increments will be required. Any invoice payment past due will accrue interest, per annum, calculated in accordance with 5 C.F.R. § 1315.10.[186] If the balancing authority joining EDAM fails timely to pay any undisputed costs, the CAISO will not be obligated to continue implementation activities unless and until all undisputed amounts are paid. After successful implementation, the CAISO will provide a report that details deposit(s) received, actual costs incurred, and applicable interest earnings (on deposit balance).

The ongoing administrative costs of EDAM services will consist of the CAISO's existing market services charge and a new system operations charge, both volumetric charges.[187] The market services charge represents fees for the real-time market and the day-ahead market services that the extended day-ahead market offers, and applies to awarded MWh of energy and MW of capacity.[188] The systems operations charge represents the fees for real-time dispatch services, and it applies to metered flows in MWh of supply and demand. Assessing an EDAM systems operations charge in this manner is reasonable

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183 *See generally* new tariff section 33.2 (establishing a readiness framework for EDAM with requirements appropriate for a participant already in the WEIM); *compare with* existing tariff section 29.2(b) (including readiness procedures for the WEIM).

184 http://www.caiso.com/InitiativeDocuments/2023-Cost-of-Service-Study-and-2023-GMC-Update-Jul122023.pdf.

185 New tariff section 33.11.5.

186 This interest rate is also used in comparable circumstances in existing tariff section 29.11(g)(2).

187 New tariff section 33.11.6 and existing tariff appendix F, schedule 1, revised part A.

188 As noted above, balancing authorities participating in EDAM must also participate in the WEIM.

because it represents the CAISO's efforts to manage the dispatch of energy and capacity in day-ahead and real-time. Once a balancing authority begins participating in the extended day-ahead market, it will no longer pay WEIM administrative fees, it will only pay EDAM administrative fees, which cover services provided by the CAISO for both the day-ahead and real-time markets. As participation in EDAM grows, the increase in volumes will contribute to lower market services and system operations rates, all other factors held constant. Under this approach, all customers receiving market services (including customers in the existing CAISO footprint) will benefit from a lower market services rate because the market service charge will be calculated using the incremental day-ahead MWh volumes from participants.

2. Transitional Protective Measures

Several WEIM transitional measures guard against potential adverse reliability or market outcomes in a particular balancing area or in the broader market area. The CAISO proposes to extend these existing measures to the extended day-ahead market for a similar timeframe so the CAISO and participants have mechanisms to respond to potentially adverse reliability or market outcomes during the initial period these participants are integrating into the CAISO's day-ahead market.

Prior to implementation, each balancing authority joining EDAM can request a change in its implementation date if it determines it cannot proceed on that date.[189] Over the years, WEIM entities have exercised their right to change their implementation date during WEIM implementation due to lack of readiness or other factors, such as the timing of requisite approvals. The CAISO believes prospective EDAM entities should have a similar opportunity.[190]

The CAISO may, within 60 days following the implementation date, temporarily suspend participation of a balancing authority in EDAM for a period not to exceed 60 days.[191] Although the CAISO as market operator institutes the suspension, the CAISO would make the decision for any temporary suspension only after consultation and coordination with the participant. This suspension feature has yet to be exercised following a balancing area implementation in the

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189 New tariff section 33.2.7; *compare with* existing tariff section 29.2(b)(6)(B).

190 The CAISO tariff refers to a balancing authority participating in EDAM as an EDAM entity. This transmittal letter generally refers to balancing authorities participating in EDAM.

191 New tariff section 33.1.1; *compare with* existing tariff section 29.1(d). This provision has never been invoked in the WEIM during its nearly ten years of operation, and would likely only be invoked in response to a significant and unexpected market or system operational issue arising at the onset of EDAM participation.

WEIM but remains a prudent safeguard at the outset of EDAM operation within a balancing area.

The WEIM transitional price discovery mechanism is another important, existing feature that will also apply to the extended day-ahead market. For a period of six months following implementation, the CAISO will not apply certain transmission constraints and will relax certain transmission and/or power balance constraints.[192] In these circumstances, the CAISO will determine prices consistent with other provisions of its tariff, effectively substituting the last economic bid for what would otherwise be a parameter price. This feature has helped balancing areas transition to the WEIM and will similarly help them transition to EDAM.

The CAISO also proposes to extend its day-ahead price correction authority from five business days to 10 business days for a three-month period following an EDAM implementation date.[193] Extending the window for the CAISO to assess and implement EDAM price corrections will help facilitate resolution of any lingering implementation-related issues. This protective measure has been a valuable tool in the WEIM, and it should apply to EDAM for the same reason.

Finally, the CAISO will apply an EDAM measure that is available beyond initial participation in the WEIM. Specifically, the CAISO may interrupt balancing area participation in the market when operational circumstances have caused or are likely to cause abnormal system conditions that require immediate action to maintain system reliability or there is a communication failure that prevents access to CAISO systems.[194] In these instances, although the CAISO makes the ultimate decision, the CAISO will coordinate closely with the affected balancing authority to assess whether interruption is necessary to ensure reliable operation. This measure will also extend to the CAISO balancing area if isolation from the rest of the EDAM market area is necessary, while supporting the separate running of the day-ahead market within its own balancing area. This is important in limited circumstances to allow interruption of the market and maintain system reliability.

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192 New tariff section 33.27.1; *compare with* existing tariff section 29.27(b). This transitional pricing period may be extended beyond six months, but an extension requires Commission approval.

193 New tariff section 33.35; *compare with* existing tariff section 29.35.

194 New tariff section 33.7.4; *compare with* existing tariff section 29.7(j). The CAISO has exercised this WEIM authority. For example, the CAISO has temporarily interrupted a balancing area's participation in the WEIM due to transmission outages that electrically separated two participating balancing areas.

3. Participants in Each Balancing Area

There will be four identified participant roles in each balancing area participating in the extended day-ahead market, versus two in the WEIM. A scheduling coordinator must represent each participant undertaking these roles.[195]

The first role is a balancing authority that enables EDAM participation in its balancing area. The CAISO refers to this participant as an EDAM entity, and it will be an extension of the WEIM entity function.[196] Accordingly, during the implementation process, an existing or new WEIM entity will enter into EDAM Entity Implementation Agreement with the CAISO and an addendum to its EIM Entity Agreement with the CAISO, which agreements will be effective within the balancing area according to their terms. The second participant role is a resource owner or operator, referred to as an EDAM resource, which will enter into an addendum to its EIM Participating Resource Agreement with the CAISO. The third participant role is an EDAM transmission service provider, which will enter into an EDAM Transmission Service Provider Agreement with the CAISO.[197] The fourth participant role is an EDAM load serving entity, which will enter into an EDAM Load Serving Entity Agreement with the CAISO.[198]

4. Participation in EDAM Versus the WEIM

The CAISO's day-ahead market optimizes all supply and demand within a balancing area, including settlement of the day-ahead market awards, operation of the real-time market based on the day-ahead market schedules, and settlement of differences between day-ahead market schedules and real-time market results. This structure requires participation in the day-ahead market, through either an economic bid or a self-schedule, by all supply and demand within a balancing area; otherwise, the day-ahead market would not clear as designed. The extended day-ahead market accounts for these differences through additional roles and responsibilities applicable to the associated day-ahead market functions and integration of these roles and responsibilities with the associated real-time market functions.

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195 New tariff section 33.4; *compare with* existing tariff section 29.4.

196 Tariff appendix A, new definition of EDAM Entity.

197 In many cases, a balancing authority participating in EDAM as an EDAM entity will be the only or most significant transmission service provider in a balancing area. Due to the need to coordinate with transmission service providers on certain aspects of EDAM, including transmission availability issues, the CAISO has determined it will be beneficial to have a direct contractual relationship with all transmission service providers in the EDAM area.

198 The various types of agreements described above (including scheduling coordinator agreements) are discussed in greater detail in section V.A.6 of this transmittal letter.

In the WEIM, resources are divided into: (1) those eligible to participate and registered to submit bids into the real-time market, referred to as EIM participating resources, and (2) all other resources within the WEIM balancing area, which are registered as non-participating resources and are ineligible to submit bids in the real-time market. The balancing authority submits base schedules to represent the expected operation of non-participating resources and intertie transactions in the WEIM. The CAISO issues dispatch instructions only to WEIM participating resources and settles the delivered energy and imbalance energy directly with the scheduling coordinator for the participating resource. The CAISO settles imbalances from the base schedule with the balancing authority, not the resource owner or operator. Base schedules also reflect forecasted demand within the balancing area, and the CAISO settles imbalance between the base schedule and the metered quantity with the balancing authority. This structure is reasonable for operating a real-time market providing imbalance energy service within a participating balancing area within the operational hour, but this structure is insufficient for extension of the day-ahead market because all supply and demand resources must be available for the optimization to clear within each balancing area and establish feasible energy and capacity transfers between balancing areas.

All resources in a balancing area participating in EDAM will be required to submit bids or self-schedules into the day-ahead market,[199] which will produce an end result similar to base scheduling in the WEIM through self-scheduling of supply and the exercise of existing transmission rights. A self-schedule in the market indicates the resource does not have an economic offer expressing a willingness for the market to optimize and commit it. Self-scheduled resources are price-takers that want their output to flow irrespective of market prices, and they typically have existing transmission rights to deliver that generation. Because they will be obligated to submit bids or self-schedules, resources that are non-participating resources in the WEIM and currently represented by a WEIM entity scheduling coordinator must establish a resource-specific scheduling coordinator relationship with the CAISO as an EDAM resource. It will be unnecessary for EDAM participants to submit base schedules in the real-time market because EDAM participants will have day-ahead market schedules that serve the purpose of WEIM base schedules.

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[199] As a result of this different market design approach, the tariff terminology for resources in EDAM is different from the tariff terminology for resources in the WEIM. An EDAM Resource Facility is the physical resource in an EDAM balancing area that can deliver energy, curtailable demand, demand response services, or similar services. An EDAM Resource is the owner or operator of an EDAM Resource Facility. Tariff appendix A, new definitions of EDAM Resource and EDAM Resource Facility. By comparison, an EIM Resource is the physical resource, and an EIM Participating Resource is the owner or operator of an EIM Resource. Tariff appendix A, existing definitions of EIM Resource and EIM Participating Resource.

The CAISO day-ahead market clears supply and demand bids, which requires load serving entities within a balancing area in EDAM to self-schedule or economically bid their demand. As the starting point, the CAISO would look to the scheduling coordinator for demand within the balancing area to bid and self-schedule. Having a single scheduling coordinator for all load serving entities in a balancing area participating in EDAM supports the coordination required for forecasting and the reliable and efficient submission of demand bids into the day-ahead market. The CAISO can also enable individual load serving entities within a balancing area to represent their demand in the market separately from the rest of the demand in the balancing area. The individual load serving entity would need to work with the balancing authority and the CAISO through the implementation process to model its demand separately. Separating individual load serving entities within a balancing area will require separate metering that satisfies the standards of the balancing authority and the CAISO tariff. Additionally, the load serving entities would need a scheduling coordinator to represent their demand in the market and submit additional information, including meter data, to support settlement, and enter into an EDAM Load Serving Entity Agreement.[200]

5. Stakeholder Positions on the EDAM Participation Framework

Stakeholders broadly supported a voluntary participation model for EDAM, similar to the WEIM, which does not bind participants to lengthy participation timeframes and provides for ease of exit if necessary. Stakeholders also sought and broadly supported application of WEIM transitional protective measures to the extended day-ahead market that allow entities and the CAISO to manage participation risk to the extent there are unexpected operational, reliability, or financial impacts from participation. Stakeholders largely supported the role and function of the day-ahead market and incorporation of the proposed enhancements to EDAM.

Some stakeholders sought the ability to use base schedules for resources in EDAM, similar to the WEIM. The CAISO explained, however, that to provide the benefits of the day-ahead market to customers in EDAM, unlike the WEIM, all resources in a balancing area must be represented in the market and submit bids (economic bids or self-schedules). Such resources will receive a day-ahead schedule that serves the same purpose as a base schedule, thus removing the option to submit base schedules. Base schedules are reasonable for operating a

[200] As discussed in section V.C.1 of this transmittal letter, balancing authorities participating in EDAM may elect at the onset of their participation whether to implement virtual bidding in their balancing areas in the day-ahead market. In balancing areas that implement convergence bidding, load-serving entities will also be able to engage in convergence bidding to promote convergence between day-ahead and real-time prices.

real-time market providing imbalance energy service within a participating balancing area, but this structure is not sufficient for extension of the day-ahead market because all supply and demand resources must be available for the optimization to clear within each balancing area and establish feasible energy and capacity transfers between balancing areas.

Other stakeholders sought assurance resources can participate in the extended day-ahead market without modification of underlying supply contracts. The CAISO clarified that, assuming the entity holding the supply contract and the entity serving its load with the resource have the same scheduling coordinator, the CAISO settlement with the single scheduling coordinator for any energy payments can be managed and redistributed in accordance with the terms of its contract to ensure the contract price is covered. The scheduling coordinator can then manage redistribution of those payments in accordance with the terms of its contract to ensure the contract price is covered. This treatment would support EDAM settlements for resources subject to regulatory must-take requirements or with special contractual provisions regulated by state commissions without the need for fundamental contractual changes.[201]

[201] Some contracting parties may wish to enter into supporting arrangements to settle differences between the market price and the contract price, which are relatively common and will not alter fundamental supply arrangements. The CAISO will continue to support inter-scheduling coordinator trades within its balancing area but will not extend this feature to EDAM, which is consistent with the WEIM.

6. EDAM Agreements

a. Overview of EDAM *Pro Forma* Agreements and Addenda

The CAISO is including in Appendix B of the CAISO tariff various *pro forma* agreements, and addenda to existing *pro forma* agreements, that will enable participation in the day-ahead market by an EDAM entity, EDAM entity scheduling coordinator, EDAM resource, EDAM resource scheduling coordinator, EDAM transmission service provider, and EDAM load serving entity as follows.

b. EDAM Entity Implementation Agreement

A balancing authority that currently participates in the WEIM and seeks to participate in EDAM, or that seeks to begin participating in the WEIM and EDAM concurrently, must first execute a *pro forma* EDAM Entity Implementation Agreement with the CAISO. This agreement requires the prospective EDAM entity to compensate the CAISO for the start-up costs necessary to incorporate the EDAM entity into the day-ahead market. The agreement also establishes the implementation date for participation in the day-ahead market and requires the prospective EDAM entity to sign a *pro forma* addendum to its existing EIM Entity Agreement no later than 90 days prior to its implementation date.

Under the agreement, the CAISO will perform changes to its systems, in accordance with the CAISO tariff, to allow the prospective EDAM entity to participate in the day-ahead market. In addition to the implementation activities and fee discussed in section V.A.1 of this transmittal letter, the prospective EDAM entity must satisfy the CAISO tariff requirements applicable to an EDAM entity prior to its implementation date. Specifically, the prospective EDAM entity must: (1) demonstrate that it satisfies all qualifications for participation as an EDAM entity, (2) show that it is authorized to make transmission available in its balancing area consistent with the CAISO tariff and the applicable transmission service tariffs, contracts, rules, procedures, or other arrangements, (3) enter into an EDAM addendum to its EIM Entity Agreement with the CAISO governing its participation in the day-ahead market, and (4) secure representation by an EDAM entity scheduling coordinator.

The CAISO may terminate the EDAM Entity Implementation Agreement: (1) under new tariff section 33.1; or (2) if the prospective EDAM entity materially defaults under the agreement or new tariff section 33 and does not cure the default within 30 days. The prospective EDAM entity may terminate the agreement, without penalty, by giving at least 30 days written notice to the CAISO. In the event of termination, the CAISO will make every effort to halt work and related costs on the implementation as soon as practical and refund any

payments provided by the prospective EDAM entity in excess of costs already incurred by the CAISO.

The agreement also discusses how the CAISO will settle deposits, including any refunds owed. In addition, the EDAM Entity Implementation Agreement provides the prospective EDAM entity the right to audit the CAISO's records to verify costs incurred by the CAISO. The remaining terms are identical to or consistent with those contained in other similar *pro forma* agreements.

c. EDAM Addendum to EIM Entity Agreement

Any balancing authority that seeks to participate in EDAM must enter into a *pro forma* EDAM Addendum to its EIM Entity Agreement with the CAISO. The prospective EDAM entity must execute the addendum no later than 90 days before its designated implementation date.

This addendum incorporates new tariff section 33 into the underlying EIM Entity Agreement, thereby allowing an EIM entity also to participate as an EDAM entity in the day-ahead market. The addendum obligates the CAISO to provide open access to the day-ahead market under the terms of the CAISO tariff. In turn, the EDAM entity will have provisions in its tariff to enable operation of the day-ahead market in accordance with the CAISO tariff. The balancing authority also must ensure it is represented by an EDAM entity scheduling coordinator, which may be the EDAM entity, itself, or another entity certified by the CAISO to perform the requisite function. Under the addendum, the EDAM entity must provide information to the CAISO regarding the network topology of its facilities within its balancing area, non-participating resources, and loads in accordance with the CAISO tariff. The EDAM entity also will make available for use in the day-ahead market transmission capacity on its system that is not otherwise encumbered, reserved, scheduled, or being used by its transmission customers or others. Finally, the EDAM entity will provide the CAISO with real-time information regarding the availability of transmission capacity for use in the day-ahead market.

Once the addendum becomes effective, it will remain in effect until terminated with 180 days' notice pursuant to the same process set forth in the underlying EIM Entity Agreement. If the balancing authority terminates its participation in EDAM, it may continue to participate in the WEIM under the terms of the underlying EIM Entity Agreement.

d. EDAM Addendum to EIM Entity Scheduling Coordinator Agreement

Any EIM entity scheduling coordinator that wishes to act as an EDAM entity scheduling coordinator must execute a *pro forma* Addendum to the EIM Entity Scheduling Coordinator Agreement.

The addendum, which incorporates new tariff section 33, requires the EDAM entity scheduling coordinator to perform all associated obligations under tariff section 33, including obligations related to scheduling, settlement, system security policy and procedures, billing and payments, confidentiality, compliance with standards of conduct requirements, and dispute resolution.[202] The EDAM entity scheduling coordinator also will have primary responsibility to the CAISO for the payment obligations under tariff section 33. In addition, it will ensure that each EDAM entity that it represents executes an EDAM Addendum to the EIM Entity Agreement.

Once effective, the addendum to the EIM entity scheduling coordinator agreement will remain in effect until terminated under the same process set forth in the underlying agreement. If the EDAM entity scheduling coordinator terminates its participation in EDAM, it may continue to participate in the WEIM as an EIM entity scheduling coordinator under the terms of the underlying EIM Entity Scheduling Coordinator Agreement.

An EDAM entity scheduling coordinator must have the same scope for its EDAM participation as it has for its corresponding relationship with the EIM entity it represents in the WEIM, *i.e.*, the scope of participation in the day-ahead market must correlate directly with the scope of participation in the real-time market to ensure alignment of scheduling coordinator's responsibilities in the CAISO markets.

e. EDAM Addendum to EIM Participating Resource Agreement

The owner or operator of each resource in an EDAM balancing area must participate in the day-ahead market as an EDAM resource and execute a *pro forma* Addendum to the EIM Participating Resource Agreement. The addendum, which incorporates new tariff section 33, requires the EDAM resource to perform

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[202] Consistent with new tariff section 33.4.3, a governmental entity that is an EDAM entity scheduling coordinator may also be an EDAM resource scheduling coordinator or a scheduling coordinator for one or more EDAM load serving entities if it agrees to comply with standards of conduct equivalent to those set forth in 18 C.F.R. § 358.

all associated obligations under tariff section 33. Owners and operators of resources in a balancing area participating in EDAM that are not currently EIM participating resources are required to enter into both a new EIM Participating Resource Agreement and an EDAM addendum to that agreement. Each EDAM resource also must be represented by an EDAM resource scheduling coordinator.

The EDAM resource also must register its resource with the CAISO as an EDAM resource facility. Accordingly, the addendum requires listing in Schedule 1 of the underlying EIM Participating Resource Agreement all EDAM resource facilities not already included in Schedule 1 as an EIM participating resource, including the operating characteristics of the EDAM resource facilities. The EDAM Resource must notify the CAISO of any changes to these characteristics under the requirements in the underlying EIM Participating Resource Agreement.

Once the addendum becomes effective, it will remain in effect until terminated under the same process set forth in the underlying EIM Participating Resource Agreement. If the EDAM resource terminates its participation in EDAM, it may continue to participate as an EIM participating resource under the terms of the underlying EIM Participating Resource Agreement.

f. EDAM Addendum to EIM Participating Resource Scheduling Coordinator Agreement

Any EIM participating resource scheduling coordinator that wishes to act as an EDAM resource scheduling coordinator must execute a *pro forma* Addendum to the EIM Participating Resource Scheduling Coordinator Agreement. A new entity that wishes to act as an EDAM resource scheduling coordinator must execute both the EIM Participating Resource Scheduling Coordinator Agreement and the addendum.

The addendum, which incorporates new tariff section 33, requires the EDAM resource scheduling coordinator to perform all associated obligations under tariff section 33, including obligations related to scheduling, settlement, system security policy and procedures, billing and payments, confidentiality, compliance with standards of conduct requirements, and dispute resolution. The EDAM resource scheduling coordinator also will have primary responsibility to the CAISO for the payment obligations under tariff section 33. In addition, it will ensure that each EDAM resource for which it submits bids enters into an Addendum to the EIM Participating Resource Agreement and an EIM Participating Resource Agreement where one is not already in effect.

Once effective, the addendum will remain in effect until terminated pursuant to the same process set forth in the underlying EIM Participating Resource Scheduling Coordinator Agreement. If the EDAM resource scheduling coordinator terminates its participation in EDAM, it may continue to act as a scheduling coordinator in the WEIM as an EIM participating resource scheduling coordinator under the terms of the underlying EIM Participating Resource Scheduling Coordinator Agreement. An EDAM resource scheduling coordinator must also have the same scope for its EDAM participation as it has for its corresponding relationship with the EIM participating resources it represents in the WEIM.

g. EDAM Transmission Service Provider Agreement

An EDAM transmission service provider is a transmission service provider that owns transmission or has rights to provide transmission service on an EDAM intertie or within an EDAM balancing area that makes transmission service available for use in the day-ahead market through an EDAM entity.[203] This is a new role for EDAM to clarify the roles associated with transmission available in the day-ahead market. An entity may not qualify as an EDAM transmission service provider solely by being a network integration transmission service customer of another entity. All transmission service providers within a balancing authority participating in EDAM must execute the *pro forma* EDAM Transmission Service Provider Agreement.

The agreement, which incorporates new tariff section 33, requires the EDAM transmission service provider to perform all associated obligations under tariff section 33, including having provisions in its tariff to enable operation of the day-ahead market and ensuring scheduling coordinators represent its transmission customers that submit schedules in the day-ahead market. The EDAM transmission service provider must use the EDAM entity scheduling coordinator for its balancing area as its sole scheduling coordinator. This ensures a single EDAM point of contact for balancing authority and transmission owner communications regarding operation of the transmission facilities in the balancing area. The EDAM transmission service provider must provide information about transmission capacity available to the day-ahead market to its EDAM entity scheduling coordinator and the CAISO.

The CAISO may terminate the agreement if (1) the EDAM transmission service provider materially defaults under the agreement or tariff section 33 and does not cure the default within 30 days, or (2) the EDAM entity for the balancing area where the EDAM transmission service provider is located terminates participation in EDAM. If the EDAM transmission service provider will no longer

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[203] Tariff appendix A, new definition of EDAM Transmission Service Provider.

make transmission service available in the day-ahead market, it may terminate the agreement on 180 days' notice, provided the termination must be concurrent with the termination of participation in the day-ahead market by the EDAM entity for the balancing area where the EDAM transmission service provider operates. The remaining terms in the agreement are identical to or consistent with those contained in other similar *pro forma* agreements.

h. EDAM Load Serving Entity Agreement

The EDAM load serving entity is responsible for demand within an EDAM balancing area, and the EDAM entity must authorize it to represent its load in the day-ahead and real-time markets.[204] This is a new role for EDAM to clarify the roles associated with representation of demand in the day-ahead market. A load serving entity that wishes to act as an EDAM load serving entity must execute the *pro forma* EDAM Load Serving Entity Agreement.

The agreement requires the EDAM load serving entity to provide information regarding its load, including the submission of bids and settlement of demand, to the CAISO for day-ahead market purposes in accordance with the CAISO tariff. The EDAM load serving entity also is required to be represented by an EDAM load serving entity scheduling coordinator, which may be the EDAM load serving entity or another entity certified by the CAISO to be an EDAM load serving entity scheduling coordinator.[205]

The CAISO may terminate the agreement if (1) the EDAM transmission service provider materially defaults under the agreement or new tariff section 33 and does not cure the default within 30 days, or (2) the EDAM entity for the balancing area in which the EDAM load serving entity is located terminates participation in EDAM. If the EDAM load serving entity no longer wishes to participate in EDAM, it may terminate the agreement by giving at least 90 days written notice to the CAISO. The remaining terms in the agreement are identical to or consistent with those contained in other similar *pro forma* agreements.

7. Metering and Telemetry

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[204] It may be that an EDAM entity represents most or a load in a balancing area, in which case the EDAM entity would execute the EDAM Load Serving Entity Agreement in addition to the other agreements the EDAM entity must execute, as described above.

[205] The CAISO has not proposed a new agreement for an EDAM load serving entity scheduling coordinator, which may use the services of any scheduling coordinator, including the EDAM entity scheduling coordinator.

The CAISO's metering provisions are set forth in existing tariff section 10. This section will apply in the EDAM area, meaning that scheduling coordinators in new EDAM balancing areas must ensure compliance with the CAISO's metering provisions.[206] All EDAM resources – including generating units, storage resources, distributed energy resource providers, demand response providers, and interties – must be CAISO metered entities or scheduling coordinator metered entities and comply with existing tariff section 10.[207] This broad application of existing rules ensures fairness and accurate metering across a new market footprint.

To ensure compliance across new tie points, the CAISO proposes to require each balancing authority participating in EDAM to ensure the separate metering of any load aggregation point in its balancing area not represented by the EDAM entity scheduling coordinator so that associated demand can be settled.[208]

The CAISO also proposes to accommodate any legacy generating units in the EDAM footprint that have not updated to modern metering systems. In the CAISO, this has not been an issue because local regulators' metering requirements have kept pace with the CAISO's metering requirements. However, other states may have units where the costs to update the metering of legacy units would outweigh the benefits, principally with units soon to retire. As such, the CAISO proposes to provide a narrow exception to its metering granularity requirement: scheduling coordinators for EDAM resources that cannot meter the EDAM resource facility's energy every 15 minutes or faster may not submit economic bids or provide ancillary services, and they must submit self-schedules in the day-ahead and real-time markets.[209] This will allow legacy units to participate in the day-ahead market without requiring expensive upgrades, and it will protect against inaccurate price signals and settlement data.

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206 New tariff section 33.10.

207 New tariff sections 33.10 and 33.10.3. *See also* transmittal letter for tariff amendment to implement metering rules enhancements initiative, Docket No. ER17-949-000, at 1-6 (Feb. 8, 2017) (discussing the CAISO's metering rules comprehensively). This tariff amendment was accepted by a letter order issued on March 31, 2017. For CAISO metered entities, the CAISO directly polls the meters and performs the validation, estimation, and editing procedures to produce settlement qualify meter data. For scheduling coordinator metered entities, the scheduling coordinator polls the meters, performs the validation, estimation, and editing procedures, and submits the resulting settlement qualify meter data to the CAISO. Resources elect to be one or the other based on myriad factors, including the complexity of their metering configuration, local regulatory authority requirements, and power purchase agreement requirements.

208 New tariff section 33.10.1.

209 New tariff section 33.10.2.

Based on the CAISO's discussions with EDAM transmission service providers and resource owners, the CAISO expects very few resources will need to use this provision, and even those few will likely only need to use the provision for a few years before retirement or retrofitting.

As with metering, the CAISO proposes to apply the same telemetry requirements in the CAISO and the WEIM to EDAM.[210] This means EDAM resources must satisfy communications, telemetry, and control requirements in a manner that ensures that the CAISO and EDAM entities are able to monitor the operations of the EDAM resource as necessary to maintain reliability.[211] Just as in the CAISO, an EDAM resource facility will be exempt from telemetry requirements if it has a rated capacity of less than 10 MW, unless it seeks to provide ancillary services.[212] EDAM resource facilities must comply with any EDAM entity or local regulatory authority requirements in addition to the EDAM telemetry provisions in the CAISO tariff.[213]

B. Pre-Market Activities

1. Ensuring Sufficient Transmission Is Available for the Day-Ahead Market

There must be sufficient available transmission capability to support optimized unit commitment in the day-ahead market and transfers between balancing areas for the extended day-ahead market to deliver the expected benefits to a diverse group of participants over a broad area. The CAISO proposal achieves this goal by balancing two key objectives regarding transmission availability. First, the design seeks to maximize the transmission capability available to the day-ahead market and thus improve efficiency and outcomes for all participants. Second, the design respects the rights of transmission customers and facilitates their participation in the market. The extended day-ahead market does not include financial transmission rights and thus not require or permit transmission service providers or their customers to

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210 New tariff section 33.10.4. This provision mirrors the CAISO's own telemetry provision in existing tariff section 7.6.1, but with minor edits for clarity. For example, tariff section 7.6.1 refers to a "direct communication link," but modern Inter-control Center Communications Protocols enable data exchange over wide area networks between control centers, so tariff section 33.10.4 instead refers more generally to "control requirements."

211 New tariff section 33.10.4.

212 *Id*.

213 *Id.*

convert any transmission rights under existing tariffs to tradable or financial rights.[214]

The changes proposed to the CAISO tariff will establish an EDAM market transmission availability framework that: (1) prescribes the use of transmission across the broader EDAM area in the day-ahead market to improve outcomes for customers, and (2) harmonizes an ISO/RTO day-ahead market structure with transmission customer rights utilized to serve load and engage in the bilateral market under a *pro forma* OATT structure.

The transmission availability framework will require each transmission service provider in an EDAM balancing area to amend its tariff to account for the market availability of transmission on its system consistent with the EDAM provisions of the CAISO tariff, thus enabling operation of the day-ahead market within a balancing area that joins EDAM.[215] Transmission service providers in EDAM balancing areas will continue to maintain and administer their approved OATTs, as the CAISO will due under its tariff within the CAISO balancing area. At the same time, the CAISO and other transmission service providers will continue to sell transmission on their systems and will consider the specific matters their individual tariffs will need to address for their balancing area.[216] Although amendments to individual transmission service provider tariffs are beyond the scope of the instant filing, the CAISO expects the Commission will consider such amendments as targeted variations from the *pro forma* OATTs of such transmission service providers to be evaluated under the "consistent with or

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[214] As such, the EDAM proposal is consistent with section 218 of the FPA, 16 U.S.C. § 824r(b) (stating that "nothing in [the FPA] confers on the Commission the authority to require an electric utility or person to convert to tradable or financial rights (1) firm transmission rights" pursuant to contract or by reason of ownership of transmission facilities as of the date the Energy Policy Act of 2005 was enacted, or "(2) firm transmission rights obtained by exercising contract or tariff rights associated with" such firm transmission rights).

[215] *See* new tariff section 33.4.2 (clarifying that each transmission service provider individually remains responsible for providing transmission service to its customers); *see also* existing tariff section 29.4(b)(3)(B). Transmission service outside the EDAM area will continue in the WEIM and in other balancing areas as it does today.

[216] https://stakeholdercenter.caiso.com/StakeholderInitiatives/Extended-day-ahead-market-ISO-balancing-authority-area-participation-rules.

superior to" standard,[217] just as the Commission did when it accepted tariff amendments of transmission service providers participating in the WEIM.[218]

The WEIM utilizes available transmission capability in the real-time market to support optimization of economic offers, meet imbalance energy needs and facilitate energy transfers between balancing areas.[219] The extended day-ahead market will similarly maximize available transmission capability in the day-ahead market to support optimization of demand and supply[220] and facilitate transfers of energy and capacity between balancing areas.[221] However, some additional complexity arises in the context of EDAM compared to the WEIM because under EDAM, all generation will be committed or dispatched by the market (in the day-ahead and real-time timeframes, respectively). Moreover, the transmission

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[217] In both Order Nos. 888 and 890, the Commission found that transmission service providers may submit FPA section 205 filings proposing rates, terms and conditions in their tariffs that are "consistent with or superior to" the *pro forma* OATT. *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Servs. by Pub. Utils.; Recovery of Stranded Costs by Pub. Utils. & Transmitting Utils.*, Order No. 888, FERC Stats. & Regs. ¶ 31,036, at 31,770 (1996) (cross-referenced at 75 FERC ¶ 61,080) (Order No. 888); *Preventing Undue Discrimination & Preference in Transmission Serv.*, Order No. 890, 118 FERC ¶ 61,119, at P 135 (2007) (Order No. 890). The Commission's application of this standard can take into account the unique tariff structure or market design of an ISO or RTO. *See, e.g., N.Y. Indep. Sys. Operator Corp., Inc*., 123 FERC ¶ 61,134, at P 13 (2008) ("[W]e recognize that NYISO's [New York Independent System Operator, Inc.] proposed deviations from the *pro forma* OATT reflect the actual market design used by NYISO, and find these deviations to be consistent with or superior to the *pro forma* OATT, except as otherwise addressed below.").

[218] *See, e.g., Nev. Power Co.,* 151 FERC ¶ 61,131, at P 85 (2015) ("Except as discussed below, we find that NV Energy has met its burden of proof to demonstrate that the proposed OATT revisions are just and reasonable and not unduly discriminatory or preferential pursuant to section 205 of the FPA, and that the proposed revisions to NV Energy's OATT are consistent with or superior to the Commission's pro forma OATT. Moreover, we find that NV Energy has adequately demonstrated that participation in the EIM can be expected to provide NV Energy's customers with economic benefits, in the form of interregional dispatch savings, reduced flexibility reserve, and reduced renewable energy curtailment, as well as reliability benefits through improved situational awareness, responsiveness, and ability to optimize transmission capacities previously left unused."). The Commission affirmed this finding on rehearing. *Nev. Power Co.,* 153 FERC ¶ 61,306, at P 30 (2015).

[219] *See* existing tariff section 29.17 (providing for the transmission made available to the WEIM); *see also* existing tariff appendix B.17, *pro forma* EIM Entity Agreement, section 2.5 (providing for the transmission made available to the WEIM).

[220] Supply in EDAM will include energy, imbalance reserves, and reliability capacity, but not ancillary services. Ancillary services will be self-provided by transmission service providers participating in EDAM and not optimized by EDAM, although the ancillary services will count as supply in the resource sufficiency evaluation.

[221] *See* new tariff sections 33.16 – 33.18 (providing for the transmission made available to the WEIM), *see also* tariff appendix B.27, new *pro forma* Addendum to EIM Entity Agreement (incorporating new tariff section 33).

capability supporting schedules resulting from the day-ahead market must remain available through the real-time market, whereas transmission that supports the real-time market represents whatever is available in real-time after customers have exercised transmission service rights under the Commission's *pro forma* OATT.

The day-ahead market schedules resulting from EDAM are the basis for the operation of the real-time market, and market participants need a substantial degree of assurance they can rely upon the results, particularly given that energy and capacity transfers between balancing areas will be part of resource sufficiency evaluation and ultimately support reliability. Having the transmission capability backing day-ahead market awards available through the real-time is essential for the integrity of the day-ahead market results and providing confidence in the transfers between balancing areas. A high degree of confidence in transfers between balancing areas is critical as each balancing authority maintains its reliability and transmission-related functions in EDAM. Having invested in EDAM, the participating balancing authority will be relying on the market to determine reliable, economic, and feasible schedules to serve load on its system. Establishing this level of confidence is the primary reason the market will afford a transfer between balancing areas equal priority with demand in the balancing area and defer to the balancing authority to determine what operator action will fulfill its balancing authority obligations under its tariff to address any underlying infeasibility.[222] As discussed below, the CAISO will work with EDAM transmission service providers to accommodate balanced intra-day schedule changes associated with the exercise of specific firm OATT transmission rights in real-time.[223]

The CAISO carefully conceived this balanced transmission availability framework with the input of stakeholders throughout the Western Interconnection, recognizing that transmission service providers participating in EDAM would need targeted variations from the terms and conditions of the *pro forma* OATT as permitted under Commission policy. All stakeholders involved in developing the widely supported transmission availability framework understand

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222 *See generally* new tariff section 33.7.5 (establishing the equal priority and providing each balancing area the discretion to determine appropriate operator action to resolve a market infeasibility); *see also* section V.B.1.f of this transmittal letter (discussing stakeholder positions on this provision).

223 Firm rights under OATT service may vary but are normally in the form of Network Integrated Transmission Service, Firm Point-to-Point, or Conditional Firm rights. The permissible uses for the higher priority will be as prescribed by the transmission service provider and consistent with their OATT provisions. In this transmittal letter the reference to specific firm OATT transmission rights is intended to capture the transmission service providers' firm rights offerings under their tariffs.

that some discrete enhancements to the terms and conditions of transmission service are a prerequisite to enable a day-ahead market across a multi-balancing area market, and the CAISO presents the EDAM transmission availability framework as an approach that will lead to changes consistent with or superior to the *pro forma* OATT.[224]

For these reasons, the CAISO respectfully requests that the Commission accept the proposed CAISO tariff provisions implementing the EDAM transmission availability framework.

a. Transmission System Information

The first step to account for available transmission capability is administrative and requires all balancing authorities participating in the extended day-ahead market to provide the CAISO with all of the necessary information from the transmission service providers in its balancing area. This necessary information includes updates to the network model, outages, and day-ahead scheduling limits that allow the CAISO to utilize flow-based congestion management respecting intra-balancing area physical transmission constraints, balancing area-specific power balance constraints, and intertie constraints between balancing areas (both physical limits and scheduling limits).[225] The CAISO will integrate this information into the associated systems.

As noted above, EDAM is structured to provide day-ahead market opportunities and benefits to balancing areas outside the CAISO balancing area. Unlike circumstances where a transmission owner is joining an ISO or RTO by transferring operational control of its transmission to the ISO/RTO, the balancing authorities participating in EDAM remain responsible for the reliability of the transmission system in their area. Accordingly, the CAISO will look to the balancing authority participating in EDAM, in coordination with its transmission service providers, to provide system information required to support market operations and ensure the CAISO has the latest most accurate current state of the system, look-ahead scheduling, and forecasting information from different sources so the day-ahead market operates effectively within a multi-balancing area environment.

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224 The Commission has recognized that its open access requirements are not intended to prevent customers from realizing the benefits of ISO or RTO markets under terms and conditions that differ from the *pro forma* OATT. For example, In Order No. 890, the Commission held that "the purpose of this rulemaking is not to redesign approved, fully-functioning RTO or ISO markets." Order No. 890 at P 143; *see also id.* at PP 157-58.

225 *See generally* new tariff section 33.4 (establishing the roles and responsibilities of EDAM market participants at a high level).

The CAISO will receive all updates of transmission system and other pertinent operational information directly from the entities responsible for reliability of their transmission systems and the associated transmission services within the participating balancing area, and the CAISO will incorporate that information directly into the optimization to produce a quality solution. This enables EDAM, like the WEIM, to function in a multi-balancing area environment in a compatible and complementary manner with the transmission services, while respecting the transmission rights of third parties and scheduled transactions in the market.

The day-ahead market relies upon the flow-based capability of the transmission system within a balancing area participating in EDAM to support optimized unit commitment, including the internal flows supporting the transfers between participating balancing areas. Availability of internal flow capability in EDAM aligns with the availability of internal transmission in the WEIM and will ensure that the day-ahead market model relies upon the same transmission capability available in the real-time market.[226] This internal flow-based capability is broken down by three categories of available transmission – legacy contract rights, transmission ownership rights, and OATT service rights[227] – as well as the distinction of whether the transmission capability supports a transfer between balancing areas in the EDAM footprint or imports, exports, or wheels through a balancing area in the EDAM footprint.[228]

b. Legacy Contracts and Third-Party Ownership Rights

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[226] *See Tri-State Transmission & Generation Ass'n*, 174 FERC ¶ 61,250, at P 3 (2021) ("Each EIM Entity must ensure that transmission service providers in its BAA [balancing authority area] make unused transmission capacity available for use in the CAISO real-time market.") (citing existing tariff section 29.17(c)).

[227] *See* tariff appendix A, new definitions of EDAM Legacy Contract and EDAM Transmission Ownership Right (defining an EDAM Legacy Contract as a transmission service contract entered into prior to the effective date of the EDAM transmission service provider's tariff or otherwise not governed by the terms of the applicable tariff, and defining an EDAM Transmission Ownership Right as a third-party right on transmission facilities within an EDAM balancing area that is not subject to the applicable tariff).

[228] The CAISO refers to interfaces between balancing areas in the EDAM area as "internal interties", and it refers to interfaces with non-EDAM balancing areas, including balancing areas in the WEIM, as "external interties." This distinction matters because transmission capability between balancing areas in EDAM supports the transfer of energy and capacity in the day-ahead market and this requires unique modeling capabilities and specific provision on the availability and resulting revenue. *See* tariff appendix A, new definitions of EDAM Internal Intertie and EDAM External Intertie.

The CAISO honors existing contracts in existence on the CAISO operations date and transmission ownership rights in the CAISO balancing area through a series of requirements and procedures designed to maintain the existing and underlying rights within the CAISO markets, including the day-ahead market construct.[229] Similarly, the CAISO will honor legacy transmission contracts, *i.e.*, non-OATT transmission service agreements entered into with an EDAM transmission service provider prior to the effective date of the applicable OATT or otherwise not governed by the terms of that tariff, and will also honor transmission ownership rights by third parties on transmission facilities within an EDAM balancing area not subject to the applicable OATT according to these existing mechanisms by cross-referencing the requirements and procedures in the EDAM provisions of the CAISO tariff.[230] These procedures require the balancing authority and transmission service provider to register the underlying rights with the CAISO so the CAISO can establish an associated contract reference number in its systems. The assigned contract reference number will afford scheduled use of the rights treatment in the day-ahead and real-time markets consistent with the rights, which may include both a scheduling priority and a financial right.

The CAISO will provide a balanced legacy contract or ownership right self-schedule associated with a contract reference number a priority higher than other self-schedules in the market, and will allow changes to the associated self-schedule through real-time while maintaining the higher scheduling priority throughout this timeframe. In addition, the CAISO will afford the balanced portion of a legacy contract or ownership right schedule associated with a contract reference number financial protection from congestion charges and losses, sometimes called the "perfect hedge," to the extent the underlying contract rights support such financial protections. Alternatively, holders of legacy contracts and ownership rights will be eligible voluntarily to make their transmission capacity available at interties between balancing areas in exchange for the accrued transfer revenue as discussed below in section V.B.1.d of this transmittal letter. This transfer revenue opportunity will extend to existing contracts and ownership rights in the CAISO balancing area, thereby establishing comparable and equitable treatment of all non-tariff based transmission rights in the broader EDAM footprint.

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[229] *See* existing tariff section 16 (establishing the requirements and procedures that honor existing contracts), and existing tariff section 17 (establishing the requirements and procedures that honor ownership rights); *see also Cal. Indep. Sys. Operator Corp.*, 116 FERC ¶ 61,274, at PP 901-1003 (2006), *order on clarification & reh'g*, 119 FERC ¶ 61,076, at PP 442-85 (2007) (accepting tariff sections 16 and 17).

[230] *See* new tariff section 33.16 (establishing the requirements and procedures that honor legacy contracts), and new tariff section 33.17 (establishing the requirements and procedures that honor ownership rights).

c. Exercising OATT Rights in the Market

The CAISO proposes several provisions to allow customers with transmission service rights under *pro forma* OATTs to elect how to exercise those rights in EDAM. The first step requires registration with the CAISO of all firm and conditional firm transmission service customer rights within a balancing area, including point-to-point service rights and network transmission service rights.[231] The registration process for customer rights will be a simplified version of the legacy contract registration process, and likely will include some degree of automation so the process can account for both long-term and short-term rights under an existing OATT as well as ongoing transmission sales under the transmission service provider's tariff. This registration process will associate: (a) a source in an EDAM balancing area to an external location, (b) an EDAM external location to a sink within the EDAM balancing area, (c) a wheel through an EDAM balancing area from/to an external location, (d) a source to a sink within an EDAM balancing area, or (e) a source or sink to/from an intertie with another balancing area participating in EDAM. Registration of network integration transmission service rights will allow for the identification of multiple sources and sinks. Again, similar to the process for legacy contracts and ownership rights, the CAISO will assign each registered transmission customer right a contract reference number for schedules that indicate the customer's use of the associated transmission capability in the day-ahead market.[232]

The scheduling coordinator for the transmission customer will reference the assigned contract reference number to provide the CAISO information about scheduled use of a customer's rights.[233] The customer will use its OATT rights by submitting a balanced self-schedule in the markets associated with the contract reference number, and the market scheduling priority assigned to the self-schedule will depend upon the terms of the applicable EDAM transmission provider tariff and whether the use was communicated to the market prior to the close of the day-ahead market at 10:00 a.m. The deadline of 10:00 a.m. on the

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231 *See* new tariff sections 33.18.1 (providing a registration process for internal rights and rights at external interties), and 33.18.2 (requiring registration of rights at internal interties using a similar process).

232 *See* new tariff section 33.18.3 (providing for issuance of a CRN and the associated treatment in the day-ahead market).

233 Contract reference numbers registered for firm OATT transmission rights (*i.e.*, not legacy contract rights or transmission ownership rights) are not eligible to receive a financial protection against congestion costs. This is consistent with how the CAISO tariff currently treats transmission service not under existing contracts or transmission ownership rights.

day prior to the operating day follows the firm deadline established in section 13.8 of the *pro forma* OATT, which provides, "Schedules for the Transmission Customer's Firm Point-To-Point Transmission Service must be submitted to the Transmission Provider no later than 10:00 a.m. of the day prior to commencement of such service."

Balanced self-schedules associated with a contract reference number submitted prior to the close of the day-ahead market will receive a priority higher than a self-schedule not associated with a contract reference number, and below a self-schedule associated with a contract reference number representing a legacy contract or ownership right.[234] The CAISO will not adjust a self-schedule associated with registered OATT rights communicated to the CAISO by 10:00 a.m. (before the close of the day-ahead market) to accommodate a self-schedule that is not associated with registered OATT rights. This provides a priority higher than other self-schedules not exercising registered transmission rights and higher than economic bids, affording the transmission customer near certainty that the self-schedule will clear the day-ahead market. The timely exercise of rights and associated market priority allows the market to identify the volume/magnitude of transfers between areas and attribute the associated confidence for all balancing authorities to serve load reliably through the market.

To the extent a transmission customer does not exercise its firm OATT rights through balanced self-schedules in the day-ahead market, *i.e.,* by 10:00 a.m. on the day prior to the operating day, the scheduling coordinator for the transmission service customer can still use them in the real-time market by submitting a balanced self-schedule associated with the transmission rights.[235] The requirement that customers exercise their specific firm OATT transmission rights by submitting balanced supply and demand self-schedules is a key feature of the EDAM design and is consistent the contract path point requirements for scheduling firm point-to-point service under the *pro forma* OATT.[236] The CAISO expects these intra-day balanced schedule changes associated with specific OATT transmission rights will be accommodated by the EDAM transmission service provider if practicable, consistent with section 13.8 of the *pro forma* OATT, which provides "Schedules submitted after 10:00 a.m. will be accommodated, if practicable." Transmission customers must submit such intra-day schedule changes associated with specific OATT transmission rights prior to

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234 *See* new tariff sections 33.18.3.1 and 33.18.3.2 (providing for the relative priority of a self-schedule associated with a CRN).

235 If a self-schedule or intra-day schedule change is not balanced, it will be treated as a regular real-time self-schedule and will not have the priority afforded to balanced schedules exercising OATT rights.

236 EDAM Final Proposal at 33.

the close of the real-time market established in the transmission service provider tariff regarding WEIM.[237] The EDAM transmission provider will make the ultimate determination whether a post-10:00 a.m. schedule using point-to-point service is practicable in accordance with its OATT.

Absent EDAM transmission provider instructions supporting a different priority, the CAISO will afford the intra-day schedule submissions a priority in the real-time market higher than other real-time self-schedules and equal to cleared day-ahead self-schedules, including transfer schedules between balancing areas serving load. Thus, the real-time market will seek to accommodate these self-schedules and, if necessary, redispatch the available supply across all balancing areas based on the transfer capability between balancing areas to support the exercise of the customer's rights. If there is insufficient redispatch capability in the real-time market, the market will manage all schedules through the market clearing process until the solution becomes infeasible and the power balance constraint is relaxed, ultimately affording transfers between balancing areas equal priority to demand within the balancing areas.[238] The CAISO will monitor the frequency and magnitude of the exercise of these transmission rights across different systems and interfaces to understand the market impacts of redispatch and infeasibilities in the market.

In the context of EDAM, transmission service providers will play a role in determining how to accommodate such post-10:00 a.m. point-to-point service schedules. If instructed by an EDAM transmission provider, the CAISO will afford balanced intra-day self-schedules or schedule changes associated with a contract reference number for balanced, specific, firm OATT transmission rights a priority in the real-time market higher than other real-time self-schedules and higher than cleared day-ahead self-schedules not based on specific firm OATT transmission rights, including transfer schedules between balancing areas

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[237] In the WEIM, the Commission accepted a deadline proposed by each transmission service provider for the submission of base schedules, which generally has been set at T-57.5. This enables each balancing area to account for all schedules prior to the deadline for the WEIM resource sufficiency evaluation at T-40. *See, e.g.*, NV Energy OATT, Attachment P, section 4.2.4.5.2. The Commission found these modified real-time scheduling timelines to be just and reasonable and necessary to implement the WEIM. *Nev. Power Co.,* 151 FERC ¶ 61,131, at PP 161-164.

[238] *See* new tariff section 33.7.5 (establishing an equal priority between day-ahead transfers and demand within a balancing area and requiring coordination and communication concerning any curtailment of transfers between balancing areas to maintain reliability); *see also* EDAM Final Proposal, appendix 3, Mathematical Formulation of the WEIM Power Balance Constraint Relaxation (establishing the formulation for establishing the conditions when the power balance constraint within a balancing area will be relaxed, providing for confidence in transfers, and supporting the equal priority of demand and transfers established in tariff section 33.7.5).

serving load.[239] Such balanced intra-day self-schedules using specific OATT firm transmission rights will have a priority below a self-schedule associated with a contract reference number representing a legacy contract or ownership right. Unlike individual customer legacy contracts or ownership rights, balanced intra-day self-schedules using specific firm OATT transmission rights will not receive a perfect hedge and such schedules will be responsible for congestion or redispatch costs.[240] This approach is consistent with the treatment of non-legacy contracts in ISOs and RTOs with firm OATT transmission rights where such customers pay market congestion charges.[241]

The CAISO believes this higher priority for intra-day self-schedules using balanced, specific, firm OATT transmission rights where instructed by EDAM transmission service providers coupled with the redispatch process across a multi-balancing area market footprint goes beyond the actions that transmission service providers are obligated to undertake today under the *pro forma* OATT or may undertake within their balancing area. Indeed, the proposed actions go even further than existing measures by leveraging the supply capabilities of multiple balancing areas to accommodate these real-time schedule changes by customers with OATT rights that submit such schedule changes after the 10:00 a.m. deadline.[242] In other words, EDAM will afford even greater tools and flexibility than exists today to accommodate, if practicable, such post-deadline schedules seeking to use firm point-to-point service. This approach maintains confidence in EDAM transfers clearing the day-ahead market, which EDAM entities depend upon to serve load, while respecting the late exercise of transmission customer rights in the real-time market. In applying the priorities described above that may result from an infeasibility, the market will inform the

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239 *See* new tariff sections 33.18.2.2.3 and 33.18.3.1.

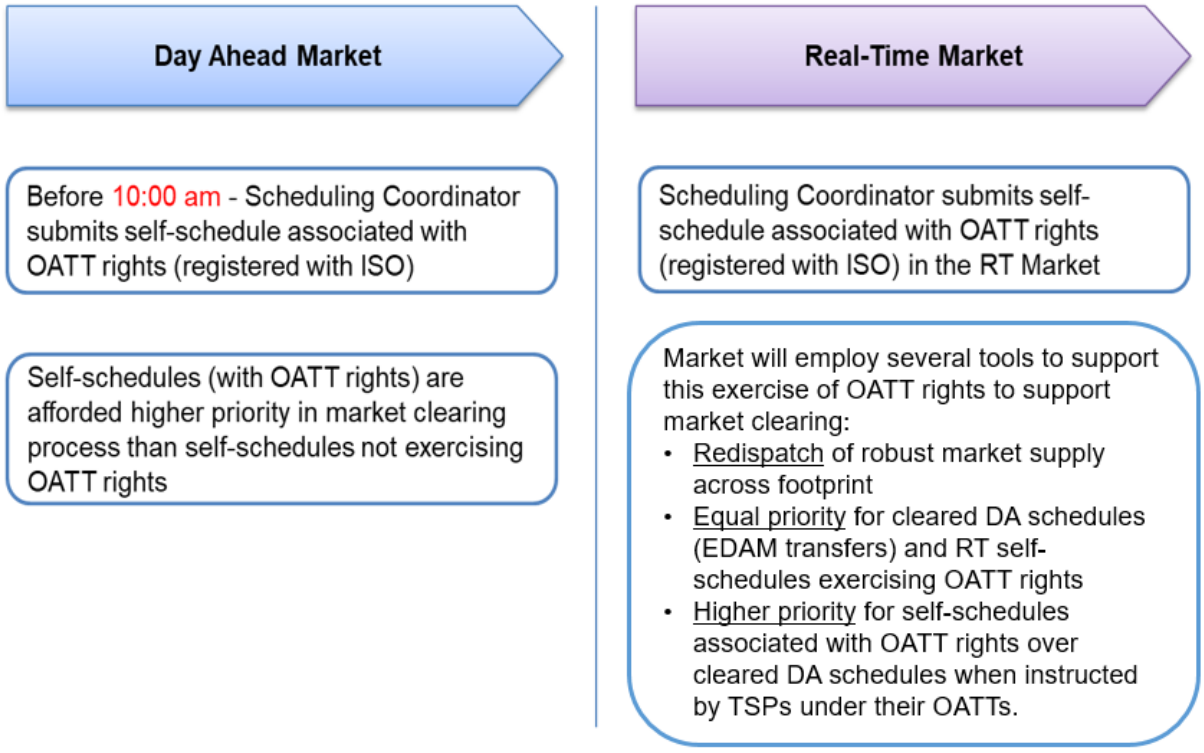
240 In the context of the WEIM, the Commission similarly found that applying imbalance energy charges, including congestion charges to deviations from firm transmission customers' schedules after T-55 (and before T-20) is "just and reasonable and not unduly discriminatory" and "appropriately allocates the costs of imbalances to the customers causing such costs and is necessary to implement the EIM." *Nev. Power Co.,* 151 FERC ¶ 61,131, at P 162; *order on reh'g*, *Nev. Power Co*., 153 FERC ¶ 61,306, at PP 32-40.

241 *See, e.g.,* NYISO OATT, sections 6.7.1.1 and 6.7.1.2.

242 As noted above, section 13.8 of the *pro forma* OATT provides that "Schedules submitted after 10:00 a.m. will be accommodated, if practicable." The Commission has recognized that section 13.8 gives transmission service providers flexibility to "accommodate" transmission service schedules submitted after 10:00 a.m. *See Integration of Variable Energy Res.*, 139 FERC ¶ 61,246, at P 136 (2012) ("The Commission recognizes that transmission providers have flexibility under [section 13.8 of] the *pro forma* OATT to award transmission service based on transmission capability that becomes available when firm transmission service is not scheduled by 10:00 am the day prior to operation."); *Allegheny Power Sys. Inc*., 77 FERC ¶ 61,266, at 62,100 (1996) (finding that the "if practicable" language in section 13.8 "permits flexibility").

balancing authority of the magnitude of the infeasibility and the affected schedules so they may take appropriate action according to their balancing authority obligations and the applicable transmission service provider tariffs.[243]

The following illustration represents the market scheduling priorities established through EDAM as described above. These market scheduling priorities work with the various avenues for transmission to become available in the day-ahead market and together represent the EDAM transmission availability framework. The CAISO carefully conceived this framework with the input from all stakeholders, a substantial majority that support it. The framework effectively harmonizes the extended day-ahead market framework with the *pro forma* OATT framework.



A key policy element of the EDAM market design is that resources in EDAM must have transmission reserved under the respective transmission service provider's tariff. Consequently, the transmission service provider will assess a transmission charge to resources located in an EDAM balancing area

[243] *See, e.g.*, existing tariff sections 29.4(b), 29.7(g), and 29.34(o) (establishing responsibility of the balancing authority to manage conditions within its area based on information provided by the CAISO as the market operator of the WEIM).

that submit a bid in the day-ahead market and have not reserved transmission capacity associated with their schedule under the applicable transmission tariff through firm, conditional firm, or network integration service.[244] This EDAM transmission service provider charge will be based upon the shortest duration of firm transmission service offered under the transmission service provider's tariff, including any applicable penalties. Requiring transmission service reservations or network designations in advance will ensure transmission service providers with revenues normally received to avoid or limit undue cost shifts, support continued transmission planning, avoid free riding, and allow for resources to participate in the market. It is important to recognize the vast majority of resources, are likely to meet the transmission reservation requirement today as they have reserved transmission service or have been designated as a network resource by its off-taker. This proposed design nonetheless ensures that all supply resources will continue to contribute to the costs of the associated transmission system and its availability in EDAM.

d. Transmission Available to Support Transfers Between Balancing Areas

Transmission between balancing areas participating in EDAM will be available to support the transfer of energy, imbalance reserves and reliability capacity within three categories of transmission. Transmission within those three categories can be released for market optimization, respecting any pre-market net export transfer constraints,[245] and this released transmission will provide significant transfer capability and support optimized transfers among balancing areas participating in EDAM. The design models these transfers using transfer system resources with associated scheduling limits based on the transmission capability available at each intertie location, *i.e.*, a transfer location between two balancing areas participating in EDAM, which the balancing authority will communicate to the CAISO prior to the day-ahead market.

The first category of transmission available for transfers is the balancing authority's external supply resources needed to support its day-ahead resource sufficiency evaluation.[246] A balancing area that has load serving entities with contracted supply in another balancing area participating in EDAM will be supported by a transfer system resource. Prior to the day-ahead market, the

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244 *See* new tariff section 33.23 (establishing a transmission charge for schedules that do not have an associated transmission reservation).

245 *See* section V.B.3 of this transmittal letter.

246 *See* new tariff section 33.18.2.1 (governing transmission to support resource sufficiency provided by the participating balancing authority, *i.e.*, the EDAM entity).

balancing authority will communicate to the CAISO the transmission capability available at each of its internal interties that will be available in the day-ahead market and support a transfer at that intertie location.[247] These transfers support the EDAM resource sufficiency evaluation and the resulting diversity benefit that result from the transfer of energy and capacity in the day-ahead market.

The second category of transmission considered in the extended day-ahead market is transmission customer rights, broken down by type, which may be self-scheduled or released in exchange for transfer revenue. A transmission rights holder, whether receiving with service under a *pro forma* OATT, a legacy contract or ownership right, may submit a self-schedule as described in section V.B.1.b of this transmittal letter. All self-schedules submitted in the day-ahead market will be available to support transfers between balancing areas participating in the day-ahead market, including transfers supporting the EDAM resource sufficiency evaluation.

Alternatively, the transmission customer can elect voluntarily to release its transmission rights to the market. To the extent transfer revenue accrues across the interface due to energy or capacity price differences between balancing areas, the CAISO will settle those transfer revenues with the transmission customer that released its transmission rights for market optimization.[248] Transmission customers releasing their rights cannot self-schedule such rights in the day-ahead market or after the close of the day-ahead market.

Any portion of a registered right that is neither released nor self-scheduled in the day-ahead market (*i.e.,* by 10:00 a.m.) will be available for optimization in the day-ahead market.[249] In essence, the transmission customer would retain its right to submit an intra-day self-schedule later. Absent instructions by the transmission service provider, balanced intra-day self-schedules associated with specific firm OATT transmission service would receive equal priority. The market also would redispatch the system through the real-time market to accommodate both the transfer and all self-schedules submitted after the close of the day-ahead market. If the market cannot accomplish this, the market will afford the transfer an equal priority with demand in the balancing area and provide the balancing authority information regarding the infeasibility. If instructed by the

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247 The balancing authority must also procure firm, conditional firm or network integration transmission service to deliver the supply to its balancing area (new tariff section 33.18.2.1). With respect to the CAISO balancing area, this would include any procurement or reservation of available transfer capability to deliver the supply to its balancing area (new tariff section 33.18.4).

248 *See* section V.D.3 of this transmittal letter (describing the settlement of transfer revenue).

249 The market will accommodate the transmission customer's later self-schedule through the higher or equal priority for self-schedules in accordance with EDAM transmission service provider instructions coupled with economic redispatch for all later self-schedules, as described in section V.B.1.c of this transmittal letter.

EDAM transmission service provider, balanced intra-day self-schedules associated with firm OATT transmission service would receive a higher priority when submitted in accordance with instructions by EDAM transmission service provider. The balancing authority, in accordance with the applicable transmission service provider tariff(s), would determine whether to dispatch additional resources manually, adjust the transfer or the self-schedule, or take other operator action to fulfill its balancing authority obligations, including firm load shedding as a last resort.

The third category of transmission considered in the extended day-ahead market is the unsold available transmission capability available at transfer locations prior to the day-ahead market. Each transmission service provider in an EDAM balancing area must make unsold firm transmission capability available prior to the day-ahead market for the market to optimize transfers between balancing areas participating in the day-ahead market. The transmission service provider will determine the available transmission capability under its tariff, including transmission capability reserved for reliability, and it will communicate the associated limit to the CAISO.[250] As with the other categories of transmission considered by the day-ahead market, transmission service providers make unsold firm available transmission capability on interfaces available to the market only at the interfaces between two balancing areas participating in the extended day-ahead market and not at the interface of a balancing area not participating in the day-ahead market. After the market close of the day-ahead market through to the publication of day-ahead market results, the transmission service provider cannot make further sales of available transfer capability. After the publication of day-ahead market results, the CAISO will produce a report identifying the amount of unsold transmission capability the day-ahead market optimized, so the transmission service provider can resume sales of the transmission after the day-ahead market results are published.

e. Transmission that May Not Be Available in the Day-Ahead Market

It is necessary for a day-ahead market covering multiple balancing areas and transmission service provider territories to account for the fact each balancing area will have its own transmission service terms and conditions and mechanisms for managing procurement and transmission constraints/limitations

[250] The CAISO expects each transmission service provider in an EDAM balancing area to determine available transmission capability consistent with its tariff-approved methodology to assess available transfer capability based on attachment C to its tariff, including any provisions accounting for transmission reliability margin or TRM.

to maintain reliability. Accordingly, if a balancing authority informs the CAISO through the implementation process, or anytime following its participation in EDAM, that transmission availability should be restricted in the day-ahead market to accommodate the exercise of transmission customer rights, the CAISO will adjust day-ahead market transmission availability of the affected transmission elements.[251] Because the EDAM design depends heavily on making transmission capacity available to the market to reach efficient outcomes, the CAISO expects the transmission service provider will request adjustment of available transmission only under narrow, limited, and specific circumstances as provided in the transmission service provider's tariff. For example, a certain transmission path may consistently produce infeasibilities due to persistent intra-day schedule changes. In such cases, it may be appropriate to limit the availability of the transmission in advance of the day-ahead market, rather than repeatedly facing infeasibilities that are difficult to manage in real-time or produce market outcomes that are inefficient or unreasonable. In these circumstances, the CAISO will defer to these transmission service providers and the terms of their tariffs.

As in the WEIM today, it is appropriate to provide deference to the EDAM balancing authority and its associated transmission service providers to manage these infeasibilities.[252] The balancing authority and other entities with reliability- and transmission-related functional responsibilities in each balancing area are in the best position to make determinations regarding how to administer the terms and conditions of the affected transmission customer's rights based on applicable tariffs and other agreements.[253] This should not be the responsibility of the CAISO as a market operator.

Although the CAISO tariff provides an equal market scheduling priority for transfers and load,[254] each EDAM transmission service provider would retain the ability to manage its system under stressed system conditions within its balancing area, including consideration of any obligations associated with a

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251 *See* new tariff section 33.18.3.3.

252 The CAISO also provides reliability coordinator services to most balancing authorities and transmission operators in the WEIM area today and will continue to provide such services. *See* existing tariff section 19 (providing for reliability coordinator services).

253 For example, an EDAM transmission provider, in accordance with its tariff, may determines if it is necessary to reduce or suspend EDAM transfers between balancing areas based on operational judgment (*e.g.*, in the event of infeasibility). *See* new tariff section 33.7.5 (establishing an equal priority between day-ahead transfers and demand within a balancing area and requiring coordination and communication concerning any curtailment of transfers between balancing areas to maintain reliability).

254 *See* new tariff section 33.7.5.

resource adequacy program in which it participates.[255] This priority framework retains the value of firm transmission rights by providing the customer with a higher market scheduling priority for intra-day self-schedules associated with specific firm OATT transmission service in accordance with EDAM transmission service provider instructions and a priority equal to cleared day-ahead EDAM transfers for all other intra-day self-schedules as described in section V.B.1.d of this transmittal letter. From there, the CAISO will use the full capability of the real-time market, including utilizing redispatch, to accommodate these rights.

Today, firm transmission rights under the *pro forma* OATT are not guaranteed to flow under any and all conditions. Customers with OATT firm point-to-point transmission service rights can schedule their rights with a certain degree of confidence. If there is a transmission derate in real-time, however, firm point-to-point rights holders are not held harmless relative to other priority schedules. In the event of a derate, both firm point-to-point customers and network integration customers may not be ensured absolute protection for schedules using their rights.

The EDAM self-schedule process will provide at least a comparable high degree of certainty in the ability to schedule firm OATT rights. Due to the transmission contributions across the entire EDAM area and flexibility afforded transmission operators by EDAM, the CAISO does not anticipate a need for the transmission service provider to cut schedules except in the event of a derate. The proposed market scheduling priority and real-time market measures mitigate the concern of affording the transmission customer rights a market scheduling priority higher than transfers and other cleared day-ahead schedules. The EDAM transmission provider, acting in accordance with its tariff, will make the final determination of schedule priorities after the close of the day-ahead market. Granting a higher priority for all intra-day schedule changes submitted after the 10:00 a.m. deadline, even when there is no basis in the EDAM transmission service tariff for such a higher priority, would degrade the confidence in EDAM transfers because the transfer could be unwound to accommodate the exercise of transmission customer rights in the real-time market. Unwinding transfers awarded based on transmission capability that becomes available when firm transmission service is not scheduled by 10:00 a.m. the day prior to operation would adversely affect other entities that depend on such market transfers, including other resource adequacy program participants, further eroding the confidence in transfers, reducing market efficiency, and possibly creating an

[255] *See* new tariff section 33.18.3.3 (establishing a process whereby a balancing authority can inform the CAISO of limited circumstances whereby transmission should not be available to the market).

inappropriate arbitrage opportunity.[256] In any case, each EDAM transmission service provider will remain responsible for managing its system and coordinating with their balancing authority under stressed system conditions.

The CAISO believes limiting the availability of transmission in the day-ahead market must be the exception rather than the rule, recognizing reduced transmission availability could significantly affect the benefits of EDAM and have adverse economic effects on congestion prices settled with the balancing authority and passed down to wholesale customers. Unnecessarily restricting the transmission available in the day-ahead market would reduce efficiency, potentially causing congestion that could have been avoided if the transmission had been available.

[256] The Commission has recognized that "transmission providers have flexibility under the *pro forma* OATT to award transmission service based on transmission capability that becomes available when firm transmission service is not scheduled by 10:00 am the day prior to operation." *Integration of Variable Energy Res.*, 139 FERC ¶ 61,246, at P 136.

f. Stakeholder Positions on Transmission Availability

Stakeholders favored the concept that transmission supporting delivery of resources to meet the EDAM resource sufficiency evaluation be available to the market. This approach promotes mutually beneficial transfers, and to the extent the scheduling limit at the interfaces is binding, transmission revenue could accrue to the benefit of entities making transmission available.

Stakeholders almost universally supported a design to maximize transmission availability in the day-ahead market, including unused or unscheduled firm/conditional firm transmission, to support transfers and derive the benefits of optimized commitment through the day-ahead market. A few stakeholders, primarily transmission customers holding firm or conditional firm transmission rights, sought a design under which they could elect whether to make their transmission rights available to the market or withhold them from the market even if they have not scheduled use of those firm transmission rights by the 10:00 a.m. day-ahead deadline. In particular, these stakeholders contended that, if a transmission customer exercises previously unscheduled firm transmission rights that may support a day-ahead schedule, they should be assured of delivery and not be exposed to additional risks associated with the exercise of their transmission rights by receiving a higher scheduling priority than proposed by the CAISO. At least one stakeholder with firm transmission rights raised concerns that the EDAM design's use of unscheduled firm transmission rights in the day-ahead market could either devalue or undo their firm transmission rights under the *pro forma* OATT.

In response to these concerns, the CAISO clarified that firm transmission rights registered with the CAISO, whether legacy rights or firm OATT rights, remain eligible for scheduling after the close of the day-ahead market, thereby preserving the physical right through the real-time market where WEIM scheduling practices would apply. The use of unscheduled capacity in the day-ahead market after 10:00 a.m. does not change this outcome; rather, the CAISO would accommodate their physical rights through redispatch as required.[257] As noted above, the CAISO believes this accommodation of firm transmission rights not scheduled by 10:00 a.m. day-ahead goes beyond the actions transmission service providers are obligated to undertake today under section 13.8 of the *pro*

[257] As discussed in section V.B.1.d of this transmittal letter, the CAISO would assign equal priority to balanced intra-day self-schedules relative to day-ahead schedules absent instructions by the EDAM transmission service provider that the ISO provide balanced self-schedules associated with specified firm point to point rights higher priority than day-ahead schedules.

forma OATT.[258] Indeed, EDAM will leverage the supply capabilities of multiple balancing areas to accommodate these real-time schedule changes, thus establishing a reasonable limit of what EDAM will accommodate consistent with or superior to the *pro forma* OATT. The Commission has found variations in *pro forma* OATT scheduling timelines are reasonable to allow customers to realize the substantial benefits of the WEIM.[259] EDAM will provide widespread benefits to customers.

As the CAISO further considered how to implement the OATT provision regarding the accommodation of post-10:00 a.m. intra-day schedules if practicable, the CAISO determined it is appropriate to afford such intra-day schedules using firm OATT transmission rights a priority higher than other self-schedules not using firm rights, legacy contracts, or transmission ownership rights when the higher priority is based an instruction from the EDAM transmission provider acting in accordance with its tariff. If the intra-day self-schedules are not submitted consistent with the instructions provided by the EDAM transmission provider, they will receive equal priority to day-ahead schedules as specified in section V.B.1.d of this transmittal letter.

The CAISO further acknowledges that providing transmission customers with firm OATT rights that submit all intra-day schedules after the 10:00 a.m. deadline a market scheduling priority higher than all other self-schedules would ensure delivery of their self-schedules submitted after the close of the day-ahead market; however, the CAISO and most stakeholders disagreed with these stakeholders position, largely because the transmission customers can still schedule their unused rights in real-time, receive a market scheduling priority equal to cleared day-ahead schedules, including transfers, and rely on CAISO redispatching all of the supply available to it from the various participating EDAM balancing areas.[260] Further, firm transmission service will continue to maintain a higher priority through the market scheduling process compared to non-firm

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[258] Section 13.8 of the *pro forma* OATT provides that firm point-to-point schedules submitted after 10:00 a.m. of the day prior to the commencement of such service "will be accommodated, *if practicable*" (emphasis added).

[259] *See Nev. Power Co*., 151 FERC ¶ 61,131, at PP 161-164. In that order, the Commission found the WEIM would provide numerous economic and reliability benefits to NV Energy's customers and that, in order to effectuate the WEIM, it is necessary for NV Energy and its customers to submit forecast data in advance of T-20. The Commission affirmed this finding on rehearing. *Nev. Power Co.,* 153 FERC ¶ 61,306, at P 40 (". . . in order to realize the numerous benefits from the EIM, participants must submit forecast data consistent with the timelines established by CAISO in order to run the security-constrained economic dispatch.").

[260] Legacy contract rights and transmission ownership rights will receive a higher priority through the real-time market if supported by the contract, similar to existing contract rights and ownership rights in the CAISO balancing area. *See* new tariff sections 33.16 and 33.17.

transmission rights, similar to today under an EDAM transmission service provider's tariff.[261] The CAISO believes that the EDAM transmission availability framework strikes the right balance between the need for transmission to be available in the market and the certainty market participants expect from the market.[262] As explained above, affording all self-schedules submitted after the close of the day-ahead market a higher scheduling priority where an EDAM transmission provider has not instructed the CAISO that a higher priority is needed to implement its OATT, would create inefficiency and undermine the objective to maintain confidence in all transfers.[263]

Some stakeholders also expressed a desire to have the right to carve their OATT transmission rights out of the market to the extent they are rights that support exports from or wheels through an EDAM balancing area to a non-EDAM balancing area to meet resource adequacy or other obligations. The proposed EDAM tariff provisions do not "carve out" such transmission rights (*i.e.*, take such capacity away from the market), but they allow customers to exercise their rights associated with such transactions. To do so, transmission customers would submit a market self-schedule associated with firm transmission rights registered with the CAISO. The market would respect these rights through an appropriate scheduling priority. This recognizes the need of parties to export from or wheel through another balancing area to serve their load and meet reliability needs. The design also provides for the physical "carveout" of certain transmission rights across particular frequently scheduled paths where the applicable transmission service provider determines such carveouts are necessary in accordance with its tariff. If there is frequent use and exercise of particular transmission rights across discrete and specific paths or flowgates, the transmission service provider could request an adjustment to "carve out" the transmission right from the market

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261 Transmission service in the CAISO balancing area will follow the CAISO tariff market priorities to facilitate the equivalent priority of transfers and load. *See, e.g.,* existing tariff sections 31.4 and 34.12 (establishing the real-time market and day-ahead market scheduling priorities).

262 The CAISO further notes that the market is constantly re-dispatching resources to account for changed conditions, including changes to load, topology due to outages, generation availability, or other factors. As such, the CAISO does not propose to assign any direct costs of redispatch to any specific scheduling coordinator representing transmission customer rights. Instead, each balancing area and transmission service provider in the extended day-ahead market will have the opportunity to work with their transmission customers and load serving entities to determine an equitable allocation of any shortfall or excess from the pool of congestion revenues and transfer revenues the CAISO allocates to the balancing area for sub-allocation according to its tariff. *See infra* Section V.D.3 of this transmittal letter (describing the allocation of transfer revenues and congestion revenues).

263 Transmission service in the CAISO balancing area will follow the CAISO tariff export and wheeling priorities to facilitate the equivalent priority of transfers and load. *See, e.g.,* existing tariff section 23 and tariff appendix L (establishing the scheduling priorities for wheeling through and export schedules).

under limited circumstances specified in the transmission service provider's tariff, which the CAISO would implement.[264]

The CAISO and stakeholders considered a variety of options to balance the objectives of maximizing the transmission capability available to the market (and the associated customer benefits) with the firm transmission rights of OATT customers, understanding that EDAM does not interfere with the obligation of each balancing authority to maintain reliability and does not disrupt the authority of any transmission service provider to manage transmission schedules under stressed system conditions. As explained above, the decision was to provide: (i) transmission customer schedules using specific firm OATT transmission rights submitted after the day-ahead market a higher priority than cleared day-ahead schedules in accordance with EDAM transmission provider instructions, (ii) all other transmission customer schedules using firm OATT transmission rights submitted after the day-ahead market an equal priority to cleared day-ahead schedules (iii) the full redispatch capability of the market in an effort to accommodate all intra-day schedules, (iv) the transmission service provider with discretion to determine the relative priority if accommodating these schedules was infeasible, and (v) the option for the transmission service provider to "carve out" the transmission if the end redispatch was not sufficient.

The CAISO appreciates that this approach will require each transmission service provider to amend its OATT to implement these features. Each EDAM transmission service provider's development of these supporting OATT rules and procedures is a significant next step in the evolution of EDAM, and the CAISO is committed to continuing its work with all interested participants through the associated approval processes, while continuing to look for uniform ways to address these issues. Accordingly, this transmission availability framework provides room for further consideration of the concerns expressed by some stakeholders that EDAM could diminish the value of their firm OATT rights, and allows the Commission to consider these important questions further when individual transmission providers participating in EDAM file the requisite OATT changes.[265] The CAISO believes these further efforts will build upon and enhance this framework. Based on these efforts, the CAISO will evaluate whether to enhance its tariff in the future to consider further conforming changes as may be appropriate based on the Commission-accepted OATT changes. The

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[264] *See* sections II.B.1.a and V.B.1.f of this transmittal letter (describing the option to "carve out" transmission from the market and explaining the inefficiency of doing so except in limited circumstances).

[265] The CAISO recognizes that some potential EDAM transmission service providers may not be subject to the Commission's jurisdiction. Nonetheless, the CAISO expects that the associated tariff provisions to implement EDAM, much the same as in the WEIM today, will coalesce around a standardized approach that supports broader market participation, with variances as needed to account for unique circumstances or existing business practices of individual transmission providers.

fact the CAISO has provided the opportunity for EDAM transmission service providers to develop OATT modifications for future consideration by the Commission does not undermine the CAISO's basic proposal. Indeed, EDAM transmission service providers will depend on the Commission's acceptance of the CAISO's proposal as a foundation for developing their OATT changes and submitting them to the Commission.

Numerous stakeholders expressed concerns about the interaction between EDAM and the Western Resource Adequacy Program (WRAP), a new voluntary resource adequacy planning and compliance program in the Western Interconnection for which the Commission recently approved a tariff framework effective January 1, 2023.[266] The CAISO expects the first binding season for the WRAP to be the summer of 2025, followed by a three-year transition period ending in the summer of 2028.[267] These stakeholders raised several issues and questions early in the EDAM stakeholder process and expressed appreciation for the CAISO's collaboration, which resolved many of the questions and issues. Given the critical role of resource adequacy in the West and the central role WRAP will play, the CAISO worked to ensure that the market design respected WRAP functionality, and believes that its proposed solution will provide a high degree of certainty for WRAP participants to meet their bilateral obligations to one another. In the reviewing the draft tariff language, however, these stakeholders raised two additional related issues related to the WRAP similar to the stakeholder comments addressed above.

First, they contended that real-time self-schedules using firm or conditional firm transmission service rights for WRAP transactions backed by capacity should be given a scheduling priority in the extended day-ahead market higher than the scheduling priority of cleared day-ahead schedules. While the CAISO did not adopt a special resource adequacy scheduling priority, the CAISO clarifies that if instructed by the EDAM transmission provider, certain intra-day self-schedules using specific firm OATT transmission service rights may be afforded higher priority than cleared day-ahead schedules when so instructed by EDAM transmission providers acting in accordance with their OATTs. Such firm OATT transmission rights may support WRAP schedules, and insofar as they do, WRAP schedules would be afforded the same higher priority treatment. However, such treatment should arise out of the EDAM transmission provider's OATT requirements. In practice the CAISO expects it will be able to accommodate most, if not all, such self-schedules using firm and conditional firm rights after the Commission's 10:00 a.m. deadline through redispatch and thus WRAP transactions should have a high degree of confidence of delivery.

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266 *Nw. Power Pool*, 182 FERC ¶ 61,063 (2023).

267 *Id.* at PP 13-14.

In the alternative, certain stakeholders proposed that the CAISO should address more specifically in the CAISO tariff how EDAM will accommodate transmission service provider "carveouts" to accommodate intra-day self-schedules in the real-time market that were not scheduled day-ahead. Based on this feedback, the CAISO revised new tariff section 33.18.3.3 to clarify the role of the EDAM transmission provider tariff to establish the narrow and limited circumstances when it would request the CAISO restrict the transmission available to the day-ahead market, with the CAISO simply accepting notice from the balancing authority as supported by the transmission service provider's tariff. Further, as the CAISO explained in the EDAM Final Proposal, the CAISO remains committed to continue engaging with EDAM participants and WRAP representatives, and it will strive to ensure and build upon the interoperability between EDAM and the WRAP through future evolution of the market design as needed.[268] Thus, if experience with EDAM and the WRAP over the next few years reveals interoperability issues, the CAISO will work with stakeholders and WRAP representatives to address them at that time.

Lastly, stakeholders generally understood and did not oppose the requirement to require customers that submit a bid in the day-ahead market and have not reserved transmission capacity associated with their schedule under the applicable transmission tariff to pay a transmission charge for use beyond a transmission reservation. Nonetheless, some stakeholders focused instead on the CAISO tariff requiring transmission service providers to offer an hourly firm service option. The CAISO has not proposed this as a requirement in its tariff, understanding that some transmission service providers may not currently provide hourly firm service. However, hourly firm transmission service is not a requirement under the *pro forma* OATT and is not something required to support extension of the day-ahead market. Stakeholders recommending this approach are essentially engaging in a collateral attack on the Commission's prior decisions not to require transmission service providers to offer firm hourly transmission service. Transmission service providers participating in EDAM are in the best position to consider whether to offer hourly firm transmission service to their customers, not the CAISO.

2. Ensuring Resource Sufficiency in the Day-Ahead Time Horizon

Resource sufficiency has been a cornerstone of the expansion of the CAISO's markets. The success of the WEIM is, in part, due to the foundational support of the WEIM resource sufficiency evaluation, which ensures each balancing authority participating in the WEIM can adequately balance its own supply and demand prior to accessing the CAISO's real-time market. The WEIM resource sufficiency evaluation has functioned to ensure each participating

[268] EDAM Final Proposal at 9.

balancing authority retains its respective resource adequacy obligation to ensure long-term availability of sufficient resources within its own area while allowing each balancing authority to accrue benefits through a wider-area optimization in real-time.

In designing EDAM, the CAISO worked with stakeholders to incorporate a uniform resource sufficiency evaluation into the extended day-ahead market design.[269] As further explained below, the structure of the EDAM resource sufficiency evaluation incentivizes each balancing authority to adequately demonstrate a balance of its own supply and demand prior to entering the day-ahead market. Under this structure, balancing authorities in the EDAM footprint that satisfy the EDAM resource sufficiency evaluation will receive the revenue generated by resource sufficiency evaluation failure surcharges paid by those that do not pass the evaluation and will be pooled together for purposes of the WEIM's resource sufficiency evaluation. A balancing authority in EDAM that cannot demonstrate it has sufficient resources to satisfy the obligations for its own balancing area will be allocated an EDAM resource sufficiency evaluation failure surcharge, but it will remain eligible for inclusion in the pool of passing entities if the insufficiency is cured through the day-ahead market. If the failing balancing authority does not cure the insufficiency through the day-ahead market, then it will be evaluated as a stand-alone balancing area for purposes of the WEIM resource sufficiency evaluation. Serving as a uniform standard applicable to all balancing authorities in the EDAM footprint, the EDAM resource sufficiency evaluation is a just and reasonable pillar supporting the EDAM framework.[270]

a. Uniform Assessment of Resource Sufficiency for All EDAM Balancing Areas

A key element of the just and reasonable design of EDAM is the uniform application of the EDAM resource sufficiency evaluation. As proposed, the EDAM RSE respects each balancing authority's existing resource adequacy regime and its control over its own transmission system, but it also sets a minimum expectation of the evaluation of sufficient resources needed to satisfy the day-ahead needs of the balancing authority. Because balancing authorities across the West are not subject to a common resource adequacy or resource planning program, the EDAM RSE serves as the common mechanism to ensure

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[269] New tariff sections 33.11.2, *et seq.* and 33.31.1, *et seq.*; *see also* EDAM Final Proposal, appendix 1: EDAM RSE Application Formulation (proposing a formulation for the EDAM resource sufficiency evaluation).

[270] *See, e.g.*, *Cal. Indep. Sys. Operator Corp.*, 153 FERC ¶ 61,087, at P 72 (2015) (explaining that a uniform resource sufficiency evaluation, applied to all entities on an equivalent basis, is just and reasonable).

day-ahead supply sufficiency without duplicating or supplanting the existing resource adequacy regimes. The uniform EDAM RSE ensures each balancing authority can meet its own obligations before it engages in transfers with other balancing authorities in the EDAM area through the day-ahead market. By requiring each balancing authority in the EDAM area (*i.e.*, the aggregate of all balancing areas participating in EDAM) to demonstrate sufficient forward procured supply each day, the EDAM RSE structure discourages entities with insufficient resources from "leaning" on its neighboring balancing authorities. The CAISO designed the EDAM RSE proposed herein to work in harmony with, and not act as a replacement of, the WEIM resource sufficiency evaluation assessments performed in real-time.[271]

Building upon the principles of the WEIM resource sufficiency evaluation, where the resource sufficiency evaluation tests are uniformly applied to a diverse group of balancing authorities, the EDAM RSE will apply uniformly to produce an hour-by-hour assessment of resource sufficiency for the day-ahead timeframe for each balancing authority in EDAM. In particular, the proposed tariff revisions provide the structure for performing the EDAM RSE prior to running the day-ahead market.[272] The CAISO will perform "advisory" runs of the EDAM RSE and provide the results to each balancing authority at 6:00 a.m. and 9:00 a.m. each day. The CAISO will perform the final binding run of the EDAM RSE at approximately 10:00 a.m. In each advisory and binding run, the EDAM RSE application will establish the hourly quantity of upward sufficiency or downward insufficiency for each balancing authority in the EDAM area looking across three components in the day-ahead timeframe: forecasted demand, imbalance reserves, and ancillary services requirements.[273]

This framework is consistent with each balancing authority's individual obligations to meet its individual requirements for forecasted load, uncertainty, and ancillary services. Specifically, each balancing authority in the EDAM area will submit its demand forecast and variable energy supply forecast to establish its daily demand requirement prior to 9:00 a.m., either by using the CAISO's forecasting system or a direct submission from an approved forecasting provider.[274] To recognize the diversity benefit of participating in EDAM, the CAISO will establish daily imbalance reserve requirements for each balancing authority that account for the breadth and depth of the broader geographic EDAM footprint and the supply options made available therein. Each balancing

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271 Existing tariff sections 29.34(l)-(n). The EDAM resource sufficiency evaluation is also compatible with the resource adequacy program in the CAISO balancing area and other balancing areas that may participate in the Western Resource Adequacy Program (WRAP).

272 New tariff section 33.31.1.

273 New tariff sections 33.31.1.2 and 33.31.1.3.

274 New tariff sections 33.31.1.2.1.1 and 33.31.4.

authority's imbalance reserve requirements will be fixed at 9:00 a.m., thereby providing entities with certainty as to their resource sufficiency obligations that can be addressed prior to the final binding EDAM RSE at 10:00 a.m. Ancillary services requirements for each balancing authority will be submitted prior to 9:00 a.m. and in accordance with the CAISO's ancillary services self-provision requirements in existing tariff section 8.

To perform the evaluation, the EDAM RSE application will model an EDAM balancing area's entire load and supply on a single bus[275] and perform a unit commitment optimization using all of the existing CAISO resource models. The optimal function of the EDAM RSE will be set to minimize the total cost as a means to determine the most efficient use of the varying resource types and capabilities made available to EDAM. By using existing market models in each hour of the day-ahead time horizon, the EDAM RSE application will establish the hourly requirements in the upward and downward direction for each balancing authority in the EDAM area across each of the three component parts and will compare each balancing authority's requirements against the same balancing authority's EDAM RSE-eligible supply. Resources within the CAISO balancing area can be resource sufficiency evaluation-eligible supply without undertaking additional registration requirements; intertie resources and EDAM resources will be designated as resource sufficiency evaluation-eligible supply following completion of the registration process that will be further described in the Business Practice Manual for the Extended Day-Ahead Market.

A balancing authority in the EDAM area will pass the final binding EDAM RSE if it meets all of the component requirements in each hour of the day-ahead time horizon. In recognition of the common demonstration of daily resource sufficiency, the passing EDAM entities will be "pooled" together and evaluated as a single group for purposes of the WEIM resource sufficiency evaluation.[276] Entities that satisfy the upward requirements of the EDAM RSE will be pooled together in the EDAM upward pool. Likewise, entities that satisfy the downward requirements of the EDAM RSE are pooled together in the EDAM downward pool. If a balancing authority in the EDAM area fails to satisfy all component requirements of the EDAM RSE, such entity remains eligible for inclusion in the

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[275] The EDAM RSE application will not reflect a full security constrained economic dispatch because it does not include transmission constraints or calculate resultant power flows. EDAM Final Proposal at 60.

[276] The EDAM RSE application will test an EDAM entity's ability to meet its balancing area requirements, including demand and ancillary service obligations, in each of the 24 hours of the day-ahead market run, as well as the flexibility to ramp between the requirements in each hour. Accordingly, in the WEIM, the CAISO will only evaluate balancing authorities in the EDAM area pursuant to the WEIM RSE flexibility test and not the capacity or balancing tests. New tariff section 33.31.1.4.1.

EDAM upward pool and/or the EDAM downward pool if it can resolve the insufficiency through supply procured in the IFM. If the entity cannot resolve its failure through the IFM, then the entity will not be placed into the pool, and it will be evaluated individually for purposes of the WEIM resource sufficiency evaluation.[277]

Entities placed in the EDAM upward pool and the EDAM downward pool commit to timely e-tag all imports and exports.[278] Entities that fail to comply with the required e-tagging protocols, and do not otherwise re-supply, will be removed from the pool.[279] Entities removed from the pool(s) also will be evaluated individually for purposes of the WEIM resource sufficiency evaluation.

b. EDAM Resource Sufficiency Evaluation Failure Surcharges

The tariff revisions set forth the framework for the EDAM RSE failure surcharge and provide for three types of surcharges: the *EDAM RSE On-Peak Upward Failure Insufficiency Surcharge*, the *EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge*, and the *EDAM RSE Downward Failure Insufficiency Surcharge*.[280] Scheduling coordinators for EDAM entities that fail the EDAM RSE by more than a *de minimis* amount, including failing entities that cured their failure through the IFM, will be allocated the applicable EDAM RSE failure surcharge.[281] Revenue generated by the EDAM RSE failure surcharges will be allocated to the scheduling coordinators for the balancing authorities in the EDAM area that passed the EDAM RSE.[282] Each entity allocated charges for an EDAM RSE failure, or otherwise allocated revenue associated with such surcharges, will distribute the charge (or revenue) in accordance with the provisions of its applicable tariff(s).[283]

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277 New tariff section 33.31.1.4.

278 For avoidance of doubt, the EDAM resource sufficiency evaluation does not propose a surcharge for tagging failures.

279 New tariff section 33.31.1.6. The CAISO will evaluate entities that are excluded from the pool as an individual balancing areas in the WEIM resource sufficiency evaluation.

280 New tariff sections 33.11.2 and 33.31.1.5.

281 The tariff defines a *de minimis* failure as the higher of 10 MW or an amount less than or equal to one percent of the balancing area's upward imbalance reserve requirement for the hour. New tariff section 33.31.1.5.1(i).

282 New tariff sections 33.11.2.2.1, 33.11.2.2.2, and 33.11.2.2.3.

283 The CAISO is currently undertaking a separate stakeholder initiative to address CAISO balancing area-specific elements required for EDAM participation, including how to allocate CAISO balancing area EDAM resource sufficiency evaluation failure surcharges and revenues, and options for curing CAISO balancing area EDAM advisory resource sufficiency evaluation

The *EDAM RSE On-Peak Upward Failure Insufficiency Surcharge* addresses deficiencies during on-peak hours, which present the most severe risk associated with identified resource deficiencies in the day-ahead time horizon. To incentivize all balancing authorities in the EDAM area to demonstrate sufficient supply and flexibility in each of the sixteen on-peak hours, the *EDAM RSE On-Peak Upward Failure Insufficiency Surcharge* applies in all sixteen on-peak hours during the day.[284] Stakeholders agreed that identified resource deficiencies during off-peak hours present a lesser degree of risk. Accordingly, the *EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge* will yield a lower failure surcharge and will apply during the failed hour only. Likewise, the *EDAM RSE Downward Failure Surcharge* will be allocated to the applicable scheduling coordinator in the failed hour only.

The proposed tariff revisions govern the *EDAM RSE On-Peak Upward Failure Insufficiency Surcharge*.[285] The CAISO will calculate this surcharge as the product of three values to reflect (1) the failure quantity, (2) the applicable surcharge price, and (3) a scaled adder for severe and persistent failures. First, the CAISO will determine the failure quantity of the *EDAM RSE On-Peak Upward Failure Insufficiency Surcharge* based on the failing entity's highest *EDAM RSE Hourly Upward Deficiency Quantity* during the sixteen on-peak hours.[286] Second, the CAISO will determine the applicable surcharge price by the applicable trading hub price (*e.g.*, Mid-Columbia or Palo-Verde).[287] The CAISO selected these

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shortfalls. *See* https://stakeholdercenter.caiso.com/StakeholderInitiatives/Extended-day-ahead-market-ISO-balancing-authority-area-participation-rules. That ongoing stakeholder initiative, which is anticipated to result in a future tariff amendment, is separate from the initiatives that resulted in this tariff amendment and need not be completed before the Commission issues an order accepting the tariff revisions contained in this filing.

[284] New tariff sections 33.11.2.1.1 and 33.11.2.2.1. In accordance with the tariff, all of the times listed in these tariff sections are Pacific Time. *See* existing tariff section 1.3.2(i). Details on EDAM resource sufficiency evaluation Upward Credit for passing hours.

[285] New tariff section 33.11.2.1.1.

[286] The EDAM resource sufficiency evaluation Hourly Upward Deficiency Quantity is the MW sum total of the upward failures during any single operating hour. Tariff appendix A, new definition of EDAM RSE Hourly Upward Deficiency Quantity. The EDAM resource sufficiency evaluation On-Peak Upward Failure Insufficiency Surcharge utilizes the highest value during any of the sixteen on-peak hours as the failure quantity. New tariff sections 33.11.2.1.1 and 33.31.1.5.1; tariff appendix A, new definition of EDAM RSE On-Peak Upward Failure Insufficiency Surcharge.

[287] Some stakeholders raised concerns regarding the ongoing liquidity of the bilateral hubs following implementation of EDAM. The CAISO commits to monitoring the liquidity of referenced trading hubs. If a hub does not remain sufficiently liquid, it may no longer be appropriate to use it as a reference point and the CAISO will reevaluate the proposed reference.

trading hubs as appropriate price proxies because they represents the cost the failing entity would bear as it sought additional supply to cure the insufficiency. Third, the scaled adder is composed of two parts, with the *EDAM RSE Failure Multiplier* reflecting the severity of the failure and the *EDAM RSE Failure Scaling Factor* reflecting the persistence of failures. The *EDAM RSE Failure Multiplier* reflects the severity of the failures, denoted by three tiers. Tier 1 failures are *de minimis* failures and the *EDAM RSE Failure Multiplier* will be set to zero; tier 2 failures are those of a magnitude less than or equal to fifty percent of the entity's upward imbalance reserve requirement and increase the *EDAM RSE Failure Multiplier* from zero to 1.25; tier 3 failures are those of a magnitude greater than fifty percent of the entity's upward imbalance reserve requirement and increase the *EDAM RSE Failure Multiplier* to 2. The *EDAM RSE Failure Scaling Factor* reflects persistence and adds one percent to the *EDAM RSE Failure Multiplier* for every additional day during the preceding thirty-day period in which the entity had a tier 2 or tier 3 failure in the upward direction.[288] For example, seven failures over the preceding 30 days would increase the *EDAM RSE Failure Multiplier* of a tier 2 failure from 1.25 to 1.31.

The *EDAM RSE On-Peak Upward Failure Insufficiency Surcharge* will also include a credit to account for any of the sixteen on-peak hours in which the entity satisfied the EDAM RSE. The CAISO will determine the *EDAM RSE On-Peak Upward Credit* as the product of the highest *EDAM RSE Hourly Upward Deficiency Quantity* and the load-weighted average LMP of the load aggregation point in the balancing area.[289] If the *EDAM RSE On-Peak Credit* amount exceeds the surcharge amount, the *EDAM RSE On-Peak Upward Failure Insufficiency Surcharge* will be capped at zero.[290]

The tariff also sets forth the *EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge* and the *EDAM RSE Downward Failure Insufficiency Surcharge*.[291] Like the on-peak surcharge described above, the CAISO will calculate the off-peak surcharge as the product of three values to reflect: (1) the failure quantity, (2) the applicable surcharge price, and (3) a scaled adder for severe failures. Unlike the *EDAM RSE On-Peak Upward Failure Insufficiency Surcharge*, which applies in each of the sixteen on-peak hours, the *EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge* applies only in the failed hour.

In addition, the tariff includes the *EDAM RSE Downward Failure Insufficiency Surcharge*.[292] The CAISO will calculate this surcharge as the

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288 Tariff appendix A, new definition of EDAM RSE Failure Scaling Factor.

289 Tariff appendix A, new definition of EDAM RSE On-Peak Upward Credit.

290 New tariff section 33.11.2.1.1.

291 New tariff section 33.11.2.1.2.

292 New tariff section 33.11.2.1.3.

product of two values to reflect: (1) the failure quantity and (2) the applicable surcharge price. The CAISO will determine the failure quantity based on the *EDAM RSE Hourly Downward RSE Deficiency Quantity* during the failed hour, and the applicable surcharge price will be the marginal energy cost of the failing balancing area. The CAISO does not expect downward insufficiency to present a challenge across a more geographically diverse EDAM footprint and a scaled adder for severity is not included.

Through the stakeholder process, the CAISO evaluated the need for surcharges associated with failures of the resource sufficiency evaluation. The WEIM resource sufficiency evaluation does not include a component for financial penalties, but a physical limitation on transfers is a more appropriate consequence given the near real-time nature of the WEIM's imbalance product. In the day-ahead time horizon, locking transfers may not incentivize resource sufficiency in the same manner as it does in real-time and could significantly reduce the benefits of the extended day-ahead market. Each of the failure surcharge types are uniquely calibrated to address the severity of the failure and the time period in which the failure occurs and establish a targeted proxy price to address the specific risks presented. Each of the surcharges is narrowly tailored to address the unique circumstances presented, and taken together they constitute a just, reasonable, and not unduly discriminatory structure to address resource sufficiency failures.[293]

c. Stakeholder Positions on the Resource Sufficiency Evaluation Proposal

Some stakeholders initially questioned the need for a uniform resource sufficiency evaluation, contending that the resource adequacy programs governing the load serving entities within each balancing authority should be sufficient. In the stakeholder process, the CAISO and interested parties evaluated the various resource adequacy programs that govern entities that may wish to participate in EDAM including, but not limited to, the CPUC's resource adequacy program and the developing WRAP. After recognizing the differences in how the various programs ensure resource adequacy within their jurisdictions, stakeholders agreed that the EDAM resource sufficiency evaluation was an appropriate tool to complement and maximize the value of these programs by ensuring participants can account for the capacity and optimize use of resources they have procured to support reliability within their individual footprints. On

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[293] *See, e.g.*, *Midcontinent Indep. Sys. Operator Corp.*, 175 FERC ¶ 61,093, at P 12 (2021) (determining that the proposed rate structure, which was narrowly tailored to address the unique circumstances, was just and reasonable); *Cal. Indep. Sys. Operator Corp.*, 145 FERC ¶ 61,135, at PP 9, 14 (2013) (finding that the proposed rate structure was just and reasonable as it was narrowly tailored to address the unique challenges).

balance, stakeholders agreed that using a uniform resource sufficiency evaluation to test the sufficiency of supply procured under different resource adequacy and resource planning programs was the appropriate means to ensure equitable participation optimal resource commitments. Although not all stakeholders agreed with utilizing the EDAM resource sufficiency evaluation, the large majority of stakeholders supported the EDAM resource sufficiency evaluation as a tool to ensure entities in different resource adequacy programs (or without any centralized resource adequacy program) all bring adequate resources to meet their individual balancing authority obligations.

In addition to ensuring each balancing authority in the EDAM area demonstrates resource sufficiency prior to the day-ahead time horizon, some stakeholders requested that the EDAM resource sufficiency evaluation also reflect transmission constraints and power flows over transmission facilities used to facilitate EDAM transfers. Underlying this concern is the potential that a balancing area could pass the EDAM resource sufficiency evaluation yet still have insufficient resources available to clear the day-ahead market. In the course of numerous working groups and stakeholder meetings, the CAISO explored this option and determined that including transmission elements in the EDAM resource sufficiency evaluation would require using the CAISO's full network model, which in turn would require integration with additional market applications. Functionally, the EDAM resource sufficiency evaluation application would become a proxy run of the CAISO's existing day-ahead market. Given the computation time required to run the application in this configuration, implementing such a configuration would require trade-offs between the number and frequency of advisory runs prior to the final binding EDAM resource sufficiency evaluation and the accuracy of the application itself. Stakeholders ultimately agreed that, while modeling transmission constraints would have some benefits, it would not increase the accuracy of the test sufficiently to justify the significant effort and complexity of implementing such modeling at this time. The CAISO will monitor and evaluate the EDAM resource sufficiency evaluation to ensure it performs as expected without the modeling of transmission constraints, and it will continue working with its stakeholders as EDAM is implemented to explore whether and how the EDAM resource sufficiency evaluation can reflect such constraints.

The CAISO worked closely with stakeholders to ensure that the EDAM resource sufficiency evaluation reflects all owned and contracted resources available for the next day. Stakeholders raised questions and concerns about the compatibility of the EDAM resource sufficiency evaluation with the various resource types owned and contracted within the balancing authorities considering joining EDAM, as well as external supply resources. To aid entities participating in EDAM in their gas procurement planning, the CAISO will provide EDAM resource sufficiency evaluation advisory results two days prior to the relevant day-ahead market to facilitate alignment with the gas nomination cycle.

For stakeholders with hydroelectric supply within their balancing area, the EDAM resource sufficiency evaluation permits entities to manage daily energy limits and hourly energy bids, which in turn inform minimum discharge obligations and availability to discharge. To ensure appropriate consideration of variable energy resource supply in the EDAM resource sufficiency evaluation, the EDAM resource sufficiency evaluation application will create default supply bids for the difference between the bid-in quantity and forecast quantity. The CAISO will use default supply bids derived from the variable energy resource forecast for purposes of the EDAM resource sufficiency evaluation only.

Stakeholders requested that the EDAM resource sufficiency evaluation also permit use of resource or load modification programs that EDAM cannot explicitly model, including delivered firm energy contracts commonly executed through arrangements pursuant to Service Schedule C of the Western Systems Power Pool (WSPP) Agreement and demand response programs within their borders. To accommodate delivered firm energy contracts, the CAISO will utilize a registration system to prevent double counting and ensure sufficient resource integrity before classifying such resources or programs as eligible for the EDAM resource sufficiency evaluation. Non-resource-specific intertie bids submitted at the border of the CAISO balancing area will count in the EDAM resource sufficiency evaluation when such bids are associated with a resource adequacy contract, originate from a resource pseudo-tied with the CAISO, originate from resources dynamically scheduled into the CAISO, or otherwise have an executed agreement with the CAISO that specifies performance and operating requirements. Emergency supply or load modification programs that inform a balancing authority's next-day operating plan may be accounted for through manual forecast adjustments, consistent with the methodology under the WEIM resource sufficiency evaluation.[294] The CAISO will monitor and evaluate the EDAM resource sufficiency evaluation-eligible supply construct and continue working with stakeholders as EDAM is implemented to ensure the EDAM resource sufficiency evaluation reflects all owned and contracted resources available for the next day.

3. Ensuring Sufficient Resources to Serve Balancing Area Needs

In evaluating whether a balancing authority has sufficient resources to meet its own obligations prior to the day-ahead market, EDAM will enable each balancing authority to utilize a configurable net export transfer constraint to communicate to the CAISO the amount of its resources that can be optimized to

[294] New tariff section 33.31.4.1; *see also* section V.C.2 of this transmittal letter (describing external resource participation in the EDAM area).

support EDAM transfers to another balancing area.[295] This mechanism enables each balancing authority to control its supply to meet its own needs before assisting the needs of others. The net export transfer constraint, a configurable feature, will allow balancing areas, including the CAISO balancing area, to manage its internal supply more effectively, while also allowing such supply for support regional needs. The constraint will be calculated as the available capacity of supply bids from all resources multiplied by a configurable confidence factor, minus the EDAM RSE requirements and a configurable non-exportable capacity margin. The net export transfer constraint formula is designed to allow each balancing authority to select the appropriate reliability margin and confidence factor input variables to reflect the unique needs of its balancing area. When enabled, the constraint will enforce an hourly limit on the amount of net EDAM transfer exports from a balancing area in the EDAM footprint. No balancing authority can reduce the constraint to impose a limit below the higher of zero or the transmission service made available to support a net export in the EDAM resource sufficiency evaluation. A balancing authority must elect to enable the constraint prior to 9:00 a.m. on the day before the trading day and may choose which hours of the operating day the constraint will apply.

The voluntary adoption of this constraint prior to the trading day will allow each balancing area to maintain excess supply to meet its expected day-ahead needs and manage reliability conditions. In the CAISO balancing area, this feature protects against EDAM export transfers from resource adequacy capacity, similar to the CAISO's ability to recall lower-priority exports that are not contractually obligated to serve external load. In participating balancing areas outside of California, this constraint will also enable non-CAISO balancing authorities to manage reliability and resource adequacy obligations, such as obligations arising from participation in WRAP.

The EDAM resource sufficiency evaluation, in conjunction with the net export transfer constraint, will instill confidence in the availability of supply to realize an optimal market solution and encourage entities to make excess supply available to the market beyond what they need to meet the EDAM resource sufficiency evaluation.

C. Day-Ahead Market Activities

Section III.A.1 of this transmittal letter describes operation of the day-ahead market in the CAISO balancing area, section IV.G of the transmittal letter describes the connection between DAME and EDAM, and section V.B.1 of the transmittal letter describes the scheduling of transmission to support EDAM

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[295] New tariff section 33.31.3; *see also* EDAM Final Proposal, appendix 4: Mathematical Formulation of the Net EDAM Export Transfer Constraint (proposing a detailed formulation for this constraint).

transfers. This section V.C of the transmittal letter describes additional changes necessary to extend the day-ahead market to other balancing areas. Otherwise, EDAM participants representing supply and demand will submit economic bids and self-schedules according to the same timelines and procedures as other scheduling coordinators in the day-ahead market today.[296]

1. Virtual Bidding

The CAISO day-ahead market currently enables virtual bidding, also known as convergence bidding. Although virtual bidding has benefits, it also has resulted in some of the Commission's most significant enforcement actions for market manipulation.[297]

Based on overwhelming stakeholder input, the CAISO proposes to allow EDAM transmission service providers to enable virtual bidding in their balancing areas at the onset of their participation in EDAM but will not mandate it.[298] EDAM virtual bidding would function just as CAISO virtual bidding functions today, except with a larger footprint.[299] Alternatively, EDAM balancing authorities may elect to forgo allowing virtual bidding in their balancing areas at the outset of EDAM. A large number of external stakeholders staunchly objected to implementing mandatory virtual bidding at the start of EDAM. They stressed their lack of experience with day-ahead markets, their unfamiliarity with virtual bidding, and their concerns about the potential financial and reliability effects impacts of virtual bidding in the early stages of EDAM under these circumstances. Once EDAM participation begins, the CAISO will begin a stakeholder process to determine a permanent virtual bidding design for the EDAM and CAISO footprint. The optional transition period will give EDAM transmission service providers, their customers and market participants, and their local regulators experience and comfort with two-day markets before enabling virtual bidding. During the EDAM stakeholder initiative, many EDAM market participants and regulators stressed the importance of such a transition period in the decision to join the day-ahead market.

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296 New tariff section 33.30.

297 *See, e.g.*, *Barclays Bank PLC*, 161 FERC ¶ 61,147 (2017).

298 New tariff section 33.30.7.

299 The CAISO will retain its authority to suspend or limit virtual bidding. *See* existing tariff section 7.9. Each EDAM Entity may recommend that the CAISO suspend convergence bidding in its balancing area, provided that the CAISO will make the ultimate determination as to such recommendation. New tariff section 33.30.7.3.

If an EDAM transmission service provider elects to use the optional transitional period, load serving entities within the balancing area may not bid or self-schedule demand above the amount of supply within the balancing area. The CAISO will enforce this demand limitation based on the available supply, accounting for the difference between variable energy resource bids and their forecasts.[300] This limitation will help mitigate the risk of inaccurate price signals in the day-ahead market.

The CAISO and the Department of Market Monitoring will continue to monitor and evaluate the extended day-ahead market's performance with or without convergence bidding in balancing areas to help inform the evolution of the future design and address any unintended consequences of an optional convergence bidding design at the onset of EDAM.

2. External Resource Participation

External resource participation in EDAM refers to the opportunity for resources physically located outside of the EDAM area, *i.e.*, resources located in a non-EDAM balancing area (including WEIM balancing areas that have not joined EDAM) to participate in the day-ahead market operating in the EDAM area. The approach to external resource participation in EDAM provides numerous options for source-specific and non-source-specific resources to bid economically and self-schedule into the day-ahead market consistent with current practices in the CAISO balancing area and balancing areas in the WEIM. Accordingly, the tariff requirements for participation in EDAM by external resources accounts for existing rules at CAISO interties,[301] existing rules at WEIM interties,[302] and the resource sufficiency evaluation.[303] This means the opportunities for participation in the extended day-ahead market may be different depending on whether the external resource is associated with a pseudo-tie, a dynamic schedule, a self-schedule, or an economic bid.[304] Further, the

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300 New tariff section 33.30.7.2.

301 *See, e.g.*, existing tariff sections 27, 30.5.2.4.1, and 31.8.

302 *See, e.g.*, existing tariff section 29.34(f)(3) (providing for base schedules of imports and exports); *see also* existing tariff section 29.34(i)(2) (providing an EIM balancing authority discretion whether to enable economic intertie bidding, which to date has not been enabled by any participant); *Ariz. Pub. Serv. Co.*, 155 FERC ¶ 61,112, *reh'g denied*, 156 FERC ¶ 61,227 (2016) (accepting proposal to allow external resources to participate in the WEIM via dynamic scheduling).

303 New tariff section 33.30.8.3.

304 Dynamic schedules and pseudo-ties are the two basic categories of dynamic transfers. A dynamic transfer is the transfer of energy or ancillary services from resources interconnected in one balancing area into another balancing area pursuant to a dynamic signal processed in the

resource's participation may depend on whether the intertie is associated with a boundary between a balancing area in the WEIM and a balancing area outside the WEIM, an external intertie in all cases, a boundary between a balancing area in the WEIM and EDAM, an external intertie with the EDAM area, or between a balancing area in the WEIM or EDAM and the CAISO balancing area, an internal EDAM area intertie.[305]

The table below illustrates the different types of external resources and their ability to offer supply into the day-ahead market under EDAM.

Type of External Resource	Market Participation
1. Source-Specific: Pseudo-Tied Resource	Economically bid and self-schedule in the day-ahead market
2. Source-Specific: Dynamically Scheduled Resource	Economically bid and self-schedule in the day-ahead market
3. Off-System Designated Network Resource	Economically bid and self-schedule in the day-ahead market
4. Other Contracted Supply[306]	Self-schedule in the day-ahead market at EDAM external interties
5. Non-Source-Specific, Non-Contracted Supply	Cannot self-schedule or economically bid into the market at EDAM external interties, except at CAISO external interties, unless economic bidding has been enabled according to existing tariff section 29.34(i)(2)

balancing authorities' energy management systems. A dynamic schedule is a dynamic transfer in which the resource supplying the energy or ancillary services remains under the control of the host balancing authority – the balancing authority for the balancing area where the resource is interconnected to the electric system. Under a dynamic schedule, the host balancing authority includes the resource's output in its balancing of supply and demand. A pseudo-tie is a dynamic transfer in which the balancing authority for the balancing area into which a resource's energy and ancillary services are delivered – called the attaining balancing authority – accounts for the resource supplying the energy or ancillary services. The attaining balancing authority also performs other balancing authority functions for the resource, even though the resource is interconnected to the electric system within another balancing area – called its native balancing area. *See* existing tariff sections 4.14 – 4.15; tariff appendix A, existing definitions of Dynamic Schedule and Pseudo-Tie; existing tariff appendices M and N.

305 New tariff section 33.30.8.

306 This type of external resource includes supply under contract to serve load in the balancing area as further described below.

First, external resources delivered through a pseudo-tie are deemed located within the attaining balancing area based on modeling, telemetry, and other requirements. These arrangements and obligations are captured in tariffs and under contractual provisions between the balancing authorities and the resource owner, and they establish obligations related to performance, delivery, and other operational requirements. As such, these resources will continue their association with either a WEIM, EDAM, or CAISO intertie consistent with the arrangements they use today.[307]

Second, external resources delivered through a dynamic schedule represent source-specific supply located outside of a balancing area, but the market treats them as supply available to the balancing area similar to other dispatchable resources inside the balancing area. Because the resource remains outside of the balancing area, the introduction of the WEIM required further modeling that the CAISO implemented through a feature called a "mirror system resource."[308] This modeling feature allows accurate real-time pricing of a resource located in a WEIM balancing area dynamically scheduled into another balancing area in the WEIM area, including the CAISO balancing area, and will continue between a WEIM balancing area that joins EDAM and a balancing area remaining in the WEIM. These resources may continue to participate in EDAM. However, extending the day-ahead market to other balancing areas will mean that dynamic schedules that have been between WEIM balancing areas may become dynamic schedules between two balancing areas in EDAM. In these cases, the transfer of the resource's output through a dynamic schedule will no longer produce accurate modeling and pricing, even with a mirror system resource, so pseudo-ties will be required to implement these dynamic schedules.[309]

This inaccuracy occurs because the resources in the source EDAM balancing area that produce the energy for the dynamic schedule are also optimally scheduled to produce energy for transfers between the EDAM balancing areas. The mirror resource solution works for dynamic schedules into

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307 New tariff section 33.30.8.1.

308 Existing tariff section 29.27(c).

309 Resources located in an EDAM balancing area that otherwise may have utilized dynamic scheduling in the WEIM will instead be able to submit an economic bid at their location and have the opportunity to transfer their energy or capacity between balancing areas based on the optimal market solution. In addition, these resources can be designated to support the resource sufficiency evaluation of another balancing area, essentially assuring the transfer capability is available and the associated delivery is economic. If these options are insufficient to support the delivery of supply from the resource, pseudo-tying the resource from one EDAM balancing area to another EDAM balancing area, including the CAISO balancing area, will be necessary.

the CAISO balancing area today because it is possible to attribute the import resources with an adder to the bid price of the resources in the source balancing area. This same feature will not work when the day-ahead market is extended to other balancing areas because a source balancing area participating in EDAM will have its resources optimized in the same day-ahead market solution as other balancing areas in the day-ahead market, including the CAISO balancing area. Dynamic schedules without the mirror resource feature working properly would clear only after the EDAM transfers are at their respective scheduling limits, and they may not even clear even when their bid price is lower than the LMP at their location. To address this condition and permit dynamic scheduling among balancing areas in EDAM, it would be necessary to dedicate transmission capacity which is inefficient because that dedicated transmission capacity could support economic transfers but may go unused if the dynamically scheduled resource is not economic. Accordingly, resources within EDAM balancing areas will be required to pseudo-tie if they are dynamically scheduled to another EDAM balancing area; EDAM will not support dynamic schedules between EDAM balancing areas.

Third, the EDAM design will support external resource participation by source-specific off-system designated network resources.[310] An external resource located in a balancing area outside of the EDAM area can economically bid or self-schedule at the intertie where the resource is a network resource to serve load under the terms of the transmission service provider's tariff.[311] Because the resource is a network resource under the terms of the tariff, its supply is deliverable on firm transmission to the intertie of the balancing area where the load is served, and it will be delivered to load using the network integration transmission service across the balancing area where the load is located. Allowing participation by an off-system designated network resource in this way allows the generation the load serving entity has procured and designated to serve its load to bid economically into the market, and in turn it allows the day-ahead market to serve the demand more cost-effectively. Similarly, source-specific supply that is otherwise not associated with a designated network resource, but is owned or under contract to serve load within

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310 New tariff section 33.30.3. The resource must be located in a WEIM balancing area, not a balancing area outside of the WEIM. This ensures appropriate modeling of the resource in the CAISO full network model, and the resource characteristics and abilities will be registered and visible to the market operator. Similarly, bids must be associated with the intertie of the EDAM balancing area where the load associated with the designated resource is located, and the bid-in quantity cannot exceed the amount of the off-system network resource being designated.

311 An off-system designated network resource under the terms of the Commission's *pro forma* OATT can be designated to serve load based upon: (1) an attestation that the designation is supported by a contract for the supply, (2) the supply will be delivered on firm transmission to the balancing area where the load is located, and (3) the resource is designated to serve that specific load. *See Preventing Undue Discrimination & Preference in Transmission Serv.*, 123 FERC ¶ 61,299, at PP 177-78, 182-85 (2008).

a balancing area participating in EDAM, can self-schedule or economically bid at an intertie with a balancing area in the WEIM or outside of the WEIM. These resources have a contractual relationship with the balancing authority in EDAM or another load serving entity within the balancing area and their delivery is reliable.

However, and fourth in the table above, other contracted supply must be self-scheduled and cannot economically bid at an intertie between a balancing area in EDAM and a balancing area outside of EDAM. This may include non-source-specific import supply under contract, such as firm energy contracts where the source of the generation is unknown ahead of the 10:00 a.m. day-ahead market close (*e.g.*, WSPP Schedule C arrangements), which can self-schedule at an EDAM intertie.[312] These contracted supply arrangements impose certain performance and delivery requirements that instill greater confidence regarding their performance and delivery. Moreover, the balancing authority can better account for these from a reliability perspective by considering them when defining the level of ancillary services procurement necessary to support them.

Finally, non-source-specific supply not under contract to serve demand within an EDAM balancing area cannot offer supply at external interties of balancing authorities participating in EDAM, either by self-scheduling or economic bidding, unless the balancing authority has enabled economic bidding at external interties with respect to the WEIM.[313] This extension of the Commission-accepted WEIM approach to EDAM is premised upon stakeholder reiteration of the same concerns expressed in the development of the WEIM, *i.e.*, a concern that EDAM balancing areas will be exposed to increase uncertainty about the delivery of the supply, which could raise reliability risks if the supply is not delivered as expected.

This exclusion from participation in EDAM is limited to non-source-specific supply resources at EDAM external interties with balancing authorities participating in EDAM, and does not apply at the CAISO external interties.[314] Within the CAISO balancing area, and unlike in other balancing areas

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312 The tariff revisions also specify that bids from delivered firm energy contracts may participate in the day-ahead market, and that such contracts include but are not limited to WSPP Schedule C arrangements, CAISO resource adequacy imports, and similar forward contracted supply. New tariff section 33.30.8.2. Further, all energy scheduled from such non-resource-specific supply contracts must have a submitted e-tag within three hours following publication of the day-ahead market results and satisfy other e-tagging requirements. New tariff section 33.30.8.3.

313 *See* existing tariff section 29.34(i)(2) (providing balancing areas the option to enable economic external intertie bidding by non-source specific resources). To date, external economic external intertie bidding by non-source-specific resources has not been enabled by any WEIM balancing area.

314 New tariff section 33.30.3.

participating in EDAM, energy and ancillary services procurement is co-optimized through the market and, as such, the CAISO can better manage potential risks associated with economic bidding at its external interties. Moreover, economic bidding at CAISO external interties has been a longstanding and beneficial feature of the CAISO market, providing suppliers an opportunity to offer excess supply into the market, enabling the CAISO to serve demand more economically. Other balancing authorities considering participating in EDAM expressed reliability concerns about these types of transactions at their interties, and the CAISIO is precluding them at the onset of EDAM unless a balancing authority has enabled economic bidding of such supply under its tariff consistent with the WEIM rules. In any event, the CAISO remains committed to working with market participants to evaluate the EDAM and WEIM external resource participation model and evolve the design as participants gain experience in the day-ahead market and supply structures across the West continue to evolve, potentially in a manner that further mitigates the reliability concerns many stakeholders have expressed.

Most stakeholders support or do not oppose continuing to allow economic bidding at CAISO external interties because this historically has provided an opportunity to derive value for excess supply that may bid into the day-ahead market. Stakeholders recognize the value the CAISO balancing area derives from excess supply offered economically by non-source-specific resources in the day-ahead market. Economic bidding at the CAISO external interties has been a longstanding and beneficial feature, allowing suppliers to offer excess supply to the CAISO balancing area and enabling the CAISO to serve demand more economically. Some stakeholders expressed equity concerns about allowing economic intertie bidding at the CAISO external interties but not allowing it to the same extent at the external interties of other EDAM balancing areas. Nonetheless, the CAISO views a continuation of the practices in the WEIM and the CAISO balancing area to be a reasonable starting point for EDAM, namely allowing non-resource specific resources to bid economically at the CAISO interties, but not allowing them to bid economically at the interties of other balancing authorities participating in the WEIM/EDAM unless authorized at the balancing area interties.

3. Greenhouse Gas Accounting

a. State Programs

The CAISO's EDAM design accounts for the costs arising from state GHG accounting and reduction policies that price carbon.[315] This includes factoring in GHG emission costs incurred for GHG regulatory compliance associated with

[315] States other than California and Washington, such as Oregon, have greenhouse gas policies that address emissions without specifically pricing carbon.

power transactions, reflecting those costs in the CAISO's security constrained least-cost dispatch, and facilitating any required GHG reporting and verification processes. The CAISO proposes to extend the WEIM GHG framework to EDAM. This design allows resources' scheduling coordinators to recover their cost of compliance with a state's carbon pricing policy and provides a mechanism to identify which scheduling coordinators are electricity importers into a GHG regulation area. To ensure the market respects state policies, it does not reflect the price of carbon in LMPs paid by demand outside of a GHG regulation area. The CAISO also proposes several enhancements to its current GHG design to reflect new state programs and address stakeholder concerns involving the potential for emissions leakage.[316] The CAISO also proposes enhancements to the WEIM tariff provisions to align the day-ahead market GHG accounting rules with the real-time market.

California's greenhouse gas cap-and-trade program requires covered entities, including electric generators and electricity importers, to retire allowances for the emissions they produce. These allowances are available to emitters via auction or bilateral purchases, ultimately establishing a price on carbon.[317] Within California, emitting resources can reflect the cost of compliance in their energy bids similar to other costs associated with the production of energy. For imports into California associated with the WEIM, California's program utilizes a "first jurisdictional deliverer" structure to identify the compliance entity for imports. California regulations define the WEIM participating resource scheduling coordinator as the entity with the compliance obligation, if its resource receives an attribution to serve load within California.[318] For resources located outside California and participating in the WEIM, the resources may use a bid adder to indicate a willingness to serve demand in California.[319] The CAISO's proposal extends this existing framework into EDAM,

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316 Revised tariff section 29.32, *et seq.* and new tariff section 33.32, *et seq.* Secondary dispatch can occur if lower-emitting resources dispatched to serve demand in a GHG area require additional higher-emitting resources to backfill to serve demand outside of that GHG regulation area. The CAISO discusses secondary dispatch in more detail below and explains it can lead to "leakage" under state GHG policies.

317 In some cases, limited free allowances may also be allocated to certain entities or industries to ease the transition into a compliance program, reduce leakage, or offset ratepayer costs.

318 California Code of Regulations Title 17, section 95802(a) defines the electricity importer as the WEIM entity scheduling coordinator. The California Air Resources Board (CARB) is currently undertaking a rulemaking to update the rules for EDAM. The CAISO anticipates CARB will update the existing definitions to include reference to EDAM.

319 At the outset of the WEIM, the Commission recognized that WEIM participating resource scheduling coordinators could submit a bid adder to reflect their GHG costs on a daily basis for each of their WEIM participating resources. WEIM Authorization Order at PP 238-40. The

but with some additions specific to the nature of the day-ahead market to recognize the potential for additional GHG regulation areas. Using bid adders allows the market to attribute transfers into a GHG regulation area to EDAM resources and WEIM participating resources. It also allows sellers of power to recover their production costs associated with compliance with a state program that prices carbon.

Beginning in 2023, Washington implemented a cap-and-invest program. Washington's program uses its own compliance instruments, so the price of carbon is different from the price of carbon under California's program. If an emitting resource located in California is supporting an import into Washington or vice versa, the resource would separately have a compliance obligation under both states' regimes.[320] Like California, Washington's program identifies the first jurisdictional deliverer[321] as the compliance entity for electricity imported into the state. Washington defines a "first jurisdictional deliverer" as the owner or operator of an electric generating facility in Washington or an electricity importer. The statue does not define which entity serves as the "importer," and instead defers the determination to a future rulemaking.[322] Washington's Climate Commitment Act requires Washington agencies to define a more specific rule and methodology for addressing imported electricity associated with a centralized electricity market by October 1, 2026.[323] Washington's Department of Ecology has initiated a rulemaking.[324] The CAISO's EDAM framework allows Washington

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Commission later approved the CAISO's proposal to allow WEIM participating resource scheduling coordinators to submit an hourly bid quantity to express how much of the resource's output could support an EIM transfer serving CAISO demand through the submission of an hourly price in its bid adder. *Cal. Indep. Sys. Operator Corp.*, 153 FERC ¶ 61,087, at PP 57-58 (order on WEIM Year 1 Enhancements).

320 This would occur in a situation where a resource located in either California or Washington receives an attribution through the market to serve demand in the other state.

321 Revised Code of Washington (RCW) section 70A.65.080(1)(c).

322 RCW 70A.65.010(38).

323 Washington's Climate Commitment Act states that by October 1, 2026, the department of ecology, in consultation with the department of commerce and the utilities and transportation commission, shall adopt by rule a methodology for addressing imported electricity associated with a centralized electricity market. RCW 70A.65.080(1)(c). The Washington Department of Ecology has put out a temporary rule that defines the importer as the "energy imbalance market purchasing entity located or operating in Washington that receives the delivery of electricity transacted through the energy imbalance market." *See* https://ecology.wa.gov/Regulations-Permits/Laws-rules-rulemaking/Rulemaking/WAC-173-441-446#CR101; WAC (Washington Administrative Code)-173-446-040(3)(e)(iv), available at https://app.leg.wa.gov/WAC/default.aspx?cite=173-446-040&pdf=true.

324 *See* https://ecology.wa.gov/regulations-permits/laws-rules-rulemaking/rulemaking/wac-173-441-446.

to identify EDAM resource scheduling coordinators and WEIM participating resource scheduling coordinators as the electricity importer based on market optimization results because the market tool will identify these entities as the source of emissions and allow them to report.

b. Proposed GHG Regulation Areas and Bid Adders

To recognize multiple state GHG programs, the CAISO proposes to update the current balancing area boundaries used for modeling and GHG accounting to create separate GHG regulation areas based on the GHG boundary as defined by a state's jurisdiction.[325] This will allow the CAISO to reflect the costs of compliance for resources within those boundaries, but it will not subject resources outside of the GHG regulation areas to these costs unless they offer their supply to support a GHG transfer into a GHG regulation area. The CAISO will model GHG Regulation Areas[326] in EDAM and the WEIM to align the boundaries across all market runs.[327] However, the pricing nodes included in a specific GHG Regulation Area for the fifteen-minute market and real-time dispatch, and that same GHG Regulation Area for EDAM, may differ because some balancing areas may participate in the WEIM but not in EDAM.[328]

Currently, the CAISO will only model California and Washington as GHG regulation areas because they are the only two states in the WEIM area pricing carbon. However, the CAISO's modeling approach allows for flexibility of either including new GHG regulation areas if additional states implement similar programs, or collapsing GHG regulation areas into one GHG regulation area if jurisdictions link their programs. Furthermore, this approach allows the CAISO to model unique circumstances such as special state provisions for entities whose

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325 New tariff section 33.32.1.2 describes GHG Regulation Areas. These will reflect the pricing nodes of the CAISO balancing area or an EDAM entity balancing area within a state jurisdiction that has priced GHG emissions as part of a state GHG reporting and reduction program. Resources pseudo-tied or dynamically scheduled into a GHG Regulation Area will be considered to be located within that area.

326 The CAISO proposes a new defined term "GHG Regulation Area" that encompasses the nodes of a balancing area within a state jurisdiction that has priced greenhouse gas emissions as part of a state carbon reduction law or regulation. Tariff appendix A, new definition of GHG Regulation Area.

327 New tariff section 29.32(a) amends existing tariff language to incorporate the concept of multiple GHG Regulation Areas.

328 New tariff section 29.32(a)(2).

generation or load is not associated with the state for GHG accounting purposes, such as certain areas under federal jurisdiction.[329]

Using this new framework for modeling GHG regulation areas, the CAISO proposes to extend to EDAM a bid adder structure similar to what the Commission approved for the WEIM. This design allows a scheduling coordinator for a resource located outside of a specific GHG regulation area to submit a voluntary GHG bid adder,[330] which reflects its willingness to serve demand in a GHG regulation area as an electricity importer.[331] GHG bid adders will consist of a price and a MW quantity, consistent with the WEIM GHG design. Scheduling coordinators for resources located outside of GHG regulation areas may submit separate bid adders as an hourly bid component specific to each GHG regulation area. Scheduling coordinators for resources located in a GHG regulation area may submit a separate bid adder as an hourly bid component specific to another GHG regulation area.[332] Similar to the WEIM GHG design, scheduling coordinators for resources located within a specific GHG regulation area will not have to submit a bid adder to serve demand within that GHG regulation area and instead can include any GHG compliance costs in their energy bid.[333] To align the market rules in the WEIM with EDAM, the CAISO proposes to recognize GHG bid adders related to each new GHG regulation area in the fifteen-minute market and real-time dispatch.[334]

Similar to the current WEIM rules, the CAISO proposes to calculate a maximum GHG bid adder price for each resource located outside each GHG regulation area on a daily basis. This calculation reflects a resource's highest average heat rate on its heat rate curve, the applicable GHG allowance price derived from published indices, and the resource's applicable emission rate.[335]

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329 *See, e.g.*, WAC-446-040(3)(e)(ii)-(iii), available at https://app.leg.wa.gov/WAC/default.aspx?cite=173-446-040&pdf=true.

330 In tariff appendix A, the CAISO proposes a new defined term "GHG Bid Adder" to replace "EIM Bid Adder" and recognize the use of such bid adders in both EDAM and the WEIM.

331 New tariff section 33.32.1.1 describes the use of these bid adders as specific to Washington and California. As relevant to the WEIM, these proposed tariff amendments are in new tariff section 29.32(a)(2)(A).

332 New tariff section 33.32.1.3; new tariff section 29.32(a)(2)(A).

333 New tariff section 29.32(a)(2). This includes resources pseudo-tied or dynamically scheduled into a GHG Regulation Area.

334 New tariff section 29.32(a)(2).

335 The CAISO proposes a minor clarification to the current WEIM GHG rules to reflect that it uses the average heat rate, not the incremental heat rate, on the heat rate curve in calculating the maximum bid adder. Using the average heat rate avoids the potential for cost under-recovery because the heat rate changes throughout the resource's operating range and is typically higher

The CAISO also provides an option for resources to negotiate a maximum GHG bid adder for each regulation area. Bid adders will be not less than $0/MWh and not greater than 110 percent of the resource's maximum GHG bid adder price GHG maximum compliance cost.[336] This is the same cost-based approach currently in place for bid adders in the WEIM. The CAISO has extended this calculation for bid adders to serve demand in both California and Washington. The CAISO also proposes revisions to the WEIM provisions in new tariff section 29.32 to recognize multiple GHG regulation areas.

Consistent with the Commission's Order No. 831,[337] the CAISO will allow resources to bid above the soft energy bid cap when their bids are cost-verified, including the relevant cost-verified GHG bid adder.[338] In cases where a resource utilizes the existing reference level change request process contained in tariff section 30.11, which allows for an adjustment to the default energy bid,[339] the CAISO will allow a resource to bid up to the sum of its adjusted default energy bid and the relevant maximum daily GHG bid adder. However, the sum of the GHG bid adder price and the energy bid price cannot exceed the hard energy bid cap of $2,000/MWh, as is the case today.[340] This rule will treat resources located within a GHG regulation area and outside of a GHG regulation area in the same manner if their energy costs and GHG compliance costs exceed the soft energy bid cap.

c. Enhancements to Address Secondary Dispatch Concerns

(*i.e.*, less efficient) at lower operating points. Resources can submit bids lower to reflect their actual costs.

336 New tariff section 33.32.1.3.

337 *Offer Caps in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Order No. 831, FERC Stats. & Regs. ¶ 31,387 (2016) (Order No. 831), *order on reh'g and clarification*, Order No. 831-A, 161 FERC ¶ 61,156 (2017) (Order No. 831-A).

338 New tariff section 33.32.1.6; *see* new tariff section 29.32(a)(4) for parallel language as applicable to the WEIM. The hard energy bid cap is the maximum energy bid price the CAISO will use for purposes of clearing the CAISO Market Processes, and is set at $2,000/MWh. The soft energy bid cap is the maximum Energy Bid price submitted by Scheduling Coordinators for resources the CAISO will use for purposes of clearing the CAISO Market Processes without cost verification, and is set at $1,000/MWh. Existing tariff section 39.6.1.1; tariff appendix A, existing definitions of Hard Energy Bid Cap and Soft Energy Bid Cap.

339 The CAISO's existing process for evaluating resources that wish to bid above the soft energy bid cap uses a reference level change to the default energy bid as the vehicle for verifying costs. The CAISO does not propose any changes to this process as part of this proposal. *See* existing tariff section 30.11.

340 *Id.*

The integrated forward market will take into account GHG bid adders in selecting energy produced by resources outside of a specific GHG regulation area up to the associated MW quantity included in the bid adder, as is the case in the WEIM.[341] The integrated forward market will not dispatch resources located outside of a GHG regulation area for attribution to serve demand in a GHG regulation area if the MW quantity included in the GHG bid adder is zero or if a scheduling coordinator for a resource does not submit a GHG bid adder.[342] The integrated forward market does not consider GHG bid adders when selecting resources to serve demand outside of a GHG regulation area. This ensures a state's carbon pricing policies do not affect prices for energy outside of the GHG regulation area. The CAISO's restated tariff provisions for the WEIM also reflect these market rules.

A centralized market that seeks to reflect the price of carbon established by a GHG regulation area but spans both GHG regulation areas and non-GHG regulation areas creates the potential for secondary dispatch. Secondary dispatch can occur if lower-emitting resources receive an attribution to serve demand in a GHG regulation area, resulting in higher-emitting resources backfilling.[343] The CAISO proposes two specific enhancements to address secondary dispatch: an optimized counterfactual in the integrated forward market and a GHG net export constraint. The latter will apply in the WEIM and is severable from the remainder of the CAISO's GHG design proposal. The Commission has previously accepted tariff revisions to support modeling enhancements in the WEIM to improve the accuracy of the CAISO's GHG attributions to generation actually dispatched to serve demand in a GHG

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341 New tariff section 33.32.2.1; *see* new tariff section 29.32(b)(1), which contains the same substance as the existing tariff, but updates the language to reflect new terminology.

342 New tariff section 33.32.2.4; *see also* new tariff section 29.32(b)(3), which reflects the same policy as the existing tariff but updates the language to reflect new terminology.

343 The CAISO does not identify emissions associated with secondary dispatch; rather, CARB accounts for them through its outstanding emissions calculation by calculating total California WEIM emissions at the unspecified source rate and then subtracting emissions of WEIM participating resources outside of California that the market optimization attributes as supporting California demand, subject to a transmission loss factor. CARB then addresses WEIM outstanding emissions through the direct retirement of freely allocated allowances that CARB would otherwise allocate to electric distribution utilities within California. The outstanding emissions calculation is subject to CARB's jurisdiction. The CAISO understands Washington's approach will continue to evolve and may address secondary dispatch. As explained above, Washington's Climate Commitment Act requires the Washington Department of Ecology, in consultation with the Washington Utilities and Transportation Commission and Washington Department of Commerce, to adopt by regulation a methodology in the cap-and-invest context for addressing imported electricity associated with a centralized energy market by October 1, 2026.

regulation area.[344] These modeling changes also addressed the potential for secondary dispatch by reducing GHG attributions to resources that would have generated even without demand in the GHG regulation area, as reflected in WEIM resources' base schedules.

The WEIM nets transfers into and out of balancing authorities in GHG regulation areas to determine the volume of real-time supply to attribute to participating resources based on their bid adders.[345] The same will be true upon implementation of EDAM, except the CAISO will model and attribute transfers into GHG regulation areas instead of balancing areas. Subject to submitted GHG bid adders, the WEIM limits any GHG attributions to a MW value equal to the WEIM participating resource's dispatchable bid range between a resource's base schedule and its upper economic limit.[346]

EDAM balancing areas will not submit resource base schedules.[347] As described in section V.C.3.d of this transmittal letter, EDAM will include a GHG reference pass to inform the MW attribution of GHG transfers to EDAM resources in the integrated forward market based on their bid adders. In the integrated forward market, EDAM would limit an attribution to the lower of: (i) the GHG bid capacity, (ii) the positive difference between a resource's upper economic limit and its GHG reference pass, or (iii) the optimal energy schedule.[348] The CAISO proposes to rely on the EDAM resource's day-ahead schedule to limit the MW value of a real-time GHG transfer. In real-time, this limit will reflect the lower of: (i) the MW value of the GHG bid adder, (ii) the resource's upper economic bid minus the day-ahead energy schedule, plus the resource's total day-ahead attribution to serve demand in a GHG regulation area, or (iii) the resource's real-time market energy schedule.[349] The difference between the day-ahead energy schedule and the day-ahead attribution reflects the MW value associated with serving load outside the GHG regulation area and is analogous to a base schedule in the WEIM. These rules seek to improve the accuracy of the CAISO's GHG attributions to generation actually dispatched to serve demand in a GHG regulation area. They also address concerns with the potential for secondary

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344 *Cal. Indep. Sys. Operator Corp.*, 165 FERC ¶ 61,050, at P 17 (2018).

345 The CAISO proposes a new defined term "GHG Transfer" that defines the algebraic difference between supply and demand in a GHG regulation area.

346 Existing tariff section 29.32(b)(2). This also considers any applicable derates and ancillary services capacity reservations, for the relevant hour.

347 *See* section V.A.4 of this transmittal letter (describing differences between participation in EDAM and the WEIM).

348 New tariff section 33.32.2.2.

349 New tariff section 29.32(b)(2).

dispatch by reducing GHG attributions to resources that would have generated even without demand in the GHG regulation area, as reflected in the EDAM resources' integrated forward market schedules or WEIM resources' base schedules.

d. The GHG Reference Pass is an Optimized Counterfactual

In EDAM, the CAISO proposes to conduct an optimized GHG counterfactual based on submitted bids after the day-ahead resource sufficiency evaluation but prior to running the integrated forward market.[350] In this process, the CAISO will identify reference schedules to reflect what dispatch would have occurred without GHG transfers. These reference schedules allow the market to identify an eligible MW value for EDAM resources located outside of a GHG regulation area to receive an attribution in the integrated forward market to serve demand in a GHG regulation area. For this limited purpose, the reference schedules are similar to base schedules in the WEIM, The MW value identified in reference schedules will reflect the difference between an EDAM resource's GHG reference schedule and its upper economic limit.

The CAISO calls this counterfactual for the extended day-ahead market the GHG reference pass. It optimizes resources across the EDAM area based on bids but without transfers into GHG regulation areas. The optimized result will create reference schedules that depict what supply will serve demand outside of a GHG regulation area based on submitted bids. Because the reference schedules reflect supply bids from resources across the EDAM footprint, the CAISO expects the results will be more accurate than base schedules submitted in the WEIM. Given this higher level of accuracy, the CAISO anticipates that the GHG reference pass will result in a material reduction in secondary dispatch arising from dispatch of EDAM resources to serve demand in a GHG regulation area. The GHG reference pass will establish a baseline to determine what dispatch would have occurred in the non-GHG regulation area without offers to serve demand in GHG regulation areas and then will limit attributions to the dispatchable bid range between the resource's GHG reference pass schedule and the resource's effective upper economic bid.[351]

In this market process, the CAISO will use day-ahead bids and self-schedules of resources to optimally clear supply and demand bids without allowing GHG transfers into GHG regulation areas. The GHG reference pass will not allow net imports into a GHG regulation area in order to approximate how a

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350 New tariff section 33.32.2.3.

351 As described above, the integrated forward market will limit attribution to a value equal to the lower of the described value, the MW value in the resource's bid adder, or the resource's day-ahead energy schedule. New tariff section 33.32.2.2.

balancing area outside the GHG regulation areas will meet its own load with its internal generation as well as supply from other balancing areas outside of the GHG regulation area. The goal of the GHG reference pass is to reflect how supply resources can optimally serve demand in the EDAM footprint without net imports into the GHG regulation areas and the associated cost of compliance with GHG regulation. Therefore, the reference pass will find an optimal market solution without net imports into the GHG regulation areas and the associated GHG regulation cost. A feature of the GHG reference pass is that it will not dispatch resources that have registered that their capacity is committed to serve demand in a GHG regulation area. This supply will receive a GHG reference schedule of zero MW, thereby allowing it to receive a full attribution to serve demand in the GHG regulation area through the integrated forward market.[352]

As described above, the results of this GHG reference pass will serve as a counterfactual to limit the attribution of GHG transfers to EDAM resources in the integrated forward market to the difference between a resource's reference schedule and upper economic limit. For resources that participate in both EDAM and the WEIM, the GHG counterfactual used in place of a base schedule during the real-time market is the difference between the resource's day-ahead market energy schedule and day-ahead market GHG award. For resources that participate in the WEIM and not EDAM, the CAISO will continue to use the self-submitted base schedule as the GHG counterfactual.

The simplified example shown in the table immediately below reflects a counterfactual for, and the attribution of, a 100 MW EDAM resource located outside of a specific GHG regulation area that receives a 40 MW energy schedule from the GHG reference pass based on its bid. If the day-ahead upper economic bid is 90 MW, then 50 MW of that resource's capacity is attributable to serving a GHG regulation area (or a combination of GHG regulation areas) in the integrated forward market. For the purpose of this example, assume that the resource received a day-ahead energy award of 90 MW and a GHG award of 50 MW in the integrated forward market. In the real-time market, the counterfactual becomes the difference between the day-ahead energy award and GHG award, *i.e.*, 40 MW. Assuming the upper economic bid in the real-time market is now 100 MW, the resource can then receive a GHG award up to 60 MW. This 60 MW of capacity eligible for a GHG award cannot exceed the resource's real-time energy award and its GHG bid adder quantity.

Market Process	**Upper Economic Bid**	**Energy Award**	**MW Attributable to GHG Areas**

[352] New section 33.32.2.3. EDAM will afford similar treatment to a pseudo-tie or a dynamically scheduled resource into a balancing authority that has demand in a GHG regulation area, if the resource's scheduling coordinator registers that the supply is associated with demand in the GHG regulation area.

DAM: GHG Reference Pass	90 MW	40 MW	n/a
DAM: IFM	90 MW	90 MW	50 MW
RTM	100 MW	100 MW	60 MW

e. GHG Net Export Constraint

To reduce the potential risk of secondary dispatch further, the CAISO also proposes to utilize a new GHG net export constraint that will limit the attribution of resources serving a GHG regulation area.[353] This net export constraint is specific to the CAISO's GHG modeling and should not be confused with the net export transfer constraint discussed in section V.B.3 of this transmittal letter.

This GHG net export constraint in the integrated forward market limits the aggregate attribution of GHG transfers to EDAM resources within a specific EDAM entity balancing area. Under this constraint, attributions of GHG transfers to EDAM resources located in an EDAM balancing authority outside of a GHG regulation area may not exceed the net exports from that EDAM balancing area. If an EDAM balancing area is a net importer during any hour, no EDAM resource located within the EDAM balancing area may receive an attribution of a GHG transfer during that hour. This constraint reflects how these EDAM balancing areas are relying on their internal supply as well as imports to meet demand and do not have surplus supply to support demand in a GHG regulation area. This constraint will reduce the potential for secondary dispatch by not attributing a GHG transfer to a resource for which another resource will need to backfill to serve demand in the balancing area that is a net importer. This constraint will also limit the aggregate attribution of resources within a specific GHG regulation area to serve demand in another GHG regulation area such that the attribution may not exceed the net exports from these resources' native balancing areas.

This modeling feature responds to stakeholder feedback related to the WEIM's GHG design, which permits WEIM participating resources to receive a GHG attribution even if the balancing area in which it is located is a net importer during a market interval. Although this constraint will restrict attributions in EDAM, it will not apply to "committed capacity" located outside a specific GHG regulation area that is obligated to serve demand within that GHG regulation

[353] New tariff sections 29.32.1 and 33.32.5. These two proposed tariff sections are severable from the rest of the GHG design proposed in this filing. The CAISO proposes to implement the GHG net export constraint to limit secondary dispatch and better align attribution with the transfer capabilities of the system.

area, so long as the scheduling coordinator registers that capacity with the CAISO.[354] This allows capacity owned or contracted to serve demand in a GHG regulation area to receive a full attribution to serve that demand consistent with ownership or contractual entitlements. The CAISO also proposes to implement the GHG net export constraint in the WEIM so the same constraints apply in both markets.[355] This enhancement directly addresses stakeholder concerns involving the potential for secondary dispatch.

The CAISO also proposes to relax this constraint in cases where it might pose reliability or pricing risks. If a balancing area that overlaps with a GHG regulation area fails the EDAM resource sufficiency evaluation in the upward direction, the CAISO will not impose the GHG net export constraint in the relevant day-ahead or fifteen-minute market interval. This means resources outside the GHG regulation area may receive an attribution to serve that deficient balancing area even if that attribution is above the net exports of the resource's native balancing area.

The following simplified example reflects three scenarios (labeled A, B, and C) related to the CAISO's approach to limit attribution using the GHG net export constraint. The constraint limits the aggregate GHG attribution to resources in a balancing area in the non-GHG area to the higher of the optimal net transfer or the aggregate available "committed capacity" in that balancing area. In the example, balancing area 1 is in a non-GHG regulation area, and balancing area 2 is entirely within a GHG regulation area.

In scenario A, balancing area 1 is a net importer and therefore resources within its balancing area may not receive an attribution to serve demand in a GHG regulation area. In scenario B, balancing area 1 is a net exporter with an optimal net transfer of 100 MW. As a result, resources within balancing area 1 may receive an attribution to serve demand in a GHG regulation area up to 100 MW. Scenario C outlines how the CAISO will approach committed capacity. In this example, balancing area 1 has a 100 MW resource, of which 20 MW is committed through contracting to balancing area 2. In this case, the resource's GHG reference schedule cannot exceed 80 MW, leaving 20 MW available for attribution unless the optimal net transfer from balancing area 1 is below 20 MW. The resource in balancing area 1 may receive an additional attribution above 20 MW to serve demand in balancing area 2 at a value above the resource's GHG reference schedule but not to exceed balancing area 1's optimal net exports for that hour.

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354 New tariff sections 29.32.1 and 33.32.5. Committed capacity refers to contracted capacity.

355 New tariff section 29.32.1 describes the GHG Export Constraint as applicable to the WEIM.

Scenario	Description	Total Attribution to Balancing Area 1
A.) Net importer	Balancing area 1 is a net importer for the hour	None
B.) Net exporter	Balancing area 1's net transfer limit is 100 MW	Up to 100 MW
C.) Accounted-for committed capacity	Balancing area 1 has a 100 MW resource, of which 20 MW is committed capacity to balancing area 2	Up to 20 MW of committed capacity The resource in balancing area 1 may receive an additional attribution to serve demand in balancing area 2 at a value above the resource's GHG reference schedule but not to exceed balancing area 1's net exports for that hour.

The CAISO recognizes enforcing this constraint may create market inefficiency in some intervals but it should improve the accuracy of the CAISO's GHG attributions to generation actually dispatched to serve demand in a GHG regulation area. These modeling changes also reduce the potential for secondary dispatch by eliminating GHG attributions to resources that could require other resources to backfill for them in order to serve demand outside of the GHG regulation areas. Finally, the constraint respects forward contracting to access supply to serve demand in the GHG regulation areas.

f. GHG Settlement

As part of the proposed design for GHG accounting payments, the CAISO will calculate a separate marginal GHG cost[356] for each GHG regulation area in both the day-ahead and real-time markets. This approach differs from the current WEIM rules under which the CAISO calculates one marginal GHG cost for the GHG regulation area of the State of California. Today, in the WEIM, resources outside of California that receive an attribution to serve demand within California receive the system marginal energy cost, which includes the marginal

[356] The CAISO proposes a revision to this already defined term to recognize its applicability in both EDAM and the WEIM. Tariff appendix A, revised definition of Marginal Greenhouse Gas Cost.

GHG cost. The CAISO then subtracts this marginal GHG cost at pricing nodes of participating resources located outside of California that serve demand outside of California balancing areas.[357] With the formation of more than one GHG regulation area with different prices for GHG compliance, the CAISO is proposing for both EDAM and the WEIM to calculate separate marginal GHG costs for each GHG regulation area.[358] This will create an additional payment above the marginal energy cost, called Greenhouse Gas Emission Cost Revenue, for resources located outside of a specific GHG regulation area that receive an attribution to serve demand in that GHG regulation area.[359] The applicable marginal GHG cost for a GHG regulation area will reflect the GHG bid adder of the marginal resource selected through the market optimization to serve demand in that GHG regulation area.[360]

As proposed, in the day-ahead market, GHG payments to resource scheduling coordinators will reflect the product of the obligation to serve demand in a specific GHG regulation area and the marginal GHG cost from the integrated forward market for the respective GHG regulation area.[361] EDAM will collect these payments through locational marginal prices paid by load in the GHG regulation areas. Similar to today, scheduling coordinators for resources within a GHG regulation area will recover the cost of GHG compliance through energy payments.[362] These rules will ensure resources that offer their supply and receive an attribution through the day-ahead market to serve demand in a GHG regulation area receive compensation for the compliance obligations they will face as electricity importers into a GHG regulation area. In addition, the rules ensure demand within the GHG regulation area bears the cost of that payment. Locational marginal prices for supply serving demand outside of a GHG regulation area will not reflect these costs.

In the fifteen-minute market and five-minute real-time dispatch, the GHG payments to resource scheduling coordinators will reflect the product of the obligation to serve demand in a specific GHG regulation area and the marginal GHG cost for the respective GHG regulation area.[363] The WEIM will collect

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357 Tariff appendix C, existing section F.

358 Tariff appendix C, new section A.5.

359 The CAISO proposes to revise the existing term Greenhouse Gas Emission Cost Revenue to make it applicable to both EDAM and the WEIM. Tariff appendix A, revised definition of Greenhouse Gas Emission Cost Revenue.

360 The CAISO also proposes clarifying changes to its bid cost recovery calculations to account for GHG bid costs and revenues in both the integrated forward market and real-time market. *See, e.g.*, revisions to existing tariff sections 11.8.2.1, 11.8.2.2, 11.8.4.1, and 11.8.4.2.

361 New tariff sections 11.2.1.1 and 33.11.3.7.

362 *Id.*

363 New tariff section 11.5.10.

these payments through locational marginal prices paid by load in the GHG regulation areas. Similar to today, scheduling coordinators for resources within a GHG regulation will recover the cost of GHG compliance through energy payments. Real-time market settlements of GHG payments reflect deviations or imbalances from day-ahead market settlements. A resource's fifteen-minute market settlement for GHG payments associated with an attribution to serve demand in a specific GHG regulation area reflects any imbalance from the resource's day-ahead attribution for that GHG regulation area. A resource's real-time dispatch GHG settlement for a specific GHG regulation area reflects any imbalance from the resource's fifteen-minute market GHG attribution for that GHG regulation area. This is similar to how the WEIM works today. Under the proposed approach, these rules will ensure resources that offer their supply and receive an attribution to serve demand in a GHG regulation area receive compensation for the compliance obligations they will face as electricity importers into a GHG regulation area. In addition, the rules ensure demand within the GHG regulation area bears the cost of that payment. Locational marginal prices for supply serving demand outside of a GHG regulation area will not reflect these costs.

The following simplified example reflects the settlement of an EDAM resource located outside of a specific GHG regulation area that receives a 50 MWh attribution to serve demand in that GHG regulation area in the day-ahead market for a particular trading hour and an incremental attribution of 10 MWh in each of the real-time market intervals of that operating hour. In total for that hour, the resource will receive a $500 MWh payment from its day-ahead market attributions and an additional $400 MWh payment from its real-time market attributions. The additional payment reflects the increase in the real-time marginal GHG cost for its 50 MWh day-ahead attribution that rolled over into real-time and for its incremental real-time market attribution of 10MWh at the real-time marginal GHG cost.[364]

Market Interval	**Attribution and Marginal GHG Cost**	**Payment**
Day-ahead market	50 MWh at $10 marginal GHG cost	$500 MWh
Fifteen-minute market intervals	60 MWh at $15 marginal GHG cost	$900 MWh

[364] The resource's imbalance settlement could also be lower if it received less of an attribution in the real-time market than it received in the day-ahead market and/or if the marginal GHG cost is lower in the real-time market than in the day-ahead market.

Five-minute real-time dispatch intervals	60 MWh at $15 marginal GHG cost	$900 MWh[365]

The CAISO also proposes to establish offset accounts in the day-ahead market and real-time market for marginal GHG costs associated with a specific GHG Regulation Area.[366] These offset accounts ensure there is a balance between amounts collected from demand in a GHG regulation area and payments made to compensate resources that receive an attribution to serve that demand. These offset accounts maintain financial neutrality for the CAISO as a market operator and address variances that may arise between dispatch and settlement quantities across market intervals. The Commission has previously accepted using these neutrality adjustments through offset accounts in the CAISO's markets.[367] Conceptually, marginal GHG cost payments made to resources receiving an attribution to serve demand in a GHG regulation area should be equal to amounts charged to demand for that payment. To the extent the sum of the settlement amount for GHG payments and costs for a specific GHG regulation area does not equal zero because of variances in meter data or tagged quantities, the CAISO will assess charges or make payments to metered demand within a specific GHG regulation area through these offset accounts.

Today, the CAISO utilizes its real-time imbalance energy offset account to ensure neutrality between payments made to resources based on their attributions to serve demand in California balancing areas and amounts collected from demand in those balancing areas to make those payments. With the implementation of two GHG regulation areas with separate marginal GHG costs, the CAISO proposes to create a separate offset account for each GHG regulation area. This will ensure the CAISO maintains neutrality within each GHG regulation area. Additionally, the CAISO is proposing tariff revisions to exclude marginal GHG costs from the current real-time imbalance energy offset.[368]

g. Data Availability

365 This $900 MWh amount consists of the $500 MWh attribution from the day-ahead market listed above plus the incremental deviation in real-time (*i.e.*, 50 MWh x $5 increase at the real-time marginal GHG cost plus 10 MWh x $15).

366 New tariff sections 33.11.3.9.2 and 11.5.4.1.4.

367 *See Cal. Indep. Sys. Operator Corp.*, Commission Letter Order, Docket No. ER19-2497-000 (Sept. 6, 2019).

368 Revised tariff section 11.5.4.1.1.

Finally, the CAISO proposes to confirm its data availability and disclosure policies as they relate to GHG in the tariff.[369] For resources located in California and for resources located in EDAM balancing areas, the CAISO will notify scheduling coordinators of their reference pass schedules and their market results reflecting the MW quantity of any energy supporting transfers that served a particular GHG regulation area. The CAISO also will have the authority to disclose information regarding GHG transfers to a governmental authority only so long as the information does not disclose confidential information of any market participant. The CAISO intends to disclose such information to governmental authorities involved in overseeing state GHG policies. The CAISO proposes parallel obligations related to GHG transfers in the WEIM.[370] These tariff provisions will ensure market participants have access to the data needed to meet their compliance obligations, and state agencies can review aggregated data relevant to their programs.

4. Locational Marginal Price Formation Changes

The CAISO calculates the LMP in each market interval for each node using a reference bus that represents the distributed load in the market area (*i.e.*, the full EDAM area of all balancing authorities participating in the extended day-ahead market or the full WEIM area of all balancing areas participating in the extended day-ahead market or the full WEIM area of all balancing areas participating in the real-time market).[371] Today the CAISO derives a marginal energy cost based on the shadow price of the power balance constraint at the optimal solution across the entire market area. Upon implementation of EDAM, the CAISO will derive a marginal energy cost based on the shadow price of the power balance constraint at the optimal solution for each balancing area in the market area.[372]

The textbook definition of the locational marginal price at a given location or pricing node is the cost of serving the next increment of demand at that location. In the CAISO's current market solution, the LMP is synthesized from its components, namely the marginal energy cost (MEC), the marginal cost of losses (MCL), the marginal cost of congestion (MCC), and the marginal cost of greenhouse gas (MCG) – an additional component developed to represent GHG bid adders in the WEIM.[373] In the traditional market with a single balancing area,

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369 New tariff section 33.32.6.

370 New tariff section 29.32.2.

371 Revised tariff appendix C.

372 *Id.*

373 *See Cal. Ind. Sys. Operator Corp.*, 153 FERC ¶ 61,087, at PP 57-58 (accepting CAISO's proposal regarding the greenhouse gas bid adder enhancements).

like today's day-ahead market for the CAISO balancing area, the MEC is the shadow price of the power balance constraint, which balances supply and demand in the market area.

With the extension of the real-time market to other balancing areas starting in 2014 under the WEIM, a power balance constraint is enforced for each balancing area reflecting the net transfer as the mismatch of supply and demand within each balancing area. This results in a MEC for each balancing area. To maintain the traditional system marginal energy cost (SMEC) as part of the WEIM, which as its name suggests is the same for all locations in the market area, the CAISO balancing area was selected as a reference setting balancing area of the SMEC for the market area. This transformation from the MEC to the SMEC in the WEIM does not alter the LMP, which remains the sum of its components. Instead, the difference among other balancing areas' MEC and the CAISO balancing area MEC is added to the MCC for each balancing area in the WEIM to account and allocate congestion offset costs among balancing areas.[374] With the introduction of transfer settlement in EDAM and the separation between transfer and congestion revenue, however, this transformation is no longer applicable.[375] The difference between the MECs of two balancing areas in EDAM will result in transfer revenue from the transfers between them, and as such it cannot be added to the MCC. The MEC for each balancing area in EDAM must be referenced, and it is no longer necessary or appropriate to reference a SMEC in the LMP formulation.

The market model will include transfer system resources on each side of the market transfer between balancing areas participating in the extended day-ahead market to represent the MEC of the respective balancing area. The MEC may differ between balancing areas in the market area when market transfers between the balancing areas are scheduled at their respective scheduling limits. The MEC difference between the balancing areas on either side of a specific market transfer generates transfer revenue.[376]

The CAISO will calculate the MCC at each node as the net contribution of the shadow prices of the binding constraints at the optimal solution, weighed by

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374 *See* existing tariff section 11.5.8.4 (accounting for congestion offset costs between balancing areas in the WEIM); *see also Cal. Ind. Sys. Operator Corp.*, 155 FERC ¶ 61,329, at P 35 (2016) (accepting revisions to enhance the calculation and allocation of congestion offset costs between balancing areas in the WEIM).

375 *See* section V.D.3 of this transmittal letter (discussing the calculation and allocation of congestion revenue and transfer revenue between balancing areas).

376 No stakeholders raised specific concerns regarding the proposed changes to tariff appendix C.

the respective power transfer distribution factors. For market area intertie resources at a scheduling point and transfer resources at a transfer location, the power transfer distribution factors to an intertie constraint or intertie scheduling limit at that scheduling point is +1 for an import and –1 for an export.[377] The CAISO does not consider the effect of transmission losses in calculating power transfer distribution factors; they depend only on the network configuration. Furthermore, the difference between the power transfer distribution factors at two nodes with respect to any binding transmission constraint, and thus the difference between the MCC at these nodes, is independent of the selection of the reference bus.

Under the proposed tariff revisions, the CAISO will calculate the MCL at each node as the product of the MEC and the rate for marginal losses at that node, where the rate for marginal losses is the sensitivity (partial derivative) of system losses to an increment of power injected at that node and absorbed by the reference bus.[378] The distributed load reference used in this calculation is the scheduled load in the integrated forward market and the distributed demand forecast in the residual unit commitment process and the real-time market, within the market area. This calculation reflects the area interchange control feature of the alternating current power flow where the net scheduled interchange of a balancing area is kept constant, while the iterative solution distributes loss deviation from the previous iteration to the reference bus. Consequently, the rate for marginal losses of the transfer system resources that model a transfer at a location between two balancing areas in the EDAM market area may be different because these transfer system resources belong to different balancing areas. The CAISO will set the MCL for both of these transfer system resources to the average rate for marginal losses between the two so that there is no MCL difference between the transfer system resources on either side of a specific market transfer. The calculation of the MCL ignores the marginal losses on transmission facilities outside the market area.

To reflect the LMP calculation at scheduling points outside the market area accurately, the CAISO will deploy an aggregated generation pricing node to account for prices at scheduling points separately from the transfer locations between balancing areas in the market area. The CAISO calculates LMPs for intertie resources at scheduling points, which are represented in the network model as nodes or aggregations of nodes external to the market area (*i.e.*, at the boundary of a balancing area inside the market area with a balancing area outside the market area), through the same process it uses to calculate LMPs for nodes within the market area. When system resources are registered at a scheduling point to a balancing area in the EDAM market area to model energy or capacity imports/exports from/to a balancing area outside the market area, the

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377 Tariff appendix C, revised section A.3.

378 Tariff appendix C, revised section A.4.

CAISO will distribute the import/export energy schedule or capacity award of the system resource to a default generation aggregation point of the balancing area outside the market area that is the source/sink. If the source/sink balancing area is unknown at the time the market runs, the CAISO will distribute the import/export energy schedule or capacity award of the relevant system resource to a generic generation aggregation point for the relevant scheduling point, and the LMP components of the system resource will reflect the marginal losses and congestion at the relevant aggregation point.

In certain cases, system resources are registered at a scheduling point to a balancing area in the market area to model energy imports/exports from/to another balancing area inside the market area. This occurs because of differences in the applicable market area between the day-ahead market and the real-time market when a balancing area is outside the EDAM area in the day-ahead market, but inside the WEIM area in the real-time market. In this case, the CAISO cannot distribute the day-ahead energy schedule of the relevant system resource in the real-time market to the default aggregation point of the source/sink balancing area that is in the WEIM area because the resources in that balancing area are dispatched optimally. Instead, the market distributes the day-ahead energy schedule of the relevant system resource to the node(s) of the relevant scheduling point using a WEIM mirror system resource at the same scheduling point.[379] The WEIM mirror system resource belongs to the source/sink balancing area, and its base energy schedule matches the day-ahead energy schedule of the system resource it mirrors. The WEIM mirror system resource that mirrors a system resource has an export base schedule that matches the day-ahead import schedule of its mirrored system resource, or a base import schedule that matches the day-ahead export schedule of its mirrored system resource.[380] The LMPs of the WEIM mirror system resource and the system resource it mirrors will be different because the MEC, MCC, and MCL differ because the two resources belong to different balancing areas in the market area.

D. Post-Market Processes and Outputs

The CAISO's extended day-ahead market will produce resource commitments and EDAM energy transfers that the CAISO, as the market operator, will ultimately settle and allocate to the appropriate scheduling

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379 *See* existing tariff section 29.27(c) (providing for WEIM mirror system resources between balancing areas), and new tariff section 33.18.1 (requiring WEIM mirror system resource registration for system resources at transfer locations between a balancing area in the EDAM area and a balancing area in the WEIM area).

380 New tariff section 33.30.9.

coordinator for the balancing authority. The proposed tariff framework addresses the structure for such charges and the creation of any revenue. Individual balancing authorities, including the CAISO, will distribute charges and revenue to the appropriate entities within their balancing area in accordance with the terms and conditions of their individual tariffs.[381]

1. Transmission Revenue Recovery

Participating in the day-ahead market will not affect transmission owners' costs of owning, maintaining, or constructing transmission facilities. For example, the CAISO will not become the transmission planner for balancing areas participating in EDAM. Moreover, EDAM transmission owners will still be subject to the rates accepted by the Commission.[382] Most expected EDAM transmission owners also use formula transmission rates, which help mitigate the risk that joining EDAM will suddenly result in over- or under-recovery of their revenue requirements. Any change in costs or revenues would roll over into the next annual update of the formula rate. Even if a transmission owner has stated rates, it would have the opportunity to file a new rate case soon after joining EDAM to account for any new costs and revenues.

Although participating in the day-ahead market will not affect the transmission owner's transmission costs, it may affect the *allocation* of revenues received for using its transmission system. If transmission owners release transmission to the CAISO's day-ahead market, they will forego some transmission sales established in their rate cases before joining EDAM. Stakeholders, EDAM transmission owners, and EDAM local regulators have raised concerns that changes to transmission owner revenue recovery due to transmission owner participation in EDAM may result in unexpected downstream cost shifts for ratepayers. To avoid unintended cost shifts at the outset of their participation in EDAM, the CAISO proposes to protect EDAM transmission owners against the risk of foregone transmission revenues. The CAISO will assess an EDAM access charge[383] to recover the eligible revenue shortfalls of

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381 https://stakeholdercenter.caiso.com/StakeholderInitiatives/Extended-day-ahead-market-ISO-balancing-authority-area-participation-rules.

382 EDAM transmission owners can also have rates subject to another applicable regulator or self-regulated by publicly-owned entities; however, the vast majority of potential transmission owners participating in EDAM are Commission jurisdictional public utilities.

383 CAISO regional and local access charges (known collectively as transmission access charges or TAC) are unaffected and apply to the CAISO balancing area only. *See* existing tariff section 26 and tariff appendix F, existing schedule 3.

one EDAM balancing area to the other EDAM balancing areas.[384] The CAISO and prospective EDAM transmission owners expect these access charges will be relatively small at the beginning and potentially become lower as EDAM transmission owners adjust their rates to reflect recovery of their revenue requirements under a model where they use their transmission assets to support participation in the day-ahead market. The CAISO included projected EDAM access charges in appendix 2 to the EDAM Final Proposal (provided in attachment E to this filing).

EDAM transmission owners may include in the EDAM access charges only those shortfalls expected to result from transitioning from bilateral transmission service to day-ahead market service. These include potential shortfalls associated with expected revenues[385] from sales of hourly non-firm point-to-point, daily non-firm point-to-point, weekly non-firm point-to-point, monthly non-firm point-to-point, hourly firm point-to-point, daily firm point-to-point, weekly firm point-to-point, and monthly firm point-to-point transmission service.[386] These are the transmission services most likely to be displaced by EDAM transfers.

Likewise, the CAISO will permit EDAM transmission owners to recover revenue shortfalls associated with wheeling through an EDAM balancing area or the CAISO balancing area associated with an EDAM transmission service provider in excess of the total net transfers of the EDAM balancing area.[387] In periods where this excess occurs, the transmission owner will be compensated for the transmission use that supports the excess wheeling.[388] Recovering these eligible revenue shortfalls through the EDAM access charge will mitigate potential rate shocks among ratepayers of EDAM transmission service providers due to any loss of expected revenues, maintaining just and reasonable rates for EDAM transmission owners.

All costs related to sales with an EDAM transmission owner's merchant/marketing function are ineligible to be recovered through the EDAM

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384 New tariff sections 33.26 and 33.26.1. All provisions in new tariff section 33.26 are severable from each other, and new tariff section 33.26 as a whole is severable from the rest of this filing.

385 The shortfalls between expected revenues and actual revenues from these services reflect services a transmission service provider may not sell after transmission capacity is released for optimization in the day-ahead market, resulting in EDAM transfers.

386 New tariff section 33.26.2.1.

387 New tariff section 33.26.2.3.

388 *Id*.

access charge because EDAM participation will impact the total cost and revenue equally, negating any impact to ratepayers.[389] To determine the costs eligible for recovery through the EDAM access charge, EDAM transmission owners will first calculate their recoverable revenue based on their average rate approved by the Commission or applicable regulator for the preceding three years. The costs recoverable through the EDAM access charge consist of the difference between the EDAM recoverable revenue and actual transmission recovered revenue eligible for recovery.[390]

Additionally, EDAM transmission owners may recover in the EDAM access charge a portion of costs that would not appear in the three-year lookback, but whose cost recovery EDAM affects.[391] These include certain new network upgrade costs and revenue shortfalls from sales of non-firm and short-term firm transmission associated with the release of transmission capacity resulting from the expiration of EDAM legacy contracts. EDAM transmission owners can only include in the EDAM access charge new network upgrade costs that relate to EDAM transmission service. Eligible new network upgrade costs are those that increase transfer capability between EDAM entity balancing areas or between the CAISO balancing area and an EDAM entity balancing area and are energized after the EDAM entity begins participation in the day-ahead market.[392] Likewise, an EDAM transmission owner cannot shift all of its eligible new network upgrade costs into the EDAM access charge.[393] The EDAM access charge can only include a percentage of the projected revenue[394] from the new network upgrades equal to the EDAM transmission owner's ratio of (a) the non-firm and short-term firm point-to-point historical EDAM recoverable transmission revenues[395] to (b) the EDAM transmission owner's total revenue requirement. For example, if non-firm and short-term firm sales constitute 10 percent of an EDAM transmission owner's total revenue requirement, and a new eligible upgrade costs $100 million, the maximum amount recoverable through the EDAM access charge would be $10 million (*i.e.*, 10 percent of $100 million). This caps the EDAM access charge recovery of eligible new network upgrades by applying the historic ratio of non-firm/short-term firm transmission revenues to

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389 New tariff section 33.26.2.1.

390 New tariff section 33.26.2.1.1.

391 New tariff section 33.26.2.2.

392 *Id*.

393 *Id*.

394 In other words, the EDAM access charge can only include projected revenues associated with approved new transmission costs.

395 *I.e.*, those described in the previous paragraph.

total transmission revenues to the costs of the new transmission facility. This will mitigate the risk of rate shock from new network upgrades, and dis-incent transmission owners from attempting to construct new network upgrades so they can fully allocate the project costs to the EDAM access charge.

The CAISO also proposes to include a provision requiring the CAISO to include examples of network upgrades that increase transfer capability in the applicable business practice manual.[396] Generally, network upgrades increase transfer capability if they increase total transfer capability, create new interfaces, increase the simultaneous import limits at existing interfaces, result from an interregional transmission project to increase transfer capability, or are identified through the Western Electricity Coordinating Council (WECC) path rating process to do the same.[397] These tariff provisions will help protect transmission ratepayers from undue costs, while ensuring they contribute to network upgrade costs commensurate with the benefits they receive. Absent these tariff provisions, transmission customers of EDAM transmission service providers could free-ride on new network upgrades, unduly shifting costs to other ratepayer classes.

Using the aggregate annual costs described above for each EDAM transmission owner, the CAISO will compute a $/MWh rate specific to each EDAM balancing area.[398] To form the numerator of the rate, the CAISO will divide each EDAM transmission owner's revenue shortfall to the EDAM balancing areas associated with the other EDAM transmission owners by (a) the EDAM transmission service provider's gross load divided by (b) the total EDAM area gross load minus gross load of the EDAM transmission service provider. Accounting for the EDAM transmission service provider's gross load in relation to the overall EDAM gross load helps ensure EDAM access charges do not allocate costs beyond potential benefits, because the EDAM transmission owner's impact on the EDAM access charge will be proportional to its own share of gross load in the EDAM area.

The CAISO will assess the EDAM access charge to gross load in each EDAM balancing area.[399] Gross load represents end-use customer demand (adjusted for distribution losses), including demand served by excess behind-the-

396 New tariff section 33.26.2.2.

397 *Id*.

398 New tariff section 33.26.1.1.

399 New tariff section 33.26.3.

meter production.[400] Each EDAM access charge will recover the projected recoverable revenue shortfalls for the EDAM balancing areas outside the balancing area for that access charge, such that no EDAM balancing area will be assessed its own projected recoverable revenue shortfalls.

Once collected through the EDAM access charges, the CAISO will allocate revenues collected to EDAM entities on behalf of each such EDAM transmission owner, in proportion to its share of EDAM projected recoverable revenue shortfalls.[401] For example if EDAM transmission owner A expected to recover $6 million from the EDAM access charge, and EDAM transmission owner B expected to recover $4 million, and the CAISO collected $12 million through the access charge, transmission owner A would receive $7.2 million and transmission owner B would receive $4.8 million. The same calculation would apply if the CAISO recovered less than expected through the access charge. In either situation, the CAISO tariff requires that any under- or over-recovery be rolled into the next year's forecasted recoverable revenue from the access charge.[402] This true-up will help right-size the EDAM access charge year-to-year based on expected collections and actual collections.

To ensure complete transparency over the EDAM access charges, the CAISO proposes to require EDAM transmission owners to provide the CAISO with all documentation necessary to determine each component of the EDAM access charge.[403] At a minimum, this documentation will include: (a) the final order from the Commission or the local regulatory authority effecting the approved transmission rates; (b) the sums for each recoverable revenue component and true-up; and (c) an authorized affidavit from each EDAM transmission owner attesting to the accuracy of the data provided.[404] The CAISO may include other requirements in its business practice manuals to ensure consistent practices, and to ensure third parties can review and verify the inputs to the EDAM access charges. For each EDAM transmission owner, the CAISO will maintain on its website the current sum of each recoverable revenue component, the total true-up, and total eligible recovery. The CAISO also will maintain on its website each EDAM access charge, including the rate, the gross

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400 The CAISO proposes to revise the existing definition of gross load to include demand directly connected to the distribution system of an EDAM transmission service provider in an EDAM balancing area. Tariff appendix A, revised definition of Gross Load. Under both the existing and the revised definition, gross load excludes demand served onsite by the customer's own behind-the-meter production, such as rooftop solar generation that serves the customer's own demand. Gross load also is the billing determinant for the CAISO's transmission access charges.

401 New tariff section 33.26.3.

402 New tariff section 33.26.1.2.

403 New tariff section 33.26.4.

404 *Id*.

load, and the total eligible recovery in that balancing area, similar to how the CAISO maintains data for its transmission owners' transmission access charges. This transparency will help ensure load-serving entities, regulators, and ratepayers can review and verify the accuracy of the inputs and assumptions within the EDAM access charges.

2. Settlements Generally

The extended day-ahead market will settle in accordance with the CAISO tariff-based timelines and procedures associated with settlement of all market participant transactions. The CAISO will assess and settle all day-ahead market charges in EDAM in same manner as it does today in the CAISO balancing area today; however, there are some a unique dimensions to EDAM necessitates additional EDAM-specific settlement provisions.[405] Differences in settlement between EDAM and the CAISO day-ahead market in a single balancing area primarily arise in the context of the resource sufficiency evaluation surcharge and the greenhouse gas accounting rules (both discussed above),[406] and in the context of transfer and congestion revenues allocated between balancing areas (discussed immediately below).

3. Transfer and Congestion Revenue Allocation

The CAISO models internal transmission constraints, internal transmission limits, and transmission transfer limits in the WEIM today, and will continue to do so in EDAM. If these internal transmission limitations or constraints are reached, the market will seek to redispatch around them. The marginal cost of congestion accounts for differences between the incremental cost to serve demand in different locations, and the CAISO recovers these costs as congestion revenues. In the WEIM, the CAISO settles this congestion revenue through one charge code on a net basis where the revenues accrued are offset by incurred congestion costs.[407] This calculation accounts for congestion revenue accrued due to binding transfer scheduling constraints among the balancing areas associated with the transfer locations between balancing areas. In EDAM, the CAISO proposes to account for these accrued incremental costs as internal congestion revenues and will allocate them to the balancing authority where the binding constraint is modeled, including any adjustment for congestion

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405 New tariff section 33.11, *et seq.*

406 *See* sections V.B.2 and V.C.3 of this transmittal letter.

407 *See* existing tariff section 11.5.4.1 (allocating congestion revenue through a single offset calculation).

differences that may be reversed for legacy contracts or ownership rights.[408] Allocating congestion revenues associated with binding internal transmission constraints within a balancing area to the corresponding balancing authority participating in EDAM is appropriate because that is where the constraint is modeled. In the CAISO balancing area, these congestion revenues will fund CRRs.

Entities in the WEIM also make transmission available at interties between balancing areas to support energy transfers. This practice will continue with EDAM along with the addition of capacity transfers.[409] The transmission across interfaces between balancing areas may have limitations or other constraints, largely due to the amount of transmission capability made available to the market across the transfer interfaces, which sets a scheduling limit. When this transfer scheduling limit binds, the market will seek to re-dispatch to meet the obligations across the market footprint (*i.e.*, the EDAM area), and it may award energy or capacity from higher-cost resources within a balancing area to meet demand and uncertainty requirements in another balancing area. This will result in price separation of the marginal energy component between the balancing area where the constraint is located and the rest of the EDAM area (or price differences in imbalance reserves or reliability capacity). This price separation represents the accrual of transfer revenue in the extended day-ahead market. Rather than settling these revenues under the umbrella of congestion revenue using one settlement charge code, the CAISO will separate this revenue component as accrued transfer revenue and settle it independently from accrued congestion revenue.[410] This separation of the congestion revenue from the transfer revenue supports separate accounting, which in turn provides for the allocation of transfer revenue to the rights holders that voluntarily made transmission available to the day-ahead market. Otherwise, EDAM would be unable to account for this revenue these rights holders are entitled to under the EDAM transmission availability framework.[411]

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408 *See* new tariff section 33.11.1.2 (allocating congestion revenue internal to each balancing area without consideration of transfer scheduling constraints).

409 Transfer revenue will similarly accrue for price differences between the marginal imbalance reserve and reliability capacity products. For simplicity, this discussion focuses on the price difference in energy, which will account for the most transfer revenue.

410 *See* new tariff section 33.11.1 (separating the allocation of day-ahead congestion and transfer revenue into distinct calculations); *see also* new tariff section 11.5.4.1.2(b)(3) (modifying the real-time congestion offset calculation to reflect the changes in the settlement of day-ahead congestion revenue).

411 *See* section V.B.1.b-c of this transmittal letter (describing the option for legacy contract, ownership, and transmission customer rights holders to make transmission available to support EDAM transfers in exchange for transfer revenue).

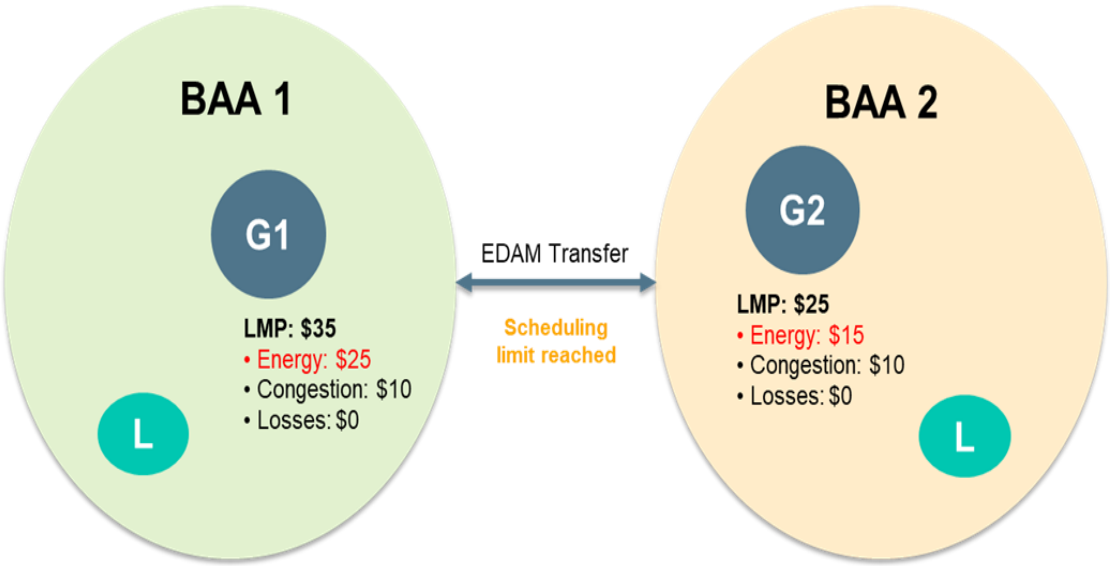
As described in the LMP discussion in section V.C.4 of this transmittal letter, in a single balancing area like today's CAISO day-ahead market, the marginal energy cost (MEC) is the shadow price of the power balance constraint. With the extension of the real-time market in the WEIM, the market enforces a power balance constraint for each balancing area introducing the WEIM net transfer as the mismatch of supply and demand in each balancing area. This results in a MEC for each balancing area. To maintain the traditional system marginal energy costs in the WEIM, which is the same for all locations in the market footprint, the CAISO balancing area was selected as a reference setting for the SMEC, whereas the difference between any other balancing area MEC and the CAISO MEC was added to the MCC for that balancing area.

The settlement of imbalance energy at the relevant nodal MCC determined the real-time congestion revenue or shortfall collected from each balancing area. The real-time balancing area congestion revenue/shortfall in the WEIM does not distinguish between congestion generated by the price separation between balancing areas versus internal transmission constraints. However, to ensure the appropriate balancing area is distributed the appropriate congestion revenue or congestion shortfall, the WEIM also calculates a MCC distribution price. The MCC distribution price is the sum associated the congestion attributed to the enforcement of the net transfer constraint by balancing area based upon the released transmission at transfer location plus the congestion associated with internal transmission constraint. The congestion attributed to enforcing the net transfer constraint is distributed to the balancing area that released unsold transmission at transfer location to facilitate the transfer of energy between the balancing areas. In addition, the internal transmission constraint congestion was retained in the balancing area where the internal transmission constraint is defined. This approach breaks down when transfer revenue, which is essentially congestion revenue at the transfer location between balancing areas in EDAM, is separately calculated and settled.

In EDAM, congestion revenue is collected from the settlement of energy or capacity and MCC difference between source or sink associated with an binding internal transmission constraints. Allocating EDAM congestion revenues in all cases to the balancing area where the constraint is binding is appropriate because that balancing area is responsible for resolving the constraint, whether through re-dispatch or otherwise. Thus, it is reasonable to allocate the congestion revenue to the balancing area where the internal transmission constraint materialized. This rationale applies regardless of the condition that triggers the internal constraint, (*e.g.*, caused by purely internal congestion or imports across multiple interties simultaneously creating congestion on internal transmission constraints). Simultaneous import flow conditions and internal path interactions are a common occurrence across balancing areas, and the host balancing area is responsible for responding to the condition occurring in its

balancing area. Thus, it should receive the congestion revenue from all internal flows and when external flows cause internal constraints to bind.

The following example illustrates the accrual and settlement of transfer revenue between balancing area 1 (BAA1) and balancing area 2 (BAA2) based on the price differences between the two balancing areas. For simplicity, this example reflects a difference in energy prices, with a similar outcome possible when price differences for reliability capacity or imbalance reserves occur and the scheduling limit between balancing areas is reached.



- Transfer revenue accrues when the scheduling limit is reached at a transfer point between two EDAM areas.
- Transfer revenue is the difference in the energy component of the LMP between the two EDAM areas. In this example, transfer revenue is $10 as the difference in energy component of LMP in BAA1 and BAA 2.
- Allocated 50:50 between the two EDAM areas.

The two EDAM entities that made the transmission available to facilitate the energy or capacity transfer generally will share the transfer revenue equally. The exception to the equal sharing of transfer revenue is for situations where a transmission customer releases its transmission rights and makes capacity available at an interface in advance in return for transfer revenue. In such cases, the transmission customer will receive the full allocation of transfer revenue associated with its released right. EDAM will also accommodate any agreed-

upon and documented different sharing arrangement of transfer revenues between two balancing areas.[412]

The separation of congestion revenue settlement from transfer revenue settlement in EDAM is necessary for accurate accounting and settlement of day-ahead energy and capacity transfer costs because transmission customers that make their rights available for the day-ahead market and forgo their right to later scheduled use in exchange for transfer revenue must be settled separately. Transfer revenue represents the market value of transmission made available at internal interties by the service provider or customers holding transmission rights. Congestion revenue, on the other hand, represents the cost to serve demand across the internal transmission system of a balancing area. Without separation of congestion revenue from transfer revenue, the CAISO would be unable to allocate transfer revenue cleanly and directly to transmission customers because the monies would be comingled with congestion revenue that would be allocated to the balancing area supporting the transfer.[413]

This settlement mechanism supports an important dimension of transmission availability and relates to changes in the formulation of the marginal energy component of the locational marginal price that facilitate extension of the day-ahead market across a multi-balancing area footprint.

The following example illustrates the accrual of congestion revenue within a balancing area based on the locational marginal price differences between generation G1 and G2 and load L due to a binding constraint between locations.

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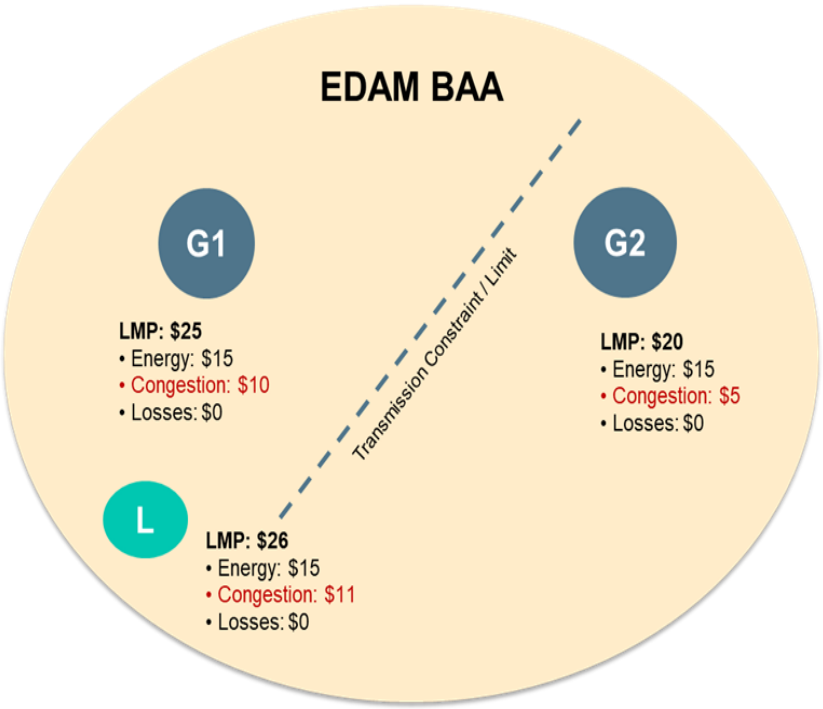
412 New tariff section 33.11.1.1.1.

413 *See Real-Time Settlement Review*, Draft Final Proposal, at 8-13 (Oct. 20, 2021) (evaluating potential cost shifting within the WEIM area and between WEIM and non-WEIM balancing areas, and concluding that the CAISO should settle all system resources associated with transfers). This document is available on the CAISO website at http://www.caiso.com/InitiativeDocuments/DraftFinalProposal-Real-TimeSettlementReview.pdf.



- Congestion revenue is the difference in congestion price between Generation and Load across a binding internal constraint.
- The congestion revenue is $1 for every MWh delivered from G1 and $6 from G2 to serve Load.
- Congestion revenue is allocated to the EDAM entity where the constraint materialized.

Settling transfer revenue separately from congestion revenue in EDAM is also necessary to support CRRs in the CAISO balancing area. CRR holders purchase or are allocated rights from a source to a sink to hedge their exposure to internal transmission congestion.[414] CRR holders in the CAISO balancing area have not purchased rights on transmission between two balancing areas. The CAISO thus will still require an allocation of congestion revenue separate from transfer revenue to fund CRRs.

The CAISO will adjust congestion revenue within an EDAM balancing area for legacy contract and ownership rights that receive a hedge against congestion and will settle with the scheduling coordinator for the balancing authority.[415] The transmission service provider would thereafter allocate the congestion revenue under the provisions of its tariff.[416] The allocation of congestion revenue to an EDAM balancing area is consistent with the allocation of congestion offset costs

414 *See generally* existing tariff section 36.

415 New tariff section 33.11.3.8 (providing for settlement of legacy contracts and ownership rights).

416 New tariff section 33.11.1.2 (providing for settlement of congestion revenue).

in the WEIM today.[417] Moreover, the transmission service provider within an EDAM balancing area is in the best position to determine what an equitable allocation among its transmission customers is. An attempt to standardize this allocation under the CAISO tariff would invariably infringe upon the relationship between the EDAM transmission service provider and its customers.[418]

4. Stakeholder Positions on Transfer and Congestion Revenue Allocation

Stakeholders supported an equal distribution of transfer revenue that accrues between balancing areas as equitable. Establishing an equal sharing allocation as the default recognizes that both balancing areas brought transmission to the interface that supported the transfer. Further, two balancing authorities can mutually agree to an allocation different than an equal sharing to support a commercial, agreed upon arrangement that requires a different allocation.

A few stakeholders recommended extending the current WEIM congestion distribution to EDAM with a slight modification. Specifically, they suggested the MCC distribution price should not retain the congestion associated with internal transmission constraint to the balancing area in which it was modeled; rather, it should be shared equally among the balancing areas similar to transfer revenues. The CAISO considered this suggestion and concluded adopting this position would increase the revenue to transmission customers and reduce compensation to the balancing area. This revenue represents an important dimension of the pool of revenue available for each balancing area to sub-allocate under the associated transmission owner tariff. The transmission service provider is in the best position to determine an equitable allocation of these revenues among its transmission customers, and directing the revenue from the CAISO to the transmission customers would undermine this opportunity for each balancing area to pool congestion revenue and determine the most appropriate allocation methodology among its customers.

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417 Existing tariff section 11.5.8 (providing for settlement of the congestion offset between balancing areas, including the CAISO balancing area).

418 Similarly, although the CAISO balancing area has implemented congestion revenue rights, they may not be appropriate for all balancing authorities to implement at the outset of EDAM, particularly in the Northwest given the limitations on the Commission's ability to require the conversion of firm transmission rights to tradable or financial rights. *See* FPA section 218, 16 U.S.C. § 824r(b) (stating that "nothing in [the FPA] confers on the Commission the authority to require an electric utility or person to convert to tradable or financial rights (1) firm transmission rights" pursuant to contract or by reason of ownership of transmission facilities as of the date the Energy Policy Act of 2005 was enacted, or "(2) firm transmission rights obtained by exercising contract or tariff rights associated with" such firm transmission rights). The CAISO will continue to collaborate with stakeholders to explore the potential for CRRs to be made available as a means to allocate congestion revenue within an EDAM balancing area.

This stakeholder recommendation further highlights the need to distinguish between transfer revenue associated when the net transfer constraint binds and the congestion revenue generated when an internal transmission constraint binds. As explained above, in EDAM transfer revenue is collected from the settlement of transfer schedules of energy or capacity between two balancing areas when the net transfer constraint binds. It is appropriate to allocate transfer revenue to the balancing areas whose transmission service providers or transmission customers schedule either their rights across the transfer or release those rights to the market for optimization the transfer of energy and capacity because: (1) it provides transmission customer the ability to protect against marginal price differences of energy scheduled to flow between balancing areas, and (2) compensation for releasing transmission capacity to market for optimal dispatch of energy or capacity from a resource in one balancing area to meet the need of another balancing area.

E. Additional General Tariff Provisions

1. Creditworthiness

Scheduling coordinators participating in EDAM must comply with the creditworthiness requirements in existing tariff section 12.[419] If a scheduling coordinator fails to satisfy these requirements, the CAISO may implement enforcement actions pursuant to tariff section 12. These are the same creditworthiness requirements that apply to scheduling coordinators taking part in the WEIM.[420]

2. Dispute Resolution, Liability, and Confidentiality

The intake of disputes initiated by EDAM participants in the day-ahead market will be subject to existing tariff section 11.29.8 and managed through the CAISO's customer inquiry, dispute, and information (CIDI) system. EDAM participants must follow the dispute resolution process described in existing tariff section 13, which requires parties to engage in informal good-faith negotiations and mediation before resorting to arbitration.[421]

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419 New tariff section 33.12.

420 Existing tariff section 29.12.

421 New tariff section 33.13.

The provisions in existing tariff section 14 regarding force majeure events, indemnity, liability, and penalties, as well as the confidentiality provisions in existing tariff section 20, also will apply to EDAM participation.[422] WEIM participants already are obligated to follow these same provisions.[423]

[422] New tariff sections 33.14 and 33.20.

[423] Existing tariff sections 29.14 and 29.20.

3. Miscellaneous

Miscellaneous tariff requirements, such as those regarding assignment, notice, and governing law and forum, are included in existing tariff section 22 and will apply to EDAM.[424] Other miscellaneous tariff requirements specifically relate to EDAM participation. For example, the CAISO may pass on taxes it incurs due to an entity's EDAM participation to the applicable EDAM scheduling coordinator. The tariff requirements also address how title to energy will pass in the day-ahead market and specify that neither the CAISO nor a balancing authority participating in EDAM will be a "Purchasing Selling Entity" under NERC requirements for purposes of e-tags or EDAM transfers.[425]

F. Components of the CAISO's Day-Ahead Market Design Not Included in the EDAM Design

EDAM does not include every market design element of the CAISO's day-ahead market processes that currently applies to the CAISO balancing area. In particular, the CAISO is not proposing at this time to extend existing functionality for inter-scheduling coordinator trades, ancillary services procurement, or congestion revenue rights to EDAM. These features are either discretionary or are addressed through other mechanisms under the open access transmission tariffs that will remain in effect in non-CAISO balancing areas participating in EDAM. The Commission should accept the EDAM design without these features, but it should not foreclose the opportunity for the CAISO and market participants to pursue them as potential future enhancements.

1. Inter-Scheduling Coordinator Trades

At this time, the CAISO is not proposing to support inter-scheduling coordinator trades within non-CAISO balancing areas participating in EDAM. Inter-scheduling coordinator trade functionality is a voluntary settlement service the CAISO makes available to scheduling coordinators to facilitate the market settlement of bilateral transactions that invoice the delivery of energy and ancillary services, as well as a means to allocate market payments and costs between bilateral counterparties.[426] The functionality involves a series of pre-

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424 New tariff section 33.22.

425 *Id.*

426 Existing tariff section 28. *See also Cal. Ind. Sys. Operator Corp.* 116 FERC ¶ 61,274, at PP 453-54. Inter-scheduling coordinator trading functionality also accommodated the settlement of certain bilateral energy contracts entered into by the State of California during the 2000-2001 energy crisis. These contracts had delivery provisions that could give the seller the choice of delivering power at any node within the CAISO's balancing area. These contracts have since terminated.

market validation and post-market confirmation steps to ensure the accuracy of settlements on which scheduling coordinators rely.

The functionality for inter-scheduling coordinator trades has the potential to assist participants in EDAM, but is unnecessary to ensure extension of the day-ahead market is just and reasonable. Inter-scheduling coordinator trades are not a necessary service for entities to participate in a day-ahead market process. Buyers and sellers can still determine how they will manage the allocation of any market payments and costs under bilateral transactions between them. The CAISO does not offer the functionality for inter-scheduling coordinator trades to participants in the WEIM.[427] Likewise, it is unnecessary for initial implementation of EDAM. However, the CAISO will discuss with stakeholders whether to extend this settlement functionality to participants in EDAM as a future design enhancement.

2. Ancillary Services Procurement

Today, the day-ahead and real-time market processes in the CAISO balancing area provide for the procurement of four ancillary services – regulation up, regulation down, spinning reserve, and non-spinning reserve.[428] The CAISO market procures these services from ancillary service providers whose resources have met specific technical requirements. Scheduling coordinators for these resources submit economic bids to offer their capacity or self-provide these services. The CAISO co-optimizes ancillary services with energy when it procures these ancillary services in the day-ahead and real-time markets. When the CAISO implements imbalance reserves through its day-ahead market enhancements proposed in this filing, it will also co-optimize ancillary services procurement with these commodities in the CAISO balancing area.

The CAISO will not procure or settle ancillary services in other balancing areas at the outset of EDAM.[429] Instead, the CAISO will consider whether a participating balancing area has secured sufficient capacity to meet its own ancillary service requirements and, in the case of reserve sharing groups, whether there is sufficient transmission to support delivery of those ancillary services as part of the resource sufficiency evaluation. Meeting ancillary services requirements will remain a balancing authority function. Transmission providers will continue to secure and allocate the costs of ancillary services such

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427 Existing tariff section 29.28.

428 In addition, the CAISO contracts for a fifth ancillary service – voltage support – annually (or for such other period as the CAISO may determine is economically advantageous) and on a daily or hourly basis as required to maintain system reliability. *See generally* existing tariff section 8; tariff appendix A, existing definition of Ancillary Services.

429 New tariff section 33.8.

as frequency regulation and operating reserves through various schedules of their open access transmission tariffs.

EDAM will operate based on the input that each balancing area is securing sufficient ancillary services to meet its requirements. Balancing areas participating in EDAM will self-provide their ancillary services in both the day-ahead and real-time market and the market will validate this input through the resource sufficiency evaluation. The integrated forward market will not optimize ancillary service capacity of balancing area participating in EDAM and will not optimize transmission for energy transfers when that transmission is set aside for use by reserve sharing groups to deploy ancillary services. This approach respects each balancing authority's responsibility for securing adequate ancillary services under its respective open access transmission tariffs.

The CAISO plans to continue to work with stakeholders to explore implementing functionality to optimize bids and self-schedules for ancillary services in EDAM as a potential future design enhancement. Prior to implementing any such functionality, the CAISO will propose market rules for consideration by the Commission.

3. Congestion Revenue Rights

Congestion Revenue Rights are financial instruments that market participants can acquire through a CAISO-administered allocation and auction process to provide a level of financial protection against the risks associated with unpredictable congestion charges.[430] The CAISO financially settles CRRs based on the difference in the marginal cost of congestion component of the day-ahead market locational marginal price between two pricing points – a source and a sink – on the CAISO's system, multiplied by the MW quantity of the CRRs a market participant holds between the two points.

The CAISO maintains a CRR model that reflects the most up-to-date direct current full network model. This model includes constraints and network topology that seeks to reflect, as closely as possible, similar constraints and network topology expected in the day-ahead market. The CRR model, however, supports annual and monthly CRR allocations and auctions and runs well before the day-ahead market.[431]

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[430] *See generally* existing tariff section 36. *See also Cal. Indep. Sys. Operator Corp*., 149 FERC ¶ 61,093, at P 2 (citations omitted) ("CRRs are financial instruments that enable their holders to hedge variability in congestion costs. Entities acquire CRRs primarily to offset integrated forward market congestion costs reflected in the congestion component of locational marginal prices (LMPs).").

[431] Existing tariff section 36.4.1.

The CAISO is not proposing to extend CRRs to balancing areas participating in EDAM as part of its initial design. Transmission customers outside of the CAISO currently manage their risk of congestion by purchasing physical transmission rights under transmission service providers' open access transmission tariffs or by exercising rights under legacy contracts. They will continue to do so under EDAM. These rights reflect existing path-specific transmission. EDAM will compensate transmission customers with any energy transfer payments when they make transmission available to the market. Alternatively, EDAM will provide scheduling priority to transmission customers that self-schedule their physical transmission rights. Like the use of financial transmission rights,[432] using physical transmission rights to hedge the cost of congestion does not insulate transmission customers from all congestion costs. Physical transmission rights do, however, mitigate the risk of congestion costs between a specific source and delivery point on the transmission system.

The CAISO will continue to discuss with stakeholders whether to make CRRs available across the EDAM area as a future design enhancement and how best to align CRRs with physical transmission rights secured under open access transmission tariffs. This effort will include assessing how to ensure the market adequately funds CRRs as well as their value as an effective tool for market participants to hedge the cost of congestion between individual sources and sinks.

G. Conforming Tariff Changes for Entities Participating in EDAM

Each entity that participates in EDAM, including the CAISO, must evaluate what changes to its individual tariff may be required to implement the final Commission-approved EDAM framework, understanding the EDAM framework has been designed with the goal of accommodating each of the diverse group of balancing authorities in the West. For the CAISO balancing area, much of the relationship with its existing tariff provisions and the application of those provisions in EDAM have been included in the framework. For other balancing areas, as stakeholder discussion revealed, although there is commonality in conforming changes that will need to be made, ultimately each potentially impacted balancing area and transmission service provider must address its unique considerations and work through its established stakeholder and governance processes to develop supporting tariff changes for participation in EDAM.

The CAISO has already initiated a stakeholder initiative to identify any portions of its tariff that may require amendment to allow the CAISO to participate in EDAM at the go-live date. This initiative will determine the method to distribute

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[432] *Cal. Ind. Sys. Operator Corp.* 116 FERC ¶ 61,274, at P 731.

the revenue, and charges, associated with EDAM resource sufficiency evaluation failures of the CAISO balancing area and EDAM transfer revenues. Additionally, the initiative will produce guiding principles for the CAISO balancing area's use of the EDAM net export transfer constraint and a process for recovering historical wheeling access charge revenues. Throughout the course of this initiative, the CAISO is working with its stakeholders to develop a just and reasonable solution to allocate the EDAM benefits, and obligations, among the members of its balancing area. The CAISO anticipates it will complete its stakeholder process and submit its proposed tariff revisions in a separate filing pursuant to section 205 of the FPA shortly after consideration of its initial proposal, and assuming approval, by the CAISO Board of Governors at its September 2023 meeting.[433]

Other balancing authorities, including non-jurisdictional balancing authorities, will use similar processes to address similar concerns and can look to the CAISO's leadership and experience from within its stakeholder process, as well as engagement during the approval processes applicable to the other balancing authorities.[434] Entities that administer jurisdictional tariff services will need to harmonize their existing rules with the EDAM framework, particularly in the context of making transmission available to EDAM, in addition to specific cost allocation considerations within their balancing area.[435]

For example, the EDAM framework will recover congestion and transfer revenues that the CAISO will allocate to the balancing area, and each balancing area will need to develop a methodology to re-allocate the revenue and costs under the associated EDAM transmission service provider tariff. This cost allocation methodology may become somewhat standard across balancing areas through their associated approval processes prior to their participation in EDAM; however, the CAISO tariff does not prescribe it.

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433 *See* the extended day-ahead market CAISO balancing authority area participation rules stakeholder initiative, located at https://stakeholdercenter.caiso.com/StakeholderInitiatives/Extended-day-ahead-market-ISO-balancing-authority-area-participation-rules. According to the current schedule, the CAISO intends to submit for its Board of Governors consideration this fall a proposal that addresses all of the issues necessary to support its balancing area participation, followed by a filing with the Commission prior to the end of this year. This schedule is designed to ensure the Commission receives all rules associated with participation in EDAM by the CAISO prior to the requested effective date of the EDAM framework presented in this filing, and to support acceptance of the CAISO balancing area specific changes before the first balancing area outside of CAISO participates in EDAM.

434 Generation-only balancing authorities may participate in EDAM similar to participation in the WEIM; however, the nature of a generation only balancing authority may not raise similar cost allocation considerations given the absence of demand within the balancing area.

435 While the CAISO's initiative is limited the tariff changes necessary to allow its own balancing area to participate in EDAM, the public stakeholder initiative allows other entities to benefit by learning about the issues raised and the potential solutions evaluated

During the EDAM stakeholder process, consideration was given to whether it would be appropriate for the CAISO tariff to include applicable cost allocation principles. Some stakeholders would prefer the CAISO tariff included requirements to hold transmission customers harmless from congestion costs to the extent practicable, while others preferred to defer to the EDAM transmission service provider tariff and associated approval process. In the end, the CAISO concluded that establishing criteria for the cost allocation determinations of other balancing areas participating in EDAM was not its proper role. Accordingly, the EDAM framework defers to the EDAM transmission service provider tariff for this determination, as it does with respect to other transmission service provider functional responsibilities.

VI. Effective Dates of DAME and EDAM Tariff Revisions, Request for Waiver of Notice Requirements, and Request for Commission Order

As to the EDAM tariff revisions contained in this filing, the CAISO respectfully requests an effective date of December 21, 2023 for new tariff sections 33.1, 33.2, and 33.4 and the new *pro forma* agreements to be included in appendix B of the CAISO tariff, which constitute the extension of EDAM, the initial onboarding and implementation provisions, the roles and responsibilities of EDAM participants, and the agreements participants need to execute.[436] For all other tariff revisions to implement EDAM and the DAME tariff revisions, the CAISO plans to implement concurrently the day-ahead market enhancements and the extension of the enhanced day-ahead market. This will facilitate and simplify development, testing, and implementation. The CAISO requests an effective date of May 1, 2025 for these other tariff revisions.[437]

The CAISO respectfully requests waiver of the Commission's 120-day notice requirement to permit the requested May 1, 2025 effective date.[438] Good cause exists to grant the requested waiver. The tariff revisions to become effective May 1, 2025 will require significant amounts of time to implement pursuant to a four-step process. First, the EDAM tariff revisions will require the largest and most complex suite of software enhancements since the CAISO's

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[436] The tariff revisions that will go into effect on December 21, 2023 are incorporated into the clean CAISO tariff sheets contained in attachment A-1 to this filing and are shown in redline format in attachment B-1 to this filing.

[437] The tariff revisions that will go into effect on May 1, 2025 are incorporated into the clean CAISO tariff sheets contained in attachment A-2 to this filing and are shown in redline format in attachment B-2 to this filing.

[438] Specifically, pursuant to section 35.11 of the Commission's regulations, 18 C.F.R. § 35.11, the CAISO respectfully requests waiver of the notice requirement in section 35.3(a)(1) of the Commission's regulations, 18 C.F.R. § 35.3(a)(1), to allow the EDAM tariff revisions to go into effect more than 120 days after submittal of this filing.

market redesign and technology upgrade almost 15 years ago. Second, prospective EDAM participants may need to follow extensive approval processes in each of the jurisdictions where they operate and must understand the market design in which they will participate to obtain such approvals. Third, prospective EDAM participants and transmission owners will need to revise their own tariffs and rate schedules extensively to adopt the new processes, costs, and revenues proposed here. Fourth, prospective EDAM participants and EDAM scheduling coordinators will need significant software enhancements to transition from participation solely in the WEIM to participation in EDAM as well, including a period of market simulation and parallel operations. Therefore, it is appropriate for the Commission to grant the requested waiver.

In addition, for the same reasons described above regarding the effective dates of the DAME and EDAM tariff revisions, the CAISO respectfully requests that the Commission issue an order by December 21, 2023 accepting this tariff amendment in its entirety. It is critical for the CAISO and market participants to have a reasonable degree of certainty regarding the market design so they can make decisions and make commitments accordingly. No one can begin the four steps regarding the EDAM tariff revisions described above without initial regulatory approval from the Commission. Therefore, the CAISO and prospective EDAM participants need Commission approvals in an order on the complete suite of tariff revisions by the date the first subset of them will become effective and well before the vast majority of them become effective. This will provide the CAISO, prospective EDAM participants, and other stakeholders certainty regarding all of the steps needed to participate in EDAM.

Finally, consistent with Commission precedent recognizing the actual implementation date of some market rule changes can depend on variables that cannot be fully predicted in advance and additional time may be needed to implement some market rule changes, the CAISO further requests authorization to inform the Commission of the actual effective date of the proposed May 1, 2025 tariff changes through a subsequent filing within five business days following their implementation.[439]

In support of these requests, and to ensure the Commission has a full record in this proceeding, the CAISO further requests that the Commission set the date for comments 30 days from the date for filing, *i.e.*, September 21, 2023, and set the date for answers to 20 days from the date comments are due, or October 11, 2023. This will help market participants prepare meaningful

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[439] *See Cal. Indep. Sys. Operator Corp.,* 172 FERC ¶ 61,263, at PP 1, 39 (2020). The CAISO has included an effective date of 12/31/9998 as part of the tariff records submitted in this filing. The CAISO will notify the Commission of the actual effective date of these tariff records within five business days of implementation in an eTariff submittal using Type of Filing code 150 – Report.

comments and provide the CAISO additional time to review intervenors' comments, without eroding the time for the Commission's consideration because the CAISO is submitting this filing 120 days prior to the requested effective date for some of the tariff provisions and an order on all of the tariff provisions.

VII. Filing

A. Communications

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B. Service

The CAISO has served copies of this filing on the CPUC, the California Energy Commission, and all parties with scheduling coordinator agreements under the CAISO tariff. In addition, the CAISO has posted a copy of the filing on the CAISO website.

C. Contents of this Filing

Besides this transmittal letter, this filing includes the following attachments:

Attachment A-1	Clean CAISO tariff sheets with an effective date of December 21, 2023
Attachment A-2	Clean CAISO tariff sheets with an effective date of May 1, 2025
Attachment B-1	Redlined CAISO tariff sheets with an effective date of December 21, 2023
Attachment B-2	Redlined CAISO tariff sheets with an effective date of May 1, 2025
Attachment C	DAME Final Proposal
Attachment D	DAME CAISO Board of Governors and WEIM Governing Body Memo/Vote
Attachment E	EDAM Final Proposal
Attachment F	EDAM CAISO Board of Governors and WEIM Governing Body Memo/Vote

VIII. Conclusion

For the reasons set forth in this filing, the CAISO respectfully requests that the Commission issue an order accepting the tariff revisions in this filing by December 21, 2023, effective as of the dates specified herein.

Respectfully submitted,

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Attachment A-1 – Clean Tariff Language – Effective Dec. 21, 2023

Day-Ahead Market Enhancements and Extended Day-Ahead Market

California Independent System Operator Corporation

August 22, 2023

Section 33

33.1 General Provisions

Section 1 will apply to EDAM Market Participants in addition to the provisions in this Section 33.1, unless limited in their application by this Section 33.1.

Participation in, operation of, and Settlement of the Extended Day-Ahead Market will be subject to the provisions of Section 33, and to all other provisions of the CAISO Tariff to the extent those provisions are applicable to the Extended Day-Ahead Market. The provisions of Section 33 will apply only to the Extended Day-Ahead Market.

EDAM Market Participants must comply with the provisions of Section 33, and other applicable provisions of the CAISO Tariff to the extent such provisions:

(a) expressly refer to Section 33 or EDAM Market Participants,

(b) are cross-referenced in Section 33, or

(c) are not limited in applicability to the CAISO Controlled Grid, the CAISO Balancing Authority Area, or CAISO Markets other than the Day-Ahead Market or Real-Time Market.

If there is an inconsistency between a provision in Section 33 and another provision of the CAISO Tariff regarding the rights or obligations of EDAM Market Participants, except in their capacity as EIM Market Participants under Section 29, the provisions in Section 33 will prevail to the extent of the inconsistency.

If there is an inconsistency between a provision in Section 33 and a provision in Section 29, the provisions of Section 33 will prevail with respect to participation in the Day-Ahead Market and the provisions of Section 29 will prevail with respect to participation in the Real-Time Market, provided that the provisions of both Sections 33 and 29 will be given equal consideration such that the provisions applicable as an EDAM Market Participant and EIM Market Participant may be reconciled where provisions apply to participation in both the Day-Ahead Market and the Real-Time Market.

33.1.1 Suspension of EDAM Entity Participation

The CAISO may, within 60 days following an EDAM Entity Implementation Date for an EDAM Entity, and pursuant to the terms of a Market Notice, temporarily suspend the participation of that EDAM Entity in the Day-Ahead Market within the EDAM Entity Balancing Authority Area for a period not to exceed 60 days if market or system operational issues adversely impact any portion

of the EDAM Area, provided that the CAISO may continue operation of the Day-Ahead Market in the rest of the EDAM Area without the participation of the EDAM Entity for a reasonable additional period of time in order to implement a resolution of the market or system operational issues.

If the CAISO is not able to identify a resolution of the EDAM-related market or system operational issues within 60 days after issuance of the Market Notice of temporary suspension of EDAM participation by an EDAM Entity, the CAISO may, upon issuance of a subsequent Market Notice, terminate participation by the EDAM Entity in the Day-Ahead Market and may extend the suspension of EDAM participation by the EDAM Entity for a time sufficient to process the termination of the EDAM Addendum to EIM Entity Agreement. The CAISO may reinstate EDAM operations after a temporary suspension of EDAM participation by an EDAM Entity by issuing a Market Notice announcing the intended reinstatement no less than 5 days in advance of the reinstatement date.

33.1.1.1 EDAM Entity Action.

In the event the CAISO issues a Market Notice of the temporary suspension of EDAM participation by an EDAM Entity, the EDAM Entity will either (a) undertake manual operation of its Balancing Authority Area without reliance on the Day-Ahead Market or (b) continue to submit EDAM Bids, forecast information, and the associated Meter Data to enable continued operation of the Day-Ahead Market until the CAISO issues a subsequent Market Notice either that (i) the cause of the temporary suspension has been resolved and the EDAM Entity has been reinstated, in which case EDAM participation by the EDAM Entity will return to normal, or (ii) EDAM participation by the EDAM Entity has been terminated.

In the event the CAISO issues a Market Notice of the temporary suspension of EDAM participation by an EDAM Entity, the EDAM Entity will either (a) not continue participation as an EIM Entity if its Balancing Authority Area is under manual operation or (b) continue participation as an EIM Entity unless otherwise directed in accordance with Section 29.1(d), specifically to submit EIM Base Schedules and the associated Meter Data to

enable continued operation of the Real-Time Market until the CAISO issues a subsequent Market Notice either that (i) the cause of the temporary suspension has been resolved and the EDAM Entity has been reinstated, in which case EDAM participation by the EDAM Entity will return to normal; or (ii) EDAM participation by the EDAM Entity has been terminated, in which case the EDAM Entity will continue participation in the EIM as an EIM Entity.

33.1.2.1 CAISO Action.

In the event the CAISO issues a Market Notice of the temporary suspension of EDAM participation by an EDAM Entity, the CAISO will (i) prevent EDAM Transfers and separate the EDAM Entity Balancing Authority Area from operation of the Day-Ahead Market in the EDAM Area in accordance with the provisions of the Business Practice Manual for the Extended Day-Ahead Market, (ii) suspend Settlement of Day-Ahead Market charges with respect to the EDAM Entity in accordance with the provisions of the Business Practice Manual for the Extended Day-Ahead Market, and (iii) issue a subsequent Market Notice either that the cause of the temporary suspension has been resolved and the EDAM Entity has been reinstated, in which case EDAM participation by the EDAM Entity will return to normal, or EDAM participation by the EDAM Entity has been terminated.

33.2 Access To EDAM

Section 2 will not apply to EDAM Market Participants; rather, the specific provisions of this Section 33.2 will apply to EDAM Market Participants.

The CAISO will provide open and non-discriminatory access to the Day-Ahead Market, including the Extended Day-Ahead Market for Balancing Authorities that also participate in the Energy Imbalance Market in accordance with the CAISO Tariff. Only EIM Entities may be EDAM Entities, while EIM Entities who do not become EDAM Entities will have no obligation to participate in the Extended Day-Ahead Market and may continue to participate solely in the Energy Imbalance Market.

33.2.1 EDAM Entity Implementation Agreement.

A Balancing Authority that seeks to become an EDAM Entity must first execute an EDAM Entity

Implementation Agreement with the CAISO that establishes the EDAM Entity Implementation Date, an obligation to sign an EDAM Addendum to EIM Entity Agreement, the onboarding fee for its implementation, and the scope of work required for its participation in the EDAM. A prospective EDAM Entity that has not yet executed an EDAM Addendum to EIM Entity Agreement may terminate its EDAM Entity Implementation Agreement at any time and for any reason in accordance with the terms of the EDAM Entity Implementation Agreement.

33.2.2 Implementation Date.

The CAISO and the prospective EDAM Entity shall work together to determine the EDAM Entity Implementation Date based on the complexity and compatibility of the Balancing Authority's transmission and technology systems with the CAISO systems and the planned timing of the CAISO's implementation of software enhancements. The EDAM Entity Implementation Date must be not less than six months and not more than twenty-four months after the date that the EDAM Entity Implementation Agreement between the CAISO and the Balancing Authority becomes effective in accordance with its terms. Once established, the EDAM Entity may request a change in the EDAM Entity Implementation Date to account for any circumstances that may affect the implementation timeline.

33.2.3 Market Simulation and Parallel Operations.

The CAISO and the prospective EDAM Entity will engage in (a) market simulation that accounts for the prospective EDAM Entity's implementation circumstances and (b) at least 30 days of parallel operations representing the Extended Day-Ahead Market to support the CAISO and the prospective EDAM Entity's implementation.

33.2.4 Reporting.

The CAISO will report on the CAISO Website periodically, but not less than once during market simulation, on progress towards completing the implementation activities and once again during parallel operations confirming completion of the implementation activities.

33.2.5 Implementation Activities.

The CAISO and the prospective EDAM Entity will complete the following implementation activities:

(A) **Execution of Necessary Agreements.** The prospective EDAM Entity has complied with Section 33.2.1, executed any necessary agreements for operating as an EDAM Entity, and helped the CAISO secure necessary agreements with third party prospective EDAM Market Participants.

(B) **Operations Training.** Prior to the start of parallel operations as set forth in Section 33.2.3, all operations staff (including contractors or vendors) identified by the prospective EDAM Entity who will have responsibility for EDAM operations, market transactions and settlements, will have completed identified CAISO training modules.

(C) **Forecasting Capability.** The CAISO and, to the extent the prospective EDAM Entity will use its own forecasts or is otherwise required to provide forecasting information to the CAISO, the prospective EDAM Entity has demonstrated its respective forecasting capability through –

(i) the definition of day-ahead demand forecast boundaries based on the conforming and non-conforming load characteristics, as applicable;

(ii) the documentation of EDAM Entity's choice of day-ahead demand forecast provider and how the demand forecast will be completed;

(iii) the accuracy of the CAISO forecast of demand based on historical actual load data for the defined demand forecast boundaries;

(iv) the identification of weather stations locations used in forecasting, as applicable;

(v) the identification of the source of day-ahead Variable Energy Resource forecasts;

(vi) the accuracy of the day-ahead forecast of Variable Energy Resources;

(vii) the identification of all Hybrid Resources; and

(viii) the provision of CAISO historical data on day-ahead demand and renewable forecast information to fill the needed historical data period to produce the Imbalance Reserve requirements at the net load level.

(D) **Resource Sufficiency Evaluation.** The prospective EDAM Entity Scheduling Coordinator demonstrates its ability to pass the Resource Sufficiency Evaluation for the prospective EDAM Entity's Balancing Authority Area.

(E) **Transmission Availability.** The prospective EDAM Entity confirms initial registration of the transmission rights of the EDAM Transmission Service Providers in its Balancing Authority Area available for EDAM Transfers or that otherwise may be scheduled in the Day-Ahead Market.

(F) **Historical Transmission Revenue Recovery.** The EDAM Entity provides the information and documentation necessary to account for the EDAM recoverable revenue pursuant to Section 33.26 associated with the EDAM Transmission Service Providers in its Balancing Authority Area.

(G) **Operating Procedures.** Prior to the start of parallel operations pursuant to Section 33.2.3, the CAISO and the prospective EDAM Entity have defined, completed, and tested operating procedures for the prospective EDAM Entity and its Scheduling Coordinator's participation in the Energy Imbalance Market.

(H) **System Readiness and Integration.**

(i) **System and Functional Testing.** The prospective EDAM Entity and the CAISO have tested the functional and system elements in accordance with functional and system testing documentation posted on the CAISO Website.

(ii) **Prospective EDAM Entity Identification.** The CAISO has established and the prospective EDAM Entity has tested all necessary SCIDs and Resource IDs established for the prospective EDAM Entity's Balancing Authority Area.

(iii) **Certificates and Access.** The prospective EDAM Entity has issued all necessary certificates to its employees, contractors and vendors that require system access to perform EDAM-related job functions.

(I) **Market Simulation and Structured Scenarios simulation.** The prospective

EDAM Entity operations staff identified by the prospective EDAM Entity who will have responsibility for EDAM operations, transactions and settlements, have executed and passed all structured scenarios provided by CAISO with all significant issues resolved.

(J) **Settlements.** The CAISO and the prospective EDAM Entity have demonstrated that –

(i) CAISO settlement statements and invoices match the operational data published to stakeholders or fed into settlement system and the resulting calculations correspond to the formulas defined in CAISO's tariff and Business Practice Manuals.

(ii) CAISO settlement statements and invoices allocates charges and credits to its customers accurately reflecting system and market data during parallel operations.

(K) **Parallel Operations Plan.** The period of parallel operations specified in Section 33.2.3 runs consistently and in accordance with the prospective EDAM Entity specific parallel operations plan.

33.2.6 Readiness.

No later than 10 days prior to the prospective EDAM Entity Implementation Date as established in the EDAM Entity Implementation Agreement, the CAISO will determine, in consultation with the prospective EDAM Entity, whether prospective EDAM Entity will be ready for the prospective EDAM Entity's participation in the Extended Day-Ahead Market on the EDAM Entity Implementation Date as contemplated by the implementation activities in Section 33.2.5.

33.2.7 Delay.

If the CAISO or the prospective EDAM Entity determines that either cannot proceed with implementation on the EDAM Entity Implementation Date, the CAISO and the prospective EDAM Entity will establish a new EDAM Entity Implementation Date as soon as it can be determined and reflect that date in an amended version of the EDAM Entity Implementation Agreement.

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33.4 Roles And Responsibilities

Section 4 will apply to EDAM Market Participants to the extent their roles and responsibilities are included in the Extended Day-Ahead Market, in addition to the provisions in this Section 33.4.

(a) Nothing in this Section 33 will alter the CAISO's responsibilities under the other sections of the CAISO Tariff, under any agreement not required by Section 33, or under NERC Reliability Standards, any other NERC requirements or criteria, or any other Applicable Reliability Criteria as the Balancing Authority for the CAISO Balancing Authority Area and the transmission operator for the CAISO Controlled Grid. During any interruption of the normal operation of the Day-Ahead Market, the CAISO as Balancing Authority will remain responsible for managing the resources in its Balancing Authority Area and the flows on transmission lines internal to the CAISO Balancing Authority Area, including imports and exports, for the duration of the interruption.

(b) Nothing in this Section 33 will alter an EDAM Entity's responsibilities under NERC Reliability Standards and any other NERC requirements or criteria as the Balancing Authority for the EDAM Entity Balancing Authority Area and, to the extent applicable, as the transmission operator for transmission facilities within its Balancing Authority Area. During any interruption of the normal operation of the Day-Ahead Market, the EDAM Entity as Balancing Authority will remain responsible in accordance with Section 33.7 for managing the resources in its Balancing Authority Area and the flows on internal transmission lines, including imports into and exports out of its Balancing Authority Area, for the duration of the interruption.

(c) An EDAM Transmission Service Provider will remain the transmission service provider in accordance with its tariff and will be responsible to manage transmission sales, reservations, and schedules on its transmission system in accordance with the EDAM Transmission Service Provider tariff.

(d) The CAISO will remain the transmission service provider for transmission capacity on the CAISO Controlled Grid in accordance with the CAISO Tariff.

33.4.1 EDAM Entity

An EDAM Entity must be a Balancing Authority registered and certified as such under the

applicable authorities and execute an EDAM Addendum to EIM Entity Agreement no later than ninety (90) days before the EDAM Entity Implementation Date. Upon receipt of such notice, the CAISO will undertake all necessary preparations to disable operation of the Day-Ahead Market within the EDAM Entity Balancing Authority Area, as outlined in the Business Practice Manual for the Extended Day-Ahead Market, including issuance of a Market Notice within five Business Days after receipt of such notice.

An EDAM Entity must:

(a) perform the obligations of an EDAM Entity in accordance with the EDAM Addendum to EIM Entity Agreement, Section 33, and other provisions of the CAISO Tariff that apply to EDAM Entities, subject to the limitations specified in Section 33.1;

(b) determine and inform the CAISO about all Load Serving Entities within the EDAM Entity's Balancing Authority Area necessary to enable operation of the Day-Ahead Market in its Balancing Authority Area;

(c) qualify as, or secure representation by, an EDAM Entity Scheduling Coordinator, provided that an EDAM Entity may not be represented by more than one EDAM Entity Scheduling Coordinator;

(d) provide the CAISO and its EDAM Entity Scheduling Coordinator with information regarding all Transmission Constraints of which it is aware;

(e) work with the CAISO to identify all resources within its Balancing Authority Area that do not currently participate in the Energy Imbalance Market pursuant to Section 29 so they can be represented in the Extended Day-Ahead Market as EDAM Resources and execute an EDAM Addendum to EIM Participating Resource Agreement pursuant to Section 33, which may be accomplished through execution of a separate EDAM Addendum to EIM Participating Resource Agreement or by including all or some of the resources under its EDAM Addendum to EIM Participating Resource Agreement;

(f) define Load Aggregation Points in its Balancing Authority Area and be responsible for serving the associated Demand, including for an EDAM Load Serving Entity in its Balancing Authority Area that will be separately responsible for serving the associated

Demand;

(g) identify and inform the CAISO which resource types supported by the CAISO Markets are eligible to participate in the Day-Ahead Market as EDAM Resource Facilities;

(h) determine and inform the CAISO of EDAM Transmission Service Providers within the EDAM Entity Balancing Authority Area;

(i) serve as the entity that interacts with EDAM Transmission Service Providers within the EDAM Entity Balancing Authority Area; and

(j) inform the CAISO whether or not the EDAM Entity intends to utilize the CAISO's Demand Forecast consistent with Section 33.31.1.

33.4.2 EDAM Transmission Service Provider

An EDAM Transmission Service Provider must execute an EDAM Transmission Service Provider Agreement with the CAISO. An EDAM Transmission Service Provider that is not an EDAM Entity and no longer wishes to make transmission service available for use in the Day-Ahead Market may terminate the EDAM Transmission Service Provider Agreement pursuant to its terms only if such termination is concurrent with the termination of participation in the Day-Ahead Market by the EDAM Entity for the Balancing Authority Area within which the EDAM Transmission Service Provider operates or holds transmission rights.

An EDAM Transmission Service Provider must:

(a) perform the obligations of an EDAM Transmission Service Provider in accordance with the EDAM Transmission Service Provider Agreement, Section 33, and other provisions of the CAISO Tariff that apply to EDAM Transmission Service Providers;

(b) have provisions in effect in the EDAM Transmission Service Provider's tariff, as necessary or applicable, to enable operation of the Day-Ahead Market, including an obligation for customers of the EDAM Transmission Service Provider to have a Scheduling Coordinator for purposes of interfacing with the CAISO;

(c) use the EDAM Entity Scheduling Coordinator as the sole Scheduling Coordinator for the EDAM Transmission Service Provider;

(d) provide information about transmission capacity available to the Day-Ahead Market to

its EDAM Entity Scheduling Coordinator and the CAISO; and

(e) ensure transmission customers of the EDAM Transmission Service Provider that will submit schedules in the Day-Ahead Market secure representation by a Scheduling Coordinator.

33.4.3 EDAM Entity Scheduling Coordinator

An EDAM Entity Scheduling Coordinator must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator, and enter into an EDAM Addendum to EIM Entity Scheduling Coordinator Agreement with the CAISO, which will satisfy the obligation to enter into a Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the EDAM Entity.

An EDAM Entity Scheduling Coordinator may represent a Market Participant other than an EDAM Entity if it enters into a Scheduling Coordinator Agreement under Section 4.5.1 with regard to such Market Participant or more than one EDAM Entity if it has certified to the CAISO in the manner described in the Business Practice Manual for the Extended Day-Ahead Market that it has informed each EDAM Entity it represents of the multiple representation. However, an EDAM Entity Scheduling Coordinator may not also be an EDAM Resource Scheduling Coordinator or a Scheduling Coordinator for a Participating Generator, Participating Load, Demand Resource Provider, or Load Serving Entity, unless the EDAM Entity Scheduling Coordinator is a transmission provider subject to the standards of conduct set forth in 18 C.F.R. § 358, is a governmental entity that agrees to comply with standards of conduct equivalent to those set forth in 18 C.F.R. § 358, or is a generation-only balancing authority that has implemented procedures equivalent to the protections offered under the standards of conduct that specifically include procedures addressing the no-conduit rule to preclude non-public transmission function information that may be received from being passed to employees that satisfy the definition of a "Marketing Function Employee."

33.4.4 EDAM Resource

The owner or operator of each resource in an EDAM Entity Balancing Authority Area is required to participate in the Day-Ahead Market and is required to register its resource with the CAISO as

an EDAM Resource Facility if it is capable of delivering Energy, Imbalance Reserves, Reliability Capacity, Flexible Ramping Product, other Ancillary Services, curtailable Demand, or Demand Response Services (or similar services) that may be committed in the Day-Ahead and committed for dispatch in the Real-Time Market as provided in the CAISO Tariff and the Business Practice Manual for the Extended Day-Ahead Market.

33.4.4.1 EDAM Addendum to EIM Participating Resource Agreement. An EDAM Resource must (a) perform the obligations of an EDAM Resource under the EDAM Addendum to EIM Participating Resource Agreement and Section 33, and (b) perform the obligations applicable to Market Participants and resources under the provisions of the CAISO Tariff described in Section 33.1. An EDAM Resource Facility must be listed in an executed EDAM Addendum to EIM Participating Resource Agreement.

33.4.4.2 EDAM Resource and the Energy Imbalance Market. An EDAM Resource Facility must also be registered as an EIM Resource pursuant to Section 29 and participate in the Real-Time Market as an EIM Participating Resource through representation by an EIM Participating Resource Scheduling Coordinator. Resource non-participation as provided under Section 29 is no longer an option.

33.4.5 EDAM Resource Scheduling Coordinator.

Each EDAM Resource must be represented by an EDAM Resource Scheduling Coordinator. An EDAM Resource Scheduling Coordinator must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator, and enter into an EDAM Addendum to EIM Participating Resource Scheduling Coordinator Agreement with the CAISO (in addition to an EIM Participating Resource Scheduling Coordinator Agreement if it has not done so already), which will satisfy the obligation to enter into a Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the EDAM Resource.

An EDAM Resource Scheduling Coordinator may represent more than one EDAM Resource or a Market Participant other than an EDAM Resource, but only if it enters into a Scheduling Coordinator Agreement under Section 4.5.1 with regard to such Market Participant. However, an EDAM Resource Scheduling Coordinator may not also be an EDAM Entity Scheduling

Coordinator unless the EDAM Resource Scheduling Coordinator is a transmission provider subject to the standards of conduct set forth in 18 C.F.R. § 358, is a governmental entity that agrees to comply with standards of conduct equivalent to those set forth in 18 C.F.R. § 358, or is a generation-only balancing authority that has implemented procedures equivalent to the protections offered under the standards of conduct that specifically include procedures addressing the no-conduit rule to preclude non-public transmission function information that may be received from being passed to employees that satisfy the definition of a "Marketing Function Employee."

An EDAM Resource Scheduling Coordinator must (a) perform the obligations of an EDAM Resource Scheduling Coordinator under the EDAM Addendum to EIM Participating Resource Scheduling Coordinator Agreement and Section 33, (b) perform the obligations of a Scheduling Coordinator under the provisions of the CAISO Tariff described in Section 33.1(c), (c) ensure that the entity it represents has obtained any transmission service necessary to participate in the Extended Day-Ahead Market under the terms of the CAISO Tariff or the tariff of another transmission service provider, as applicable, and (d) register in the manner set forth in the Business Practice Manual for the Extended Day-Ahead Market all EDAM Resources that it represents, provide such information to the EDAM Entity Scheduling Coordinator, and update such information with the CAISO in a timely manner.

33.4.6 EDAM Load Serving Entity

All Load in an EDAM Entity Balancing Authority Area must be represented by an EDAM Load Serving Entity. An EDAM Load Serving Entity will be responsible for Load in the Day-Ahead Market and the Real-Time Market, including the submission of Bids and Settlement of Demand, in accordance with Section 33 and Section 29, and must be represented by an EDAM Load Serving Entity Scheduling Coordinator.

33.4.7 EDAM Load Serving Entity Scheduling Coordinator

An EDAM Load Serving Entity Scheduling Coordinator must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator, and enter into a Scheduling Coordinator Agreement with the CAISO, which will satisfy the obligation to enter into a

Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the EDAM Load Serving Entity.

An EDAM Load Serving Entity Scheduling Coordinator may represent more than one EDAM Load Serving Entity or a Market Participant other than an EDAM Load Serving Entity, but only if it enters into a Scheduling Coordinator Agreement under Section 4.5.1 with regard to such Market Participant. However, an EDAM Load Serving Entity Scheduling Coordinator may not also be an EDAM Entity Scheduling Coordinator unless the EDAM Load Serving Entity Scheduling Coordinator either is a transmission provider subject to the standards of conduct set forth in 18 C.F.R. § 358, a governmental entity that agrees to comply with standards of conduct equivalent to those set forth in 18 C.F.R. § 358, or a generation-only balancing authority that has implemented procedures equivalent to the protections offered under the standards of conduct that specifically include procedures addressing the no-conduit rule to preclude non-public transmission function information that may be received from being passed to employees that satisfy the definition of a "Marketing Function Employee".

An EDAM Load Serving Entity Scheduling Coordinator must (a) perform the obligations of an EDAM Load Serving Entity Scheduling Coordinator under the applicable Scheduling Coordinator Agreement and Section 33, (b) perform the obligations of a Scheduling Coordinator under the provisions of the CAISO Tariff described in Section 33.1, (c) ensure that Load it represents has secured any transmission service necessary to participate in the Extended Day-Ahead Market under the terms of the applicable EDAM Transmission Service Provider tariff, and (d) register the EDAM Demand that it represents in the manner set forth in the Business Practice Manual for the Extended Day-Ahead Market, provide such information to the EDAM Entity Scheduling Coordinator, and update such information with the CAISO in a timely manner.

33.4.8 Scheduling Coordinator Representation

The Scheduling Coordinator for an EDAM Entity must be the same as the Scheduling Coordinator for the corresponding EIM Entity to ensure alignment between representation of the Balancing Authority Area in the Day-Ahead Market and the Real-Time Market. The Scheduling Coordinator for an EDAM Resource must be the same as the Scheduling Coordinator for the corresponding

EIM Participating Resource to ensure alignment between representation of resources in the Day-Ahead Market and the Real-Time Market. Similarly, an EDAM Load Serving Entity Scheduling Coordinator will be responsible for Settlement of the Demand in the Real-Time Market it represents in the Day-Ahead Market. If the Demand represented by an EDAM Load Serving Entity Scheduling Coordinator is also associated with an EIM Sub-Entity, the Scheduling Coordinator must also represent the Demand for the EIM Sub-Entity in the Real-Time Market.

* * * * *

APPENDIX B.27

EDAM ADDENDUM TO EIM ENTITY AGREEMENT

Effective [Date], [Full Legal Name] ("[Short Legal Name]") and the California Independent System Operator Corporation ("CAISO") (collectively the "Parties") make and enter into this EDAM Addendum to the Parties' [Date] EIM Entity Agreement (the "Agreement").

WHEREAS:

A. Pursuant to the Agreement, [Short Legal Name] participates as an EIM Entity in the CAISO's Real-Time Market and provides Energy Imbalance Market services within the EIM Entity Balancing Authority Area, including Real-Time transfers of Energy among the CAISO Balancing Authority Area and other EIM Entity Balancing Authority Areas;

B. The CAISO also operates the Day-Ahead Market pursuant to the CAISO Tariff, which the CAISO will extend to an EIM Entity that enters into an EDAM Entity Implementation Agreement; and

C. [Short Legal Name] has entered into an EDAM Entity Implementation Agreement to extend its participation to the CAISO's Day-Ahead Market and to provide Extended Day-Ahead Market services within the EDAM Entity Balancing Authority Area, including Day-Ahead transfers of Energy, Reliability Capacity, and Imbalance Reserves among the CAISO Balancing Authority Area and other EDAM Entity Balancing Authority Areas.

NOW, THEREFORE, for good and sufficient consideration, the receipt of which is hereby acknowledged, the Parties agree that the Agreement is hereby supplemented as follows:

1. **Agreement to be Bound by CAISO Tariff.** Section 33 of the CAISO Tariff is incorporated into the Agreement and made a part thereof.

2. **Interpretation.** All references in the Agreement to the "EIM" or the "Energy Imbalance Market" will also be read as references to the "EDAM" or the "Extended Day-Ahead Market." All references in the Agreement to the "Real-Time Market" will also be read as references to the "Day-Ahead Market." All references in the Agreement to an "EIM Entity" will also be read as references to an "EDAM Entity." All references in the Agreement to "EIM Entity Scheduling Coordinator(s)" will also be read as references to the "EDAM Entity Scheduling Coordinator(s)." All references to "non-participating resources" will also be read as references to "EDAM Resources." All references in the Agreement to Sections 29 or 29.1(d) of the CAISO Tariff will also be read as references to Sections 33 or 33.1.1 of the CAISO Tariff, respectively.

3. **Effective Date and Termination.** This EDAM Addendum will be effective as of the later of the date it is executed by the Parties and shall remain in full force and effect until terminated pursuant to the same process as is set forth in Section 3.2 of the Agreement. If [Short Legal Name] terminates its participation as an EDAM Entity, it may continue to participate as an EIM Entity under the terms of the Agreement.

4. **Miscellaneous.** Except as expressly modified by this EDAM Addendum, all other terms and conditions of the Agreement shall remain unchanged and in full force and effect.

[Full Legal Name]

By:_____

Printed Name:_____

Title:_____

Date:_____

California Independent System Operator Corporation

By:_____

Printed Name:_____

Title:_____

Date:_____

APPENDIX B.28

EDAM ADDENDUM TO EIM ENTITY SCHEDULING COORDINATOR AGREEMENT

Effective [Date], [Full Legal Name] ("[Short Legal Name]") and the California Independent System Operator Corporation ("CAISO") (collectively the "Parties") make and enter into this EDAM Addendum to the Parties' [Date] EIM Entity Scheduling Coordinator Agreement (the "Agreement").

WHEREAS:

A. Pursuant to the Agreement, [Short Legal Name] is certified as an EIM Entity Scheduling Coordinator by the CAISO under the certification procedure referenced in Section 29 of the CAISO Tariff;

B. The CAISO also operates the Day-Ahead Market pursuant to the CAISO Tariff;

C. [Short Legal Name] has chosen to extend its role as a Scheduling Coordinator in the EIM to the CAISO Day-Ahead Market so that it can represent an EDAM Entity under the terms and conditions set forth in Section 33 of the CAISO Tariff; and

D. [Short Legal Name] has applied for certification or has been certified as an EDAM Entity Scheduling Coordinator by the CAISO under the certification procedure referenced in Section 33 of the CAISO Tariff.

NOW, THEREFORE, for good and sufficient consideration, the receipt of which is hereby acknowledged, the Parties agree that the Agreement is hereby supplemented as follows:

1. **Agreement to be Bound by CAISO Tariff.** Section 33 of the CAISO Tariff is incorporated into the Agreement and made a part thereof.

2. **Interpretation.** All references in the Agreement to the "EIM" or the "Energy Imbalance Market" will also be read as references to the "EDAM" or the "Extended Day-Ahead Market." All references in the Agreement to "EIM Entity Scheduling Coordinator(s)" will also be read as references to the "EDAM Entity Scheduling Coordinator(s)." All references in the Agreement to Section 29 of the CAISO Tariff will also be read as references to Section 33 of the CAISO Tariff.

3. **Effective Date and Termination.** This EDAM Addendum will be effective as of the later of the date it is executed by the Parties and shall remain in full force and effect until terminated pursuant to the same process as is set forth in Section 3.2 of the Agreement. If [Short Legal Name] terminates its participation as an EDAM Entity Scheduling Coordinator, it may continue to participate as an EIM Entity Scheduling Coordinator under the terms of the Agreement.

4. **Miscellaneous.** Except as expressly modified by this EDAM Addendum, all other terms and conditions of the Agreement shall remain unchanged and in full force and effect.

[Full Legal Name]

By:_____

Printed Name:_____

Title:_____

Date:_____

California Independent System Operator Corporation

By:_____

Printed Name:_____

Title:_____

Date:_____

APPENDIX B.29

EDAM ADDENDUM TO EIM PARTICIPATING RESOURCE AGREEMENT

Effective [Date], [Full Legal Name] ("[Short Legal Name]") and the California Independent System Operator Corporation ("CAISO") (collectively the "Parties") make and enter into this EDAM Addendum to the Parties' [Date] EIM Participating Resource Agreement (the "Agreement").

WHEREAS:

A. Pursuant to the Agreement, [Short Legal Name] has participated or will participate as an EIM Participating Resource in the CAISO's Real-Time Market and is located in an EDAM Entity Balancing Authority Area;

B. The CAISO also operates the Day-Ahead Market pursuant to the CAISO Tariff; and

C. [Short Legal Name] extends its participation to the CAISO's Day-Ahead Market in accordance with the EDAM Entity's open access transmission tariff or the tariff of another transmission service provider within the EDAM Entity Balancing Authority Area.

NOW, THEREFORE, for good and sufficient consideration, the receipt of which is hereby acknowledged, the Parties agree that the Agreement is hereby supplemented as follows:

1. **Agreement to be Bound by CAISO Tariff.** Section 33 of the CAISO Tariff is incorporated herein and made a part hereof.

2. **Interpretation.** All references in the Agreement to the "EIM" or the "Energy Imbalance Market" will also be read as references to the "EDAM" or the "Extended Day Ahead Market." All references in the Agreement to an "EIM Entity" will also be read as references to an "EDAM Entity." All references in the Agreement to "EIM Participating Resource(s)" will also be read as references to the "EDAM Resource(s)." All references in the Agreement to "EIM Resources" will also be read as references to "EDAM Resource Facilities." All references in the Agreement to an "EIM Participating Resource Scheduling Coordinator" will also be read as references to an "EDAM Resource Scheduling Coordinator." All references in the Agreement to Section 29 of the CAISO Tariff will also be read as references to Section 33 of the CAISO Tariff.

3. **EDAM Resource Facilities.** Schedule 1 of the Agreement will be updated to include all EDAM Resource Facilities not already included in Schedule 1 as an EIM Resource.

4. **Effective Date and Termination.** This EDAM Addendum will be effective as of the later of the date it is executed by the Parties and shall remain in full force and effect until terminated pursuant to the same process as is set forth in Section 3.2 of the Agreement. If [Short Legal Name] terminates its participation as an EDAM Resource, it may continue to participate as an EIM Participating Resource under the terms of the Agreement.

5. **Miscellaneous.** Except as expressly modified by this EDAM Addendum, all other terms and conditions of the Agreement shall remain unchanged and in full force and effect.

[Full Legal Name]

By:_____

Printed Name:_____

Title:_____

Date:_____

California Independent System Operator Corporation

By:_____

Printed Name:_____

Title:_____

Date:_____

APPENDIX B.30

EDAM ADDENDUM TO EIM PARTICIPATING RESOURCE SCHEDULING COORDINATOR AGREEMENT

Effective [Date], [Full Legal Name] ("[Short Legal Name]") and the California Independent System Operator Corporation ("CAISO") (collectively the "Parties") make and enter into this EDAM Addendum to the Parties' [Date] EIM Participating Resource Scheduling Coordinator Agreement (the "Agreement").

WHEREAS:

A. Pursuant to the Agreement, [Short Legal Name] is certified as an EIM Participating Resource Scheduling Coordinator by the CAISO under the certification procedure referenced in Section 29 of the CAISO Tariff and represents EIM Participating Resources in an EDAM Entity Balancing Authority Area;

B. [Short Legal Name] extends its role as an EIM Participating Resource Scheduling Coordinator to the CAISO Day-Ahead Market so that it can represent EDAM Resources under the terms and conditions set forth in Section 33 of the CAISO Tariff; and

C. [Short Legal Name] has applied for certification or has been certified as an EDAM Resource Scheduling Coordinator by the CAISO under the certification procedure referenced in Section 33 of the CAISO Tariff.

NOW, THEREFORE, for good and sufficient consideration, the receipt of which is hereby acknowledged, the Parties agree that the Agreement is hereby supplemented as follows:

1. **Agreement to be Bound by CAISO Tariff.** Section 33 of the CAISO Tariff is incorporated into the Agreement and made a part thereof.

2. **Interpretation.** All references in the Agreement to the "EIM" or the "Energy Imbalance Market" will also be read as references to the "EDAM" or the "Extended Day-Ahead Market." All references in the Agreement to the "Real-Time Market" will also be read as references to the "Extended Day-Ahead Market." All references in the Agreement to "EIM Participating Resources" will also be read as references to "EDAM Resources." All references in the Agreement to "EIM Participating Resource Scheduling Coordinator(s)" will also be read as references to the "EDAM Resource Scheduling Coordinator(s)." All references in the Agreement to Section 29 of the CAISO Tariff will also be read as references to Section 33 of the CAISO Tariff.

3. **Effective Date and Termination.** This EDAM Addendum will be effective as of the later of the date it is executed by the Parties and shall remain in full force and effect until terminated pursuant to the same process as is set forth in Section 3.2 of the Agreement. If [Short Legal Name] terminates its participation as an EDAM Resource Scheduling Coordinator, it may continue to participate as an EIM Participating Resource Scheduling Coordinator under the terms of the Agreement.

4. **Miscellaneous.** Except as expressly modified by this EDAM Addendum, all other terms and conditions of the Agreement shall remain unchanged and in full force and effect.

[Full Legal Name]

By:_____

Printed Name:_____

Title:_____

Date:_____

California Independent System Operator Corporation

By:_____

Printed Name:_____

Title:_____

Date:_____

Appendix B.31 EDAM Entity Implementation Agreement

THIS EXTENDED DAY-AHEAD MARKET ENTITY IMPLEMENTATION AGREEMENT ("Agreement") is established this ____ day of _____, ____, and is accepted by and between:

(1) [Full legal name] having its registered and principal executive office at [address] ("[Short Legal Name]" or "EDAM Entity"),

and

(2) California Independent System Operator Corporation, a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate, ("CAISO").

The EDAM Entity and the CAISO each are hereinafter referred to as the "Parties."

Whereas:

A. The CAISO operates the Day-Ahead Market pursuant to the CAISO Tariff, and will extend the Day-Ahead Market to an EIM Entity that executes and performs in accordance with an EDAM Entity Implementation Agreement.

B. [Short Legal Name] is an EIM Entity, or is in a concurrent implementation process to become an EIM Entity, and has requested to participate in the CAISO's Day-Ahead Market as an EDAM Entity.

C. The Parties acknowledge that the rules and procedures governing participation in the CAISO's Day-Ahead Market as an EDAM Entity are set forth in the provisions of the CAISO Tariff as filed with the Federal Energy Regulatory Commission ("FERC") and that implementation as an EDAM Entity requires corresponding revisions to [Short Legal Name's] Open Access Transmission Tariff/retail distribution tariff and the execution of associated service agreements;

D. Implementation of participation by [Short Legal Name] in the CAISO's Day-Ahead Market as an EDAM Entity requires the CAISO to incur costs to set up its business and software systems on behalf of [Short Legal Name].

E. [Short Legal Name] has requested the CAISO to conduct or cause to be performed work to implement [Short Legal Name] as an EDAM Entity into the CAISO systems, and [Short Legal Name] will reimburse the CAISO for the actual costs incurred.

F. The Parties are entering into this Agreement to set forth the terms upon which the CAISO will timely configure its systems to incorporate [Short Legal Name] as an EDAM Entity on or before [date] ("EDAM Entity Implementation Date").

NOW, THEREFORE, in consideration of the mutual covenants contained herein, the Parties agree as follows:

ARTICLE I

DEFINITIONS AND INTERPRETATION

1.1 Master Definitions Supplement. All terms and expressions used in this Agreement shall have the same meaning as those contained in the Master Definitions Supplement to the CAISO Tariff.

1.2 Rules of Interpretation. The following rules of interpretation and conventions shall apply to this Agreement:

(a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;

(b) the singular shall include the plural and vice versa;

(c) the masculine shall include the feminine and neutral and vice versa;

(d) "includes" or "including" shall mean "including without limitation";

(e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;

(f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;

(g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;

(h) unless the context otherwise requires, any reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;

(i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;

(j) any reference to a day, week, month or year is to a calendar day, week, month or year;

(k) unless the context requires otherwise, "or" is used in the conjunctive sense; and

(l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

ARTICLE II

RESPONSIBILITIES OF EDAM ENTITY AND CAISO

2.1 Scope of Responsibilities. The CAISO shall conduct or cause to be performed changes to the CAISO business and software systems, in accordance with the CAISO Tariff, to allow [Short Legal Name] to participate in the CAISO's Day-Ahead Market as an EDAM Entity. The

scope of the implementation will include planning and project management; full network modeling of resources; system integration and testing; metering and settlements; and operations readiness and training. The CAISO shall also provide [Short Legal Name] a project plan of implementation activities, including a schedule by which information and data will be required to be sent to the CAISO; testing to be performed by [Short Legal Name]; and training to meet the EDAM Entity Implementation Date.

2.2 Implementation Deposit and Cost Allocation. Consistent with Section 33.11.5 of the CAISO tariff, [Short Legal Name] will provide a deposit and pay the actual costs of the implementation, including any actual amounts in excess of the initial deposit. The CAISO will provide invoices and refunds on a timely basis. Any difference between the deposit(s) made toward the implementation of [Short Legal Name] and associated administrative costs, and the actual cost of the implementation of [Short Legal Name] shall be paid by or refunded to [Short Legal Name], in accordance with Article V of this Agreement.

2.3 Technical Data. [Short Legal Name] will provide the CAISO technical data to facilitate the implementation in the Day-Ahead Market as an EDAM Entity and assumptions used for the data, such as system conditions, existing and planned generation, and unit modeling. The CAISO shall not be responsible for any additional costs, including, without limitation, costs of new or additional facilities, system upgrades, or schedule changes, that may be incurred by [Short Legal Name] as a result of implementation in the Day-Ahead Market as an EDAM Entity.

2.4 Compliance with CAISO Tariff Requirements for an EDAM Entity. Prior to the EDAM Entity Implementation Date, [Short Legal Name] will satisfy all requirements of the CAISO Tariff applicable to an EDAM Entity, including: (1) demonstrating that [Short Legal Name] satisfies all qualifications for participation as an EDAM Entity; (2) showing that [Short Legal Name] is authorized to make transmission available in its Balancing Authority Area consistent with the CAISO Tariff and the applicable transmission service tariffs, contracts, rules, procedures or other arrangements; (3) entering into an addendum to its EIM Entity Agreement with the CAISO governing [Short Legal Name's] participation in the Extended Day-Ahead Market; and (4) securing representation by an EDAM Entity Scheduling Coordinator.

ARTICLE III

TERM AND TERMINATION

3.1 Effective Date. This Agreement shall be effective as of the later of the date it is executed by the Parties or the date it is accepted for filing and made effective by FERC (if applicable) and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.

3.2 Termination

3.2.1 Termination by CAISO. The CAISO may terminate this Agreement by giving written notice of termination pursuant to Section 33.1 of the CAISO Tariff or in the event that [Short Legal Name] commits any material default under this Agreement or Section 33 of the CAISO Tariff that, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given [Short Legal Name] written notice of the default, unless the default is excused by reason of Uncontrollable Forces in accordance with Article IX of this Agreement. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if (1) the filing of the notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

3.2.2 Termination by EDAM Entity. In the event that [Short Legal Name] no longer wishes to participate in the CAISO's Extended Day-Ahead Market as an EDAM Entity pursuant to the CAISO Tariff, it may terminate this Agreement on giving the CAISO not less than thirty (30) days written notice. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if (1) the request to file a notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within thirty (30) days of receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination or upon the next production date of the Full-Network Model release following the thirty (30) days after the CAISO's receipt of [Short Legal Name]'s notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

3.3 No Termination Charge. With the exception of the implementation costs, the CAISO shall not levy an exit fee or other charge associated with CAISO systems, procedures, or other changes required by the termination of [Short Legal Name]'s participation in the Extended Day-Ahead Market as of the effective date of such notice, provided that [Short Legal Name] obligations incurred under this Agreement shall survive termination until satisfied.

ARTICLE IV

CAISO TARIFF

4.1 Agreement Subject to CAISO Tariff. This Agreement shall be subject to Section 33 of the

CAISO Tariff and all other provisions of the CAISO Tariff applicable to an EDAM Entity.

ARTICLE V

COSTS AND ACCOUNTING

5.1 Costs. The CAISO shall maintain records and accounts of all costs incurred in performing the implementation of the EDAM Entity in sufficient detail to allow verification of all costs incurred, including associated overheads.

5.2 Settlement of Deposit(s). The deposit provided in accordance with Section 2.2 of this Agreement shall be applied to the prudent costs of the CAISO in implementing [Short Legal Name] as an EDAM Entity in the Day-Ahead Market. If the actual costs of the implementation of [Short Legal Name] are greater than the initial deposit provided by [Short Legal Name], the CAISO will invoice [Short Legal Name] for an additional deposit amount to cover expenses. Payment of invoices shall be due no later than thirty (30) days after the date of receipt. Any invoice payment past due will accrue interest, per annum, calculated in accordance with 5 C.F.R. 1315.10.

At the end of the implementation, the CAISO will provide a report that details deposit(s) received, actual costs incurred, and applicable interest earnings (on deposit balance) for each implementation project. Interest will be calculated at the end of the implementation project, from the time the deposit(s) was received until the implementation is completed. The calculation will be based on the average earning of the bank account, in which the deposit is held, on the remaining amount of the deposit. Any unused deposit remaining after the implementation is completed plus interest on the remaining deposit will be returned to [Short Legal Name] within ninety (90) calendar days after the implementation is completed; the CAISO and [Short Legal Name] approve the completion; and all required documents for the refund are received by the CAISO. All refunds will be processed following the CAISO's generally accepted accounting practices. Any deadline for CAISO action will be tolled to the extent [Short Legal Name] has not provided the CAISO with the appropriate documents to facilitate an eligible refund.

In the event this agreement is terminated by either party or both parties after [Short Legal Name]'s implementation has begun, then the CAISO will make every attempt to halt work and related costs on the implementation as soon as practical and begin the refund process for any payments provided by [Short Legal Name] in excess of costs incurred by the CAISO, if applicable.

5.3 **Audit.** [Short Legal Name] shall have the right, upon reasonable notice, within a reasonable time at the CAISO's offices and at its own expense, to audit the CAISO's records as necessary and as appropriate in order to verify costs incurred by the CAISO. Any audit requested by [Short Legal Name] shall be completed, and written notice of any audit dispute provided to the CAISO representative, within one hundred eighty (180) calendar days following receipt by [Short Legal Name] of the CAISO's notification of the final costs of the implementation of [Short Legal Name].

ARTICLE VI

DISPUTE RESOLUTION

6.1 **Dispute Resolution.** The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to [Short Legal Name] and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE VII

REPRESENTATIONS AND WARRANTIES

7.1 **Representation and Warranties.** Each Party represents and warrants that the execution, delivery and performance of this Agreement has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.

7.2 **Necessary Approvals.** [Short Legal Name] represents that all necessary rights, leases, approvals, permits, licenses, easements, access to operate in compliance with this Agreement have been or will be obtained by [Short Legal Name] prior to the effective date of this Agreement, including any arrangement with any third party Balancing Authorities.

ARTICLE VIII

LIABILITY

8.1 **Liability.** The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to [Short Legal Name] and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE IX

UNCONTROLLABLE FORCES

9.1 Uncontrollable Forces Tariff Provisions. Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to [Short Legal Name] and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE X

MISCELLANEOUS

10.1 Assignments. Either Party may assign or transfer any or all of its rights or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights or obligations under this Agreement as if said successor in interest were an original Party to this Agreement.

10.2 Notices. Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to [Short Legal Name] and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.

10.3 Waivers. Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.

10.4 Governing Law and Forum. This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that

any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.

10.5 Consistency with Federal Laws and Regulations. This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.

10.6 Merger. This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.

10.7 Severability. If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.

10.8 Amendments. This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the Federal Power Act ("FPA") and pursuant to FERC's rules and regulations promulgated thereunder, and [Short Legal Name] shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.

10.9 Electronic Signatures. The Parties agree that this Agreement may be executed by either handwritten signature or digitally signed using Adobe Sign, Adobe E-Sign, or DocuSign. A digital signature is the same as a handwritten signature and shall be considered valid and acceptable.

10.10 Counterparts. This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.

California Independent System Operator Corporation

By: _____

Name: _____

Title: _____

Date: _____

[NAME OF PROSPECTIVE EDAM ENTITY]

By: _____

Name: _____

Title: _____

Date: _____

SCHEDULE 1

NOTICES

[Section 10.2]

[Short Legal Name]

Name of Primary

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

CAISO

Name of Primary Representative:	Regulatory Contracts
Title:	N/A
Address:	250 Outcropping Way
City/State/Zip Code:	Folsom, CA 95630
Email address:	RegulatoryContracts@caiso.com
Phone:	(916) 351-4400
Fax:	(916) 608-5063

Name of Alternative Representative:	Christopher J. Sibley
Title:	Manager, Regulatory Contracts
Address:	250 Outcropping Way
City/State/Zip Code:	Folsom, CA 95630
Email address:	csibley@caiso.com
Phone:	(916) 608-7030
Fax:	(916) 608-5063

Appendix B.32 EDAM Load Serving Entity Agreement (EDAMLSEA)

THIS EXTENDED DAY-AHEAD MARKET LOAD SERVING ENTITY AGREEMENT ("AGREEMENT") is established this ____ day of _____, ____ and is accepted by and between:

[Full legal name] ("EDAM Load Serving Entity"), **[legal description]** having its registered and principal executive office at [**address**],

and

California Independent System Operator Corporation ("CAISO"), a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate.

The EDAM Load Serving Entity and the CAISO are hereinafter referred to as the "Parties."

Whereas:

A. The CAISO operates the Day-Ahead Market and Real-Time Market pursuant to the CAISO Tariff.

B. The EDAM Load Serving Entity is responsible for Load within an EDAM Entity Balancing Authority Area not represented by an EDAM Entity and authorized by the EDAM Entity to represent its Load in the Day-Ahead Market and Real-Time Market; and

C. The Parties wish to enter into this Agreement to establish the terms and conditions for participation in the CAISO's Day-Ahead Market and Real-Time Market by the EDAM Load Serving Entity in accordance with Section 33 and Section 29 of the CAISO Tariff.

NOW THEREFORE, in consideration of the mutual covenants set forth herein, the Parties agree as follows:

ARTICLE I

DEFINITIONS AND INTERPRETATION

1.1 Master Definitions Supplement. All terms and expressions used in this Agreement shall have the same meaning as those contained in the Master Definitions Supplement to the CAISO Tariff.

1.2 Rules of Interpretation. The following rules of interpretation and conventions shall apply to this Agreement:

(a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;

(b) the singular shall include the plural and vice versa;

(c) the masculine shall include the feminine and neutral and vice versa;

(d) "includes" or "including" shall mean "including without limitation";

(e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;

(f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;

(g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;

(h) unless the context otherwise requires, any reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;

(i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;

(j) unless the context otherwise requires, "or" is used in the conjunctive sense;

(k) any reference to a day, week, month or year is to a calendar day, week, month or year; and

(l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

[***1.3 EDAM Load Serving Entity's Non-Jurisdictional Status.*** *The CAISO acknowledges that the EDAM Load Serving Entity is a exempt/non-jurisdictional entity as described in section 201(f) of the Federal Power Act, 16 U.S.C. 824(f), and understands that this Agreement does not extend the authority that FERC has over the EDAM Load Serving Entity apart from any authority it has to interpret or enforce this Agreement.*]

ARTICLE II

RESPONSIBILITIES OF EDAM LOAD SERVING ENTITY

2.1 EDAM Load Serving Entity Scheduling Coordinator. The EDAM Load Serving Entity shall be represented by an EDAM Load Serving Entity Scheduling Coordinator, which may be the EDAM Load Serving Entity or another entity certified by the CAISO to perform the functions of an EDAM Load Serving Entity Scheduling Coordinator.

2.2 EDAM Load Serving Entity Information. The EDAM Load Serving Entity shall provide information regarding its Load to the CAISO for Extended Day-Ahead Market purposes, in accordance with the CAISO Tariff and applicable Business Practice Manuals. The EDAM Load Serving Entity is responsible for the accuracy and completeness of this information.

ARTICLE III

TERM AND TERMINATION

3.1 Effective Date. This Agreement shall be effective as of the later of the date it is executed by the Parties or the date it is accepted for filing and made effective by FERC, if such FERC filing is required, and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.

3.2 Termination

3.2.1 Termination by CAISO. Subject to Section 10.2, the CAISO may terminate this Agreement by giving written notice of termination in the event that (i) the EDAM Load Serving Entity commits any material default under this Agreement and/or the CAISO Tariff which, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given written notice of the default, unless excused by reason of Uncontrollable Forces in accordance with Article IX of this Agreement, or (ii) the EDAM Entity for the Balancing Authority Area in which the EDAM Load Serving Entity is located terminates participation in the CAISO's Extended Day-Ahead Market. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement was filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the filing of the notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if filed with FERC, or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

3.2.2 Termination by EDAM Load Serving Entity. In the event that the EDAM Load Serving Entity no longer wishes to participate in the CAISO's Extended Day-Ahead Market, it may terminate this Agreement, on giving the CAISO not less than ninety (90) days written notice. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the request to file a notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within thirty (30) days of receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if such notice is required to be filed with FERC, or upon ninety (90) days after the CAISO's receipt of the EDAM Load Serving Entity's notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

ARTICLE IV

CAISO TARIFF

4.1 Agreement Subject to CAISO Tariff. This Agreement shall be subject to Section 33 and Section 29 of the CAISO Tariff, which shall be deemed to be incorporated herein. The EDAM Load Serving Entity shall abide by, and shall perform all of the obligations under the CAISO Tariff placed on EDAM Load Serving Entities in respect of all matters set forth therein.

ARTICLE V

COSTS

5.1 Operating and Maintenance Costs. The EDAM Load Serving Entity shall be responsible for all its costs incurred in connection with meeting its obligations under this Agreement.

ARTICLE VI

DISPUTE RESOLUTION

6.1 Dispute Resolution. The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Load Serving Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE VII

REPRESENTATIONS AND WARRANTIES

7.1 Representation and Warranties. Each Party represents and warrants that the execution, delivery and performance of this Agreement has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.

7.2 Necessary Approvals. The EDAM Load Serving Entity represents that all necessary rights, leases, approvals, permits, licenses, easements, access to operate in compliance with this Agreement have been or will be obtained by the EDAM Load Serving Entity prior to the effective date of this Agreement, including any arrangement with the EDAM Entity for the Balancing Authority Area in which the EDAM Load Serving Entity is located and any third party Balancing Authorities.

ARTICLE VIII

LIABILITY

8.1 Liability. The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EDAM Load Serving Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE IX

UNCONTROLLABLE FORCES

9.1 Uncontrollable Forces Tariff Provisions. Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Load Serving Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE X

MISCELLANEOUS

10.1 Assignments. Either Party may assign or transfer any or all of its rights or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the

CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest were an original Party to this Agreement.

10.2 Notices. Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Load Serving Entity and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1 of this Agreement. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.

10.3 Waivers. Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.

10.4 Governing Law and Forum. This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.

10.5 Consistency with Federal Laws and Regulations. This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.

10.6 Merger. This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.

10.7 Severability. If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.

10.8 Amendments. This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and

regulations promulgated thereunder, and the EDAM Load Serving Entity shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.

[***10.9*** ***Federal Provisions.*** *The CAISO hereby affirmatively agrees to incorporate into this Agreement the federal law provisions as provided by the EDAM Load Serving Entity and previously agreed to by the CAISO.*]

10.10 **Electronic Signatures.** The Parties agree that this Agreement may be executed by either handwritten signature or digitally signed using Adobe Sign, Adobe E-Sign, or DocuSign. A digital signature is the same as a handwritten signature and shall be considered valid and acceptable.

10.11 **Counterparts.** This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.

California Independent System Operator Corporation

By: _____

Name: _____

Title: _____

Date: _____

[NAME OF EDAM LOAD SERVING ENTITY]

By: _____

Name: _____

Title: _____

Date: _____

SCHEDULE 1

NOTICES

[Section 10.2]

EDAM Load Serving Entity

Name of Primary

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

CAISO

Name of Primary

Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative

Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Appendix B.33 EDAM Transmission Service Provider Agreement (EDAMTSPA)

THIS EXTENDED DAY-AHEAD MARKET TRANSMISSION SERVICE PROVIDER AGREEMENT ("AGREEMENT") is established this ____ day of _____, ____ and is accepted by and between:

[Full legal name] ("EDAM Transmission Service Provider"), [**legal description]** having its registered and principal executive office at [**address**],

and

California Independent System Operator Corporation ("CAISO"), a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate.

The EDAM Transmission Service Provider and the CAISO are hereinafter referred to as the "Parties."

Whereas:

A. The CAISO operates the Day-Ahead Market for Energy pursuant to the CAISO Tariff;

B. The EDAM Transmission Service Provider is a transmission service provider that owns transmission or has transmission service rights on an EDAM Intertie or within an EDAM Entity Balancing Authority Area, provides transmission service, and that makes transmission service available for use in the Day-Ahead Market through an EDAM Entity. (The term "EDAM Transmission Provider" does not include network integration transmission service customers or other transmission customers of an EDAM Transmission Service Provider, EDAM Legacy Contract Rights or EDAM Transmission Ownership Rights); and

C. The Parties wish to enter into this Agreement to establish the terms and conditions for participation in the CAISO's Day-Ahead Market by the EDAM Transmission Service Provider in accordance with Section 33 of the CAISO Tariff.

NOW THEREFORE, in consideration of the mutual covenants set forth herein, the Parties agree as follows:

ARTICLE I

DEFINITIONS AND INTERPRETATION

1.1 Master Definitions Supplement. All terms and expressions used in this Agreement shall have the same meaning as those contained in the Master Definitions Supplement to the CAISO Tariff.

1.2 Rules of Interpretation. The following rules of interpretation and conventions shall apply to this Agreement:

(a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;

(b) the singular shall include the plural and vice versa;

(c) the masculine shall include the feminine and neutral and vice versa;

(d) “includes” or “including” shall mean “including without limitation”;

(e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;

(f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;

(g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;

(h) unless the context otherwise requires, any reference to a “person” includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;

(i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;

(j) unless the context otherwise requires, “or” is used in the conjunctive sense;

(k) any reference to a day, week, month or year is to a calendar day, week, month or year; and

(l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

ARTICLE II

RESPONSIBILITIES OF EDAM TRANSMISSION SERVICE PROVIDER

2.1 Agreement Subject to CAISO Tariff. This Agreement shall be subject to Section 33 of the CAISO Tariff, which shall be deemed to be incorporated herein. The EDAM Transmission Service Provider shall abide by, and shall perform all of the obligations under the CAISO Tariff placed on EDAM Transmission Service Providers in respect of all matters set forth therein.

ARTICLE III

TERM AND TERMINATION

3.1 Effective Date. This Agreement shall be effective as of the later of the date it is executed by the Parties or the date it is accepted for filing and made effective by FERC, if such FERC filing is required, and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.

3.2 Termination

3.2.1 Termination by CAISO. Subject to Section 9.2, the CAISO may terminate this Agreement by giving written notice of termination in the event that (i) the EDAM Transmission Service Provider commits any material default under this Agreement and/or the CAISO Tariff which, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given, to the EDAM Transmission Service Provider, written notice of the default, unless excused by reason of Uncontrollable Forces in accordance with Article VII of this Agreement, or (ii) the EDAM Entity for the Balancing Authority Area in which the EDAM Transmission Service Provider is located terminates participation in the CAISO's Extended Day-Ahead Market. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement was filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the filing of the notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if filed with FERC, or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

3.2.2 Termination by EDAM Transmission Service Provider. In the event that the EDAM Transmission Service Provider no longer wishes to make transmission service available for use in the Day-Ahead Market through an EDAM Entity, it may terminate this Agreement on giving the CAISO not less than one-hundred and eighty (180) days written notice and so long as such termination is concurrent with the termination of participation in the Day-Ahead Market by the EDAM Entity for the Balancing Authority Area within which the EDAM Transmission Service Provider operates or holds transmission rights. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the request to file a notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within thirty (30) days of receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if such notice is required to be filed with FERC, or upon ninety (90) days after the CAISO's receipt of the EDAM Transmission Service Provider's notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

ARTICLE IV

COSTS

4.1 Operating and Maintenance Costs. The EDAM Transmission Service Provider shall be responsible for all its costs incurred in connection with meeting its obligations under this Agreement.

ARTICLE V

DISPUTE RESOLUTION

5.1 Dispute Resolution. The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall

adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Transmission Service Provider, and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE VI

REPRESENTATIONS AND WARRANTIES

6.1 **Representation and Warranties.** Each Party represents and warrants that the execution, delivery and performance of this Agreement by it have been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.

6.2 **Necessary Approvals.** The EDAM Transmission Service Provider represents that all necessary rights, leases, approvals, permits, licenses, easements, access to operate in compliance with this Agreement have been or will be obtained by the EDAM Transmission Service Provider prior to the effective date of this Agreement, including any arrangement with the EDAM Entity within which the EDAM Transmission Service provider operates or holds transmission rights or third party Balancing Authorities.

ARTICLE VII

LIABILITY

7.1 **Liability.** The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EDAM Transmission Service Provider, and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE VIII

UNCONTROLLABLE FORCES

8.1 **Uncontrollable Forces Tariff Provisions.** Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Transmission Service Provider, and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE IX

MISCELLANEOUS

9.1 **Assignments.** Either Party may assign or transfer any or all of its rights or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest were an original Party to this Agreement.

9.2 **Notices.** Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff,

provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Transmission Service Provider, and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.

9.3 **Waivers.** Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.

9.4 **Governing Law and Forum.** This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.

9.5 **Consistency with Federal Laws and Regulations.** This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.

9.6 **Merger.** This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.

9.7 **Severability.** If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.

9.8 **Amendments.** This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the EDAM Transmission Service Provider shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate

fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.

9.9 Electronic Signatures. The Parties agree that this Agreement may be executed by either handwritten signature or digitally signed using Adobe Sign, Adobe E-Sign, or DocuSign. A digital signature is the same as a handwritten signature and shall be considered valid and acceptable.

9.10 Counterparts. This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.

California Independent System Operator Corporation

By: _____

Name: _____

Title: _____

Date: _____

[NAME OF EDAM TRANSMISSION SERVICE PROVIDER]

By: _____

Name: _____

Title: _____

Date: _____

SCHEDULE 1

NOTICES

[Section 9.2]

EDAM Transmission Service Provider

Name of Primary

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

CAISO

Name of Primary

Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative

Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Attachment A-2 – Clean Tariff Language – Effective May 1, 2025

Day-Ahead Market Enhancements and Extended Day-Ahead Market

California Independent System Operator Corporation

August 22, 2023

Section 4

4. Roles and Responsibilities

* * * * *

4.5 Responsibilities of a Scheduling Coordinator

4.5.1 Scheduling Coordinator Certification

Only Scheduling Coordinators that the CAISO has certified as having met the requirements of this Section 4.5.1 may participate in the Day-Ahead Market or Real-Time Market or submit Supply Plans or RA Plans. Scheduling Coordinators offering Ancillary Services shall additionally meet the requirements of Section 8.

Each Scheduling Coordinator shall:

(a) demonstrate to the CAISO's reasonable satisfaction that it is capable of performing the functions of a Scheduling Coordinator under this CAISO Tariff including (without limitation) the functions specified in Sections 4.5.3 and 4.5.4 as applicable;

(b) identify each of the Eligible Customers (including itself if it trades for its own account) which it is authorized to represent as Scheduling Coordinator and confirm that the metering requirements under Section 10 are met in relation to each Eligible Customer that it represents under this CAISO Tariff;

(c) identify each of the Convergence Bidding Entities that it is authorized to represent as Scheduling Coordinator;

(d) confirm that each of the End-Use Customers it represents is eligible for service as a Direct Access End User;

(e) confirm that none of the Wholesale Customers it represents is ineligible for wholesale transmission service pursuant to the provisions of FPA Section 212(h);

(f) demonstrate to the CAISO’s reasonable satisfaction that it meets the financial criteria set out in Section 12;

(g) enter into a Scheduling Coordinator Agreement with the CAISO; and

(h) provide NERC tagging data, as applicable.

* * * * *

4.5.3 Responsibilities of a Scheduling Coordinator

Each Scheduling Coordinator shall be responsible for:

4.5.3.1 Obligation to Pay

Paying the CAISO's charges in accordance with this CAISO Tariff;

4.5.3.2 Submit Bids and Interchange Schedules

4.5.3.2.1 Submitting Bids, including Self-Schedules, in CAISO Markets that relate to the Market Participants for which it serves as Scheduling Coordinator;

4.5.3.2.2 Submitting Interchange Schedules prepared in accordance with all NERC, WECC and CAISO requirements, including providing E-Tags for all applicable transactions pursuant to WECC practices. The CAISO shall not accept E-Tags for ten-minute recallable reserve transactions (i.e., transactions with a WECC energy product code of "C-RE"). The CAISO is not, and shall not be listed as, the "Purchasing Selling Entity" for purposes of E-Tags. Title to Energy shall pass directly from the entity that holds title when the Energy enters the CAISO Controlled Grid to the entity that removes the Energy from the CAISO Controlled Grid, in each case in accordance with the terms of this CAISO Tariff.

4.5.3.3 Modifications in Demand Supply

Coordinating and allocating modifications in Demand and exports and Generation and imports at the direction of the CAISO in accordance with this CAISO Tariff;

4.5.3.4 Inter-SC Trades

Submitting any applicable Inter-SC Trades that the Market Participants intend to have settled through the CAISO Markets, pursuant to this CAISO Tariff;

4.5.3.5 Tracking and Settling Trades

Tracking and settling all intermediate trades, including bilateral transactions and Inter-SC Trades, among the entities for which it serves as Scheduling Coordinator;

4.5.3.6 Ancillary Services

Providing Ancillary Services in accordance with Section 8;

4.5.3.7 [Not Used]

4.5.3.8 Business Practice Manuals

Complying with all CAISO Business Practice Manuals and ensuring compliance by each of the Market Participants which it represents with all applicable provisions of the Business Practice Manuals;

4.5.3.9 Interruptible Imports

Identifying any Interruptible Imports included in its Bids or Inter-SC Trades;

4.5.3.10 Participating Intermittent Resources

Submitting Bids, including Self-Schedules, for Participating Intermittent Resources consistent with the CAISO Tariff;

4.5.3.11 Day-Ahead Market Published Schedules and Awards

Starting-up units and timely achieving specified operating levels in response to Dispatch Instructions, in accordance with CAISO published Schedules and awards;

4.5.3.12 Financial Responsibility

Assuming financial responsibility for all Schedules, AS Awards and Dispatch Instructions issued in the CAISO Markets, and all Virtual Awards in accordance with the provisions of this CAISO Tariff;

4.5.3.13 Compliance with Environmental Constraints, Operating Permits and Applicable Law

Submitting Bids so that any service provided in accordance with such Bids does not violate environmental constraints, operating permits or applicable law. All submitted Bids must reflect resource limitations and other constraints as such are required to be reported to the CAISO Control Center;

4.5.3.14 Tax Compliance

Providing, as described in the Business Practice Manuals, resale certificates or other proof acceptable to CAISO that its purchases of energy are exempt from any sales and use taxes that otherwise might apply; and

4.5.3.15 SQMD Plan

Complying with the SQMD Pan for eligible entities it serves pursuant to Section 10.3.7.

4.5.3.16 RA Plans and Supply Plans

Providing RA Plans for LSEs or CPEs for which it serves as Scheduling Coordinator and providing Supply Plans for Resource Adequacy Resources for which it serves as Scheduling Coordinator. If a CPE is also a Load Serving Entity and the CPE and Load Serving Entity are represented by the same Scheduling Coordinator, that Scheduling Coordinator must use distinct Scheduling Coordinator ID Codes for its activities related to the CPE and Load Serving Entity functions.

4.5.4 Operations of a Scheduling Coordinator

4.5.4.1 Maintain Twenty-four (24) Hour Scheduling Centers

Each Scheduling Coordinator other than a Scheduling Coordinator that represents only Convergence Bidding Entities shall operate and maintain a twenty-four (24) hour, seven (7) days per week, scheduling center. Each Scheduling Coordinator shall designate a senior member of staff as its scheduling center manager who shall be responsible for operational communications with the CAISO and who shall have sufficient authority to commit and bind the Scheduling Coordinator.

4.5.4.2 [Not Used]

4.5.4.3 Dynamic Scheduling

4.5.4.3.1 Dynamic Scheduling of Imports

Scheduling Coordinators may submit Bids for imports of Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services for which associated Energy is delivered from Dynamic System Resources located outside of the CAISO Balancing Authority Area, provided that: (a) such dynamic scheduling is technically feasible and consistent with NERC and WECC reliability standards and any requirements of the NRC, (b) all operating, technical, and business requirements for dynamic scheduling functionality, as set forth in the Dynamic Scheduling Protocol in Appendix M or posted in standards on the CAISO Website, are satisfied, (c) the Scheduling Coordinator for the Dynamic System Resource executes a Dynamic Scheduling Agreement for Scheduling Coordinators as provided in Appendix B.5 with the CAISO for the operation of dynamic scheduling functionality, and (d) all affected Balancing Authorities each execute with the CAISO a Dynamic Scheduling Host Balancing Authority Operating Agreement as provided in Appendix B.9, or a special operating agreement particular to the operation of dynamic functionality.

4.5.4.3.2 Dynamic Scheduling of Exports of Energy

Scheduling Coordinators may submit Bids for Dynamic Schedules of exports of Energy from Generating Units located in the CAISO Balancing Authority Area, provided that: (a) such dynamic scheduling is technically feasible and consistent with NERC and WECC reliability standards and any requirements of the NRC, (b) all operating, technical, and business requirements for dynamic scheduling functionality, as set forth in the Dynamic Scheduling Protocol in Appendix M or posted in standards on the CAISO Website, are satisfied, (c) the Scheduling Coordinator for the Generating Unit executes a Dynamic Scheduling Agreement for Scheduling Coordinators as provided in Appendix B.5 with the CAISO for the operation of dynamic scheduling functionality, and (d) all affected Balancing Authorities each execute with the CAISO an operating agreement particular to the operation of dynamic functionality. Scheduling Coordinators may not submit Bids for Dynamic Schedules of exports of Ancillary Services from resources located in the CAISO Balancing Authority Area, nor may Scheduling Coordinators submit Bids for Dynamic Schedules of exports from Loads located in the CAISO Balancing Authority Area.

4.5.4.4 Termination of Scheduling Coordinator Agreement and Suspension of Certification

(a) A Scheduling Coordinator's Scheduling Coordinator Agreement may be terminated by the CAISO on written notice to the Scheduling Coordinator:

(i) if the Scheduling Coordinator no longer meets the requirements for eligibility set out in Section 4.5 and fails to remedy the default within a period of five (5) Business Days after the CAISO has given written notice of the default;

(ii) if the Scheduling Coordinator fails to pay any sum under this CAISO Tariff and fails to remedy the default within a period of five (5) Business Days after the CAISO has given written notice of the default;

(iii) if the Scheduling Coordinator commits any other default under this CAISO Tariff or any of the CAISO Business Practice Manuals which, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given it written notice of the default; or

(iv) if the Scheduling Coordinator does not participate in the CAISO’s markets for Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services for a

period of twelve (12) consecutive months and fails to comply with the provisions of Section 4.5.4.4.2 within 120 days after the CAISO has given it written notice of the CAISO's intent to terminate its Scheduling Coordinator Agreement.

(b) A Scheduling Coordinator's Scheduling Coordinator Agreement may be terminated by the Scheduling Coordinator on sixty (60) days written notice to the CAISO, provided that such notice shall not be effective to terminate the Scheduling Coordinator Agreement until the Scheduling Coordinator has complied with all applicable requirements of Section 4.5.2.

(c) The CAISO shall, following termination of a Scheduling Coordinator Agreement and within thirty (30) days of being satisfied that no sums remain owing by the Scheduling Coordinator under the CAISO Tariff, return or release to the Scheduling Coordinator, as appropriate, any money or credit support provided by such Scheduling Coordinator to the CAISO under Section 12.

4.5.4.4.1 Pending the effective date of termination of service pursuant to Section 4.5.4.5.1, the CAISO will suspend the certification of a Scheduling Coordinator which has received a notice of termination under Section 4.5.4.4(a) and the Scheduling Coordinator will not be eligible to participate in the CAISO's markets for Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services.

4.5.4.4.2 A Scheduling Coordinator that has received a notice of the CAISO's intent to terminate its Scheduling Coordinator Agreement for failure to participate in the CAISO's markets for Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services for a period of twelve (12) consecutive months pursuant to Section 4.5.4.4(a)(iv) will avoid having its Scheduling Coordinator Agreement terminated and will have its certification reinstated if it completes the testing and training required for Scheduling Coordinator certification as set forth in the applicable Business Practice Manual within 120 days after the CAISO's issuance of the notice of intent to terminate.

4.5.4.5 Notification of Termination

The CAISO shall, promptly after providing written notice of default to a Scheduling Coordinator as specified in Section 4.5.4.4(a), notify the Scheduling Coordinators that could be required to represent End User Eligible Customers of the Scheduling Coordinator under Section 4.5.4.6.2 if the default is not cured.

The CAISO shall, as soon as reasonably practicable following the occurrence of any of the events specified in Section 4.5.4.4, notify the Scheduling Coordinator and the Scheduling Coordinators that could be required to represent End User Eligible Customers of the defaulting Scheduling Coordinator, and the UDCs, and shall as soon as reasonably practicable after the issuance of such notice of termination post such notice on the CAISO Website. Termination of the Scheduling Coordinator Agreement will automatically remove the Scheduling Coordinator's certification under Section 4.5 and Section 8.4.

4.5.4.5.1 Filing of Notice of Termination

Any notice of termination given pursuant to Section 4.5.4.4 shall also be filed by the CAISO with FERC, if required by FERC rules, if the non-compliance is not remedied within the period specified in Section 4.5.4.4, and it shall be effective in accordance with FERC rules.

4.5.4.6 Continuation of Service on Termination

4.5.4.6.1 Option for Eligible Customers to choose a new Scheduling Coordinator

When the CAISO suspends the certification of a Scheduling Coordinator pending termination, Eligible Customers of the defaulting Scheduling Coordinator shall be entitled to select another Scheduling Coordinator to represent them. The CAISO will post notice of any suspension on the CAISO Website. Until the CAISO is notified by another Scheduling Coordinator that it represents an Eligible Customer of the defaulting Scheduling Coordinator, the Eligible Customer of the defaulting Scheduling Coordinator will receive interim service in accordance with Section 4.5.4.6.2.

4.5.4.6.2 Interim Service

The CAISO shall maintain a list of Scheduling Coordinators willing to represent Eligible Customers of a defaulting Scheduling Coordinator, which list may be differentiated by UDC service area. Scheduling Coordinators who indicate to the CAISO their desire to be on such list shall be placed thereon by the CAISO in random order.

(a) When the CAISO suspends the certification of a Scheduling Coordinator in accordance with Section 4.5.4.4.1, Eligible Customers of the defaulting Scheduling Coordinators shall be assigned to all Scheduling Coordinators on the list established pursuant to this Section 4.5.4.6.2 in a non-discriminatory manner to be established by the CAISO, and each Eligible Customer shall thereafter be represented by the Scheduling Coordinator to

which it is assigned unless and until it selects another Scheduling Coordinator in accordance with Section 4.5.4.6.1, subject to this Section 4.5.4.6.2 subsection (b).

(b) Unless the CAISO is notified by another Scheduling Coordinator that it represents an Eligible Customer of a defaulting Scheduling Coordinator within seven (7) days of the notice of termination being posted on the CAISO Website, the Scheduling Coordinator to which that Eligible Customer has been assigned in accordance with subsection (a) may establish a reasonable minimum period for service, not to exceed thirty (30) days.

(c) In the event no Scheduling Coordinator indicates its willingness to represent Eligible Customers of a defaulting Scheduling Coordinator, the UDC that has the obligation to serve End-Use Customers of the Eligible Customer, if any, shall arrange to serve those End-Use Customers of such Eligible Customers that are located within the service area of the UDC. Such service will be provided in a manner consistent with that which the UDC provides, pursuant to the rules and tariffs of the Local Regulatory Authority, for its bundled End-Use Customers.

(d) This Section shall not in any way require a UDC to provide or arrange for Scheduling Coordinator service for wholesale Eligible Customers.

* * * * *

4.6.3 Requirements for Certain Participating Generators

4.6.3.1 Participating Generators Directly Connected to a Distribution System

With regard to any Generating Unit directly connected to a Distribution System, a Participating Generator shall comply with applicable UDC tariffs, requirements of the Local Regulatory Authority, interconnection requirements and generation agreements. With regard to a Participating Generator's Generating Units directly connected to a Distribution System, the CAISO and the UDC or MSS, as applicable, will coordinate to develop procedures to avoid conflicting CAISO and UDC or MSS, as applicable, operational directives.

4.6.3.2 Exemption for Generating Units Less Than One (1) MW

A Generator with a Generating Unit directly connected to a Distribution System will be exempt from compliance with this Section 4.6 and Section 10.1.3 in relation to that Generating Unit provided that (i) the rated capacity of the Generating Unit is less than one (1) MW, and (ii) the Generator does not use the Generating Unit to participate in the CAISO Markets. This exemption in no way affects the calculation of or any obligation to pay the appropriate charges or to comply with all the other applicable Sections of this CAISO Tariff. A Generating Unit with a rated capacity of less than 500 kW, unless the Generating Unit is (a) participating in an aggregation agreement approved by the CAISO or (b) a storage resource with a rated capacity of 100 kW or more, is not eligible to participate in the CAISO Markets and the Generator is not a Participating Generator for that Generating Unit.

With regard to any Generating Unit directly connected to a UDC system, a Participating Generator shall comply with applicable UDC tariffs, interconnection requirements and generation agreements. With regard to a Participating Generator's Generating Units directly connected to a UDC system, the CAISO and the UDC will coordinate to develop procedures to avoid conflicting CAISO and UDC operational directives. With regard to Regulatory Must-Take Generation, the CAISO will honor applicable terms and conditions of existing agreements, including Existing QF Contracts, as specified in Section 4.6.3.2. Qualifying Facilities that are not Regulatory Must-Take Generation subject to an Existing QF Contract shall comply with the requirements applicable to Participating Generators, as specified in Section 4.6.3.3.

4.6.3.3 Qualifying Facilities and Combined Heat and Power Resources

The owner or operator of (1) a Qualifying Facility, (2) a resource that is subject to an Amended QF Contract, or (3) a Combined Heat and Power Resource may satisfy the requirements of Section 4.6, to the extent applicable, by entering into Net Scheduled Participating Generator Agreement (Net Scheduled PGA) with the CAISO, in which case it shall comply with the provisions of the Net Scheduled PGA and Section 4.6.3.4. In order to be eligible to enter into the Net Scheduled PGA, a Participating Generator must demonstrate to the CAISO (a) that its Generating Unit (1) has established QF status pursuant to PURPA, (2) is a party to an Amended QF Contract; or (3) is a CHP Resource and (b) that the Self-provided Load of the Participating Generator that is served by the resource either (1) has and continues through the term of the Net Scheduled PGA to have, standby service from a UDC or MSS Operator under terms approved by the Local Regulatory Authority or FERC, as applicable, or (2) is curtailed concurrently

with any Outage of the Generation serving that Self-provided Load in an amount sufficient to cover that Outage.

4.6.3.4 Participating Generator with a Net Scheduled PGA

A Participating Generator that is eligible for and has entered into a Net Scheduled Participating Generator Agreement shall be subject to the provisions of this Section 4.6.3.4, as reflected in the terms of the Net Scheduled PGA.

4.6.3.4.1 Revenue Metering for a Net Scheduled Generating Unit

In accordance with the terms of the Net Scheduled PGA and Section 10.1.3.3, a Participating Generator that has entered into a Net Scheduled PGA may net the revenue metering value for the Generation produced by each Net Scheduled Generating Unit listed in the Net Scheduled PGA and the revenue metering value for the Demand of the Self-provided Load that is (i) served by the Net Scheduled Generating Unit and (ii) electrically located on the same side of the Point of Demarcation.

4.6.3.4.2 Telemetry for a Net Scheduled Generating Unit

A Participating Generator that has entered into a Net Scheduled PGA may satisfy the provisions of Section 7.6.1(d) for the installation of telemetry by installing telemetry at the Point of Demarcation for the purpose of recording the net impact of the Net Scheduled Generating Unit upon the CAISO Controlled Grid; provided that the installed telemetry satisfies the technical, functional, and performance requirements for telemetry set forth in the CAISO Tariff and the applicable Business Practice Manual.

4.6.3.4.3 Market and Settlement Processes for a Net Scheduled Generating Unit

For bidding, scheduling, billing, and Settlement purposes regarding the Net Scheduled Generating Unit Self-provided Load of a Participating Generator that has entered into a Net Scheduled PGA, measurements of Generation or Demand of the Net Scheduled Generating Unit shall be made at the Point of Demarcation. In all other respects, the Generation and Load of the Net Scheduled Generating Unit shall be subject to the applicable provisions of the CAISO Tariff regarding bidding, scheduling, billing, and Settlements.

4.6.3.4.4 Operating Requirements for a Net Scheduled Generating Unit

A Participating Generator that has entered into a Net Scheduled PGA shall abide by CAISO Tariff provisions regarding the CAISO's ability to dispatch or curtail Generation from the Net Scheduled

Generating Units listed in its Net Scheduled PGA. The CAISO shall only dispatch or curtail a Net Scheduled Generating Unit of the Participating Generator: (a) to the extent the Participating Generator bids Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services from the Net Scheduled Generating Unit into the CAISO Markets or the Energy is otherwise available to the CAISO under Section 40, subject to the restrictions on Dispatch Instructions or Operating Instructions set forth below; or (b) if the CAISO must dispatch or curtail the Net Scheduled Generating Unit in order to respond to an existing or imminent System Emergency or condition that would compromise CAISO Balancing Authority Area integrity or reliability as provided in Sections 7 and 7.6.1.

The CAISO will not knowingly issue a Dispatch Instruction or Operating Instruction to a Participating Generator that has entered into a Net Scheduled PGA that: (1) requires a Participating Generator to reduce its Generation below the delineated minimum operating limit, other than in a System Emergency; (2) conflicts with operating limitations provided to the CAISO by the Participating Generator; or (3) results in damage to the Participating Generator's equipment, provided that any such equipment limitation has been provided to the CAISO and incorporated in the Participating Generator's operating limitations. If the Participating Generator: (1) receives a Schedule which requires operation below the minimum operating limit, and (2) deviates from that Schedule to continue to operate at the minimum operating limit, it will not be subject to any penalties or sanctions as a result of operating at the minimum operating limit. The Participating Generator's consequences for deviating from Schedules in Real-Time will be governed by the CAISO Tariff.

The CAISO shall have the authority to coordinate and approve Generation Outage schedules for the Generating Unit(s) listed in a Net Scheduled PGA, in accordance with the provisions of Section 9.

4.6.3.5 [Not Used]

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4.7 Relationship Between CAISO and Participating Loads

The CAISO shall only accept Bids for Supply of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services or Submissions to Self-Provide Ancillary Services from Loads if such Loads are those

of a Participating Load that has entered into a Participating Load Agreement with the CAISO and which meet standards adopted by the CAISO and published on the CAISO Website. The CAISO shall not accept submitted Bids for Supply of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services from a Participating Load other than through a Scheduling Coordinator. The CAISO shall not accept Bids from Scheduling Coordinators for Participating Loads using the Non-Generator Resource model unless the resource owner or operator undertakes in writing, by entering into a Participating Load Agreement, to comply with all applicable provisions of this CAISO Tariff as they may be amended from time to time.

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4.9.4 MSS Operator Responsibilities

The MSS Operator's MSS Agreement with the CAISO shall obligate the MSS Operator to comply with all provisions of the CAISO Tariff, as amended from time to time, applicable to the UDCs, including, without limitation, the applicable provisions of Section 4.4 and Section 7.7. In addition, recognizing the CAISO's responsibility to promote the efficient use and reliable operation of the CAISO Controlled Grid and the CAISO Balancing Authority Area consistent with the Applicable Reliability Criteria, each MSS Operator shall:

4.9.4.1 operate and maintain its facilities, in accordance with applicable safety and reliability standards, regulatory requirements, applicable operating guidelines, applicable rates, tariffs, statutes and regulations governing their provision of service to their End-Use Customers and Good Utility Practice so as to avoid any material adverse impact on the CAISO Controlled Grid, it being understood that, if the MSS Operator does not so operate and maintain its facilities and the CAISO concludes, after notice is provided to the MSS Operator, that such failure impairs or threatens to impair the reliability of the CAISO Controlled Grid, the CAISO may suspend MSS status, in accordance with this Section 4.9, until the MSS Operator demonstrates the ability and willingness to so operate and maintain its facilities;

4.9.4.2 provide the CAISO each year with a schedule of upcoming maintenance of facilities forming part of the MSS that will affect, or is reasonably likely to affect, the CAISO Controlled Grid in accordance with

Section 9.3.6;

4.9.4.3 coordinate with the CAISO, Participating TOs, and Generators to ensure that the CAISO Controlled Grid Critical Protective Systems, including relay systems, are installed and maintained in order to function on a coordinated and complementary basis with the protective systems of the MSS, Participating TOs, and Generators, and notify the CAISO as soon as is reasonably possible of any condition that it becomes aware of that may compromise the CAISO Controlled Grid Critical Protective Systems;

4.9.4.4 be responsible for any Reliability Must-Run Generation and Voltage Support required for reliability of the MSS, including the responsibility for any costs of such Reliability Must-Run Generation, and Voltage Support and may satisfy this requirement through Generating Units owned by the MSS Operator or under contract to the MSS Operator; and

4.9.4.5 [Not Used]

4.9.4.6 be responsible for Congestion Management and transmission line Outages within or at the boundary of the MSS, and all associated costs of actions the MSS Operator has to take to resolve such Congestion internal to the MSS and not be responsible for Congestion Management elsewhere, except to the extent that a Scheduling Coordinator is delivering Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services to or from the MSS. An MSS Operator must notify and communicate with the CAISO regarding transmission line Outages to the extent such Outages impact the CAISO Controlled Grid.

4.9.5 Scheduling by or on Behalf of a MSS Operator

All Bids, including but not limited to Self-Schedules, submitted on behalf of an MSS Operator for the delivery of Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services to Loads connected to the MSS and for the delivery of Energy and Ancillary Services from Generating Units forming part of the MSS or System Units shall be submitted by a Scheduling Coordinator that complies with all applicable provisions of the CAISO Tariff, which Scheduling Coordinator may be the MSS Operator, provided that the MSS Operator complies with all applicable requirements for Scheduling Coordinators. A Scheduling Coordinator shall separately identify Bids that it submits on behalf of an MSS Operator.

4.9.5.1 Without limiting the foregoing, the Scheduling Coordinator for the MSS must submit gross

generation information for the System Unit, Generating Unit, and information regarding imports, exports and Gross Loads to the CAISO in the format and in accordance with the timelines applicable to other Scheduling Coordinators.

4.9.5.2 The Scheduling Coordinator for the MSS will designate, in discrete quantities and with prices for Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services: (1) Bids in the Day-Ahead Market and Real-Time Market (including Bids for internal Generation and internal Demand within the MSS), (2) Submissions to Self-Provide Ancillary Services or Bids for Regulation, Spinning Reserve, and Non-Spinning Reserve, capacity and associated Bid for Energy, or (3) any feasible combination thereof.

4.9.5.3 MSS Demand Forecast

The Scheduling Coordinator for the MSS shall provide CAISO with Demand forecasts of the MSS. To the extent that the Scheduling Coordinator does not provide requisite Demand Forecast for the MSS it represents, the CAISO shall produce a Demand Forecast for each MSS Load Take-Out Point.

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4.9.13 MSS Elections and Participation in CAISO Markets

MSS Operators must make an election or choice on three (3) issues that govern the manner in which the MSS participates in the CAISO Markets. The MSS Operator must choose either: (i) net Settlements or gross Settlements, (ii) to Load follow or not Load follow with its generating resources, and (iii) whether or not to charge the CAISO for their Emissions Costs as provided in Section 11.7.4. The MSS Operator shall make annual elections regarding these three (3) sets of options pursuant to the timeline specified for such elections in the Business Practice Manuals.

The MSS Operator's prior year election will be the default if the MSS Operator does not make a timely election, unless the MSS Operator has been found to have violated Load following requirements and is no longer eligible for making such elections. If the MSS Operator fails to elect net Settlement as specified in Section 11.2.3.2, the default mechanism for all MSS Settlements shall be gross Settlement as specified in Section 11.2.3.1.

The Load following and net or gross Settlement elections of an MSS Operator change certain aspects of,

but do not preclude, the participation of the MSS in the CAISO Markets. An MSS Operator may: (i) bid to supply Energy to, or purchase Energy from, the CAISO Markets, (ii) bid to provide available capacity in RUC, and (iii) bid or make a Submission to Self-Provide an Ancillary Service from a System Unit or from individual Generating Units, Participating Loads or Proxy Demand Resources within the MSS. An MSS Operator also may purchase Ancillary Services from CAISO or third parties to meet its Ancillary Service Obligations under the CAISO Tariff.

4.9.13.1 Gross or Net Settlement

An MSS Operator has the option to settle with the CAISO on either a gross basis or a net basis for its Load and generating resources. This election shall be made annually for a period consistent with annual CRR Allocation. If the MSS Operator elects net Settlement, then CRRs would be allocated on MSS net Load and the MSS may choose the MSS LAP as its CRR Sink in the first tiers of CRR Allocation. If the MSS Operator elects gross Settlement, then CRRs would be allocated on a gross Load basis and the MSS may not choose the MSS LAPs as its CRR Sink in the first tiers of CRR Allocation.

4.9.13.2 Load-Following or Non Load-Following Election

The MSS Operator has the option to elect to operate a System Unit or Generating Units in the MSS to follow its Load, provided that: (a) the Scheduling Coordinator for the MSS Operator shall remain responsible for purchases of Energy in accordance with the CAISO Tariff if the MSS Operator does not operate its System Unit or Generating Units and bid or schedule imports into the MSS, to match the metered Demand in the MSS and exports from the MSS; and (b) if the deviation between Generation and imports into the MSS and metered Demand and exports from the MSS exceeds the MSS Deviation Band, then the Scheduling Coordinator for the MSS Operator shall pay the additional amounts specified in Section 11.7. If an MSS Operator elects Load-following and net Settlements, all generating resources within the MSS must be designated as Load-following resources. If an MSS Operator elects Load-following and gross Settlements, generating resources within the MSS can be designated as either Load-following or non-Load-following resources. Consistent with these requirements, the MSS Operator may also modify the designation of generating resources within the MSS within the timing requirements specified for such Master File changes as described in the Business Practice Manuals.

If the MSS Operator has elected gross Settlement and is a Load-following MSS: (i) it must designate in

the Master File which of its generating resources are Load-following resources, (ii) it must complying with the additional bidding requirements in Section 30.5.2.5, and (iii) the generation resources designated as Load-following resources cannot set Real-Time prices. However, Load-following resources will be eligible to receive Bid Cost Recovery to ensure that the price paid for Energy dispatched by the CAISO is not less than the MSS Operator's accepted Bid price. Bid Cost Recovery for a Load-following MSS resource is only applicable to generation capacity provided to the CAISO Markets by that MSS resource and is not applicable for the generating capacity that is designated or used by an MSS Operator to follow its own Load.

An MSS Operator may designate RMR Resources as Load-following. Load-following RMR Resources must be available to the CAISO for Dispatch up to the RMR Contract Capacity specified in the RMR Contract. Energy shall be accounted for as a delivery from the MSS to the CAISO for the purposes of determining if the MSS Operator followed its metered Demand and exports from the MSS as described in this Section 4.9.13.2 except that Energy from an RMR Resources in a Day-Ahead Schedule can be used for Load-following to satisfy Day-Ahead scheduled Demand like any other non-RMR Resource Load-following resource. If no RMR Dispatch Notice is received for a Load-following RMR Resource, such Load-following RMR Resource may participate in the CAISO Markets as any other non-RMR Load-following resource subject to Section 30.5.2.5.

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4.12 Relationship of CAISO and Resource-Specific System Resources

The CAISO shall not accept Bids for any Resource-Specific System Resource otherwise than through a Scheduling Coordinator. The CAISO shall further not be obligated to provide Bid Cost Recovery to any Resource-Specific System Resource unless the relevant Resource-Specific System Resource owner undertakes in writing, by entering into a Resource-Specific System Resource Agreement, to comply with all applicable provisions of this CAISO Tariff as they may be amended from time to time, including, without limitation, the applicable provisions of this Section 4.12. Except as otherwise provided in this Section 4.12, Resource-Specific System Resources shall have the same rights and obligations as other

System Resources, including the ability to have Bids submitted for either full or partial output from the RSSR, provided that a Bid must be for at least the Minimum Load of the resource in order to be eligible for Bid Cost Recovery.

4.12.1 General Responsibilities

4.12.1.1 Operate Pursuant to Relevant Provisions of CAISO Tariff

Resource-Specific System Resource owners shall operate, or cause their facilities to be operated, in accordance with the relevant provisions of this CAISO Tariff, including but not limited to the following.

(i) A Resource-Specific System Resource shall only be eligible for Bid Cost Recovery if the Resource-Specific System Resource has complied with a Start-Up Instruction or Dispatch Instruction issued by the CAISO as specified in Section 11.8.

(ii) In order to be eligible for Bid Cost Recovery, a Resource-Specific System Resource owner shall ensure that its Scheduling Coordinator makes an election for Default Start-Up Bids and Default Minimum Load Bids pursuant to Sections 30.4 and 30.5.2.4.

(iii) A Resource-Specific System Resource owner shall ensure that any Ancillary Services Bids submitted by its Scheduling Coordinator are submitted in accordance with Section 30.5.2.6.

(iv) Owners of Dynamic Resource-Specific System Resources that are Resource Adequacy Resources shall comply with additional availability requirements to the extent required by Section 40.6.5.1.

(v) Each Resource-Specific System Resource owner shall immediately inform the CAISO, through its respective Scheduling Coordinator and using the CAISO's outage management system as described in Section 9, of any change or potential change in the current status of any Resource-Specific System Resource that may affect a submitted Bid. This will include, but not be limited to, any change in status of equipment that could affect the maximum output of a Resource-Specific System Resource, the Minimum Load of a Resource-Specific System Resource, or the ability of a Resource-Specific System Resource to provide Ancillary Services in accordance with its Bid.

(vi) In the event that a Resource-Specific System Resource owner cannot meet its Day-

Ahead Schedule, or comply with a Dispatch Instruction, whether due to a Resource-Specific System Resource trip or the loss of a piece of equipment causing a reduction in capacity or output, the Resource-Specific System Resource owner shall notify the CAISO, through its Scheduling Coordinator, at once. If a Resource-Specific System Resource owner will not be able to meet a time commitment or requires the cancellation of a Resource-Specific System Resource Start-Up, it shall notify the CAISO, through its Scheduling Coordinator, at once.

4.12.1.2 Operate Pursuant to Relevant Operating Procedures

Resource-Specific System Resource owners shall operate, or cause their Resource-Specific System Resources and associated facilities to be operated, in accordance with the relevant Operating Procedures and Business Practice Manuals established by the CAISO.

4.12.2 Identification of Resource-Specific System Resources

Each Resource-Specific System Resource owner shall provide data identifying each of its Resource-Specific System Resources and such information regarding the capacity and the operating characteristics of the Resource-Specific System Resource as may be reasonably requested from time to time by the CAISO. All information provided to the CAISO regarding the operational and technical constraints in the Master File must be an accurate reflection of the design capabilities of the resources and its constituent equipment when operating at maximum sustainable performance over Minimum Run Time, recognizing that resource performance may degrade over time. Information registered in the Master File by a Scheduling Coordinator must also conform to any additional definitional requirements in Appendix A as may exist as to that information. Pursuant to Sections 8.9 and 8.10, the CAISO may verify, inspect and test the capacity and operating characteristics of the resource provided to the CAISO.

4.12.3 Telemetry Data to Demonstrate Compliance

The Resource-Specific System Resource owner shall provide SCADA data by telemetry to the CAISO EMS at the Resource-Specific System Resource owner's expense in order to demonstrate compliance with CAISO Start-Up Instructions in order to be eligible for BCR. Telemetry data from Dynamic Resource-Specific System Resources shall be provided in accordance with the requirements of the CAISO's Dynamic Scheduling Protocol in Appendix M. For Non-Dynamic Resource-Specific System Resources,

the Resource-Specific System Resource owner shall have the option of providing the required telemetry data by transmittal directly to the CAISO EMS in accordance with the CAISO's standards for direct telemetry or by means of transmittal to the CAISO EMS through the EMS of its Host Balancing Authority Area by use of the inter-control center communications protocol (ICCP).

4.12.4 Recordkeeping

Resource-Specific System Resource owners shall provide to the CAISO such information and maintain such records as are reasonably required by the CAISO to implement the provisions of the CAISO Tariff applicable to Resource-Specific System Resources.

4.12.5 Access Rights

A Resource-Specific System Resource owner shall, at the request of the CAISO and upon reasonable notice, provide access to its facilities and records (including those relating to communications and telemetry) as necessary to permit the CAISO to perform such testing as is necessary to test the accuracy of any telemetry equipment upon which the Resource-Specific System Resource owner's performance is measured.

4.13 DRPs, RDRRs, and PDRs

4.13.1 Relationship Between CAISO and DRPs

Consistent with Section 30.6, the CAISO shall only accept Bids from Reliability Demand Response Resources and Proxy Demand Resources if such Reliability Demand Response Resources or Proxy Demand Resources are represented by a Demand Response Provider that has entered into a Demand Response Provider Agreement with the CAISO, has accurately provided the information required in the Demand Response System, has satisfied all Reliability Demand Response Resource or Proxy Demand Resource registration requirements, and has met standards adopted by the CAISO and published on the CAISO Website. Reliability Demand Response Resources and Proxy Demand Resources may not participate in a Distributed Energy Resource Aggregation. The CAISO shall not accept Bids from a Demand Response Provider other than through a Scheduling Coordinator, which Scheduling Coordinator may be the Demand Response Provider itself or another entity. Proxy Demand Response Resources providing Ancillary Services must submit Meter Data for the interval preceding, during, and following the Trading Interval(s) in which they were awarded Ancillary Services for the purposes of determining

settlement pursuant to Section 8.10.8.

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4.17 Distributed Energy Resource Aggregations

4.17.1 Relationship with Distributed Energy Resource Providers

The CAISO will accept Bids from Distributed Energy Resource Aggregations only if such Distributed Energy Resource Aggregations are represented by a Distributed Energy Resource Provider that has entered into a Distributed Energy Resource Provider Agreement with the CAISO to comply with all applicable provisions of the CAISO Tariff as they may be amended from time to time. The CAISO will not accept Bids from a Distributed Energy Resource Aggregation other than through a Scheduling Coordinator. The Scheduling Coordinator may be the Distributed Energy Resource Provider itself or another entity.

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4.17.4 Identification of Distributed Energy Resources

Each Distributed Energy Resource Provider will provide information, as described in the Business Practice Manual, identifying each of its Distributed Energy Resource Aggregations and such information regarding the location, capacity, operating characteristics and applicable Generation Distribution Factors of its Distributed Energy Resource Aggregation(s) as may be reasonably requested from time to time by the CAISO, and when the information changes due to the removal, addition, or modification of a Distributed Energy Resource or Distributed Curtailment Resource within the Distributed Energy Resource Aggregation. All information provided to the CAISO by a Distributed Energy Resource Provider regarding the operational and technical characteristics of its Distributed Energy Resource Aggregation(s) must be an accurate reflection of the design capabilities of the resources and its constituent equipment when operating at maximum sustainable performance over Minimum Run Time, recognizing that resource performance may degrade over time. Information registered in the Master File by a Scheduling

Coordinator must also conform to any additional definitional requirements in Appendix A as may exist as to that information.

As further described in the Business Practice Manual, the CAISO will share any necessary information and data about the Distributed Energy Resources comprising a Distributed Energy Resource Aggregation with the applicable Utility Distribution Company or Metered Subsystem. The Utility Distribution Company or Metered Subsystem will have an opportunity to provide written comments within thirty (30) days regarding the accuracy of the information about Distributed Energy Resources comprising a Distributed Energy Resource Aggregation(s) or raise concerns with respect to whether the Distributed Energy Resources (1) are participating in another Distributed Energy Resource Aggregation; (2) are participating as a Proxy Demand Response resource or a Reliability Demand Response Resource; (3) do not comply with applicable Utility Distribution Company tariffs or requirements of the relevant Local Regulatory Authority; (4) receive compensation from retail programs for capacity, Energy, or other services that would be offered to the CAISO Markets; or (5) may pose a significant threat to the safe and reliable operation of the Distribution System, if operated as part of a Distributed Energy Resource Aggregation. The Utility Distribution Company or Metered Subsystem review of criterion (5) must be limited to those impacts resulting from the aggregation, exclusive of issues previously considered during the interconnection study process for each Distributed Energy Resource. The CAISO will provide the Distributed Energy Resource Provider with the Utility Distribution Company or Metered Subsystem's written comments and any other information regarding the Distributed Energy Resources provided by the Utility Distribution Company or Metered Subsystem to CAISO, and the Distributed Energy Resource Provider will resolve any concerns with the Utility Distribution Company or Metered Subsystem prior to the CAISO allowing the individual Distributed Energy Resource to participate in a Distributed Energy Resource Aggregation. Parties may resolve any disputes regarding any issues related to the distribution utility review process with the applicable Governmental Authority for the Utility Distribution Company or Metered Subsystem or under Section 13 of the CAISO tariff, as applicable to the dispute.

4.17.4.1 Modifications to Distributed Energy Resource Aggregations

The Distributed Energy Resource Provider will notify the CAISO of any changes to the information it provided during the registration process due to the removal, addition, or modification of a Distributed

Energy Resource or Distributed Curtailment Resource within the Distributed Energy Resource Aggregation. The Distributed Energy Resource Provider also will notify the CAISO of any changes to its Distributed Energy Resource Aggregation's physical or operational characteristics. The CAISO will notify the applicable Utility Distribution Company or Metered Subsystem of any changes, and the Utility Distribution Company or Metered Subsystem will have fourteen (14) days to provide the CAISO any written comments raising concerns under Section 4.17.4.

4.17.5 Characteristics of Distributed Energy Resource Aggregations

4.17.5.1 Size Limits

A Distributed Energy Resource Aggregation will be no smaller than 100kW. A Distributed Energy Resource Aggregation that includes Distributed Energy Resources located at different PNodes will be no larger than 20 MW.

4.17.5.2 Metering and Telemetry

Scheduling Coordinators shall submit to the CAISO Actual Settlement Quality Meter Data or Estimated Settlement Quality Meter Data for Distributed Energy Resource Aggregations they represent for each Settlement Period in an Operating Day. Distributed Energy Resources and Distributed Curtailment Resources participating in a Distributed Energy Resource Aggregation will be directly metered pursuant to a meter that complies with any applicable Utility Distribution Company tariff and any standards of the relevant Local Regulatory Authority or, if no such tariff exists or no standards have been set by that Local Regulatory Authority, the metering standards as further detailed in the CAISO's Business Practice Manual. Distributed Energy Resource Providers must make Settlement Quality Meter Data from individual Distributed Energy Resources and Distributed Curtailment Resources comprising a Distributed Energy Resource Aggregation available to the CAISO upon request.

Distributed Energy Resource Providers shall provide information regarding Distributed Energy Resource Aggregation(s) with a rated capacity of 10 MW or greater or, if the Distributed Energy Resource Aggregation(s) provides Ancillary Services, through telemetry to the CAISO's EMS in accordance with the CAISO's standards for direct telemetry and consistent with the requirement for telemetry set forth in Section 7.6.1. Distributed Energy Resource Providers are not required to have their own direct telemetry on each DER, and may acquire the data required to provide the CAISO with accurate telemetry data for

the DERA by any means, including calculation.

4.17.6 Operating Requirements

Distributed Energy Resource Aggregations will respond to (1) CAISO Dispatch Instructions and (2) instructions from the Utility Distribution Company to maintain the safety and reliability of the Distribution System. The CAISO may dispatch a Distributed Energy Resource Aggregation to the extent the Distributed Energy Resource Aggregation bids or schedules into the CAISO Markets and receives an award. The CAISO may also issue an Exceptional Dispatch Instruction for the Distributed Energy Resource Aggregation for reliability pursuant to Section 34.10. Distributed Energy Resource Aggregations shall respond to Dispatch Instructions consistent with Generation Distribution Factors for the Distributed Energy Resource Aggregation.

Each Distributed Energy Resource Provider will operate its Distributed Energy Resource Aggregation(s) in a manner consistent with limitations or operating orders established by the Utility Distribution Company or Metered Subsystem. Scheduling Coordinators for Distributed Energy Resources Providers shall submit Outages to the CAISO as necessary to reflect any distribution constraints impacting Distributed Energy Resources that comprise a Distributed Energy Resource Aggregation under its control. The CAISO shall have the authority to coordinate and approve Outage schedules for the Distributed Energy Resource Aggregation(s) listed in a Distributed Energy Resource Provider Agreement, in accordance with the provisions of Section 9. Where the Utility Distribution Company requires its own direct communication with the Distributed Energy Resource Provider for the safety and reliability of the Distribution System, those communication and data protocols will be established in Schedule 4 to the Distributed Energy Resource Provider Agreement.

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Section 6

6. Communications

6.1 Methods of Communication

6.1.1 Full-Time Communications Facility Requirements

Each Scheduling Coordinator, Utility Distribution Company, Participating TO, Participating Generator, Balancing Authority (to the extent the agreement between the Balancing Authority and the CAISO so provides), and MSS Operator must provide a communications facility manned twenty-four (24) hours a day, seven (7) days a week capable of receiving Dispatch Instructions issued by the CAISO.

6.1.2 Information Transfer from Scheduling Coordinator to CAISO

Unless otherwise agreed by the CAISO, Scheduling Coordinators who wish to submit Bids into CAISO Markets must submit the information to the CAISO's secure communication system. Scheduling Coordinators that wish to submit Dynamic Schedules or Bids for Ancillary Services to the CAISO must also comply with the applicable requirements of Sections 4.5.4.3, 8.3.7, and 8.4.5.

6.1.3 Submitting Information to the Secure Communication System

For Scheduling Coordinators submitting information to the CAISO's secure communication system, each such Scheduling Coordinator shall establish a network connection with the CAISO's secure communication system. Link initialization procedures shall be necessary to establish a connection to the CAISO's secure communication system. In order to log in, each Scheduling Coordinator will be furnished a digital certificate by the CAISO.

6.1.3.1 The CAISO will make available data templates and validation rules information that provides a description of the templates which will be utilized to enter data into the CAISO's secure communication system.

6.1.4 Information Transfer from CAISO to Scheduling Coordinator

Unless otherwise agreed between a Scheduling Coordinator and the CAISO, the CAISO shall furnish scheduling information to Scheduling Coordinators by electronic transfer as described in Section 6. If electronic data transfer is not available, the information may be furnished by facsimile. If it is not possible to communicate with the Scheduling Coordinator using the primary means of communication, an alternate means of communication shall be selected by the CAISO.

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Section 7

7. System Operations Under Normal and Emergency Conditions

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7.6 Normal System Operations

7.6.1 Actions for Maintaining Reliability of CAISO Controlled Grid

The CAISO shall obtain the control over Generating Units that it needs to control the CAISO Controlled Grid and maintain reliability by ensuring that sufficient Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services are procured through the CAISO Markets. When the CAISO responds to events or circumstances, it shall first use the generation control it is able to obtain from market processes to respond to the operating event and maintain reliability. Only when the CAISO has used the Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services that are available to it and that are effective in responding to the problem and the CAISO is still in need of additional control over Generating Units, shall the CAISO assume supervisory control over other Generating Units. It is expected that at this point, the operational circumstances will be so severe that a Real-Time system problem or emergency condition could be in existence or imminent.

Each Participating Generator shall take, at the direction of the CAISO, such actions affecting such Generator as the CAISO determines to be necessary to maintain the reliability of the CAISO Controlled Grid. Such actions shall include (but are not limited to):

(a) compliance with Dispatch Instructions including instructions to deliver Energy and Ancillary Services in Real-Time pursuant to the AS Awards, Day-Ahead Schedules and FMM Schedules, and FMM AS Awards;

(b) compliance with the system operation requirements set out in this Section 7;

(c) notification to the CAISO of the persons to whom an instruction of the CAISO should be directed on a 24-hour basis, including their telephone and facsimile numbers; and

(d) the provision of communications, telemetry and direct control requirements, including the establishment of a direct communication link from the control room of the Generator to

the CAISO in a manner that ensures that the CAISO will have the ability, consistent with this CAISO Tariff, to direct the operations of the Generator as necessary to maintain the reliability of the CAISO Controlled Grid, except that a Participating Generator will be exempt from CAISO requirements imposed in accordance with this subsection (d) with regard to any Generating Unit with a rated capacity of less than ten (10) MW, unless that Generating Unit is certified by the CAISO to provide Ancillary Services.

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7.7.7 Removal of Bids in the Event of a Market Disruption, to Prevent a Market Disruption, or to Minimize the Extent of a Market Disruption

(a) Types of Bids. The types of Bids that the CAISO may remove are Bids that are not feasible based on the misalignment of resource-specific conditions and physical constraints represented in the Master File, current outage information, and the Bid itself.

(b) Removal of a Portion of a Bid. The CAISO may remove part of a Bid, but retain other parts of the Bid for the applicable CAISO Market run and interval for the same or a different product, and may retain parts of the Bid for subsequent CAISO Market runs or intervals.

(c) Removal of a Bid Pursuant to Section 7.7.6(a)(2). If a Bid must be removed pursuant to Section 7.7.6(a)(2), the CAISO will remove the entire Bid for that particular service and market.

(d) Resubmittal of Bids. The Scheduling Coordinator may resubmit removed Bids in subsequent CAISO Markets, provided the Scheduling Coordinator complies with any operator instructions regarding the subject Bids.

(e) RUC Bids. In the event the CAISO removes a Bid from an IFM run, the RUC Availability Bid associated with the removed IFM Bid may still be accepted for the corresponding RUC run, unless the CAISO determines that the RUC Availability Bid is the cause of the disruption.

(f) **RTM Bids.** If the CAISO removes a Bid in the advisory RTUC or RTD runs during the Real-Time Market, the CAISO may still use the removed Bid in the binding runs of the Real-Time Market for the same interval if the problems previously experienced with the Bid do not arise.

(g) **Energy Component of Ancillary Services Bids.** If the CAISO removes an Ancillary Services Bid submitted to the Real-Time Market, the CAISO may retain the associated Energy Bid for that CAISO Market run.

(h) **Settlement Consequences of Removal of Bids**

(1) **Day-Ahead Market.** In the event that a Bid is removed from the Day-Ahead Market, the Scheduling Coordinator whose Bid is removed will not be subject to Settlement for the Day-Ahead Market for the affected service.

(2) **Ancillary Services.** In the case of Ancillary Services Bids, including Submissions to Self-Provide an Ancillary Service, that are removed from the Day-Ahead Market, the Scheduling Coordinator will not receive Settlement for the Ancillary Services in the Day-Ahead Market and will not receive an opportunity cost payment in the Day-Ahead Market for the offered service.

(3) **Exceptional Dispatch.** In the event that a Bid is removed from a CAISO Market run or interval, the CAISO may subsequently be required to issue an Exceptional Dispatch for the resource, in which case the Scheduling Coordinator will receive Exceptional Dispatch Settlement as provided in Section 11.5.6.

(4) **Demand Bids.** In the event that a Demand Bid is removed from the Day-Ahead Market, because no Demand Bids for load can be submitted in the Real-Time Market, Scheduling Coordinators for the load not cleared in the Day-Ahead Market will be settled as Uninstructed Imbalance Energy as provided in Section 11.5.2.

(i) **Reporting to Affected Scheduling Coordinators.** To the extent practicable, the CAISO will contact a Scheduling Coordinator's representative before removing a Bid and advise the representative of the issues encountered with the Bid as soon as practicable, but no

later than three (3) Business Days, after the applicable Bid was removed and will provide information specifying when its Bid was removed and the nature of the disruption.

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Section 8

8. Ancillary Services

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8.3 Procurement; Certification and Testing; Contracting Period

8.3.1 Procurement of Ancillary Services

The CAISO shall operate competitive Day-Ahead and Real-Time Markets to procure Ancillary Services. The Security Constrained Unit Commitment (SCUC) and Security Constrained Economic Dispatch (SCED) applications used in the Integrated Forward Market (IFM) and the Real-Time Market (RTM) shall calculate optimal resource commitment, Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services Awards and Schedules at least cost to End-Use Customers consistent with maintaining System Reliability. Any Scheduling Coordinator representing resources, System Units, Participating Loads, Proxy Demand Resources or imports of System Resources may submit Bids into the CAISO's Ancillary Services markets provided that it is in possession of a current certificate for the resources concerned. Regulation Up, Regulation Down, and Operating Reserves necessary to meet CAISO requirements not met by self-provision will be procured by the CAISO as described in this CAISO Tariff. The amount of Ancillary Services procured in the IFM is net of (i) Self-Provided Ancillary Services from resources internal to the CAISO Balancing Authority Area (which includes Pseudo-Ties of Generating Units to the CAISO Balancing Authority Area) and Dynamic System Resources certified to provide Ancillary Services and (ii) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The amount of Ancillary Services procured in the Real-Time Market is net of (i) available awarded Day-Ahead Ancillary Services, (ii) Self-Provided Ancillary Services from resources internal to the CAISO Balancing Authority Area (which

includes Pseudo-Ties of Generating Units to the CAISO Balancing Authority Area) and Dynamic System Resources certified to provide Ancillary Services, (iii) additional Operating Reserves procured in the FMM, and (iv) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The CAISO may procure incremental Ancillary Services in the Real-Time Market based in part on a determination during the FMM that any Ancillary Services capacity awarded or self-provided in the Day-Ahead Market is not available as a result of a resource constraint or Transmission Constraints. Resource constraints may include but are not limited to an Outage of a resource or Ramp Rate constraints. Incremental procurement in the Real-Time Market will exclude Ancillary Services Capacity the CAISO has determined is not available.

The CAISO will manage the Energy from both CAISO-procured and Self-Provided Ancillary Services as part of the FMM and Real-Time Dispatch. In the Day-Ahead Market, the CAISO procures one-hundred (100) percent of its Ancillary Service requirements based on the Day-Ahead Demand Forecast net of Self-Provided Ancillary Services. After the Day-Ahead Market, the CAISO procures additional Ancillary Services needed to meet system requirements from all resources in the Real-Time Market. The amount of Ancillary Services procured in the Real-Time Market is based on the CAISO Forecast of BAA Demand for the CAISO for the Operating Hour net of Self-Provided Ancillary Services.

Awards of AS in the RTM to Non-Dynamic System Resources are for the entire next Operating Hour. The CAISO procurement of Ancillary Services from all other resources in the Real-Time Market is for a fifteen (15) minute FMM interval. The CAISO's procurement of Ancillary Services from Non-Dynamic System Resources, Dynamic System Resources and internal Generation (which includes Generation from Generating Units that are Pseudo-Ties to the CAISO Balancing Authority Area) in the Real-Time Market is based on the Ancillary Service Bids submitted or generated in the RTM consistent with the requirements in Section 30. The CAISO may also procure Ancillary Services pursuant to the requirements in Section 42.1 and as permitted under the terms and conditions of a Reliability Must-Run Contract.

The CAISO will contract for long-term Voltage Support service with owners of Reliability Must-Run Units under Reliability Must-Run Contracts. These requirements and standards apply to all Ancillary Services whether self-provided or procured by the CAISO.

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8.4 Technical Requirements for Providing Ancillary Services

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8.4.1.1 Regulation

A resource offering Regulation must have the following operating characteristics and technical capabilities:

(a) it must be capable of being controlled and monitored by the CAISO EMS by means of the installation and use of a standard CAISO direct communication and direct control system, a description of which and criteria for any temporary exemption from which, the CAISO shall publish on the CAISO Website;

(b) it must be capable of achieving at least the Ramp Rates (increase and decrease in MW/minute) stated in its Bid for the full amount of Regulation capacity offered;

(c) the Regulation capacity offered must not exceed the maximum Ramp Rate (MW/minute) of that resource times ten (10) minutes;

(d) the resource to CAISO Control Center telemetry must, in a manner meeting CAISO standards, include indications of whether the resource is on or off CAISO EMS control at the resource terminal equipment;

(e) the resource must be capable of the full range of movement within the amount of Regulation capability offered without manual resource operator intervention of any kind;

(f) each Ancillary Service Provider must ensure that its CAISO EMS control and related SCADA equipment for its resource are operational throughout the time period during which Regulation is required to be provided;

(g) Regulation capacity offered must be dispatchable on a continuous basis for at least sixty (60) minutes in the Day-Ahead Market and at least thirty (30) minutes in the Real-Time Market after issuance of the Dispatch Instruction. The CAISO will measure continuous

Energy from the time a resource reaches its award capacity. In the Real-Time Market, where a storage resource using the Non-Generator Resource model will not have sufficient State of Charge to meet its Ancillary Services Schedule, Imbalance Reserves Award, or RUC Award, the CAISO will dispatch the storage resource to have sufficient State of Charge to meet its Ancillary Services Schedule, Imbalance Reserves Award, or RUC Award. Scheduling Coordinators for Non-Generator Resources located within the CAISO Balancing Authority Area that require Energy from the Real-Time Market to offer their full capacity as Regulation may request the use of Regulation Energy Management as described in Section 8.4.1.2; and

(h) Regulation capacity offered must meet or exceed the minimum performance threshold of twenty-five (25) percent measured accuracy as specified in Section 8.2.3.1.1.

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Section 11

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11.2 Settlement of Day-Ahead Market Transactions

All transactions in the IFM and RUC as specified in the Day-Ahead Schedule, AS Awards and RUC Awards, respectively, are financially binding and will be settled based on the Day-Ahead LMP, ASMP or RUC Price for the relevant Location for the specific resource or transaction identified for the Bid. The CAISO will settle the costs of Demand, Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services as separate Settlement charges and payments for each Settlement Period as appropriate.

11.2.1 IFM Settlements

11.2.1.1 IFM Payments for Supply of Energy and Imbalance Reserves

For each Settlement Period for which the CAISO clears Energy transactions in the IFM, the CAISO shall pay the relevant Scheduling Coordinator for the MWh quantity of Supply of Energy from all Generating Units, Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, Distributed Energy Resource Aggregations and System Resources in an amount equal to the IFM LMP at the applicable PNode or Aggregated PNode multiplied by the MWh quantity specified in the Day-Ahead Schedule for Supply (which consists of the Day-Ahead Scheduled Energy).

For each Settlement Period for which the CAISO clears Imbalance Reserves transactions in the IFM, the CAISO pays Scheduling Coordinators representing Generating Units, Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, Distributed Energy Resource Aggregations and System Resources the product of the: (a) Locational IRU Price or Locational IRD Price at the applicable PNode or Aggregated PNode; and (b) MW quantity of the awarded IRU or IRD.

For each Settlement Period for which the CAISO clears Imbalance Reserves transactions in the IFM, the CAISO pays the congestion revenue from Transmission Constraints binding in the up and down deployment scenarios for Imbalance Reserves calculated per Section 31.3.1.6.4 to the EDAM Entity Scheduling Coordinator to distribute per the EDAM Entity's OATT or, for the CAISO BAA, as specified in Section 11.2.4.

11.2.1.1.1 Greenhouse Gas in the IFM

Scheduling coordinators for resources that receive an IFM attribution to serve Demand in a GHG Regulation Area will receive a GHG settlement in the applicable Settlement Period. The GHG settlement is the product of the IFM attribution to serve Demand in a specific GHG Regulation Area and the applicable IFM Marginal GHG Cost for that respective GHG Regulation Area. For a resource within a GHG Regulation Area that does not receive an attribution to served Demand in another GHG Regulation Area, the cost of GHG compliance is embedded in the resource's LMP.

11.2.1.2 IFM Charges for Demand at LAPS

For each Settlement Period that the CAISO clears Energy transactions in the IFM, except as specified in Section 30.5.3.2 and except for Participating Loads, which shall be subject to the charges specified in 11.2.1.3, the CAISO shall charge Scheduling Coordinators for the MWh quantity of Demand scheduled at an individual LAP in the Day-Ahead Schedule, in an amount equal to the IFM LMP for the applicable LAP multiplied by the MWh quantity scheduled in the Day-Ahead Schedule at the relevant LAP. The applicable Default LAP IFM LMP is as described in Section 27.2.2. For Scheduling Coordinators whose Demand scheduled at the individual LAP is subject to an upward price correction as specified in Section 11.21, the CAISO will use the Price Correction Derived LMP to settle the MWh quantity of Demand scheduled in the Day-Ahead Schedule at the relevant LAP.

11.2.1.3 IFM Charges for Demand by Participating Loads, Including Aggregated Participating Load

For each Settlement Period that the CAISO clears Energy transactions in the IFM for Demand by Participating Loads, the CAISO shall charge the Scheduling Coordinators an amount equal to the MWh quantity of Demand scheduled in the Day-Ahead Schedule for the relevant Participating Load at the PNode (or Custom LAP, in the case of Aggregated Participating Load), multiplied by the IFM LMP at that PNode (or Custom LAP, in the case of Aggregated Participating Load). The Custom LAP Price is determined as described in Section 27.2.2. For Scheduling Coordinators whose Demand scheduled at the individual PNode or Custom LAP is subject to an upward price correction as specified in Section 11.21, the CAISO will use the Price Correction Derived LMP to settle the MWh quantity scheduled in the Day-Ahead Schedule for that Scheduling Coordinator at the relevant PNode or Custom LAP.

11.2.1.4 IFM Charges for Energy Exports at Scheduling Points

For each Settlement Period that the CAISO clears Energy transactions in the IFM, the CAISO shall charge Scheduling Coordinators for the Energy export MWh quantity at individual Scheduling Points scheduled in the Day-Ahead Schedule, an amount equal to the IFM LMP for the applicable Scheduling Point multiplied by the MWh quantity at the individual Scheduling Point scheduled in the Day-Ahead Schedule. For Scheduling Coordinators whose exports scheduled at the individual Scheduling Points is subject to an upward price correction as specified in Section 11.21, the CAISO will use the Price Correction Derived LMP to settle the MWh quantity of Energy exports scheduled in the Day-Ahead Schedule at the relevant Scheduling Point.

11.2.1.5 IFM Congestion Credit for ETCs, TORs, and Converted Rights

For all Points of Receipt and Points of Delivery pairs associated with a valid and balanced ETC Self-Schedule, TOR Self-Schedule or Converted Rights Self-Schedule, the CAISO shall not impose any charge or make any payment to the Scheduling Coordinator related to the MCC associated with such Self-Schedules. For each Scheduling Coordinator, the CAISO shall determine the applicable IFM Congestion Credit, which can be positive or negative, as the sum of the products of the quantity scheduled in the Day-Ahead Schedule and the MCC at each eligible Point of Receipt and Point of Delivery associated with the valid and balanced portions of that Scheduling Coordinator's ETC, TOR, and Converted Rights Self-Schedules.

11.2.1.6 Allocation of IFM Marginal Losses Surplus Credit

On each Settlement Statement, the CAISO shall apply the IFM Marginal Losses Surplus Credit to each Scheduling Coordinator for the period of each Settlement Statement. For each Settlement Period, the IFM Marginal Losses Surplus Credit shall be the product of the IFM Marginal Losses Surplus rate ($/MWh) and the MWh of Measured Demand for the relevant Scheduling Coordinator net of that Scheduling Coordinator's (1) Measured Demand associated with a TOR Self-Schedule subject to the IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules as provided in Section 11.2.1.7; and (2) Measured Demand associated with a TOR Self-Schedule subject to the RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules as provided in Section 11.5.7.2.

The IFM Marginal Losses Surplus rate shall be equal to the total IFM Marginal Losses Surplus ($) divided

by the sum of the total MWh of Measured Demand in the CAISO Balancing Authority Area for the relevant Settlement Period net of (1) any Measured Demand associated with a TOR Self-Schedule subject to the IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules as provided in Section 11.2.1.7; and (2) any Measured Demand associated with a TOR Self-Schedule subject to the RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules as provided in Section 11.5.7.2.

11.2.1.7 IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules

For all Points of Receipt and Points of Delivery pairs associated with a valid and balanced TOR Self-Schedule submitted pursuant to an existing agreement between the TOR holder and either the CAISO or a Participating TO as specified in Section 17.3.3, the CAISO shall not impose any charge or make any payment to the Scheduling Coordinator related to the MCL associated with such TOR Self-Schedules and will instead impose any applicable losses charges as specified in the existing agreement between the TOR holder and either the CAISO or a Participating TO applicable to the relevant TOR. In any case in which the TOR holder has an existing agreement regarding its TORs with either the CAISO or a Participating TO, the provisions of the agreement shall prevail over any conflicting provisions of this Section 11.2.1.7. Where the provisions of this Section 11.2.1.7 do not conflict with the provisions of the agreement, the provisions of this Section 11.2.1.7 shall apply to the subject TORs. For each Scheduling Coordinator, the CAISO shall determine the applicable IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules, which can be positive or negative, as the sum of the products of the quantity scheduled in the Day-Ahead Schedule and the MCL at each eligible Point of Receipt and Point of Delivery associated with the valid and balanced portions of that Scheduling Coordinator's TOR Self-Schedules.

11.2.1.8 Charges for Unavailable Imbalance Reserves

As provided in this Section 11.2.1.8, the CAISO charges resources with Imbalance Reserves Awards when some portion of the Imbalance Reserves Award is unavailable to the CAISO. Charges assessed pursuant to this Section 11.2.1.8 for unavailable IRU and IRD awards are subtracted from the separate allocations of IRU and IRD costs, respectively, pursuant to Section 11.2.1.9.

11.2.1.8.1 Charges for Unavailable IRU awards

A resource's unavailable IRU quantity is the amount, if any, by which the resource's Day-Ahead Schedule

for Supply plus Ancillary Services Awards other than for Regulation Down plus the IRU award minus the Five-Minute Imbalance Reserve Quantity exceeds the resource's Upper Economic Limit as adjusted by applicable Outages in the FMM. The CAISO charges a resource with an unavailable IRU quantity the product of the unavailable quantity and the higher of the FMM Flexible Ramp Up Price or the resource's Locational IRU Price.

11.2.1.8.2 Charges for Unavailable IRD awards

A resource's unavailable IRD quantity is the amount, if any, by which the resource's Lower Economic Limit as adjusted by applicable Outages in the FMM exceeds the resource's Day-Ahead Schedule for Supply minus the Ancillary Services Awards for Regulation Down minus the IRD award plus the Five-Minute Imbalance Reserve Quantity. The CAISO charges a resource with an unavailable IRD quantity the product of the unavailable quantity and the higher of the FMM Flexible Ramp Down price or the resource's Locational IRD Price.

11.2.1.8.3 Priority of Charges When a Resource is Unavailable for both Imbalance Reserves and Reliability Capacity

For Settlement Periods in which a resource receives both a RUC Award and Imbalance Reserves Award and is unavailable in the RTM, or only bids a portion of its combined award in the RTM, the CAISO first applies charges per Section 11.2.2.2 to the quantity of unavailable Reliability Capacity and then applies charges per this Section 11.2.1.8 to the remaining unavailable capacity. If a resource has an Ancillary Services Award, RUC Award, and Imbalance Reserves Award in the same Settlement Period and is unavailable in the RTM, then the CAISO first determines any unavailable quantities pursuant to this Section 11.2.1.8.3 and then applies the rescission rules in Section 11.10.9.

11.2.1.9 Allocation of Imbalance Reserves Costs The CAISO allocates the separate costs of IRU and IRD through distinct two-tiered allocations. For IRU, the costs allocated include the direct costs of procuring IRU, as reflected by the summation of the product of each Imbalance Reserves Award for IRU and its Locational IRU Price, and the congestion revenue calculated per Section 31.3.1.6.4 from transmission constraints binding in the up deployment scenario for Imbalance Reserves. For IRD, the costs allocated include both the direct costs, as reflected by the summation of the product of each Imbalance Reserves Award for IRD and its Locational IRD Price, of procuring IRD and the congestion

revenue calculated per Section 31.3.1.6.4 from transmission constraints binding in the down deployment scenario for imbalance reserves.

A Scheduling Coordinator's allocation of IRU costs in tier 1 is the product of its IRU tier 1 cost allocation quantity, as specified in Section 11.2.1.9.1, and its IRU tier 1 cost allocation price, as specified in Section 11.2.1.9.3. A Scheduling Coordinator's allocation of IRD costs in tier 1 is the product of its IRD tier 1 cost allocation quantity, as specified in Section 11.2.1.9.2, and its IRD tier 1 cost allocation price, as specified in Section 11.2.1.9.4.

The CAISO allocates the costs of Imbalance Reserves procurement not recovered through the IRU or IRD tier 1 cost allocations to Scheduling Coordinators in Tier 2 in proportion to their metered Demand in the interval for which the CAISO procured the Imbalance Reserves. For ETC and TOR self-schedules, the CAISO treats quantities above the valid and balanced portion as metered Demand subject to cost allocation in Tier 2.

11.2.1.9.1 IRU Tier 1 Cost Allocation Quantity

A Scheduling Coordinator's total IRU tier 1 cost allocation quantity is the sum of the tier 1 quantities for the entities it represents specified as follows.

The IRU tier 1 cost allocation quantity for Generating Units, Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, Distributed Energy Resource Aggregations and System Resources that are not scheduled as a Wheeling Through transaction is the higher of: (a) zero; and (b) the difference between the Energy portion of the Day-Ahead Schedule and the FMM Upper Economic Limit (as adjusted by Outages, a reduction in VER forecast from the Day-Ahead Market to FMM, or the E-Tag transmission profile used by the Real-Time Market).

For non-Participating Load, the IRU tier 1 cost allocation quantity is its negative Uninstructed Imbalance Energy quantity, if any.

The IRU tier 1 cost allocation quantity for an entity exporting Energy, excluding wheel through transactions, is the higher of: (a) zero; and (b) the difference between the FMM self-schedule and Energy portion of the Day-Ahead Schedule.

11.2.1.9.2 IRD Tier 1 Cost Allocation Quantity

A Scheduling Coordinator's total IRD tier 1 cost allocation quantity is the sum of the tier 1 quantities for

the entities it represents, specified as follows.

The IRD tier 1 cost allocation quantity for Generating Units, Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, Distributed Energy Resource Aggregations and System Resources that are not scheduled as a Wheeling Through transaction is the higher of: (a) zero; and (b) the difference between the FMM Lower Economic Limit (as adjusted by Outages, a reduction in VER forecast from the Day-Ahead Market to FMM, or the E-Tag transmission profile used by the Real-Time Market) and the Energy portion of the Day-Ahead Schedule.

For non-Participating Load, the IRD tier 1 cost allocation quantity is its positive Uninstructed Imbalance Energy quantity, if any.

The IRD tier 1 cost allocation quantity for an entity exporting Energy from the CAISO Balancing Authority Area is the higher of: (a) zero; and (b) the difference between the Energy portion of the Day-Ahead Schedule and the E-Tag transmission profile used by the Real-Time Market).

11.2.1.9.3 IRU Tier 1 Cost Allocation Price

The IRU tier 1 cost allocation price in an interval is the lower of: (a) the total IRU cost, as adjusted by charges assessed per Section 11.2.1.8.1, divided by the total MWs of IRU procured; and (b) the total IRU cost, as adjusted by charges assessed per Section 11.2.1.8.1, divided by the total IRU tier 1 allocation quantity.

11.2.1.9.4 IRD Tier 1 Cost Allocation Price

The IRD tier 1 cost allocation price in an interval is the lower of: (a) the total IRD cost, as adjusted by charges assessed per Section 11.2.1.8.2, divided by the total MWs of IRD procured; and (b) the total IRD cost, as adjusted by charges assessed per Section 11.2.1.8.2, divided by the total IRD tier 1 allocation quantity.

11.2.1.9.5 Imbalance Reserves Cost Allocation to MSSs

The CAISO allocates costs of Imbalance Reserves to a MSS in the same fashion as any other Scheduling Coordinator irrespective of the MSS's election, per Section 4.9.13, of net Settlements or gross Settlements.

The CAISO allocates costs of Imbalance Reserves to a MSS that has elected, per Section 4.9.13, to Load follow with its generating resources based on the MSS's net portfolio Uninstructed Deviations in tier 1 and

tier 2 of the IRU and IRD cost allocation based on the MSS's net portfolio Uninstructed Deviations.

11.2.2 Calculation of Hourly RUC Compensation

For each Settlement Period and resource, Scheduling Coordinators shall receive RUC Compensation, which is the sum of the RUC Availability Payment as determined pursuant to Section 11.2.2.1 and the RUC Bid Cost Recovery amount as determined in Section 11.8.3.

11.2.2.1 Settlement of RUC Availability Payment

Scheduling Coordinators shall receive RUC Availability Payments for all eligible capacity awarded in the RUC process. RMR Capacity is not eligible for RUC Availability Payments in the DAM. The RUC Availability Payment shall be calculated for each resource as the product of the RCU Availability Quantity and the RUC Price for RCU or the product of the RCD Availability Quantity and the RUC Price for RCD. The RUC Availability Payment amounts are allocated through the RUC Compensation Costs allocation in Section 11.8.6.5.

The CAISO provides a RUC Availability Payment to a Scheduling Coordinator for a MSS the same as any other Scheduling Coordinator irrespective of the MSS's election, per Section 4.9.13, of net Settlements or gross Settlements.

11.2.2.2 Rescission of RUC Availability Payment

Rescission of all or a portion of the RUC Availability Payment for a resource as defined in Section 31.5.7 shall be settled in accordance with this Section 11.2.2.2.

11.2.2.2.1 Undispatchable RUC Capacity

The CAISO rescinds the RUC Availability Payment in a Settlement Interval for Undispatchable Capacity related to Reliability Capacity.

In a settlement interval, a Generating Unit, Participating Load, Proxy Demand Resource, System Unit or System Resource has Undispatchable Capacity for RCU to the extent the Energy portion of the Day-Ahead Schedule plus Ancillary Services Awards other than for Regulation Down plus the IRU award plus the RCU award exceeds the lower of the resource's Upper Economic Limit or upper operating limit.

In a settlement interval, a Generating Unit, Participating Load, Proxy Demand Resource, System Unit or System Resource has Undispatchable Capacity for RCD to the extent the resource's Lower Economic Limit exceeds the Energy portion of the Day-Ahead Schedule minus the Ancillary Services Awards for

Regulation Down minus the IRD award minus the RCD award.

The CAISO evaluates a Multi-Stage Generating Resource for Undispatchable Capacity related to Reliability Capacity for the entire Generating Unit and not for the MSG Configuration.

11.2.2.2.2 [Not Used]

11.2.2.2.3 Allocation of Rescinded RUC Availability Payments Due to Non-Performance

RUC Availability Payments rescinded due to Undispatchable Capacity are subtracted from the RUC Compensation Costs allocated per Section 11.8.6.5.3.

11.2.3 IFM Energy Charges and Payments for Metered Subsystems

11.2.3.1 Gross Energy Settlement for Metered Subsystems

For Scheduling Coordinators that submit Bids for MSS Operators that have selected gross Energy Settlement, CAISO shall settle Energy, the MSS Demand and MSS Supply, in the Day-Ahead Schedules pursuant to Section 11.2.3.1.1 and 11.2.3.1.2.

11.2.3.1.1 IFM Charges for MSS Demand under Gross Energy Settlement

The CAISO shall charge Scheduling Coordinators that submit Bids for MSS Operators that have selected or are subject to gross Energy Settlement an amount equal to the product of the MWh quantity of Demand internal to the MSS in its Day-Ahead Schedule at the price at the Default LAP where the MSS LAP is located.

11.2.3.1.2 IFM Payments for MSS Supply under Gross Energy Settlement

The CAISO shall pay Scheduling Coordinators that submit Bids for MSS Operators that have selected or are subject to gross Energy Settlement an amount equal to the product of the MWh quantity of Supply from the MSS in its Day-Ahead Schedule at the corresponding PNode and the applicable IFM LMP.

11.2.3.1.3 IFM Payments for MSSs providing Imbalance Reserves

A MSS that receives an Imbalance Reserves Award will be settled per Section 11.2.1.1 irrespective of that MSS's election under Section 4.9.13 of net or gross Settlement.

11.2.3.2 Net Energy Settlement for Metered Subsystems

For Scheduling Coordinators that submit Bids for MSS Operators that have selected net Energy Settlement, the CAISO shall settle the net MSS Demand and MSS Supply in the Day-Ahead Schedules

pursuant to Section 11.2.3.2.1 and 11.2.3.2.2.

11.2.3.2.1 IFM Charges for MSS Demand under Net Energy Settlement

The CAISO shall charge Scheduling Coordinators that submit Bids for MSS Operators that have selected net Energy Settlement an amount equal to the product of the net MSS Demand in the Day-Ahead Schedule and the IFM MSS Price. The net MSS Demand is the quantity of MSS Demand that exceeds MSS Generation for the applicable MSS.

11.2.3.2.2 IFM Payment for MSS Supply under Net Energy Settlement

The CAISO shall pay Scheduling Coordinators that submit Bids for MSS Operators that have selected net Energy Settlement an amount equal to the product of the net MSS Supply in the Day-Ahead Schedule and the weighted average price of all IFM LMPs for all applicable PNodes within the relevant MSS. The net MSS Supply is the quantity of MSS Generation that exceeds the MSS Demand for the applicable MSS. The weights used to compute the weighted average LMPs shall be equal to MSS Generation scheduled in the Day-Ahead Schedule.

11.2.4 CRR Settlements

The CAISO will pay or charge CRR Holders as further specified in this Section 11.2.4 and its subsections.

11.2.4.1 Calculation of the IFM Congestion Charge

For each Settlement Period of the IFM, the CAISO will calculate the IFM Congestion Charge as the IFM MCC amount for all scheduled Demand and Virtual Demand Awards, minus the IFM MCC amount for all scheduled Supply and Virtual Supply Awards.

The IFM MCC amount for all scheduled Demand and Virtual Demand Awards is the sum of part (a), part (b), and part (c) of this Section 11.2.4.1.

The IFM MCC amount for all scheduled Supply and Virtual Supply Awards is the sum of part (d), part (e) and part (f) of this Section 11.2.4.1.

Part (a) is the sum of the products of the IFM MCC of Energy and the total MWh of Demand scheduled in the Day-Ahead Schedule and Virtual Demand Awards at all the applicable PNodes and Aggregated Pricing Nodes for the Settlement Period.

Part (b) is the sum of the products of the MCC for the Locational IRU Price and the nodally distributed Upward Imbalance Reserves Requirement specified in Section 31.3.1.6.3.2, as adjusted by any

procurement relaxation specified in Section 31.3.1.6.2.

Part (c) is the sum of the products of the MCC for the Locational IRD Price and the nodally distributed Downward Imbalance Reserves Requirement specified in Section 31.3.1.6.3.2, as adjusted by any procurement relaxation specified in Section 31.3.1.6.2.Part (d) is the sum of the products of the IFM MCC and the total of the MWh of Supply scheduled in the Day-Ahead Schedule and the Virtual Supply Awards at all the applicable PNodes for the Settlement Period.

Part (e) is the sum of the products of the MCC for the Locational IRU Price and the IRU Awards.

Part (f) is the sum of the products of the MCC for the Locational IRD Price and the IRD Awards.

11.2.4.1.1 [Not Used]

11.2.4.1.2 Calculation of Hourly CRR Congestion Fund

The CAISO calculates an Hourly CRR Congestion Fund for every Transmission Constraint that is congested in the IFM in a Settlement Period. The Hourly CRR Congestion Fund specific to a particular binding Transmission Constraint in a given Settlement Period is the sum of the: (a) portion of the IFM Congestion Charge in that Settlement Period attributable to congestion on the Transmission Constraint to which the Hourly CRR Congestion Fund corresponds; (b) charges specific to the Transmission Constraint calculated pursuant to Section 11.2.4.4.1; and (c) CRR revenue adjustments the CAISO may make pursuant to Sections 11.2.4.6 or 11.2.4.7 that are associated with the Transmission Constraint.

11.2.4.2 Settlement Calculation for the Different CRR Types

For the purposes of settling the various CRR Types, the CAISO will calculate the Settlement of CRRs as described in this Section 11.2.4.2. When a CRR Source or CRR Sink is a LAP, the CAISO will use the Load Distribution Factors used in the IFM to produce the LAP Price at which it will settle the CRR. When a CRR Source or CRR Sink is a Trading Hub, the CAISO will use the weighting factors used in the IFM, and in the CRR Allocation and CRR Auction processes, to produce the Trading Hub prices that it will use to settle the various CRR Types.

11.2.4.2.1 [Not Used]

11.2.4.2.2 [Not Used]

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11.2.6 DAME Transition Period

11.2.6.1 Opting In to DAME Transitional Measures

The CAISO applies DAME Transitional Measures to RA Capacity and Flexible RA Capacity provided from Resource Adequacy Resources if the CAISO receives notice, in the form and manner specified in the Business Practice Manual, from both the resource's Scheduling Coordinator and the LSE's Scheduling Coordinator that they mutually elect for the CAISO to apply DAME Transitional Measures to the RA Capacity and Flexible RA Capacity the resource provides on behalf of the LSE.

An election for DAME Transitional Measures is tied to a specific resource/LSE pair and applies to all RA Capacity and Flexible RA Capacity shown on behalf of the LSE on a monthly Supply Plan for the resource submitted during the DAME Transition Period. The same resource may be part of multiple resource/LSE pairs subject to DAME Transitional Measures.

The CAISO applies DAME Transitional Measures to a resource/LSE pair retroactive to the effective date of this Section 11.2.6 if the Scheduling Coordinators for the resource and LSE complete the DAME Transitional Measures election process within sixty (60) days of the effective date of this Section 11.2.6. If the Scheduling Coordinators for a resource and LSE complete the DAME Transitional Measures election process for a resource/LSE pair more than sixty (60) days after the effective date of this Section 11.2.6, then the CAISO applies DAME Transitional Measures to the resource/LSE pair prospectively starting with the first Trading Day of the month after the month in which the Scheduling Coordinators completed the election process. Upon mutual consent of the Scheduling Coordinator for both the resource and LSE, a resource/LSE pair may end application of DAME Transitional Measures before the end of the DAME Transition Period. Such early termination of DAME Transitional Measures does not preclude re-electing application of DAME Transitional Measures later within the DAME Transition Period.

11.2.6.2 Calculating Quantity of Overlapping Capacity in a Settlement Period

As specified in this Section 11.2.6.2, the CAISO determines in each Settlement Period how much of the RA Capacity and Flexible RA Capacity subject to DAME Transitional Measures overlaps separately with the subject resource's Imbalance Reserves Award for IRU, RUC Award for RCU, Imbalance Reserves Award for IRD, and RUC Award for RCD.

11.2.6.2.1 Overlapping Capacity for IRU

The quantity of overlapping IRU is the lower of the: (1) Imbalance Reserves Award for IRU; or (2) higher of the RA Capacity or Flexible RA Capacity shown on that resource's monthly Supply Plan minus the Energy Schedule minus the Ancillary Services Awards other than for Regulation Down. Provided, however, that the quantity of overlapping IRU cannot be less than zero.

11.2.6.2.2 Overlapping Capacity for RCU

The quantity of overlapping RCU is the lower of the: (1) RUC Award for RCU; or (2) higher of the RA Capacity or Flexible RA Capacity shown on that resource's monthly Supply Plan minus the Energy Schedule minus the Ancillary Services Awards other than for Regulation Down minus the Imbalance Reserves Award for IRU. Provided, however, that the quantity of overlapping RCU cannot be less than zero.

11.2.6.2.3 Overlapping Capacity for IRD

The quantity of overlapping IRD is the lower of the: (1) Imbalance Reserves Award for IRD; or (2) Energy Schedule minus the award for Regulation Down minus the higher of the RA Capacity or Flexible RA Capacity shown on that resource's monthly Supply Plan. Provided, however, that the quantity of overlapping IRD cannot be less than zero.

11.2.6.2.4 Overlapping Capacity for RCD

The quantity of overlapping RCD is the lower of the: (1) RUC Award for RCD; or (2) Energy Schedule minus the award for Regulation Down minus the Imbalance Reserves Award for IRD minus the higher of the RA Capacity or Flexible RA Capacity shown on that resource's monthly Supply Plan. Provided, however, that the quantity of overlapping RCD cannot be less than zero.

11.2.6.3 Settlement of Overlapping Capacity Subject to DAME Transitional Measures

11.2.6.3.1 Settlement of Overlapping IRU

The CAISO allocates the revenue from the overlapping IRU, calculated as the product of the quantity of overlapping IRU and the applicable Locational IRU Price, partially to the Scheduling Coordinator for the LSE and partially to the Scheduling Coordinator for the resource.

The CAISO allocates the opportunity cost component of that revenue, calculated as the integral of the positive difference between the Energy LMP and the Energy Bid over the capacity range of the

overlapping IRU, to the Scheduling Coordinator for the resource.

The CAISO allocates the balance of the revenue from the overlapping IRU to the Scheduling Coordinator for the LSE. If the resource is part of multiple resource/LSE pairs subject to DAME Transitional Measures, then the CAISO allocates that balance of the revenue to the LSEs in proportion to the higher of each LSE's RA Capacity or Flexible RA Capacity obligation met by that resource.

11.2.6.3.2 Settlement of Overlapping RCU

The CAISO allocates the revenue from the overlapping RCU, calculated as the product of the quantity of overlapping RCU and the applicable RUC Price for RCU, to the Scheduling Coordinator for the LSE.

If the resource is part of multiple resource/LSE pairs subject to DAME Transitional Measures, then the CAISO allocates that revenue to the LSEs in proportion to the higher of each LSE's RA Capacity or Flexible RA Capacity obligation met by that resource.

11.2.6.3.3 Settlement of Overlapping IRD

The CAISO allocates the revenue from the overlapping IRD, calculated as the product of the quantity of overlapping IRD and the applicable Locational IRD Price, partially to the Scheduling Coordinator for the LSE and partially to the Scheduling Coordinator for the resource.

The CAISO allocates the opportunity cost component of that revenue, calculated as the integral of the positive difference between the Energy Bid over the capacity range of the overlapping IRD and the Energy LMP, to the Scheduling Coordinator for the resource.

The CAISO allocates the balance of the revenue from the overlapping IRD to the Scheduling Coordinator for the LSE. If the resource is part of multiple resource/LSE pairs subject to DAME Transitional Measures, then the CAISO allocates that balance of the revenue to the LSEs in proportion to the higher of each LSE's RA Capacity or Flexible RA Capacity obligation met by that resource.

11.2.6.3.4 Settlement of Overlapping RCD

The CAISO allocates the revenue from the overlapping RCD, calculated as the product of the quantity of overlapping RCD and the applicable RUC Price for RCD, to the Scheduling Coordinator for the LSE.

If the resource is part of multiple resource/LSE pairs subject to DAME Transitional Measures, then the CAISO allocates that revenue to the LSEs in proportion to the higher of each LSE's RA Capacity or Flexible RA Capacity obligation met by that resource.

11.2.6.4 Information Provision for RA Capacity Not Subject to DAME Transitional Measures

For RA Capacity and Flexible RA Capacity not subject to DAME Transitional Measures either because the capacity is not covered by a valid election under Section 11.2.6.1 or because the DAME Transition Period has expired, the CAISO provides the Scheduling Coordinator for LSEs whose RA and Flexible RA obligations are met with that capacity information regarding the opportunity costs described in Section 11.2.6.3.1 and 11.2.6.3.3 and the Imbalance Reserves and Reliability Capacity revenue from that overlapping capacity.

11.3 Settlement of Virtual Awards

11.3.1 Virtual Supply Awards

The CAISO will pay each Scheduling Coordinator with Virtual Supply Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the Day-Ahead LMP at the Eligible PNode or Eligible Aggregated PNode multiplied by the MWhs of Virtual Supply Awards. Virtual Supply Awards subject to price correction will be settled as specified in Section 11.21.

The CAISO will charge each Scheduling Coordinator with Virtual Supply Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the product of the MWhs of Virtual Supply Awards and the simple average of the four FMM LMPs for the applicable Trading Hour at the Eligible PNode or Eligible Aggregated PNode.

The CAISO pays or charges, depending on whether the value is positive or negative, the product of the virtual Forecasted Movement quantity and the difference between the FMM Flexible Ramp Up Price and the FMM Flexible Ramp Down Price.

11.3.2 Virtual Demand Awards

The CAISO will charge each Scheduling Coordinator with Virtual Demand Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the Day-Ahead Market LMP at the Eligible PNode or Eligible Aggregated PNode multiplied by the MWhs of Virtual Demand Awards. Virtual Demand Awards subject to price correction will be settled as specified in Section 11.21.

The CAISO will pay each Scheduling Coordinator with Virtual Demand Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the product of the MWhs of Virtual Demand Awards and

the simple average of the four FMM LMPs for the applicable Trading Hour at the Eligible PNode or Eligible Aggregated PNode.

The CAISO pays or charges, depending on whether the value is positive or negative, the product of the virtual Forecasted Movement quantity and the difference between the FMM Flexible Ramp Up Price and the FMM Flexible Ramp Down Price.

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11.5.2 Uninstructed Imbalance Energy

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11.5.2.2 Hourly Real-Time Demand Settlement

The Default LAP Hourly Real-Time Price will apply to CAISO Demand and MSS Demand under net Settlement of imbalance energy, except for CAISO Demand not settled at the Default LAP as provided in Section 30.5.3.2, and per the methodology as may be further defined in the Business Practice Manuals. For each Settlement Interval, the differences between the Day-Ahead Scheduled CAISO Demand and metered Demand (MWh) is settled at the Default LAP Hourly Real-Time Price or the Custom LAP Hourly Real-Time Price, as appropriate. For each Default LAP, the CAISO calculates the applicable Default LAP Hourly Real-Time Price as the weighted average LMP of the four Default LAP FMM LMPs and the twelve (12) five-minute Default LAP RTD LMPs. The CAISO calculates the weighted average LMP for each Default LAP as the summation of the weighted average MEC, the weighted average MCC, and the weighted average MCL for that Default LAP. The CAISO calculates the weighted average MEC, MCC, and MCL for each applicable Trading Hour based on the four applicable Default LAP FMM MECs, MCCs, and MCLs, respectively, and the twelve (12) applicable Default LAP RTD MECs, MCCs, and MCLs, respectively. For each Custom LAP, the CAISO calculates the applicable Custom LAP Hourly Real-Time Price as the weighted average LMP of the four Custom LAP FMM LMPs and the twelve (12) five-minute Custom LAP RTD LMPs. The CAISO calculates the weighted average LMP for each Custom LAP as the

summation of the weighted average MEC, the weighted average MCC, and the weighted average MCL for that Custom LAP. The CAISO calculates the weighted average MEC, MCC, and MCL for each applicable Trading Hour based on the four applicable Custom LAP FMM MECs, MCCs, and MCLs, respectively, and the twelve (12) applicable Custom LAP RTD MECs, MCCs, and MCLs, respectively. In calculating the weighted average MEC, MCC, and MCL for each hour for either the Default LAPs or Custom LAPs, the CAISO determines the weights based on the difference between Day-Ahead Schedules at the applicable LAP and the CAISO Forecast of BAA Demand for the CAISO used in the FMM multiplied by the relevant FMM LMP at the applicable LAP plus the difference between the CAISO Forecast of BAA Demand for the CAISO used in the FMM and the CAISO Forecast of BAA Demand for the CAISO used in the RTD multiplied by the relevant RTD LMP at the applicable LAP divided by the sum of the difference between Day-Ahead Schedules at the applicable LAP and the CAISO Forecast of BAA Demand for the CAISO used in the FMM plus the difference between the CAISO Forecast of BAA Demand for the CAISO used in the FMM and the CAISO Forecast of BAA Demand for the CAISO used in the RTD. Furthermore, the Default LAP Hourly Real-Time Prices and the Custom LAP Hourly Real-Time Prices will be bounded by the maximum and the lowest LMP and its components, for the applicable Trading Hour from those relevant intervals at the relevant LAP. If the calculated price exceeds the upper boundary or is below the lower boundary, then the Default LAP Hourly Real-Time Price or the Custom LAP Hourly Real-Time Price, as appropriate, instead will be calculated based on a weighted average price with the weightings based on gross deviations (absolute value of each deviation).

The Hourly Real-Time LAP Prices are determined by the requirements in Section 27.2.2.2.

11.5.2.3 Revenue Neutrality Resulting from Changes in LAP Load Distribution Factors

Any resulting revenue from changes in the LAP Load Distribution Factors between the Day-Ahead Market and the Real-Time Dispatch shall be allocated to metered CAISO Demand in the corresponding LAP within the CAISO Balancing Authority Area and metered EDAM Demand in the corresponding LAP within an EDAM Entity Balancing Authority Area.

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11.5.4 Imbalance Energy Pricing; Non-Zero Offset Amount Allocation

11.5.4.1 EIM Transfers and Offset Allocations

EIM Transfer revenue will be collected when one Balancing Authority Area in the EIM Area provides Energy to another Balancing Authority Area in the EIM Area and the associated EIM Transfer System Resource prices differ. Congestion revenue will be collected when a Transmission Constraint or intertie scheduling limit binds at different locations of the transmission system and the LMP varies across a Balancing Authority Area in the EIM Area and across FMM and RTD LMPs from source to sink within and across the EIM Area. The CAISO will collect neutrality amounts to recover differences between Real-Time Market payments made and Real-Time Market payments received within Balancing Authority Areas in the EIM Area. The CAISO will allocate EIM Transfer revenue, Real-Time Congestion revenue, and offsets to an EIM Entity Balancing Authority Area or the CAISO Balancing Authority Area as provided below.

11.5.4.1.1 Real-Time Imbalance Energy Offset

(a) **Financial Value of EIM Transfers.** For each Balancing Authority Area in the EIM Area, the CAISO will calculate the Real-Time Market financial value of EIM Transfers as the product of the EIM Transfer MWh, either positive or negative, and the Marginal Energy Cost.

(b) **Initial Calculation.** The CAISO will initially calculate the Real-Time Imbalance Energy Offset to be recovered on a 5-minute basis for each Balancing Authority Area in the EIM Area as the sum of the financial value of EIM Transfers and the Settlement amounts for FMM Instructed Imbalance Energy and RTD Instructed Imbalance Energy, Uninstructed Imbalance Energy, and Unaccounted For Energy, and for the CAISO and EDAM Entity Balancing Authority Areas with Convergence Bidding, Real-Time Virtual Bid Settlement, plus the Real-Time Ancillary Services Congestion revenues for the CAISO, and Virtual Awards settlements in the Real-Time Market in accordance with Section 11.3, less the Real-Time Congestion Offset and less the Real-Time Marginal Cost of Losses Offset, and excluding the Marginal GHG Cost.

(c) **Allocation.** The CAISO will allocate the adjusted Real-Time Imbalance Energy Offset:

(1) for the CAISO Balancing Authority Area, to Scheduling Coordinators in the CAISO Balancing Authority Area according to Measured Demand; and

(2) for EIM Entity Balancing Authority Areas, to the applicable EIM Entity Scheduling Coordinator.

(d) **Residual Neutrality Amounts.** The CAISO will allocate any residual Real-Time Imbalance Energy Offset amount to Scheduling Coordinators in the EIM Area based upon EIM Measured Demand.

11.5.4.1.2 Real-Time Congestion Offset.

(a) **Contribution to Marginal Cost of Congestion.** For each Settlement Period of the RTM, the CAISO shall calculate the contribution of each Balancing Authority Area in the EIM Area to the Marginal Cost of Congestion at each resource location and intertie in the EIM Area for each Balancing Authority Area based on the location of the Transmission Constraints in each Balancing Authority Area, EIM Interties, and constraints enforced outside of the EIM Area needed to manage that Balancing Authority Area's responsibilities.

(b) **Real-Time Congestion Offset.** For each Settlement Period of the RTM, the CAISO shall calculate the Real-Time Congestion Offset for each Balancing Authority Area in the EIM Area as –

(1) the sum of the product of the contribution of that Balancing Authority Area as determined in subsection (a) of this section, the Marginal Cost of Congestion component of the Locational Marginal Price at each resource location in the EIM Area, and the imbalance energy at that resource location, including Virtual Bids at that resource location;

(2) minus any Virtual Bid adjustment as determined in accordance with section 11.5.4.1.1(d); and

(3) including any marginal Congestion adjustment to account for schedules associated with EDAM Legacy Contracts, EDAM Transmission Ownership Rights under Section 33.16 and Section 33.17 and registered EDAM Transmission

Service Provider transmission customer rights under Section 33.18.

(c) **Virtual Bid Adjustment.**

(1) **Individual Constraint Calculation.** For each Transmission Constraint in an EIM Entity Balancing Authority Area, the CAISO will calculate a Virtual Bid adjustment as the product of that Transmission Constraint's FMM Shadow Price and the lesser of –

(A) the Flow Impact of Virtual Bids and

(B) the Flow Impacts of all Day-Ahead Scheduled Energy and EIM Base Schedules less the Flow Impacts of FMM Schedules,

but not less than zero.

(2) **EIM Entity Balancing Authority Area Calculation.** Each EIM Entity Balancing Authority Area's Virtual Bid adjustment shall be the sum of the individual Transmission Constraint calculation for all Transmission Constraints within that EIM Entity Balancing Authority Area.

(d) **Allocation.** The CAISO will allocate –

(1) the Real-Time Congestion Offset for each EIM Entity Balancing Authority Area to the applicable EIM Entity Scheduling Coordinator;

(2) the Real-time Congestion Offset for the CAISO Balancing Authority Area in accordance with Section 11.5.4.2; and

(3) the Virtual Bid adjustment from each individual constraint calculation to each Scheduling Coordinator who submitted Virtual Bids based on that Scheduling Coordinator's Virtual Award's pro rata share of the gross positive Congestion revenues received by all Virtual Awards from that Transmission Constraint.

11.5.4.1.3 Real-Time Marginal Cost of Losses Offset

(a) **Calculation.** The CAISO will calculate the Real-Time Marginal Cost of Losses Offset for each Balancing Authority Area as the sum of the product of the Marginal Cost of Losses component of the LMP and all positive or negative FMM Instructed Imbalance Energy,

RTD Instructed Imbalance Energy, Uninstructed Imbalance Energy, and Unaccounted For Energy in the Balancing Authority Area.

(b) **Allocation.** The CAISO will allocate the amounts determined according to Section 11.5.4.1.3(a) –

(1) for the CAISO Balancing Authority Area, according to Section 11.5.4.2; and

(2) for EIM Entity Balancing Authority Areas, to the applicable EIM Entity Scheduling Coordinator.

11.5.4.1.4 Real-Time Marginal Greenhouse Gas Cost Offset.

The CAISO will calculate a five-minute Real-Time Marginal GHG Cost Offset amount in relation to each GHG Regulation Area. The five-minute Real-Time Marginal GHG Cost Offset amount will equal the product of FMM IIE, RTD IIE, UIE and UFE within a GHG Regulation Area, including Schedules for Virtual Awards; GHG attributions associated with the GHG Regulation Area and the applicable Marginal GHG Cost. The CAISO will allocate the Real-Time Marginal GHG Cost Offset amount to a GHG Regulation Area's metered Demand.

11.5.4.1.5 EIM Transfer Revenue.

(a) **Calculation.** The CAISO will calculate EIM Transfer revenue when the net EIM Transfer scheduling limit is reached in the Real-Time Market as the separation of the Marginal Energy Cost of the binding Balancing Authority Area in the EIM Area from the Marginal Energy Cost of an adjacent Balancing Authority Area in the EIM Area that is attributed to an EIM Transfer System Resource.

(b) **Allocation.** The CAISO will allocate EIM Transfer revenue by dividing the revenue equally to the Balancing Authorities on each side of the EDAM Internal Intertie as defined by the Balancing Authority Area boundary at that intertie, except when the CAISO has been notified during the implementation of the Real-Time Market within an EIM Entity Balancing Authority Area of an agreement between both EIM Entities on either side of a EIM Transfer that a different allocation for some portion of the transfer revenue is required to give effect to a pre-existing commercial arrangement, which will then be sub-allocated–

(1) for the CAISO Balancing Authority Area in accordance with the CAISO Tariff in the CAISO Balancing Authority Area, including allocation to Scheduling Coordinators for Existing Contract rights and Transmission Ownership Rights holders consistent with the terms of the agreements concerning use of the transmission facilities supporting the EIM Transfer;

(2) for an EIM Entity Balancing Authority Area that does not participate in the Day-Ahead Market in accordance with the associated EIM Transmission Service Provider tariff; and

(3) for an EIM Entity Balancing Authority Area that participates in the Day-Ahead Market depending on whether the transmission across an EIM Intertie is made available by: (a) an EDAM Entity pursuant to Section 33.18.2, 2.1 or Section 33.18.2.2.3, in which case the CAISO will allocate the EIM Transfer revenue to the EIM Entity Scheduling Coordinator for further allocation by the EIM Transmission Service Provider in accordance with its tariff, (b) an EDAM Transmission Service Provider customer pursuant to Section 33.18.2.2, in which case the CAISO will allocate the EIM Transfer revenue directly to the Scheduling Coordinator for the EDAM Transmission Service Provider customer, or (c) an EDAM Legacy Contact or EDAM Transmission Ownership Right pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Legacy Contact or EDAM Transmission Ownership Right holder, respectively.

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11.5.7 Congestion Credit and Marginal Credit of Losses Credit

11.5.7.1 RTM Congestion Credit for ETCs and TORs

The CAISO shall not apply charges or payments to Scheduling Coordinators related to the MCC associated with all Points of Receipt and Points of Delivery pairs associated with valid and balanced ETC

Self-Schedules or TOR Self-Schedules after the Day-Ahead Market. The balanced portion for each ETC or TOR contract for each Settlement Interval will be based on the difference between: (1) the minimum of (a) the total Demand, (b) the total ETC or TOR Supply Self-Schedule submitted in RTM, including changes after twenty (20) minutes before the applicable Trading Hour if such change is permitted by the Existing Contract, or (c) the Existing Contract maximum capacity as specified in the TRTC Instructions; and (2) the valid and balanced portion of the Day-Ahead Schedule. In determining the balanced portions, the CAISO evaluates the amounts based on the following variables: (a) for exports and imports, the CAISO shall use the schedule quantity specified in the Interchange schedule used for check out between CAISO and other Balancing Authority Areas; (b) for CAISO Demand, the CAISO shall use the Gross Load associated with the applicable ETC or TOR; and (c) for all Generation the CAISO shall use the quantity specified in the Dispatch Instructions. For each Scheduling Coordinator, the CAISO shall determine for each Settlement Interval the applicable RTM Congestion Credit for FMM Instructed Imbalance Energy or RTD Instructed Imbalance Energy, which can be positive or negative, as the sum of the product of the relevant MWh quantity and the applicable weighted average MCC at each Point of Receipt and Point of Delivery associated with the valid and balanced portions of that Scheduling Coordinator's ETC or TOR Self-Schedules. The weights in the two markets will be based on the absolute values of the (a) deviation of the FMM Schedule or the CAISO Forecast of BAA Demand for the CAISO used in the FMM from Day-Ahead Schedules and (b) deviation of the RTD schedule or the CAISO Forecast of BAA Demand for the CAISO used in the RTD from Day-Ahead Schedules.

11.5.7.2 RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules

For all Points of Receipt and Points of Delivery pairs associated with a valid and balanced TOR Self-Schedule submitted to the RTM pursuant to an existing agreement between the TOR holder and either the CAISO or a Participating TO as specified in Section 17.3.3, the CAISO shall not impose any charge or make any payment to the Scheduling Coordinator related to the MCL associated with such TOR Self-Schedules and will instead impose any applicable charges for losses as specified in the existing agreement between the TOR holder and either the CAISO or a Participating TO applicable to the relevant TOR. In any case in which the TOR holder has an existing agreement regarding its TORs with either the CAISO or a Participating TO, the provisions of the agreement shall prevail over any conflicting provisions

of this Section 11.5.7.2. Where the provisions of this Section 11.5.7.2 do not conflict with the provisions of the agreement, the provisions of this Section 11.5.7.2 shall apply to the subject TORs. The balanced portion of the TOR Self-Schedule after the Day-Ahead Market is the same balanced quantity mentioned in this Section 11.5.7.2 for the TOR Self-Schedule. For each Scheduling Coordinator, the CAISO shall determine for each Settlement Interval the applicable RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules for FMM Instructed Imbalance Energy and RTD Instructed Imbalance Energy, which can be positive or negative, as the sum of the product of the relevant MWh quantity and the weighted average MCL at each of the eligible Points of Receipt and Points of Delivery associated with the valid and balanced portions of that Scheduling Coordinator's TOR Self-Schedules. The weights in the two markets will be based on the absolute values of the: (a) deviation of the FMM Schedule or the CAISO Forecast of BAA Demand for the CAISO used in the FMM from Day-Ahead Schedules; and (b) deviation of the RTD schedule or the CAISO Forecast of BAA Demand for the CAISO used in the RTD from Day-Ahead Schedules. For losses that the CAISO shall charge pursuant to Section 17.3.3, the specific loss charge amount shall be the product of: (a) the specific loss percentage as may be specified in an applicable agreement between the TOR holder and the CAISO or an existing agreement between the TOR holder and a Participating TO; (b) the weighted average MEC price from the FMM and RTD markets with weights based on the absolute values of (1) deviation of FMM schedule or CAISO Forecast of BAA Demand for the CAISO used in the FMM from Day-Ahead Schedules and (2) deviation of RTD schedule or CAISO Forecast of BAA Demand for the CAISO used in the RTD from Day-Ahead Schedules; and (c) the balanced contract quantity mentioned in Section 11.5.7.1.

11.5.8 Settlement for Emergency Assistance

This Section 11.5.8 shall apply to Settlement for emergency assistance provided to or by the CAISO, not EIM Assistance Energy Transfer Surcharges. In any case in which the CAISO has entered into an agreement regarding emergency assistance, which agreement has been accepted by FERC, the provisions of the agreement shall prevail over any conflicting provisions of this Section 11.5.8. Where the provisions of this Section 11.5.8 do not conflict with the provisions of the FERC-accepted agreement, the provisions of this Section 11.5.8 shall apply to the subject emergency assistance.

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11.5.9 Flexible Ramping Product

The CAISO will settle the Flexible Ramping Product as set forth in Section 11.25.

11.5.10 Greenhouse Gas in the RTM

Resources that receive a FMM or RTD attribution to serve Demand in a GHG Regulation Area will receive a GHG settlement. The GHG settlement is the product of the FMM or RTD attribution to serve Demand in a specific GHG Regulation Area and the applicable FMM or RTD Marginal GHG Cost for that respective GHG Regulation Area. A resource's FMM GHG settlement for a specific GHG Regulation Area reflects any imbalance from the resource's IFM GHG attribution for that GHG Regulation Area. A resource's RTD GHG settlement for a specific GHG Regulation Area reflects any imbalance from the resource's FMM GHG attribution for that GHG Regulation Area. For a resource within a GHG Regulation Area that does not receive an attribution to served Demand in another GHG Regulation Area, the cost of GHG compliance is embedded in the resource's LMP.

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11.8.1.2 Real-Time Self-Commitment Period

A Real-Time Market Self-Commitment Period for a Bid Cost Recovery Eligible Resource shall consist of all consecutive Dispatch Intervals not in an IFM Commitment Period or a RUC Commitment Period where the Bid Cost Recovery Eligible Resource has a Self-Schedule or, except for Self-Provided Ancillary Services for Non-Spinning Reserve by a Short Start Unit, has a non-zero amount of Self-Provided Ancillary Services. A Real-Time Market Self-Commitment Period for a Bid Cost Recovery Eligible Resource may not be less than the relevant MUT (rounded up to the next 15-minute Commitment Interval) when considered jointly with any adjacent IFM Self-Commitment Period. For example, if a Bid Cost Recovery Eligible Resource self-commits at time h, the self-commitment will be extended to Commitment Interval h + MUT, unless an IFM or RUC Commitment Period exists starting after hour h, in which case the self-commitment will be extended to Commitment Interval h + min (MUT, t), where t represents the time interval between the Real-Time Market Self-Commitment Period and the IFM or RUC

Commitment Period. A Real-Time Market Self-Commitment Period for a Bid Cost Recovery Eligible Resource may not be apart from an IFM or RUC Commitment Period by less than the relevant MDT (rounded up to the next 15-minute Commitment Interval). To determine whether an extension of the RTM Self-Commitment Period applies for Multi-Stage Generating Resources, the CAISO will ensure that the respective Minimum Run Time and Minimum Down Time for both the Generating Unit and MSG Configuration levels are simultaneously respected.

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11.8.2 IFM Bid Cost Recovery Amount

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11.8.2.1 IFM Bid Cost Calculation

For each Settlement Interval, the CAISO shall calculate IFM Bid Cost for each Bid Cost Recovery Eligible Resource as the algebraic sum of the IFM Start-Up Cost, IFM Transition Cost, IFM Minimum Load Cost, IFM Pump Shut-Down Cost, IFM Energy Bid Cost, IFM Pumping Cost, IFM AS Bid Cost, IFM GHG Bid Cost, and IFM Imbalance Reserves Bid Cost. For Multi-Stage Generating Resources, in addition to the specific IFM Bid Cost rules described in Section 11.8.2.1, the CAISO will apply the rules described in Section 11.8.1.3 to further determine the applicable MSG Configuration-based CAISO Market Start-Up Bid Cost, Transition Bid Cost, and Minimum Load Bid Cost in any given Settlement Interval. For Multi-Stage Generating Resources, the incremental IFM Start-Up Costs, IFM Minimum Load Costs, and IFM Transition Costs to provide Energy Scheduled in the Day-Ahead Schedule or awarded RUC or Ancillary Service capacity for an MSG Configuration other than the self-scheduled MSG Configuration are determined by the IFM rules specified in Section 31.3. For RMR Resources, the CAISO shall calculate the IFM Bid Cost as the algebraic sum of the IFM Start-Up Cost adjusted to remove Opportunity Costs, IFM Transition Cost adjusted to remove Opportunity Costs, IFM Minimum Load Costs adjusted to remove Opportunity Costs, IFM Energy Bid Cost adjusted to remove Opportunity Costs, and IFM AS Bid Cost.

The CAISO will also adjust the IFM Bid Costs for RMR Resources, to remove any bid adder that includes costs that were recovered under the RMR Contract.

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11.8.2.1.7 IFM Transition Cost

For each Settlement Interval, the IFM Transition Costs shall be based on the MSG Configuration to which the Multi-Stage Generating Resource is transitioning and is allocated to the CAISO Commitment Period of that MSG Configuration.

11.8.2.1.7.1 IFM Transition Cost Applicability

Within any eligible IFM CAISO Commitment Period determined pursuant to the rules specified in Section 11.8.1.3, the CAISO shall apply the IFM Transition Costs for the Settlement Intervals in which the Multi-Stage Generating Resource is actually transitioning from the “from” MSG Configuration and reaches the Minimum Load as registered in the Master File, or if applicable, as modified pursuant to Section 9.3.3, of the “to” MSG Configuration to which the Multi-Stage Generating Resource is transitioning, subject to the Tolerance Band.

11.8.2.1.8 IFM Imbalance Reserves Bid Cost

For any Settlement Interval, the IFM Imbalance Reserves Bid Cost shall be the product of the IRU Bid price and IRU Bid quantity (as reduced by the unavailable IRU quantity calculated per Section 11.2.1.8.1) plus the product of the IRD Bid price and IRD Bid quantity (as reduced by the unavailable IRD quantity calculated per Section 11.2.1.8.2).

11.8.2.1.9 IFM GHG Bid Cost

For each Settlement Interval, the IFM GHG Bid Cost shall be the product of the IFM GHG Award from each accepted IFM GHG Bid Adder for a relevant GHG Regulation Area and the applicable Marginal GHG Cost divided by the number of Settlement Intervals in a Trading Hour.

11.8.2.2 IFM Market Revenue

The CAISO will apply the following rules to calculate a Bid Cost Recovery Eligible Resource’s IFM Market Revenue used for purposes of calculating its IFM Bid Cost Shortfalls and IFM Bid Cost Surpluses

calculated pursuant to Section 11.8.2, and for purposes of allocating the Bid Cost Uplift pursuant to Section 11.8.6. The IFM Market Revenue calculations for both CAISO IFM Commitment Periods and Self-Committed Periods will be subject to the Day-Ahead Metered Energy Adjustment Factor pursuant to the rules specified in Section 11.8.2.5.

11.8.2.2.1 CAISO IFM Commitment

For any Settlement Interval in a CAISO IFM Commitment Period the IFM Market Revenue for a Bid Cost Recovery Eligible Resource is the algebraic sum of the five products specified below. In the case of a Multi-Stage Generating Resource, the CAISO will calculate the market revenue at the Generating Unit or Dynamic Resource-Specific System Resource level.

(1) The product of the delivered MWh in the relevant Day-Ahead Schedule in that Trading Hour (where for Pumped-Storage Hydro Units and Participating Load operating in the pumping mode or serving Load the MWh is negative), and the relevant IFM LMP, divided by the number of Settlement Intervals in a Trading Hour.

(2) The product of the IFM AS Award from each accepted IFM AS Bid and the relevant Resource-Specific ASMP, divided by the number of Settlement Intervals in a Trading Hour.

(3) The product of IFM GHG Award and relevant Marginal GHG Cost, divided by the number of Settlement Intervals in a Trading Hour.

(4) The product of the IRU award (as reduced by the unavailable IRU quantity calculated per Section 11.2.1.8.1) and the Locational IRU Price.

(5) The product of the IRD award (as reduced by the unavailable IRD quantity calculated per Section 11.2.1.8.2) and the Locational IRD Price.

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11.8.3 RUC Bid Cost Recovery Amount

For purposes of determining the RUC Unrecovered Bid Cost Uplift Payments as determined in Section 11.8.5 and for the purposes of allocating Net RUC Bid Cost Uplift as described in Section 11.8.6.5, the CAISO shall calculate the RUC Bid Cost Shortfall or the RUC Bid Cost Surplus as the algebraic difference

between the RUC Bid Cost and the RUC Market Revenues for each Bid Cost Recovery Eligible Resource for each Settlement Interval. The RUC Bid Costs shall be calculated pursuant to Section 11.8.3.1 and the RUC Market Revenues shall be calculated pursuant to Section 11.8.3.2. The CAISO will include Bid Cost Recovery costs related to Short Start Units committed in Real-Time because of awarded RUC Capacity in RTM Compensation Costs. The CAISO excludes RUC Bid Costs and RUC Market Revenues from calculations under this Section 11.8.3 to the extent the costs or revenues relate to RA Capacity that overlaps with a RUC Award for RCU or RUC Award for RCD as calculated per the methodology identified in Section 11.2.6.2.2 or Section 11.2.6.2.4, respectively.

11.8.3.1 RUC Bid Cost Calculation

For each Settlement Interval, the CAISO shall determine the RUC Bid Cost for a Bid Cost Recovery Eligible Resource as the algebraic sum of the RUC Start-Up Cost, RUC Transition Cost, RUC Minimum Load Cost, and RUC Availability Bid Cost. For Multi-Stage Generating Resources, in addition to the specific RUC Bid Cost rules described in Section 11.8.3.1, the rules described in Section 11.8.1.3 will be applied to further determine the applicable MSG Configuration-based CAISO Market Start-Up Bid Costs, Transition Bid Costs, and Minimum Load Bid Costs. For Multi-Stage Generating Resources, the incremental RUC Start-Up Costs, RUC Minimum Load Costs, and RUC Transition Costs to provide RUC awarded capacity for an MSG Configuration other than the self-scheduled MSG Configuration are determined by the RUC optimization rules in specified in Section 31.5. For each Settlement Interval, the CAISO shall determine the RUC Bid Cost for an RMR Resource as the algebraic sum of the RUC Start-Up Cost adjusted to remove Opportunity Costs and Variable Start-Up Operations and Maintenance Adders, and RUC Transition Cost adjusted to remove Opportunity Costs and Variable Start-Up Operations and Maintenance Adders.

11.8.3.1.1 RUC Start-Up Cost

The RUC Start-Up Cost for any Settlement Interval in a RUC Commitment Period shall consist of Start-Up Bid Cost of the Bid Cost Recovery Eligible Resource for the applicable RUC Commitment Period divided by the number of Settlement Intervals in the applicable RUC Commitment Period. For each Settlement Interval, only the RUC Start-Up Cost in a CAISO RUC Commitment Period is eligible for Bid Cost Recovery. The CAISO will determine the RUC Start-Up Cost for a Multi-Stage Generating Resource

based on the MSG Configuration committed by the CAISO in RUC.

The following rules shall be applied in sequence and shall qualify the RUC Start-Up Cost in a RUC Commitment Period:

(a) The RUC Start-Up Cost for a RUC Commitment Period is zero if there is an IFM Commitment Period within that RUC Commitment Period.

(b) The RUC Start-Up Cost for a RUC Commitment Period is zero if the Bid Cost Recovery Eligible Resource is manually pre-dispatched under an RMR Contract prior to the Day-Ahead Market or is flagged as an RMR Dispatch in the Day-Ahead Schedule anywhere within that RUC Commitment Period.

(c) The RUC Start-Up Cost for a RUC Commitment Period is zero if there is no RUC Start-Up at the start of that RUC Commitment Period because the RUC Commitment Period is the continuation of an IFM Commitment Period, RUC Commitment Period, or RTM Commitment Period from the previous Trading Day.

(d) The RUC Start-Up Cost for a RUC Commitment Period is zero if the Start-Up is delayed beyond the RUC Commitment Period in question or cancelled by the Real-Time Market prior to the Bid Cost Recovery Eligible Resource starting its start-up process.

(e) If a RUC Start-Up is terminated in the Real-Time within the applicable RUC Commitment Period through an Exceptional Dispatch Shut-Down Instruction issued while the Bid Cost Recovery Eligible Resource is starting up, the RUC Start-Up Cost is prorated by the ratio of the Start-Up Time before termination over the RUC Start-Up Time.

(f) The RUC Start-Up Cost for a RUC Commitment Period is qualified if an actual Start-Up occurs within that RUC Commitment Period. An actual Start-Up is detected when the relevant metered Energy in the applicable Settlement Intervals indicates that the resource is Off before the time the resource is instructed to be On as specified in its Start-Up Instruction and is On in the Settlement Intervals that fall within the CAISO RUC Commitment Period. The CAISO will determine whether the resource is On for this purpose based on whether its metered Energy is at or above the resource's Minimum Load as registered in the Master File, or if applicable, as modified pursuant to Section

9.3.3.

(g) The RUC Start-Up Cost shall be qualified if an actual Start-Up occurs. An actual Start-Up is detected when the relevant metered Energy in the applicable Settlement Intervals indicates the unit is Off before the time the resource is instructed to be On as specified in its Start Up Instruction and is On in the Settlement Intervals that fall within the CAISO RUC Commitment Period.

11.8.3.1.2 RUC Minimum Load Cost

The RUC Minimum Load Cost for the applicable Settlement Interval shall be the Minimum Load Bid Cost of the Bid Cost Recovery Eligible Resource, divided by the number of Settlement Intervals in a Trading Hour. For each Settlement Interval, only the RUC Minimum Load Cost in a CAISO RUC Commitment Period is eligible for Bid Cost Recovery. The RUC Minimum Load Cost for any Settlement Interval is zero if: (1) the Bid Cost Recovery Eligible Resource is manually pre-dispatched under a Legacy RMR Contract or the resource is flagged as an RMR Dispatch in the Day-Ahead Schedule in that Settlement Interval; (2) the Bid Cost Recovery Eligible Resource is not committed or Dispatched in the Real-time Market in the applicable Settlement Interval; or (3) the applicable Settlement Interval is included in an IFM Commitment Period. For the purposes of determining RUC Minimum Load Cost for a Bid Cost Recovery Eligible Resource, recovery of the RUC Minimum Load Cost is subject to the Real-Time Performance Metric as specified in Section 11.8.4.4. For Multi-Stage Generating Resources, the commitment period is further determined based on application of section 11.8.1.3. The RUC Minimum Load Cost calculation will be subject to the Shut-Down State Variable and disqualified as specified in Section 11.17.2.

11.8.3.1.3 RUC Availability Bid Cost

The RUC Availability Bid Cost is calculated as the product of the RUC Award with the relevant RUC Availability Bid price, divided by the number of Settlement Intervals in a Trading Hour. The CAISO will determine the RUC Availability Bid Cost based on the MSG Configuration. The RUC Availability Cost for a Bid Cost for an RMR Resource for a Settlement Interval is zero.

11.8.3.1.4 RUC Transition Cost

For each Settlement Interval, the RUC Transition Costs shall be based on the MSG Configuration to which the Multi-Stage Generating Resource is transitioning and is allocated to the CAISO commitment

period of that MSG Configuration.

11.8.3.1.4.1 RUC Transition Costs Applicability

Within any eligible RUC CAISO Commitment Period determined pursuant to the rules specified in Section 11.8.1.3, the CAISO shall apply the RUC Transition Costs for the Settlement Intervals in which the Multi-Stage Generating Resource is actually transitioning from the “from” MSG Configuration and reaches the Minimum Load as registered in the Master File, or if applicable, as modified pursuant to Section 9.3.3, of the “to” MSG Configuration to which the Multi-Stage Generating Resource is transitioning, subject to the Tolerance Band.

11.8.3.2 RUC Market Revenues

For any Settlement Interval, the RUC Market Revenue for a Bid Cost Recovery Eligible Resource is the RUC Availability Payment as specified in Section 11.2.2.1 divided by the number of Settlement Intervals in a Trading Hour. The CAISO will determine the RUC Market Revenues for Multi-Stage Generating Resources based on the Generating Unit level.

11.8.3.3 RUC Bid Cost Recovery for Metered Subsystem

11.8.3.3.1 MSS Elected Gross Settlement

For an MSS Operator that has elected gross Settlement, regardless of other MSS optional elections (Load following or RUC opt-in or out), the RUC Bid Cost and the RUC Market Revenue are calculated similarly to non-MSS resources on an individual resource basis as described in Sections 11.8.3.1 and 11.8.3.2, respectively.

11.8.3.3.2 MSS Elected Net Settlement

For an MSS Operator that has elected net Settlement, regardless of other MSS optional elections (Load following or RUC opt-in or out), the RUC Bid Costs and RUC Market Revenue are combined with RTM Bid Cost and RTM Market Revenue on an MSS level, consistent with the Energy Settlement as calculated according to Section 11.8.4.3.2.

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11.8.4 RTM Bid Cost Recovery Amount

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11.8.4.1 RTM Bid Cost Calculation

For each Settlement Interval, the CAISO shall calculate RTM Bid Cost for each Bid Cost Recovery Eligible Resource, as the algebraic sum of the RTM Start-Up Cost, RTM Minimum Load Cost, RTM Transition Cost, RTM Pump Shut-Down Cost, RTM Energy Bid Cost, RTM Pumping Cost, RTM AS Bid Cost, and RTM GHG Bid Cost. For each Settlement Interval, the CAISO shall calculate RTM Bid Cost for each RMR Resource as the algebraic sum of the RTM Start-Up Cost adjusted to remove Opportunity Costs and Variable Start-Up Operations and Maintenance Adders, RTM Transition Costs adjusted to remove Opportunity Costs and Variable Start-Up Operations and Maintenance Adders, RTM Energy Bid Cost adjusted to remove Opportunity Costs and Variable Energy Operations and Maintenance Adders, and RTM AS Bid Cost. For Multi-Stage Generating Resources, in addition to the specific RTM Bid Cost rules described in Section 11.8.4.1, the rules described in Section 11.8.1.3 will be applied to further determine the applicable MSG Configuration-based CAISO Market Start-Up Bid Cost, Transition Bid Cost, and Minimum Load Bid Cost, in a given Settlement Interval. For Multi-Stage Generating Resources, the incremental RTM Start-Up Cost, RTM Minimum Load Cost, and RTM Transition Cost to provide RTM committed Energy or awarded Ancillary Services capacity for an MSG Configuration other than the self-scheduled MSG Configuration are determined by the RTM optimization rules in specified in Section 34.

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11.8.4.1.7 RTM Transition Cost

For each Settlement Interval, the RTM Transition Costs shall be based on the MSG Configuration to which the Multi-Stage Generating Resource is transitioning and are allocated to the CAISO commitment period of that MSG Configuration.

11.8.4.1.7.1 RTM Transition Cost Applicability

Within any eligible RTM CAISO Commitment Period determined pursuant to the rules specified in Section

11.8.1.3, the CAISO shall apply the RTM Transition Costs for the Settlement Intervals in which the Multi-Stage Generating Resource is actually transitioning from the “from” MSG Configuration and reaches the Minimum Load as registered in the Master File, or if applicable, as modified pursuant to Section 9.3.3, of the “to” MSG Configuration to which the Multi-Stage Generating Resource is transitioning, subject to the Tolerance Band.

11.8.4.1.8 RTM GHG Bid Cost

For each Settlement Interval, the RTM GHG Bid Cost shall be the product of the RTM GHG Award from each accepted RTM GHG Bid Adder for a relevant GHG Regulation Area and the applicable Marginal GHG Cost.

11.8.4.2 RTM Market Revenue Calculations

11.8.4.2.1 For each Settlement Interval in a CAISO Real-Time Market Commitment Period, the RTM Market Revenue for a Bid Cost Recovery Eligible Resource is the algebraic sum of the elements listed below in this Section. For Multi-Stage Generating Resources the RTM Market Revenue calculations will be made at the Generating Unit level.

(a) The sum of the products of the FMM or RTD Instructed Imbalance Energy (including Minimum Load Energy of the Bid Cost Recovery Eligible Resource committed in RUC and where for Pumped-Storage Hydro Units and Participating Load operating in the pumping mode or serving Load, the MWh is negative), except Standard Ramping Energy, Residual Imbalance Energy, Exceptional Dispatch Energy, Derate Energy, MSS Load following Energy, Ramping Energy Deviation and Regulation Energy, with the relevant FMM and RTD LMP, for each Dispatch Interval in the Settlement Interval. These amounts are subject to the Real-Time Performance Metric and the Persistent Deviation Metric as described in Sections 11.8.4.4 and 11.17, respectively.

(b) The product of the Real-Time Market AS Award from each accepted Real-Time Market AS Bid in the Settlement Interval with the relevant ASMP, divided by the number of fifteen (15)-minute Commitment Intervals in a Trading Hour (4), and prorated to the duration of the Settlement Interval.

(c) The relevant tier-1 No Pay charges for that Bid Cost Recovery Eligible Resource in that

Settlement Interval.

(d) The Forecasted Movement and Uncertainty Awards Settlement Amounts as calculated pursuant to Section 11.25 are included in the RTM Market Revenues calculation, not including:

(1) the amounts rescinded pursuant to Section 11.25.3;

(2) Forecasted Movement revenue when there are changes in Self-Schedules across consecutive Trading Hours; and

(3) Forecasted Movement revenue when there are changes in EIM Base Schedules across consecutive Trading Hours without Economic Bids.

(e) The product of RTM GHG Award from each accepted RTM GHG Bid Adder and relevant Marginal GHG Cost in that Settlement Interval.

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11.8.6.5 Allocation of RUC Compensation Costs

11.8.6.5.1 Calculation of RUC Compensation Costs

For each Trading Hour of the RUC, the CAISO shall calculate the RUC Compensation Costs separately for RCU and RCD as the sum of the RUC Availability Payments for either RCU or RCD. The RUC Compensation Costs for RCU additionally include the hourly Net RUC Bid Cost Uplift.

11.8.6.5.2 Calculation of the Hourly Net RUC Bid Cost Uplift

For each Trading Hour of the RUC, the hourly Net RUC Bid Cost Uplift is determined as the sum over the Settlement Intervals in that Trading Hour of the product of any positive Net RUC Bid Cost Uplift remaining in the Settlement Interval after the sequential netting in Section 11.8.6.2 and the application of the uplift ratio as determined in Section 11.8.6.3. Scheduling Coordinators for MSS Operators that are non-Load following and under gross Settlement receive the allocation of hourly Net RUC Bid Cost Uplift like all other Scheduling Coordinators.

11.8.6.5.3 Allocation of the RUC Compensation Costs

The CAISO allocates the sum of the RUC Compensation Costs as specified below.A Scheduling Coordinator's allocation of RCU costs in tier 1 is the product of the RCU tier 1 cost allocation quantity, as specified in Section 11.8.6.5.3.1, and the RCU tier 1 cost allocation price, as specified in Section 11.8.6.5.3.3.

A Scheduling Coordinator's allocation of RCD costs in tier 1 is the product of the RCD tier 1 cost allocation quantity, as specified in Section 11.8.6.5.3.2, and the RCD tier 1 cost allocation price, as specified in 11.8.6.5.3.4.

The CAISO allocates the costs of Reliability Capacity procurement not recovered through the RCU or RCD tier 1 cost allocations to Scheduling Coordinators in proportion to their metered Demand in the Trading Hour for which the CAISO procured the Imbalance Reserves.

11.8.6.5.3.1 RCU Tier 1 Cost Allocation Quantity

A Scheduling Coordinator's total RCU tier 1 cost allocation quantity is the sum of the tier 1 quantities, specified as follows.

For a Scheduling Coordinator with net Virtual Supply Awards in a Trading Hour, the RCU tier 1 cost allocation quantity associated with its Virtual Supply is the higher of: (a) zero; or (b) the Scheduling Coordinator's net Virtual Awards, if the Balancing Authority Area in which that Scheduling Coordinator is located has net Virtual Supply.

For a Scheduling Coordinator with under-scheduled Load in a Trading Hour, the RCU tier 1 cost allocation quantity associated with its under-scheduled Load is the net negative metered Demand, excluding net negative Demand associated with balanced ETC/TOR rights and negative deviation for Participating Load resulting from a market dispatch.

11.8.6.5.3.2 RCD Tier 1 Cost Allocation Quantity

A Scheduling Coordinator's total RCD tier 1 cost allocation quantity is the sum of the tier 1 quantities, specified as follows.

For a Scheduling Coordinator with net Virtual Demand Awards in a Trading Hour, the RCD tier 1 cost allocation quantity associated with its Virtual Demand is the lower of: (a) zero; or (b) the Scheduling Coordinator's net Virtual Awards, if the Balancing Authority Area in which that Scheduling Coordinator is located has net Virtual Demand.

For a Scheduling Coordinator with over-scheduled Load in a Trading Hour, the RCD tier 1 cost allocation associated with its over-scheduled Load is the net positive metered Demand, excluding net positive demand associated with balanced ETC/TOR rights and positive deviation for Participating Load resulting from a market dispatch.

11.8.6.5.3.3 RCU Tier 1 Cost Allocation Price

The RCU tier 1 cost allocation price for a Trading Hour is the lower of: (a) the RUC Compensation Costs for RCU, as adjusted by payment rescissions applied per Section 11.2.2.2, divided by the total MWs of RCU awards; and (b) the RUC Compensation Costs for RCU to meet Measured Demand divided by the sum of each Scheduling Coordinator's RCU tier 1 cost allocation quantity in that Trading Hour.

11.8.6.5.3.4 RCD Tier 1 Cost Allocation Price

The RCD tier 1 cost allocation price for a Trading Hour is the lower of: (a) the RUC Compensation Costs for RCD, as adjusted by payment rescissions applied per Section 11.2.2.2, divided by the total MWs of RCD awards; and (b) the RUC Compensation Costs for RCD to meet Measured Demand divided by the sum of each Scheduling Coordinator's RCD tier 1 cost allocation quantity in that Trading Hour

11.8.6.5.3.5 Reliability Capacity Cost Allocation to MSSs

The CAISO allocates costs of Reliability Capacity to a MSS the same as any other Scheduling Coordinator irrespective of the MSS's election, per Section 4.9.13, of net Settlements or gross Settlements.

The CAISO does not allocate costs of Reliability Capacity from either tier 1 or tier 2 to a MSS that has elected, per Section 4.9.13, to Load follow with its generating resources.

11.8.6.5.3.6 Reliability Capacity Cost Allocation to Holders of ETCs or TORs

The CAISO excludes from tier 1 and tier 2 allocations for both RCU and RCD the valid and balanced portion of ETC and TOR self-schedules. The CAISO does not exclude from the Reliability Capacity cost allocations any quantities above the valid and balanced portion of ETC or TOR self-schedules.

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11.10.6 Upward Ancillary Services Neutrality Adjustment

For each Settlement Period the difference between the upwards Ancillary Service cost and the sum of the total Ancillary Services obligation and neutrality adjustments will be allocated to all Scheduling Coordinators in proportion to their upward Ancillary Service Obligation (before taking into consideration the Inter-SC Trades of Ancillary Services). The CAISO shall exclude EDAM Transfers and EIM Transfers between the CAISO and an EDAM Entity, or an EIM Entity, from the calculation of the upwards Ancillary Service Obligation for this neutrality adjustment. The upwards Ancillary Service cost is the sum of the upward Ancillary Services payments made pursuant to Sections 11.10.1.1, 11.10.1.2, and 11.10.3.1. The total upward Ancillary Services obligation and neutrality adjustments is the sum of the requirements in Sections 11.10.2.2.2, 11.10.2.2.3, 11.10.3.1, 11.10.3.4, 11.10.4.1, and 11.10.4.4.

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11.14 Neutrality

The CAISO shall be authorized to levy additional charges or make additional payments as special adjustments in regard to:

(a) amounts required to reach an accounting trial balance of zero in the course of the Settlement process in the event that the charges calculated as due from CAISO Debtors are lower than payments calculated as due to the CAISO Creditors for the same Trading Day, which includes any amounts required to round up any invoice amount expressed in dollars and cents to the nearest whole dollar amount. These charges will be allocated amongst the Scheduling Coordinators who traded on that Trading Day pro rata to their Measured Demand in MWh of Energy for that Trading Day on a monthly basis. In the event that the charges due from CAISO Debtors are higher than the payments due to CAISO Creditors, the CAISO shall allocate a payment to the Scheduling Coordinators who traded on that Trading Day pro rata to their Measured Demand in MWh of Energy for that Trading Day on a monthly basis; and

(b) awards payable by or to the CAISO pursuant to good faith negotiations or CAISO ADR Procedures that the CAISO is not able to allocate to or to collect from a Market

Participant or Market Participants in accordance with Section 13.5.3. These charges will be allocated among Scheduling Coordinators over an interval determined by the CAISO and pro rata based on EDAM Measured Demand during that interval, if the dispute concerned the IFM, EIM Measured Demand during that interval, if the dispute concerned the Real-Time Market or RUC, or otherwise Measured Demand during that interval.

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11.25 Settlement of Flexible Ramping Product

11.25.1 Settlement of Forecasted Movement

11.25.1.1 Generally

The CAISO will settle Forecasted Movement for a direction as specified in this Section 11.25.1 by Balancing Authority Area for each Balancing Authority Area that has a distinct Uncertainty Requirement for that direction, as specified in Section 44.2.4.1, and separately will settle Forecasted Movement for a direction as specified in this Section 11.25.1 for the group of Balancing Authority Areas that shares a common Uncertainty Requirement for that direction, as specified in Section 44.2.4.1.

11.25.1.2 FMM.

The CAISO settles FMM Forecasted Movement with Scheduling Coordinators as the product of: (a) the difference between the FMM Forecasted Movement quantity and the DAM Forecasted Movement Quantity or Base Schedule Forecasted Movement quantity; and (b) the difference between the FMM Flexible Ramp Up Price and the FMM Flexible Ramp Down Price.

11.25.1.3 RTD.

The CAISO settles RTD Forecasted Movement with Scheduling Coordinators as the product of: (a) the difference between the RTD Forecasted Movement quantity and the FMM Forecasted Movement Quantity; and (b) the difference between the RTD Flexible Ramp Up Price and the RTD Flexible Ramp Down Price.

11.25.1.4 Allocation of Residual Forecasted Movement Settlements.

For Balancing Authority Areas that share a common Uncertainty Requirement for a direction, as specified

in Section 44.2.4.1, the CAISO allocates the algebraic sum of the funds remaining after it settles Forecasted Movement for a direction pursuant to Sections 11.3.1, 11.3.2, and 11.25.1 to each Scheduling Coordinator's metered CAISO Demand, metered EDAM Demand, or metered EIM Demand in proportion to its share of the sum of metered CAISO Demand, metered EDAM Demand, and metered EIM Demand within that group of Balancing Authority Areas sharing a common Uncertainty Requirement..

For a Balancing Authority Area that has a distinct Uncertainty Requirement for a direction, as specified in Section 44.2.4.1, the CAISO allocates the algebraic sum of the funds remaining after it settles Forecasted Movement for a direction pursuant to Sections 11.3.1, 11.3.2, and 11.25.1 to each Scheduling Coordinator's metered Demand in proportion to its share of the sum of metered Demand within that single Balancing Authority Area.

The allocation to Scheduling Coordinators is a charge if the algebraic sum of funds remaining is negative and a payment if the algebraic sum is positive.

11.25.2 Settlement of Uncertainty Requirement

11.25.2.1 Payment to Resources.

11.25.2.1.1 FMM Uncertainty Awards

For a resource with an IRU Award, the CAISO applies a deviation settlement as the product of the Flexible Ramp Up Price and the difference between the upward Five-minute Imbalance Reserve Quantity and the upward FMM Uncertainty Award.

For a resource with an IRD Award, the CAISO applies a deviation settlement as the product of the Flexible Ramp Down Price and the difference between the downward Five-minute Imbalance Reserve Quantity and downward FMM Uncertainty Award.

If a resource has no Imbalance Reserves Award, then the CAISO settles upward and downward Uncertainty Awards as the product of the Uncertainty Award and the Flexible Ramp Up Price, in the case of an upward Uncertainty Award, or the Flexible Ramp Down Price, in the case of a downward Uncertainty Award.

11.25.2.1.2 RTD Uncertainty Awards

The CAISO settles RTD Uncertainty Awards with Scheduling Coordinators as the algebraic sum of the

upward uncertainty awards defined in part (a) of this Section 11.25.2.1.2 and the downward uncertainty awards defined in part (b) of this Section 11.25.2.1.2.

(a) Upward Uncertainty Awards – the product of the RTD Flexible Ramp Up Price and the difference between the upward RTD Uncertainty Award quantity and the upward FMM Uncertainty Award quantity for the relevant Settlement Interval, both calculated for each resource pursuant to Section 44.2 in MWhs, less any rescission amounts pursuant to section 11.25.3.

(b) Downward Uncertainty Awards – the product of the RTD Flexible Ramp Down Price and the difference between the downward RTD Uncertainty Award quantity and the downward FMM Uncertainty Award quantity for the relevant Settlement Interval, both calculated for each resource pursuant to Section 44.2 in MWhs, less any rescission amounts pursuant to section 11.25.3.

11.25.2.2 Allocation of Costs of Uncertainty Movement Procured.

11.25.2.2.1 Settlement Process.

(a) **Generally.** The CAISO will settle Uncertainty Awards for a direction as specified in this Section 11.25.2.2 by Balancing Authority Area for each Balancing Authority Area that has a distinct Uncertainty Requirement for that direction, as specified in Section 44.2.4.1, or separately will settle Uncertainty Awards for a direction as specified in this Section 11.25.2.2 for the group of Balancing Authority Areas that shares a common Uncertainty Requirement for that direction, as specified in Section 44.2.4.1.

(b) **Daily.** The CAISO will initially—

(1) allocate the cost of the Uncertainty Awards for a direction on a daily basis according to the categories as set forth in Sections 11.25.2.2.2 and 11.25.2.2.3 within

the group of Balancing Authority Areas that shares a common Uncertainty Requirement for that direction or within a Balancing Authority Area that has a distinct Uncertainty Requirement for that direction, as applicable; and

(2) allocate the daily amounts to Scheduling Coordinators as set forth in Section 11.25.2.2.4.

(c) **Monthly.** The CAISO will resettle the costs of the Uncertainty Awards by—

(1) reversing the daily allocation;

(2) assigning the monthly costs of the Uncertainty Awards to Peak Flexible Ramp Hours and Off-Peak Flexible Ramp Hours;

(3) separately allocating the monthly Peak Flexible Ramp Hours amounts and Off-Peak Flexible Ramp Hours amounts to the categories as set forth in Sections 11.25.2.2.2 and 11.25.2.2.3 within the group of Balancing Authority Areas that shares a common Uncertainty Requirement for that direction or within a Balancing Authority Area that has a distinct Uncertainty Requirement for that direction, as applicable; and

(4) allocating the monthly amounts in each category to Scheduling Coordinators as set forth in Section 11.25.2.2.4.

11.25.2.2.2 Allocation of Charges to Categories.

(a) **Determination of Uncertainty Movement for Resources.** For each interval, the CAISO will calculate the net Uncertainty Movement of each resource according to the following categories:

(1) for Supply resources other than non-Dynamic System Resources as the difference between the Dispatch Instruction of the binding interval in the next RTD run and the first advisory RTD interval in the current run.

(2) for non-Dynamic System Resources and export schedules as the difference between the schedule used in the RTD (accounting for ramp) for the binding interval in the next RTD run and the schedule used for the first advisory interval in the current RTD run.

(b) **RTD Uncertainty Movement.** The CAISO will determine the total net RTD Uncertainty Movement for each category separately for the group of Balancing Authority Areas that shares a common Uncertainty Requirement for that direction or a Balancing Authority Area that has a distinct Uncertainty Requirement for that direction, as applicable—

(1) for the category of Supply resources, which shall not include non-Dynamic System Resources, as the net sum of the five-minute Uncertainty Movement determined pursuant to Section 11.25.2.2.2 of all the Supply resources in the category.

(2) for the category of Intertie resources, which shall comprise non-Dynamic System Resources and exports, as the net sum of the five-minute Uncertainty Movement determined pursuant to Section 11.25.2.2 of all the non-Dynamic System resources and export schedules.

(3) for the non-Participating Load category, as the difference between –

(A) the CAISO Forecast of BAA Demand of the binding interval in the next RTD run; and

(B) CAISO Forecast of BAA Demand for the first advisory interval in the current RTD run.

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11.29.5.3 Data Files

Settlement Statements relating to each Scheduling Coordinator, CRR Holder, Black Start Generator or Participating TO will be accompanied by data files of supporting information that includes the following for each Settlement Period of the Trading Day:

(a) the aggregate quantity (in MWh) of Energy supplied or withdrawn by the Scheduling Coordinator Metered Entities represented by the Scheduling Coordinator;

(b) the aggregate quantity (in MW) and type of Ancillary Services capacity provided or purchased;

(c) the relevant prices that the CAISO has applied in its calculations;

(d) details of the scheduled quantities of Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services accepted by the CAISO in the Day-Ahead Market and the RTM;

(e) details of FMM Instructed Imbalance Energy or RTD Imbalance Energy and penalty payments;

(f) details of any payments or charges associated with the CRR Auctions; and

(g) detailed calculations of all fees, charges and payments allocated among Scheduling Coordinators and each Scheduling Coordinator's share.

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11.29.17.2 Payment Default Allocation

11.29.17.2.1 Methodology for Allocating Payment Default Amounts

Each payment default amount allocated to CAISO Creditors through a shortfall allocation pursuant to Section 11.29.17.1 and that remains unpaid by the defaulting CAISO Debtor will be allocated on the next practicable Invoices to the Default-Invoiced SCIDs to which the percentage shares calculated pursuant to Section 11.29.17.2.7 for the current calendar quarter apply, excluding the CAISO Debtor that has not paid the payment default amount, pursuant to the following methodology:

(a) Twenty (20) percent of the payment default amount will be allocated to the Default-Invoiced SCIDs in proportion to the net amounts that were payable in each applicable calendar quarter (and averaged within such calendar quarter) to the Default-Invoiced

SCIDs over the applicable Default Look-Back Periods. For Market Participants subject to Default Election option 1, these net amounts will be calculated on an SCID-by-SCID basis. For Market Participants that are eligible for and have chosen Default Election option 2, these net amounts will be calculated by consolidating all of the data for the applicable SCIDs, recognizing any offsetting effect of an individual SCID's positive or negative dollar amount in the consolidated total.

(b) Thirty (30) percent of the payment default amount will be allocated to the Default-Invoiced SCIDs in proportion to the sum of the absolute values of the dollar amounts shown on their Invoices payable or receivable in each applicable calendar quarter (and averaged within such calendar quarter) over the applicable Default Look-Back Periods, after excluding dollar amounts shown on the Invoices for payments and charges for GMC, RMR, and Wheeling Access Charge costs, and after excluding the billing of Access Charges and the payment of Transmission Revenue Requirements to Participating Transmission Owners. For Market Participants subject to Default Election option 1, the sum of the absolute values of the dollar amounts shown on their Invoices payable or receivable in each applicable calendar quarter will be calculated on an SCID-by-SCID basis. For Market Participants that are eligible for and have chosen Default Election option 2, the absolute values of the net sum of the dollar amounts shown on their Invoices payable or receivable in each applicable calendar quarter will be calculated by consolidating all of the data for the applicable SCIDs, recognizing any offsetting effect of an individual SCID's positive or negative dollar amount in the consolidated total.

(c) Fifty (50) percent of the payment default amount will be allocated to the Default-Invoiced SCIDs in proportion to the largest of the following five (5) amounts calculated in MWh for every month in each applicable calendar quarter (and averaged within such calendar quarter) for each Default-Invoiced SCID over the applicable Default Look-Back Periods:

(1) Cleared Day-Ahead Schedules to supply Energy, plus Day-Ahead Ancillary

Services Awards and qualified Self-Provided Ancillary Services, plus scheduled supply obligation for Ancillary Services (including imports but excluding RUC Awards), plus Virtual Supply Awards;

(2) Metered Generation, plus Real-Time Interchange Import Schedules, plus Real-Time Ancillary Services Awards and qualified Self-Provided Ancillary Services, plus FMM Ancillary Services Awards and qualified Self-Provided Ancillary Services, plus Real-Time supply obligation for Ancillary Services;

(3) Cleared Day-Ahead Schedules for Demand (including Demand served by Pumped-Storage Hydro Units and exports) multiplied by one-hundred three (103) percent to reflect Transmission Losses, plus scheduled demand obligation for Ancillary Services, plus Virtual Demand Awards;

(4) Metered Load multiplied by one-hundred three (103) percent to reflect Transmission Losses, plus Real-Time Interchange Export Schedules, plus Real- Time demand obligation for Ancillary Services; or

(5) The greater of (A) the quantity of CRRs acquired in CRR Auctions or transferred through the Secondary Registration System (excluding CRRs acquired in CRR Allocations) or (B) Inter-SC Trades of Energy.

For Market Participants subject to Default Election option 1, each of the five (5) amounts calculated in MWh for every month in each applicable calendar quarter (and averaged within such calendar quarter) will be calculated on an SCID-by-SCID basis. For Market Participants that are eligible for and have chosen Default Election option 2, each of the five (5) amounts calculated in MWh for every month in each applicable calendar quarter (and averaged within such calendar quarter) will be calculated by consolidating all of the data for the applicable SCIDs.

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Section 27

In the Day-Ahead and Real-Time time frames the CAISO operates a series of procedures and markets that together comprise the CAISO Markets Processes. In the Day-Ahead time frame, the CAISO conducts the Market Power Mitigation (MPM) process, the Integrated Forward Market (IFM) and the Residual Unit Commitment (RUC) process. In the Real-Time time frame, the CAISO does the following: 1) accepts the Economic Bids and Self-Schedules used in the Real-Time Market procedures, 2) conducts the MPM process for the RTM, 3) accepts and awards HASP Block Intertie Schedules for Energy and Ancillary Services, 4) provides HASP Advisory Schedules for Energy and Ancillary Services for Bids that do not create a HASP Block Intertie Schedule, 5) conducts the Real-Time Unit Commitment (RTUC), 6) conducts the Short-Term Unit Commitment (STUC), 7) conducts the Fifteen Minute Market (FMM), and 8) conducts the five-minute Real-Time Dispatch (RTD). As appropriate, the CAISO Markets Processes utilize transmission and Security Constrained Unit Commitment and dispatch algorithms in conjunction with a Base Market Model adjusted as described in Sections 27.5.1 and 27.5.6 to optimally commit, schedule and Dispatch resources and determine marginal prices for Energy, Imbalance Reserves, Ancillary Services and RUC Capacity. Congestion Revenue Rights are available and entitle holders of such instruments to a stream of hourly payments or charges associated with revenue the CAISO collects or pays from the Marginal Cost of Congestion component of hourly Day-Ahead LMPs for Energy, Locational IRU Prices, and Locational IRD Prices. Through the operation of the CAISO Markets Processes the CAISO develops Day-Ahead Schedules, Imbalance Reserves Awards, Day-Ahead AS Awards and RUC Schedules, HASP Block Intertie Schedules for Energy and AS Awards, HASP Advisory Schedules, FMM Energy Schedules, and FMM Ancillary Services Awards, Real-Time AS Awards and Dispatch Instructions to ensure that sufficient supply resources are available in Real-Time to balance Supply and Demand and operate in accordance with Reliability Criteria.

27.1 LMPs and Ancillary Services Marginal Prices

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27.1.1 Locational Marginal Prices for Energy

As further described in Appendix C, the LMP for Energy at any PNode is the marginal cost of serving the next increment of Demand at that PNode calculated by the CAISO through the operations of the CAISO Markets considering, as described further in the CAISO Tariff, among other things, modeled Transmission Constraints (including Remedial Action Schemes), transmission losses, the performance characteristics of resources, and Bids submitted by Scheduling Coordinators and as modified through the Locational Market Power Mitigation process. The LMP at any given PNode is comprised of four marginal cost components: the Marginal Energy Cost (MEC); Marginal Cost of Losses (MCL);Marginal Cost of Congestion (MCC); and Marginal Greenhouse Gas Cost. Through the IFM the CAISO calculates LMPs for each Trading Hour of the next Trading Day. Through the FMM the CAISO calculates distinct financially binding fifteen-minute LMPs for each of the four fifteen-minute intervals within a Trading Hour. Through the Real-Time Dispatch, the CAISO calculates five-minute LMPs for each of the twelve (12) five (5) minute Dispatch Intervals of each Trading Hour. The CAISO uses the FMM or RTD LMPs for Settlements of the Real-Time Market.

27.1.1.1 Marginal Energy Cost

The Marginal Energy Cost (MEC) component of the LMP reflects the marginal cost of providing Energy from a designated reference Location. For this designated reference Location the CAISO will utilize a distributed Reference Bus whose constituent PNodes are weighted in proportions referred to as Reference Bus distribution factors. The MEC shall be the same throughout the Balancing Authority Area.

27.1.1.2 Marginal Cost of Losses

For all PNodes and Aggregated PNodes in the CAISO Balancing Authority Area, including Scheduling Points, the use of the Base Market Model adjusted as described in Sections 27.5.1 and 27.5.6 in the DAM and the RTM processes incorporates Transmission Losses. At each PNode or Aggregated PNode, the Marginal Cost of Losses is the Marginal Energy Cost multiplied by the Marginal Loss factor at that PNode or Aggregated PNode. The Marginal Cost of Losses at a Location (PNode or APNode) may be positive or negative depending on whether an increase in Demand at that Location marginally increases or decreases the cost of Transmission Losses, using the distributed Reference Bus to balance it. The Marginal Loss factors are determined through a process that calculates the sensitivities of Transmission Losses with respect to changes in injection at each Location in the FNM. For CAISO Controlled Grid

facilities outside the CAISO Balancing Authority Area, the CAISO shall assess the cost of Transmission Losses to Scheduling Coordinators using each such facility based on the quantity of losses agreed upon with the neighboring Balancing Authority multiplied by the LMP at the PNode of the Transmission Interface with the neighboring Balancing Authority Area. The MCLs calculated for Locations within the CAISO Balancing Authority Area shall not reflect the cost of Transmission Losses on those facilities.

27.1.1.3 Marginal Cost of Congestion

The Marginal Cost of Congestion at a PNode reflects the net contribution of the Shadow Prices of the binding Transmission Constraints (including Remedial Action Schemes) at the optimal solution, weighted by the corresponding Power Transfer Distribution Factors (PTDFs), as described in Appendix C. The Marginal Cost of Congestion for a Transmission Constraint may be positive or negative depending on whether a power injection at that Location marginally increases or decreases Congestion.

27.1.1.3.1 Marginal GHG Cost

The Marginal GHG Cost at a PNode reflects the allocation of a GHG Transfer for a GHG Regulation Area as described in Appendix C. The Marginal GHG Cost for a GHG Regulation Area may be positive or zero depending on the resources receiving an attribution of GHG Transfers for that GHG Regulation Area.

27.1.1.4 Disconnected Pricing Node or Aggregated Pricing Node

In the event that a Pricing Node or Aggregated Pricing Node becomes electrically disconnected from the market model during a CAISO Market run, the LMP, including the Marginal Energy Cost, Marginal Cost of Congestion, Marginal Cost of Losses, and Marginal Greenhouse Gas Cost at the closest electrically connected Pricing Node will be used as the LMP at the affected location. The CAISO will include the impact of the disconnected Pricing Node on any modeled Remedial Action Scheme in determining the LMP.

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27.1.2 Ancillary Service Prices

27.1.2.1 Ancillary Service Marginal Prices – Sufficient Supply

As provided in Section 8.3, Ancillary Services are procured and awarded through the IFM and the FMM,

and the CAISO also accepts and awards HASP Block Intertie Schedules for Ancillary Services in HASP. Ancillary Services awarded through HASP are made financially binding in the FMM. The IFM calculates hourly Day-Ahead Ancillary Service Awards and establishes Ancillary Service Marginal Prices (ASMPs) for the accepted Regulation Up, Regulation Down, Spinning Reserve and Non-Spinning Reserve Bids. The IFM co-optimizes Energy, Imbalance Reserves, and Ancillary Services subject to resource, network and regional constraints. In the HASP, the CAISO accepts and awards Ancillary Services from HASP Block Intertie Schedules for the next Trading Hour as described in Section 34.2. The CAISO calculates the price for the settlement of Ancillary Services accepted and awarded in HASP based on the FMM ASMP as described herein and further described in Section 34.4. The FMM process that is performed every fifteen (15) minutes establishes fifteen (15) minute Ancillary Service Schedules, Awards, and prices for the upcoming quarter of the given Trading Hour. ASMPs are determined by first calculating Shadow Prices of Ancillary Services for each Ancillary Service type and the applicable Ancillary Services Regions. The Ancillary Services Shadow Prices are produced as a result of the co-optimization of Energy and Ancillary Services through the IFM and the Real-Time Market, subject to resource, network, and requirement constraints. The Ancillary Services Shadow Prices represent the marginal cost of the relevant binding regional constraints at the optimal solution, or the reduction of the combined Energy and Ancillary Service procurement cost associated with a marginal relaxation of that constraint. If the constraint for an Ancillary Services Region is not binding, the corresponding Ancillary Services Shadow Price in the Ancillary Services Region is zero (0). During periods in which supply is sufficient, the ASMP for a particular Ancillary Service type and Ancillary Services Region is then the sum of the Ancillary Services Shadow Prices for the specific type of Ancillary Service and all the other types of Ancillary Services for which the subject Ancillary Service can substitute, as described in Section 8.2.3.5, for the given Ancillary Service Region and all the other Ancillary Service Regions that include that given Ancillary Service Region. During periods in which supply is insufficient, the ASMP for a particular Ancillary Service type and Ancillary Services Region will reflect the Scarcity Reserve Demand Curve Values set forth in Section 27.1.2.3.

27.1.2.2 Opportunity Cost in ASMP

The Ancillary Services Shadow Price, which, as described above, is a result of co-optimizing procurement

of Energy, Imbalance Reserves, and Ancillary Services, includes the foregone opportunity cost of the marginal resource, if any, for not providing Energy, Imbalance Reserves, or Ancillary Services the marginal resource is capable of providing in the relevant market. The ASMPs determined by the IFM or FMM optimization process for each resource whose Ancillary Service Bid is accepted will be no lower than the sum of (i) the Ancillary Service capacity Bid price submitted for that resource, and (ii) the foregone opportunity cost of Energy or Imbalance Reserves in the IFM or Energy and FRP in the FMM for that resource. The foregone opportunity cost of Energy or Imbalance Reserves for this purpose is measured as the positive difference between the price in the relevant market for the given product at the resource's Pricing Node and the resource's Bid price in the relevant market for the given product. If the Bid price for the resource is higher than the LMP, the opportunity cost measured for this calculation is $0. If a resource has submitted an Ancillary Service Bid but no Energy Bid and this Tariff obligates the resource to submit Bids for Energy in the Day-Ahead Market, then the CAISO inserts an Energy Bid at its Default Energy Bid and the CAISO calculates its opportunity cost based on that Default Energy Bid. If a resource has submitted an Ancillary Service Bid but no Energy Bid and is not under an obligation to offer Energy in the Day-Ahead Market, its Energy opportunity cost measured for this calculation is $0 since it cannot be dispatched for Energy. For Self-Scheduled Hourly Block Bids for Ancillary Services awarded in the Real-Time Market, the opportunity cost measured for this purpose is $0 because, as provided in Section 34.2.3, the CAISO cannot Schedule Energy in the Real-Time Market from the Energy Bid under the same Resource ID as the submitted Ancillary Service Bid.

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27.1.2.4 Opportunity Cost in LMPs for Energy

In the event that there is insufficient supply to meet an Ancillary Services procurement requirement in a particular Ancillary Service Region or Sub-Region, the Ancillary Services Shadow Prices will rise automatically to the Scarcity Reserve Demand Curve Values in that Ancillary Service Region or Sub-Region. LMPs for Energy will reflect the forgone opportunity cost of the marginal resource, if any, for not

providing other products procured in the IFM.

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27.1.4 Locational IRU Price and Locational IRD Price

As further described in Appendix C, the Locational IRU Price or Locational IRD Price at any PNode is the marginal cost of procuring the next increment of IRU or IRD, respectively, at that PNode calculated by the CAISO through the operations of the CAISO Markets considering, as described further in the CAISO Tariff, among other things, modeled Transmission Constraints (including Remedial Action Schemes), the performance characteristics of resources, and Imbalance Reserves Bids submitted by Scheduling Coordinators as modified by the IFM MPM. The Locational IRU Price or Locational IRD Price at a PNode is comprised of two marginal cost components: (1) the Shadow Price of the IRU or IRD procurement constraint for the relevant BAA in the EDAM Area; and (2) the MCC for IRU or IRD.

27.1.5 Locational RCU Price and Locational RCD Price

As further described in Appendix C, the Locational RCU Price or Locational RCD Price at any PNode is the marginal cost of procuring the next increment of RCU or RCD, respectively, at that PNode calculated by the CAISO through the operations of the CAISO Markets considering, as described further in the CAISO Tariff, among other things, modeled Transmission Constraints (including Remedial Action Schemes), the performance characteristics of resources, and RUC Availability Bids submitted by Scheduling Coordinators as modified by the RUC MPM. The Locational RCU Price or Locational RCD Price at a PNode is comprised of three marginal cost components: (1) the Shadow Price of the RUC power balance constraint for the relevant BAA in the EDAM Area; (2) the Marginal Cost of Losses; and (3) the MCC for RCU or RCD.

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27.4.3.4 Protection of TOR, ETC and Converted Rights Self-Schedules in the IFM

In accordance with the submitted and accepted TRTC Instructions, valid Day-Ahead TOR Self-Schedules, Day-Ahead ETC Self-Schedules and Day-Ahead Converted Rights Self-Schedules shall not

be adjusted in the IFM in response to an insufficiency of Effective Economic Bids. The scheduling parameters associated with the TOR, ETC, or Converted Rights Self-Schedules will be set to values higher than the scheduling parameter associated with relaxation of an enforced internal and Intertie Transmission Constraint as specified in Section 27.4.3.2, so that when there is a congested Transmission Constraint that would otherwise subject a Supply or Demand resource submitted in a valid and balanced ETC, TOR or Converted Rights Self-Schedule to adjustment in the IFM, the IFM software will relax the Transmission Constraint rather than curtail the TOR or ETC Self-Schedule. This priority will be adhered to by the operation of the IFM Market Clearing software, and if necessary, by adjustment of Schedules after the IFM has been executed and the results have been reviewed by the CAISO operators.

27.4.3.5 Effectiveness Threshold

The CAISO Markets software includes a lower effectiveness threshold setting that governs whether the software will consider a bid "effective" for managing congestion on a congested Transmission Constraint, which in the case of Nomograms will be applied to the individual flowgates that make up the Nomogram, rather than to the Nomogram itself. For the purposes of applying these thresholds in procuring Imbalance Reserves Awards under Section 31.3.1.6.3, the CAISO considers the product of the shift factor and the Deployment Factor.

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27.13 Aggregate Capability Constraint

At the request of the Interconnection Customer, the CAISO may enforce an Aggregate Capability Constraint for Generating Facilities with Co-located Resources that reflects a Generating Facility's maximum and minimum capability or a portion of that capability for purposes of Day-Ahead Market Awards, Real-Time Market Awards, and Real-Time Dispatch as described in the CAISO's Business Practice Manuals. If the combined PMax of Co-located Resources associated with a single Generating Facility would exceed the Interconnection Service Capacity of that Generating Facility, the

Interconnection Customer may request that the CAISO enforce an Aggregate Capability Constraint or multiple Aggregate Capability Constraints at the Generating Facility as described in the CAISO's Business Practice Manuals. If the Interconnection Customer requests that the CAISO enforce multiple Aggregate Capability Constraints, the CAISO will enforce an Aggregate Capability Constraint at the Generating Facility level and subordinate Aggregate Capability Constraints at the level of Resource IDs. If the Interconnection Customer does not elect an Aggregate Capability Constraint(s), the combined PMax of the Co-located Resources registered in the Master File for that Generating Facility may not exceed the Generating Facility's Interconnection Service Capacity. EIM Participating Resource Scheduling Coordinators also may request that the CAISO enforce an Aggregate Capability Constraint or multiple Aggregate Capability Constraints for Co-located Resources, subject to the prior written approval of the applicable EIM Entity Balancing Authority that enforcing an Aggregate Capability Constraint(s) for Co-located Resources does not create a threat to safety or reliability.

As described in the CAISO's Business Practice Manuals the CAISO may relax enforcement of subordinate Aggregate Capability Constraints in its Real-Time Market prior to relaxing enforcement of the system energy-balance constraint specified in Sections 27.4.3.3.4 to ensure there is sufficient Supply to meet the CAISO Forecast of CAISO Demand.

Notwithstanding Section 34.13, a Generating Facility whose Co-located Resources, including Variable Energy Resources, do not comply with Dispatch Instructions such that their output exceeds the Interconnection Service Capacity of the Generating Facility, will be ineligible for the Aggregate Capability Constraint. In such cases, the CAISO will adjust the PMaxes of those Co-located Resources proportionate to each Generating Unit's capacity such that the sum of the PMax values equals the Interconnection Service Capacity of the Generating Facility, or as requested by the Interconnection Customer so long as the total value does not exceed the Interconnection Service Capacity of the Generating Facility.

Similar to other Generating Facilities with multiple Resource IDs, the CAISO will have no liability with respect to Co-located Resources or their Scheduling Coordinators if Co-located Resources do not comply with Dispatch Instructions and infringe on Interconnection Service Capability used by other Co-located Resources at a Generating Facility.

In the event that Co-located Resources in an EIM Entity Balancing Authority area do not comply with Dispatch Instructions such that their output exceeds the interconnection service capacity for the Co-located Resources, the CAISO will ask the applicable EIM Entity Balancing Authority whether it will revoke its prior approval of enforcing the Aggregate Capability Constraint for such Co-located Resources.

The following resources are not eligible to use the Aggregate Capability Constraint: Multi-Stage Generators, Pseudo-Tie Resources, Proxy Demand Response, Pumped Storage Hydro Units, Metered Subsystems, and Use-Limited Resources.

Scheduling Coordinators may not offer or self-provide Ancillary Services into the CAISO's Markets or receive Uncertainty Awards from Generating Units, EDAM Resources, or EIM Resources that are subject to Aggregate Capability Constraints until the CAISO issues a Market Notice stating this restriction will no longer apply. The Pricing Node for the Generating Units, EDAM Resources or EIM Resources subject to an Aggregate Capability Constraint will be their Point of Interconnection.

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Section 29

29. Energy Imbalance Market

29.1 General Provisions.

(a) **Operation of EIM.** Pursuant to Section 29, the CAISO shall expand operation and settlement of the Real-Time Market to provide for the purchase and sale of balancing Energy in any Balancing Authority Area for which the Balancing Authority executes an EIM Entity Agreement with the CAISO. Operation and Settlement of the Real-Time Market in an EIM Entity Balancing Authority Area for which the Balancing Authority executes an EDAM Entity Agreement with the CAISO is supplemented by Section 33.

(b) **EIM Tariff Obligations.** EIM Market Participants shall comply with –

(1) the provisions of Section 29; and

(2) other provisions of the CAISO Tariff that apply to the extent such provisions –

(A) expressly refer to Section 29 or EIM Market Participants;

(B) are cross referenced in Section 29; or

(C) are not limited in applicability to the CAISO Controlled Grid, the CAISO Balancing Authority Area, or CAISO Markets other than the Real-Time Market.

(c) **Inconsistency Between Provisions.** If there is an inconsistency between a provision in Section 29 and another provision of the CAISO Tariff regarding the rights or obligations of EIM Market Participants, except in their capacity as EDAM Market Participants under Section 33, the provision in Section 29 shall prevail to the extent of the inconsistency. If there is an inconsistency between a provision in Section 29 and a provision in Section 33, the provisions of Section 33 will prevail with respect to participation in the Day-Ahead Market and the provisions of Section 29 will prevail with respect to participation in the Real-Time Market, provided that the provisions of both Sections 33 and 29 will be given equal consideration such that the provisions applicable as an EIM Market Participant and EDAM Market Participant may be reconciled where provisions apply to participation in both the Real-Time Market and the Day-Ahead Market.

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29.2 EIM Entity and EIM Sub-Entity Access to the Real-Time Market

(a) **In general.** The CAISO shall –

(1) provide open and non-discriminatory access to the Real-Time Market, including the Energy Imbalance Market, in accordance with the provisions of the CAISO Tariff; and

(2) make available for use in the Real-Time Market the transmission capacity that is available in Real-Time –

(A) on the CAISO Controlled Grid; and

(B) for which an EIM Entity or EIM Sub-Entity provides EIM Transmission Service Information pursuant to Section 29.17.

(b) **Implementation of Access as an EIM Entity.**

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(7) **Readiness Criteria.**

(A) **Prospective EIM Entity Full Network Model Integration.** The network model data of the prospective EIM Entity is integrated into the Full Network Model such that –

(i) the Load, EIM Internal Intertie and EIM External Interties and Generating Unit definition in the Full Network Model is consistent with the Load, EIM Internal Intertie and EIM External Interties and Generating Unit definition in the prospective EIM Entity network model file that it delivered to the CAISO;

(ii) the SCADA measurements used in the prospective EIM Entity's EMS model match the measurements observed by the CAISO through the CAISO EMS;

(iii) the State Estimator solution is equivalent or superior to the prospective EIM Entity's state estimator solution for its Balancing Authority Area; and

(iv) the physical representation of the prospective EIM Entity network matches the Base Market Model that accounts for non-conforming load, behind-the-meter generation, Pseudo-Ties, and Dynamic Schedules, and third party transmission service provider and path operator information that the CAISO agrees is used to support EIM Transfers and Real-Time Dispatch in the Energy Imbalance Market, as applicable.

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(K) **Additional Criteria**

(i) **Execution of Necessary Agreements.** The prospective EIM Entity has complied with Section 29.4(c)(2) and executed any necessary agreements for operating as an EIM Entity, including any non-disclosure agreements required for the exchange of information.

(ii) **Operating Procedures.** Prior to the start of parallel operations pursuant to Section 29.2(b)(4)(B), the CAISO and the prospective EIM Entity have defined, completed, and tested operating procedures for the prospective EIM Entity and its Scheduling Coordinator's participation in the Energy Imbalance Market.

(iii) **Identification of EIM Available Balancing Capacity.** The prospective EIM Entity has identified EIM Resources and non-participating resources that it intends to designate in the EIM

Resource Plan as EIM Available Balancing Capacity.

(iv) **Flexible Capacity Requirements.** The CAISO has received and stored all historical data from the prospective EIM Entity necessary and sufficient for the CAISO to perform the flexible ramp requirement, and the CAISO has established flexible capacity requirements for the prospective EIM Entity's Balancing Authority Area and for the combined EIM Area including the prospective EIM Entity.

(v) **Monitoring.** Sufficient and adequate data is available to the CAISO and the Department of Market Monitoring to enable market monitoring as of the Implementation Date.

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29.4 Roles and Responsibilities

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(b) **EIM Entity.**

(1) **Balancing Authority Obligations.**

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(3) **EIM Entity Obligations.** An EIM Entity shall –

(A) perform the obligations of an EIM Entity in accordance with the EIM Entity Agreement, Section 29, and other provisions of the CAISO Tariff that apply to EIM Entities, subject to the limitations specified in Section 29.1(b)(2)(C);

(B) ensure that each EIM Transmission Service Provider in its Balancing Authority Area has provisions in effect in the EIM Transmission Service Provider's transmission tariff, as necessary or applicable, to enable operation of the Real-Time Market in its Balancing Authority Area;

(C) qualify as or secure representation by no more than one EIM Entity Scheduling Coordinator;

(D) review and validate information about available transmission capacity submitted to it by an EIM Transmission Service Provider and transmit such validated information to its EIM Entity Scheduling Coordinator;

(E) provide the CAISO and its EIM Entity Scheduling Coordinator with information regarding the transmission capacity available to the Real-Time Market, including any information regarding Transmission Constraints of which it is aware;

(F) define Load Aggregation Points in its Balancing Authority Area;

(G) determine and inform the CAISO which resource types are eligible to participate in the Real-Time Market as resources and which transmission service providers or holders of transmission rights are EIM Transmission Service Providers; and

(H) inform the CAISO whether or not the EIM Entity intends to utilize the CAISO's Demand Forecast consistent with Section 29.34(d).

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29.7 EIM Operations Under Normal and Emergency Conditions.

(a) **CAISO Controlled Grid Operations.** Section 7 shall not apply to EIM Market Participants in their capacities as such.

(b) **Normal EIM Operations.** The CAISO shall administer the transmission capacity made available to the Real-Time Market to manage Energy imbalances in the EIM Area under

normal operations.

(c) **Load Curtailment.** The CAISO will not issue Dispatch Instructions to an EIM Entity Scheduling Coordinator or an EIM Sub-Entity Scheduling Coordinator with respect to Load or Demand that has not been bid into the Real-Time Market.

(d) **Dispatch Instructions for EIM Resources.** The CAISO will not issue Dispatch Instructions to an EIM Participating Resource Scheduling Coordinator with respect to Supply that has not been bid into the Real-Time Market.

(e) **EIM Transfers.** The CAISO will use Transfer System Resources to manage EIM Transfers as aggregate Dynamic Schedules with each EIM Entity Balancing Authority Area, which –

(1) shall not require individual resource E-Tags;

(2) shall not constitute inadvertent Energy;

(3) shall reflect intra-hour incremental EIM Transfers between the CAISO Balancing Authority Area and each EIM Entity Balancing Authority Area;

(4) shall be updated by the CAISO within 60 minutes after the end of each Operating Hour to include the integrated Energy during the hour for the sum of all EIM Transfers between each Balancing Authority Area in the EIM Area in accordance with WECC business practices for purposes of inadvertent Energy accounting; and

(5) shall be subsequently updated as necessary consistent with the requirements of WECC, NERC, and North American Energy Standards Board standards and business practices.

(f) **Dynamic Imbalance Schedule to Net EIM Transfers.** The CAISO will use Transfer System Resources to –

(1) model changes in the net five-minute scheduled EIM Transfers that result from Real-Time Dispatch as a Dynamic Schedule between the CAISO and EIM Entity for AGC control accuracy; and

(2) calculate the dynamic net scheduled EIM Transfers for the CAISO and each EIM

Entity Balancing Authority Area and derive from these dynamic net scheduled EIM Transfers the Dynamic Schedules on EIM Internal Interties for E-Tag purposes.

(g) **EIM Manual Dispatch.**

(1) The EIM Entity may issue an EIM Manual Dispatch to an EIM Resource or a non-participating resource in its Balancing Authority Area, outside of the Market Clearing of the Real-Time Market, when necessary to address reliability or operational issues in the EIM Entity Balancing Authority Area that the CAISO is not able to address through normal economic Dispatch and Congestion Management. The EIM Entity may issue an EIM Manual Dispatch to any EIM Resource or a non-participating resource in its Balancing Authority Area regardless of whether an EIM Sub-Entity Scheduling Coordinator has rights to issue an EIM Manual Dispatch to such EIM Resource or non-participating resource.

(2) If authorized by the EIM Entity, the EIM Sub-Entity may issue an EIM Manual Dispatch to an EIM Resource or a non-participating resource for which it is registered as the EIM Sub-Entity Scheduling Coordinator when necessary to address reliability or operational issues in its service territory that the CAISO is not able to address through normal economic Dispatch and Congestion Management, provided that such ability by the EIM Sub-Entity shall not prevent the EIM Entity from issuing an EIM Manual Dispatch to any EIM Resource or a non-participating resource in its Balancing Authority Area, and the most recent EIM Manual Dispatch shall take precedence over any prior EIM Manual Dispatch issued to the EIM Resource. Any financial or operational impact on an EIM Sub-Entity resulting from an EIM Manual Dispatch issued by the EIM Entity shall be resolved in accordance with the applicable tariff or contractual arrangements between the EIM Entity and the EIM Sub-Entity.

(h) **EIM Entity and EIM Sub-Entity Actions in Response to an EIM Manual Dispatch.** If

the EIM Entity or EIM Sub-Entity issues an EIM Manual Dispatch to address circumstances on its system –

(1) the EIM Entity shall immediately inform the CAISO, as specified in the Business Practice Manual for the Energy Imbalance Market, if the EIM Entity Balancing Authority Area is under manual operation;

(2) the EIM Entity or EIM Sub-Entity shall immediately inform the CAISO of the EIM Manual Dispatch issued to any EIM Resource or non-participating resource by submitting the EIM Manual Dispatch instruction for the affected resource to the CAISO as specified in the Business Practice Manual for the Energy Imbalance Market; and

(3) the EIM Entity or EIM Sub-Entity remains responsible for informing the Reliability Coordinator of the circumstances creating the need for the EIM Manual Dispatch and may enforce Transmission Constraints, as may be required.

(i) **CAISO Actions in Response to Notification of EIM Manual Dispatch.** Upon receipt of notice of an EIM Manual Dispatch, the CAISO shall –

(1) reflect the EIM Manual Dispatch in the Real-Time Market;

(2) disregard an EIM Manual Dispatch in the determination of the Locational Marginal Price; and

(3) treat an EIM Manual Dispatch to an EIM Participating Resource or non-participating resource as FMM or RTD Instructed Imbalance Energy for Settlement.

(j) **EIM Disruption.**

(1) **Declaration.** The CAISO may declare an interruption of EIM Entity participation in the Real-Time Market when in its judgment –

(A) operational circumstances (including a failure of the Real-Time Market operation to produce feasible results in the EIM Area or other CAISO Market Disruption) in the EIM Area have caused or are in danger of causing an abnormal system condition in the CAISO Balancing Authority

Area or an EIM Balancing Authority Area that requires immediate action to prevent loss of Load, equipment damage, or tripping system elements that might result in cascading Outages, or to restore system operation to meet Applicable Reliability Criteria; or

(B) communications between the CAISO and EIM Market Participants are disrupted and prevent an EIM Entity, EIM Entity Scheduling Coordinator, EIM Sub-Entity, EIM Sub-Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator from accessing CAISO systems to submit or receive information.

(2) **CAISO Response to EIM Disruption.** If the CAISO declares an interruption of EIM Entity participation in the Real-Time Market, the CAISO may in its judgment, among other things-

(A) separate the affected EIM Entity Balancing Authority Area from the EIM Area and maintain the Real-Time Market for other Balancing Authority Areas in the EIM Area by enforcing a net transfer constraint for the affected Balancing Authority Area to separate it from the remainder of the EIM Area;

(B) reduce or suspend EIM Transfers between one or more Balancing Authority Areas in the EIM Area including the CAISO Balancing Authority Area and in accordance with Section 33.7.5 as applicable to EDAM Transfers, and communication and coordination with all impacted EIM Entities to assess and mitigate potential issues within the EIM Area;

(C) instruct one or more EIM Entities to maintain system balance within their Balancing Authority Area without RTM Dispatch; or

(D) in addition or as an alternative, use market results in the Real-Time Market in accordance with Section 7.7.9 or take any of the actions specified in Section 7.7.6 with respect to the Real-Time Market, except that if Section 7.7.6 calls for the use of Day-Ahead Market results, the

CAISO will use:

(i) the price specified in the EIM Entity's open access transmission tariff as the LMP;

(ii) the EIM Entity's or EIM Sub-Entity's EIM Base Schedule as the schedule;

(iii) the EIM Bid Adder from the most recent corresponding interval that is available as the EIM Bid Adder; and

(iv) the emissions rate set by the California Air Resources Board for an unspecified source multiplied by the daily Greenhouse Gas Allowance Price.

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29.9 Outages and Critical Contingencies.

(a) **Applicability of Section 9.** Section 9 shall not apply to EIM Market Participants except as referenced in Section 29.9.

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(e) **Forced Outages.** An EIM Entity Scheduling Coordinator and an EIM Sub-Entity Scheduling Coordinator shall comply with the reporting provisions of Section 9 with regard to Forced Outages of transmission facilities within the EIM Entity Balancing Authority Area or within the EIM Sub-Entity area they represent and an EIM Participating Resource Scheduling Coordinator shall comply with the reporting provisions of Section 9 with regard to Forced Outages of Generating Units it represents as EIM Resources. The applicable provisions of Section 9 as to Forced Outages on transmission facilities and Generating Units include, but are not limited to, Sections 9.3.6.4.1(b), 9.3.6.4.1(c), 9.3.6.4.1(d), 9.3.6.4.2(2), 9.3.6.4.2(3), and 9.3.10.

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29.11 Settlements and Billing for EIM Market Participants.

(a) **Applicability.** Section 29.11, rather than Section 11, shall apply to the CAISO Settlement with EIM Entity Scheduling Coordinators, EIM Sub-Entity Scheduling Coordinators, and EIM Participating Resource Scheduling Coordinators, except as otherwise provided, but not to other Scheduling Coordinators. Settlement of the Real-Time Market with EDAM Entity Scheduling Coordinators, EDAM Resource Scheduling Coordinators, and EDAM Load Serving Entity Scheduling Coordinators is also governed by Section 33.11. Settlement under Section 33.11 results in outcomes not produced for EIM Market Participants that are not EDAM Market Participants, including Settlement of Demand within an EDAM Entity Balancing Authority Area, Settlement of Supply from EDAM Resources that would otherwise be settled as non-participating resources in an EIM Entity Balancing Authority Area, sequential netting of Bid Cost Recovery from the RUC to the RTM, and Settlement of transfer revenue associated with an EDAM Transfer limit established in accordance with Section 33.7 and Section 33.18.

(b) **Imbalance Energy.**

(1) **FMM Instructed Imbalance Energy.**

(A) **Calculation.**

(i) **EIM Participating Resources.** The CAISO will calculate an EIM Participating Resource's FMM Instructed Imbalance Energy in the same manner as it calculates FMM Instructed Imbalance Energy under Section 11.5.1.1, except that references to the Day-Ahead Schedule in the relevant Appendix A definitions shall be deemed references to the EIM Base Schedule, unless the EIM Participating Resource is also an EDAM Resource (in which case the Day-Ahead Schedule will be referenced), and that the

CAISO will include any Energy from an EIM Manual Dispatch of the EIM Participating Resource in the FMM that is identified by the EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator prior to the start of the FMM.

(ii) **Non-Participating Resources.** The CAISO will calculate the FMM Instructed Imbalance Energy of non-participating resources in an EIM Entity Balancing Authority Area in the same manner as it calculates FMM Instructed Imbalance Energy under Section 11.5.1.1, except that references to the Day-Ahead Schedule in the relevant Appendix A definitions shall be deemed references to the EIM Base Schedule, and that the CAISO will include any Energy from an EIM Manual Dispatch or EIM Auto-Match of the EIM non-participating resource in the FMM that is identified by the EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator prior to the start of the FMM.

(B) **Settlement.** The CAISO will settle –

(i) the FMM Instructed Imbalance Energy with the EIM Participating Resource Scheduling Coordinator for EIM Participating Resources; and

(ii) with the applicable EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator for non-participating resources in an EIM Entity Balancing Authority Area.

(2) **RTD Instructed Imbalance Energy.**

(A) **Calculation.**

(i) **EIM Participating Resources.** The CAISO will calculate an EIM Participating Resource's RTD Instructed Imbalance Energy in the same manner in which it calculates RTD Instructed Imbalance Energy under Sections 11.5.1.2 and 11.5.5, except

that the CAISO will include any Energy from an EIM Manual Dispatch of the EIM Participating Resource in the RTD that is identified by the EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator.

(ii) **Non-Participating Resources.** The CAISO will calculate the RTD Instructed Imbalance Energy of non-participating resources in an EIM Entity Balancing Authority Area in the same manner in which it calculates RTD Instructed Imbalance Energy under Section 11.5.1.2 and 11.5.5, except that the CAISO will include any Energy from an EIM Manual Dispatch or EIM Auto-Match of the EIM non-participating resource in the RTD that is identified by the EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator.

(B) **Settlement.** The CAISO will settle the RTD Instructed Imbalance Energy –

(i) with the EIM Participating Resource Scheduling Coordinator for EIM Participating Resources; and

(ii) with the applicable EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator for non-participating resources in an EIM Entity Balancing Authority Area.

(3) **Uninstructed Imbalance Energy.**

(A) **EIM Participating Resources.**

(i) **Calculation.** For EIM Participating Resources and an EIM Entity Balancing Authority Area's dynamic import/export schedules with external resources, the CAISO will calculate Uninstructed Imbalance Energy in the same manner in which it calculates Uninstructed Imbalance Energy under Section 11.5.2.1.

(ii) **Settlement.** The CAISO will settle the Uninstructed Imbalance

Energy with the EIM Participating Resource Scheduling Coordinator, the EIM Entity Scheduling Coordinator, or the EIM Sub-Entity Scheduling Coordinator, as applicable.

(B) **Non-Participating Resources.**

(i) **Calculation.** For non-participating resources in an EIM Entity Balancing Authority Area, the CAISO will calculate Uninstructed Imbalance Energy in accordance with Section 11.5.2, except that the CAISO will treat an EIM Base Schedule as a Day-Ahead Schedule and the CAISO will treat an EIM Manual Dispatch and an EIM Auto-Match as a Dispatch Instruction.

(ii) **Settlement.** The CAISO will settle the Uninstructed Imbalance Energy for non-participating resources in an EIM Entity Balancing Authority Area at the applicable RTD Locational Marginal Price in accordance with Section 11.5.2.1 with the applicable EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator and will treat EIM Entity Balancing Authority Demand in the same manner as the CAISO treats CAISO Demand under that Section.

(C) **Non-Participating Load.**

(i) **Calculation.** For non-participating Load in an EIM Entity Balancing Authority Area, the CAISO will calculate Uninstructed Imbalance Energy in accordance with Section 11.5.2.2, except that the CAISO will determine deviations based on the EIM Base Load Schedule unless associated with an EDAM Balancing Authority Area (in which case the CAISO will reference the Day-Ahead Schedule).

(ii) **Settlement.** The CAISO will settle Uninstructed Imbalance Energy for non-participating Load in an EIM Entity Balancing

Authority Area at the applicable Default LAP Hourly Real-Time Price in accordance with Section 11.5.2.2 with the applicable EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator and will treat EIM Entity Balancing Authority Demand in the same manner as the CAISO treats CAISO Demand under that Section.

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(e) **Neutrality Accounts.**

(1) **In General.** The CAISO will collect neutrality amounts from EIM Market Participants to recover differences in Real-Time Market payments made and Real-Time Market payments received.

(2) **Real-Time Congestion Offset.** The CAISO will assess EIM Entity Scheduling Coordinators a Real-Time Congestion Offset allocation calculated pursuant to Section 11.5.4.1.2.

(3) **Real-Time Imbalance Energy Offset Allocation.** The CAISO will assess EIM Entity Scheduling Coordinators a Real-Time Imbalance Energy Offset allocation calculated pursuant to Section 11.5.4.1.1.

(4) **Real-Time Marginal Cost of Losses Offset.** The CAISO will allocate the Real-Time Marginal Cost of Losses Offset to EIM Entity Scheduling Coordinators pursuant to Section 11.5.4.1.3.

(5) **Marginal Greenhouse Gas Cost Offset.** The CAISO will allocate the Marginal Greenhouse Gas Cost Offset to a GHG Regulation Area's metered Demand pursuant to Section 11.5.4.1.4.

(6) **EIM Transfer Revenue.** The CAISO will allocate EIM Transfer revenue to EIM Entity Scheduling Coordinators pursuant to Section 11.5.4.1.5.

(7) **Other Neutrality Adjustments.** The CAISO will levy additional charges on or

make additional payments to EIM Market Participants as adjustments in accordance with Section 11.14.

(f) **Real-Time Bid Cost Recovery.**

(1) **In General.** The CAISO will provide EIM Participating Resources RTM Bid Cost Recovery. The CAISO will net RUC Bid Cost Shortfalls and RUC Bid Cost Surpluses in accordance with Section 11.8.5 for EIM Participating Resources that are also EDAM Resources.

(2) **Calculation of Real-Time Bid Cost Recovery.** The CAISO will calculate Real-Time Bid Cost Recovery in accordance with Section 11.8.4, except that the CAISO will treat a non-zero EIM Base Schedule of an EIM Participating Resource as an IFM Self-Schedule and the corresponding intervals as IFM self-commitment intervals.

(3) **Application of Real-Time Performance Metric.**

The CAISO will adjust the RTM Energy Bid Cost, the RTM Market Revenues, and RTM Minimum Load Costs determined pursuant to Section 29.11(f)(2) by multiplying the Real-Time Performance Metric with those amounts for the applicable Settlement Interval pursuant to the rules specified in Section 11.8.4.4 and its subsections, except that the CAISO will treat an EIM Base Schedule as a Day-Ahead Schedule.

(4) **Allocation of EIM Entity RTM Bid Cost Uplift.**

(A) **Calculation of Charge.** The Net RTM Bid Cost Uplift will be determined for each EIM Entity Balancing Authority Area in accordance with the methodology set forth in Section 11.8.6.

(B) **Settlement.** The CAISO will assess the Net RTM Bid Cost Uplift calculated for each EIM Entity Balancing Authority Area to the applicable EIM Entity Scheduling Coordinator in accordance with Section 11.8.6.6.(ii).

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(i) **EIM Administrative Charge.**

(1) **In General.** The CAISO will charge EIM Market Participants an EIM Administrative Charge consisting of the real-portions of the Market Services Charge and the System Operations Charge.

(2) **Market Services Charge.** The Market Services Charge shall be the product of the Market Services Charge for each Scheduling Coordinator as calculated according to the formula in Appendix F, Schedule 1, Part A, the real-time market percentage as calculated in the cost of service study according to Appendix F, Schedule 1, Part A, and the sum of Gross FMM Instructed Imbalance Energy (excluding FMM Manual Dispatch Energy) and Gross RTD Instructed Imbalance Energy (excluding RTD Manual Dispatch Energy Standard Ramping Deviation, Ramping Energy Deviation, Residual Imbalance Energy, and Operational Adjustments).

(3) **System Operations Charge.** The System Operations Charge shall be the product of the System Operations Charge for each Scheduling Coordinator, as calculated according to the formula in Appendix F, Schedule 1, Part A, the real-time market percentage as calculated in the cost of service study conducted according to Appendix F, Schedule 1, Part A, and the absolute difference between metered energy and the EIM Base Schedules.

(4) **Minimum EIM Administrative Charge.** The CAISO will calculate the minimum EIM Administrative Charge as the product of the sum of the real-time activities associated with market services charge and the real-time activities chart associated with system operations, as well as –

(A) five percent of the total gross absolute value of Supply of all EIM Market Participants; plus

(B) five percent of the total gross absolute value of Demand of all EIM Market Participants.

(5) **Withdrawing EIM Entity.** If the EIM Entity notifies the CAISO of its intent to terminate participation in the Energy Imbalance Market and requests suspension of the Energy Imbalance Market in its Balancing Authority Area under Section 29.4(b)(4), the CAISO will charge the EIM Entity the minimum EIM Administrative Charge calculated under Section 29.11(i)(4) during the notice period.

(6) **Application of Revenues.** The CAISO will apply revenues received from the EIM Administrative Charge against the costs to be recovered through the Grid Management Charge as described in Appendix F, Schedule 1, Part A.

(7) **EDAM Administrative Charge.** An EIM Market Participant that is also an EDAM Market Participant will pay the EDAM Administrative Charge and will not pay the EIM Administrative Charge.

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(r) **EIM Transfer System Resource Settlement.**

(1) **EIM Transfer System Resource Registration.** The CAISO will provide each EIM Entity with financially binding Settlement of Energy transfer schedule changes from its respective base schedules between EIM Entity Balancing Authority Areas, unless the EIM Entity Balancing Authority Areas are also EDAM Entity Balancing Authority Areas in which case transfer schedule changes will be referenced from the Day-Ahead Schedule for the EDAM Transfer, and will –

(A) establish for each EIM Entity that shares an EIM Internal Intertie a to/from EIM Transfer System Resource pricing location in their respective EIM Entity Balancing Authority Area;

(B) associate with each to/from EIM Transfer System Resource pricing location, a unique base EIM Transfer System Resource that accounts for Energy transfer schedule changes between EIM Entity Balancing Authority Areas;

(C) require each EIM Entity Scheduling Coordinator to submit EIM Base

Schedules and E-Tags that identifies Energy transfer schedule changes at the registered base EIM Transfer System Resource; and

(D) reject EIM Base Schedule changes at the to/from EIM Transfer System Resource pricing location not associated with the registered base EIM Transfer System Resource.

(2) **Settlement for EIM Transfer System Resource Changes.** The CAISO will settle EIM Transfer System Resource changes established pursuant to Section 29.11(r)(1) as –

(A) FMM Instructed Imbalance Energy or RTD Instructed Energy based on the Settlement Interval in which the E-Tag is received, without regard for other Energy types identified in Sections 11.5.1.1 or 11.5.2.2, or as an Operational Adjustment if the E-Tag is received after the end of the Operating Hour for purposes of Energy accounting in accordance with the applicable WECC business practices;

(B) based on the difference between the E-Tag and the EIM Transfer System Resource base schedule;

(C) at the relevant FMM or RTD Locational Marginal Price at each unique EIM Transfer System Resource pricing location associated with the base EIM Transfer System Resource; and

(D) including any contribution that the base EIM Transfer System Resource might have on the RTM Bid Cost Recovery pursuant to Section 29.11(f).

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29.17 EIM Transmission System

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(f) **EIM Transfer Availability.**

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(6) **EIM Transfer Limit Constraints.** The CAISO's Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch shall enforce the EIM Transfer limit and the associated physical limit at each EIM Internal Intertie.

(7) **EIM Transfer Limits at EDAM Interties.** The CAISO will not re-optimize EDAM Transfer limits established in accordance with Section 33.16, Section 33.17, and Section 33.18 in the Real-Time Market, and will establish separate EIM Transfer limits to represent other transmission capacity from the Day-Ahead Market at each EDAM Internal Intertie.

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29.29 EIM Relationship to EDAM

The provisions of this Section 29 apply to EIM Market Participants and EDAM Market Participants, in addition to Section 33, which includes requirements applicable to EDAM Market Participants that are not applicable to EIM Market Participants.

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29.31 Day-Ahead.

EIM Entity Scheduling Coordinators, EIM Sub-Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators may not submit Bids in the CAISO's Day-Ahead Market on behalf of EIM Market Participants that they represent in their capacity as an EIM Entity Scheduling Coordinator, EIM Sub-Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator, unless participation in the Day-Ahead Market is enabled within an EIM Entity Balancing Authority Area in

accordance with Section 33, in which case participation in the Day-Ahead Market by EDAM Market Participants is governed by Section 33 and execution of the associated agreement in Appendix B is required to support participation in the Day-Ahead Market.

29.32 Greenhouse Gas Regulation and GHG Bid Adders.

(a) GHG Bid Adders.

(1) In General. EDAM Resource Scheduling Coordinators, EIM Participating Resource Scheduling Coordinators, and Scheduling Coordinators for resources within the CAISO Balancing Authority Area will have an opportunity to recover costs of compliance with GHG regulations adopted by a state jurisdiction that has priced GHG emissions as part of a state GHG reporting and reduction program.

(2) Bid Adders. The Fifteen-Minute Market and Real-Time Dispatch will use GHG Bid Adders submitted by EDAM Resource Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators for resources located outside of a specific GHG Regulation Area to optimize the attribution of GHG Transfers into that GHG Regulation Area.

The Fifteen-Minute Market and Real-Time Dispatch will use GHG Bid Adders submitted by EDAM Resource Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators for resources located within the GHG Regulation Area of the State of Washington to optimize the attribution of GHG Transfers into GHG Regulation Areas outside of the State of Washington.

The Fifteen-Minute Market and Real-Time Dispatch will use GHG Bid Adders submitted by EDAM Resource Scheduling Coordinators, EIM Participating Resource Scheduling Coordinators, and Scheduling Coordinators for resources located within the GHG Regulation Area of the State of California to optimize the attribution of GHG Transfers into GHG Regulation Areas outside of the State of California.

For purposes of this Section 29.32, GHG Regulation Areas will reflect the Pricing Nodes of the CAISO Balancing Authority Area, an EDAM Entity Balancing Authority Area or an EIM Entity Balancing Authority Area within the GHG boundary as defined by a state jurisdiction that has priced GHG emissions as part of a state GHG reporting and reduction program. GHG Regulation Areas modeled in the Fifteen-Minute Market and Real-Time Dispatch may include Pricing Nodes in addition to Pricing Nodes for GHG Regulation Areas modeled in the Day Ahead Market, because the EIM Area may include EIM Entity Balancing Authority Areas located within the GHG boundary area as defined by a state jurisdiction that has priced GHG emissions as part of a state GHG reporting and reduction program that are not participating in the Day-Ahead Market.
Scheduling Coordinators, EDAM Resource Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators for resources located inside a specific GHG Regulation Area will not submit GHG Bid Adders to serve Demand within that GHG Regulation Area.
Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into the CAISO Balancing Authority Area that register in the Master File that their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of California will not submit GHG Bid Adders.

EDAM Resource Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into an EDAM Entity Balancing Authority Area with Demand in the State of California that register in the Master File that their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of California will not submit GHG Bid Adders.
EDAM Resource Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into an EDAM Balancing Authority Area

with Demand in the State of Washington that register in the Master File that their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of Washington will not submit GHG Bid Adders.

EIM Participating Resource Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into an EIM Balancing Authority Area with Demand in the State of California that register in the Master File that their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of California will not submit GHG Bid Adders.

EIM Participating Resource Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into an EIM Balancing Authority Area with Demand in the State of Washington that register in the Master File that their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of Washington will not submit GHG Bid Adders.

(A) Bid Submission.

EDAM Resource Scheduling Coordinators for resources located outside of a GHG Regulation Area may submit a separate GHG Bid Adder as an hourly Bid component specific to each GHG Regulation Area.

EIM Participating Resource Scheduling Coordinators for resources located outside of a GHG Regulation Area may submit a separate GHG Bid Adder as an hourly Bid component specific to each GHG Regulation Area.

Scheduling Coordinators for resources located within the GHG Regulation Area of the State of California may submit a GHG Bid Adder as an hourly Bid component for the GHG Regulation Area outside of the State of California.

Scheduling Coordinators for resources located within the GHG Regulation Area of the State of Washington may submit a GHG Bid

Adder as an hourly Bid component for the GHG Regulation Area outside of the State of Washington.

GHG Bid Adders will consist of a price and MW quantity. The price included in the EIM Bid Adder will not be less than $0/MWh and not greater than 110% of the resource's GHG maximum compliance cost as determined in accordance with Section 29.32(a)(3).

(B) Default Treatment. If a resource located outside of a specific GHG Regulation Area does not have a GHG Bid Adder, the Fifteen-Minute Market and Real-Time Dispatch will not select the resource for attribution into that GHG Regulation Area.

(3) Determination of EIM Maximum GHG Bid Adder.

The CAISO will calculate maximum daily GHG Bid Adders for each EDAM Resource, each EIM Resource, and each resource located within the CAISO Balancing Authority Area in relation to GHG Regulation Areas, as applicable, based on the resource's highest average heat rate on its heat rate curve, the applicable Greenhouse Gas Allowance Price, and the resource's applicable emission rate. The CAISO will perform this calculation in accordance with the provisions of the applicable Business Practice Manual. The CAISO will also provide for an option to negotiate a maximum daily GHG Bid Adder for each GHG Regulation Area in accordance with the provisions of the applicable Business Practice Manual.

(4) GHG Bid Adder Price. The price included in the GHG Bid Adder will not be less than $0/MWh. The sum of the GHG Bid Adder price and the Energy Bid price may not exceed the Soft Energy Bid Cap unless the sum of a resource's relevant maximum daily GHG Bid Adder and Default Energy Bid as adjusted pursuant to Section 30.11 exceeds the Soft Energy Bid Cap. In this case, the sum of a resource's GHG Bid Adder and Energy Bid price may not exceed the sum of the

relevant maximum daily GHG Bid Adder and the resource's Default Energy Bid or the Hard Energy Bid Cap, whichever is lower.

(b) Consideration of GHG Bid Adders in Market Clearing.

(1) Dispatch of Resources with Nonzero GHG Bid Adders.

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will take into account GHG Bid Adders in selecting Energy produced by EDAM Resources located outside of a specific GHG Regulation Area up to the associated MW quantity included in the GHG Bid Adder to serve Demand within that GHG Regulation Area.

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will take into account GHG Bid Adders in selecting Energy produced by resources located within the GHG Regulation Area of the State of California up to the associated MW quantity included in the GHG Bid Adder to serve Demand in the GHG Regulation Area outside the State of California.

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will take into account GHG Bid Adders in selecting Energy produced by resources located within the GHG Regulation Area of the State of Washington up to the associated MW quantity included in the GHG Bid Adder to serve Demand in the GHG Regulation Area outside the State of Washington.

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will not consider GHG Bid Adders when selecting EDAM Resource Facilities, EIM Resources, or resources located within the CAISO Balancing Authority Area to serve Demand outside of GHG Regulation Areas.

(2) Maximum GHG MW Attribution Quantity. The Fifteen-Minute Market and Real-Time Dispatch will limit the total GHG attribution to an EDAM Resource Facility located outside GHG Regulation Areas to serve Demand in GHG Regulation Areas to a value equal to the lower of (i) the MW value in the EDAM Resource's GHG Bid Adder, (ii) the EDAM Resource's upper Economic Bid minus the EDAM Resource Facility's Day-Ahead Energy Schedule plus the EDAM Resource Facility's total Day-Ahead Market GHG attribution, considering any applicable derates and Ancillary Services capacity reservations, for the relevant Operating Hour, or (iii) the EDAM Resource Facility's Real-Time Market Energy Schedule.

The Fifteen-Minute Market and Real-Time Dispatch will limit the maximum GHG Bid Adder MW quantity of an EIM Participating Resource located outside GHG Regulation Areas to a value equal to the lower of (i) the MW value in the EIM Participating Resource's GHG Bid Adder; (ii) the EIM Participating Resource's dispatchable Bid range between the EIM Participating Resource's EIM Base Schedule and the EIM Participating Resource's effective upper Economic Bid, considering any applicable derates and Ancillary Services capacity reservations, for the relevant Operating Hour, or (iii) the EIM Participating Resource's Real-Time Market Energy Schedule.

The Fifteen-Minute Market and Real-Time Dispatch will limit the maximum GHG Bid Adder MW quantity of a resource located within the CAISO Balancing Authority Area to serve Demand in a GHG Regulation Area outside of the State of California to a value equal to the lower of (i) the MW value in the resource's GHG Bid Adder; (ii) the resource's upper Economic Bid minus the resources's Day-Ahead Energy Schedule plus the EDAM Resource's total Day-Ahead Market GHG attribution, considering any applicable derates and Ancillary Services capacity reservations, for the relevant Operating Hour, or (iii) the resource's Real-Time Market Energy Schedule.

(3) Dispatch of EIM Participating Resources Bid Adders of Zero. The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will not dispatch resources located outside a GHG Regulation Area for delivery into that GHG Regulation Area if the MW quantity included in the GHG Bid Adder is zero.

(c) GHG Marginal Cost.

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will take into account Energy Bids and GHG Bids, optimally select resources located outside of a GHG Regulation Area to support GHG Transfers into a GHG Regulation Area until the total MW of GHG Transfers into the respective GHG Regulation Area is fully allocated. The Shadow Price of this allocation constraint is the Marginal GHG Cost for the respective GHG Regulation Area.

(d) Compensation.

EIM Resource Scheduling Coordinators and EDAM Resource Scheduling Coordinators will receive GHG settlements pursuant to Section 11. When the Real-Time Market attributes a resource located outside of a GHG Regulation Area to support a GHG Transfer to serve Demand in a GHG Regulation Area, the applicable Scheduling Coordinator for the resource will receive a payment equaling the product of the GHG Transfer to the GHG Regulation Area attributed to the resource in the Real-Time Market at the applicable Real-Time Market Marginal GHG Cost for that GHG Regulation Area.

29.32.1 GHG Net Export Constraint

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will apply a net export constraint for EDAM Entity and EIM Entity Balancing Authority Areas that do not overlap with a GHG Regulation Area. This constraint will limit the aggregate attribution of EDAM Resource Facilities within a specific EDAM Entity Balancing Authority Area or EIM Participating Resources within an EIM Entity Balancing Authority Area such that the aggregate attribution does not exceed the net exports from that Balancing Authority Area. This constraint will also limit the

aggregate attribution of resources within a specific GHG Regulation Area to serve Demand in another GHG Regulation Area such that the attribution may not exceed the net exports from these resources' native Balancing Authority Areas. This constraint will not restrict the Real-Time Market from attributing capacity located outside of a specific GHG Regulation Area obligated to serve Demand within that GHG Regulation Area that is registered with the CAISO in accordance with the applicable Business Practice Manual. The CAISO will not enforce this constraint for any Balancing Authority Area in the EIM Area and during any Real-Time Market interval in which the CAISO Balancing Authority Area, an EDAM Entity Balancing Authority Area, or an EIM Entity Balancing Authority Area with Demand in a GHG Regulation Area is deficient in the upward direction for purposes of the capacity or flexibility tests described Section 29.34.

29.32.2 Data Availability

(a) Notification. The CAISO will notify an EDAM Resource Scheduling Coordinator of the portion of the FMM Energy Schedule and the portion of the RTD Energy Dispatch that support a GHG Transfer to serve Demand in a GHG Regulation Area as part of the Real-Time Market results publication.

The CAISO will notify an EIM Participating Resource Scheduling Coordinator of the portion of the FMM Energy Schedule and the portion of the RTD Energy Dispatch that support a GHG Transfer to serve Demand in a GHG Regulation Area as part of the Real-Time Market results publication.

The CAISO will notify the Scheduling Coordinator for a resource located in the CAISO Balancing Authority Area of the portion of the resource's FMM Energy Schedule and the portion of the RTD Energy Dispatch that support a GHG Transfer to serve Demand in a GHG Regulation Area as part of the Real-Time Market results publication.

(b) Disclosure. The CAISO may disclose information related to GHG Transfers to a Government Authority, so long as such information does not disclose confidential information of any individual Market Participant.

29.33 [Not Used]

29.34 EIM Operations

(a) **In General.** Section 34, as supplemented by provisions in Section 29.34, will govern the operation of the Real-Time Market within the EIM Area. Operation of the Real-Time Market within the EDAM Area is further supplemented by Section 33, which produces outcomes that satisfy or modify certain requirements otherwise applicable to EIM Market Participants, including a Day-Ahead Schedule instead of a submitted EIM Base Schedule and an initial EIM Base Load Schedule, pools of Balancing Authority Areas for purposes of the EIM Resource Sufficiency Evaluation, and Energy transfers between Balancing Authority Areas with equal scheduling priority to Demand.

(b) **Applicability.** EIM Entity Scheduling Coordinators, EIM Sub-Entity Scheduling Coordinators, and EIM Participating Resource Scheduling Coordinators will submit EIM Base Schedules and other necessary information to the CAISO for use in the Real-Time Market pursuant to Section 29.34 and not pursuant to Section 34.

(c) **Submission Deadlines.** If an EIM Entity Scheduling Coordinator, EIM Sub-Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator fails to submit an EIM Base Schedule according to the timelines established in this Section 29.34, the CAISO will not accept the EIM Base Schedule or use it in the Real-Time Market.

(d) **Demand Forecast.**

(1) **In General.** In accordance with procedures set forth in the Business Practice Manual for the Energy Imbalance Market, the CAISO shall develop short-term and mid-term Demand Forecasts by Demand Forecast zone within each EIM Entity Balancing Authority Area, separately from the CAISO Balancing Authority Area, and, as needed for the EDAM Upward Pool or EDAM Downward Pool.

(2) **Short Term Forecast.** The CAISO's short-term Demand Forecast for an EIM Entity Balancing Authority Area shall produce a value every five minutes for the duration of the CAISO's Dispatch horizon, which has five-minute granularity and extends several Dispatch Intervals.

* * * * *

(l) **EIM Resource Sufficiency Evaluation – Capacity Test.**

(1) **Requirement.**

The Supply, as applicable and as detailed in Business Practice Manuals, included in—

(A) the EIM Resource Plan must meet the Demand Forecast for each EIM Entity Balancing Authority Area, and

(B) the RUC Schedules, the HASP Advisory Schedules and HASP Intertie Block Schedules or the FMM Schedules must meet the Demand Forecast for the CAISO Balancing Authority Area.

* * * * *

(m) **EIM Resource Sufficiency Evaluation – Flexibility Test.**

(1) **Review.**

(A) **Individual EIM Entity Balancing Authority Areas.** The CAISO will review the EIM Resource Plan for an EIM Entity Balancing Authority Area pursuant to the process set forth in the Business Practice Manual for the Energy Imbalance Market and verify that it has sufficient Bids for Ramping capability, accounting for Sections 29.34(l)(2)(A)(iii), 29.34(l)(2)(A)(iv), 29.34(l)(2)(B)(iv) and 29.34(l)(2)(D), to meet the EIM Entity Balancing Authority Area upward and downward Ramping requirements within a one percent or one MW tolerance, as adjusted pursuant to Sections 29.34(m)(2), (3), and (7).

(B) **CAISO Balancing Authority Area.** The CAISO will review the RUC Schedules, the HASP Advisory Schedules and HASP Intertie Block

Schedules or the FMM Schedules in the CAISO Balancing Authority Area pursuant to the process set forth in the Business Practice Manual for the Energy Imbalance Market and verify that it has sufficient Bids for Ramping capability, accounting for Sections 29.34(l)(2)(A)(iii), 29.34(l)(2)(A)(iv) and 29.34(l)(2)(B)(iv), to meet the CAISO Balancing Authority Area upward and downward Ramping requirements within a one percent or one MW tolerance, as adjusted pursuant to Sections 29.34(m)(2), (3), and (7), provided that the benefit of the exclusion of the export schedules which may be curtailed in accordance with Section 34.12.4(a) or 34.12.4(b) will be reflected in the upward capacity test results for the CAISO Balancing Authority Area.

(C) **EIM Resource Sufficiency Evaluation for the Balancing Authority Areas in the EDAM Area**. Consistent with Section 33.31.1.4, the CAISO will evaluate resource sufficiency of the Balancing Authority Areas in the EDAM Area solely pursuant to this Section 29.34(m). The CAISO will consider all Day-Ahead Market awards for Energy, Imbalance Reserves, and Reliability Capacity as supply prior to testing an individual Balancing Authority Area in the EDAM Area for EIM resource sufficiency. The CAISO will evaluate the EDAM Upward Pool to verify that it has sufficient Bids and Ramping capability to meet the Upward Uncertainty Requirement for the EDAM Upward Pool within a one percent or one MW tolerance, as adjusted pursuant to Sections 29.34(m)(2)-(5). The CAISO will evaluate the EDAM Downward Pool to verify that it has sufficient Bids and Ramping capability to meet the Downward Uncertainty Requirement for the EDAM Downward Pool within a one percent or one MW tolerance, as adjusted pursuant to Sections 29.34(m)(2)-(5). A Balancing Authority in the EDAM Area not included in the EDAM Upward Pool or EDAM Downward Pool will be evaluated in

the same manner as an individual EIM Balancing Authority Area.

(D) **Power Balance Constraint and Load Conformance Considerations.** The CAISO, pursuant to the process set forth in the Business Practice Manual for the Energy Imbalance Market, will consider the quantity of any power balance constraint relaxation in the Real-Time Market solution, while excluding from consideration any constraint relaxation due to Load conformance in the Real-Time Market solution, in the determination of whether sufficient Bids for Ramping capability are available to meet the upward and downward Ramping requirements in accordance with this Section 29.34(m)(1).

(2) **Determination of Diversity Benefits.** The CAISO will calculate separately the upward and downward EIM Diversity Benefits as the difference between the sum of the upward and downward Uncertainty Requirements for all Balancing Authority Areas in the EIM Area, and the Uncertainty Requirement for the EIM Area. The Diversity Benefits for a Balancing Authority Area in the EDAM Area is its proportional amount of the difference between the sum of each Balancing Authority Area's individual Imbalance Reserve requirement and the EDAM Area Imbalance Reserve requirements, with the CAISO calculating the Imbalance Reserve requirements for each Balancing Authority Area independently and for the EDAM Area as a whole.

(3) **Effects of Diversity Benefits for EIM Entities that Are Not Balancing Authorities in the EDAM Area.** For each Balancing Authority Area in the EIM Area that is not a Balancing Authority Area in the EDAM Area, the CAISO will reduce the upward and downward Uncertainty Requirements by the Balancing Authority Area's pro rata share of the upward and downward EIM Diversity Benefit in the EIM Area as may be limited by –

(A) the available net import EIM Transfer capability into that Balancing Authority Area in the case of an upward Uncertainty Requirement; and

(B) the available net export EIM Transfer capability from that Balancing Authority Area in the case of a downward Uncertainty Requirement.

(4) **Effect of Diversity Benefit for Balancing Authority Areas that Are Within the Pool of EDAM Balancing Authority Areas.** For each Balancing Authority Area that is included in the pool of Balancing Authority Areas in the EDAM Area as provided in Section 33.31.1.4, the EIM RSE will hold a portion of the Diversity Benefit from allocation and reflect this quantity as additional global procurement of Imbalance Reserves for the EDAM Area as provided in the Business Practice Manuals for purposes of the EIM RSE. If the pool of Balancing Authority Areas in the EDAM Area is subdivided for purposes of accepting the assistance Energy transfer product as provided in Section 29.34(n)(3)(C), each sub-pool will carry with it and leverage the Diversity Benefit of the entities within the sub-pool.

(5) **Effect of Diversity Benefit for Balancing Authority Areas in the EDAM Area that Are not Within the Pool of EDAM Balancing Authority Areas.** The EIM RSE will consider the effects of dynamic transfers from the members of the EDAM Upward Pool and EDAM Downward Pool to the Balancing Authority Area not included in the pool as provided in Section 33.31.1.4, pursuant to the procedures the Business Practice Manuals.

(6) **Determination of Flexible Ramping Sufficiency Credit.** The CAISO will calculate for each Balancing Authority Area in the EIM Area, the upward flexible Ramping sufficiency credit as the outgoing EIM Transfer from that area and the downward flexible Ramping sufficiency credit as the incoming EIM transfer into that area.

(7) **Effect of Flexible Ramping Sufficiency Credit.** The CAISO will reduce the upward Uncertainty Requirement of a Balancing Authority Area in the EIM Area by its upward flexible Ramping sufficiency credit, and will reduce the downward Uncertainty Requirement of a Balancing Authority Area in the EIM Area by its downward flexible Ramping sufficiency credit.

(n) **Effect of EIM Resource Capacity or Flexibility Insufficiency.**

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(3) **Assistance Energy Transfers.**

(A) **In General.** A Balancing Authority Area in the EIM Area may obtain assistance Energy transfers into its Balancing Authority Area prior to December 31, 2025 if its Scheduling Coordinator has submitted to the Master File a designation to accept automatically incremental EIM Transfer imports and pay the associated EIM Assistance Energy Transfer Surcharge following the failure of the upward capacity test in Section 29.34(l) or the upward flexibility test in Section 29.34(m) in accordance with the timelines and procedures included in the Business Practice Manual for the Energy Imbalance Market. Consistent with the requirements in the Business Practice Manual, the CAISO will issue a market notice prior to the CAISO Balancing Authority Area accepting assistance Energy transfers as provided in this section, with such election to remain in effect unless the CAISO issues a market notice at least 5 Business Days prior to withdrawing or resuming its participation.

(B) **Assistance Energy Transfer Product.** If a participating Balancing Authority Area in the EIM Area has opted-in to receive assistance Energy transfers consistent with the process requirements set forth in the Business Practice Manuals and the participating Balancing Authority Area fails the upward capacity test in Section 29.34(l) or the upward flexibility test in Section 29.34(m) then—

(i) the Balancing Authority Area will not be subject to the capacity test or flexibility test failure consequences in Section 29.34(n);

(ii) the Balancing Authority Area will pay the EIM Assistance Energy

Transfer Surcharge according to Section 29.11(t).

(C) **Access to the Assistance Energy Transfer Product for pooled Balancing Authority Areas within the EDAM Area.** A Balancing Authority Area in the EDAM Area that is pooled together with other Balancing Authority Areas within the EDAM Area as part of the EDAM Upward Pool or EDAM Downward Pool pursuant to Section 33.31.1.4 may elect to receive assistance Energy transfers. If the Balancing Authority Areas in the EDAM Area that are pooled together for purposes of the EIM RSE do not uniformly elect to receive assistance Energy transfers, then the EDAM Upward Pool will be subdivided into two sub-pools: those Balancing Authority Areas in the EDAM Area that elect to receive assistance Energy transfers and those Balancing Authority Areas in the EDAM Area that do not elect to receive assistance Energy transfers. If the EDAM Upward Pool, or its sub-pool as applicable, elects to receive assistance Energy transfers and fails the upward flexibility test in Section 29.34(m) then:

(i) The EDAM Upward Pool, or its sub-pool as applicable, will not be subject to the failure consequences of Section 29.34(n)(1)(B) or Section 29.34(n)(2)(B); and

(ii) the EDAM Upward Pool, or sub-pool as applicable, will receive an assistance Energy transfer and will be assessed the EIM Assistance Energy Transfer Surcharge according to Section 29.11(t), with any revenue or Surcharges distributed to the EDAM Upward Pool to be allocated *pro-rata* to the members of the EDAM Upward Pool, or sub-pool as applicable, that received the assistance Energy transfers.

(D) **Sunset Period**. This Section 29.34(n), together with Section 29.11(t), will terminate on December 31, 2025.

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(r) **Use of EIM Available Balancing Capacity.**

(1) **In General.** The CAISO will use EIM Available Balancing Capacity identified in the EIM Resource Plan to address power balance constraint infeasibilities in the EIM Balancing Authority Area for which the EIM Available Balancing Capacity is designated by the responsible EIM Entity Scheduling Coordinator, while simultaneously participating in Congestion Management.

(2) **EIM Resource Sufficiency Evaluations.** The CAISO will not apply the EIM Available Balancing Capacity towards its evaluation of the resource sufficiency tests specified in Section 29.34(k), (l), and (m).

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Section 30

30.1 Bids, Including Self-Schedules

Scheduling Coordinators shall submit Bids to participate in the CAISO Markets, as well as any Self-Schedules, ETC Self-Schedules, TOR Self-Schedules, or Self-Provided Ancillary Services. Bidding rules for each type of resource are contained in this Section 30 and additional specifications regarding bidding practices are contained in the Business Practice Manuals posted on the CAISO Website. Bids will consist of various components described in this Section 30 through which the Scheduling Coordinator provides information regarding the parameters and conditions pursuant to which the Bid may be optimized by the CAISO Markets.

30.1.1 Day-Ahead Market

Bids submitted in the DAM apply to the twenty-four (24) hours of the next Trading Day (23 or 25 hours on the Daylight Savings transition days) and are used in both the IFM and RUC. Bids for the Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve service in the Day-Ahead Market must be received by Market Close for the Day-Ahead Market. The Bids shall include information for each of the twenty-four (24) Settlement Periods of the Trading Day. Failure to provide the information within the stated time frame shall result in the Bids being declared invalid by the CAISO. Scheduling Coordinators may submit Bids for the DAM as early as seven (7) days ahead of the targeted Trading Day.

30.1.2 Real-Time Market

Economic Bids and Self-Schedules submitted in the RTM apply to a single Trading Hour and are used for all market processes of the RTM. The CAISO will require Scheduling Coordinators to honor their Day-Ahead Ancillary Services Awards when submitting Ancillary Services Bids in the RTM. Bids for Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve service for each Settlement Period must be received at least seventy-five minutes prior to the commencement of that Settlement Period. The Bids shall include information for only the relevant Settlement Period. Failure to provide the information within the stated timeframe shall result in the Bids being declared invalid and rejected by the CAISO.

30.2 Bid Types

There are four types of Bids: Energy Bids (which include Virtual Bids), Ancillary Services Bids, Imbalance Reserves Bids, and RUC Availability Bids. Energy Bids that are not Virtual Bids, and Ancillary Services Bids can be submitted as either an Economic Bid or a Self-Schedule. All other bid types must be submitted as Economic Bids. Economic Bids specify prices for MW amounts of capacity or MWh amounts of Energy. Self-Schedules do not have any prices associated for MW or MWh. Energy Bids, including both Economic Bids and Self-Schedules (where Self-Schedules are otherwise permitted), may be either Supply Bids, Demand Bids, Virtual Supply Bids, or Virtual Demand Bids. Ancillary Services Bids, RUC Availability Bids, and Imbalance Reserves Bids are Supply Bids only. Ancillary Services may be self-provided by providing a Submission to Self-Provide an Ancillary Service and having that submission accepted by the CAISO. Rules for submitting the four types of Bids vary by the type of resource to which the Bid applies as described in Section 30.5 and as further required in each CAISO Markets process as specified in Sections 31, 33, and 34.

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30.5 Bidding Rules

30.5.1 General Bidding Rules

(a) All Bids submitted by Scheduling Coordinators to the DAM for the following Trading Day shall be submitted at or prior to 10:00 a.m. on the day preceding the Trading Day, but no sooner than seven (7) days prior to the Trading Day. All Energy and Ancillary Services Bids of each Scheduling Coordinator submitted to the RTM for the following Trading Day shall be submitted starting from the time of publication of DAM results for the Trading Day, and ending seventy-five (75) minutes prior to each applicable Trading Hour in the RTM. Scheduling Coordinators may submit only one set of Bids to the RTM for a given Trading Hour, which the CAISO uses for all Real-Time Market processes. ;

(b) Bid prices submitted by a Scheduling Coordinator for Energy accepted and cleared in the IFM and scheduled in the Day-Ahead Schedule may be increased or decreased in the RTM . Bid prices for Energy submitted but not scheduled in the Day-Ahead Schedule

may be increased or decreased in the RTM. Incremental Bid prices for Energy associated with Day-Ahead AS or RUC Awards in Bids submitted to the RTM may be revised.

(c) A Scheduling Coordinator may submit in the Real-Time Market new daily Start-Up Bids, Minimum Load Bids, and Transition Bids for resources and MSG Configurations for which the Scheduling Coordinator previously submitted such Bids in the Day-Ahead Market, except for: (1) Trading Hours in which a resource or MSG Configuration has received a Day-Ahead Schedule or has received a Start-Up Instruction in RUC; and (2) Trading Hours that span the Minimum Run Time of the resource or MSG Configuration after the CAISO has committed the resource or the Scheduling Coordinator has self-committed the resource in the RTM.

(d) Scheduling Coordinators may revise ETC Self-Schedules for Supply in the RTM to the extent such a change is consistent with TRTC Instructions provided to the CAISO by the Participating TO in accordance with Section 16.

(e) Scheduling Coordinators may revise TOR Self-Schedules for Supply only in the HASP to the extent such a change is consistent with TRTC Instructions provided to the CAISO by the Non-Participating TO in accordance with Section 17. Energy associated with awarded Ancillary Services capacity cannot be offered in the Real-Time Market separate and apart from the awarded Ancillary Services capacity.

(f) Scheduling Coordinators may submit Energy Bids, AS Bids and RUC Bids in the DAM that are different for each Trading Hour of the Trading Day.

(g) Bids for Energy or capacity that are submitted to one CAISO Market, but are not accepted in that market are no longer a binding commitment and Scheduling Coordinators may submit Bids in a subsequent CAISO Market at a different price.

(h) The CAISO shall be entitled to take all reasonable measures to verify that Scheduling Coordinators meet the technical and financial criteria set forth in Section 4.5.1 and the accuracy of information submitted to the CAISO pursuant to this Section 30.

(i) In order to retain the priorities specified in Section 31.4 and 34.12 for scheduled amounts

in the Day-Ahead Schedule associated with ETC and TOR Self-Schedules or Self-Schedules associated with Regulatory Must-Take Generation, a Scheduling Coordinator must submit to the Real-Time Market ETC or TOR Self-Schedules, or Self-Schedules associated with Regulatory Must-Take Generation, at or below the Day-Ahead Schedule quantities associated with the scheduled ETC, TOR, or Regulatory Must-Take Generation Self-Schedules. If the Scheduling Coordinator fails to submit such Real-Time Market ETC, TOR, or Regulatory Must-Take Generation Self-Schedules, the defined scheduling priorities of the ETC, TOR, or Regulatory Must-Take Generation Day-Ahead Schedule quantities may be subject to adjustment in the HASP and the Real-Time Market as further provided in Sections 31.4 and 34.12 in order to meet operating conditions.

(j) For Multi-Stage Generating Resources that receive a Day-Ahead Schedule, RUC Award, or Ancillary Services Award, the Scheduling Coordinator must submit an Energy Bid in the Real-Time Market for the same Trading Hour(s). If the Scheduling Coordinator submits an Economic Bid for such Trading Hour(s), the Economic Bid must be for either: the same MSG Configuration scheduled or awarded in the Integrated Forward Market, or the MSG Configuration committed in RUC. If the Scheduling Coordinator submits a Self-Schedule in the Real-Time Market for such Trading Hour(s), then the Energy Self-Schedule may be submitted in any registered MSG Configuration, including the MSG Configuration awarded in the Day-Ahead Market, that can support the awarded Ancillary Services (as further required by Section 8).

(k) Scheduling Coordinators for Multi-Stage Generating Resources may submit into the Real-Time Market bids from up to six (6) MSG Configurations in addition to the MSG Configuration scheduled or awarded in the Integrated Forward Market and Residual Unit Commitment, provided that the MSG Transitions between the MSG Configurations bid into the Real-Time Market are feasible and the transition from the previous Trading Hour are also feasible.

(l) For the Trading Hours that Multi-Stage Generating Resources do not have a CAISO Schedule or award from a prior CAISO Market run, the Scheduling Coordinator can

submit up to six (6) MSG Configurations into the RTM.

(m) A Scheduling Coordinator cannot submit a Bid to the CAISO Markets for a MSG Configuration into which the Multi-Stage Generating Resource cannot transition due to lack of Bids for the specific Multi-Stage Generating Resource in other MSG Configurations that are required for the requisite MSG Transition.

(n) In order for Multi-Stage Generating Resource to meet any Resource Adequacy must-offer obligations, the responsible Scheduling Coordinator must submit either an Economic Bid or Self-Schedule for at least one MSG Configuration into the Day-Ahead Market and Real-Time Market that is capable of fulfilling that Resource Adequacy obligation, as feasible. The Economic Bid shall cover the entire capacity range between the maximum bid-in Energy MW and the higher of Self-Scheduled Energy MW and the Multi-Stage Generating Resource plant-level PMin as registered in the Master File.

(o) For any given Trading Hour, a Scheduling Coordinator may submit Self-Schedules and/or Submissions to Self-Provide Ancillary Services in only one MSG Configuration for each Generating Unit.

(p) In any given Trading Hour in which a Scheduling Coordinator has submitted a Self-Schedule for a Multi-Stage Generating Resource, the Scheduling Coordinator may also submit Bids for other MSG Configurations provided that they concurrently submit Bids that enable the applicable CAISO Market to transition the Multi-Stage Generating Resource to other MSG Configurations.

(q) If in any given Trading Hour the Multi-Stage Generating Resource was awarded Regulation or Operating Reserves in the IFM, any Self-Schedules or Submissions to Self-Provide Ancillary Services the Scheduling Coordinator submits for that Multi-Stage Generating Resource in the RTM must be for the same MSG Configuration for which Regulation or Operating Reserve is Awarded in IFM for that Multi-Stage Generating Resource in that given Trading Hour.

(r) If a Multi-Stage Generating Resource has received a binding RUC Start-Up Instruction as provided in Section 31, any Self-Schedule or Submission to Self-Provide Ancillary

Services in the RTM must be in the same MSG Configuration committed in RUC.

(s) If in any given Trading Hour the Multi-Stage Generating Resource is scheduled for Energy in the IFM, any Self-Schedules the Scheduling Coordinator submits for that Multi-Stage Generating Resource in the RTM must be for the same MSG Configuration for which Energy is scheduled in IFM for that Multi-Stage Generating Resource in that given Trading Hour.

(t) For a Multi-Stage Generating Resource, the Bid(s) submitted for the resource's configuration(s) shall collectively cover the entire capacity range between the maximum bid-in Energy MW and the higher of the Self-Scheduled Energy MW and the Multi-Stage Generating Resource plant-level PMin as registered in the Master File. This rule shall apply separately to the Day-Ahead Market and the Real-Time Market.

(u) A Scheduling Coordinator may submit a Self-Schedule Hourly Block for the RTM as an import to or an export from the CAISO Balancing Authority Area and may also submit Self-Scheduled Hourly Blocks for Ancillary Services imports. Such a Bid shall be for the same MWh quantity for each of the four (4) fifteen (15)-minute intervals that make up the applicable Trading Hour.

(v) A Scheduling Coordinator may submit a Variable Energy Resource Self-Schedule for the RTM can be submitted from a Variable Energy Resource. A Scheduling Coordinator can use either the CAISO forecast for Expected Energy in the RTM or can provide its own forecast for Expected Energy pursuant to the requirements specified in Section 4.8.2. The Scheduling Coordinator must indicate in the Master File whether it is using its own forecast or the CAISO forecast for its resource in support of the Variable Energy Self-Schedule. The Scheduling Coordinator is not required to include the same MWh quantity for each of the four (4) fifteen (15)-minute intervals that make up the applicable Trading Hour for the Variable Energy Resource Self-Schedule include. If an external Variable Energy Resource that is not using a forecast of its output provided by the CAISO submits a Variable Energy Resource Self-Schedule and the Expected Energy is not delivered in the FMM, the Scheduling Coordinator for the Variable Energy Resource will be subject to

the Under/Over Delivery Charge as described in Section 11.31. Scheduling Coordinators for Dynamically Scheduled Variable Energy Resources that provide the CAISO with a two (2)-hour rolling forecast with five (5)-minute granularity can submit Variable Energy Resource Self-Schedules.

(w) Scheduling Coordinators can submit Economic Hourly Block Bids to be considered in the HASP and to be accepted as binding Schedules with the same MWh award for each of the four (4) FMM intervals. Scheduling Coordinator can also submit Economic Hourly Block Bids for Ancillary Services. As specified in Section 11, a cleared Economic Hourly Block Bid is not eligible for Bid Cost Recovery.

(x) Scheduling Coordinators can submit Economic Hourly Block Bids with Intra-Hour Option. If accepted in the HASP, such a Bid creates a binding schedule with same MWh awards for each of the four (4) FMM intervals. After that, the RTM can optimize such schedules for economic reasons once through an FMM during the Trading Hour. As specified in Section 11, a cleared Economic Hourly Block Bid with Intra-Hour Option is not eligible for Bid Cost Recovery.

(y) A Scheduling Coordinator submitting Bids to the RTM is not required to submit a Self-Schedule Hourly Block, a Variable Energy Resource Self-Schedule, an Economic Hourly Block Bid, or an Economic Hourly Block Bid with Intra-Hour Option, and may instead choose to participate in the RTM through Economic Bids or Self-Schedules.

(z) For a Wheeling Through Self Schedule to be eligible as a Priority Wheeling Through for a given month, the Scheduling Coordinator must notify the CAISO of the MW quantity of the power supply contract MW supporting the export Self-Schedule of the Priority Wheeling Through transaction and confirm it meets the eligibility requirements to support a Priority Wheeling Through. The Scheduling Coordinator must provide such information to the CAISO by 45 days prior to the applicable month.

(aa) A Scheduling Coordinator for a CAISO Balancing Authority Area resource will indicate through a resource parameter as prescribed in the Business Practice Manual that it has sold capacity to an out-of-balancing authority area Load Serving Entity, and no CAISO

Load Serving Entity has a right to such capacity. If the Scheduling Coordinator does not indicate this status, the resource cannot be a designated resource for an export Self-Schedule at Scheduling Points backed by non-Resource Adequacy Capacity. The CAISO will notify a Scheduling Coordinator hourly, to the extent practicable, that its resource, which is flagged to support an export, is designated by another entity to support export Self-Schedules at Scheduling Points backed by non-Resource Adequacy Capacity. Upon receiving the notice, the Scheduling Coordinator for the designated resource shall notify the CAISO if it does not have a contractual commitment to support such export Self-Schedule or does not have a reasonable expectation to be available to support the export Self Schedule. The Scheduling Coordinator for the designated resource and the Scheduling Coordinator for the export Self-Schedule shall designate a resource to support such export only if the resource is expected to have sufficient available capacity to support the export quantity throughout the entire hour. For Variable Energy Resources, this requirement can only be satisfied if the resource's forecasted output for each of the applicable four (4) fifteen (15) minute intervals in the applicable hour for which a bid has been submitted, based on the most recent forecast for that hour, is for Generation that is equal to or greater than the Self Schedule export quantity. The designated capacity must be the deliverable capacity of a resource with Full Capacity Deliverability Status, Partial Capacity Deliverability Status, or Interim Deliverability Status that is shown on the CAISO's NQC list.

(bb) In addition to meeting any obligations applicable to Resource Adequacy Resources, a Scheduling Coordinator for a resource supporting Self-Schedules of exports at Scheduling Points backed by non-Resource Adequacy Capacity shall submit a RUC Availability Bid for RCU for a quantity equal to or greater than the quantity of the export.

(cc) The Scheduling Coordinator for the resource shall offer Energy Bids into the Real-Time Market to support Self-Schedules of exports at Scheduling Points backed by non-Resource Adequacy Capacity.

(dd) The positive difference in quantity between the higher of a designated resource's Day-

Ahead Schedule or a designated resource's RUC Schedule and the Day-Ahead Schedule of the corresponding Self-Schedule at a Scheduling Point backed by non-Resource Adequacy Capacity cannot back additional exports at a Scheduling Point backed by non-Resource Adequacy Capacity scheduled in the Real-Time Market.

(ee) A Scheduling Coordinator shall not schedule an import Self-Schedule to support an export Self-Schedule of exports at Scheduling Points explicitly sourced by non-Resource Adequacy Capacity. The transaction is properly scheduled as a Wheeling Through transaction as described in section 30.5.4.

30.5.2 Supply Bids

30.5.2.1 Common Elements for Supply Bids

In addition to the resource-specific Bid requirements of this Section, all Supply Bids must contain the following components: Scheduling Coordinator ID Code; Resource Location or Resource ID, as appropriate; MSG Configuration ID, as applicable; PNode or Aggregated Pricing Node as applicable; Energy Bid Curve, as applicable; Self-Schedule component; Ancillary Services Bid; RUC Availability Bid as applicable; Imbalance Reserves Bid as applicable; the CAISO Market to which the Bid applies; Trading Day to which the Bid applies; Priority Type (if any), and a Transaction ID as created by the CAISO.

Supply Bids offered in the CAISO Markets must be monotonically increasing. Energy Bids in the RTM must also contain a Bid for Ancillary Services to the extent the resource is certified and capable of providing Ancillary Service in the RTM up to the registered certified capacity for that Ancillary Service less any Day-Ahead Ancillary Services Awards.

Scheduling Coordinators must submit the applicable Supply Bid components, including Self-Schedules, for the submitted MSG Configuration.

Scheduling Coordinators submitting Bids for Scheduling Points must adhere to the E-Tagging requirements outlined in Section 30.5.7.

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30.5.2.5 Supply Bids for Metered Subsystems

Consistent with the bidding rules specified in this Section 30.5, Scheduling Coordinators that represent MSS Operators may submit Bids, including Self-Schedules and Submissions to Self-Provide an Ancillary Service, to the DAM. All Bids to supply Energy by MSS Operators must identify each Generating Unit on an individual unit basis. The CAISO will not accept aggregated Generation Bids without complying with the requirements of Section 4.9.12 of the CAISO Tariff. All Scheduling Coordinators that represent MSS Operators must submit Demand Bids at the relevant MSS LAP. Scheduling Coordinators that represent MSS Operators must comply with Section 4.9 of the CAISO Tariff. For an MSS that elects Load following, the MSS Operator shall also self-schedule or bid Supply to match the Demand Forecast. All Bids for MSSs must be identify each Generating Unit on an individual unit basis or a System Unit. For an MSS that elects Load following consistent with Section 4.9.13.2, the Scheduling Coordinator for the MSS Operator must include the following additional information with its Bids: the Generating Unit(s) that are Load following; the range of the Generating Unit(s) being reserved for Load following; whether the quantity of Load following capacity is either up or down; and, if there are multiple Generating Units in the MSS, the priority list or distribution factors among the Generating Units. The CAISO will not dispatch the resource within the range declared as Load following capacity, leaving that capacity entirely available for the MSS to dispatch. The CAISO uses this information in the IFM runs and the RUC to simulate MSS Load following. The Scheduling Coordinator for the MSS Operator may change these characteristics through the Bid submission process in the RTM.

If the Load following resource is also an RMR Unit, the MSS Operator must not specify the RMR Contract Capacity specified in the RMR Contract as Load following up or down capacity to allow the CAISO to access such capacity for RMR Dispatch.

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30.5.2.8 RUC Availability Bids

Scheduling Coordinators may submit RUC Availability Bids to seek a RUC Award. Scheduling Coordinators submit separate RUC Availability Bids for RCU and RCD. For Multi-Stage Generating Resources, the RUC Availability Bids shall be submitted at the MSG Configuration. The RUC Availability

Bid is a MW quantity in $/MW per hour. The value for the $/MW per hour component of the Bid must be between 0 and 250.

Resources offering Energy Bids, other than Virtual Bids, to the IFM must submit a RUC Availability Bid for RCU at a quantity no less than the quantity of the Energy Bid.

30.5.2.9 Imbalance Reserves Bids

Scheduling Coordinators may submit Imbalance Reserves Bids to seek an Imbalance Reserves Award. Scheduling Coordinators submit separate Imbalance Reserves Bids for IRU and IRD. For Multi-Stage Generating Resources, the Imbalance Reserves Bids shall be submitted at the MSG Configuration level. The Imbalance Reserves component is MW-quantity in $/MW per hour. The value for the $/MW per hour component of the Bid must be between 0 and 55.

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30.5.8.2 Real-Time Market.

Scheduling Coordinators may submit Demand Bids, Export Bids, Virtual Bids, and Bids for Non-Resource-Specific System Resources above the Soft Energy Bid Cap, not to exceed the Hard Energy Bid Cap, for any Trading Hour of the Real-Time Market in which

(a) The conditions in Section 30.5.8.1 applied to the same Trading Hour of the Day-Ahead Market; or

(b) (1) The CAISO has accepted a Bid for the applicable Trading Hour of the Real-Time Market with an Energy Bid price that exceeds the Soft Energy Bid Cap pursuant to Section 30.7.12, not including Bids from Reliability Demand Response Resources, or (2) the Maximum Import Bid Price exceeds the Soft Energy Bid Cap

30.5.9 GHG Bid Adders

Scheduling Coordinators for resources located within a GHG Regulation Area may submit GHG Bid Adders to serve Demand within another GHG Regulation Area in accordance with Sections 29.32 and 33.32.

30.6 Bidding and Scheduling of PDRs and RDRRs

30.6.1 Bidding and Scheduling of PDRs

Unless otherwise specified in the CAISO Tariff and applicable Business Practice Manuals, and subject to Section 30.6.3, the CAISO will treat Bids for Energy and Ancillary Services on behalf of Proxy Demand Resources like Bids for Energy and Ancillary Services on behalf of other types of supply resources. The CAISO will only accept the following types of Bids from Proxy Demand Resources:

(i) Economic Bids for Energy or Ancillary Services;

(ii) submissions to Self-Provide Ancillary Services;

(iii) submissions of Energy Self-Schedules from Proxy Demand Resources that have provided Submissions to Self-Provide Ancillary Services;

(iv) submissions of Energy Self-Schedules in the Real-Time Market up to the Proxy Demand Resource's Day-Ahead Market Schedule in the same Trading Hour;

(v) RUC Availability Bids; and

(vi) Imbalance Reserves Bids.

A Scheduling Coordinator for a Demand Response Provider representing a Proxy Demand Resource may Self-Provide Ancillary Services for which it is certified. The Demand Response Provider's Demand Response Services for Proxy Demand Resources will be bid separately and independently from the LSE's underlying Demand Bid.

30.6.1.1 Bidding and Scheduling of PDRs in the Real-Time Market

Pursuant to Section 4.13.3, Scheduling Coordinators for Proxy Demand Resources may submit Economic Bids for Energy and Ancillary Services in the Real-Time Markets. Pursuant to Section 30.5.1(s), Scheduling Coordinators for Proxy Demand Resources may submit Economic Hourly Block Bids to be considered in the HASP, and to be accepted as binding Schedules with the same MWh award for each of the four FMM intervals. A cleared Economic Hourly Block Bid is not eligible for Bid Cost Recovery. Scheduling Coordinators for Proxy Demand Resources may not submit Economic Hourly Block Bids with an Intra-Hour Option.

30.6.1.2 Bidding and Scheduling of Proxy Demand Resources using the Load-Shift Methodology

Scheduling Coordinators for Proxy Demand Resources using the load-shift methodology described in Section 4.13.4.7 will submit separate Economic Bids for the curtailment Resource ID and the consumption Resource ID that comprise the Proxy Demand Resource. The CAISO will use reasonable efforts to optimize both Resource IDs to avoid sending conflicting Schedules.

The CAISO will only accept the following types of Bids for the curtailment Resource ID:

(i) Economic Bids for Energy or Ancillary Services;

(ii) submissions to Self-Provide Ancillary Services;

(iii) submissions of Energy Self-Schedules where the curtailment Resource ID has provided Submissions to Self-Provide Ancillary Services;

(iv) submissions of Energy Self-Schedules in the Real-Time Market up to curtailment Resource ID's Day-Ahead Market Schedule in the same Trading Hour; and

(v) RUC Availability Bids; and

(vi) Imbalance Reserves Bids.

All Economic Bids for Energy for the curtailment Resource ID must be above the Market Clearing Prices established in Section 30.6.3. For the consumption Resource ID, the CAISO will only accept Economic Bids for Energy and submissions of Energy Self-Schedules in the Real-Time Market up to its Day-Ahead Market Schedule in the same Trading Hour. All Economic Bids for the consumption Resources must be below $0/MWh.

30.6.2 Bidding and Scheduling of RDRRs

Unless otherwise specified in the CAISO Tariff and applicable Business Practice Manuals, and subject to Section 30.6.3, the CAISO will treat Bids for Energy on behalf of Reliability Demand Response Resources like Bids for Energy on behalf of other types of supply resources. The CAISO will only accept Economic Bids for Energy from Reliability Demand Response Resources. A Scheduling Coordinator for a Demand Response Provider representing a Reliability Demand Response Resource may submit Economic Energy Bids for the Reliability Demand Response Resource only in the Day-Ahead Market and in the Real-Time Market, but may not submit Energy Self-Schedules for the Reliability Demand Response Resource, may not Self-Provide Ancillary Services from the Reliability Demand Response Resource, and may not submit RUC Availability Bids, Ancillary Service Bids for the Reliability Demand Response Resource, or

Imbalance Reserves Bids. The Demand Response Provider's Demand Response Services for Reliability Demand Response Resources will be bid separately and independently from the LSE's underlying Demand Bid.

30.6.2.1 Bidding and Scheduling of RDRRs in the Real-Time Market

Pursuant to Section 4.13.3, Scheduling Coordinators for Reliability Demand Response Resources may submit Economic Bids for Energy in the Real-Time Markets. Scheduling Coordinators for Reliability Demand Response Resources may submit Economic Hourly Block Bids to be considered in the HASP, and to be accepted as binding Schedules with the same MWh award for each of the four FMM intervals. A cleared Economic Hourly Block Bid is not eligible for Bid Cost Recovery. Scheduling Coordinators for Reliability Demand Response Resources may not submit Economic Hourly Block Bids with an Intra-Hour Option.

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30.7 Bid Validation

The CAISO shall validate submitted Bids pursuant to the procedures set forth in this Section 30.7 and the rules set forth in the Business Practice Manuals.

30.7.1 Scheduling Coordinator Access

Each Scheduling Coordinator will be provided access to the CAISO's secure communication system to submit, modify and cancel Bids prior to the close of both the DAM and RTM, as specified in Section 30.5.1. The CAISO shall provide information regarding submitted Bids including, but not be limited to, the following: (i) notification of acceptance; (ii) notification of validation; (iii) notification of rejection; (iv) notification of status; (v) notification of submission error(s); and (vi) default modification or generation of Bids, including as further provided below, if any, on behalf of Scheduling Coordinators.

30.7.2 Timing of CAISO Validation

Once a Bid is submitted to the CAISO Markets, the Bid is available for validation, which is conducted in multiple steps. Clean Bids will be generated after Market Close.

30.7.3 Day-Ahead Market Validation

30.7.3.1 Validation Prior to Market Close and Master File Update

The CAISO conducts Bid validation in three steps:

Step 1: The CAISO will validate all Bids after submission of the Bid for content validation which determines that the Bid adheres to the structural rules required of all Bids as further described in the Business Practices Manuals. If the Bid fails any of the content level rules the CAISO shall assign it a rejected status and the Scheduling Coordinator must correct and resubmit the Bid.

Step 2: After the Bids are successfully validated for content, but prior to the Market Close of the DAM, the Bids will continue through the second level of validation rules to verify that the Bid adheres to the applicable CAISO Market rules and if applicable, limits based on Master File data. If the Bid fails any level two validation rules, the CAISO shall assign the Bid as invalid and the Scheduling Coordinator must either correct or resubmit the Bid.

Step 3: If the Bid successfully passes validation in Step 2, it will continue through the third level of validation where the Bid will be analyzed based on its contents to identify any missing Bid components that must be present for the Bid to be valid consistent with the market rules contained in Article III of this CAISO Tariff and as reflected in the Business Practice Manuals. At this stage the Bid will either be automatically modified for correctness and assigned a status of conditionally modified or modified, or if it can be accepted as is, the Bid will be assigned a status of conditionally valid, or valid. A Bid will be automatically modified and assigned a status of modified or conditionally modified Bid, whenever the CAISO inserts or modifies a Bid component. The CAISO will insert or modify a Bid component whenever (1) a Self-Schedule quantity is less than the lowest quantity specified as an Economic Bid for either an Energy Bid or Demand Bid, in which case the CAISO extends the Self-Schedule to cover the gap; and (2) for a Resource Adequacy Resource that is not a Use-Limited Resource, the CAISO will submit Generated Bids for Reliability Capacity as specified in Section 40.6.8.

To the extent the Scheduling Coordinator for an Eligible Intermittent Resource fails to submit a Bid for RCU up to the quantity of its forecasted output based on the forecast referenced in Section 34.1.6 the CAISO generates a bid for RCU up to the forecasted output. The price of the generated bid is at the price included in the RUC Availability Bid for RCU, or at the Default

Availability Bid if the Scheduling Coordinator did not submit any such Bid.

To the extent an RMR Resource fails to submit a Bid for RCU up to the quantity required in Section 31.5.1.2 the CAISO generates a bid for RCU up to the required quantity. The price of the generated bid is at the price included in the RUC Availability Bid for RCU, or at the Default Availability Bid if the Scheduling Coordinator did not submit any such Bid.

Throughout the Bid evaluation process, the Scheduling Coordinator shall have the ability to view the Bid and may choose to cancel the Bid, modify and re-submit the Bid, or leave the modified, conditionally modified or valid, conditionally valid Bid as is to be processed in the designated CAISO Market. These validation rules apply to Bids submitted on behalf of Use Limited Resources. The purpose of the validation rules is not to increase the amount of capacity that a Use Limited Resource has offered into the CAISO Markets.

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30.7.3.5 Bid Validation Rules for Multi-Stage Generating Resources

If a Scheduling Coordinator does not submit a Bid in the Day-Ahead Market or Real-Time Market for a Multi-Stage Generating Resource with a Resource Adequacy must-offer obligation at a MSG Configuration that can meet the applicable Resource Adequacy must-offer obligation, the CAISO will create a Generated Bid for the default Resource Adequacy MSG Configuration. If the Multi-Stage Generating Resource is not capable of Start-Up in the default Resource Adequacy MSG Configuration, then the ISO will, based on feasibility of transitions, create a Generated Bid for every MSG Configuration that has a minimum output below the MW level of the Resource Adequacy must-offer obligation, which will cover the operating range from its minimum output to the minimum of its maximum output and the MW level of the Resource Adequacy must-offer obligation. In the event that the Scheduling Coordinator does not submit a Bid in compliance with section 30.5.1(p), the CAISO will create a Generated Bid for all of the capacity not bid into the CAISO Market between the maximum bid-in Energy MW and the higher of Self-Scheduled Energy MW and the Multi-Stage Generating Resource plant-level PMin. If the Scheduling Coordinator submits a Bid for the Multi-Stage Generating Resource, the CAISO will create this Generated

Bid for the registered MSG Configurations before the Market Close, and if it does not submit such a Bid the CAISO will create this Generated Bid after the Market Close. Any Generated Bid created by the CAISO for the default Resource Adequacy MSG Configuration will be in addition to the MSG Configurations bid into the Real-Time Market by the responsible Scheduling Coordinator. If the Scheduling Coordinator submits a Bid in the Day-Ahead Market or Real-Time Market for a MSG Configuration that is not the default Resource Adequacy MSG Configuration and that does not cover the full amount of the resource's Resource Adequacy requirements, the CAISO will create a Generated Bid for the full Resource Adequacy Capacity. Before the market closes, if a Scheduling Coordinator submits a Bid in the Day-Ahead Market or Real-Time Market for the default Resource Adequacy MSG Configuration of a Multi-Stage Generating Resource that only meets part of the resource's Resource Adequacy must-offer obligation, the CAISO will extend the last segment of the Energy Bid curve in the submitted Bid for the Multi-Stage Generating Resource up to the Multi-Stage Generating Resource's Resource Adequacy must-offer obligation. After the market closes, to the extent that no Bid is submitted into the Real-Time Market for a Multi-Stage Generating Resource scheduled in the Integrated Forward Market as required in Section 30.5 the CAISO will create a Self-Schedule for MSG Configuration equal to the Day-Ahead Schedule for that resource for the MSG Configuration scheduled in the IFM. To the extent a Multi-Stage Generating Resource is awarded Operating Reserves in the Day-Ahead Market and no Economic Energy Bids is submitted for that resource in the Real-Time Market, the CAISO will insert Proxy Energy Bid in the MSG Configuration that was awarded in the Day-Ahead Market to cover the awarded Operating Reserves. The CAISO will validate that the combination of the Day-Ahead Ancillary Services Awards and Submissions to Self-Provide Ancillary Services are feasible with respect to the physical operating characteristics of the applicable MSG Configuration. The CAISO will reject Ancillary Services Bids or Submissions to Self-Provide Ancillary Services for MSG Configurations that are not certified to provide Ancillary Services. For any given Multi-Stage Generating Resource, for any given CAISO Market and Trading Hour if one MSG Configuration's Bid fails the bid validation process, all other Bids for all other MSG Configurations are also invalidated.

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30.7.4 RTM Validation

RTM Bids will include the same validation process implemented in the DAM with the following additional rules. The CAISO will not validate the Bid before and again after the Master File Data update. RTM Bids are only validated based on the current Master File Data on the relevant Trading Day.

The CAISO will insert a Generated Bid or extend an Energy Bid or Self-Schedule in the RTM to cover any Day-Ahead Schedule, RUC Award, or Imbalance Reserves Award in the absence of the required Self-Schedule or Economic Bid components, or to fill in any gaps between any Self-Schedule Bid and any Economic Bid components to cover a Day-Ahead Schedule, RUC Award, or Imbalance Reserves Award. To the extent that an Energy Bid to the HASP/RTM is not accompanied by an Ancillary Services Bid, the CAISO will insert a Spinning Reserve and Non-Spinning Reserve Ancillary Services Bid at $ 0/MW for any certified Operating Reserve capacity. The CAISO also will generate a Self-Schedule Bid for any Generating Unit that has a Day-Ahead Schedule but has not submitted Bids in HASP/RTM, up to the quantity in the Day-Ahead Schedule.

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30.7.12.5 Virtual Bids, Export Bids, Demand Bids, and Bids for Non-Resource-Specific System Resources

30.7.12.5.1 Bids for Non-Resource-Specific System Resources that are Resource Adequacy Resources

The CAISO will reduce Bids for Non-Resource-Specific System Resources that are Resource Adequacy Resources that exceed the Maximum Import Bid Price to the greater of the Soft Energy Bid Cap, the Maximum Import Bid Price, or the highest-priced Energy Bid from a Resource-Specific System Resource that the CAISO has accepted for the applicable Trading Hour pursuant to Section 30.7.12.2.

30.7.12.5.2 Virtual Bids, Export Bids, Demand Bids, and Bids for Non-Resource-Specific System Resources that are not Resource Adequacy Resources

The CAISO will accept Virtual Bids, Export Bids, Demand Bids, and Bids for Non-Resource-Specific

System Resources that are not Resource Adequacy Resources that exceed the Soft Energy Bid consistent with the conditions specified in Section 30.5.8. The CAISO will not accept Export Bids, Demand Bids, Virtual Bids, or Bids for Non-Resource-Specific System Resources that are not Resource Adequacy Resources that exceed the Hard Energy Bid Cap.

30.7.12.5.3 Maximum Import Bid Price

The CAISO calculates hourly Maximum Import Bid Prices for the Day-Ahead Market and Real-Time Market, separately, including for on-peak and off-peak hours. The CAISO calculates the Maximum Import Bid Price as 110 percent of the greater of the published bilateral electric index prices for the Mid-Columbia or Palo Verde trading hub locations, multiplied by an hourly shaping ratio. As detailed in the CAISO Business Practice Manual, the CAISO calculates the hourly shaping ratio for each hour by dividing the Day-Ahead Market Marginal Energy Cost for the CAISO Balancing Authority Area in that hour of a previous representative Trading Day by the average Day-Ahead Market Marginal Energy Cost for the CAISO Balancing Authority Area in all on-peak hours of the same previous representative Trading Day. If for any given Trading Hour the CAISO cannot calculate the Maximum Import Bid Price, the applicable Maximum Import Bid Price will be the most recently available calculated Maximum Import Bid Price.

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Section 31

31. Day-Ahead Market

The DAM consists of the following functions performed in sequence: Bid submission and validation, the IFM MPM, IFM, RUC MPM, and RUC.

Scheduling Coordinators may submit Energy Bids, Ancillary Services Bids, RUC Availability Bids, and Imbalance Reserves Bids for an applicable Trading Day. The CAISO issues Schedules for all Supply and Demand, including Participating Load, Reliability Demand Response Resources, and Proxy Demand Resources, pursuant to their Bids as provided in this Section 31. The CAISO also issues RUC Awards and Imbalance Reserves Awards to Scheduling Coordinators pursuant to their RUC Availability Bids and Imbalance Reserves Bids, respectively, as provided in this Section 31.

31.1 Bid Submission and Validation in the Day-Ahead Market

Bids, including Self-Schedules and Ancillary Services Bids, and Submissions to Self-Provide an Ancillary Service shall be submitted pursuant to the submission rules specified in Section 30. There is a single Bid submission in which Scheduling Coordinators' Bids are used for purposes of the DAM, which includes the IFM MPM, the IFM, the RUC MPM, and RUC. Scheduling Coordinators may submit Bids for the DAM as early as seven (7) days prior to the applicable Trading Day up to Market Close of the DAM for the applicable Trading Day. The CAISO will validate all Bids submitted to the DAM pursuant to the procedures set forth in Section 30.7. Scheduling Coordinators must submit Bids for participation in the IFM for Resource Adequacy Capacity as required in Section 40.

31.2 IFM MPM Process

After the Market Close of the DAM, the CAISO has validated the Bids pursuant to Section 30.7, and after the CAISO conducts the EDAM RSE, the CAISO performs the IFM MPM process, which is a single market run that occurs prior to the IFM Market Clearing run. The IFM MPM process determines, pursuant to Section 31.2.3, which Energy Bids need to be mitigated to the applicable Default Energy Bids and which Imbalance Reserves Bids for IRU need to be mitigated to the IRU Default Availability Bid in the IFM. For Maximum Net Dependable Capacity of Legacy RMR Units, Energy Bids will be mitigated to the RMR Proxy Bids pursuant to Section 31.2.3. The IFM MPM process optimizes resources to meet

Demand reflected in Demand Bids, including Export Bids and Virtual Demand Bids, targets procurement of one hundred (100) percent of Imbalance Reserves requirements based on Bids submitted to the DAM, and procures one hundred (100) percent of Ancillary Services requirements based on Supply Bids submitted to the DAM. Virtual Bids and Bids from Demand Response Resources, Participating Load, and Hybrid Resources are considered in the MPM process, but are not subject to Bid mitigation. Energy storage resources whose PMax is less than five (5) MW are considered in the MPM process, but not subject to Bid mitigation. Bids from Participating Load resources that are not subject to Bid mitigation will also be considered in the IFM MPM process. The mitigated or unmitigated Bids and RMR Proxy Bids identified in the IFM MPM process for all resources that cleared in the IFM MPM are then passed to the IFM. The CAISO performs the IFM MPM process for the IFM for the twenty-four (24) hours of the targeted Trading Day.

31.2.1 Determining Competitive and Non-Competitive Congestion Components in the IFM

The IFM MPM process enforces all Transmission Constraints that are expected to be enforced in the relevant market, in the base case of meeting Demand and in the separate cases of modeling the dispatch of Energy from all capacity awarded IRU and IRD, and produces dispatch levels for all resources with submitted Bids and LMPs for all Locations. Bid mitigation is determined by decomposing the Congestion component of each LMP determined in the IFM MPM process into competitive Congestion and non-competitive Congestion components. The competitive Congestion component of each LMP is calculated as the sum of the product of the shift factor and the Shadow Price for all competitive Transmission Constraints and the non-competitive Congestion component of each LMP is calculated as the sum of the product of the shift factor and the Shadow Price for all non-competitive Transmission Constraints. The non-competitive Congestion component of an LMP can be based on a Transmission Constraint deemed non-competitive in the base case of meeting Demand or in the separate case of modeling the dispatch for Energy of all capacity awarded IRU. The Reference Bus used in the MPM process will be either: (1) the Midway 500kV bus if Path 26 flow is from north to south; or (2) the Vincent 500kV bus if Path 26 flow is from south to north. The treatment of a particular Transmission Constraint as competitive or non-competitive for purposes of the IFM MPM process is determined pursuant to Section 39.7.2.

31.2.2 [Not Used]

31.2.3 IFM Bid Mitigation

31.2.3.1 Mitigation of Energy Bids

If the non-competitive Congestion component of an LMP calculated in an MPM process is greater than zero (0), then any resource at that Location that is dispatched in that MPM process is subject to Local Market Power Mitigation. Bids on behalf of any such resource, to the extent that they exceed the Competitive LMP plus the Competitive LMP Parameter at the resource's Location for the DAM or RTM process interval for which the MPM process applies, will be mitigated to the higher of the resource's Default Energy Bid (or RMR Proxy Bid for Legacy RMR Units), as specified in Section 39, or the Competitive LMP plus the Competitive LMP Parameter at the resource's Location for the DAM and RTM process interval for which the MPM process applies. To the extent a Multi-Stage Generating Resource is dispatched in the MPM process and the non-competitive Congestion component of the LMP calculated at the Multi-Stage Generating Resource's Location is greater than zero, for purposes of mitigation, all the MSG Configurations will be mitigated similarly and the CAISO will evaluate all submitted Energy Bids for all MSG Configurations based on the relevant Default Energy Bids for the applicable MSG Configuration. The CAISO will calculate the Default Energy Bids for Multi-Stage Generating Resources by submitted MSG Configuration. Any market Bids equal to or less than the Competitive LMP plus the Competitive LMP Parameter will be retained in the DAM and RTM process.

31.2.3.2 Mitigation of Bids for IRU

The CAISO applies Local Market Power Mitigation to Imbalance Reserves Bid for IRU if the resource for which that Bid was submitted could provide counter-flow to a Transmission Constraint deemed non-competitive pursuant to Section 39.7.2.2(B)(a) in the case of modeling the dispatch for Energy of the capacity awarded IRU. To the extent a Bid for IRU is subject to Local Market Power Mitigation and exceeds the Competitive Locational IRU Price plus the Competitive LMP Parameter, the CAISO mitigates the Bid to the higher of the: (i) resource's IRU Default Availability Bid; or (ii) Competitive Locational IRU Price plus the Competitive LMP Parameter.

31.3 Integrated Forward Market

After the IFM MPM and prior to RUC, the CAISO shall perform the IFM. The IFM (1) performs Unit Commitment and Congestion Management (2) clears mitigated or unmitigated Bids for Energy and Imbalance Reserves cleared in the MPM as well as Bids for Energy and Imbalance Reserves that were not cleared in the MPM process against bid-in Demand, taking into account transmission limits and honoring technical and inter-temporal operating constraints, such as Minimum Run Times (3) and procures Ancillary Services to meet one hundred (100) percent of the Ancillary Services requirements based on the CAISO Forecast of BAA Demand for the CAISO. The IFM utilizes a set of integrated programs that: (1) determine Day-Ahead Schedules, Imbalance Reserves Awards, and AS Awards, and related LMPs and ASMPs; and (2) optimally commits resources that are bid in to the DAM. The IFM utilizes a SCUC algorithm that optimizes Start-Up Costs, Minimum Load Costs as modified pursuant to Section 30.7.10.2, if applicable, Transition Costs, and Energy Bids along with any Bids for Ancillary Services or Imbalance Reserves as well as Self-Schedules submitted by Scheduling Coordinators. The IFM selects the optimal MSG Configuration from a maximum of ten MSG Configurations of each Multi-Stage Generating Resource as mutually exclusive resources. If a Scheduling Coordinator submits a Self-Schedule or a Submission to Self-Provide Ancillary Services for a given MSG Configuration in a given Trading Hour, the IFM will consider the Start-Up Cost, Minimum Load Cost as modified pursuant to Section 30.7.10.2, if applicable, and Transition Cost associated with any Economic Bids for other MSG Configurations as incremental costs between the other MSG Configurations and the self-scheduled MSG Configuration. In such cases, incremental costs are the additional costs incurred to transition or operate in an MSG Configuration in addition to the costs associated with the self-scheduled MSG Configuration. The IFM also provides for the optimal management of Use-Limited Resources. The ELS Resources committed through the ELC Process conducted two days before the day the IFM process is conducted for the next Trading Day as described in Section 31.7 are binding.

31.3.1 Market Clearing and Price Determination

31.3.1.1 Integrated Forward Market Output

The IFM produces: (1) a set of hourly Day-Ahead Schedules, Imbalance Reserves Awards, AS Awards,

and AS Schedules for all participating Scheduling Coordinators that cover each Trading Hour of the next Trading Day; and (2) the hourly LMPs for Energy and Imbalance Reserves and the ASMPs for Ancillary Services to be used for settlement of the IFM. For a Multi-Stage Generating Resource, the IFM produces a Day-Ahead Schedule for no more than one MSG Configuration per Trading Hour. In addition, the IFM will produce the MSG Transition and the MSG Configuration indicators for the Multi-Stage Generating Resource, which would establish the expected MSG Configuration in which the Multi-Stage Generating Resource will operate. During a transition, the committed MSG Configuration is considered to be the "from" MSG Configuration. The CAISO will publish the LMPs at each PNode as calculated in the IFM. In determining Day-Ahead Schedules, Imbalance Reserves Awards, AS Awards, and AS Schedules the IFM optimization will minimize total Bid Costs based on submitted and mitigated Bids while respecting the operating characteristics of resources, the operating limits of transmission facilities, and a set of scheduling priorities that are described in Section 31.4. In performing its optimization, the IFM first tries to complete its required functions utilizing Effective Economic Bids without adjusting Self-Schedules, and skips Ineffective Economic Bids and adjusts Self-Schedules only if it is not possible to balance Supply and Demand and manage Congestion in an operationally prudent manner with available Effective Economic Bids. The process and criteria by which the IFM adjusts Self-Schedules and other Non-priced Quantities are described in Sections 27.4.3, 31.3.1.3 and 31.4. The Day-Ahead Schedules are binding commitments, including the commitment to Start-Up, if necessary, to comply with the Day-Ahead Schedules. The CAISO will not issue separate Start-Up Instructions for Day-Ahead commitments. A resource's status, however, can be modified as a result of additional market processes occurring in the RTM.

31.3.1.2 Treatment of Ancillary Services Bids in IFM

In clearing the IFM, the CAISO co-optimizes awards from Energy Bids, Imbalance Reserves Bids, and Ancillary Services Bids. To the extent that capacity subject to an Ancillary Services Bid submitted in the Day-Ahead Market is not associated with an Energy Bid or Imbalance Reserves Bid, there is no co-optimization, and therefore, no opportunity cost associated with that resource for that Bid for the purposes of calculating the Ancillary Services Marginal Price as specified in Section 27.1.2.2. The capacity that will

be considered when co-optimizing the procurement of Energy, Imbalance Reserves, and Ancillary Services from Bids in the IFM will consider capacity up to the total capacity of the resource as reflected in the Ancillary Services Bid as derated through the CAISO's outage management system pursuant to Section 9, if at all. In the case of Regulation, the capacity that will be considered is the lower of the capacity of the resource offered in the Ancillary Services Bid or the upper Regulation limit of the highest Regulating Range as contained in the Master File. For any Trading Hour within the period in which the Multi-Stage Generating Resource is transitioning from one MSG Configuration to another, the IFM will not award Ancillary Services and any Submission to Self-Provide Ancillary Services will be disqualified. Any Ancillary Services Awards in the IFM to Multi-Stage Generating Resources will carry through to the Real-Time Market in the same MSG Configuration that the Multi-Stage Generating Resource is awarded in the IFM.

31.3.1.3 Reduction of Self-Scheduled LAP Demand

In the IFM, to the extent the market software cannot resolve a non-competitive Transmission Constraint utilizing Effective Economic Bids such that self-scheduled Load at the LAP level would otherwise be reduced to relieve the Transmission Constraint, the CAISO Market software will adjust Non-Priced Quantities in accordance with the process and criteria described in Section 27.4.3. For this purpose the priority sequence, starting with the first type of Non-Priced Quantity to be adjusted, will be:

(a) Schedule the Energy from Self-Provided Ancillary Service Bids from capacity that is obligated to offer an Energy Bid under a must-offer obligation such as from an RMR Resource or a Resource Adequacy Resource. Consistent with Section 8.6.2, the CAISO Market software could also utilize the Energy from Self-Provided Ancillary Service Bids from capacity that is not under a must-offer obligation such as from an RMR Resource or a Resource Adequacy Resource, to the extent the Scheduling Coordinator has submitted an Energy Bid for such capacity. The associated Energy Bid prices will be those resulting from the MPM process.

(b) Relax the constraint consistent with Section 27.4.3.1, and establish prices consistent with Section 27.4.3.2. No constraints, including Transmission Constraints, on Interties with

adjacent Balancing Authority Areas will be relaxed in this procedure.

31.3.1.4 Eligibility to Set the Day-Ahead LMP

All Generating Units, Participating Loads, non-Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, System Resources, System Units, or Constrained Output Generators subject to the provisions in Section 27.7, with Bids, including Generated Bids, that are unconstrained due to Ramp Rates, MSG Transitions, Forbidden Operating Regions, or other temporal constraints are eligible to set the LMP, provided that (a) the Schedule for the Generating Unit or Resource-Specific System Resource is between its Minimum Operating Limit and the highest MW value in its Economic Bid or Generated Bid; or (b) the Schedule for the Participating Load, non-Participating Load, Proxy Demand Resources, Reliability Demand Response Resources, Non-Resource-Specific System Resource, or System Unit is between zero (0) MW and the highest MW value in its Economic Bid or Generated Bid. If (a) a resource's Schedule is constrained by its Minimum Operating Limit or the highest MW value in its Economic Bid or Generated Bid; (b) the CAISO enforces a resource-specific constraint on the resource due to an RMR Dispatch of a Legacy RMR Unit or Exceptional Dispatch; (c) the resource is constrained by a boundary of a Forbidden Operating Region or is Ramping through a Forbidden Operating Region; or (d) the resource's full Ramping capability is constraining its inter-hour change in Schedule, the resource cannot be marginal and thus is not eligible to set the LMP. Resources identified as MSS Load following resources are not eligible to set the LMP. A Constrained Output Generator will be eligible to set the hourly LMP if any portion of its Energy is necessary to serve Demand.

31.3.1.5 Treatment of Imbalance Reserves Bids in IFM

In considering Imbalance Reserves Bids in the IFM, the CAISO applies the following rules.

31.3.1.5.1 Eligible Resource Types

The CAISO only considers Imbalance Reserves Bids from Generating Units, Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, System Units, System Resources with a Resource ID defined in the CAISO Master File, and Physical Scheduling Plants.

31.3.1.5.2 Fifteen-Minute Dispatchability and Start-up

The CAISO disregards Imbalance Reserves Bids submitted for a resource that is not 15-minute dispatchable.

The CAISO disregards Imbalance Reserves Bids submitted for a resource that otherwise would be Off during the relevant period unless it has a Start-Up Time of 15 minutes or less.

31.3.1.5.3 Energy Bid Submission Requirement

The CAISO only considers Imbalance Reserves Bids to the extent the resource submitted an Energy Bid in the Day-Ahead Market with Economic Bids for a quantity no less than the quantity of Imbalance Reserves Bid.

31.3.1.5.4 Ramp Capability as Limitation on Imbalance Reserves Awards

The CAISO disregards an Imbalance Reserves Bid to the extent it exceeds the resource's maximum 30-minute ramp capability as determined by the ramp rate defined in the CAISO Master File for the operating range covered by the Bid.

31.3.1.5.5 Simultaneous Bids and Awards for IRU and IRD

A Scheduling Coordinator may offer Bids for both IRU and IRD on distinct portions of capacity for the same interval for the same resource. The CAISO may award the resource both IRU and IRD based on those Bids if it is feasible to provide both.

31.3.1.6 Imbalance Reserves Procurement

Subject to the procurement curve described in Section 31.3.1.6.1, the CAISO procures Imbalance Reserves to meet the Imbalance Reserves Requirement for each hour and creates separate Locational IRU Prices and Locational IRD Prices at each Node based on that procurement.

31.3.1.6.1 Establishing the Imbalance Reserves Requirement

As further described in the Business Practice Manual, the CAISO sets each Balancing Authority Area's Upward Imbalance Reserves Requirement and Downward Imbalance Reserves Requirement to capture the anticipated levels of upward and downward Net Load Forecast deviations between the Day-Ahead Market and the Fifteen-Minute Market, respectively, within a specified confidence interval. The CAISO sets these values based on: (a) analysis of the differences between the load, wind, and solar forecasts utilized in the Day-Ahead Market and those used in the Fifteen-Minute Market, corresponding to the same

time intervals; (b) production forecasts for EIRs in each Balancing Authority Area; and (c) the CAISO Forecast of BAA Demand. For each Balancing Authority Area participating in the Day-Ahead Market, the CAISO reduces the Balancing Authority Area's hourly Imbalance Reserves Requirement by its proportional allocation of the Diversity Benefit for EDAM.

31.3.1.6.2 Procurement Curve

In each run of the IFM, the CAISO procures IRU and IRD for each Balancing Authority Area participating in the Day-Ahead Market to meet their Upward Imbalance Reserves Requirement and Downward Imbalance Reserves Requirement, respectively, subject to a procurement curve. The procurement curves for IRU and IRD are calculated based on separate statistical analysis of the Upward Imbalance Reserve Requirement and Downward Imbalance Reserve Requirement for each EDAM Entity Balancing Authority Area to ensure the total cost of Imbalance Reserves Awards for IRU or IRD does not exceed the expected cost of violating Operating Reserve requirements. Provided, however, the upper bound of the procurement curve for both IRU and IRD is $55 per MW.

31.3.1.6.3 Imbalance Reserves Deliverability and Nodal Procurement

31.3.1.6.3.1 Nodal Procurement of Imbalance Reserves Awards

The CAISO optimizes procurement of Imbalance Reserves Awards such that, in the event modeled uncertainty arises fully for either the upward or downward directions, the Energy that would be dispatched from resource capacity corresponding to the Imbalance Reserves Awards, as adjusted by the applicable Deployment Factor, would not result in flows exceeding Transmission Constraints and scheduling limits, including EDAM Transfer limits, on transmission facilities identified in the Business Practice Manual.

31.3.1.6.3.2 Nodal Distribution of Requirements

The CAISO distributes the Upward Imbalance Reserves Requirement and Downward Imbalance Reserves Requirement to the Demand and Variable Energy Resources Locations within each Balancing Authority Area participating in the Day-Ahead Market based on distribution factors derived from historical and/or forecasted information that reflect the relative contributions of Demand and Variable Energy Resources to the overall Imbalance Reserves Requirements.**31.3.1.6.4 Congestion Revenue from Procuring Imbalance Reserves**

As further specified in the Business Practice Manual, the CAISO separately calculates Energy Congestion revenue displaced from meeting the Upward Imbalance Reserves Requirements and the Downward Imbalance Reserves Requirements as follows.

The CAISO calculates the Energy Congestion revenue displaced from meeting the Upward Imbalance Reserves Requirement by calculating for each resource for each Transmission Constraint binding in the case of modeling uncertainty in the upward direction the sum of the product of the: IRU award; Deployment Factor; Shift Factor from the resource location to the binding Transmission Constraint; and Shadow Price of the Transmission Constraint.

The CAISO calculates the Energy Congestion revenue displaced from meeting the Downward Imbalance Reserves Requirement by calculating for each resource for each Transmission Constraint binding in the case of modeling uncertainty in the downward direction the sum of the product of: IRD award; Deployment Factor; Shift Factor from the resource location to the binding Transmission Constraint; and Shadow Price of the Transmission Constraint.

31.3.1.6.5 Accounting for State of Charge in Awarding Ancillary Services and Imbalance Reserves to Non-Generator Resources

The IFM only awards an Ancillary Services Schedule or Imbalance Reserves Award to a storage resource using the Non-Generator Resource model to the extent its modeled State of Charge, as determined by a methodology defined in the Business Practice Manual, can support such schedule or award.

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31.3.4 RTM Bidding Obligations from Imbalance Reserves Awards

An Imbalance Reserves Award for an hour obligates the Scheduling Coordinator for the resource receiving the award to submit Economic Bids for Energy to the Real-Time Market for the full range of awarded Imbalance Reserves.

The portion of the resource's Day-Ahead Schedule for Energy below a IRD award may be Self-Scheduled in the Real-Time Market.

The Scheduling Coordinator for a resource receiving an Imbalance Reserves Award in an hour cannot submit a Self-Schedule for Energy in the Real-Time Market for a quantity in excess of its Day-Ahead Schedule for Energy minus any awards for IRD and RCD.

By forty minutes prior to the applicable Trading Hour, a System Resource receiving an Imbalance Reserves Award that has not submitted an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures, with the quantity (or sum of quantities) of the transmission profile no less than the sum of the Imbalance Reserves Award and any Day-Ahead Schedule for Energy will result in the CAISO deeming the untagged portion of the Imbalance Reserves Award unavailable for purposes of Section 11.2.1.8.

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31.5 Residual Unit Commitment

The CAISO shall perform the RUC process after the IFM. As further specified in this Section 31.5, RUC procures RUC Capacity, which includes Reliability Capacity Up and Reliability Capacity Down, to address mismatches between the CAISO Forecast of BAA Demand and the physical capacity committed in the IFM.

RUC Capacity is selected by a SCUC optimization that uses the same Base Market Model used in the IFM adjusted as described in Section 27.5.1 and 27.5.6 to help ensure the deliverability of Energy from the RUC Capacity. That optimization procures RUC Capacity by Node and creates separate RUC Prices for RCU and RCD by Node. In the case of Multi-Stage Generating Resources, the RUC will optimize Transition Costs in addition to the Start-Up and Minimum Load Costs. If a Scheduling Coordinator submits a Self-Schedule or a Submission to Self-Provide Ancillary Services for a given MSG Configuration in a given Trading Hour, the RUC will consider the Start-Up Cost, Minimum Load Cost, and Transition Cost associated with any Economic Bids for other MSG Configurations as incremental costs between the other MSG Configurations and the self-scheduled MSG Configuration. In such cases, incremental costs are the additional costs incurred to transition or operate in an MSG Configuration in addition to the costs associated with the self-scheduled MSG Configuration.

31.5.1 RUC Participation

31.5.1.1 Capacity Eligible for RUC Participation

Scheduling Coordinators may make capacity available for participation in RUC by submitting a RUC Availability Bid, provided the Scheduling Coordinator has also submitted an Energy Bid (other than a Virtual Bid) for such capacity into the IFM. As part of the Bid validation procedures specified in Section 30.7.3, the CAISO disregards RUC Availability Bids from capacity that is not accompanied in the IFM by an Energy Bid that is not a Virtual Bid. Virtual Bids are not eligible to participate in RUC. Non-Participating Load and Reliability Demand Response Resources are not eligible to participate in RUC. RUC participation is required for Resource Adequacy Capacity. System Resources with a Resource ID defined in the CAISO Master File are eligible to participate in RUC and will be considered on an hourly basis; that is, RUC will not observe any multi-hour block constraints. A Long Start Unit is eligible to participate in RUC to the extent it has submitted an Energy Bid to the Day-Ahead Market above PMin. In RUC the CAISO may commit a Multi-Stage Generating Resource with a Resource Adequacy must-offer obligation at any MSG Configuration with capacity equal to or greater than the MSG Configuration committed in the Integrated Forward Market. RUC will observe the Energy Limits that may have been submitted in conjunction with Energy Bids to the IFM. Legacy RMR Unit capacity will be considered in RUC in accordance with Section 31.5.1.3. MSS resources may participate in RUC in accordance with Section 31.5.2.3. COG resources are accounted for in RUC, but may not submit or be paid RUC Availability Payments. The ELS Resources committed through the ELC Process conducted two days before the day the RUC process is conducted for the next Trading Day as described in Section 31.7 are binding.

31.5.1.2 RUC Availability Bids

With the exception of capacity from Eligible Intermittent Resources, Scheduling Coordinators may only submit RUC Availability Bids for capacity (above the Minimum Load as registered in the Master File) for which they are also submitting an Energy Bid (other than a Virtual Bid) to participate in the IFM. A Scheduling Coordinator representing an Eligible Intermittent Resource must submit RUC Availability Bids for RCU at a quantity equal to their forecasted output based on the forecast referenced in Section 34.1.6.

An RMR Resource must submit a RUC Availability Bid for RCU for their full RMR Capacity.

31.5.1.3 Legacy RMR Treatment

If a Legacy RMR Unit is determined to have a generation requirement for any Trading Hour of the next day, either by the MPM process or by the CAISO through a Manual RMR Dispatch, and if any portion of the generation requirement has not been cleared in the IFM, the entire portion of the generation requirement will be represented as a Legacy RMR Generation Self-Schedule in the RUC.

31.5.1.4 Eligibility to Set the RUC Price

All resources that are eligible for RUC participation as described in Section 31.5.1.1 with RUC Bids, other than resources with RUC Capacity resulting from RUC Availability Bids inserted pursuant to Section 31.5.1.5, that are unconstrained due to Ramp Rates or other temporal constraints, including MSG Transitions, are eligible to set the RUC Price, provided the Schedule for the eligible resource other than a Generating Unit or Resource-Specific System Resource is between zero (0) MW and the highest MW value in its Economic Bid or Generated Bid. If (a) a resource's Schedule is constrained by its Minimum Operating Limit or the highest MW value in its Economic Bid or Generated Bid, (b) the CAISO enforces a resource-specific constraint on the resource due to an RMR Dispatch Notice or Exceptional Dispatch or (c) the resource's full Ramping capability is constraining its inter-hour change in Schedule, the resource cannot be marginal and thus is not eligible to set the RUC Price. Resources identified as MSS Load following resources are not eligible to set the RUC Price.

31.5.1.5 RCU Bid Insertion for Exports and Eligible Intermittent Resources

The CAISO inserts RUC Availability Bids for RCU: (a) if an Economic Bid to export Energy is awarded in the IFM and is not accompanied by a RUC Availability Bid for RCU of at least the same quantity as the Economic Bid for Energy; (b) for Self-Schedules of exports not explicitly sourced by non-Resource Adequacy Capacity awarded in the IFM; and (c) for a Scheduling Coordinator representing an Eligible Intermittent Resource that fails to submit a RUC Availability Bid for RCU as required by Section 31.5.1.2. For parts (a) and (b), the quantity of the inserted Bid is the quantity of the Day-Ahead Schedule for Energy and the price of the inserted Bid is formulated to maintain the merit order of the resource's Energy Bid in the IFM. For part (c), the quantity of the inserted Bid is the quantity not covered by a RUC

Availability Bid for RCU as required by Section 31.5.1.2 and the price of the inserted Bid is at the price included in the RUC Availability Bid for RCU or, if the Scheduling Coordinator did not submit any such Bid, at a price above the Default Availability Bid and below the RUC power balance constraint penalty price parameter specified in the Business Practice Manual.

31.5.2 [Not Used]

31.5.2.1 [Not Used]

31.5.2.2 [Not Used]

31.5.2.2.1 [Not Used]

31.5.2.2.2[Not Used]

31.5.2.3 [Not Used]

31.5.3 RUC Procurement Target

Subject to Sections 31.5.3.1 and 31.5.4, the RUC Procurement Target for each Balancing Authority Area participating in the Day-Ahead Market is based on the relationship between the CAISO Forecast of BAA Demand for that BAA and the Supply cleared in the IFM for that Trading Hour (excluding Virtual Supply).

If the CAISO Forecast of BAA Demand exceeds the Supply cleared in the IFM for a Trading Hour (excluding Virtual Supply), then the RUC Procurement Target for that Balancing Authority Area is RCU in the amount of the excess Demand.

If the Supply (excluding Virtual Supply) cleared in the IFM for a Trading Hour exceeds the CAISO Forecast of BAA Demand, then the RUC Procurement Target for that Balancing Authority Area is RCD in the amount of the excess Supply.

If the Supply (excluding Virtual Supply) cleared in the IFM for a Trading Hour equals the CAISO Forecast of BAA Demand, then the RUC Procurement Target for that Balancing Authority Area is zero RCU and zero RCD.

The adjustments listed in Sections 31.5.3.1 to 31.5.3.1.6 will be made to the CAISO Forecast of BAA Demand to account for the conditions as provided therein. The RUC Procurement Target setting procedure is designed to meet the requirements of reliable grid operation without unnecessary over-

procurement of RUC Capacity or over-commitment of resources. Additional detail on the process for setting the RUC Procurement Target is specified in the Business Practice Manuals.

31.5.3.1 CAISO Operator Review & Adjustment

The CAISO Operator reviews the CAISO Forecast of BAA Demand and all calculated adjustments as provided in Sections 31.5.3.1.1 through 31.5.3.1.6. The CAISO Operator shall accept, modify, or reject such adjustments based on Good Utility Practice. If the CAISO Operator determines it must modify the CAISO Forecast of BAA Demand, the CAISO Operator shall log sufficient information as to reason, Operating Hour, and specific modification(s) made to the CAISO Forecast of BAA Demand.

31.5.3.1.1 RUC Net Short Conditions

The CAISO Operator may conform the CAISO Forecast of BAA Demand in the event the CAISO Operator has determined that additional capacity may need to be procured in RUC to meet anticipated Real-Time system conditions. The CAISO Operator will consider factors such as: CAISO Forecast of BAA Demand error; weather pattern that is expected to continue or change within the next Trading Day; generator outage resulting in different Supply availability than was bid into the Day-Ahead Market; fire that threatens transmission lines and/or corridors; the expectation that the amount of Generation committed in the IFM will not be sufficient to meet the anticipated Demand; and Reliability Coordinator next-day analysis of system conditions.

31.5.3.1.2 Demand Response Adjustments.

The CAISO shall account for Demand response that is clearly communicated to the CAISO as certain to be curtailed for the next Trading Day only for the two following types of Demand response: (1) Demand response triggered by a staged System Emergency event; and (2) Demand response that is triggered by a price or an event known in advance. If an LSE informs the CAISO of anticipated Demand response prior to Market Close of the DAM, the CAISO Forecast of BAA Demand used as the RUC procurement target will be reduced accordingly.

31.5.3.1.3 [Not Used]

31.5.3.1.4 Eligible Intermittent Resource Adjustment

Scheduling Coordinators for Eligible Intermittent Resources may submit Bids, including Self-Schedules, in

the Day-Ahead Market and the quantity ultimately scheduled from Eligible Intermittent Resources may differ from the CAISO forecasted deliveries from the Eligible Intermittent Resources. The CAISO may adjust the forecasted Demand either up or down for such differences by RUC Zone in which the Eligible Intermittent Resource resides. If the EIR's expected output participating in the Day-Ahead Market, as reflected in the EIR's Bid, including a Self-Schedule, or lack thereof, is less than CAISO's forecast of the EIR, the CAISO may make a Supply-side adjustment to the resource's expected output by using the CAISO's forecast of the EIR. If on the other hand, the EIR's expected output participating in the Day-Ahead Market, as reflected in the EIR's Bid, including a Self-Schedule, or lack thereof, is greater than the CAISO's forecast of the EIR, the CAISO may make a Demand side adjustment to the RUC Zone Demand equal to the difference between the EIR's Day-Ahead Schedule and the CAISO forecasted quantity.

31.5.3.1.5 Real-Time Expected Incremental Supply Self-Schedule Adjustment

In order to avoid over procurement of RUC, the CAISO shall, using a similar-day approach, estimate the RTM Self-Schedules for resources that usually submit RTM Self-Schedules that are greater than their Day-Ahead Schedules. The CAISO Operator may set the length of the Self-Schedule moving average window. Initially this moving average window shall be set by default to seven (7) days; in which case the weekday estimate is based on the average of five (5) most recent weekdays and the weekend estimate is based on the average of the two (2) most recent weekend days. To the extent weather conditions differ significantly from the historical days, additional adjustment may be necessary. After determining the estimate of Real-Time Self-Schedules, using a similar day forecasting approach, the CAISO adjusts the CAISO Forecast of BAA Demand of a RUC Zone based on the forecasted quantity changes in Supply as a result of Self-Schedules submitted in the RTM. This adjustment for forecasted Real-Time Self-Schedules may result in positive or negative adjustments. Demand adjustments to the CAISO Forecast of BAA Demand result when there is a net forecast decrease in Real-Time Self-Schedule Supply relative to the Day-Ahead Schedule Supply. Supply adjustments to the individual resources occur when there is a net forecast increase in Real-Time Self-Schedule Supply relative to the Day-Ahead Schedule Supply of the individual resource.

31.5.3.1.6 Day-Ahead Ancillary Service Procurement Deficiency Adjustment

While the CAISO intends to procure one hundred percent (100%) of its forecasted Operating Reserve requirement in the IFM based on the CAISO Forecast of BAA Demand as specified in Section 8.3.1, the CAISO shall make adjustments to the CAISO Forecast of BAA Demand used in RUC to ensure sufficient capacity is available or resources committed in cases that the CAISO is unable to procure one hundred percent (100%) of its forecasted Operating Reserve requirement in the IFM; provided, however, that the CAISO shall not procure specific Ancillary Services products in RUC, nor will the RUC optimization consider AS-related performance requirements of available capacity.

31.5.3.2 RUC Zones

31.5.3.2.1 Use of RUC Zones

The CAISO shall adjust the CAISO Forecast of BAA Demand by RUC Zone for the conditions described in Sections 31.5.3.2 through 31.5.3.6. If any adjustments are made throughout the affected RUC Zone, such adjustments will be made consistent with the subset of system LDFs for the Nodes that define the RUC Zone(s). The CAISO will adjust the CAISO Forecast of BAA Demand of each affected RUC Zone, preserving the LDFs within each RUC Zone, but the relative weighting of the LDFs across the system will deviate from the original LDFs.

31.5.3.2.2 Designation of RUC Zones

The CAISO shall define RUC Zones as areas that represent UDC or MSS Service Areas, Local Capacity Areas, or any other collection of Nodes. RUC Zones will be designated by the CAISO as necessary and to the extent that the CAISO has developed sufficient data on historical Demand in a BAA and weather conditions to allow it to perform Demand Forecasts. Once the CAISO has established RUC zones, the mapping of RUC Zones to Nodes shall be static data and shall be maintained in the Master File. The CAISO may add new Nodes to a RUC Zone if new Nodes are added to the FNM. The status of each RUC Zone shall remain active for as long as the CAISO maintains regional forecasting capabilities, but once a RUC Zone is designated the CAISO will only adjust the CAISO Forecast of BAA Demand as necessary to address RUC procurement constraints and not as a normal course for all CAISO Market functions. The actual RUC Zones used by the CAISO in its operation of RUC are posted on the CAISO Website.

31.5.4 RUC Procurement Constraints

In addition to the resource constraints and Transmission Constraints employed by SCUC as discussed in Section 27.4.1, the CAISO shall employ the following constraint in RUC:

(a) To ensure that sufficient RUC Capacity is procured to meet the CAISO Forecast of BAA Demand, the CAISO will enforce the power balance between the total Supply, which includes Day-Ahead Schedules and RUC Capacity, and the total Demand, which includes the CAISO Forecast of BAA Demand and IFM export Schedules. The CAISO may adjust the CAISO Forecast of BAA Demand to increase the RUC procurement target if there is AS Bid insufficiency in the IFM.

31.5.5 Selection and Commitment of RUC Capacity

Capacity that is not already scheduled in the IFM may be selected as RUC Capacity to meet a RUC Procurement Target.

31.5.5.1 Nodal Procurement and Deliverability of Reliability Capacity

RUC optimizes procurement of Reliability Capacity such that, in the event the Real-Time Market awards the incremental or decremental Energy Bids corresponding to the Reliability Capacity Awards, the dispatch of Energy from the Reliability Capacity in the market would not result in flows exceeding Transmission Constraints and scheduling limits, including EDAM Transfer limits.

The RUC optimization distributes an EDAM Entity's RUC procurement target to the Demand Locations within each EDAM Entity based on distribution factors derived from historical and/or forecasted information that reflect the relative contributions of Demand to the RUC procurement targets.

31.5.5.2 The RUC Optimization

The RUC optimization will select RUC Capacity and produce nodal RUC Prices by minimizing total Bid cost based on RUC Availability Bids and Start-Up, Minimum Load Bids and Transition Costs. RUC will not consider Start-Up, Minimum Load Bids, or Transition Costs for resources already committed in the IFM. The CAISO will only issue RUC Start-Up Instructions to resources committed in RUC that must receive a Start-Up Instruction in the Day-Ahead in order to be available to meet Real-Time Demand.

RUC Schedules will be provided to Scheduling Coordinators even if a RUC Start-Up Instruction is not issued at that time. RUC shall not Shut Down resources scheduled through the IFM but RUC may commit a Multi-Stage Generating Resource to a lower MSG Configuration. If the RUC process cannot find a feasible solution given the resources committed in the IFM, the RUC process will adjust constraints as described in Section 31.5.4 to arrive at a feasible solution that accommodates all the resources committed in the IFM.

31.5.5.3 Limitations on RUC Awards

A RUC Award is limited to a resource's 60-minute ramp capability. A RUC Award to a specific resource only can consist of RCU or RCD, and not both. RUC shall not Shut Down resources scheduled through the IFM. RUC shall not provide a RUC Award to a Multi-Stage Generating Resource that would require it to make an infeasible transition from the MSG Configuration applicable to its Day-Ahead Schedule to the MSG Configuration applicable to meeting the requirements of the potential RUC Award.

The RUC optimization applies a capacity constraint such that the sum of awards for Energy, upward Ancillary Services, IRU, and RCU does not exceed the resource's Upper Economic Limit or, in the case of an Eligible Intermittent Resource, the forecasted output based on the forecast referenced in Section 4.8.2.1.

The RUC optimization only awards a RUC Award to a storage resource using the Non-Generator Resource model to the extent its modeled State of Charge can support such schedule or award.

31.5.6 Eligibility for RUC Compensation

All RUC Capacity is eligible for the RUC Availability Payment except for: (i) RMR Capacity from RMR Resources; (ii) RUC Capacity resulting from RUC Availability Bids for exports inserted pursuant to Section 31.5.1.5; and (iii) RUC Capacity that corresponds to the resource's Minimum Load, which is compensated through the Bid Cost Recovery as described in Section 11.8. Resources not committed in the IFM that are committed in RUC, including Condition 1 Legacy RMR Units that were not designated for RMR Dispatches and Resource Adequacy Resources, are also eligible for RUC Cost Compensation, which includes Start-Up, Transition Costs, and Minimum Load Cost compensation, and Bid Cost Recovery, subject to the resource actually following its Dispatch Instructions as verified by the CAISO pursuant to

procedures set forth in the Business Practice Manuals.

31.5.7 Rescission of Payments for RUC Capacity

If capacity committed in RUC provided from a Generating Unit, Participating Load, Proxy Demand Resource, System Unit or System Resource is Undispatchable Capacity during the relevant Settlement Interval, then the CAISO rescinds the payments as described in this Section 31.5.7 and settled in accordance with Section 11.2.2.2. If the CAISO determines that non-compliance of a Participating Load, Proxy Demand Resource, Generating Unit, System Unit or System Resource with an Operating Instruction or Dispatch Instruction from the CAISO, or with any other applicable technical standard under the CAISO Tariff, causes or exacerbates system conditions for which the WECC imposes a penalty on the CAISO, then the Scheduling Coordinator of such Participating Load, Proxy Demand Resource, Generating Unit, System Unit or System Resource shall be assigned that portion of the WECC penalty which the CAISO reasonably determines is attributable to such non-compliance, in addition to any other penalties or sanctions applicable under the CAISO Tariff. The rescission of payments in this Section 31.5.7 shall not apply to a capacity payment for any particular RUC Capacity if the RUC Availability Payment is less than or equal to zero (0).

31.5.8 RTM Bidding Obligations from RUC Awards

A RUC Availability Award in an hour obligates the Scheduling Coordinator for the resource receiving the award to submit Economic Bids to the Real-Time Market for the full range of awarded Reliability Capacity. The portion of the resource's Day-Ahead Schedule for Energy below a RCD award may be Self-Scheduled in the Real-Time Market.

A resource receiving a RUC Availability Award in an hour cannot submit a Self-Schedule for Energy in the Real-Time Market for a quantity in excess of its Day-Ahead Schedule for Energy minus any awards for IRD and RCD.

Resources receiving a RUC Availability Award for RCU for which their Scheduling Coordinator has submitted an Energy Bid in the Day-Ahead Market to export outside the EDAM Area must provide a decremental Energy Bid to dispatch down the export schedule in the FMM if needed.

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator for a System Resource

receiving a RUC Award must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures, with the quantity (or sum of quantities) of the transmission profile no less than the sum of the RUC Award and any Day-Ahead Schedule for Energy. Failure to meet this deadline results in the CAISO deeming the entire quantity of the RUC Award as Undispatchable Capacity for RUC for purposes of Section 11.2.2.2.1.

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31.9 RUC MPM Process

After the IFM and prior to RUC, the CAISO performs the RUC MPM.

31.9.1 Determining Competitive and Non-Competitive Congestion Components in RUC

The RUC MPM process produces potential RUC Availability Awards by enforcing all Transmission Constraints that are expected to be enforced in procuring Reliability Capacity to meet the CAISO Forecast of BAA Demand, with that forecast distributed to Demand Locations based on Load Distribution Factors, and based on unmitigated RUC Availability Bids. The RUC MPM uses as the Reference Bus either: (1) the Midway 500kV bus if Path 26 flow is from north to south; or (2) the Vincent 500kV bus if Path 26 flow is from south to north. The treatment of a particular Transmission Constraint as competitive or non-competitive for purposes of the RUC MPM process is determined pursuant to Section 39.7.2.

31.9.2 RUC Bid Mitigation

The CAISO applies Local Market Power Mitigation to Bids for RCU if the resource for which that Bid was submitted could provide counter-flow to a Transmission Constraint deemed non-competitive pursuant to the methodology outlined in Section 39.7.2.2(B)(a) in the case of modeling the dispatch of Energy from the capacity corresponding to RCU Awards. To the extent a Bid for RCU is subject to Local Market Power Mitigation and exceeds the Competitive RCU LMP plus the Competitive LMP Parameter, the CAISO mitigates the Bid to the higher of the: (i) resource's RCU Default Availability Bid; or (ii) Competitive RUC Price for RCU plus the Competitive LMP Parameter.

The CAISO does not mitigate RUC Availability Bids for RCD and does not mitigate RUC Availability Bids

for RCU submitted on behalf of imports from outside the EDAM Area.

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Section 33

33. Extended Day-Ahead Market

Pursuant to Section 33, the CAISO will expand operation and Settlement of the Day-Ahead Market in an EIM Entity Balancing Authority Area for which the Balancing Authority executes an EDAM Addendum to EIM Entity Agreement with the CAISO.

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33.3 Local Furnishing PTO

The provisions applicable to transmission facilities owned by a Local Furnishing PTO or other Tax-Exempt PTO in CAISO Tariff Section 3 do not apply to the Extended Day-Ahead Market.

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33.5 Black Start

The provisions applicable to Black Start and system restoration in Section 5 do not apply to the Extended Day-Ahead Market.

33.6 Communications

Section 6 will apply to EDAM Market Participants and govern communications and information availability regarding EDAM Market Participants in the Day-Ahead Market, except as this Section 33.6 specifically provides.

33.6.1 Technical Requirements.

The EDAM Entity must satisfy the technical and communication requirements specified in the Business Practice Manual for the Extended Day-Ahead Market, which will be based on the Inter-Control Center Communication Protocol and Reliability Standards.

33.6.2 Communications and OASIS.

Section 6 will govern communications and information availability regarding the participation of EDAM Market Participants in the Day-Ahead Market except that (a) references to internal

resources will be deemed to include EDAM Resource Facilities, (b) references in Sections 6.2.2.1 and 6.5.2.1 to the CAISO Controlled Grid and references in Sections 6.5.4.2.2(a) and 6.5.5.1.1 to the CAISO Balancing Authority Area will be deemed references to the EDAM Area, and (c) the provisions of Section 6.3.1 that authorize the CAISO to communicate directly with Generators and Demand Response Providers to ensure System Reliability will not apply to Generators and Demand Response Providers in the EDAM Entity's Balancing Authority Area or pseudo-tied from an external Balancing Authority Area to the EDAM Entity Balancing Authority Area.

33.6.3 Loss of Communications.

The CAISO and each EDAM Entity, EDAM Entity Scheduling Coordinator, and EDAM Load Serving Entity Scheduling Coordinator will establish procedures to address an interruption of Day-Ahead Market communications, which will include steps to be taken to restore communications and address any impact on system or market operations as provided in Section 33. An EDAM Entity that loses communication with the CAISO remains responsible for managing its Balancing Authority Area without the Day-Ahead Market, and each EDAM Entity will have communication procedures to address such circumstances.

33.6.4 Variable Energy Resource Forecast Communications.

If the EDAM Resource Scheduling Coordinator for a Variable Energy Resource elects to use an independent forecasting service, it must make data transfer arrangements with the CAISO for the CAISO to receive the forecast in a format and on a schedule set forth in the Business Practice Manual for the Extended Day-Ahead Market.

33.6.5 Hybrid Resource Forecast Communications.

If the EDAM Resource Scheduling Coordinator for a Hybrid Resource elects to use an independent forecasting service, it must make data transfer arrangements with the CAISO for the CAISO to receive the forecast in a format and on a schedule set forth in the Business Practice Manual for the Extended Day-Ahead Market.

33.7 EDAM Operations Under Normal And Emergency Conditions

Section 7 of the CAISO Tariff will not apply to EDAM Market Participants; rather, the specific provisions of this Section 33.7 will apply to EDAM Market Participants.

33.7.1 Normal Operations

The CAISO will administer the transmission capacity made available to the Day-Ahead Market to support transfers of Energy, Reliability Capacity, and Imbalance Reserves in the EDAM Area under normal operations. The CAISO will issue a Day-Ahead Schedule only to an EDAM Entity Scheduling Coordinator or EDAM Load Serving Entity Scheduling Coordinator for Load in the Day-Ahead Market. The CAISO will issue a Day-Ahead Schedule to an EDAM Resource only if that resource has a Bid in the Day-Ahead Market, including Load participating as an EDAM Resource. The CAISO will have no authority to issue an Exceptional Dispatch to an EDAM Resource.

33.7.2 EDAM Transfer Modeling.

EDAM Transfers support both Energy and capacity transfers between Balancing Authority Areas in the EDAM Area. Each EDAM Transfer is modeled by a pair of export and import EDAM Transfer System Resources, one for each Balancing Authority Area on each side of the EDAM Internal Intertie with equal Energy schedules and/or capacity awards. EDAM Transfers include the exchange of Energy, Imbalance Reserves, Reliability Capacity, and ancillary services in support of the EDAM RSE at EDAM Internal Interties. The Ancillary Service transfers are declared by the Balancing Authority, not optimized in the IFM, and supported by designated transmission capacity. The CAISO will model individual constraints for each EDAM Transfer scheduling limit available on an EDAM Internal Intertie based on the transmission capacity made available under Section 33.18, and will enforce the scheduling limit for an EDAM Transfer in the Day-Ahead Market. The CAISO will calculate the net scheduled EDAM Transfers for the Balancing Authority Areas in the EDAM Area and derive from these net scheduled EDAM Transfers the schedules on EDAM Internal Interties for E-Tag purposes. The CAISO will communicate the EDAM Transfer limit to the EDAM Entity Scheduling Coordinator with each Balancing Authority Area in the EDAM Area for E-Tag purposes.

33.7.3 Manual Dispatch.

The EDAM Entity may issue a manual dispatch to an EDAM Resource in its Balancing Authority Area, outside of the Market Clearing of the Day-Ahead Market, and enforce Transmission

Constraints when necessary to address issues in the EDAM Entity Balancing Authority Area that the CAISO is unable to address through normal economic Dispatch and Congestion Management in accordance with the timelines and procedures in Business Practice Manual for the Extended Day-Ahead Market. The EDAM Entity Scheduling Coordinator will inform the CAISO of the manual dispatch through submission of a Self-Schedule or EIM Manual Dispatch, and if the EDAM Entity Balancing Authority Area is under manual operation. Upon receiving notice of a manual dispatch, the CAISO will reflect the manual dispatch in the applicable CAISO Market depending upon when the notice is received and only to the extent that reflection of the manual dispatch in the market is practicable.

33.7.4 EDAM Disruption.

The CAISO may declare an interruption of EDAM Entity participation in the Day-Ahead Market when in its judgment (a) operational circumstances (including a failure of the Day-Ahead Market operation to produce feasible results in the EDAM Area or other CAISO Market Disruption) in the EDAM Area have caused or are in danger of causing an abnormal system condition in the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area that requires immediate action, or (b) communications between the CAISO and EDAM Market Participants are disrupted and prevent an EDAM Entity, EDAM Entity Scheduling Coordinator, EDAM Load Serving Entity Scheduling Coordinator, or EDAM Resource Scheduling Coordinator from accessing CAISO systems to submit or receive information. The CAISO will reinstate normal operation of the Day-Ahead Market in the EDAM Area at such time as it determines that the conditions that caused the interruption of EDAM Entity participation in the Day-Ahead Market have been resolved.

33.7.4.1 CAISO Response to EDAM Disruption. If the CAISO declares an interruption of EDAM Entity participation in the Day-Ahead Market or the CAISO Balancing Authority Area in the EDAM Area, the CAISO may in its judgment, among other things:

(a) separate the affected EDAM Entity Balancing Authority Area or the CAISO Balancing Authority Area from the EDAM Area and maintain the Day-Ahead Market for other Balancing Authority Areas in the EDAM Area including the CAISO Balancing Authority Area, by enforcing a net transfer constraint for the affected Balancing Authority Area to

separate it from the remainder of the EDAM Area,

(b) reduce or suspend EDAM Transfers between one or more Balancing Authority Areas in the EDAM Area, including the CAISO Balancing Authority Area, in accordance with Section 33.7.5, and communicate and coordinate with impacted EDAM Entities to assess and potentially mitigate potential issues within the EDAM Area,

(c) instruct one or more EDAM Entities to maintain system balance within their Balancing Authority Area without Day-Ahead Market results, or take similar actions within the CAISO Balancing Authority Area,

(d) in addition or as an alternative, use market results in the Day-Ahead Market in accordance with Section 7.7.9 or take any of the actions specified in Section 7.7.6 or Section 7.7.7 with respect to the Day-Ahead Market, with reference to Section 29.7(j)(2)(D)(i) as necessary to establish an Administrative Price,

(e) suspend or limit the ability of all Scheduling Coordinators to submit Virtual Bids on behalf of Convergence Bidding Entities at specific Eligible PNodes or Eligible Aggregated PNodes, or at all Eligible PNodes or Eligible Aggregated PNodes, or

(f) postpone the publication of Day-Ahead Market results.

33.7.4.2 EDAM Entity Responsibility. In response to an interruption of EDAM Entity participation in the Day-Ahead Market by the CAISO, all EDAM Entities will follow NERC Reliability Standards applicable to their roles as Balancing Authorities in an effort to alleviate operational and system conditions and restore routine operations, and all EDAM Entity Scheduling Coordinators will promptly inform the CAISO of actions taken by the EDAM Entities they represent in response to an interruption of EDAM Entity participation in the Day-Ahead Market by the CAISO through updates to their Schedules, Interchange E-Tags, transmission limit adjustments, or Outage and derate information, as applicable. If the interruption of EDAM Entity participation results in the EDAM Entity not receiving a Day-Ahead Market Schedule, then the EDAM Entity must submit information to the RTM as required by Section 29 and applicable to an EIM Entity. If it is necessary for an EDAM Entity to reduce or suspend EDAM Transfers between one or more Balancing Authority

Areas in the EDAM Area, the EDAM Entity must communicate and coordinate with the CAISO and impacted EDAM Entities prior to curtailing EDAM Transfers or as soon as practicable, and should continue to communicate and coordinate with the CAISO and all EDAM Entities to assess and mitigate potential issues within the EDAM Area.

33.7.5 EDAM Transfer Priority Relative to Demand

EDAM Transfers will have a priority equal to Demand in the EDAM Area. If it is necessary for an EDAM Entity or the CAISO to reduce or suspend EDAM Transfers between one or more Balancing Authority Areas in the EDAM Area based on operational judgement and consistent with Good Utility Practice, the EDAM Entity will do so solely with respect to its Balancing Authority Area or the CAISO will do so solely with respect to its Balancing Authority Area, provided that the reduction or suspension is consistent with the EDAM Transmission Service Provider tariff or the CAISO Tariff, as applicable, and communicated to potentially impacted Balancing Authority Areas in the EDAM Area in advance, if practicable, or immediately following the reduction or suspension. This communication and subsequent coordination should continue among the CAISO and all potentially impacted EDAM Entities to assess and mitigate potential issues within the EDAM Area until resolution of the circumstances underlying the reduction or suspension in the Real-Time Market as may be reflected by information provided by the CAISO under Section 29.34(o). The CAISO will promptly adjust the EDAM Transfer limits or EIM Transfer limits associated with the reduction or suspension to reflect in the CAISO Markets the reduction or suspension directed by the EDAM Entity with respect to its Balancing Authority Area or the CAISO with respect to its Balancing Authority Area.

33.8 Ancillary Services

Ancillary services are not procured through the EDAM and the Ancillary Services provisions of Section 8 do not apply to the Extended Day-Ahead Market, including other CAISO Tariff sections that apply to the procurement and pricing of Ancillary Services. Each EDAM Entity will remain responsible for procuring and maintaining its own Ancillary Services to meet its Balancing Authority Area obligations and communicating these quantities to the CAISO as Self-Provided Ancillary Services through a Submission to Self-Provide an Ancillary Service.

33.9 Outages and Critical Contingencies

Section 9 does not apply to EDAM Market Participants except as referenced in this Section 33.9.

33.9.1 Maintenance Outages

An EDAM Entity, EDAM Transmission Service Provider, or transmission operator within the Balancing Authority Area shall remain responsible for performing engineering studies and approving Maintenance Outages under the applicable EDAM Transmission Service Provider tariff or the Reliability Standards, as applicable, within its EDAM Entity Balancing Authority Area on both transmission facilities and EDAM Resources. An EDAM Entity Scheduling Coordinator must submit notice of Maintenance Outages approved by that EDAM Entity to the CAISO by the means and in the manner set forth in the Business Practice Manual for the Extended Day-Ahead Market at least seven Business Days prior to the planned Outage. The CAISO implements Maintenance Outages submitted by that deadline in the Day-Ahead Market process and informs the EDAM Entity of any anticipated transmission overloads expected due to Maintenance Outages reported to the CAISO.

33.9.2 Forced Outages

EDAM Entity Scheduling Coordinators and EDAM Resource Scheduling Coordinators must report Forced Outages to the CAISO for Outages of transmission facilities within the EDAM Entity Balancing Authority Area they represent and Generating Units or other resources they represent as EDAM Resources, respectively, in accordance with the provisions of Section 9 regarding Forced Outage reporting, including Sections 9.3.6.4.1(b), 9.3.6.4.1(c), 9.3.6.4.1(d), 9.3.6.4.2(2), 9.3.6.4.2(3), and 9.3.10.

33.9.3 Transmission Limits

An EDAM Entity Scheduling Coordinator must notify the CAISO by the means and in the manner specified in the Business Practice Manual for the Extended Day-Ahead Market regarding transmission limits on the transmission capacity made available to the Day-Ahead Market within the EDAM Entity Balancing Authority Area that need to be enforced in the Day-Ahead Market.

33.10 EDAM Metering and Telemetry

Section 10 will apply in the EDAM unless otherwise noted in this Section 33.10. In the event of any

conflict, this Section 33.10 will apply.

Scheduling Coordinators must ensure compliance with this Section 33.10. The EDAM Entity Scheduling Coordinator will ensure compliance with this Section 33.10 for each Energy, Load, intertie, or other resource in its Balancing Authority Area unless that resource or Load has its own Scheduling Coordinator. The EDAM Entity will ensure each EDAM Market Participant in an EDAM Entity Balancing Authority Area becomes either a CAISO Metered Entity or a Scheduling Coordinator Metered Entity and complies with the requirements of Section 10.

33.10.1 Demand Metering

The EDAM Entity will ensure that any Load Aggregation Point in its Balancing Authority Area not represented by the EDAM Entity Scheduling Coordinator is metered separately so that the associated Demand may be settled.

33.10.2 EDAM Resource Metering

All EDAM Resource Facilities must be CAISO Metered Entities or Scheduling Coordinator Metered Entities and comply with Section 10. Scheduling Coordinators for EDAM Resources may elect to submit Meter Data in 5-minute or 15-minute intervals. Scheduling Coordinators for EDAM Resources that cannot meter the EDAM Resource's Energy every 15 minutes or faster may not submit Economic Bids or provide Ancillary Services, and must submit Self-Schedules in the EDAM and Real-Time Market.

33.10.3 EDAM Interties

EDAM Interties must have their Meter Data reported by either CAISO Metered Entities or Scheduling Coordinator Metered Entities. Each EDAM Entity Scheduling Coordinator for the EDAM Entity at the EDAM Intertie will be responsible for submitting Settlement Quality Meter Data in compliance with Section 10. EDAM Entity Scheduling Coordinators also must ensure the EDAM Intertie provides telemetry consistent with Section 33.10.4.

33.10.4 Telemetry

As described in the Business Practice Manual for the Extended Day-Ahead Market, Scheduling Coordinators for EDAM Interties and EDAM Resource Facilities, including without limitation Generating Units, storage resources, Distributed Energy Resources, and Demand Response

Resources, must satisfy communications, telemetry, and control requirements in a manner that ensures that the CAISO and EDAM Entities will have the ability, consistent with the CAISO Tariff, to monitor the EDAM Resource Facility as necessary to maintain reliability in their respective Balancing Authority Areas. An EDAM Resource Facility will be exempt from this Section 33.10.4 if it has a rated capacity of less than ten (10) MW, unless it is certified by the CAISO to provide Ancillary Services. For purposes of this calculation, aggregated resources will calculate their aggregated capacity and provide telemetry at the aggregate level. EDAM Resource Facilities must comply with any EDAM Entity or Local Regulatory Authority requirements in addition to this Section 33.10.4.

33.11 Settlements And Billing for EDAM Market Participants

Section 33.11, rather than Section 11, will apply to CAISO Settlement with EDAM Entity Scheduling Coordinators, EDAM Resource Scheduling Coordinators, EDAM Load Serving Entity Scheduling Coordinators and EDAM Market Participants, except as otherwise provided in this Section 33.11.

33.11.1 Transfer Revenue and Congestion Revenue Allocation

EDAM Transfer revenue will be collected when one Balancing Authority Area in the EDAM Area provides Energy, Imbalance Reserve, and/or Reliability Capacity to another Balancing Authority Area in the EDAM Area and the associated EDAM Transfer System Resource prices elements or components differ. Congestion revenue will be collected when a Transmission Constraint or intertie scheduling limit binds at different locations of the transmission system and the LMP varies across a Balancing Authority Area in the EDAM Area. The CAISO will allocate EDAM Transfer revenue and Congestion revenue attributed to an EDAM Entity Balancing Authority Area or the CAISO Balancing Authority Area as provided below.

33.11.1.1 Transfer Revenue

The CAISO will calculate and allocate EDAM Transfer revenue for Energy transfers, Imbalance Reserve transfers, and/or Reliability Capacity transfers for a Balancing Authority Area in the EDAM Area.

33.11.1.1.1 Energy Transfer Revenue

EDAM Transfer revenue for Energy occurs when the net EDAM Transfer scheduling limit

is reached in the Day-Ahead Market. This manifests as a separation of the Marginal Energy Cost of the binding Balancing Authority Area in the EDAM Area from the Marginal Energy Cost of an adjacent Balancing Authority Area in the EDAM Area that is attributed to an EDAM Transfer System Resource. The CAISO will allocate the EDAM Transfer revenue for Energy represented by EDAM Transfer System Resources equally between the Balancing Authority Areas, except when the CAISO has been notified during the implementation of the Day-Ahead Market within a prospective EDAM Entity Balancing Authority Area of an agreement between both EDAM Entities on either side of a EDAM Transfer that a different allocation for some portion of the EDAM Transfer revenue is required to give effect to a pre-existing commercial arrangement. The CAISO will then allocate the EDAM Transfer revenue for Energy directed to a Balancing Authority Area based upon whether the transmission across an EDAM Internal Intertie is made available by: (a) by an EDAM Entity pursuant to Section 33.18.2, in which case the CAISO will allocate the EDAM Transfer revenue to the EDAM Entity Scheduling Coordinator, (b) an EDAM Transmission Service Provider customer pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Transmission Service Provider customer, or (c) an EDAM Legacy Contract, Existing Contract, EDAM Transmission Ownership Right, or Transmission Ownership holder pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Legacy Contact, Existing Contract EDAM Transmission Ownership Right, or Transmission Ownership holder, respectively. An EDAM Entity will ensure EDAM Transfer revenue for Energy allocated to its EDAM Entity Scheduling Coordinator is thereafter allocated by all applicable EDAM Transmission Service Providers as may be detailed in the EDAM Transmission Service Provider tariff and business practices. EDAM Transfer revenue for Energy allocated to the CAISO Balancing Authority is further allocated according to the CAISO Tariff, unless allocated directly to a Scheduling Coordinator for a Transmission Ownership Rights holder or Existing Contract rights holder consistent with the terms of the agreement

concerning use of the transmission facilities supporting the EDAM Transfer.

33.11.1.1.2 Imbalance Reserve Transfer Revenue

The CAISO collects EDAM Transfer revenue for Imbalance Reserves when the transfer scheduling limit binds while optimizing capacity to meet the Imbalance Reserves Requirement for an EDAM Entity Balancing Authority Area or the CAISO Balancing Authority Area and manifests as price separation between the Shadow Price of the Imbalance Reserves procurement between the two Balancing Authority Areas at an EDAM Transfer location that is attributed to an EDAM Transfer System Resource. The CAISO calculates the hourly EDAM Transfer revenue for Imbalance Reserves as the product of the transfer quantity and the difference between the Locational IRU Price or Locational IRD Price, as appropriate, on either side of the binding limit. The CAISO will allocate the EDAM Transfer revenue for Imbalance Reserves equally between the Balancing Authority Areas, except when the CAISO has been notified during the implementation of the Day-Ahead Market within a prospective EDAM Entity Balancing Authority Area of an agreement between both EDAM Entities on either side of a EDAM Transfer that a different allocation for some portion of the EDAM Transfer revenue is required to give effect to a pre-existing commercial arrangement. The CAISO will then allocate the EDAM Transfer revenue for Imbalance Reserves directed to a Balancing Authority Area based upon whether the transmission across an EDAM Internal Intertie is made available by: (a) an EDAM Entity pursuant to Section 33.18.2, in which case the CAISO will allocate the EDAM Transfer revenue to the EDAM Entity Scheduling Coordinator, (b) an EDAM Transmission Service Provider customer pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Transmission Service Provider customer, or (c) an EDAM Legacy Contract, Existing Contract, EDAM Transmission Ownership Right, or Transmission Ownership holder pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Legacy Contact, Existing Contract EDAM Transmission Ownership Right, or

Transmission Ownership holder, respectively. An EDAM Entity will ensure that EDAM Transfer revenue for Imbalance Reserves allocated to its EDAM Entity Scheduling Coordinator is thereafter allocated by all applicable EDAM Transmission Service Providers as may be detailed in the EDAM Transmission Service Provider tariff. EDAM Transfer revenue for Imbalance Reserves allocated to the CAISO Balancing Authority is further allocated in the CAISO Balancing Authority Area according to the CAISO Tariff, unless allocated directly to a Scheduling Coordinator for a Transmission Ownership Rights holder or Existing Contract rights holder consistent with the terms of the agreement concerning use of the transmission facilities supporting the EDAM Transfer.

33.11.1.1.3 Reliability Capacity Transfer Revenue

EDAM Transfer revenue for Reliability Capacity occurs when the transfer scheduling limit binds while optimizing capacity to meet the RUC Procurement Target for an EDAM Entity Balancing Authority Area or the CAISO Balancing Authority Area and manifests as price separation between the Shadow Price of the Reliability Capacity procurement between the two Balancing Authority Areas at an EDAM Internal Intertie that is attributed to an EDAM Transfer System Resource. The CAISO calculates the hourly EDAM Transfer revenue for Reliability Capacity as the product of the transfer quantity and the difference between the RUC Price for RCU and the RUC Price for RCD, as applicable, on either side of the binding limit. The CAISO will allocate the EDAM Transfer revenue for Reliability Capacity equally between the Balancing Authority Areas, except when the CAISO has been notified during the implementation of the Day-Ahead Market within a prospective EDAM Entity Balancing Authority Area of an agreement between both EDAM Entities on either side of a EDAM Transfer that a different allocation for some portion of the EDAM Transfer revenue is required to give effect to a pre-existing commercial arrangement. The CAISO will then allocate the EDAM Transfer revenue for Reliability Capacity directed to a Balancing Authority Area based upon whether the transmission across an EDAM Internal Intertie is made available by: (a) an EDAM Entity pursuant to Section 33.18.2, in which case the CAISO will allocate the EDAM Transfer revenue to the

EDAM Entity Scheduling Coordinator, (b) an EDAM Transmission Service Provider customer pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Transmission Service Provider customer, or (c) an EDAM Legacy Contract, Existing Contract, EDAM Transmission Ownership Right, or Transmission Ownership holder pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Legacy Contact, Existing Contract EDAM Transmission Ownership Right, or Transmission Ownership holder, respectively. An EDAM Entity will ensure that EDAM Transfer revenue for Reliability Capacity allocated to its EDAM Entity Scheduling Coordinator is thereafter allocated by all applicable EDAM Transmission Service Providers as may be detailed in the EDAM Transmission Service Provider tariff and business practices. EDAM Transfer revenue for Reliability Capacity allocated to the CAISO Balancing Authority Area is further allocated in the CAISO Balancing Authority Area according to the CAISO Tariff, unless allocated directly to a Scheduling Coordinator for a Transmission Ownership Rights holder or Existing Contract rights holder consistent with the terms of the agreement concerning use of the transmission facilities supporting the EDAM Transfer.

33.11.1.2 Congestion Revenue

The CAISO will collect Congestion revenue based on price differences in the Marginal Cost of Congestion of the LMP across PNodes within the EDAM Area. For each Settlement Period of the DAM, the CAISO will calculate the contribution of each Balancing Authority Area in the EDAM Area to the Marginal Cost of Congestion at each resource location and intertie in the EDAM Area for each Balancing Authority Area based on the location of the Transmission Constraints in each Balancing Authority Area, EDAM Interties, and constraints enforced outside of the EDAM Area needed to manage that Balancing Authority Area's responsibilities. The CAISO will distribute the Congestion Charge revenue collected from the Transmission Constraints in each Balancing Authority Area in the EDAM Area, including any adjustment for the CAISO Balancing Authority Area in accordance with Section 11 and any adjustment for EDAM Entity Balancing Authority

Areas to account for schedules associated with EDAM Legacy Contracts, EDAM Transmission Ownership Rights and registered EDAM Transmission Service Provider transmission customer rights under Sections 33.16, 33.17, and 33.18, respectively, to the applicable Balancing Authority Area within which the Congestion occurred. An EDAM Entity will ensure that Congestion revenue allocated to its EDAM Entity Scheduling Coordinator is further allocated by all applicable EDAM Transmission Service Providers as may be detailed in the EDAM Transmission Service Provider tariff and business practices. Congestion revenue allocated to the CAISO Balancing Authority Area will be further allocated according to the CAISO Tariff, including Section 11.2.1 and Section 11.2.4.

33.11.2 EDAM RSE Failure Surcharge

A Balancing Authority Area in the EDAM Area must meet the requirements of the EDAM RSE for its Balancing Authority Area, as provided in Section 33.31.1.4. The applicable Scheduling Coordinator for each Balancing Authority Area in the EDAM Area that fails to meet all of the requirements of the EDAM RSE will be allocated the applicable EDAM RSE failure surcharge, as provided in Section 33.31.1.5.

33.11.2.1 Calculation of the EDAM RSE Failure Surcharges

33.11.2.1.1 EDAM RSE On-Peak Upward Failure Insufficiency Surcharge

If a Balancing Authority Area in the EDAM Area fails to satisfy all of the upward components of the EDAM RSE, as set forth in Section 33.31.1.3, during any hour within the sixteen-hour on-peak period, then the applicable Scheduling Coordinator for the Balancing Authority Area may be allocated the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge in each hour of the sixteen-hour on-peak period, with such surcharge established on a tiered structure, as provided in Section 33.31.1.5. The EDAM RSE On-Peak Upward Failure Insufficiency Surcharge will be calculated as the product of (a) the highest EDAM RSE Hourly Upward Deficiency Quantity during the sixteen-hour on-peak period of that day, (b) the greater of the published bilateral electric index prices for the applicable EDAM Trade Location, and (c) the EDAM RSE Failure Multiplier adjusted by the EDAM RSE Failure Scaling Factor. The EDAM RSE On-Peak Upward

Failure Insufficiency Surcharge applied in each hour of the sixteen-hour block will be adjusted by the EDAM RSE On-Peak Upward Credit amount for each hour the Balancing Authority Area satisfied all of the upward components of the EDAM RSE. In the event the EDAM RSE On-Peak Credit amount exceeds the surcharge amount, the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge will be zero.

33.11.2.1.2 EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge

If a Balancing Authority Area in the EDAM Area fails to satisfy all of the upward components of the EDAM RSE, as set forth in Section 33.31.1.3 in the upward direction during any hour within the off-peak period, then the applicable Scheduling Coordinator for the Balancing Authority Area may be allocated the EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge for each hour during the off-peak period in which there has been an upward failure. The EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge will be calculated as the product of (a) EDAM RSE Hourly Upward Deficiency Quantity; (b) the load-weighted average of the LMP of the LAP within that Balancing Authority Area and (c) the EDAM RSE Failure Multiplier.

33.11.2.1.3 EDAM RSE Downward Failure Insufficiency Surcharge

If a Balancing Authority Area in the EDAM Area fails to satisfy all of the downward components of the EDAM RSE during any hour, as set forth in Section 33.31.1.3, then the applicable Scheduling Coordinator for the Balancing Authority Area may be allocated the EDAM RSE Downward Failure Insufficiency Surcharge for each hour in which there has been a downward failure. The EDAM RSE Downward Insufficiency Charge will be calculated as the product of (a) the EDAM RSE Hourly Downward RSE Deficiency Quantity and (b) the Marginal Energy Cost of that Balancing Authority Area. If the EDAM RSE Hourly Downward Deficiency Quantity is greater than ten (10) MW, then the Balancing Authority Area will be assessed the EDAM RSE Downward Failure Insufficiency Surcharge for each hour in which there has been a downward failure. If the EDAM RSE Hourly Downward Deficiency Quantity is less than or equal to ten (10) MW, then there will be no EDAM RSE Downward Failure Insufficiency Surcharge during the

applicable hour given the *de minimis* nature of the failure.

33.11.2.2 EDAM RSE Surcharge Distribution

The CAISO will sum all EDAM RSE surcharge-related revenue on an hourly basis and distribute as follows:

33.11.2.2.1 EDAM RSE On-Peak Upward Failure Insufficiency Revenue Distribution

On an hourly basis, the CAISO will sum the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge revenue owed by Balancing Authority Areas with tier 2 or tier 3 upward failures of the EDAM RSE during the on-peak hours and distribute that revenue, pro rata, to the applicable Scheduling Coordinator for the Balancing Authority Areas in the EDAM Area that satisfied all upward components of the EDAM RSE in all of the sixteen on-peak hours of that Trading Day. If no Balancing Authority Area in the EDAM Area satisfied all of the upward components of the EDAM RSE in all of the sixteen on-peak hours of that Trading Day, then the CAISO will distribute the revenue collected on an hour-by-hour basis, pro rata, to the applicable Scheduling Coordinator for the Balancing Authority Areas that satisfied all of the upward components of the EDAM RSE in that on-peak hour. In both cases, the pro-rata distribution will be determined based on a Balancing Authority Area's total net EDAM Transfers in the export direction as the numerator and the total sum of the net EDAM Transfers in the export direction of Balancing Authority Areas that satisfied all of the upward components of the EDAM RSE upward tests as the denominator. If no Balancing Authority Area in the EDAM Area satisfied all of the upward components of the EDAM RSE in any single on-peak hour, then the CAISO will not collect the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge revenue from the applicable Scheduling Coordinator for the Balancing Authority Area in the EDAM Area for that single on-peak hour.

33.11.2.2.2 EDAM RSE Off-Peak Upward Failure Insufficiency Revenue Distribution

On an hourly basis, the CAISO will sum the EDAM RSE Off-Peak Upward Failure

Surcharge revenue owed by of the Balancing Authority Areas with tier 2 and tier 3 upward failures of the EDAM RSE during the off-peak hours and distribute that revenue to the applicable Scheduling Coordinator for the Balancing Authority Areas in the EDAM Area that satisfied all of the upward components of the EDAM RSE in all of the off-peak hours of that Trading Day. If no Balancing Authority Area in the EDAM Area satisfied all of the upward components of the EDAM RSE in all of the off-peak hours of that Trading Day, then the CAISO will distribute the revenue collected on an hour-by-hour basis, *pro rata*, to the applicable Scheduling Coordinator for the Balancing Authority Areas satisfied all of the upward components of the EDAM RSE in that off-peak hour. In both cases, the *pro rata* distribution will be determined based on a Balancing Authority Area's total net EDAM Transfers in the export direction as the numerator and the total net EDAM Transfers in the export direction of all Balancing Authority Areas that satisfied all of the upward components of the EDAM RSE as the denominator. If no Balancing Authority Area in the EDAM Area has satisfied all of the upward components of the EDAM RSE in any single off-peak hour, then the CAISO will not collect the EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge from the applicable Scheduling Coordinator for the Balancing Authority Area in the EDAM Area for that single off-peak hour.

33.11.2.2.3 EDAM RSE Downward Failure Insufficiency Revenue Distribution

On an hourly basis, the CAISO will sum the EDAM RSE Downward Failure Insufficiency revenue owed by Balancing Authority Areas in the EDAM Area that fail to satisfy all of the downward components of the EDAM RSE and distribute that revenue, *pro rata*, to the applicable Scheduling Coordinator for the Balancing Authority Areas in the EDAM Area that satisfied all downward components of the EDAM RSE for that Trading Day. If no Balancing Authority Area in the EDAM Area satisfied all of the downward components of the EDAM RSE over the twenty-four hour period of the Trading Day, then the CAISO will distribute the revenue collected on an hour-by-hour basis, *pro rata*, to the applicable Scheduling Coordinator for the Balancing Authority Areas that satisfied all of the downward components of the EDAM RSE in any single hour. In both cases, the *pro rata*

distribution will be determined based on the Balancing Authority Area total net EDAM Transfers in the import direction as the numerator and the total sum of the net EDAM Transfers in the import direction of Balancing Authority Areas that satisfied all of the downward components of the EDAM RSE downward tests as the denominator. If no Balancing Authority Area in the EDAM Area satisfied all of the downward components of the EDAM RSE in any single hour, then the CAISO will not collect the EDAM RSE Downward Failure Insufficiency Surcharge from the applicable Scheduling Coordinator for the Balancing Authority Area in the EDAM Area for that single hour.

33.11.2.3 EDAM RSE Surcharge Allocation

Revenue and costs arising from the EDAM RSE failure surcharge(s) distributed in accordance with Section 33.11.2.2 will be allocated to the CAISO Balancing Authority Area for sub-allocation in accordance with the CAISO Tariff and, for all other Balancing Authorities in the EDAM Area, to the applicable Scheduling Coordinator for any further sub-allocation in accordance with the requirements of the applicable tariffs and business practices of the entities within that EDAM Entity Balancing Authority Area.

33.11.3 Day-Ahead Market Settlement

The CAISO settles Day-Ahead Schedules and RUC Schedules issued to EDAM Market Participants as specified in this Section 33.11.3.

33.11.3.1 Settling Day-Ahead Schedules for Energy

The CAISO settles Day-Ahead Schedules for Energy issued to EDAM Market Participants as specified in Section 11.2.1.1 for Supply and as specified in Section 11.2.1.2 for Demand. The CAISO settles Energy Exports at an EDAM External Intertie as specified in Section 11.2.1.4. The CAISO settles EDAM Transfers of Energy by assessing both the importing and exporting Balancing Authority Areas. In the case of EDAM Entities, the CAISO assesses the Scheduling Coordinator representing the importing Balancing Authority Area a settlement equal to the product of the quantity of the import and the LMP at the relevant Scheduling Point pricing location and assesses the Scheduling Coordinator representing the exporting Balancing Authority Area a settlement equal to the product of the quantity of the export and the LMP at the relevant

Scheduling Point pricing location. If the CAISO is one of the importing or exporting Balancing Authority Areas, then the CAISO allocates the product of the export or import, as appropriate, and the LMP at the relevant Scheduling Point pricing location to CAISO Scheduling Coordinators as specified in Section 11 for allocating EDAM Transfers of Energy.

33.11.3.2 Settling Imbalance Reserves

The CAISO settles Imbalance Reserves Awards issued to EDAM Resources as specified in Sections 11.2.1.1.2, 11.2.1.8, and 11.25.2.1.1 as though the EDAM Resource were a Participating Generator.

The CAISO allocates the costs of procuring Imbalance Reserves in the EDAM as specified in Section 11.2.1.9 individually for each EDAM Entity with the exception that any reference to the CAISO Balancing Authority Area is a reference to the Balancing Authority Area of the relevant EDAM Entity.

In allocating the costs of Imbalance Reserves, the CAISO assesses both the importing and exporting Balancing Authority Areas for EDAM Transfers of Imbalance Reserves. In the case of EDAM Entities, the CAISO assesses the Scheduling Coordinator representing the importing Balancing Authority Area a settlement equal to the product of the quantity of the import and the Locational IRU Price or Locational IRD Price, as applicable, at the relevant Scheduling Point pricing location. In the case of EDAM Entities, the CAISO assesses the Scheduling Coordinator representing the exporting Balancing Authority Area a settlement equal to the product of the quantity of the export and the Locational IRU Price or Locational IRD Price, as applicable, at the relevant Scheduling Point pricing location. If the CAISO is one of the importing or exporting Balancing Authority Areas, then the CAISO allocates the product of the export or import, as appropriate, and the Locational IRU Price or Locational IRD Price, as applicable, at the relevant Scheduling Point pricing location to CAISO Scheduling Coordinators as specified in Section 11 for allocating EDAM Transfers of Imbalance Reserves.

33.11.3.3 Settling Reliability Capacity

The CAISO settles RUC Awards issued to EDAM Resources as specified in Section 11.2.2 as though the EDAM Resource were a Participating Generator or other seller of Energy or Ancillary

Services.

The CAISO allocates the costs of procuring Reliability Capacity in the EDAM as specified in Section 11.8.6.5.3.3 individually for each EDAM Entity with the exception that any reference to the CAISO Balancing Authority Area is a reference to the Balancing Authority Area of the relevant EDAM Entity. In allocating the costs of Reliability Capacity, the CAISO assesses both the importing and exporting Balancing Authority Areas for EDAM Transfers of Reliability Capacity. The CAISO assesses the importing Balancing Authority Area a charge equal to the product of the quantity of the import and the RUC Price for RCU or RUC Price for RCD, as applicable, at the relevant Scheduling Point pricing location. The CAISO assesses the exporting Balancing Authority Area a credit equal to the product of the quantity of the export and the RUC Price for RCU or RUC Price for RCD, as applicable, at the relevant Scheduling Point pricing location. If the CAISO is one of the importing or exporting Balancing Authority Areas, then the CAISO allocates the product of the export or import, as appropriate, and the RUC Price for RCU or RUC Price for RCD, as applicable, at the relevant Scheduling Point pricing location to CAISO Scheduling Coordinators as specified in Section 11 for allocating EDAM Transfers of Reliability Capacity.

33.11.3.4 Settling Ancillary Services

The EDAM does not procure Ancillary Services for EDAM Entity Balancing Authority Areas and the CAISO therefore does not settle charges or payments for Ancillary Services for the EDAM Entities in the Extended Day-Ahead Market. Ancillary Services provided by an EDAM Entity cannot be used to offset Ancillary Services obligations of a Scheduling Coordinator representing an entity with Ancillary Services obligations in the CAISO Balancing Authority Area.

33.11.3.5 IFM Bid Cost Recovery

EDAM Resources may receive Bid Cost Recovery for the IFM in accordance with Section 11.8. The CAISO allocates the IFM Bid Cost Uplift to Balancing Authority Areas in the EDAM Area, with the following rules in addition to any provisions in Section 11.8.

For a Balancing Authority Area with net Energy export transfer, the CAISO transfers a portion of the Balancing Authority Area's IFM Bid Cost Uplift amount to Balancing Authority Areas receiving

net Energy import transfers. For purposes of the foregoing, a Balancing Authority Area has net import transfers if the sum of the Balancing Authority Area's net Energy transfer and its net Imbalance Reserve transfer is in the import direction. If such sum is in the export direction, the Balancing Authority Area is deemed to have a net Energy export transfer.

The Balancing Authority Area IFM Bid Cost Uplift transfer adjustment amount will equal the product of the Balancing Authority Area hourly IFM Bid Cost Uplift amount and the ratio of the Balancing Authority Area's Day-Ahead net Energy export transfers and net Imbalance Reserve Up export transfers divided by Balancing Authority Area's Day-Ahead Schedules, Day-Ahead net Energy export transfers, net Imbalance Reserve Up export transfers and virtual demand, if applicable. The CAISO allocates the IFM Balancing Authority Area IFM Bid Cost Uplift transfer adjustment amount to Balancing Authority Areas with net transfers in the import direction. For each EDAM Entity Balancing Authority Area, the CAISO allocates the adjusted Balancing Authority Area IFM BCR amounts to the EDAM Entity for allocation under the applicable tariff and, for the CAISO Balancing Authority Area, pursuant to Section 11.8.6.

33.11.3.6 RUC Bid Cost Recovery

EDAM Resources may receive Bid Cost Recovery for RUC in accordance with Sections 11.8.3. For each Trading Hour, the CAISO calculates the RUC Bid Cost Uplift for each EDAM Entity and the CAISO Balancing Authority Area. The CAISO allocates the RUC Bid Cost Uplift to each EDAM Entity Balancing Authority Area according the methodology specified in Section 11.8.6.5 with the following adjustments.

For a Balancing Authority Area with net Reliability Capacity export transfer, the CAISO transfers a portion of the Balancing Authority Area's RUC Bid Cost Uplift amount to Balancing Authority Areas receiving net Reliability Capacity transfers. For purposes of the foregoing, a Balancing Authority Area receives net Reliability Capacity transfers if the sum of the Balancing Authority Area's net Reliability Capacity transfers is in the import direction. If such sum is in the export direction, the Balancing Authority Area is deemed to have a net Reliability Capacity export transfer.

The Balancing Authority Area RUC Bid Cost Uplift transfer adjustment amount will equal the

product of the Balancing Authority Area hourly RUC Bid Cost Uplift amount and the ratio of the Balancing Authority Area's net Reliability Capacity export transfers divided by Balancing Authority Area's Reliability Capacity Schedules. The CAISO allocates the IFM Balancing Authority Area IFM Bid Cost Uplift transfer adjustment amount to Balancing Authority Areas with net transfers in the import direction. For each EDAM Entity Balancing Authority Area, the CAISO allocates the adjusted Balancing Authority Area IFM BCR amounts to the EDAM Entity for allocation under its tariff and, for the CAISO Balancing Authority Area, pursuant to Section 11.8.6.

33.11.3.7 Greenhouse Gas in the IFM

Resources that receive a Day-Ahead attribution to serve Demand in a GHG Regulation Area will receive a GHG payment. The GHG payment is the product of the IFM obligation to serve Demand in a specific GHG Regulation Area and the IFM Marginal GHG Cost for that respective GHG Regulation Area. For a resource within a GHG Regulation Area that does not receive an attribution to served Demand in another GHG Regulation Area, the cost of GHG compliance is embedded in the resource's LMP.

33.11.3.8 EDAM Legacy Contracts, EDAM Ownership Rights, and Day-Ahead Schedules

Scheduling Coordinators who Self-Schedule Energy in the IFM using their qualified and registered EDAM Transmission Service Provider rights will settle at the LMP in a manner similar to all other Day-Ahead awards. Scheduling Coordinators who Self-Schedule Energy in the IFM using their qualified and registered EDAM Legacy Contract Rights or EDAM Transmission Ownership Rights will settle at the LMP in a manner similar to all other Day-Ahead awards, except the balanced portion of a Schedule associated with an EDAM Legacy Contract or an EDAM Transmission Ownership Right will be eligible for mitigation against Congestion costs in accordance with Section 33.16 and Section 33.17, and be settled as described in this Section 33.11.3.8. The CAISO will facilitate this mitigation by reversing the Marginal Cost of Congestion component of the LMP difference between the balanced source Day-Ahead Schedule and sink Day-Ahead Schedule. The CAISO will include these Congestion costs in the calculation of Day-Ahead Congestion revenue. In addition, long-term contracts with special marginal losses

provisions will have a similar Settlement mechanism apply to the Marginal Cost of Losses component of the LMP.

33.11.3.9 Neutrality

The CAISO will consider each component of the LMP to ensure neutrality within a Balancing Authority Area in the EDAM Area and across GHG Regulation Areas: Marginal Energy Cost, Marginal Cost of Congestion, Marginal Cost of Losses, and the applicable Marginal GHG Cost.

33.11.3.9.1 Marginal Loss Offset

The CAISO will calculate an hourly Day-Ahead marginal loss offset amount for each Balancing Authority Area. The hourly Day-Ahead marginal loss offset amount will equal the sum of the product of Day-Ahead Energy Schedules, including Schedules for Virtual Awards and transfer Energy schedules, and the Marginal Cost of Losses at their relevant pricing location. The CAISO will allocate the hourly Day-Ahead marginal loss offset amount to the EDAM Entity and, for the CAISO Balancing Authority Area, to Measured Demand. The hourly Day-Ahead marginal losses offset amount will also include any marginal losses reversal from balanced Schedule portions of EDAM Legacy Contracts, EDAM Transmission Ownership Rights, and Self-Schedules submitted in accordance with Section 33.18.2.2.1.

33.11.3.9.2 Marginal Greenhouse Gas Cost Offset

The CAISO will calculate an hourly Day-Ahead Marginal GHG Cost Offset amount in relation to each GHG Regulation Area. The hourly Day-Ahead Marginal GHG Cost Offset amount will equal the product of Day-Ahead Energy Schedules within the GHG Regulation Area, including Schedules for Virtual Awards; GHG attributions associated with the GHG Regulation Area and the applicable Marginal GHG Cost. The CAISO will allocate the Day-Ahead Marginal GHG Cost Offset amount to a GHG Regulation Area's metered Demand.

33.11.3.9.3 Marginal Congestion Offset

The CAISO will calculate an hourly Day-Ahead marginal Congestion offset revenue for

each EDAM Entity Balancing Authority Area. The hourly Day-Ahead marginal Congestion offset revenue will equal the sum of the product of Day-Ahead Energy Schedules, including Schedules for Virtual Awards and Energy transfer Schedules, and the Marginal Cost of Congestion contribution for each EDAM Entity Balancing Authority Area at its relevant pricing location and considering relevant intertie Transmission Constraints. The hourly Day-Ahead Congestion revenue amount will also account for any EDAM Legacy Contracts and EDAM Transmission Ownership Rights marginal Congestion adjustment amounts. The CAISO will allocate the hourly Day-Ahead marginal Congestion revenue amount to each EDAM Entity and the hourly Day-Ahead marginal Congestion revenue amount allocated to the CAISO Balancing Authority Area will be distributed first to CRRs and then to any surplus allocated to Measured Demand per the CAISO Tariff.

33.11.3.9.4 Marginal Energy Offset

The CAISO will calculate an hourly Day-Ahead marginal Energy offset amount for each EDAM Entity Balancing Authority Area. The Balancing Authority Area hourly Day-Ahead marginal Energy offset amount will equal the remainder of the hourly Day-Ahead Energy Settlement less the offset amounts attributed to the Balancing Authority Area Day-Ahead Marginal Cost of Losses, Balancing Authority Area Day-Ahead Marginal GHG Cost, and Balancing Authority Area Day-Ahead Marginal Cost of Congestion. The CAISO will allocate the hourly Day-Ahead marginal Energy offset amount to the EDAM Entity and for the CAISO Balancing Authority Area to metered Demand.

33.11.4 Real-Time Market Settlement

The CAISO settles EIM Market Participants in the RTM as specified in Sections 11.5, 11.8, 11.10, 11.25, 11.29, and all other aspects of Section 11 that pertain to the RTM and apply to EIM Market Participants. The CAISO settles EDAM Market Participants as EIM Market Participants assuming references to an EIM Base Schedule is a reference to a Day-Ahead Schedule with the following modifications.

33.11.4.1 Balancing Test Under-scheduling and Over-scheduling Charge

EDAM Entities are not subject to the balancing test in Section 29.34(k) and will not be eligible for revenue apportionment and allocation pursuant to Section 29.11(d)(3).

33.11.4.2 Fifteen-Minute Market (FMM) Imbalance Energy Settlement

Intertie Schedules awarded an Energy Schedule in the Day-Ahead Market that subsequently have an incremental/decremental FMM Schedule change in the RTM, and did not submit an E-Tag prior to the HASP, will be subject to the HASP reversal rule applied through Settlement according to Section 11.32.

33.11.4.3 Ancillary Services in the RTM

EDAM Entity Balancing Authority Areas will provide the RTM with total Ancillary Service self-provision. This RTM self-provision should equal the Day-Ahead self-provision or Day-Ahead self-provision plus any incremental Real-Time self-provision if Ancillary Service requirements increase in the RTM.

33.11.4.4 Intertie Deviations

The CAISO does not assess Under/Over Delivery Charges pursuant to Section 11.31 for intertie transactions at EDAM Internal Interties between EDAM Entities.

33.11.5 Implementation Fee

The CAISO will recover an implementation fee through the EDAM Entity Implementation Agreement to recover its costs incurred to onboard each EIM Entity into the Extended Day-Ahead Market based on the CAISO's cost of service. The CAISO will determine hourly rates for onboarding activity on an annual basis based on current aggregated and burdened labor rates. The majority of the onboarding costs will be labor costs; however, it is reasonable to assume some onboarding-specific non-labor costs. The CAISO will recover the cost to implement each EDAM Entity, which may vary depending on the size and complexity of the project. A $300,000 deposit will be collected from prospective EDAM Entities to cover the actual start-up costs incurred. If the deposit exceeds the actual cost incurred to provide onboarding services, the CAISO will refund the excess amount, including any Interest accrued on the remaining deposit. If the actual implementation costs exceed the deposit, additional deposits in $300,000 increments will be required, which the EDAM Entity must pay within thirty (30) days of receiving the invoice.

Any invoice payment past due will accrue interest, per annum, calculated in accordance with 5 C.F.R. § 1315.10. If the EDAM Entity fails to timely pay any undisputed costs, the CAISO will not be obligated to continue performing onboarding activities unless and until the EDAM Entity has paid all undisputed amounts. If an EDAM Entity terminates an implementation agreement after the prospective EDAM entity's onboarding has begun, the CAISO will make every attempt to halt work and stop incurring costs on implementation as soon as practical. Any implementation-related costs the CAISO incurs will be drawn against the deposit provided. The CAISO will invoice the prospective EDAM entity for any amounts over the onboarding deposit; invoices will be due no later than thirty (30) days after the date of receipt. The CAISO will provide a report that details deposit(s) received, actual costs incurred, and applicable interest earnings (on deposit balance) for each onboarding project and return any unused deposit remaining after onboarding, plus interest on the remaining deposit (based on the average interest rate earned), to the EDAM Entity within ninety (90) days after onboarding is completed and acknowledged by both the CAISO and EDAM Entity.

33.11.6 Administrative Charge

The CAISO will charge each EDAM Market Participant an EDAM Administrative Charge, which consists of the EDAM System Operations Charge and the Day-Ahead and Real-Time portions of the Market Services Charge, both volumetric charges. The CAISO will no longer collect the EIM Administrative Charge from an EDAM Market Participant. The Market Services Charge is described in Appendix F, Schedule 1, Part A. The EDAM System Operations Charge will be the product of the Systems Operations Charge, as calculated according to the formula in Appendix F, Schedule 1, Part A, real-time market percentage, as calculated in the cost of service study conducted according to Appendix F, Schedule 1, Part A, applied to metered values in MWh of Supply and Demand represented by the Scheduling Coordinator for the EDAM Market Participant.

33.11.7 Transmission Revenue Recovery.

The CAISO will allocate to each EDAM Entity and EDAM Load Serving Entity an EDAM Access Charge for recovery of EDAM recoverable revenue according to Section 33.26. The CAISO will

charge Market Participants for transmission service on the CAISO Controlled Grid according to Section 26.

33.11.8 Flexible Ramping Product.

The CAISO will allocate and settle payments and charges for the Flexible Ramping Product according to Section 11.25.

33.11.9 Settlement

With regard to the CAISO's assessment and payment of charges to, and collection of charges from, EDAM Market Participants pursuant to Sections 11 and 33.11, the CAISO will assess, pay, and collect such charges, address disputed invoices, assess, pay and collect Settlement-related fees and charges, including those under Sections 11.21, 11.28, and 11.29, and make any financial adjustments in accordance with the terms and schedule set forth in Section 11.

33.12 Creditworthiness

EDAM Entity Scheduling Coordinators, EDAM Load Serving Entity Scheduling Coordinators, and EDAM Resource Scheduling Coordinators must comply with the creditworthiness requirements of the CAISO Tariff. In the event EDAM Entity Scheduling Coordinators, EDAM Load Serving Entity Scheduling Coordinators, or EDAM Resource Scheduling Coordinators fail to satisfy the credit or other requirements in Section 12, the consequences specified in Section 12 will apply.

33.13 Dispute Resolution

Confirmation and validation of any dispute associated with the participation of EDAM Market Participants in the Day-Ahead Market is subject to Section 11.29.8 and will be managed through the CAISO's customer inquiry, dispute, and information system and as provided in the Business Practice Manual for the Extended Day-Ahead Market. EDAM Market Participants will be subject to dispute resolution pursuant to Section 13.

33.14 Force Majeure, Indemnity, Liabilities, and Penalties

The provisions of Section 14 regarding Uncontrollable Force, indemnity, liability, and penalties will apply to the participation of EDAM Market Participants in the Day-Ahead Market.

33.15 Regulatory Filings

The regulatory filings provisions of Section 15 will apply to the Extended Day Ahead Market.

33.16 EDAM Legacy Contracts

33.16.1 Administration.

Section 16 will apply to EDAM Market Participants as referenced in this Section 33.16. The CAISO will accommodate EDAM Legacy Contracts in accordance with Section 16 as required to implement this Section 33.16. With respect to applicable provisions of Section 16:

(a) references to Existing Contracts will be read as references to EDAM Legacy Contracts;

(b) references to a Participating TO will be read as references to an EDAM Entity;

(c) any applicable EDAM Transmission Service Providers in an EDAM Entity Balancing Authority Area must satisfy the requirements of Section 16 and this Section 33.16;

(d) references to the CAISO Controlled Grid will be read as references to EDAM Transmission Service Provider facilities; and

(e) references to the CAISO Balancing Authority or CAISO Balancing Authority Area will be read as references to an EDAM Entity Balancing Authority or EDAM Entity Balancing Authority Area, respectively.

33.16.2 Registration

The EDAM Entity for the Balancing Authority Area associated with a potential EDAM Legacy Contract will determine if the contract qualifies as an EDAM Legacy Contract and coordinate with the EDAM Legacy Contract rights holder and any applicable EDAM Transmission Service Providers to provide the CAISO with information and instructions as required by Section 16.4 and the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market.

33.16.3 Availability

An EDAM Legacy Contract rights holder, in coordination with the applicable EDAM Entity, may Self-Schedule all the capacity available under the terms of the contract, in which case none of the capacity will be available for EDAM Transfers. Alternatively, an EDAM Legacy Contract rights holder may Self-Schedule a portion of the capacity or none at all, in which case the unreserved capacity will be made available only for EDAM Transfers in accordance with Section 33.18.2.2.2

and the terms of the EDAM Legacy Contract. An EDAM Legacy Contract rights holder must be represented by a Scheduling Coordinator, which may be the EDAM Entity Scheduling Coordinator. The EDAM Legacy Contract rights holder must coordinate use of its rights with the EDAM Entity associated with the EDAM Legacy Contract, and communicate the transmission capacity available for EDAM Transfers to the CAISO in accordance with the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market.

33.16.4 Scheduling

A Scheduling Coordinator for an EDAM Legacy Contract rights holder must submit Self-Schedules consistent with the requirements of Section 16.6 and not Economic Bids associated with its Contract Reference Number. Validation of Self-Schedules associated with a Contract Reference Number will follow the procedures in Section 16.6.2, and such Self-Schedules will receive the priority established in Section 16.5 and the settlement treatment established in Section 16.6.3 according to the results of the validation rules and the registered characteristics of the rights.

33.16.5 Settlement

EDAM Transfer revenue will be settled with the Scheduling Coordinator for an EDAM Legacy Contract rights holder under Section 33.11.1. Congestion revenue associated with an EDAM Legacy Contract will be settled with the Scheduling Coordinator for an EDAM Legacy Contract rights holder under Section 33.11.3.8.

33.17 EDAM Transmission Ownership Rights

33.17.1 Administration

Section 17 will apply to EDAM Market Participants as referenced in this Section 33.17. The CAISO will administer EDAM Transmission Ownership Rights in accordance with Section 17 as required to implement this Section 33.17. With respect to applicable provisions of Section 17:

(a) references to Transmission Ownership Rights will be read as references to EDAM Transmission Ownership Rights;

(b) references to a Participating TO will be read as references to an EDAM Entity;

(c) any applicable EDAM Transmission Service Providers in an EDAM Entity Balancing

Authority Area must satisfy the requirements of Section 17 and this Section 33.17;

(d) references to the CAISO Controlled Grid will be read as references to EDAM Transmission Service Provider facilities; and

(e) references to the CAISO Balancing Authority or CAISO Balancing Authority Area will be read as references to an EDAM Entity Balancing Authority or EDAM Entity Balancing Authority Area, respectively.

33.17.2 Registration

The EDAM Entity for the Balancing Authority Area associated with the EDAM Transmission Ownership Rights will coordinate with the EDAM Transmission Ownership Rights holder to provide information and instructions as required by Section 17.1 and the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market.

33.17.3 Availability

An EDAM Transmission Ownership Rights holder may Self-Schedule all the capacity associated with its ownership interest and elect not to make any such capacity available for EDAM Transfers or other use by the market. Alternatively, an EDAM Transmission Ownership Rights holder may release a portion of the capacity for EDAM Transfers in accordance with Section 33.18.2.2.2 and, if the EDAM Transmission Ownership Rights holder is also a transmission service provider, the CAISO will afford its transmission customers similar treatment. An EDAM Transmission Ownership Rights holder or customer must be represented by a Scheduling Coordinator, which may be the EDAM Entity Scheduling Coordinator. The EDAM Transmission Ownership Rights holder must coordinate release of its rights with the EDAM Entity associated with the EDAM Transmission Ownership Rights, and communicate the available transmission capacity to the CAISO in accordance with the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market. Alternatively, an EDAM Transmission Ownership Rights holder may coordinate with the EDAM Entity to include all of its transmission ownership rights in the associated EDAM Transmission Service Information, in which case the transmission ownership rights would be made available pursuant to Section 33.18.

33.17.4 Scheduling

A Scheduling Coordinator for an EDAM Transmission Ownership Rights holder must submit Self-Schedules consistent with the requirements of Section 17.3 and not Economic Bids associated with EDAM Transmission Ownership Rights. Validation of Self-Schedules associated with EDAM Transmission Ownership Rights will follow the procedures in Section 17.3, and such Self-Schedules will receive the priority established in Section 17.2 and the settlement treatment established in Section 17.3.3 according to the results of the validation rules and the registered characteristics of the rights.

33.17.5 Settlement

EDAM Transfer revenue will be settled with the Scheduling Coordinator for the EDAM Transmission Ownership Rights under Section 33.11.1. Congestion revenue associated with an EDAM Transmission Ownership Right will be settled with the Scheduling Coordinator for the EDAM Transmission Ownership Rights under Section 33.11.3.8.

33.18 Tariff Transmission Service by EDAM Transmission Service Providers

An EDAM Entity must provide the CAISO with EDAM Transmission Service Information for the transmission system within its Balancing Authority Area and an EDAM Transmission Service Provider must make available for use in the Day-Ahead Market the transmission capacity supporting the network model data included in the CAISO's Full Network Model for the EDAM Entity Balancing Authority Area, as provided in this Section 33. The EDAM Transmission Service Provider must amend its tariff to the extent the EDAM Entity deems necessary to account for the transmission capacity it will make available in the Day-Ahead Market, provided such amendments are consistent with this Section 33.

33.18.1 Transmission at EDAM External Interties

An EDAM Transmission Service Provider with a transmission system located within an EDAM Entity Balancing Authority Area must coordinate with the EDAM Entity so that the transmission system is available to the Day-Ahead Market and the EDAM Entity has all necessary information to register the transmission service customers' transmission service rights within the EDAM Entity Balancing Authority Area and at EDAM External Interties with the CAISO and other EDAM Entities as provided under the EDAM Transmission Service Provider tariff. The EDAM Entity must also ensure association of an EIM Mirror System Resource in accordance with Section

33.30.9 if an EDAM External Intertie is with an EIM Entity Balancing Authority Area.

33.18.1.1 Qualification

Transmission service that qualifies for registration includes network integration transmission service or firm and conditional firm point-to-point transmission service from: (a) a source in an EDAM Entity Balancing Authority Area to an EDAM External Intertie location, (b) an EDAM External Intertie location to a sink within the EDAM Entity Balancing Authority Area, (c) a wheel through an EDAM Entity Balancing Authority Area from an EDAM External Intertie location to another EDAM External Intertie location, or (d) a source to a sink within an EDAM Entity Balancing Authority Area.

33.18.1.2 Registration

Qualified transmission services must be registered with the CAISO by the EDAM Entity in accordance with the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market, which may differ depending upon the duration of the transmission rights, *e.g.,* yearly, monthly, weekly or of a shorter duration. Network integration transmission service customers will follow the EDAM Transmission Service Provider tariff for designation and un-designation of network resources.

33.18.1.3 Scheduling

The Scheduling Coordinator for a transmission customer of an EDAM Transmission Service Provider must use its firm or conditional firm point-to-point transmission service rights or associated secondary network service, and network integration transmission service rights, to/from an EDAM External Intertie by submitting a Self-Schedule export/import transaction to/from an EDAM External Intertie, a Self-Schedule wheeling through transaction between two EDAM External Interties, or an internal source and sink in accordance with Section 33.18.2.2.1.

33.18.1.4 Permissible Intra-Day Transmission Schedule Changes

When a schedule associated with registered transmission service rights is submitted in accordance with the EDAM Transmission Service Provider tariff after the start of the Day-Ahead Market, it will be accommodated in the Real-Time Market. The EDAM Entity

Scheduling Coordinator for the EDAM Transmission Service Provider will ensure that the CAISO is notified of all such schedules submitted after the start of the Day-Ahead Market through submission of a Self-Schedule to the CAISO in accordance with Section 33.18.2.2.3.

33.18.1.5 Settlement

A Self-Schedule associated with registered firm or conditional firm point-to-point transmission service rights or network integration transmission service at EDAM External Interties or within an EDAM Entity Balancing Authority Area will be settled by the CAISO with the Scheduling Coordinator that submitted the Self-Schedule.

33.18.1.6 Resource Registration and Tagging

The EDAM Entity will be responsible for registration of System Resources associated with imports into its Balancing Authority Area at an EDAM External Intertie, and will provide the CAISO with a pre-market and after-the-fact E-Tag for transmission schedules associated with an import, export or wheel through its Balancing Authority Area at EDAM External Interties, unless a System Resource associated with an import is unknown and the import supports delivery of firm Energy in accordance with Section 33.30.8.2.

33.18.2 Transmission at EDAM Internal Interties

An EDAM Transmission Service Provider with a transmission system located within an EDAM Entity Balancing Authority Area must coordinate with the EDAM Entity and the EDAM Transmission Service Provider tariff so that the EDAM Entity will have all necessary information to register transmission service customers' transmission service at EDAM Internal Interties with the CAISO and other EDAM Entities in accordance with the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market, which processes may differ depending upon the duration of the transmission rights, *e.g.,* yearly, monthly, weekly or of a shorter duration. EDAM Transfers must be supported by firm or conditional firm point-to-point transmission service rights across an EDAM Internal Intertie, network integration transmission service associated with an import of a designated network resource across an EDAM Internal Intertie, or available transfer capability across an EDAM Internal Intertie. EDAM Legacy

Contracts may support EDAM Transfers only if registered under Section 33.16.2. EDAM Transmission Ownership Rights may support EDAM Transfers only if registered under Section 33.17.2. EDAM Transmission Service Provider rights may support EDAM Transfers as registered under this Section 33.18.2. An EDAM Entity Scheduling Coordinator must identify the transmission limits associated with the firm and conditional firm point-to-point transmission service capacity and network integration transmission service capacity that will be available to the Day-Ahead Market at EDAM Internal Interties to support EDAM Transfers and register those rights with the CAISO. The EDAM Entity Scheduling Coordinator responsible for submitting the E-Tag must communicate to the CAISO the transmission limits associated with the transmission service available under Section 33.18.2.1, Section 33.18.2.2 broken down into individual components for Section 33.18.2.2.1 through Section 33.18.2.2.3, and Section 33.18.2.3, in accordance with the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market.

33.18.2.1 Transmission to Support Resource Sufficiency Provided by the EDAM Entity

An EDAM Transfer from the source Balancing Authority Area to the sink Balancing Authority Area to support the EDAM Resource Sufficiency Evaluation for the sink Balancing Authority Area must be supported by firm or conditional firm point-to-point transmission service or network integration transmission service across an EDAM Internal Intertie. An EDAM Entity may also account for delivery of Supply external to its Balancing Authority Area in the EDAM Resource Sufficiency Evaluation under Section 33.30.8; however, the transmission that may ultimately support delivery of the Supply is not known before the Day-Ahead Market and will not be available to support EDAM Transfers.

33.18.2.2 Transmission Provided by Transmission Customers

The Scheduling Coordinator must take one of three pathways described in Section 33.18.2.2 prior to Market Close of the Day-Ahead Market to schedule its firm and conditional firm point-to-point transmission service rights, or network integration

transmission service rights, at an EDAM Internal Intertie to support an EDAM Transfer which may or may not be required for the EDAM Resource Sufficiency Evaluation under Section 33.18.2.1.

33.18.2.2.1 Self-Schedule Associated with Registered Transmission

The Scheduling Coordinator for a transmission customer of an EDAM Transmission Service Provider may submit a Self-Schedule for Energy associated with its registered firm or conditional firm point-to-point transmission service rights or network integration transmission service rights prior to Market Close of the Day-Ahead Market. The Energy associated with the Self-Schedule will be settled by the CAISO with the Scheduling Coordinator for the registered transmission rights.

33.18.2.2.2 Release of the Transmission

The Scheduling Coordinator for a transmission customer of an EDAM Transmission Service Provider, EDAM Legacy Contract or EDAM Transmission Ownership Right must notify the CAISO and the EDAM Transmission Service Provider prior to 9:00 a.m. the morning of the Day-Ahead Market if it intends to release its long-term and monthly firm and conditional firm point-to-point registered transmission service rights across an EDAM Internal Intertie. The Scheduling Coordinator representing the transmission rights may determine, on a daily basis, whether to make the full amount or only a portion of its registered transmission service rights available for EDAM Transfers for that day only or a longer timeframe, provided such release is consistent with the registered transmission rights and the EDAM Transmission Service Provider tariff. Released transmission service rights cannot be reclaimed or scheduled for the duration of the trade date for which they have been released. The EDAM Entity Scheduling Coordinator associated with the EDAM Transmission Service Provider will ensure that information on such released transmission service rights is communicated to the CAISO for association with an EDAM Transfer System

Resource in accordance with the timelines and procedures in the Business Practice Manual for the Extended Day-Ahead Market. The released transmission capacity utilized by the Day-Ahead Market will be settled by the CAISO with the Scheduling Coordinator for the transmission rights.

33.18.2.2.3 Permissible Intra-Day Transmission Schedule Changes

If the Scheduling Coordinator for a transmission customer of an EDAM Transmission Service Provider does not release the transmission service rights or schedule its registered firm or conditional firm point-to-point transmission service rights under Section 33.18.2.2.1 or Section 33.18.2.2.2 prior to the Day-Ahead Market, the capacity will be made available for EDAM Transfers in the Day-Ahead Market, and the transmission customer may nonetheless later exercise its rights under the EDAM Transmission Service Provider tariff. If the transmission customer later submits a schedule associated with its registered transmission service rights in accordance with the EDAM Transmission Service Provider tariff, the EDAM Entity Scheduling Coordinator associated with the EDAM Transmission Service Provider will ensure that the CAISO is notified of all such transmission schedules through submission of a Self-Schedule to the CAISO by the EDAM Entity Scheduling Coordinator, which the CAISO will accommodate in the Real-Time Market. The Real-Time Market may re-dispatch if necessary to accommodate the late Self-Schedule of the associated transmission service rights and will afford the Self-Schedule submitted by the EDAM Entity Scheduling Coordinator equal priority to cleared Day-Ahead Schedules unless the CAISO receives instructions that the EDAM Transmission Service Provider that it has assigned the Self-Schedule associated with firm OATT rights, whether point to point, network integration transmission service, or conditional firm, a scheduling priority higher than cleared Day-Ahead Schedules in accordance with the EDAM Transmission Service Provider tariff. Self-Schedules submitted after the Day-Ahead Market will be settled with the EDAM

Entity Scheduling Coordinator.

33.18.2.3 Unsold Available Transfer Capability

The EDAM Entity Scheduling Coordinator will determine the amount of unsold firm available transfer capability at an EDAM Internal Intertie under the EDAM Transmission Service Provider tariff prior to 10:00 a.m. on the morning of the Day-Ahead Market, accounting for reserve sharing group obligations or other unique circumstances and arrangements as provided in the EDAM Transmission Service Provider tariff. The unsold transmission capability as communicated by the EDAM Entity Scheduling Coordinator will be available for EDAM Transfers. A single EDAM Entity Scheduling Coordinator, as agreed upon by the respective EDAM Transmission Service Providers at each EDAM Internal Intertie between Balancing Authority Areas in the EDAM Area will provide the CAISO with the available transfer capability associated with the EDAM Internal Interties for which it is responsible.

33.18.2.4 EDAM Transfer Limits Used for the Day-Ahead Market

The CAISO will communicate the quantity of transmission that the Day-Ahead Market utilized for EDAM Transfers to the EDAM Entity Scheduling Coordinator after Market Close of the Day-Ahead Market, which the EDAM Entity associated with the EDAM Transmission Service Provider will ensure the EDAM Transmission Service Provider will thereafter use to determine any remaining transmission to make available in accordance with its tariff and Section 29. A single EDAM Entity Scheduling Coordinator, as agreed upon by the respective EDAM Transmission Service Providers at each EDAM Internal Intertie between Balancing Authority Areas in the EDAM Area, will provide the CAISO with an after-the-fact E-Tag for transmission schedules associated with the EDAM Internal Interties for which it is responsible.

33.18.3 Contract Reference Number (CRN)

The CAISO will recognize EDAM Transmission Service Provider customer transmission rights as provided under the EDAM Transmission Service Provider tariff subject to the provisions of Section 33.18.1 and Section 33.18.2. The CAISO will assign a CRN for firm point-to-point or

network transmission rights with a duration of a month or longer and registered (a) at EDAM Internal Interties, which will be associated with an EDAM Transfer System Resource, (b) at EDAM External Interties, which will be associated with a System Resource or according to Section 33.30.8.2, or (c) within an EDAM Entity Balancing Authority Area, which will be associated with an internal source and specific internal sink.

33.18.3.1 Self-Schedules Associated with a CRN

A Scheduling Coordinator that submits a balanced Self-Schedule less than or equal to the capacity associated with the CRN in accordance with Section 33.18.2.2.1 will be assigned a scheduling priority in the Day-Ahead Market above a Self-Schedule not associated with a CRN in the Day-Ahead Market in accordance with Section 27.4.3.4, which will be afforded a scheduling priority equal to cleared Day-Ahead Self-Schedules in the Real-Time Market. Otherwise, the Self-Schedule will be assigned the same priority as a Self-Schedule in the Day-Ahead Market not associated with a CRN, and will be afforded a scheduling priority equal to cleared Day-Ahead Self-Schedules in the Real-Time Market. The CAISO will notify the Scheduling Coordinator if a Self-Schedule associated with a CRN is not balanced prior to the Market Close of the Day-Ahead Market, which the Scheduling Coordinator may update prior to the Market Close of the Day-Ahead Market. A Scheduling Coordinator that submits a balanced Self-Schedule less than or equal to the capacity associated with the CRN in accordance with Section 33.18.2.2.3 will be assigned a scheduling priority equal to cleared Day-Ahead Self-Schedules in the Real-Time Market unless the CAISO receives instructions from the EDAM Transmission Service Provider that it has assigned the balanced Self-Schedule associated with firm OATT rights a scheduling priority higher than cleared Day-Ahead Self-Schedules in accordance with the EDAM Transmission Service Provider tariff. All other Self-Schedules will be assigned the same priority as a Self-Schedule in the Real-Time Market not associated with a CRN.

(a) An EDAM Transfer System Resource registered to an EDAM Entity will account for capacity available to support EDAM Transfers and will not be

assigned a CRN, which may support a capacity release for optimization and the EDAM Resource Sufficiency Evaluation, as applicable.

(b) An EDAM Transfer System Resource registered to an EDAM Transmission Service Provider customer will support a Self-Schedule or capacity release and will be assigned a CRN.

(c) An internal source and sink registered to an EDAM Transmission Service Provider customer will support a Self-Schedule and will be assigned a CRN.

(d) Any portion of a CRN that is Self-Scheduled in the Day-Ahead Market will be available for the EDAM Resource Sufficiency Evaluation.

(e) Any portion of a CRN released in accordance with Section 33.18.2.2 may not be Self-Scheduled in the Day-Ahead Market and may not be Self-Scheduled by the EDAM Entity after the Market Close of the Day-Ahead Market under Section 33.18.1.4 or Section 33.18.2.2.3.

(f) Any portion of a CRN that is neither released in accordance with Section 33.18.2.2 nor Self-Scheduled in the Day-Ahead Market will be available in the Day-Ahead Market and may be Self-Scheduled by the EDAM Entity Scheduling Coordinator after the Market Close of the Day-Ahead Market under Section 33.18.1.4 or Section 33.18.2.2.3.

(g) Self-Schedules not associated with a CRN will be afforded the same priority as any other Self-Schedule in the Day-Ahead Market that does not have a CRN.

(h) The CAISO will not adjust a Self-Schedule in the Day-Ahead Market associated with a CRN under this Section 33.18.3 to accommodate a Self-Schedule in the Day-Ahead Market that is not associated with a CRN.

(i) Each EDAM Entity will be responsible for managing Transmission Constraints after the Day-Ahead Market according to Section 29, Section 33.7.5, and the EDAM Transmission Service Provider tariff.

33.18.3.2 Self-Schedules Associated with Short-Term Transmission Rights

The CAISO will also assign a CRN for firm transmission rights with a duration of less than a month pursuant to the registration process provided in the Business Practice Manual for the Extended Day-Ahead Market. Self-Schedules associated with a CRN representing shorter-duration transmission rights will be afforded the same physical and financial treatment as a CRN associated with a longer-duration transmission right under this Section 33.18.3.

33.18.3.3 Transmission Not Available in the Day-Ahead Market

If the CAISO is informed through the prospective EDAM Entity implementation process or by the EDAM Entity Scheduling Coordinator for the EDAM Transmission Service Provider that accommodation of incremental intra-day schedules in the Real-Time Market should be unavailable in the Day-Ahead Market according to the EDAM Transmission Service Provider tariff, the CAISO will accept a notification from the EDAM Entity Scheduling Coordinator associated with the EDAM Transmission Service Provider and will adjust Day-Ahead Market availability of the impacted transmission elements and the associated transmission service rights.

33.18.4 CAISO Transmission at EDAM Interties

The CAISO will provide transmission service on the CAISO Controlled Grid and at EDAM Interties in accordance with the CAISO Tariff to support the EDAM Resource Sufficiency Evaluation for the CAISO Balancing Authority Area and to support the EDAM Resource Sufficiency Evaluation for an EDAM Entity Balancing Authority Area. The CAISO will make Available Transfer Capability at EDAM Internal Interties on the CAISO Controlled Grid available as determined in accordance with Section 23 and Appendix L at the start of the Day-Ahead Market to support EDAM Transfers, including the assessment of any applicable charges. The CAISO will facilitate the availability of transmission capacity associated with Existing Contracts and Transmission Ownership Rights for EDAM Transfers if the rights holder makes the capacity available to the CAISO consistent with Section 33.16.2 or Section 33.17.2, as applicable, which will then be eligible to receive EDAM Transfer revenue and Congestion revenue settlement with the Scheduling Coordinator for the Existing Contracts and Transmission Ownership Rights under Section 33.11.1 and Section

33.11.2.

33.18.4.1 Wheels Through

The Scheduling Coordinator of Supply wheeled through the CAISO Balancing Authority Area and accounted for in the EDAM Resource Sufficiency Evaluation must demonstrate establishment of a Wheeling Through transaction across the CAISO Controlled Grid and have designated transmission service under Section 33.18.2.1 into an EDAM Entity Balancing Authority Area and on the CAISO Controlled Grid Section in accordance with Section 23 and Appendix L. An EDAM Entity may similarly account for delivery of Supply wheeled through the CAISO Balancing Authority Area for its EDAM Resource Sufficiency Evaluation to be delivered under Section 33.30.8; however, the transmission that may ultimately support delivery of the Supply will not be available to support EDAM Transfers because it is not known before the Market Close of the Day Ahead Market.

33.18.4.2 Exports From

The Scheduling Coordinator of Supply from a CAISO Participating Resource accounted for in the EDAM Resource Sufficiency Evaluation of an EDAM Entity Balancing Authority Area must demonstrate it has a contract with a resource that has non-Resource Adequacy available capacity from the CAISO Balancing Authority Area and has designated transmission service under Section 33.18.2.1 into an EDAM Entity Balancing Authority Area and on the CAISO Controlled Grid Section in accordance with Section 23 and Appendix L. An EDAM Entity may similarly account for delivery of Supply exported from the CAISO Balancing Authority Area in the EDAM Resource Sufficiency Evaluation to be delivered under Section 33.30.8; however, the transmission that may ultimately support delivery of the Supply will not be available to support EDAM Transfers because it is not known before the Market Close of the Day Ahead Market.

33.18.5 EDAM Transfer Priority

EDAM Transfers will have a priority equal to Demand in the EDAM Area and may be curtailed only as provided in Section 33.7.5. The Day-Ahead Market will include a constraint as provided in Section 33.27.3 to ensure each Balancing Authority in the EDAM Area meets its Balancing

Authority Area requirements before supporting EDAM Transfers.

33.19 Reliability Coordination

Reliability Coordination does not apply to the Extended Day-Ahead Market, although EDAM Market Participants may separately receive Reliability Coordination services according to Section 19.

33.20 Confidentiality

The confidentiality provisions in Section 20 will apply to participation of EDAM Market Participants in the Day-Ahead Market.

33.21 [Not Used]

33.22 Miscellaneous

Section 22 and the additional miscellaneous provisions of this Section 33.22 will apply to the EDAM.

To the extent that the CAISO would incur any tax liability as a result of the participation of EDAM Market Participants in the Day-Ahead Market, for example as market operator or as central counterparty to EDAM transactions, the CAISO will pass those taxes on to the EDAM Entity Scheduling Coordinator for the EDAM Entity Balancing Authority Area where the transactions triggered the tax liability.

Neither the CAISO nor the EDAM Entity is a “Purchasing Selling Entity” for purposes of E-Tags or EDAM Transfers, nor will either be listed as a “Purchasing Selling Entity” for purposes of E-Tags or EDAM Transfers.

Title to Energy in the Day-Ahead Market passes directly from the entity that holds title when the Energy enters the CAISO Controlled Grid or the transmission system of an EDAM Transmission Service Provider, whichever is first following Dispatch, to the entity that removes the Energy from the CAISO Controlled Grid or the transmission system of a EDAM Transmission Service Provider, whichever last precedes delivery to Load.

33.23 Transmission Service Requirements for EDAM Resources

This Section 33.23 applies only to EDAM Market Participants. Transmission service requirements on the CAISO Controlled Grid will continue in accordance with Section 23 and other provisions of the CAISO Tariff applicable to transmission service on the CAISO Controlled Grid.

An EDAM Resource Scheduling Coordinator must obtain transmission service from an EDAM Transmission Service Provider, which may be satisfied through the following options:

(a) The EDAM Resource is a designated network resource under the terms of an EDAM Transmission Service Provider tariff;

(b) The EDAM Resource reserves firm point-to-point transmission service of any duration under the terms of an EDAM Transmission Service Provider tariff, or

(c) The EDAM Resource is associated with an EDAM Legacy Contract or an EDAM Transmission Ownership Right.

If options (a), (b), or (c) above are not satisfied, the CAISO will notify the EDAM Entity associated with the EDAM Transmission Service Provider so that the EDAM Transmission Service Provider assesses a transmission charge based on the transmission rate for the lowest duration of firm transmission service offered under its tariff, which may be a daily firm or hourly firm transmission service. If the EDAM Transmission Service Provider offers daily firm point-to-point transmission service as the lowest granularity of firm transmission service, the transmission service charge would be evaluated based on the single highest-hour Real-Time Dispatch of the resource across the day for the amount in excess of reserved transmission service. If the EDAM Transmission Service Provider offers hourly firm point-to-point transmission service as the lowest granularity of firm transmission service, the transmission service charge would be evaluated based on each individual hourly Real-Time Dispatch of the resource for the day. If the Real-Time Dispatch for any hour across the day is above the transmission reservation, the CAISO will notify the EDAM Entity associated with the EDAM Transmission Service Provider and the EDAM Transmission Service Provider will assess the hourly transmission charge as described above. This Section 33.23 establishes a common methodology for a Scheduling Coordinator to secure transmission service from an EDAM Transmission Service Provider. The specific transmission service requirements and any associated transmission service charges or penalties will be determined in accordance with the EDAM Transmission Service Provider tariff.

33.24 Transmission Planning

The Extended Day-Ahead Market does not include transmission planning related functions or services and Section 24 does not apply to EDAM Market Participants.

33.25 Generator Interconnection

The Extended Day-Ahead Market does not include generator interconnection related functions or services

and Section 25 does not apply to EDAM Market Participants.

33.26 Transmission Revenue Recovery And Charges

Access Charges for Day-Ahead Market transactions serving Load within the CAISO Balancing Authority Area that use the CAISO Controlled Grid are governed by Section 26. Transmission service charges for Day-Ahead Market transactions serving Load within an EDAM Entity Balancing Authority Area are governed by the applicable EDAM Transmission Service Provider tariff. Transmission service charges for Day-Ahead Market transactions supported by EDAM Transfers are addressed in this Section 33.26. Transmission service charges for Real-Time Market transactions are governed by Section 11, Section 26, or Section 29.26, as applicable.

33.26.1 EDAM Access Charges

The EDAM Transmission Service Provider will forecast its EDAM projected recoverable revenue shortfall on an annual basis. The CAISO will determine an EDAM Access Charge for each Balancing Authority Area in the EDAM Area based on the aggregate inputs of each EDAM Transmission Service Provider in that Balancing Authority Area. The CAISO will assess the EDAM Access Charges, allocate revenues collected, and true-up actual revenue recovery through an EDAM Balancing Account.

33.26.1.1 Revenue Shortfall Allocated to Gross Load

To allocate an EDAM recoverable revenue shortfall, the CAISO will derive an annual rate specific to each EDAM Entity Balancing Authority Area:

(1) allocating each EDAM Transmission Service Provider revenue shortfall to the EDAM Balancing Authority Areas associated with the other EDAM Transmission Service Providers, on behalf of such other EDAM Transmission Service Providers, in proportion to

(a) the EDAM Transmission Service Provider's Gross Load divided by

(b) the total EDAM Area Gross Load minus Gross Load of the EDAM Transmission Service Provider;

(2) calculating the total revenue shortfall allocation; and

(3) dividing the total revenue shortfall by the EDAM Transmission Service

Provider's Gross Load.

33.26.1.2 Truing Up the Forecasted Revenue Shortfall

EDAM Entities associated with EDAM Transmission Service Providers and the CAISO will recover, on behalf of each such EDAM Transmission Service Provider, any delta, positive or negative, between the actual revenue shortfall and the amount of revenue it collected toward its EDAM recoverable revenue and include the delta in the following year's forecasted recoverable revenue.

33.26.2 Recoverable Revenue Shortfalls

Projected EDAM recoverable revenue shortfalls will consist of the sum of the following three components.

33.26.2.1 Component 1: Short-Term Firm and Non-Firm Point-to-Point Transmission and Wheeling Access Charge Revenues

The first EDAM revenue shortfall component is projected revenue shortfalls associated with the costs of historical transmission sales to third parties, excluding costs related to sales to the EDAM Entity marketing function associated with EDAM Transmission Service Providers. The following transmission products are eligible for historical revenue recovery: hourly non-firm point-to-point, daily non-firm point-to-point, weekly non-firm point-to-point, monthly non-firm point-to-point, hourly firm point-to-point, daily firm point-to-point, weekly firm point-to-point, and monthly firm point-to-point transmission service.

33.26.2.1.1 Calculating and Updating EDAM Recoverable Revenue

EDAM Entities associated with EDAM Transmission Service Providers will calculate, on behalf of each such EDAM Transmission Service Provider the EDAM recoverable revenue based on the EDAM Transmission Service Provider's average FERC-approved (or Local Regulatory Authority-approved) eligible transmission services for the preceding three years.

The total costs recoverable through the EDAM consist of the difference between the EDAM recoverable revenue and actual transmission recovered revenue eligible for recovery pursuant to this Section 33.26.

33.26.2.1.2 EDAM Recoverable Revenue Limits

The EDAM recoverable revenue for each EDAM Entity will not exceed the product of (a) EDAM recoverable revenue and (b) the ratio of exports from the EDAM Entity to the EDAM Area and exports from the EDAM Entity to locations outside of the EDAM Area.

33.26.2.2 Component 2: Percentage of New Transmission Revenue Requirement

The second EDAM recoverable revenue component is new Network Upgrade costs approved by the Local Regulatory Authority or FERC, as applicable. Eligible new costs include (a) costs resulting from reduced revenues from sales of non-firm and short-term firm transmission associated with the release of transmission capacity resulting from the expiration of EDAM Legacy Contracts, and (b) new Network Upgrades costs. Eligible new Network Upgrade costs are (a) those that increase transfer capability between EDAM Entity Balancing Authority Areas or between the CAISO Balancing Authority Area and an EDAM Entity Balancing Authority Area (b) energized after the EDAM Entity begins participation in the Day-Ahead Market. For each new Network Upgrade eligible for recovery, the EDAM Entity only may recover through the EDAM the percentage of its projected revenue equal to the EDAM Entity's ratio of (a) the non-firm and short-term firm point-to-point historical EDAM recoverable transmission revenues in Component 1 to (b) the EDAM Entity's total revenue requirement.

The CAISO will include examples of Network Upgrades that increase transfer capability and examples that do not in the EDAM Business Practice Manual. Network Upgrades increase transfer capability where they:

(a) increase total transfer capability;

(b) create a new interfaces;

(c) increase the simultaneous import limits at existing interfaces;

(d) result from an Interregional Transmission Project to increase transfer capability; or

(e) were identified through the WECC path rating process as increasing total transfer capability or creating new transmission interfaces

between EDAM Entity Balancing Authority Areas or between the CAISO Balancing Authority Area and an EDAM Entity Balancing Authority Area.

33.26.2.3 Component 3: Recovery of Transmission Costs Associated With EDAM Wheeling Through Volumes Net of Imports/Exports

The third EDAM recoverable component eligible for recovery is projected revenue shortfalls associated with wheeling through an EDAM Entity Balancing Authority Area or the CAISO Balancing Authority Area associated with an EDAM Transmission Service Provider in excess of the total net transfers of the EDAM Entity Balancing Authority Area. In periods where this excess occurs, the EDAM Entity, on behalf of the EDAM Transmission Service Provider, will be compensated for the transmission use supporting excess wheeling through the EDAM Transmission Service Provider or CAISO Participating TO at the EDAM Entity's non-firm hourly point to point transmission rate.

33.26.3 Assessing Access Charges and Allocating Revenues in the EDAM

The CAISO will assess an EDAM Access Charge to recover the EDAM projected recoverable revenue shortfalls to Gross Load in each EDAM Balancing Authority Area. Each EDAM Access Charge will recover the projected recoverable revenue shortfalls for the EDAM Balancing Authority Areas outside the Balancing Authority Area for that Access Charge, such that no EDAM Balancing Authority Area will be assessed its own projected recoverable revenue shortfalls. The CAISO will assess EDAM Access Charges based on the EDAM Balancing Authority Areas' Gross Loads. The CAISO will allocate revenues collected from the EDAM Access Charges to EDAM Entities on behalf of each such EDAM Transmission Service Provider, in proportion to its share of EDAM projected recoverable revenue shortfalls.

33.26.4 Documentation

As specified in the EDAM Business Practice Manual, EDAM Entities, on behalf of their EDAM Transmission Service Providers, will provide the CAISO all supporting documentation necessary to determine the local EDAM Access Charges in each Balancing Authority Area. At a minimum this documentation will include (a) the final order from FERC or the Local Regulatory Authority effecting their approved transmission rates; (b) the sums for each recoverable revenue

component and true-up; and (c) an authorized affidavit from each EDAM Transmission Service Provider attesting to the accuracy of the data provided. For each EDAM Transmission Service Provider, the CAISO will maintain on its website the current sum of each recoverable revenue component, the total true-up, and total eligible recovery. The CAISO will maintain on its website each EDAM Access Charge, including the rate, the Gross Load, and the total eligible recovery in that Balancing Authority Area.

33.27 CAISO Markets And Processes

The provisions of Section 27 that apply to the Day-Ahead Market will apply to EDAM Market Participants, except as provided in or inconsistent with this Section 33.27 or other provisions of Section 33. For purposes of applying this Section 33.27, the term CAISO Balancing Authority Area as used in Section 27 means the Market Area unless the context requires otherwise.

33.27.1 Transitional Process

For a period of six months following the EDAM Entity Implementation Date of a new EDAM Entity, the provisions of Section 27.4.3.2 and the second sentence of Section 27.4.3.4 will not apply to constraints that are within the Balancing Authority Area of the new EDAM Entity or affect EDAM Transfers between the Balancing Authority Area of the new EDAM Entity. For those intervals that experience infeasibilities described in those provisions, the CAISO will instead determine prices consistent with the provisions of Section 27, Section 31, and Appendix C, that would apply in the absence of Section 27.4.3.2 and the second sentence of Section 27.4.3.4 constraints.

In addition, for a period of six months following the EDAM Entity Implementation Date of a new EDAM Entity, when the transmission and/or power balance constraints as specified in Section 27.4.3.2 and the second sentence of Section 27.4.3.4 are relaxed, the CAISO will set the Flexible Ramping Product parameter for pricing purposes, for the new EDAM Entity Balancing Authority Area, at an amount between and including $0 and $0.01. Sixty days prior to the expiration of the transition period, the CAISO will post on the CAISO Website an assessment of whether an extension of the transition period, for up to an additional six months, is needed for the applicable EDAM Entity. The CAISO will post an update to such assessment prior to the expiration of the transition period should there be any changes to its posted conclusions. Any extensions of the

initial six-month transition period must be approved by FERC.

33.27.2 Locational Marginal Price Formation

The Locational Marginal Price for PNodes within each Balancing Authority Area in the EDAM Area will be determined in accordance with Appendix C.

33.27.3 Default Generation Aggregation Points

Each Balancing Authority Area in the EDAM Area will associate directly with PNodes of Balancing Authority Areas in WECC outside the EDAM Area through two non-overlapping default generation aggregations as described in Appendix C:

(1) a North DGAP, which includes the WECC northwest Balancing Authority Areas; and

(2) a South DGAP, which includes the WECC southwest Balancing Authority Areas' PNodes, except Mexico.

33.27.4 Power Balance Constraint Relaxation

The Extended Day-Ahead Market will include a constraint to ensure each EDAM Entity meets its Balancing Authority Area requirements before supporting EDAM Transfers. The constraint will not allow a simultaneous power balance constraint violation in the upward/downward direction with a net EDAM Transfer export/import beyond the net EDAM Transfer eligible for the EDAM RSE as established in Section 33.18.2.1.

33.27.5 IBAA and EDAM Entity Balancing Authority Areas

Section 27.5.3 will not apply to an EDAM Entity Balancing Authority Area.

33.28 Inter-SC Trades

EDAM Entity Scheduling Coordinators, EDAM Load Serving Entity Scheduling Coordinators, EDAM Resource Scheduling Coordinators and other Scheduling Coordinators in the Extended Day-Ahead Market may not submit Inter-SC Trades for transactions outside the CAISO Balancing Authority Area, and Section 28 will not apply to the Extended Day Ahead Market.

33.29 EDAM Relationship to EIM

EDAM Market Participants are also EIM Market Participants and the provisions in Section 29 apply in their capacity as EIM Market Participants. Operation of the Day-Ahead Market within an EDAM Entity Balancing Authority Area produces outcomes that satisfy or modify certain requirements otherwise

applicable to EIM Market Participants, including a Day-Ahead Schedule that will be referenced in the Real-Time Market instead of a submitted EIM Base Schedule and an initial EIM Base Load Schedule, pools of Balancing Authority Areas for purposes of the EIM Resource Sufficiency Evaluation, and capacity and Energy transfers between Balancing Authority Areas with equal priority to Demand.

33.30 Bids And Self-Schedule Submission

Scheduling Coordinators for EDAM Resources, EDAM Entities, Load Serving Entities, and other Day-Ahead Market Participants in the EDAM Area must submit Bids, including Self-Schedules, pursuant to this Section 33.30 as supplemented by Section 30.

33.30.1 Bids

A Scheduling Coordinator may submit a Bid in the Day-Ahead Market for an EDAM Resource eligible to participate in the Day-Ahead Market according to the EDAM Transmission Service Provider tariff and Section 33, while Scheduling Coordinators for EDAM Resources self-providing Ancillary Services must provide a Submission to Self-Provide Ancillary Services. Each EDAM Resource must comply with the general Bid rules in Section 30 as well as the specific Bid rules based on resource type, including without limitation owners or operators of Non-Generator Resources, Convergence Bidding Entities, Demand Response Providers, and Distributed Energy Resource Providers. Consistent with Section 30 and Appendix A, references to Bids include Self-Schedules, and references to Economic Bids exclude Self-Schedules.

33.30.2 Demand Bids

Only an EDAM Entity Scheduling Coordinator or an EDAM Load Serving Entity Scheduling Coordinator authorized by the EDAM Entity Scheduling Coordinator may submit a Demand Bid within the EDAM Entity's Balancing Authority Area. For EDAM Entities that have not yet enabled convergence bidding, the CAISO will limit Demand Bids in the Day-Ahead Market to the Energy Bids from EDAM Resources within the EDAM Entity's Balancing Authority Area.

33.30.3 Economic Bids at EDAM Interties

Except for resource-specific resources with an obligation to serve Demand in the EDAM Area described in Section 33.30.8, a Scheduling Coordinator for a designated resource associated with network integration transmission service of an EDAM Transmission Service Provider, or a

resource located outside of the EDAM Area at an EDAM External Intertie with the CAISO Balancing Authority Area, may not submit Economic Bids at EDAM External Interties or EDAM Internal Interties unless the submission of Economic Bids has been enabled in accordance with Section 29.34(i)(2). Scheduling Coordinators may submit Self-Schedules at any EDAM Intertie.

33.30.4 EDAM Entity Access to Bid Information

For the CAISO to conduct the EDAM Resource Sufficiency Evaluation pursuant to Section 33.31, an EDAM Entity will necessarily have access to certain data related to Bids, without pricing information, associated with the EDAM Resources within the Balancing Authority Area it represents and at EDAM Interties with other Balancing Authority Areas.

33.30.5 Start-Up and Minimum Load

For the determination of Proxy Start-Up Costs and Proxy Minimum Load Costs, the CAISO will utilize the Market Services Charge and System Operations Charge reflected in the EDAM Administrative Charge.

33.30.6 RUC Availability Bids for Variable Energy Resources

An EDAM Resource Scheduling Coordinator for a Variable Energy Resource must submit RUC Availability Bids as specified in Section 31.5.1.2 as if the Variable Energy Resource were an Eligible Intermittent Resource.

33.30.7 Convergence Bidding

For all EDAM Entity Balancing Authority Areas with convergence bidding, Convergence Bidding Entities may submit Virtual Bids pursuant to Section 30.9. The CAISO will settle Virtual Bids pursuant to Section 11.3.

33.30.7.1 Optional Transition Period

Each EDAM Entity may participate in the Day-Ahead Market without Virtual Bids in its Balancing Authority Area. Alternatively, each EDAM Entity may elect to forego a transition period and commence Day-Ahead Market participation with Virtual Bids in its Balancing Authority Area.

33.30.7.2 Bidding Rules

During the period that an EDAM Entity has not enabled convergence bidding, Load Serving Entities within the EDAM Entity Balancing Authority Area may not Bid or Self-Schedule Demand

above the amount of Supply within the EDAM Entity Balancing Authority Area. The CAISO will enforce this Demand limitation based on the available Supply, accounting for the difference between Variable Energy Resource Bids and their forecasts. Forecasts will account for each Variable Energy Resource's deliverable Energy based on system conditions and input from the each EDAM Entity.

33.30.7.3 Suspension or Limitation

The CAISO has the authority to suspend or limit convergence bidding pursuant to Section 7.9. Each EDAM Entity may recommend that the CAISO suspend convergence bidding in its Balancing Authority Area, provided that the CAISO will make the ultimate determination as to such recommendation.

33.30.8 Bids from External Resources

Resources located outside of the EDAM Area may participate in the Day-Ahead Market subject to certain requirements that depend on whether (a) the resource submits a Bid at an EDAM External Intertie or an EDAM Internal Intertie, (b) the intertie is with the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area, and (c) the resource's location is specific or non-specific. The EDAM Entity Scheduling Coordinator responsible for the interchange associated with these transactions must identify the supporting resource in an E-Tag submitted in accordance with Section 29.4(c)(4).

33.30.8.1 EDAM External Interties

A Scheduling Coordinator for a resource located outside of the EDAM Area may submit a Bid at an EDAM External Intertie with an EDAM Entity if the resource is pseudo-tied into the EDAM Entity Balancing Authority Area, is dynamically scheduled into the EDAM Entity Balancing Authority Area, or submits a Self-Schedule into the EDAM Entity Balancing Authority Area. An EDAM Entity will facilitate scheduling of export transactions from its Balancing Authority Area to EDAM External Interties pursuant to Section 33.18 and the EDAM Transmission Service Provider tariff or, in the case of the CAISO Balancing Authority Area, this CAISO Tariff. A Scheduling Coordinator for a resource located outside of the EDAM Area may submit a Bid at an EDAM External Intertie with

the CAISO Balancing Authority Area in accordance with the CAISO Tariff. Economic Bids at EDAM External Interties with the CAISO Balancing Authority Area must be capable of delivery under Section 33.30.8.2 to count towards the EDAM RSE.

33.30.8.2 Delivered Firm Energy Contracts

Bids from delivered firm Energy contracts may participate in the Day-Ahead Market. Such firm Energy contracts include but are not limited to arrangements pursuant to Service Schedule C of the Western Systems Power Pool Agreement, CAISO resource adequacy imports, and similar forward contracted Supply. All source-specific forward contracted supply will, if possible, be modeled in the EDAM Area and, when the source cannot be identified, modeling assumptions will be made regarding the source based on the best information available. Bids at an EDAM Intertie with the CAISO Balancing Authority Area will be submitted by the Scheduling Coordinator associated with a forward contract with a Load Serving Entity within the CAISO Balancing Authority Area.

33.30.8.3 Non-Source Specific E-Tag Requirements.

All Energy scheduled from non-resource-specific forward supply contracts under Section 33.30.8.2 must have a submitted E-Tag within three hours following publication of the Day-Ahead Market results. The CAISO will publish an EDAM Entity Balancing Authority Area's quantity of import Supply that does not have a Day-Ahead E-Tag for situational awareness. An EDAM Entity Scheduling Coordinator will have until 5 hours before the start of the Operating Hour to submit E-Tags and/or replace the capacity with other firm schedules or physical resources for schedules that lack a valid Day-Ahead E-Tag within the timeframe. If the EDAM Entity Scheduling Coordinator does not E-Tag the outstanding import schedules, including import EDAM Transfers, and fails to resupply by submitting additional incremental Energy Bids from internal supply EDAM Resources above the resource's Day-Ahead Schedule not encumbered by Day-Ahead capacity awards to cover the E-Tag insufficiency prior to the deadline, the CAISO will remove the EDAM Entity Balancing Authority Area from the group of Balancing Authority Areas that comprise the EDAM Upward Pool in accordance with Section 33.31.1.4.

33.30.9 Base Schedules Replaced by Day-Ahead Schedules

An EDAM Entity Scheduling Coordinator will not submit EIM Base Schedules and the CAISO will not provide an EIM Base Load Schedule for the EIM Entity Balancing Authority Area it represents in the Real-Time Market. Instead, the Day-Ahead Schedules for the EDAM Entity Balancing Authority Area will be used for the EIM Entity Balancing Authority Area in the Real-Time Market rather than submitted EIM Base Schedules and an EIM Base Load Schedule provided by the CAISO. EDAM Transfer schedules of Energy between Balancing Authority Areas in the EDAM Area will persist in the Real-Time Market with the corresponding Balancing Authority Areas in the EIM Area. EDAM Transfers of Energy will not be optimized in the Real-Time Market, but they will have equal scheduling priority with Demand. Day-Ahead import and export schedules at EDAM External Interties with Balancing Authority Areas in the EIM Area will also persist in the Real-Time Market and, if the import/export schedule is with another EIM Entity Balancing Authority Area, the Day-Ahead Schedule will be mirrored at the corresponding EIM Mirror System Resources for the Balancing Authority Areas in the Real-Time Market. Day-Ahead import and export schedules at EDAM External Interties will also not be optimized in the Real-Time Market, but they will have equal scheduling priority with Demand.

33.30.10 Information Available for Bidding by Gas-Fired Resources

The CAISO will publish advisory Day-Ahead Market results two days prior to the Trading Day in accordance with Section 6.5.2.2.3 to help inform gas procurement decisions by EDAM Resource Scheduling Coordinators that submit Bids from gas-fired EDAM Resource Facilities. An EDAM Resource Scheduling Coordinator must request this information before 05:00 a.m. of the Day-Ahead Market.

33.31 Extended Day-Ahead Market Requirements

The EDAM operates within the EDAM Area in accordance with Section 31, as supplemented by provisions in this Section 33.31. EDAM Market Participants must comply with Section 31 as applicable to their participation in the Day-Ahead Market.

33.31.1 EDAM Resource Sufficiency Evaluation (EDAM RSE)

Through the EDAM RSE, the CAISO will test each Balancing Authority Area in the EDAM Area,

including the CAISO Balancing Authority Area, prior to the DAM and the results of the EDAM RSE serve as inputs into the DAM and EDAM with the CAISO completing the EDAM RSE before the IFM MPM.

33.31.1.1 Timing of Advisory and Binding EDAM RSE Runs

The CAISO produces advisory results for each Balancing Authority Area in the EDAM Area for the EDAM RSE at approximately 6:00 a.m. and 9:00 a.m. on the day the CAISO runs the Day-Ahead Market for the next Trading Day; additional advisory results for the EDAM RSE will be provided to each Balancing Authority Area in the EDAM Area consistent with the process set forth in the Business Practice Manual for the Extended Day-Ahead Market. The CAISO conducts the binding EDAM RSE after the Day-Ahead Market submission process closes at approximately 10:00 a.m., after the CAISO has validated Bids pursuant to Section 33.30, and immediately prior to running the Day-Ahead Market. Results of the advisory and binding EDAM RSE will be made available in accordance with the procedures set forth in the Business Practice Manual for the Extended Day-Ahead Market.

33.31.1.2 Components of the EDAM RSE

The EDAM RSE uses existing CAISO market models with the goal of minimizing total cost of meeting Demand and relaxing the Energy and Imbalance Reserve procurement constraints, if they cannot be satisfied, by utilizing all available Bids in the Day-Ahead Market that are eligible for participation under Section 33.31 and validated under Section 33.30, excluding Virtual Bids, non-Participating Load Bids, and intertie transactions by resources that are not registered. The EDAM RSE will also utilize all Ancillary Service Bids, self-provision of ancillary service, and the forecasted output of Variable Energy Resources, together with any adjustments made pursuant to Section 33.31.4.1, in each Balancing Authority Area and for each hour of the Day-Ahead time horizon. EDAM Resources and intertie resources qualified to register, and registered, with the CAISO are eligible for the EDAM RSE upon satisfaction of the requirements and process set forth in the Business Practice Manuals for the Extended Day-Ahead Market. All internal resources in the CAISO Balancing Authority Area are eligible to be counted for purposes of the EDAM RSE without additional registration. The EDAM RSE reflects resource constraints based on registered

resource characteristics including, but not limited to, hydro resource and limited energy storage resource energy constraints, together with other available information as provided in the Business Practice Manuals, but does not enforce Transmission Constraints within each Balancing Authority Area. The result of the EDAM RSE is the quantity of upward sufficiency or downward insufficiency for each hour in the Day-Ahead time horizon for each Balancing Authority Area in the EDAM Area.

33.31.1.2.1 Resource Sufficiency Requirements in the EDAM

To perform the EDAM RSE, the CAISO will use the following inputs in performing the advisory runs and binding runs set forth in Section 31.3.1.6.1 as requirements for each Balancing Authority Area in the EDAM Area in accordance with the procedures set forth in the Business Practice Manuals, with the following requirements fixed at the time of the final binding EDAM RSE.

33.31.1.2.1.1 Forecast Requirement

The Demand Forecast and Variable Energy Resource forecast used in the 6:00 a.m. and 9:00 a.m. advisory run by the CAISO will be determined in accordance with Section 33.31.4 and the Business Practice Manual for the Extended Day-Ahead Market. The Demand Forecast and Variable Energy Resource forecast used in the final binding EDAM RSE will be the same forecasts the CAISO used in the 9:00 am advisory run, unless the timelines in the Business Practice Manual for the Extended Day-Ahead Market otherwise allow for adjustment.

33.31.1.2.1.2 Imbalance Reserves Requirement

The Imbalance Reserve requirement used in the 6:00 a.m. and 9:00 a.m. advisory run by the CAISO will be calculated in accordance with Section 33.31.3. The Imbalance Reserve requirement used in the final binding EDAM RSE will be the same requirement the CAISO used in the 9:00 a.m. advisory run unless the timelines in the Business Practice Manual for the Extended Day-Ahead Market otherwise allow for adjustment.

33.31.1.2.1.3 Ancillary Services Requirement

Each EDAM Entity must determine the requirements for ancillary services within its Balancing Authority Area consistent with its Balancing Authority obligations. The EDAM Entity Scheduling Coordinator must communicate the ancillary services requirements to the CAISO for use in the advisory and binding runs in accordance with the timelines set forth in the Business Practice Manuals. The ancillary services requirements used in the final binding EDAM RSE for each EDAM Entity will be the same requirement the CAISO used in the 9:00 a.m. advisory run unless the timelines in the Business Practice Manual for the Extended Day-Ahead Market otherwise allow for adjustment. The Ancillary Services requirements for the CAISO Balancing Authority Area will be determined under Section 8 and used in the final binding EDAM RSE.

33.31.1.2.2 Transfers Between Balancing Authority Areas in Support of EDAM RSE

The CAISO will account for EDAM Transfers that will occur between two Balancing Authority Areas in the EDAM Area in support of the EDAM RSE pursuant to Section 33.18.2.1 by transferring the EDAM RSE requirements from the importing Balancing Authority Area to the exporting Balancing Authority Area prior to performing the advisory and binding runs of the RSE in accordance with the timelines set forth in the Business Practice Manual for the Extended Day-Ahead Market.

33.31.1.3 Performance of the EDAM Resource Sufficiency Evaluation

The EDAM RSE will evaluate whether RSE-eligible supply is sufficient to meet each of the upward and downward components of the requirements established for the Balancing Authority Area, as provided in Section 33.31.1.2 in each hour of the Day-Ahead Market.

33.31.1.3.1 Demand Evaluation

Each Balancing Authority Area in the EDAM Area must meet its Demand Forecast and Variable Energy Resource forecast requirements as determined by

Section 33.31.1.2.1.1.

33.31.1.3.2 Imbalance Reserves Evaluation

Each Balancing Authority Area in the EDAM Area must meet its Imbalance Reserve Up and Imbalance Reserve Down requirements as determined by Section 33.31.1.2.1.2.

33.31.1.3.3 Ancillary Services Evaluation

Each Balancing Authority Area in the EDAM Area must meet its ancillary service requirements as determined by Section 33.31.1.2.1.3. The CAISO Balancing Authority Area must meet its Ancillary Service obligations as provided in Section 8.

33.31.1.4 Satisfaction of the EDAM RSE Requirements

A Balancing Authority Area in the EDAM Area will pass the final binding EDAM RSE if it meets all of the requirements in Section 33.31.1.3 for each hour of the Day-Ahead Market.

33.31.1.4.1 Inclusion in the EDAM Upward Pool

A Balancing Authority Area in the EDAM Area which passes the final binding EDAM RSE by satisfying the upward requirements of the demand evaluation described in Section 33.31.1.3.1, the Imbalance Reserve evaluation described in Section 33.31.1.3.2, and the ancillary services evaluation described in Section 33.31.1.3.3 in each hour of the Day-Ahead Market, together with any Balancing Authority Area that cured its failure to pass the EDAM RSE in the upward direction through the IFM and incurred the applicable surcharge(s) set forth in Section 33.31.1.5, will be placed into the EDAM Upward Pool. The Balancing Authority Areas in the EDAM Area placed in the EDAM Upward Pool will be collectively accounted for when performing the EIM Resource Sufficiency Evaluation, with the EDAM Upward Pool evaluated as a collective in accordance with Section 29.34(m) and not otherwise evaluated under Section 29.34(k)-(l).

33.31.1.4.2 Inclusion in the EDAM Downward Pool

A Balancing Authority Area in the EDAM Area which passes the final binding EDAM RSE by satisfying the downward requirements of the demand evaluation described in Section 33.31.1.3.1, the Imbalance Reserve evaluation described in Section 33.31.1.3.2, and the ancillary services evaluation described in Section 33.31.1.3.3 in each hour of the Day-Ahead Market, together with any Balancing Authority Area that has cured its failure to pass the EDAM RSE in the downward direction through the IFM and incurred the applicable surcharge set forth in Section 33.31.1.5 will be placed into the EDAM Downward Pool. The Balancing Authority Areas in the EDAM Area placed in the EDAM Downward Pool will be collectively accounted for when performing the EIM Resource Sufficiency Evaluation, with the EDAM Downward Pool evaluated as a collective in accordance with Section 29.34(m) and not otherwise evaluated under Section 29.34(k)-(l).

33.31.1.4.3 Exclusion from the EDAM Upward and Downward Pools

If a Balancing Authority Area in the EDAM Area is excluded from either the EDAM Upward Pool or EDAM Downward Pool then the Balancing Authority Area excluded from either the EDAM Upward Pool or the EDAM Downward Pool will be evaluated as an individual Balancing Authority Area for the EIM Resource Sufficiency Evaluation in accordance with Section 29.34(m) and not otherwise evaluated under Section 29.34(k)-(l).

33.31.1.5 Surcharge Upon Failure of the EDAM RSE

A Balancing Authority Area in the EDAM Area that fails the EDAM RSE in any hour of any day and in any direction is subject to the following surcharges, with any resulting surcharges distributed to the applicable Scheduling Coordinator as provided in Section 33.11.2.2:

33.31.1.5.1 EDAM RSE On-Peak Upward Failure Insufficiency Surcharge

A Balancing Authority Area in the EDAM Area that has failed to satisfy the

upward components of the EDAM RSE during the on-peak period will be subject to a three-tiered penalty structure as follows:

(i) In a tier 1 failure, the Balancing Authority Area failure is *de minimis* defined as the higher of 10 MW or an amount that is less than or equal to one percent of the Balancing Authority Area's upward Imbalance Reserve requirement for that hour, and the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge will not be calculated.

(ii) In a tier 2 failure, the Balancing Authority Area failure is above the *de minimis* failure amount and is less than or equal to fifty percent of the Balancing Authority Area's upward Imbalance Reserve requirement and the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge will be calculated as provided in Section 33.11.2.1.1.

(iii) In a tier 3 failure, the Balancing Authority Area failure is greater than fifty percent of the Balancing Authority Area's upward Imbalance Reserve requirement and the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge will be calculated as provided in Section 33.11.2.1.1.

33.31.1.5.2 EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge

The EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge will be calculated for each Balancing Authority Area that has failed the EDAM RSE during the off-peak period in the upward direction, as provided in Section 33.11.2.1.2. The EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge will not be calculated for a *de minimis* failure, defined as the higher of 10 MW or an amount that is less than or equal to one percent of the Balancing Authority Area's upward Imbalance Reserve requirement for that hour, as provided in Section 33.11.2.1.2.

33.31.1.5.3 EDAM RSE Downward Failure Insufficiency Surcharge

The EDAM RSE Downward Failure Insufficiency Surcharge will be calculated for each Balancing Authority Area in the EDAM Area that has failed the EDAM RSE

in the downward direction in any hour on any day, as provided in Section 33.11.2.1.3. The EDAM RSE Downward Failure Insufficiency Surcharge will not be calculated for a *de minimis* failure, defined as an amount that is greater than 10 MW in the hour, as provided in Section 33.11.2.1.3.

33.31.1.6 Timely Submission of Tags Necessary to Remain in EDAM Upward and Downward Pools

A Balancing Authority Area in the EDAM Area must comply with the tagging protocols set forth in Section 33.30.8.3 and the Business Practice Manuals to ensure imports and exports are timely tagged. A Balancing Authority Area in the EDAM Area that fails to timely E-tag imports or exports and does not otherwise re-supply from a firm schedule or physical source to cover for the untagged imports or exports for the operating hour following the process in the Business Practice Manual will be removed from the EDAM Upward Pool or the EDAM Downward Pool, respectively, for that Trading Hour. A Balancing Authority Area in the EDAM Area that is removed from the EDAM Upward Pool or the EDAM Downward Pool in accordance with this Section 33.31.1.6 will be evaluated as an individual Balancing Authority Area and will be allowed to share in the Diversity Benefits of the pool that it would have otherwise been a part of and as provided in Section 33.31.1.4.3.

33.31.2 Operation of the Day-Ahead Market in the EDAM Area

33.31.2.1 IFM MPM in the EDAM Area

The CAISO applies the IFM MPM specified in Section 31.2 to the EDAM Area.

33.31.2.2 IFM in the EDAM Area

The IFM procures Energy and Imbalance Reserves for EDAM Entity Balancing Authority Areas but does not procure Ancillary Services. EDAM Entities must self-provide their full Ancillary Services requirements to the IFM and cannot submit Economic Bids for Ancillary Services to the IFM.

The CAISO procures Energy across the EDAM Area as specified in Section 31.3.1. The CAISO procures Imbalance Reserves across the EDAM Area as specified in Sections 31.3.1.5 and

31.3.1.6. An EDAM Resource must meet the requirements applicable to Participating Generators to be eligible for Imbalance Reserves Awards and must meet all of the RTM Bidding Obligations specified in Section 31.3.4.

33.31.2.3 RUC MPM in the EDAM Area

The CAISO applies the RUC MPM specified in Section 31.9 to the EDAM Area, except that a reference to the CAISO Forecast of BAA Demand for the CAISO refers to the total CAISO Forecast of BAA Demand for all Balancing Authority Areas across the EDAM Area.

33.31.2.4 RUC in the EDAM Area

The CAISO procures Reliability Capacity across the EDAM Area as specified in Sections 31.5 and 31.9 with the following additional qualifications. An EDAM Resource must meet the requirements applicable to Participating Generators to be eligible for RUC Awards and must meet all of the RTM Bidding Obligations specified in Section 31.5.8. The CAISO procures Reliability Capacity across the EDAM Area as specified in Sections 31.5, except that a reference to the CAISO Forecast of BAA Demand for the CAISO refers to the total CAISO Forecast of BAA Demand for all Balancing Authority Areas across the EDAM Area. The CAISO does not have authority under Section 31.5.3.1 to adjust the CAISO Forecast of BAA Demand for an EDAM Balancing Authority Area.

33.31.3 Net Export EDAM Transfer Constraint

The Extended Day-Ahead Market will include a configurable constraint to permit a Balancing Authority Area in the EDAM Area to enable an hourly limit on the amount of net EDAM Transfer exports, where the total net export EDAM Transfer constraint cannot be reduced below the higher of zero or the transmission service made available to support a net export in the EDAM RSE under Section 33.18.2.1. The net export EDAM Transfer constraint limit is calculated as the available capacity of Supply Bids from resources eligible for the EDAM RSE, plus the available capacity of Supply Bids from resources not eligible for the EDAM RSE, multiplied by a configurable confidence factor, minus the EDAM RSE requirements as described in Section 33.31.1, minus a configurable non-exportable capacity margin. The CAISO or an EDAM Entity may elect to enable the net export EDAM Transfer constraint for its Balancing Authority Area prior

to 9:00 a.m. on the day before the Trading Day in accordance with the timelines and procedures in the Business Practice Manual for the Extended Day-Ahead Market. If an EDAM Entity or the CAISO elects to enable the constraint, then the CAISO applies the constraint across all IFM market processes, including deployment scenarios for IRU/IRD and the RUC. Once elected, the EDAM Entity or the CAISO can choose which hours in which the constraint can be applied to the Operating Day for which the IFM is run.

33.31.3.1 Confidence Factor

If there is observed risk of non-performance or non-delivery by Supply overall or from intertie schedules, then a Balancing Authority Area in the EDAM Area may register a confidence factor of less than 100%.

33.31.3.2 Reliability Margin

Once the upper-bound limit of the net EDAM Transfer export constraint is derived, the CAISO or the EDAM Entity may further reduce this limit for its Balancing Authority Area by an additional reliability margin that reflects an amount of non-exportable capacity held back in anticipation of needing to respond to reliability conditions as may be permitted under the EDAM Transmission Service Provider tariff or the CAISO Tariff, as applicable, including associated business practices. An EDAM Entity or the CAISO may specify a reliability margin to be used in the net export EDAM Transfer constraint for its Balancing Authority Area prior to 9:00 a.m. on the day before the Trading Day for each hour of that Trading Day in accordance with the procedures in the Business Practice Manual for the Extended Day-Ahead Market.

33.31.4 CAISO Forecast of BAA Demand and Variable Energy Resource Forecast for EDAM Entities

In accordance with procedures set forth in the Business Practice Manual for the Extended Day-Ahead Market, the CAISO develops a Demand Forecast and Variable Energy Resource forecast for each EDAM Entity. This forecast constitutes the CAISO Forecast of BAA Demand and the Variable Energy Resource forecast for that EDAM Entity unless the EDAM Entity elects, in accordance with procedures set forth in the Business Practice Manual for the Extended Day-Ahead Market, to submit its own forecast. The forecast option selected by the EDAM Entity will

be the same forecast option that is utilized in the Real-Time Market. A Demand Forecast submitted by the EDAM Entity that will be utilized as the CAISO Forecast of BAA Demand must contain the expected transmission loss as defined in the EDAM Entity's tariff. In the Day-Ahead Market, the CAISO Forecast of BAA Demand for a Balancing Authority Area modeled as Supply-only is zero. The Demand Forecast provided by the EDAM Entity that meets the procedures established in the Business Practice Manual constitutes that EDAM Entity's CAISO Forecast of BAA Demand and the Variable Energy Resource forecast provided by the EDAM Entity that meets the procedures established in the Business Practice Manual constitutes that EDAM Entity's Variable Energy Resource forecast.

33.31.4.1 Load Modification/Demand Response Programs

An EDAM Entity may elect to adjust its Demand Forecast to account for demand response programs administered in its Balancing Authority Area that do not qualify as EDAM Resource Facilities in accordance with procedures set forth in the Business Practice Manual for the Extended Day-Ahead Market. When enabled, the EDAM Entity will enable or deploy the demand response corresponding to the adjustment consistent with the applicable requirements for such demand response programs. If the EDAM RSE for the CAISO BAA is adjusted to reflect demand response resources participating in demand response programs administered in its Balancing Authority Area that do not qualify as RSE-eligible EDAM Resource Facilities, then the CAISO may adjust RUC participation to correspond to such adjustment in accordance with the procedures set forth in the Business Practice Manual for the Extended Day-Ahead Market. If such an adjustment is made, the CAISO will enable or deploy the demand response corresponding to the adjustment consistent with the applicable requirements for such demand response programs. Adjustments made pursuant to this Section 33.31.4.1 are subject to audit and monitoring as provided in Section 33.38.

33.31.5 Reserve Sharing Groups

The EDAM will accommodate ancillary service requirements that are satisfied through participation in a reserve sharing group. If multiple EDAM Entity Balancing Authority Areas participate in a reserve sharing group, they must identify the transmission that will be utilized to

ensure delivery of the shown reserve capacity, consistent with existing practices the entities may have in place today for delivery of the reserves. This transmission capacity will not be available for EDAM Transfers to ensure the deliverability of the reserve sharing obligations in the Real-Time.

33.31.6 Interchange Schedules

After Day-Ahead Market results are published, EDAM Entity Scheduling Coordinators must submit Interchange Schedules with other Balancing Authority Areas at the relevant EDAM Interties and must update these Interchange Schedules with any adjustments, when applicable. For each EDAM Intertie Bid that clears the IFM resulting in a 15-minute EDAM Intertie Schedule, the EDAM Entity Scheduling Coordinator must submit to the CAISO the corresponding hourly transmission profile and 15-minute Energy profiles from the respective E-Tags. The required transmission profiles and Energy profiles must reflect the Point of Receipt and Point of Delivery that was declared in the IFM Bid submittal, must be submitted at least 20 minutes before the start of the Operating Hour, and the EDAM Entity Scheduling Coordinator must provide an updated Energy profile to the extent required by Section 30.5.7.

33.32 Greenhouse Gas (GHG)

33.32.1 GHG Compliance Cost Recovery

EDAM Resource Scheduling Coordinators and Scheduling Coordinators for resources within the CAISO Balancing Authority Area will have an opportunity to recover costs of compliance with GHG regulations adopted by a state jurisdiction that has priced GHG emissions as part of a state GHG reporting and reduction program.

33.32.1.1 Bid Adders Used by the Integrated Forward Market

The Integrated Forward Market will use GHG Bid Adders submitted by EDAM Resource Scheduling Coordinators for EDAM Resource Facilities located outside of a specific GHG Regulation Area to optimize the attribution of GHG Transfers into that GHG Regulation Area. The Integrated Forward Market will use GHG Bid Adders submitted by EDAM Resource Scheduling Coordinators for EDAM Resource Facilities located within the GHG Regulation Area of the State of Washington to optimize the attribution of GHG Transfers

into GHG Regulation Areas outside of the State of Washington. The Integrated Forward Market will use GHG Bid Adders submitted by Scheduling Coordinators for resources located within the GHG Regulation Area of the State of California to optimize the attribution of GHG Transfers into GHG Regulation Areas outside of the State of California.

33.32.1.2 Bid Adders and GHG Regulation Areas

For purposes of Section 33.32, GHG Regulation Areas will reflect the Pricing Nodes of the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area within the GHG boundary as defined by a state jurisdiction that has priced GHG emissions as part of a state GHG reporting and reduction program.

EDAM Resource Scheduling Coordinators for EDAM Resource Facilities located inside a specific GHG Regulation Area will not submit GHG Bid Adders to serve Demand within that GHG Regulation Area. Scheduling Coordinators for resources located within the GHG Regulation Area of the State of California will not submit GHG Bid Adders to serve Demand within the GHG Regulation Area of California.

Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into the CAISO Balancing Authority Area that register in the Master File that their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of California will not submit GHG Bid Adders.

33.32.1.3 Bid Submission

EDAM Resource Scheduling Coordinators for EDAM Resource Facilities located outside of GHG Regulation Areas may submit a separate GHG Bid Adder as an hourly Bid component specific to each GHG Regulation Area.

Scheduling Coordinators for resources located within the GHG Regulation Area of the State of California may submit a separate GHG Bid Adder as an hourly Bid component specific to each GHG Regulation Area located outside of the State of California. EDAM Resource Scheduling Coordinators for EDAM Resource Facilities within the GHG Regulation Area of the State of Washington may submit a separate GHG Bid Adder as an

hourly Bid component specific to each GHG Regulation Area located outside the State of Washington.

GHG Bid Adders will consist of a price and MW quantity. The price included in the GHG Bid Adder will not be less than $0/MWh and not greater than 110% of the resource's GHG maximum compliance cost as determined in accordance with Section 33.32.1.5.

33.32.1.4 Default Treatment.

If a resource located outside of a GHG Regulation Area does not have a GHG Bid Adder to serve Demand within a specific GHG Regulation Area, the Integrated Forward Market will not attribute the resource as supporting a GHG Transfer into that specific GHG Regulation Area.

33.32.1.5 Determination of Maximum GHG Bid Adder

The CAISO will calculate a maximum daily GHG Bid Adder for each EDAM Resource Facility and each resource located within the CAISO Balancing Authority Area in relation to GHG Regulation Areas, as applicable, based on the resource's highest average heat rate on its heat rate curve, the applicable GHG Allowance Price, and the resource's applicable emission rate. The CAISO will perform this calculation in accordance with the provisions of the applicable Business Practice Manual. The CAISO will also provide for an option for resources to negotiate a maximum GHG Bid Adder for each GHG Regulation Area in accordance with the provisions of the applicable Business Practice Manual.

33.32.1.6 GHG Bid Adder Price

The price included in the GHG Bid Adder will not be less than $0/MW. The sum of the GHG Bid Adder price and the Energy Bid price may not exceed the Soft Energy Bid Cap unless the sum of a resource's relevant maximum daily GHG Bid Adder and Default Energy Bid as adjusted pursuant to Section 30.11 exceeds the Soft Energy Bid Cap. In this case, the sum of a resource's GHG Bid Adder and Energy Bid price may not exceed the sum of the relevant maximum daily GHG Bid Adder and the resource's Default Energy Bid or the Hard Energy Bid Cap, whichever is lower.

33.32.2 Consideration of GHG Bid Adders in Market Clearing

33.32.2.1 Dispatch of Resources with Non-zero Bid Adders

The Integrated Forward Market will take into account GHG Bid Adders in selecting Energy produced by EDAM Resource Facilities located outside of a specific GHG Regulation Area up to the associated MW quantity included in the GHG Bid Adder to serve Demand within that GHG Regulation Area.

The Integrated Forward Market will take into account GHG Bid Adders in selecting Energy produced by resources located within the CAISO Balancing Authority Area up to the associated MW quantity included in the GHG Bid Adder to serve load Demand in the GHG Regulation Area located outside of the State of California.

The Integrated Forward Market will not consider GHG Bid Adders when selecting EDAM Resources to serve Demand outside of GHG Regulation Areas.

33.32.2.2 Maximum GHG Bid Adder MW Attribution

The Integrated Forward Market will limit the maximum MW attribution of an EDAM Resource Facility to serve Demand in a specific GHG Regulation Area to a value equal to lower of (i) the MW value in the resource's GHG Bid Adder; (ii) the dispatchable Bid range between the resource's GHG reference pass schedule and the resource's effective upper Economic Bid, considering any applicable derates and Ancillary Services capacity reservations, for the relevant Operating Hour; or (iii) the resource's Day-Ahead Energy Schedule for that Trading Hour.

The Integrated Forward Market will limit the maximum MW attribution of a resource located within the GHG Regulation Area of the State of California to serve load within a GHG Regulation Area outside of the State of California to a value equal to the lower of (i) the MW value in the resource's GHG Bid Adder; (ii) the resource's Day-Ahead Energy Schedule for that Trading Hour.

33.32.2.3 GHG Reference Pass

The GHG reference pass runs before the Integrated Forward Market. The GHG reference pass uses Day-Ahead Bids and Self-Schedules of resources to optimally clear

Supply and Demand Bids without GHG Transfers into GHG Regulation Areas. The GHG reference pass establishes GHG reference pass schedules for resources to determine what Dispatch would have occurred without GHG Transfers into GHG Regulation Areas. The GHG reference pass will not schedule capacity located outside of a GHG Regulation Area obligated to serve Demand within a GHG Regulation Area that is registered with the CAISO in accordance with the applicable Business Practice Manual, thereby allowing this capacity to support a GHG Transfer into a GHG Regulation Area in the Integrated Forward Market.

Resources with Pseudo-Tie arrangements or Dynamic Schedules into a Balancing Authority Area that includes Demand within a specific GHG Regulation Area will register in the Master File whether they are associated with Demand in that GHG Regulation Area. The GHG reference pass will not schedule Pseudo-Tie or dynamically scheduled resources to serve Demand outside of a specific GHG Regulation Area if they are associated with Demand in that GHG Regulation Area.

33.32.2.4 Dispatch of Resources with Bid Adders of Zero

The Integrated Forward Market will not dispatch resources located outside of a GHG Regulation Area for attribution to serve Demand in a GHG Regulation Area if the MW quantity included in the GHG Bid Adder is zero.

33.32.3 GHG Marginal Cost

The Integrated Forward Market will, taking into account Energy Bids and GHG Bids, optimally select resources located outside of a GHG Regulation Area to support GHG Transfers into a GHG Regulation Area until the total MW of GHG Transfers into the respective GHG Regulation Area is fully allocated. The Shadow Price of this allocation constraint is the Marginal GHG Cost for the respective GHG Regulation Area.

33.32.4 Compensation

When the Integrated Forward Market attributes a resource located outside of a GHG Regulation Area to support a GHG Transfer to serve Demand in a GHG Regulation Area, the EDAM Resource Scheduling Coordinator for the EDAM Resource Facility or Scheduling Coordinator for

the resource will receive a payment equaling the product of the GHG Transfer to a GHG Regulation Area attributed to the resource in the IFM and the IFM Marginal GHG Cost for that respective GHG Regulation Area.

33.32.5 GHG Net Export Constraint

The CAISO will apply an hourly GHG net export constraint in the Integrated Forward Market for EDAM Entity Balancing Authority Areas that do not overlap with a GHG Regulation Area. This constraint will limit the aggregate attribution of EDAM Resources within a specific EDAM Entity Balancing Authority Area such that the aggregate attribution does not exceed the net exports from that EDAM Entity Balancing Authority Area. This constraint will also limit the aggregate attribution of resources within a specific GHG Regulation Area to serve Demand in another GHG Regulation Area such that the attribution may not exceed the net exports from these resources' native Balancing Authority Areas. This constraint will not restrict the Integrated Forward Market from attributing capacity located outside of a specific GHG Regulation Area obligated to serve Demand within that GHG Regulation Area that is registered with the CAISO. In accordance with the applicable Business Practice manual, the CAISO will not enforce this constraint for any Balancing Authority Area in the EDAM Area and in any Trading Hour in which the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area with Demand in a GHG Regulation Area is deficient in the upward direction in the EDAM Resource Sufficiency Evaluation.

33.32.6 Data Availability

33.32.6.1 Notification

The CAISO will notify EDAM Resource Scheduling Coordinators for EDAM Resource Facilities and Scheduling Coordinators for resources within the CAISO Balancing Authority Area of their resources' GHG reference pass schedules. The CAISO will notify an EDAM Resource Scheduling Coordinator through the results of the Integrated Forward Market of the MW quantity of any Energy of an EDAM Resource Facility located in an EDAM Entity Balancing Authority Area outside of a specific GHG Regulation Area that supports a GHG Transfer to serve Demand in that GHG Regulation Area.

The CAISO will notify an EDAM Resource Scheduling Coordinator through the results of the Integrated Forward Market of the MW quantity of any Energy of an EDAM Resource Facility located in the GHG Regulation Area of the State of Washington that supports a GHG Transfer to serve Demand in a GHG Regulation Area outside of the State of Washington.

The CAISO will notify the Scheduling Coordinator for a resource located in the GHG Regulation Area of the State of California through the results of the Integrated Forward Market of the MW quantity of any Energy of a resource that supports a GHG Transfer to serve Demand in a GHG Regulation Area outside of the State of California.

33.32.6.2 Disclosure

The CAISO may disclose information related to GHG Transfers to a Governmental Authority, so long as such information does not disclose confidential information of any individual Market Participant.

33.33 [Not Used]

33.34 [Not Used]

33.35 Market Validation And Price Correction

The market validation and price correction provisions of Section 35 apply to the EDAM, except that, for a period not to exceed 180 days after an EDAM Entity Implementation Date, the time allowed for the CAISO's correction of Day-Ahead Market prices will be 10 Business Days.

33.36 Congestion Revenue Rights

Congestion Revenue Rights are not included in the Extended Day-Ahead Market, and the provisions of Section 36 will not apply to EDAM Market Participants.

33.37 Rules Of Conduct

All EDAM Market Participants will be subject to the provisions of Section 37 except for Section 37.2 and Section 37.4 to the extent it applies to Maintenance Outages.

33.38 Market Monitoring in EDAM

The CAISO Department of Market Monitoring is the market monitor for the EDAM and holds the same duties towards the EDAM as it holds under Appendix P, Section 5 towards the other CAISO Markets.

Any referral to FERC of a potential Market Violation or market design flaw will be made under the procedures established in Appendix P, Section 11 and Appendix P, Section 12, respectively. The obligations the CAISO holds towards the Department of Market Monitoring under Appendix P, Sections 3 and 4 apply equally to the Department of Market Monitoring in its role as market monitor for the EDAM. The CAISO Market Surveillance Committee holds the same duties towards the EDAM as it holds under Appendix O, Section 5 towards the CAISO Markets.

33.39 Local Market Power Mitigation in EDAM

The CAISO applies the Local Market Power Mitigation procedures set forth in Sections 31.2, 31.9, and 39.7 to the Extended Day-Ahead Market and uses the methods and standards for setting Default Energy Bids and Default Availability Bids in the Extended Day-Ahead Market as set forth in Section 39.7.

33.40 [Not Used]

33.41 [Not Used]

33.42 [Not Used]

33.43 [Not Used]

33.44 Flexible Ramping Product

The CAISO procures the Flexible Ramping Product in the EDAM Area as set forth in Section 44.

Section 34

34. Real-Time Market

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34.1.4 Real-Time Validation of Schedules and Bids

After the Market Close of the Real-Time Market, the CAISO performs a validation process consistent with the provisions set forth in Section 30.7 and the following additional rules. The CAISO will insert a Generated Bid to cover any RUC Award or Day-Ahead Schedule in the absence of any Self-Schedule or Economic Bid components, or to fill in any gaps between Bid components to cover a RUC Award or Day-Ahead Schedule for use in the RTM. Schedules and Bids submitted to the RTM to supply Energy and Ancillary Services will be considered in the various RTM processes, including the MPM process, the HASP, the STUC, the RTUC, the FMM and the RTD.

34.1.5 Mitigating Bids in the RTM

34.1.5.1 Generally

After the Market Close of the RTM, after the CAISO has validated the Bids pursuant to Section 30.7 and Section 34.1.4, and prior to conducting any other RTM processes, the CAISO conducts a MPM process. The results are used in the RTM optimization processes. Bids on behalf of Demand Response Resources, Participating Load, and Hybrid Resources are considered in the MPM process but are not subject to Bid mitigation. Energy storage resources whose PMax is less than five (5) MW are considered in the MPM process, but not subject to Bid mitigation.

34.1.5.2 Fifteen-Minute MPM

The CAISO conducts the MPM process as the first pass of each fifteen-minute interval in the RTUC horizon starting with the unmitigated Bid set as validated pursuant to Section 30.7 and Section 34.1.4. The MPM process produces results for each fifteen-minute interval of the RTUC horizon and thus may produce mitigated Bids for any given resource for any fifteen-minute interval in the RTUC run horizon that applies to any CAISO Market Process that is based on a specific RTUC run. The determination as to

whether a Bid is mitigated is made based on the non-competitive Congestion component of each LMP for each fifteen-minute interval of the RTUC run horizon, using the methodology set forth in Section 31.2.3 except that a resource may have a non-competitive Congestion component in a fifteen-minute interval based on a Transmission Constraint deemed non-competitive either in the base case for meeting Demand or in the separate cases of modeling the dispatch for Energy of all capacity awarded upward and downward Uncertainty Awards. If a Bid is mitigated in the MPM pass for a fifteen-minute interval in the RTUC run horizon, the mitigated Bid will be utilized in the corresponding binding HASP and FMM process for the fifteen-minute interval. If a Bid is not mitigated in a fifteen-minute MPM pass, the CAISO will still mitigate that Bid in subsequent fifteen-minute intervals of the RTUC horizon if the MPM pass for the subsequent intervals determine that mitigation is needed.

34.1.5.3 Real-Time Dispatch MPM

The RTD MPM process produces results for each five-minute interval of a Trading Hour. The determination as to whether a Bid is mitigated is made based on the non-competitive Congestion component of each LMP for each five-minute interval, using the methodology set forth in Section 31.2.3 except that a resource may have a non-competitive Congestion component in a five-minute interval based on a Transmission Constraint deemed non-competitive either in the base case for meeting Demand or in the separate cases of modeling the dispatch for Energy of all capacity awarded upward and downward Uncertainty Awards. The RTD MPM process is performed for a configurable number of RTD advisory intervals after the binding RTD interval, and the mitigated Bids are used in the corresponding RTD intervals of the following RTD.

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Section 39

39. Market Power Mitigation Procedures

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39.7 Local Market Power Mitigation for Energy Bids

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39.7.2 Competitive Path Designation

39.7.2.1 Timing of Assessments

For the DAM and RTM, the CAISO will make assessments and designations of whether Transmission Constraints are competitive or non-competitive as part of the MPM runs associated with the DAM and RTM, respectively. Only binding Transmission Constraints determined by the MPM process will be assessed in the applicable market.

39.7.2.2 Criteria

(A) Notwithstanding the provisions in Section 39.7.2.2(B), when the CAISO enforces the natural gas constraint pursuant to Section 27.11, the CAISO may deem selected internal constraints to be non-competitive for specific days or hours based on its determination that actual electric supply conditions may be non-competitive due to anticipated electric supply conditions in the Southern California Gas Company and San Diego Gas & Electric Company gas regions.

(B) Subject to Section 39.7.3, for the DAM and RTM, a Transmission Constraint will be non-competitive only if the Transmission Constraint fails the dynamic competitive path assessment pursuant to this Section 39.7.2.2.

(a) **Transmission Constraints for the IFM** - As part of the MPM process associated with the IFM, the CAISO separately evaluates Transmission Constraints for the base scenario for meeting Demand, for the scenario of modeling the dispatch of Energy for the capacity corresponding to IRU Awards, and for the scenario of modeling the dispatch of Energy for the capacity corresponding to IRD Awards. The CAISO also evaluates Transmission Constraints for the scenario of modeling the dispatch of Energy for the capacity corresponding to RCU Awards. The CAISO will designate a Transmission

Constraint for the DAM as non-competitive when the fringe supply of counter-flow to the Transmission Constraint from all portfolios of suppliers that are not identified as potentially pivotal is less than the demand for counter-flow to the Transmission Constraint. For purposes of determining whether to designate a Transmission Constraint as non-competitive pursuant to this Section 39.7.2.2(B)(a):

(i) Counter-flow to the Transmission Constraint means the delivery of Power from a resource to the system load distributed reference bus. If counter-flow to the Transmission Constraint is in the direction opposite to the market flow of Power to the Transmission Constraint, the counter-flow to the Transmission Constraint is calculated as the shift factor multiplied by the resource's scheduled Power. Otherwise, counter-flow to the Transmission Constraint is zero.

(ii) Fringe supply of counter-flow to the Transmission Constraint means all available capacity from internal resources not controlled by the identified potentially pivotal suppliers and all internal Virtual Supply Awards not controlled by the identified potentially pivotal suppliers that provide counter-flow to the Transmission Constraint. Available capacity reflects the highest capacity of a resource's Energy Bid adjusted for Self-Provided Ancillary Services and derates.

(iii) Demand for counter-flow to the Transmission Constraint means all internal dispatched Supply and Virtual Supply Awards that provide counter-flow to the Transmission Constraint.

(iv) Potentially pivotal suppliers mean the three (3) portfolios of net sellers that control the largest quantity of counter-flow supply to the Transmission Constraint.

(v) Portfolio means the effective available internal generation capacity under the control of the Scheduling Coordinator and/or Affiliate determined pursuant to Section 4.5.1.1.12 and all effective internal Virtual Supply Awards of the Scheduling Coordinator and/or Affiliate. Effectiveness in supplying counter-flow is determined by scaling generation capacity and/or Virtual Supply Awards by the

shift factor from that location to the Transmission Constraint being tested.

(vi) A portfolio of a net seller means any portfolio that is not a portfolio of a net buyer. A portfolio of a net buyer means a portfolio for which the average daily net value of Measured Demand minus Supply over a twelve (12) month period is positive. The average daily net value is determined for each portfolio by subtracting, for each Trading Day, Supply from Measured Demand and then averaging the daily value for all Trading Days over the twelve (12) month period. The CAISO will calculate whether portfolios are portfolios of net buyers in the third month of each calendar quarter and the calculations will go into effect at the start of the next calendar quarter. The twelve (12) month period used in this calculation will be the most recent twelve (12) month period for which data is available. The specific mathematical formula used to perform this calculation will be set forth in a Business Practice Manual. Market Participants without physical resources will be deemed to be net sellers for purposes of this Section 39.7.2.2(a)(vi).

(vii) In determining which Scheduling Coordinators and/or Affiliates control the resources in the three (3) identified portfolios, the CAISO will include resources and Virtual Supply Awards directly associated with all Scheduling Coordinator ID Codes associated with the Scheduling Coordinators and/or Affiliates, as well as all resources that the Scheduling Coordinators and/or Affiliates control pursuant to Resource Control Agreements registered with the CAISO as set forth Section 4.5.1.1.13. Resources identified pursuant to Resource Control Agreements will only be assigned to the portfolio of the Scheduling Coordinator that has control of the resource or whose Affiliate has control of the resource pursuant to the Resource Control Agreements.

(b) **Transmission Constraints for the RTM** - As part of the MPM processes associated with the RTM, the CAISO separately evaluates Transmission Constraints for the base scenario for meeting Demand, for the scenario of modeling the dispatch of Energy for the

capacity corresponding to upward Uncertainty Awards, and for the scenario of modeling the dispatch of Energy for the capacity corresponding to downward Uncertainty Awards. The CAISO will designate a Transmission Constraint for the RTM as non-competitive when the sum of the supply of counter-flow from all portfolios of potentially pivotal suppliers to the Transmission Constraint and the fringe supply of counter-flow to the Transmission Constraint from all portfolios of suppliers that are not identified as potentially pivotal is less than the demand for counter-flow to the Transmission Constraint. For purposes of determining whether to designate a Transmission Constraint as non-competitive pursuant to this Section 39.7.2.2(b):

(i) Counter-flow to the Transmission Constraint has the meaning set forth in Section 39.7.2.2(B)(a)(i).

(ii) Supply of counter-flow from all portfolios of potentially pivotal suppliers to the Transmission Constraint means the minimum available capacity from internal resources controlled by the identified potentially pivotal suppliers that provide counter-flow to the Transmission Constraint. The minimum available capacity for the current market interval will reflect the greatest amount of capacity that can be physically withheld. The minimum available capacity is the lowest output level the resource could achieve in the current market interval given its dispatch in the last market interval and limiting factors including Minimum Load, Ramp Rate, Self-Provided Ancillary Services, Ancillary Service Awards (in the Real-Time Market only), derates, and Uncertainty Awards.

(iii) Potentially pivotal suppliers mean the three (3) portfolios of net sellers that control the largest quantity of counter-flow supply to the Transmission Constraint that can be withheld. Counter-flow supply to the Transmission Constraint that can be withheld reflects the difference between the highest capacity and the lowest capacity of a resource’s Energy Bid (not taking into account the Ramp Rate of the resource), measured from the Dispatch Operating Point for the

resource in the immediately preceding fifteen (15) minute FMM interval or the preceding five (5) minute RTD interval, as applicable (taking into account the Ramp Rate of the resource), adjusted for Self-Provided Ancillary Services/ Ancillary Service Awards, derates, and Uncertainty Awards in determining whether to designate a Transmission Constraint as non-competitive for the RTM. In determining whether to designate a Transmission Constraint as non-competitive for the RTM, counter-flow supply to the Transmission Constraint that can be withheld also reflects the PMin of each Short Start Unit with a Start-Up Time of sixty (60) minutes or less that was off-line in the immediately preceding fifteen (15) minute interval of the FMM. In determining whether to designate a Transmission Constraint as non-competitive for the FMM, counter-flow supply to the Transmission Constraint that can be withheld also reflects the PMin of each Short Start Unit with a Start-Up Time of fifteen (15) minutes or less that was off-line in the immediately preceding fifteen (15) minute interval.

(iv) Portfolio means the effective available internal generation capacity under the control of the Scheduling Coordinator and/or Affiliate determined pursuant to Sections 4.5.1.1.12 and 39.7.2.2(a)(vii). Effectiveness in supplying counter-flow is determined by scaling generation capacity by the shift factor from that location to the Transmission Constraint being tested.

(v) A portfolio of a net seller has the meaning set forth in Section 39.7.2.2(a)(vi).

(vi) Fringe supply of counter-flow to the Transmission Constraint means all available capacity from internal resources not controlled by the identified potentially pivotal suppliers that provide counter-flow to the Transmission Constraint. Available capacity reflects the highest capacity of a resource's Energy Bid (not taking into account the Ramp Rate of the resource), measured from the Dispatch Operating Point for the resource in the immediately preceding fifteen (15) minute interval of the FMM or five (5) minute interval of the RTD, as applicable (taking into account

the Ramp Rate of the resource), adjusted for Self-Provided Ancillary Services/ Ancillary Service Awards, derates, and Uncertainty Awards in determining whether to designate a Transmission Constraint as non-competitive for the RTM.

(vii) Demand for counter-flow to the Transmission Constraint means all internal dispatched Supply that provides counter-flow to the Transmission Constraint.

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39.7.4 Default Availability Bid for Imbalance Reserves and Reliability Capacity

The CAISO applies separate IRU Default Availability Bids and RCU Default Availability Bids.

A resource's IRU Default Availability Bid is the higher of: (a) $55/MWh; or (b) the IRU Negotiated Availability Bid.

A resource's RCU Default Availability Bid is the higher of: (a) $55/MWh; or (b) the RCU Negotiated Availability Bid.

A Scheduling Coordinator may choose to pursue both an IRU Negotiated Availability Bid and an RCU Negotiated Availability Bid.

39.7.4.1 Process for Establishing an IRU or RCU Negotiated Availability Bid

Scheduling Coordinators that elect the option of pursuing a Negotiated Availability Bid must submit a proposed value to apply either for IRU or RCU, depending on which type of Negotiated Availability Bid they have chosen to pursue. The proposed value must represent the costs of providing the underlying product. Within ten (10) Business Days of receipt, the CAISO will provide a written response. If the CAISO accepts the proposed Negotiated Availability Bid, it will generally become effective within eleven (11) Business Days from the date of acceptance by the CAISO and remain in effect until: (1) FERC modifies the Negotiated Availability Bid; (2) the CAISO and the Scheduling Coordinator modify the Negotiated Availability Bid by mutual agreement; or (3) the Negotiated Availability Bid expires, is terminated, or is modified pursuant to any agreed upon term or condition or pertinent FERC order.

If the CAISO does not accept the proposed Negotiated Availability Bid, the CAISO and the Scheduling

Coordinator shall enter a period of good faith negotiations that terminates sixty (60) days following the date of submission of a proposed Negotiated Availability Bid by a Scheduling Coordinator. If at any time during this period, the CAISO and the Scheduling Coordinator agree upon the Negotiated Availability Bid, it will generally become effective within eleven (11) Business Days of the date of agreement and remain in effect as if the CAISO accepted it initially.

If by the end of the sixty (60)-day period the CAISO and the Scheduling Coordinator fail to agree on the Negotiated Availability Bid, the Scheduling Coordinator has the right to file a proposed Negotiated Availability Bid with FERC pursuant to Section 205 of the Federal Power Act.

During the sixty (60)-day period following the submission of a proposed Negotiated Availability Bid by a Scheduling Coordinator, and pending FERC's acceptance in cases where the Scheduling Coordinator filed a proposed Negotiated Availability Bid with FERC pursuant to Section 205 of the Federal Power Act, the IRU Default Availability Bid or RCU Default Availability Bid for the resource is $55/MWh.

The CAISO may require the renegotiation of any Negotiated Availability Bids enacted pursuant to this Section 39.7.4.1 that have become outdated, are possibly erroneous, or for which the Scheduling Coordinator has changed. In the renegotiation process, the CAISO may review and propose modifications to such values, and may require the Scheduling Coordinator to provide updated information to support continuation of such values.

The CAISO shall make an informational filing with FERC of any Negotiated Availability Bids enacted pursuant to this Section 39.7.4.1 no later than seven (7) days after the end of the month in which the CAISO enacted the Negotiated Availability Bids.

39.7.4.2 Transition Period for Negotiated Availability Bids

The option to pursue a Negotiated Availability Bid will be unavailable until the CAISO certifies through a market notice it has gained sufficient operational experience with Imbalance Reserves and Reliability Capacity to validate that proposed Negotiated Availability Bids correspond reasonably to the underlying costs of providing the products. Such certification is deemed to have occurred if the CAISO does not issue the market notice within 18 months of the effective date of this Section 39.7.4.

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Section 40

40. Resource Adequacy Demonstration for all SCs in the CAISO BAA

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40.6 Requirements for SCs and Resources for LSEs

This Section 40.6 does not apply to Resource Adequacy Resources of Load-following MSSs. Scheduling Coordinators supplying Resource Adequacy Capacity shall make the Resource Adequacy Capacity listed in the Scheduling Coordinator's monthly Supply Plans under Section 40.4.7 available to the CAISO each hour of each day of the reporting month in accordance with this Section 40.6 and Section 9.3.1.3.

40.6.1 Day-Ahead Availability

Except as otherwise provided in Sections 40.6.1.1 and 40.6.4, Scheduling Coordinators supplying Resource Adequacy Capacity shall make such Resource Adequacy Capacity, available Day-Ahead to the CAISO as follows:

(1) Resource Adequacy Resources physically capable of operating must submit: (a) Economic Bids for Energy and/or Self-Schedules for all their Resource Adequacy Capacity and (b) Economic Bids for Ancillary Services and/or a Submission to Self-Provide Ancillary Services in the IFM for all of their Resource Adequacy Capacity that is certified to provide Ancillary Services. For Resource Adequacy Capacity that is certified to provide Ancillary Services and is not covered by a Submission to Self-Provide Ancillary Services, the resource must submit Economic Bids for each Ancillary Service for which the resource is certified. For Resource Adequacy Capacity subject to this requirement for which no Economic Energy Bid or Self-Schedule has been submitted, the CAISO shall insert a Generated Bid in accordance with Section 40.6.8. For Resource Adequacy

Capacity subject to this requirement for which no Economic Bids for Ancillary Services or Submissions to Self-Provide Ancillary Services have been submitted, the CAISO shall insert a Generated Bid in accordance with Section 40.6.8 for each Ancillary Service the resource is certified to provide.

(2) Resource Adequacy Resources must be available except for limitations specified in the Master File, legal or regulatory prohibitions or as otherwise required by this CAISO Tariff or by Good Utility Practice.

(3) Through the IFM co-optimization process, the CAISO will utilize available Resource Adequacy Capacity to provide Energy, Imbalance Reserves, or Ancillary Services in the most efficient manner to clear the Energy market, manage congestion and procure required Ancillary Services. In so doing, the IFM will honor submitted Energy Self-Schedules of Resource Adequacy Capacity unless the CAISO is unable to satisfy one hundred percent (100%) of the Ancillary Services requirements. In such cases, the CAISO may curtail all or a portion of a submitted Energy Self-Schedule to allow Ancillary Service-certified Resource Adequacy Capacity to be used to meet the Ancillary Service requirements. The CAISO will not curtail for the purpose of meeting Ancillary Service requirements a Self-Schedule of a resource internal to a Metered Subsystem that was submitted by the Scheduling Coordinator for that Metered Subsystem. If the IFM reduces the Energy Self-Schedule of Resource Adequacy Capacity to provide an Ancillary Service, the Ancillary Service Marginal Price for that Ancillary Service will be calculated in accordance with Section 27.1.2 using the Ancillary Service Bids submitted by the Scheduling Coordinator for the Resource Adequacy Resource or inserted by the CAISO pursuant to this Section 40.6.1, and using the resource's Generated Energy Bid to determine the Resource Adequacy Resource's opportunity cost of Energy. If the Scheduling Coordinator for the Resource Adequacy Resource believes that the opportunity cost of Energy based on the Resource Adequacy Resource's Generated Energy Bid is insufficient to compensate for the resource's actual opportunity cost, the

Scheduling Coordinator may submit evidence justifying the increased amount to the CAISO and to the FERC no later than seven (7) days after the end of the month in which the submitted Energy Self-Schedule was reduced by the CAISO to provide an Ancillary Service.

The CAISO will treat such information as confidential and will apply the procedures in Section 20.4 of this CAISO Tariff with regard to requests for disclosure of such information. The CAISO shall pay any higher opportunity costs approved by FERC.

(4) Resource Adequacy Resources must submit RUC Availability Bids for RCU for their Resource Adequacy Capacity.

(5) Resource Adequacy Resources eligible to provide Imbalance Reserves must submit Bids for IRU and IRD for all RA Capacity that meets its obligation pursuant to 40.6.1(1)(a) by submitting an Economic Bid.

40.6.1.1 Day-Ahead Availability - Specific RA Resource Types

(a) **Distributed Generation Facilities.** Distributed Generation Facilities shall comply with the IFM and RUC bidding requirements that apply to the same technology type of a resource connected to the CAISO Controlled Grid.

(b) **Non-Generator Resources**

(1) Non-Generator Resources that do not use Regulation Energy Management shall submit:

(A) Economic Bids or Self-Schedules into the IFM for all RA Capacity for all hours of the month the resource is physically capable of operating; and

(B) RUC Availability Bids for both RCU and RCD for all RA Capacity for all hours of the month the resource is physically capable of operating,

(2) Non-Generator Resources using Regulation Energy Management shall submit Economic Bids or Self-Schedules into the IFM for all RA Capacity for Regulation for all hours of the month the resource is physically capable of operating.

(c) **Extremely Long-Start Resources.** Extremely Long-Start Resources that are Resource

Adequacy Resources must make themselves available to the CAISO by complying with:

(1) the Extremely Long-Start Commitment Process under Section 31.7 or otherwise committing the ELS Resource upon instruction from the CAISO, if physically capable; and

(2) the applicable provisions of Section 40.6.1 regarding Day-Ahead availability for the Trading Days for which it was committed.

40.6.2 Real-Time Availability

(a) **General Requirement.** Except as otherwise provided in Section 40.6.4, for every Trading Hour in which a Resource Adequacy Resource receives a Day-Ahead Schedule for Energy, Imbalance Reserves, or Ancillary Services or a RUC Schedule, the Resource Adequacy Resource must submit Bids to the Real-Time Market for that Trading Hour that conform with the Resource Adequacy Resource's obligations under Section 40.6.1 for the Day-Ahead Market. Provided, however, that any reference in Section 40.6.1 to RUC bidding does not apply to the Real-Time Market bidding obligations.

(b) **Short Start Units.** Irrespective of their Day-Ahead Schedule for Energy, Day-Ahead Schedule for Ancillary Services, or RUC Schedule, Short Start Units must, for each Trading Hour, submit Bids to the Real-Time Market that conform to their obligations under Section 40.6.1 for the Day-Ahead Market. Provided, however, that any reference in Section 40.6.1 to RUC bidding does not apply to the Real-Time Market bidding obligations for Short Start Units. The CAISO may waive these availability obligations for a resource that is not a Long Start Unit or an Extremely Long-Start Resource that does not have an Day-Ahead Schedule or a RUC Schedule based on a procedure to be published on the CAISO Website. The CAISO will insert Generated Bids in accordance with Section 40.6.8 for any Resource Adequacy Capacity subject to the above requirements for which the resource has failed to submit the appropriate bids to the RTM.

(c) **Long Start Units.** Long Start Units not committed in the Day-Ahead Market will be released from any further obligation to submit Self-Schedules or Bids for the relevant

Operating Day. Scheduling Coordinators for Long Start Units are not precluded from self-committing the unit after the Day-Ahead Market and submitting a Self-Schedule or Wheeling-Out in the RTM, unless precluded by terms of their contracts.

(d) **Extremely Long-Start Resources.** Once an Extremely Long-Start Resource providing Resource Adequacy Capacity is committed by the CAISO, it shall comply, for the Trading Days for it was committed, with the Real-Time availability provisions in sub-sections (a) and (b) of this Section 40.6.2, including those provisions that otherwise apply only to Short Start Units.

(e) **Self-Schedules.** The CAISO will honor submitted Energy Self-Schedules of Resource Adequacy Capacity unless the CAISO is unable to satisfy one hundred (100) percent of its Ancillary Services requirements. In such cases, the CAISO may curtail all or a portion of a submitted Energy Self-Schedule to allow Ancillary Service-certified Resource Adequacy Capacity to be used to meet the Ancillary Service requirements, as long as such curtailment does not lead to a real-time shortfall in energy supply. If the CAISO reduces a submitted Real-Time Energy Self-Schedule for Resource Adequacy Capacity when that capacity is needed to meet an Ancillary Services requirement, the Ancillary Service Marginal Price for that capacity will be calculated in accordance with Sections 27.1.2 and 40.6.1.

(f) **Distributed Generation Facilities.** Distributed Generation Facilities shall comply with the RTM bidding requirements that apply to the same technology type of resource connected to the CAISO Controlled Grid.

(g) **Non-Generator Resources**

(1) Non-Generator Resources that do not use Regulation Energy Management shall submit –

(A) Economic Bids or Self-Schedules into the RTM for any remaining RA Capacity scheduled in the IFM or RUC; and

(B) Economic Bids or Self-Schedules into the RTM for all RA Capacity not

scheduled in the IFM,

(2) Non-Generator Resources using Regulation Energy Management that are not Use-Limited Resources under Section 40.4.6.1 shall submit Economic Bids or Self-Schedules into the RTM for any remaining RA Capacity from resource scheduled in IFM or RUC.

40.6.3 [Not Used]

40.6.4 Availability Requirements for Resources with Operational Limitations that are not Qualified Use-Limits

40.6.4.1 Must-Offer Obligation in DAM and RTM

Conditionally Available Resources (irrespective of Use-Limited Resource qualification) and Run-of-River Resources that provide Resource Adequacy Capacity and that are physically capable of operating must submit Self-Schedules or Bids in the Day-Ahead Market for their expected available Energy or their expected as-available Energy, as applicable, in the Day-Ahead Market and RTM up to the quantity of Resource Adequacy Capacity the resource is providing. Such resources shall also revise their Self-Schedules or submit additional Bids in RTM based on the most current information available regarding Expected Energy deliveries.

An Eligible Intermittent Resource providing Resource Adequacy Capacity may, but is not required to, submit Bids in the Day-Ahead Market.

40.6.4.2 RUC Availability Bids

The following resource types providing Resource Adequacy Capacity are not required to submit RUC Availability Bids for that capacity: Pumping Load, Reliability Demand Response Resources, Combined Heat and Power Resources, Regulatory Must-Take Generation, Non-Generator Resources using Regulation Energy Management, Conditionally Available Resources, Run-of-River Resources, and Eligible Intermittent Resources.

40.6.4.3 Ancillary Services Bids from Participating Loads that is Pumping Load

The must-offer obligation for Participating Load that is Pumping Load is limited to submitting, for hours where underlying Load permits, Non-Spin Ancillary Services Bids and/or a Submission to Self-Provide

Non-Spin Ancillary Services in the Day-Ahead Market for its Resource Adequacy Capacity that is certified to provide Non-Spinning Reserve Ancillary Service, and Economic Bids for Energy in the Real-Time Market for its Non-Spinning Reserve Capacity that receives an Ancillary Service Award in the Day-Ahead Market.

40.6.4.4 Proxy Demand Resources

(a) Short Start Proxy Demand Resources that provide Resource Adequacy Capacity shall submit RUC Availability Bids for all of their Resource Adequacy Capacity for all hours of the month the resource is physically available.

(b) Long Start Proxy Demand Resources are not required to submit Bids or Self Schedules in the RUC for their Resource Adequacy Capacity.

* * * * *

40.6.8 Use of Generated Bids

(a) **Day-Ahead Market.** Prior to completion of the Day-Ahead Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section 40.6.1 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid for Energy, Reliability Capacity, and Ancillary Services and will insert a Generated Bid for such capacity into the CAISO Day-Ahead Market.

(b) **Real-Time Market.** Prior to running the Real-Time Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section 40.6.2 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid and will insert a Generated Bid for such capacity into the Real-Time Market.

(c) **Partial Bids for RA Capacity.** If a Scheduling Coordinator for an RA Resource submits a partial bid for the resource's RA Capacity, the CAISO will insert a Generated Bid only for the remaining RA Capacity. In addition, the CAISO will determine if all dispatchable Resource Adequacy Capacity from Short Start Units, not otherwise selected in the IFM or

RUC, is reflected in a Bid into the Real-Time Market and will insert a Generated Bid for any remaining dispatchable Resource Adequacy Capacity for which the CAISO has not received notification of an Outage.

(d) **Exemptions.** Notwithstanding any of the provisions of Section 40.6.8, for the following resource types providing Resource Adequacy Capacity, the CAISO only inserts a Bid in the Day-Ahead Market or Real-Time Market where the generally applicable bidding rules in Section 30 call for bid insertion: Use-Limited Resource, Non-Generator Resource, Variable Energy Resource, Hydroelectric Generating Unit (including Run-of-River resources), Proxy Demand Resource, Reliability Demand Response Resource, Participating Load, including Pumping Load, Combined Heat and Power Resource, Conditionally Available Resource, Non-Dispatchable Resource, and resources providing Regulatory Must-Take Generation.

(e) **NRS-RA Resources.** The CAISO will submit a Generated Bid in the Day-Ahead Market for a Non-Resource-Specific System Resource in each RAAIM assessment hour, to the extent that the resource provides Resource Adequacy Capacity subject to the requirements of Section 40.6.1 and does not submit an outage request or Bid for the entire amount of that Resource Adequacy Capacity. Aside from where the generally applicable bidding rules in Section 30 call for Bid insertion, the CAISO will not submit a Generated Bid in the Real-Time Market for a Non-Resource-Specific System Resource that fails to meet its bidding obligations under Section 40.6.2. A Bid inserted for the Real-Time Market pursuant to the generally applicable bidding rules in Section 30 may not necessarily cover the full Real-Time Market obligation under Section 40.6.2 and the resource may thus remain exposed to Non-Availability Charges.

(f) **Generated Bids for RUC.** The CAISO submits a Generated Bid for RUC Availability Bids for Resource Adequacy Resources for which a RUC Availability Bid was not submitted as required in Section 40.6.1(4). For RA Resources that submit a RUC Availability Bid for RCU with an insufficient quantity, the CAISO extends the quantity

component of the Bid using the submitted price component of the Bid. For RA Resources that fail to submit any RUC Availability Bid for either RCU or RCD, the Generated Bid is for the required quantity at the Default Availability Bid.

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40.9.3 Availability Assessment

40.9.3.1 Local and System RA Capacity Availability

(a) **Availability Assessment Hours**

(1) Prior to the start of each Resource Adequacy Compliance Year, the CAISO shall establish and publish in the Business Practice Manual the Availability Assessment Hours applicable for resources providing local and/or system Resource Adequacy Capacity for each month of that year.

(2) The Availability Assessment Hours shall be a pre-defined set of five consecutive hours for each month that –

(A) correspond to the operating periods when high demand conditions typically occur and when the availability of Resource Adequacy Capacity is most critical to maintaining system reliability:

(B) vary by season as necessary so that the coincident peak load hour typically falls within the five-hour range each day during the month, based on historical actual load data; and

(C) apply to each Trading Day that is a weekday and not a federal holiday.

(b) **Must-Offer Availability Assessment.** The CAISO shall determine the extent to which each resource providing local and/or system Resource Adequacy Capacity made that capacity available to the CAISO each day during the Availability Assessment Hours by comparing –

(1) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids or Self-Schedules in the Day-Ahead Market and the Real-Time Market on a given day; and

(2) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource had a performance obligation to submit Economic Bids or Self-Schedules in the CAISO Markets under the must-offer requirements applicable under Section 40.6 on a given day, provided that Conditionally Available Resources will have RAAIM assessed as if the resource's performance obligation were defined in Sections 40.6.1 and 40.6.2 and irrespective of their expected available Energy or their expected as-available Energy.

(3) The CAISO's availability assessment under this Section 40.9.3.1 does not consider a RA Resource's compliance with any Imbalance Reserves or Reliability Capacity bidding obligation it holds.

40.9.3.2 Flexible RA Capacity Availability

(a) **Availability Assessment Hours.** The Availability Assessment Hours for a Flexible RA Resource shall be the same period as the must-offer obligation for the Flexible Capacity Category that is designated on the Resource Flexible RA Capacity Plan for that month, as set forth in Section 40.10.6.

(b) **Must-Offer Availability Assessment.** The CAISO shall determine the extent to which each Flexible RA Resource made that capacity available in each Availability Assessment Hour of the day by comparing –

(A) the MWs of Flexible RA Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids in the Day-Ahead Market and the Real-Time Market on a given day; and

(B) the MWs of Flexible RA Capacity for which the Scheduling Coordinator for the

resource had a performance obligation to submit Economic Bids in the CAISO Markets under the must-offer requirements applicable under Section 40.10.6 on a given day.

(C) The CAISO's availability assessment under this Section 40.9.3.2 does not consider a Flexible RA Resource's compliance with any Imbalance Reserves or Reliability Capacity bidding obligation it holds.

(c) **Flexible Capacity Category.** If a Flexible RA Resource is designated to provide Flexible RA Capacity and/or RA Substitute Capacity in more than one Flexible Capacity Category on the same day, the CAISO will assess the availability of the resource using the must-offer obligation for the highest quality of Flexible Capacity Category designated.

(d) **Start-Up Less Than 90 Minutes.** For resources with a start-up time less than 90 minutes, the CAISO will use the resource's MWs of capacity from zero to the EFC value to assess the availability of the designated Flexible RA Capacity; provided that the Scheduling Coordinator for the resource does not submit Self-Schedules for the capacity from zero to PMin or for any portion of the capacity under the must-offer obligation for Energy. If the Scheduling Coordinator for the resource submits a Self-Schedule, the CAISO will deduct the MW value of PMin from the calculation of the resource's Flexible RA Capacity availability,

(e) **Start-Up Greater Than 90 Minutes.** For resources with a start-up time greater than 90 minutes, the CAISO will use the MWs of capacity between the resource's PMin and EFC value in the availability assessment and validate whether the Scheduling Coordinator for the resource submitted Economic Bids for all MWs designated on the Resource Flexible RA Capacity Plan.

(f) **Variable Energy Resources**

(1) **Flexible RA Capacity Equal to EFC.** If the Flexible RA Capacity designated on the monthly Resource Flexible RA Capacity Plan is equal to the resource's EFC

value, the CAISO will assess the availability of the designated Flexible RA Capacity based on the Economic Bids for Flexible RA Capacity the Scheduling Coordinator for the resource submitted up to the MWs in the Variable Energy Resource forecast applicable under Section 4.8.2.

(2) **Flexible RA Capacity Less Than EFC.** If the Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan is less than the EFC value for the resource, the CAISO will assess availability using the ratio of the amount shown on the monthly plan to the relevant EFC value, and applies that ratio to the MWs of Economic Bids and the Variable Energy Resource forecast.

(3) **VER Forecast Less Than Flexible RA Capacity.** If the MWs in the Variable Energy Resource forecast are less than the MWs of Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan, and the Economic Bids are greater than or equal to the forecast amount for that hour, the resource is 100 percent available up to the forecast amount.

(4) **VER Forecast Greater Than Flexible RA Capacity.** If the MWs in the Variable Energy Resource forecast are greater than the MWs of Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan, the Scheduling Coordinator for the resource must submit Economic Bids equal to the forecast amount. If the Scheduling Coordinator for the resource submits Economic Bids for MWs above the forecast, or the resource generates above the forecast, the CAISO will limit the calculated availability to the forecast amount.

(5) **No Day-Ahead Market Obligation.** For Variable Energy Resources that do not have an obligation to submit Economic Bids into the Day-Ahead Market, the CAISO will base the availability assessment of the Flexible RA Capacity only on the resource's Economic Bids in the Real-Time Market.

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40.9.6.2 Determination of Availability Incentive Payment

(a) **Self-Funding.** The Availability Incentive Payment will be funded entirely through the monthly Non-Availability Charges assessed. Availability Incentive Payments for Resource Adequacy Resources providing Flexible RA Capacity will be funded exclusively by Non-Availability Charges assessed against Resource Adequacy Resources providing Flexible RA Capacity.

(b) **Eligible Capacity.** The capacity of a Resource Adequacy Resource providing local, system or Flexible RA Capacity that is eligible to receive an Availability Incentive Payment shall be the resource's average monthly MWs of capacity that exceed the upper bound of the Availability Standard.

(c) **Calculation.**

(1) The monthly Availability Incentive Payment rate will equal the total Non-Availability Charges assessed for the month plus any unpaid funds under Section 40.9.6.2(d), divided by the total Resource Adequacy Capacity eligible to receive the Availability Incentive Payment that month.

(2) The Availability Incentive Payment rate shall not exceed three times the Non-Availability Charge rate.

(3) The Availability Incentive Payment the CAISO shall pay to each eligible resource shall equal the product of its eligible capacity and the Availability Incentive Payment rate.

(d) **Unpaid Funds.** Any Non-Availability Charge funds that are not distributed to Resource Adequacy Resources eligible to receive Availability Incentive Payments in a month will be added to the funds available for Availability Incentive Payments in the next month and will continue to roll over to successive months until the end of the year. The CAISO distributes any unallocated funds remaining after the CAISO settles December monthly RAAIM Non-Availability Charges and Non-Availability Incentive Payments. The separate

pool of undistributed Non-Availability Charge funds collected for local and/or system Resource Adequacy Capacity will be distributed to Load Serving Entities based on their load ratio share for the year. The separate pool of undistributed Non-Availability Charge funds collected for Flexible RA Capacity will be distributed to Load Serving Entities based on their overall ratio of obligation to demonstrate Flexible RA Capacity for the year.

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40.10.6 Flexible RA Capacity Must-Offer Obligation

40.10.6.1 Day-Ahead and Real-Time Availability

(a) **Must-Offer Obligation.** The Scheduling Coordinator for a resource supplying Flexible RA Capacity must submit Economic Bids for Energy for the full amount of the resource's Flexible RA Capacity, Bids for IRU and IRD for the full amount of the resource's Flexible RA Capacity that is eligible to Bid for Imbalance Reserves, and Economic Bids for Ancillary Services that are not flagged as Contingency Only in the Day-Ahead Market for the full amount of the resource's Flexible RA Capacity that is certified to provide Ancillary Services, in the Day-Ahead Market and the Real-Time Market for the applicable Trading Hours that is capable of being economically dispatched as follows, except as provided in Section 40.10.6.1(e) through(h) –

(1) Flexible Capacity Category for base ramping resources - the 17-hour period from 5:00 a.m. to 10:00 p.m., seven days a week;

(2) Flexible Capacity Category for peak ramping resources - the five-hour period determined for each season by the CAISO's Flexible Capacity Needs Assessment, seven days a week; and

(3) Flexible Capacity Category for super-peak ramping resources – the five-hour period determined for each season by the CAISO's Flexible Capacity Needs Assessment, weekdays, except holidays and as provided in Section 40.10.6.1(h),

until the resource receives during the five-hour period of the must offer obligation and responds to five CAISO dispatches for Start-Up during the month, after which the resource will not be subject to a must-offer obligation as a super-peak ramping resource for the remainder of that month; however, any other must-offer obligations for Resource Adequacy Capacity will still apply.

(b) **Availability Requirement.** During the period of the applicable must-offer obligation, a Flexible RA Capacity Resource must be operationally available except for limitations specified in the Master File, legal or regulatory prohibitions or as otherwise required by this CAISO Tariff or by Good Utility Practice.

(c) **Co-optimization.** Through the IFM co-optimization process, the CAISO will utilize available Flexible RA Capacity to provide Energy, Imbalance Reserves, or Ancillary Services in the most efficient manner to clear the Energy market, manage congestion and procure required Ancillary Services.

(d) **Participation in RUC.** The Scheduling Coordinator for a Flexible RA Capacity Resource must submit RUC Availability Bids for RCU for their Flexible RA Capacity.

(e) **Use-Limited Resources.**

(1) A Use-Limited Resource providing Flexible RA Capacity must be capable of responding to Dispatch Instructions and, consistent with its use-limitations, must submit Economic Bids for Energy for the full amount of its Flexible RA Capacity in the Day-Ahead Market and the Real-Time Market for the Trading Hours applicable to the resource's Flexible Capacity Category for that month for the Trading Hours that it is capable of being economically dispatched.

(2) The Scheduling Coordinator for the Use-Limited Resources designated as a combined resource under Section 40.10.3.2(b), 40.10.3.3(b) or 40.10.3.4(b) must submit Economic Bids for Energy for either resource for the full amount of the Flexible RA Capacity required by the applicable must-offer obligation; however, Economic Bids for Energy must be submitted for only one resource in the

combination per Trade Day.

(f) **Short or Long Start Units.**

(1) Short Start Units providing Flexible RA Capacity that do not have an IFM Schedule or a RUC Schedule for any of their Resource Adequacy Capacity for a given Trading Hour are required to participate in the Real-Time Market consistent with the provisions in Section 40.6.2 that apply to Short Start Units providing RA Capacity.

(2) Long Start Units providing Flexible RA Capacity that do not have an IFM Schedule or a RUC Schedule for any of their Resource Adequacy Capacity for a given Trading Hour are required to participate in the Real-Time Market consistent with the provisions in Section 40.6.2 that apply to Long Start Units providing RA Capacity.

(3) If availability is required under Section 40.6.2, the Scheduling Coordinator for the resource must submit to the RTM for that Trading hour for which the resource is capable of responding to Dispatch Instructions: (i) Economic Bids for Energy for the full amount of the available Flexible RA Capacity, including capacity for which it has submitted Economic Bids for Ancillary Services; and (ii) Economic Bids for Ancillary Services for the full amount of its Flexible RA Capacity that is certified to provide Ancillary Services and that did not receive a day-ahead award, and for each Ancillary Service for which the resource is certified, including capacity for which it has submitted Economic Bids for Energy.

(g) **Extremely Long-Start Resources.** Flexible RA Capacity Resources that are Extremely Long-Start Resources must be available to the CAISO by complying with the Extremely Long-Start Commitment Process under Section 31.7 or otherwise committing the resource upon instruction from the CAISO, if physically capable. Once an Extremely Long-Start Resource is committed by the CAISO, it is subject to the provisions of Section 40.10.6 regarding Day-Ahead Availability and Real-Time Availability for the Trading Days

for which it was committed.

(h) **Non-Generator Resources, Regulation Energy Management.** Non-Generator Resources providing Flexible RA Capacity and Regulation Energy Management must submit Economic Bids for Regulation Up and Regulation Down for Trading Hours in the 17-hour period from 5:00 a.m. to 10:00 p.m., seven days a week and shall not submit Bids for Energy or other Ancillary Services.

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Section 44

44. Flexible Ramping Product

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44.3 Forecasted Movement

44.3.1 Generally

The CAISO will determine the Forecasted Movement for each EIM Participating Resource, Generating Unit, System Resource, Pumped Storage, Pseudo-Tie, Non-generating Resource, PDR, Participating Load, and any other resource that has a schedule or dispatch change in the Day-Ahead Market or Real-Time Market as described below.

44.3.2 RTD Forecasted Movement

For the RTD, the Forecasted Movement for the resource is the MW difference between the resource's non-binding dispatch instruction in the first five-minute advisory RTD interval and its Dispatch Instruction in the financially binding RTD interval, in the same RTD run.

44.3.3 FMM Forecasted Movement

For FMM, the Forecasted Movement is the difference between the resource's advisory FMM schedule in the first advisory FMM interval and its FMM Schedule in the financially binding FMM interval for the same

applicable FMM run.

44.3.4 DAM Forecasted Movement

For DAM, the Forecasted Movement is the algebraic difference of the Day-Ahead Schedule between consecutive hours.

44.3.5 Virtual Forecasted Movement

For Virtual Awards, the Forecasted Movement is the algebraic difference of the Virtual Award between consecutive hours.

44.3.6 Base Schedule Forecasted Movement

For EIM Base Schedules, the Forecasted Movement is the algebraic difference of the submitted EIM Base Schedule, as adjusted in real time, between consecutive hours.

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Appendix A

Potential New Definitions

- Competitive Locational IRU Price

The Locational IRU Price minus the non-competitive Congestion components in the upward deployment scenario, as calculated pursuant to Section 31.2.1.

- Competitive RUC Price for RCU

The RUC Price for RCU minus the non-competitive Congestion components in the upward deployment scenario, as calculated pursuant to Section 31.9.1.

- DAME Transition Period

The three-year period that starts on the first Trading Day for which the CAISO procures either Imbalance Reserves or Reliability Capacity.

- DAME Transitional Measures

As specified in Section 11.2.6, the settlement provisions through which the CAISO shares the revenue of an Imbalance Reserves Award or Reliability Capacity Award to a Resource Adequacy Resource with the Scheduling Coordinator of the resource and the Scheduling Coordinator for the LSE that showed that resource on its Supply Plan

- Day-Ahead Marginal GHG Cost Offset

The amount calculated pursuant to Section 33.11.3.9.2 for purposes of determining the non-zero offset amount allocation.

- Default Generation Aggregation Point (DGAP)

The aggregation of Supply PNodes in a Balancing Authority Area outside of the Market Area, with Generation Distribution Factors that are proportional to the maximum capacity of the Supply resources at the Supply PNodes.

- Deployment Factor

As specified in the Business Practice Manual, the percentage of Imbalance Reserves Awards the CAISO models as being deployed for Energy for the purpose of modeling the deployment of Imbalance Reserves against Transmission Constraints. The CAISO establishes distinct Deployment Factors for Imbalance Reserves Up and Imbalance Reserves Down.

- Diversity Benefit

The quantity by which procurement requirements for Balancing Authority Areas that pass either the EDAM RSE or the EIM RSE can be relaxed, as described in Section 31.3.1.6.1 and Section 29.34(m)(2)-(5), respectively.

- Downward Imbalance Reserves Requirement

The extreme percentile of downward forecast error of the confidence interval described in Section 31.3.1.6.1.

- EDAM Access Charge

The Access Charge that provides for historical transmission revenue recovery through the Extended Day-Ahead Market pursuant to Section 33.26.

- EDAM Addendum to EIM Entity Agreement

An addendum to an EIM Entity Agreement between an EDAM Entity and the CAISO that constitutes an agreement to join and participate in the EDAM. A *pro forma* version of the EDAM Addendum to EIM Entity Agreement is set forth in Appendix B.

- EDAM Addendum to EIM Entity Scheduling Coordinator Agreement

An addendum to an EIM Entity Scheduling Coordinator Agreement that constitutes an agreement between an EDAM Entity Scheduling Coordinator and the CAISO. A *pro forma* version of the EDAM Addendum to EIM Entity Scheduling Coordinator Agreement is set forth in Appendix B.

- EDAM Addendum to EIM Participating Resource Agreement

An addendum to an EIM Participating Resource Agreement that constitutes an agreement between an EDAM Resource and the CAISO. A *pro forma* version of the EDAM Addendum to EIM Participating Resource Agreement is set forth in Appendix B.

- EDAM Addendum to EIM Participating Resource Scheduling Coordinator Agreement

An addendum to an EIM Participating Resource Scheduling Coordinator Agreement that constitutes an agreement between an EDAM Resource Scheduling Coordinator and the CAISO. A *pro forma* version of the EDAM Addendum to EIM Participating Resource Scheduling Coordinator Agreement is set forth in Appendix B.

- EDAM Administrative Charge

The fee imposed on transactions in the EDAM, as described in Section 33.11.6.

- EDAM Area

The combined CAISO Balancing Authority Area and all EDAM Entity Balancing Authority Areas.

- EDAM Demand

Energy delivered to Load in an EDAM Entity Balancing Authority Area.

- EDAM Downward Pool

A pool comprised of each Balancing Authority Area in the EDAM Area that satisfies the downward components of the EDAM Resource Sufficiency Evaluation described in Section 33.31.1.3 in each hour of the Day-Ahead Market, together with each Balancing Authority Area in the EDAM Area that has cured its downward failure of the EDAM Resource Sufficiency Evaluation through the IFM and incurred the EDAM RSE Downward Failure Surcharge.

- EDAM Entity

A Balancing Authority that enters into an EDAM Addendum to EIM Entity Agreement with the CAISO to enable the operation of the Day-Ahead Market in addition to the Real-Time Market in the EDAM Entity Balancing Authority Area. The CAISO is not an EDAM Entity.

- EDAM Entity Implementation Agreement

An agreement between an EIM Entity seeking to become an EDAM Entity, or a Balancing Authority seeking to become an EDAM Entity concurrently with participation in the Energy Imbalance Market as an EIM Entity, and the CAISO, a *pro forma* version of which is set forth in Appendix B.

- EDAM Entity Implementation Date

The first Trading Day for an EDAM Entity in the Day-Ahead Market.

- EDAM Entity Scheduling Coordinator

An EDAM Entity, or a third party designated by the EDAM Entity, that is certified by the CAISO and has entered into an EDAM Entity Addendum to EIM Entity Scheduling Coordinator Agreement under which it is a Scheduling Coordinator and Market Participant and is responsible for meeting the requirements specified in Section 33 on behalf of the EDAM Entity.

- EDAM External Intertie

A point of interconnection between the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area and a Balancing Authority Area other than a Balancing Authority Area in the EDAM Area.

- EDAM Internal Intertie

A point of interconnection between the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area and another Balancing Authority Area in the EDAM Area**.**

- EDAM Intertie

An EDAM Internal Intertie or EDAM External Intertie.

- EDAM Legacy Contract

A transmission service contract entered into with the EDAM Transmission Service Provider prior to the effective date of the EDAM Transmission Service Provider tariff or otherwise not governed by the terms of that tariff (including any contract entered into pursuant to such transmission service contract) as may be amended in accordance with its terms or by agreement between the parties thereto from time to time.

- EDAM Load Serving Entity

A Load Serving Entity other than the EDAM Entity within an EDAM Entity Balancing Authority Area that enters into an EDAM Load Serving Entity Agreement with the CAISO.

- EDAM Load Serving Entity Agreement

An agreement between an EDAM Load Serving Entity and the CAISO, a *pro forma* version of which is set forth in Appendix B.

- EDAM Load Serving Entity Scheduling Coordinator

An EDAM Load Serving Entity, or a third party designated by the EDAM Load Serving Entity, that is certified by the CAISO and has entered into a Scheduling Coordinator Agreement under which it is a Scheduling Coordinator and Market Participant and is responsible for meeting the requirements specified in Section 33 on behalf of the EDAM Entity.

- EDAM Market Participant

An EDAM Entity, EDAM Entity Scheduling Coordinator, EDAM Resource, EDAM Resource Scheduling Coordinator, EDAM Load Serving Entity, EDAM Load Serving Entity Scheduling Coordinator, or EDAM Transmission Service Provider.

- EDAM Measured Demand

The metered CAISO Demand and metered EDAM Demand plus Real-Time Interchange Export Schedules from the Balancing Authority Areas in the EDAM Area, excluding that portion of Demand of Non-Generator Resources dispatched as Regulation through Regulation Energy Management and EDAM Transfers out of a Balancing Authority Area.

- EDAM Resource

An owner of, operator of, or seller of Energy from an EDAM Resource Facility located in an EDAM Entity Balancing Authority Area.

- EDAM Resource Facility

A resource that (1) can deliver Energy, Curtailable Demand, Demand Response Services, or similar services; (2) is a Generating Unit, a Load of a Participating Load, or a Demand Response Resource or other CAISO-qualified resource; (3) is located within an EDAM Entity Balancing Authority Area; and (4) is listed in, and subject to, an EDAM Addendum to EIM Participating Resource Agreement.

- EDAM Resource Scheduling Coordinator

The EDAM Resource, or a third party designated by the EDAM Resource, that is certified by the CAISO and enters into an EDAM Resource Scheduling Coordinator Agreement under which it is a Scheduling Coordinator and Market Participant and is responsible for meeting the requirements specified in Section 33 on behalf of the EDAM Resource.

- EDAM Resource Sufficiency Evaluation (EDAM RSE)

A set of tests that determines whether a Balancing Authority Area in the EDAM Area, including the CAISO Balancing Authority Area, has sufficient supply and reserves to satisfy the resource sufficiency requirements described in Section 33.31.1.

- EDAM RSE Downward Failure Insufficiency Surcharge

The surcharge assessed to a Balancing Authority Area in the EDAM Area due to a failure of the EDAM

RSE in the downward direction on any day and in any hour, as provided in Section 33.31.1.5.3.

- EDAM RSE Failure Multiplier

A tiered component of the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge. Where a Balancing Authority Area's EDAM RSE Hourly Upward Deficiency Quantity is *de minimis* (a tier 1 EDAM RSE failure), such threshold determined as the higher of 10 MW or one percent of the Balancing Authority Area's upward imbalance reserve requirement for that hour, the EDAM RSE Failure Multiplier is zero. Where a Balancing Authority Area's EDAM RSE Hourly Upward Deficiency Quantity is less than or equal to fifty percent of the Balancing Authority Area's upward Imbalance Reserve requirement (a tier 2 EDAM RSE failure), the EDAM RSE Failure Multiplier is 1.25. Where a Balancing Authority Area's EDAM RSE Hourly Upward Deficiency Quantity is greater than fifty percent of the Balancing Authority Area's upward Imbalance Reserve requirement (a tier 3 EDAM RSE failure), the EDAM RSE Failure Multiplier is 2. With respect to tier 2 or tier 3 EDAM RSE failure in the upward direction, the EDAM RSE Failure Multiplier is subject to an adder consisting of the EDAM RSE Failure Scaling Factor.

- EDAM RSE Failure Scaling Factor

An adder to the EDAM RSE Failure Multiplier calculated on a rolling basis to account for hours in which a Balancing Authority Area in the EDAM Area persistently fails the EDAM RSE in the upward direction over the preceding thirty days, with the EDAM RSE Failure Scaling Factor adding one percent to the EDAM RSE Failure Multiplier for every additional day during the preceding thirty-day period in which the Balancing Authority Area experienced a tier 2 or tier 3 failure of the EDAM RSE in the upward direction.

- EDAM RSE Hourly Downward Deficiency Quantity

The MW sum total of the downward failures during any single operating hour inclusive of the downward demand deficiency described in Section 33.31.1.3, the downward imbalance reserve deficiency described in Section 33.31.1.2, or the downward Ancillary Services deficiency described in Section 33.31.1.4.

- EDAM RSE Hourly Upward Deficiency Quantity

The MW sum total of the upward failures during any single operating hour inclusive of the upward demand deficiency described in Section 33.31.1.3.1, the upward imbalance reserve deficiency described in Section 33.31.1.2, or the upward ancillary services deficiency described in Section 33.31.1.4.

- EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge

The surcharge assessed to a Balancing Authority Area in the EDAM Area due to a tier 2 or tier 3 failure of the EDAM RSE in the upward direction on any day Monday through Saturday in the off-peak hours of midnight to 6 a.m. or 10 p.m. to midnight, pacific time, and all hours on Sunday or any legal public holiday, as provided in Section 33.31.1.5.2.

- EDAM RSE On-Peak Upward Credit

A component of the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge to account for hours during the sixteen-hour on-peak period in which the Balancing Authority Area satisfies the upward requirements of the demand evaluation described in Section 33.31.1.3.1, the Imbalance Reserve evaluation described in Section 33.31.1.3.2, and the ancillary services evaluation described in Section 33.31.1.3.3, and determined as the product of the highest EDAM RSE Hourly Upward Deficiency Quantity of the day and the load-weighted average LMP of the LAP within that Balancing Authority Area in each passed hour.

- EDAM RSE On-Peak Upward Failure Insufficiency Surcharge

The surcharge assessed to a Balancing Authority Area in the EDAM Area due to a tier 2 or tier 3 failure of the EDAM RSE in the upward direction on any day Monday through Saturday during the sixteen-hour on-peak block from 6 a.m. to 10 p.m., pacific time, as provided in Section 33.31.1.5.1.

- EDAM System Operations Charge

The System Operations Charge for the Extended Day-Ahead Market described in Section 33.11.6.

- EDAM Trade Location

The major bilateral trading hubs where energy is traded day-ahead for sixteen-hour on-peak blocks and at which there is sufficient liquidity to allow the CAISO to utilize the day-ahead hub price for the sixteen-hour on-peak block as a means to index the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge, as identified in the Business Practice Manuals for the Extended Day-Ahead Market.

- EDAM Transfer

The scheduled transfer of Energy, Imbalance Reserves, or Reliability Capacity in the Day-Ahead Market between an EDAM Entity Balancing Authority Area and the CAISO Balancing Authority Area, or between EDAM Entity Balancing Authority Areas, using transmission capacity made available through the Extended Day-Ahead Market.

- EDAM Transfer System Resource

A Transfer System Resource used to model an Energy and/or capacity Market Transfer between two Balancing Authority Areas in the Extended Day-Ahead Market.

- EDAM Transmission Ownership Right

Ownership rights by a third-party on transmission facilities within an EDAM Entity Balancing Authority Area that are not subject to an EDAM Transmission Service Provider tariff.

- EDAM Transmission Service Information

Information provided by an EDAM Entity to the CAISO about transmission capacity available for use in the Extended Day-Ahead Market.

- EDAM Transmission Service Provider

An EDAM Entity or other party that owns transmission or has transmission service rights on an EDAM Intertie or within an EDAM Entity Balancing Authority Area, provides transmission service, and that makes transmission service available for use in the Day-Ahead Market through an EDAM Entity. This definition does not include network integration transmission service customers or other transmission customers of an EDAM Transmission Service Provider, EDAM Legacy Contract Rights or EDAM Transmission Ownership Rights.

- EDAM Transmission Service Provider Agreement

An agreement between an EDAM Transmission Service Provider and the CAISO, a *pro forma* version of which is set forth in Appendix B.

- EDAM Upward Pool

A pool comprised of each Balancing Authority Area in the EDAM Area that satisfies the upward components of the EDAM Resource Sufficiency Evaluation described in Section 33.31.1.3 in each hour of the Day-Ahead Market, together with each Balancing Authority Area in the EDAM Area that has cured its upward failure of the EDAM Resource Sufficiency Evaluation through the IFM and incurred the EDAM RSE On-Peak Upward Failure Surcharge or the EDAM RSE Off-Peak Upward Failure Surcharge. The CAISO Balancing Authority Area will be included in the EDAM Upward Pool upon satisfaction of the upward components of the EDAM Resource Sufficiency Evaluation described in Section 33.31.1.3 in each hour of the Day-Ahead Market or upon cure through the IFM and incurrence of the EDAM RSE On-Peak Upward Failure Surcharge or the EDAM RSE Off-Peak Upward Failure Surcharge.

- EIM Resource Sufficiency Evaluation

A test that determines whether the CAISO Balancing Authority Area and each EIM Entity Balancing Authority Areas has sufficient supply and reserves to meet forecasted Demand and uncertainty for the EIM, as described in Section 29.34(l)-(n).

- Extended Day-Ahead Market (EDAM)

The Day-Ahead Market for EDAM Market Participants, as set forth in Section 33 of the CAISO Tariff.

- Five-Minute Imbalance Reserve Quantity

For a resource with an Imbalance Reserves Award, the five-minute ramp capable portion of the award measured as the MW quantity of the resource's ramp capability above the Day-Ahead hourly Energy schedule, in the case of IRU, or below that schedule, in the case of IRD. The ramp capability is determined based on the Master File-registered ramp rate used to optimize the day-ahead market.

- Flexible Ramping Product

The product procured pursuant to Section 44 to meet flexible ramping needs to meet Forecasted Movement and Uncertainty Requirements.

- Generic Generation Aggregation Point (GGAP)

The aggregation of the Default Generation Aggregation Points of Balancing Authority Areas outside the

Market Area. The CAISO uses a northwest GGAP for Scheduling Points in the northwestern U.S. and a southwest GGAP for Scheduling Points in the southwestern U.S.

- **Greenhouse Gas (GHG)**

Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and other fluorinated greenhouse gases as defined by regulations of the California Air Resources Board and the Washington Department of Ecology.

- **GHG Bid Adder**

A component of a Bid from a Supply resource located outside of a GHG Regulation Area composed of a MW quantity and price that provides the Supply resource an opportunity to recover costs of compliance with GHG regulations adopted by the California Air Resources Board and the Washington Department of Ecology. There can be different GHG Bid Adders for different GHG Regulation Areas.

- GHG Regulation Area

The Nodes of the CAISO Balancing Authority Area, an EDAM Entity Balancing Authority Area, or an EIM Entity Balancing Authority Area within the GHG boundary as defined by a state jurisdiction that has priced greenhouse gas emissions as part of a state carbon reduction law or regulation.

- GHG Transfer

The algebraic difference (positive for imports and negative for exports) between Energy Demand and Supply in a GHG Regulation Area as modeled by the CAISO in its Integrated Forward Market, Fifteen-Minute Market, and Real-Time Dispatch.

- IFM Imbalance Reserves Bid Cost

The Bid Costs of a Bid for Imbalance Reserves, as calculated pursuant to Section 11.8.2.1.8.

- Imbalance Reserves

IRU and IRD

- Imbalance Reserves Award

IRD and IRU awarded to a resource for a given fifteen-minute interval.

- Imbalance Reserves Bid

The quantity (MW) and price ($/MW per hour) at or above which a Generating Unit, System Resource,

System Unit, Participating Load, or Proxy Demand Resource has agreed to sell IRU or IRD for a specified interval of time to the CAISO to meet the Imbalance Reserves Requirement.

- Imbalance Reserves Cost

The costs included in a bid to provide Imbalance Reserves submitted per Section 30.5.2.9 and as modified pursuant to Section 30.7.3

- Imbalance Reserves Down (IRD)

Decremental capacity procured to meet the Downward Imbalance Reserves Requirement.

- Imbalance Reserves Requirement

The Upward Imbalance Reserves Requirement and the Downward Imbalance Reserves Requirement- Imbalance Reserves Up (IRU)

Incremental capacity procured to meet the Upward Imbalance Reserves Requirement.

- IRU Default Availability Bid

The price to which an Imbalance Reserves Bid for IRU is mitigated, as specified in Section 39.7.4.

- IRU Negotiated Availability Bid

A method of calculating an IRU Default Availability Bid based on a negotiation with the CAISO pursuant to Section 39.7.4.1.

- Locational IRD Price

The marginal cost ($/MWh) of providing the next increment of IRD at a PNode consistent with binding Transmission Constraints.

- Locational IRU Price

The marginal cost ($/MWh) of providing the next increment of IRU at a PNode consistent with binding Transmission Constraints.

- Locational RCD Price

The marginal cost ($/MWh) of providing the next increment of RCD at a PNode consistent with binding Transmission Constraints.

- Locational RCU Price

The marginal cost ($/MWh) of providing the next increment of RCU at a PNode consistent with binding

Transmission Constraints.

- Lower Economic Limit

The higher of a resource's Self-Schedule quantity or Minimum Load. For a Non-Generator Resource, the Lower Economic Limit is the MW quantity at the bottom of the submitted Energy Bid Curve.

- Market Area

The EDAM Area for purposes of the Day-Ahead Market and the EIM Area for purposes of the Real-Time Market.

- Market Area Intertie

An EDAM Intertie or EIM Intertie.

- Market Transfer

The exchange of Energy or a capacity product (Regulation, contingency reserves, Imbalance Reserves, or Reliability Capacity) in the Market Area. A Market Transfer is modeled as a pair of logical intertie resources at the relevant intertie that consist of an export resource on the source Balancing Authority Area side of the Market Transfer and an import resource on the sink Balancing Authority Area side of the Market Transfer. Market Transfers include EDAM Transfers and EIM Transfers.

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- Net Market Transfer

The net of all import and export Market Transfers between a Balancing Authority Area in the Market Area and all other Balancing Authority Areas in the Market Area. Each Net Market Transfer consists of a positive net export amount and a corresponding negative net import amount, with the sum of the Net Market Transfers of all Balancing Authority Areas in the Market Area netting to zero. A Net Market Transfer does not include imports from or exports to Balancing Authority Areas outside of the Market Area.

- Negotiated Availability Bid

Either an IRU Negotiated Availability Bid or an RCU Negotiated Availability Bid.

- Net Load Forecast

The demand forecast for a BAA minus the forecast of wind and solar output for the BAA during the interval.

- Non-VER Physical Supply

The physical supply of Energy available to the CAISO net of potential Supply from VERs electrically located in a BAA in the EDAM Area.

- RCD Availability Quantity

A RCD Award (MW) excluding any RCD Capacity that is actually unavailable due to a unit derate or Outage.

- RCU Availability Quantity

A RCU Award (MW) excluding any RCU Capacity that is actually unavailable due to a unit derate or Outage.

- RCU Default Availability Bid

The price to which an RUC Availability Bid for RCU is mitigated, as specified in Section 39.7.4.

- RCU Negotiated Availability Bid

A method of calculating an RCU Default Availability Bid based on a negotiation with the CAISO pursuant to Section 39.7.4.1.

- Real-Time Marginal GHG Cost Offset

The amount calculated pursuant to Section 11.5.4.1.4 for purposes of determining the non-zero offset amount allocation.

- Reliability Capacity

RCU and RCD

- Reliability Capacity Down (RCD)

Decremental capacity procured to meet any negative difference between Net Load Forecast and Non-

VER Physical Supply with a market award.

- Reliability Capacity Up (RCU)

Incremental capacity procured to meet any positive difference between the Net Load Forecast and Non-VER Physical Supply with a market award.

- RUC Procurement Target

The quantity of either RCU or RCD the CAISO procures of behalf of each EDAM Entity or the CAISO, as specified in Sections 31.5.3 and 31.5.4.

- Transfer Location

A PNode at a boundary between Balancing Authority Areas in the Market Area where Market Transfers are defined.

- Transfer System Resource (TSR)

A System Resource used to model an Energy and/or capacity Market Transfer between two Balancing Authority Areas in the Market Area which is modeled by a pair of export and import Transfer System Resources, one for each Balancing Authority Area on either side of the Market Transfer, with equal Energy Schedules and/or capacity awards.

- Upper Economic Limit

The highest operating level submitted in a resource's Energy Bid.

- Upward Imbalance Reserves Requirement

The extreme percentile of upward forecast error of the confidence interval described in Section 31.3.1.6.1.

Appendix A

Potential Amended Definitions

- Aggregate Capability Constraint

A constraint that reflects the combined maximum and the combined minimum capability of Generating Units that comprise a single Generating Facility so that the capability does not exceed the Generating Facility's Interconnection Service Capacity or charging capacity specified in its Generator Interconnection Agreement. For EDAM Resource Facilities, a constraint that reflects the combined maximum and the combined minimum capability of individual EDAM Resource Facilities that constitute a single resource. In the case of EIM Resources, a constraint that reflects the combined maximum and the combined minimum capability of individual EIM Resources or non-participating resources that constitute a single resource.

- Base Market Model

A computer based model of the CAISO Controlled Grid, and for purposes of the Extended Day-Ahead Market, including the prospective EDAM Entity and EDAM Entity Balancing Authority Area(s), and for purposes of the Energy Imbalance Market, including the prospective EIM Entity and EIM Entity Balancing Authority Area(s), that is derived from the Full Network Model as described in Section 27.5.1 and that, as described further in Section 27.5.6, is used as the basis for formulating the market models used in the operation of each of the CAISO Markets.

- Bid

Either (1) an offer, including a Self-Schedule, submitted by a Scheduling Coordinator for a specific resource, conveyed through several components that apply differently to the different types of service offered to or demanded from any of the CAISO Markets for the Demand of Energy or the supply of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services ; or (2) a Virtual Bid.

- Bid Costs

The costs for resources manifested in the Bid components submitted, which include the Start-Up Bid Cost, Minimum Load Bid Cost, Energy Bid Cost, Transition Bid Cost, Pump Shut-Down Cost, Pumping Cost, Ancillary Services Bid Cost, RUC Availability Payment, and Imbalance Reserves Costs.

- CAISO Forecast of BAA Demand

The forecast of a Balancing Authority Area's Demand for the CAISO and EDAM Entities made by the CAISO in conjunction with EDAM Entities for use in the CAISO Markets.

- CAISO Markets

Any of the markets administered by the CAISO under the CAISO Tariff, including, without limitation, the DAM, EDAM, RTM, EIM, transmission, and Congestion Revenue Rights market.

- CAISO Metered Entity

Pursuant to Section 10.1, an eligible entity that has elected that the CAISO will collect and process its Revenue Quality Meter Data directly from CAISO certified revenue quality meters. Eligible entities include:

(a) any one of the following entities that is directly connected to the CAISO Controlled Grid:

i. a Generator other than a Generator that sells all of its Energy (excluding any Station Power that is netted pursuant to Section 10.1.3) and Ancillary Services to the Utility Distribution Company or Small Utility Distribution Company in whose Service Area it is located;

ii. an MSS Operator; or

iii. a Utility Distribution Company or Small Utility Distribution Company; and

(b) any one of the following entities:

i. a Participating Generator;

ii. a Participating TO in relation to its Tie Point Meters with other TOs or Balancing Authority Areas;

iii. a Participating Load;

iv. a Participating Intermittent Resource;

v. an EDAM Resource;

vi. an EIM Participating Resource; or

vii. a utility that requests that Unaccounted For Energy for its Service Area be

calculated separately, in relation to its meters at points of connection of its Service Area with the systems of other utilities.

- CAISO Protocols

The rules, protocols, procedures and standards promulgated by the CAISO (as amended from time to time) to be complied with by the CAISO, Scheduling Coordinators, Participating TOs and all other Market Participants in relation to the operation of the CAISO Controlled Grid and the participation in the CAISO Markets in accordance with the CAISO Tariff.

- Co-located Resources

A Generating Unit with a unique Resource ID that is part of a Generating Facility with other Generating Units, an EDAM Resource Facility with a unique Resource ID that is part of a single resource with other EDAM Resource Facilities, or an EIM Resource with a unique Resource ID that is part of a single resource with other EIM Resources.

- Connected Entity

A Participating TO or any party that owns or operates facilities that are electrically interconnected with the CAISO Controlled Grid, or, for purposes of scheduling and operating the Day-Ahead Market only, electrically connected with the transmission system of an EDAM Transmission Service Provider, or, for purposes of scheduling and operating the Real-Time Market only, electrically connected with the transmission system of an EIM Transmission Service Provider.

- Contingency

A potential Outage that is unplanned, viewed as possible or eventually probable, which is taken into account when considering approval of other requested Outages or while operating the CAISO Balancing Authority Area, an EDAM Entity Balancing Authority Area, or an EIM Entity Balancing Authority Area. Contingencies include potential Outages due to Remedial Action Schemes.

- Curtailable Demand

Demand from a Participating Load or Aggregated Participating Load that can be curtailed at the direction of the CAISO in the Real-Time Dispatch of the CAISO Controlled Grid, or, for purposes of scheduling and operating the Day-Ahead Market only, in the EDAM Area, or, for purposes of scheduling and operating the Real-Time Market only, in the EIM Area.

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- EIM Administrative Charge

The fee imposed on transactions in the Energy Imbalance Market as described in Section 29.11(i)(1).

- [Not Used]

- EIM Demand

Energy delivered to Load internal to an EIM Entity Balancing Authority Area.

- EIM Downward Available Balancing Capacity

Any downward capacity from an EIM Resource or a non-participating resource that an EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator has identified in the EIM Resource Plan as available to address power balance and transmission constraint violations in the EIM Balancing Authority Area.

- EIM Manual Dispatch

A Dispatch by an EIM Entity or EIM Sub-Entity to an EIM Resource or a non-participating resource for which it is responsible, outside of Market Clearing of the Real-Time Market.

- EIM Mirror System Resource

A System Resource at a Scheduling Point registered to an EIM Entity for mirroring CAISO or EDAM Entity intertie schedules at that Scheduling Point, when the associated Energy is generated at, wheeled through, or consumed at the corresponding EIM Entity Balancing Authority Area.

- EIM Resource Plan

The combination of EIM Base Schedules for Demand, Generation, and Interchange, the ancillary services plans of the EIM Entity, and the Bid ranges of EIM Resources, as specified in more detail in Section 29.34(e)(4).

- EIM Upward Availability Balancing Capacity

Any upward capacity from an EIM Resources or a non-participating resource that an EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator has identified in the EIM Resource Plan as available to address power balance and transmission violations in the EIM Balancing Authority Area.

- End-Use Customer or End-User

A consumer of electric power who consumes such power to satisfy a Load directly connected to the CAISO Controlled Grid, a Distribution System, or, for purposes of scheduling and operating the Day-Ahead Market only, the transmission system of an EDAM Transmission Service Provider who does not resell the power, or, for purposes of scheduling and operating the Real-Time Market only, the transmission system of an EIM Transmission Service Provider who does not resell the power.

- Forecasted Movement

A resource's change or Virtual Award’s change in forecasted output between market intervals as described in Section 44.3.

- Generating Unit

An individual electric generator and its associated plant and apparatus whose electrical output is capable

of being separately identified and metered or a Physical Scheduling Plant that, in either case, is: (a) located within the CAISO Balancing Authority Area (which includes a Pseudo-Tie of a generating unit to the CAISO Balancing Authority Area), or, for purposes of scheduling and operating the Day-Ahead Market only, an EDAM Entity Balancing Authority Area, or, for purposes of scheduling and operating the Real-Time Market only, an EIM Entity Balancing Authority Area; (b) connected to the CAISO Controlled Grid, either directly or via interconnected transmission, or distribution facilities or via a Pseudo-Tie; and (c) capable of producing and delivering net Energy (Energy in excess of a generating station's internal power requirements).

- Generator

The seller of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services produced by a Generating Unit.

- Greenhouse Gas Emission Cost Revenue

The revenues associated with the MWh compensation paid to a resource that has Energy supporting a GHG Transfer to a GHG Regulation Area priced at the Marginal Greenhouse Gas Cost multiplied by -1.

- **Gross Load**

Demand (adjusted for distribution losses) of End-Use Customer Loads directly connected to the transmission facilities or directly connected to the Distribution System of a Utility Distribution Company or MSS Operator located in a PTO Service Territory, or End Use Customer Loads directly connected to the Distribution System or transmission facilities of an EDAM Transmission Service Provider in an EDAM Entity Balancing Authority Area. Gross Load includes Load served by Excess Behind the Meter Production. Excess Behind the Meter Production shall not be netted against End-Use Customer Load in determining Gross Load. Gross Load excludes:

(1) Load with respect to which the Wheeling Access Charge is payable;

(2) Load that is exempt from the Access Charge pursuant to Section 4.1 of Appendix I;

(3) Load of an individual retail customer served by its own onsite Generating Unit or energy storage device, or as authorized by Section 218 of the California Public Utilities Code;

(4) Onsite Load served by a qualifying small power production facility or qualifying cogeneration facility, as those terms are defined in the FERC's regulations implementing Section 201 of the Public Utility Regulatory Policies Act of 1978; and

(5) Load secured by Standby Service from a Participating TO under terms approved by a Local Regulatory Authority or FERC, as applicable, or can be curtailed concurrently with an Outage of the Generating Unit serving the Load.

Gross Load forecasts consistent with filed Transmission Revenue Requirements will be provided by each Participating TO to the CAISO. For purposes of this definition, Generating Units, storage devices, and Loads will be considered onsite where they share, or are sub-metered behind, the same meter.

- IFM Bid Cost

The sum of a BCR Eligible Resource's IFM Start-Up Cost, IFM Minimum Load Cost , IFM Pump Shut-Down Cost, IFM Transition Cost, IFM Pumping Cost, IFM Energy Bid Cost, IFM AS Bid Cost and IFM Imbalance Reserves Bid Cost.

- Interchange

Imports and exports between the CAISO Balancing Authority Area and other Balancing Authority Areas, and, for purposes of scheduling and operating the Day-Ahead Market only, between an EDAM Entity Balancing Authority Area and another Balancing Authority Area, and, for purposes of scheduling and operating the Real-Time Market only, between an EIM Entity Balancing Authority Area and another Balancing Authority Area.

- Interchange Schedule

A final agreed-upon schedule of Energy to be transferred between the CAISO Balancing Authority Area and another Balancing Authority Area, including an EDAM Entity Balancing Authority Area or an EIM Entity Balancing Authority Area, and, for purposes of scheduling and operating the Day-Ahead Market only, between an EDAM Entity Balancing Authority Area and another EDAM Entity Balancing Authority Area, and, for purposes of scheduling and operating the Real-Time Market only, between an EIM Entity

Balancing Authority Area and another Balancing Authority Area.

- Interconnection Facilities

Collectively, Interconnection Facilities include all facilities and equipment between the Generating Facility and the Point of Interconnection, including any modification, additions or upgrades that are necessary to physically and electrically interconnect the Generating Facility to the transmission system. Interconnection Facilities are sole use facilities and shall not include Distribution Upgrades, Stand Alone Network Upgrades or Network Upgrades.

- Load Serving Entity (LSE)

Any entity (or the duly designated agent of such an entity, including, e.g., a Scheduling Coordinator), including a load aggregator or power marketer, that (a) (i) serves End Users within the CAISO Balancing Authority Area or the EDAM Area and (ii) has been granted authority or has an obligation pursuant to state or local law, regulation, or franchise to sell electric energy to End Users located within the CAISO Balancing Authority Area or the EDAM Area; (b) (i) is an End User, (ii) has been granted authority pursuant to state or local law or regulation to serve its own Load through the purchase of electric energy from an entity that does not qualify as a Load Serving Entity, and (iii) serves its own Load through purchases of electric energy from an entity that does not qualify as a Load Serving Entity with respect to such purchases of electric energy, or (c) is a federal power marketing authority that serves End Users. Notwithstanding the above, an entity is not a Load Serving Entity under this definition solely because it provides electric energy at no cost to its tenants or because it purchases or sells electric energy from a generating resource pursuant to a state or local law or regulation that permits the generating resource to make direct sales of electric energy to an End User, the rates, terms, and conditions of which sale are not subject to regulation by a Local Regulatory Authority.

- Marginal Cost of Congestion (MCC)

The component of LMP, Locational IRU Price, Locational IRD Price, Locational RCU Price, or Locational RCD Price at a PNode that accounts for the cost of congestion, as measured between that Node and a

Reference Bus.

- Marginal Greenhouse Gas Cost (Marginal GHG Cost) The marginal cost of compliance with GHG regulations for a GHG Transfer into a GHG Regulation Area.

- Market Participant

An entity, including a Scheduling Coordinator, who: (1) participates in the CAISO Markets through the buying, selling, transmission, or distribution of Energy, capacity, or Ancillary Services into, out of, or through the CAISO Controlled Grid; (2) is a CRR Holder or Candidate CRR Holder; (3) is a Convergence Bidding Entity; (4) for purposes of scheduling and operating the Day-Ahead Market only, is an EDAM Market Participant; or (5) for purposes of scheduling and operating the Real-Time Market only, is an EIM Market Participant.

- Net Imbalance Energy Export

The Net Imbalance Energy Export is the net Imbalance Energy imported into the CAISO Balancing Authority Area from EDAM Entity Balancing Authority Areas or EIM Entity Balancing Authority Areas.

- Network Upgrades

The additions, modifications, and upgrades to the CAISO Controlled Grid or EDAM transmission system at or beyond the Point of Interconnection and Distribution System. Network Upgrades do not include Distribution Upgrades or Interconnection Facilities.

- Node

A point in the Full Network Model representing a physical location within the CAISO Balancing Authority Area, the CAISO Controlled Grid, the EDAM Area, or the EIM Area, which includes the Load and Generating Unit busses in the EDAM Area or EIM Area (which includes a Pseudo-Tie of a Generating Unit to a Balancing Authority Area in the EDAM Area or EIM Area), and at the Intertie busses between (i) the CAISO Balancing Authority Area, an EDAM Entity Balancing Authority Area, or an EIM Entity

Balancing Authority Area and (ii) an interconnected Balancing Authority Area.

- Notional CRR Value

For a given CRR in a Settlement Period, the sum of: (1) the product of: (a) the MCC of Energy at the CRR Sink minus the MCC of Energy at the CRR Source and (b) the MW quantity for that Settlement Period; (2) the product of (a) the MCC of Locational IRU Price at the CRR Sink minus the MCC of Locational IRU Price at the CRR Source and (b) the MW quantity for that Settlement Period; and (3) the product of (a) the MCC of Locational IRD Price at the CRR Sink minus the MCC of Locational IRD Price at the CRR Source and (b) the MW quantity for that Settlement Period. The Notional CRR Value for a CRR Obligation can be a non-positive value for a Settlement Period but cannot be less than zero (0) for a CRR Option.

- Participating Generator

A Generator or other seller of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services through a Scheduling Coordinator over the CAISO Controlled Grid (1) from a Generating Unit with a rated capacity of 1 MW or greater, (2) from a Generating Unit with a rated capacity of 500 kW up to 1 MW for which the Generator elects to be a Participating Generator, (3) from a storage resource with a rated capacity of 100 kW or greater, or (4) from a Generating Unit providing Ancillary Services or submitting Energy Bids through an aggregation arrangement approved by the CAISO, which has undertaken to be bound by the terms of the CAISO Tariff, in the case of a Generator through a Participating Generator Agreement, Net Scheduled PGA, or Pseudo-Tie Participating Generator Agreement.

- Point of Interconnection

The point, as set forth in Appendix A to the Large Generator Interconnection Agreement or Attachment 3 to the Small Generator Interconnection Agreement, where the Interconnection Facilities connect to the CAISO Controlled Grid. For Generating Facilities connected to the Distribution System, the Point of Interconnection is the point at which the Generating Facility connects to the CAISO Controlled Grid. For an EDAM Resource Facility, the Point of Interconnection is the point at which the EDAM Resource Facility connects to the EDAM Transmission Service Provider’s transmission facilities. For an EIM Resource or non-participating resource, the Point of Interconnection is the point at which the EIM Resource or non-

participating resource connects to an EIM Transmission Service Provider's transmission facilities.

- Point(s) of Delivery (POD) or Withdrawal

Point(s) within the CAISO Balancing Authority Area, or for purposes of scheduling and operating the Day-Ahead Market only, the EDAM Area where Energy and Ancillary Services are made available to a receiving party under this CAISO Tariff, or, for purposes of scheduling and operating the Real-Time Market only, the EIM Area where Energy and Ancillary Services are made available to a receiving party under this CAISO Tariff.

- Point(s) of Receipt (POR) or Injection

Point(s) within the CAISO Balancing Authority Area, or for purposes of scheduling and operating the Day-Ahead Market only, the EDAM Area where Energy and Ancillary Services are made available to a delivering party under this CAISO Tariff, or, for purposes of scheduling and operating the Real-Time Market only, the EIM Area where Energy and Ancillary Services are made available by a delivering party under this CAISO Tariff.

- Real-Time Congestion Offset

The amount calculated pursuant to Section 11.5.4.1.2 for purposes of determining the non-zero offset amount allocation.

- Reference Bus

The Location(s) in the EDAM Area or the EIM Area relative to which mathematical quantities relating to a powerflow solution will be calculated.

- Residual Unit Commitment (RUC)

The process conducted by the CAISO in the Day-Ahead Market after the IFM has been executed to address mismatches between the CAISO Forecast of BAA Demand and the physical capacity committed in the IFM.

- RMR Dispatch

The quantity of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services that is mandated by the CAISO to be delivered in a given market for a resource by a Legacy RMR Unit under a Legacy RMR Contract or by an RMR Resource under an RMR Contract.

- RUC Availability Bid

The quantity (MW) and price ($/MW per hour) at or above which a Generating Unit, System Resource, System Unit, Participating Load, or Proxy Demand Resource has agreed to sell RUC Capacity for a specified interval of time to the CAISO to meet the Residual Unit Commitment requirement.

- RUC Award

The quantity of RCU or RCD awarded to a resource by the RUC for a Settlement Period.

- RUC Capacity

RCU or RCD.

- RUC Price

The Locational RCU Price or Locational RCD Price.

- RUC Schedule

The net of the Day-Ahead Schedule and the RUC Award in a given hour.- RUC Zone

A forecast region representing a UDC or MSS Service Area, Local Capacity Area, or other collection of Nodes for which the CAISO has developed sufficient historical CAISO Demand and relevant weather data to perform a Demand Forecast for such area, for which as further provided in Section 31.5.3.2 the CAISO may adjust the CAISO Forecast of BAA Demand to ensure that the RUC process produces adequate local capacity procurement.

- Scheduling Coordinator

An entity certified by the CAISO for the purposes of undertaking the functions specified in Section 4.5.3, including any entity certified by the CAISO as an EDAM Entity Scheduling Coordinator, EDAM Resource Scheduling Coordinator, EDAM Load Serving Entity Scheduling Coordinator, or a Scheduling Coordinator for the purposes of undertaking the functions specified in Section 33, and including any entity certified by the CAISO as an EIM Entity Scheduling Coordinator or an EIM Participating Resource Scheduling

Coordinator for the purposes of undertaking the functions specified in Section 29.

- Scheduling Coordinator Metered Entity

Pursuant to Section 10.1, an eligible entity that has elected that its Scheduling Coordinator will process and submit its Settlement Quality Meter Data to the CAISO. Eligible entities include:

i. a Generator, including Participating Generators and QFs;

ii. a Utility Distribution Company or Small Utility Distribution Company;

iii. a Participating Intermittent Resource;

iv. an EDAM Entity, EDAM Resource, or EDAM Load Serving Entity;

v. an EIM Entity or EIM Participating Resource;

vi. a Proxy Demand Resource or Reliability Demand Response Resource;

vii. a Distributed Energy Resource;

viii. an End User; and

ix. Tie Point Meters with other Transmission Owners or Balancing Authority Areas.

- Scheduling Point

A Location in the Base Market Model at which Scheduling Coordinators may submit intertie Bids in the CAISO Markets.

- State Estimator

A computer software program that provides the CAISO with a near Real-Time assessment of system conditions within the CAISO Balancing Authority Area, including portions of the CAISO Balancing Authority Area where Real-Time information is unavailable, and, for purposes of the Extended Day-Ahead Market, including the prospective EDAM Entity and EDAM Entity Balancing Authority Area(s), and, for purposes of the Energy Imbalance Market, including the prospective EIM Entity and EIM Entity Balancing Authority Area(s).

- Marginal Energy Cost (MEC)

The component of the LMP that reflects the marginal cost of providing Energy from a designated reference Location.

- System Resource

A group of resources, single resource, or a portion of a resource located outside of the Market Area, or an allocated portion of a Balancing Authority Area's portfolio of generating resources that are either a static Interchange Schedule or directly responsive to that Balancing Authority Area's Automatic Generation Control (AGC) capable of providing Energy and/or Ancillary Services to the CAISO Balancing Authority Area, or, for purposes of the Extended Day-Ahead Market only, to an EDAM Entity Balancing Authority Area(s), or, for purposes of scheduling and operating the Real-Time Market only, to an EIM Entity Balancing Authority Area, provided that if the System Resource is providing Regulation to the CAISO it is directly responsive to AGC.

- Undelivered Capacity

Ancillary Services capacity that was dispatched by the CAISO to provide Energy but where a certain percentage or more of the Expected Energy was not provided in Real-Time, which percentage is determined as specified in the applicable Business Practice Manual.

- Undispatchable Capacity

Ancillary Services capacity that receives an AS Award and Self-Provided Ancillary Services capacity, or capacity committed in RUC, that is not available for use due to a derate or Outage of the resource. Undispatchable Capacity includes AS Awards for Spinning Reserve and Non-Spinning Reserve capacity that are not available for use due to Ramp Rate constraints (e.g., operational Ramping ability is lower than Operating Reserve Ramp Rate). For RUC Capacity, Undispatchable Capacity also includes RUC Capacity for which the resource does not have Bids to the Real-Time Market required of the RUC Award.

- Wholesale Customer

A person wishing to purchase Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services at a Bulk Supply Point or a Scheduling Point for resale.

- Wholesale Sales

The sale of Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services at a Bulk Supply Point or a Scheduling Point for resale.

Appendix C

Locational Marginal Price

A. Locational Marginal Price for Energy

The CAISO shall calculate the price of Energy at Generation PNodes, Scheduling Points, and Aggregated Pricing Nodes, as provided in the CAISO Tariff. The CAISO establishes Trading Hub prices and LAPs as provided in the CAISO Tariff. The LMPs at PNodes, Scheduling Points, and Aggregated Pricing Nodes include separate components for the Marginal Energy Cost, Marginal Cost of Congestion, Marginal Cost of Losses, and Marginal GHG Cost. As provided in Sections 6.5.3.2.2 and 6.5.5.2.4, LMPs are calculated and posted for each hour of the Day-Ahead Market and for each interval of the Real-Time Market.

A.1 LMP Composition in the Day-Ahead Market and the Real-Time Market

In each hour of the Day-Ahead Market, each 15-minute interval of the Fifteen-Minute Market, and each 5-minute interval of the Real-Time Dispatch, the CAISO calculates the LMP for each PNode, which is based on the Bids of sellers and buyers selected in the Day-Ahead or Real-Time Market as calculated below. The CAISO uses a Reference Bus for the calculation of the Locational Marginal Prices. The Reference Bus in the base scenario is the distributed load in the Market Area used in the AC power flow solution to distribute the deviations for Transmission Losses between iterations, and in sensitivity calculations that yield rates for Marginal Losses and the Power Transfer Distribution Factors. If the CAISO Market solution reverts to a DC power flow solution, the Reference Bus is not used because Transmission Losses are not included. Nevertheless, the CAISO reflects the Transmission Losses for the Market Area in the DC power flow solution by adjusting the load by the average loss factor. The Locational Marginal Prices are not determined by resources that are not eligible to set the Locational Marginal Price as defined in Sections 31.3.1.4 and 34.20.2.3. For each PNode, the CAISO determines separate components of the LMP for the Marginal Energy Cost, Marginal Cost of Congestion, Marginal Cost of Losses, and Marginal GHG Cost, as follows:

$$LMP_i = MEC_i + MCC_i + MCL_i + MCG_i$$

where:

- i is the PNode index.
- MEC_i is the LMP component representing the Marginal Energy Cost at PNode i.

- MCC_i is the LMP component representing the Marginal Cost of Congestion at PNode i.
- MCL_i is the LMP component representing the Marginal Cost of Losses at PNode i.
- MCG_i is the LMP component representing the Marginal GHG Cost at PNode i.

A.2 Marginal Energy Cost Component of the LMP

The MEC is the same for all PNodes in each Balancing Authority Area in the Market Area. The MEC is the Shadow Price of the power balance constraint for the respective Balancing Authority Area at the optimal solution. The power balance constraint for each Balancing Authority Area in the Market Area ensures that the physical law of conservation of Energy (the sum of Generation and imports equals the sum of Demand, including exports and Transmission Losses, plus the Net Market Transfer) is accounted for in the market solution. The MEC for the Transfer System Resources (TSRs) on each side of the Market Transfer that they model is the MEC of the respective Balancing Authority Area. The MEC may be different between two Balancing Authority Areas in the Market Area when Market Transfers between these Balancing Authority Areas are scheduled at their respective scheduling limits. The MEC difference between the Balancing Authority Areas on either side of a specific Market Transfer generates Market Transfer revenue.

A.3 Marginal Congestion Component of the LMP

The CAISO calculates the Marginal Cost of Congestion at each PNode as the net contribution of the Shadow Prices of the binding Transmission Constraints at the optimal solution, weighed by the respective Power Transfer Distribution Factors, as follows:

$$MCC_i = -\sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF_{i,j,m,k}\, \mu_{m,k} - \sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF^{(IRU)}_{i,j,m,k}\, \mu^{(IRU)}_{m,k}$$

$$-\sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF^{(IRD)}_{i,j,m,k}\, \mu^{(IRD)}_{m,k}$$

Where:

- i is the PNode index.
- m is the Transmission Constraint index in the Market Area; transmission constraints outside the Market Area are not enforced.

- k is the constraint case index; zero (0) indicates the base case where all transmission and generation facilities are in service, whereas a positive case indicates a preventive transmission or generation contingency case, as applicable.
- j is the transmission component index of Transmission Constraint m. When Transmission Constraint m is a Nomogram, there can be more than one transmission components in it; otherwise, there is only one transmission component.
- K is the number of constraint cases, besides the base case.
- M is the number of Transmission Constraints.
- J_m is the number of transmission components of Transmission Constraint m.
- $PTDF_{i,j,m,k}$, $PTDF_{i,j,m,k}^{(IRU)}$, and $PTDF_{i,j,m,k}^{(IRD)}$ is the Power Transfer Distribution Factor (PTDF) for PNode i on transmission component j of Transmission Constraint m in constraint case k in the base, IRU deployment, or IRD deployment scenario, respectively; it is the flow contribution on that transmission component j when an increment of power is injected at PNode i and an equivalent amount of power is withdrawn at the Reference Bus. For Market Area Intertie Resources at a Scheduling Point, and TSRs at a Transfer Location, the PTDF to an intertie constraint or intertie scheduling limit at that Scheduling Point is +1 for an import and –1 for an export. The CAISO does not consider the effect of Transmission Losses in the calculation of PTDFs; they depend only on the network configuration. Furthermore, the difference between the PTDFs at two PNodes with respect to any binding Transmission Constraint, and thus the difference between the MCCs of the LMPs at these PNodes, is independent from the selection of the Reference Bus.
- $C_{j,m}$ is the constraint coefficient for transmission component j of Transmission Constraint m when Transmission Constraint m is a Nomogram; otherwise, this constraint coefficient is always one.
- $\mu_{m,k}$, $\mu_{m,k}^{(IRU)}$, and $\mu_{m,k}^{(IRD)}$ is the Shadow Price of Transmission Constraint m in constraint case k in the base, IRU deployment, or IRD deployment scenario, respectively.

A.4 Marginal Losses Component of the LMP

The CAISO calculates the Marginal Cost of Losses at each PNode as the product of the MEC and the rate for Marginal Losses at that PNode, as follows:

$$MCL_i = -MEC_i \frac{\partial L}{\partial P_i}$$

Where the rate for Marginal Losses at PNode i ($\partial L/\partial P_i$) is the sensitivity (partial derivative) of system losses (L) to an increment of power injected at that PNode (P_i) and absorbed by the Reference Bus. This calculation reflects the area interchange control feature of the AC power flow where the net scheduled interchange (NSI) of a Balancing Authority Area in the FNM is kept constant while the iterative solution distributes loss deviation from the previous iteration to the Reference Bus. Consequently, the rate for Marginal Losses of the TSRs that model a Market Transfer at a Transfer Location between two Balancing Authority Areas in the Market Area may be different because these TSRs belong to different Balancing Authority Areas. The CAISO sets the MCL for both of these TSRs to the average rate for Marginal Losses between the two so that there is no MCL difference between the TSRs on either side of a specific Market Transfer. The Marginal Losses on transmission facilities outside the Market Area are ignored in the calculation of the MCL.

A.5 Marginal Greenhouse Gas Cost Component of the LMP

The CAISO employs a GHG model in the DAM and RTM as described in Sections 29.32 and 33.32. The GHG model calculates an optimal GHG Transfer for each GHG Regulation Area. If the GHG Transfer for a GHG Regulation Area is an import, it is allocated optimally to resources outside that GHG Regulation Area based on those resources' GHG Bid Adders. In that case, the Marginal GHG Cost for all PNodes in a specific GHG Regulation Area is the Shadow Price of the GHG Transfer allocation constraint for that GHG Regulation Area and it represents the marginal cost of GHG regulation for net import transfer into that GHG Regulation Area. If the GHG Transfer is an export, the GHG Transfer allocation constraint is not binding, all GHG attributions are zero for that GHG Regulation Area, and the Marginal GHG Cost for all PNodes in that GHG Regulation Area is zero. The Marginal GHG Cost outside of all GHG Regulation Areas is always zero. Furthermore, the Marginal GHG Cost of a TSR is always zero, even when its Transfer Location is within or at the border of a GHG Regulation Area, because the associated GHG

regulation cost is collected from the LMP settlement of all physical resources within the GHG Regulation Area and paid explicitly to the respective resources outside the GHG Regulation Area with GHG Attributions for that GHG Regulation Area.

A.6 Trading Hub Price Calculation

The CAISO calculates Existing Zone Generation Trading Hub prices, as provided in Section 27.3, based on the LMP calculations described in this Attachment and in Section 27.2.

A.7 Load Aggregation Point Price Calculation

The CAISO calculates LAP prices as described in Section 27.2.2.

A.8 Intertie Scheduling Point Price Calculation

The CAISO calculates LMPs for intertie resources at Scheduling Points, which are represented in the FNM as PNodes or aggregations of PNodes external to the Market Area (*i.e.*, at the boundary of a Balancing Authority Area inside the Market Area with a Balancing Authority Area outside the Market Area), through the same process that is used to calculate LMPs for PNodes within the MarketArea. In some cases, facilities that are part of the CAISO Controlled Grid but are external to the CAISO Balancing Authority Area connect some intertie Scheduling Points to the CAISO Balancing Authority Area, and in these cases, the Scheduling Points are within external Balancing Authority Areas. Inthese cases, the Scheduling Points are represented in the FNM at the relevant Locations and used to schedule imports and exports to/from the CAISO Balancing Authority Area. The MCC of the LMP at a Scheduling Point includes contributions from binding intertie constraints and intertie scheduling limits that constrain import/export Schedules at the relevant Scheduling Point. Normally, System Resources are registered at a Scheduling Point to a Balancing Authority Area in the Market Area to model Energy or capacity imports/exports from/to a Balancing Authority Area outside the Market Area. In this case, the CAISO distributes the import/export Energy Schedule or capacity award of the System Resource to the Default Generation Aggregation Point (DGAP) of the Balancing Authority Area outside the Market Area that is the source/sink. If the source/sink Balancing Authority Area is unknown at the time the CAISO Market runs, the CAISO distributes the import/export Energy Schedule or capacity award of the relevant System Resource to the Generic Generation Aggregation Point (GGAP) for the relevant Scheduling Point, and the

MCL and MCC of the LMP of the System Resource reflect the Marginal Losses and Congestion at the relevant DGAP or GGAP, respectively.

In certain cases, System Resources are registered at a Scheduling Point to a Balancing Authority Area in the Market Area to model Energy imports/exports from/to another Balancing Authority Area inside the Market Area. This occurs because of differences in the Market Area between the Day-Ahead Market and the Real-Time Market when a Balancing Authority Area is outside the EDAM Area in the Day-Ahead Market, but inside the EIM Area in the Real-Time Market. In this case, the day-ahead Energy schedule of the relevant System Resource is distributed in the Real-Time Market to the DGAP of the source/sink Balancing Authority Area that is in the EIM Area, but cancelled with an opposite base Energy schedule of an EIM Mirror System Resource at the same Scheduling Point with the same distribution. The EIM Mirror System Resource belongs to the source/sink Balancing Authority Area and its base Energy schedule matches the day-ahead Energy schedule of the System Resource it mirrors. The EIM Mirror System Resource that mirrors a System Resource has an export base schedule that matches the day-ahead import schedule of its mirrored System Resource, or a base import schedule that matches the day-ahead export schedule of its mirrored System Resource. The LMPs of the EIM Mirror System Resource and the System Resource it mirrors are different in general because the MEC, MCL, and MCC components differ since the two resources belong to different Balancing Authority Areas in the Market Area.

A.8.1 Intertie Scheduling Point Price Calculation for IBAAs

A.8.1.1 Scheduling Point Prices

As described in Section 27.5.3, the CAISO's FNM includes a full model of the network topology of each IBAA. The CAISO will specify Resource IDs that associate Intertie Scheduling Point Bids and Schedules with supporting injection and withdrawal locations on the FNM. These Resource IDs may be specified by the CAISO based on the information available to it, or developed pursuant to a Market Efficiency Enhancement Agreement. Once these Resource IDs are established, the CAISO will determine Intertie Scheduling Point LMPs based on the injection and withdrawal locations associated with each Intertie Scheduling Point Bid and Schedule by the appropriate Resource ID. In calculating these LMPs the CAISO follows the provisions specified in Section 27.5.3 regarding the treatment of Transmission Constraints and losses on the IBAA network facilities. Unless otherwise required pursuant to an effective

MEEA, the default pricing for all imports from the IBAA(s) to the CAISO Balancing Authority Area will be based on the SMUD/TID IBAA Import LMP and all exports to the IBAA(s) from the CAISO Balancing Authority Area will be based on the SMUD/TID IBAA Export LMP. The SMUD/TID IBAA Import LMP will be calculated based on modeling of supply resources that assumes all supply is from the Captain Jack substation as defined by WECC. The SMUD/TID IBAA Export LMP will be calculated based on the Sacramento Municipal Utility District hub that reflects Intertie distribution factors developed from a seasonal power flow base case study of the WECC region using an equivalencing technique that requires the Sacramento Municipal Utility District hub to be equivalenced to only the buses that comprise the aggregated set of load resources in the IBAA, with all generation also being retained at its buses within the IBAA. The resulting load distribution within each aggregated set of load resources within the IBAA defines the Intertie distribution factors for exports from the CAISO Balancing Authority Area.

A.8.1.2 Applicable Marginal Losses Adjustment

For import Schedules to the CAISO Balancing Authority Area at the southern terminus of the California-Oregon Transmission Project at the Tracy substation or at the applicable Scheduling Point that connects the CAISO Balancing Authority and the Western Area Power Administration system, the CAISO will replace the Marginal Cost of Losses at the otherwise applicable source for such Schedules with the Marginal Cost of Losses at the Tracy substation or at the applicable Scheduling point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system, provided that the Scheduling Coordinators certify as discussed further below that the Schedules originate from transactions that use: (a) the California-Oregon Transmission Project; or (b) transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA. In addition, as described further below, the Scheduling Coordinator must certify that the Schedules are subject to: (a) charges for losses by the Western Area Power Administration for the use of transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA; or (b) charges for losses by the Transmission Agency of Northern California for the use of the California-Oregon Transmission Project. The CAISO will establish Resource IDs that are to be used only to submit Bids, including Self-Schedules, for the purpose of establishing Schedules that are eligible for this loss adjustment.

Prior to obtaining such Resource IDs, the relevant Scheduling Coordinator shall certify that it will only use this established Resource ID for Bids, including Self-Schedules, that originate from transactions that use: (a) the California-Oregon Transmission Project; or (b) transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA. In addition, the Scheduling Coordinator must certify that the Schedules are subject to: (a) charges for losses by the Western Area Power Administration for the use of transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA; or (b) Transmission Agency of Northern California for the use of the California-Oregon Transmission Project. Further, by actually using such Resource ID, the Scheduling Coordinator represents that such Bids, including Self-Schedules, that originate from transactions that use: (a) the California-Oregon Transmission Project; or (b) transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA. In addition, the Scheduling Coordinator must certify that the Schedules are subject to: (a) charges for losses by the Western Area Power Administration for the use of transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA; or (b) Transmission Agency of Northern California for the use of the California-Oregon Transmission Project. Schedules and Dispatches settled under such Resource IDs shall be subject to an LMP which has accounted for the Marginal Cost of Losses as if there were an actual physical generation facility at the Tracy Scheduling Point or at the applicable Scheduling Point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system as opposed to the Marginal Cost of Losses under the IBAA LMPs specified in Section I.1.1 of this Appendix. The CAISO may request information on a monthly basis from such Scheduling Coordinators to verify these certifications. Any such request shall be limited to transactions that use the designated Resource IDs during the six month prior period to the date of the request. The CAISO will calculate a re-adjustment of the Marginal Cost of Losses at the Tracy substation or at the applicable Scheduling Point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system to reflect the otherwise applicable source for such Schedules for any Settlement Interval in which the CAISO has determined that the Scheduling Coordinator’s payments did not reflect transactions that meet the above specified certification requirements. Any amounts owed to the CAISO for such Marginal Cost of Losses re-adjustments will be

recovered by the CAISO from the affected Scheduling Coordinator by netting the amounts owed from payments due in subsequent Settlements Statements until the outstanding amounts are fully recovered.
For export Schedules from the CAISO Balancing Authority Area at the southern terminus of the California-Oregon Transmission Project at the Tracy substation or at the applicable Scheduling Point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system, the CAISO will replace the Marginal Cost of Losses at the otherwise applicable sink for such Schedules with the Marginal Cost of Losses at the Tracy substation or at the applicable Scheduling Point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system, provided that the Scheduling Coordinator certifies, as discussed below, where the export Schedules use: (a) the California-Oregon Transmission Project; or (b) any transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA. In addition, the Scheduling Coordinator must certify that the affected Schedules are charged losses by: (a) the Western Area Power Administration for the use of transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA; or (b) Transmission Agency of Northern California for the use of the California-Oregon Transmission Project.
The CAISO will establish Resource IDs that are to be used only to submit Bids, including Self-Schedules, for the purpose of establishing Schedules that are eligible for this loss adjustment. Prior to obtaining such Resource IDs, the relevant Scheduling Coordinator shall certify that it will only use this established Resource ID for Bids, including Self-Schedules, where the export Schedules use: (a) the California-Oregon Transmission Project; or (b) any transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA. In addition the Scheduling Coordinator must certify that the affected Schedules are charged losses by: (a) the Western Area Power Administration for the use of transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA; or (b) Transmission Agency of Northern California for the use of the California-Oregon Transmission Project. Further, by actually using such Resource ID, the Scheduling Coordinator represents that such Bids, including Self-Schedules, are used for the above specified conditions.
Schedules and Dispatches settled under such Resource IDs shall be subject to an LMP which has accounted for the Marginal Cost of Losses as if there were an actual physical generation facility at the Tracy Scheduling Point or at the applicable Scheduling Point that connects the CAISO Balancing

Authority Area and the Western Area Power Administration system as opposed to the Marginal Cost of Losses under the IBAA LMPs specified in Section I.1.1 of this Appendix. The CAISO may request information on a monthly basis from such Scheduling Coordinators to verify that schedules for such Resource IDs meet the above specified conditions. Any such request shall be limited to transactions that use the designated Resource IDs during the six month prior period to the date of the request.
The CAISO will calculate a re-adjustment of the Marginal Cost of Losses at the Tracy substation or at the applicable Scheduling Point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system to reflect the otherwise applicable sink for such Schedules for any Settlement Interval in which the CAISO has determined that the Scheduling Coordinator's payments did not reflect transactions that met the above specified conditions. Any amounts owed to the CAISO for such Marginal Cost of Losses re-adjustments will be recovered by the CAISO from the affected Scheduling Coordinator by netting the amounts owed from payments due in subsequent Settlements Statements until the outstanding amounts are fully recovered.

B. Locational Marginal Price for Imbalance Reserves

The CAISO shall calculate the Locational IRU Price and Locational IRD Price at Generation PNodes, Scheduling Points, and Aggregated Pricing Nodes, as provided in the CAISO Tariff. The Locational IRU Price and Locational IRD Price at PNodes, Scheduling Points, and Aggregated Pricing Nodes include separate components for the Marginal IRU or IRD Cost, and the Marginal IRU or IRD Cost of Congestion, respectively. As provided in Section 6.5.3.2.2, Locational IRU Prices and Locational IRD Prices are calculated and posted for each hour of the Day-Ahead Market. There are different Locational Marginal Prices for IRU and IRD at any given Location in the Market Area.

B.1. Locational IRU and IRD Price Composition

In each hour of the Day-Ahead Market, the CAISO calculates the Locational IRU Price and Locational IRD Price for each PNode, which is based on the IRU and IRD Bids of sellers selected in the Day-Ahead Market as calculated below. The CAISO uses a Reference Bus for the calculation of the Locational IRU Price and Locational IRD Price. The Reference Bus for the Locational IRU Price is the distributed IRU requirement in the Market Area, whereas the Reference Bus for the Locational IRD Price is the distributed IRD requirement in the Market Area. The Reference Bus is used in sensitivity calculations that yield the

Power Transfer Distribution Factors. The CAISO does not employ an AC power flow in the IRU and IRD deployment scenarios in the IFM. The Transmission Constraints in the IRU and IRD deployment scenarios are formulated as linear extensions of the Transmission Constraints in the base scenario using the AC power flow solution for the base scenario. Therefore, there is no marginal loss component in the Locational IRU Price and Locational IRD Price. For each PNode, the CAISO determines separate components of the Locational IRU Price and Locational IRD Price for the Marginal IRU and IRD Cost, and the Marginal Cost of Congestion for IRU and IRD, as follows:

$$LMP_i^{(IRU)} = MEC_i^{(IRU)} + MCC_i^{(IRU)}$$

$$LMP_i^{(IRD)} = MEC_i^{(IRD)} + MCC_i^{(IRD)}$$

where:

- i is the PNode index.
- $MEC_i^{(IRU)}$ is the Locational IRU Price component representing the Marginal IRU Cost at PNode i.
- $MCC_i^{(IRU)}$ is the Locational IRU Price component representing the Marginal Cost of Congestion for IRU at PNode i.
- $MEC_i^{(IRD)}$ is the Locational IRD Price component representing the Marginal IRD Cost at PNode i.
- $MCC_i^{(IRD)}$ is the Locational IRD Price component representing the Marginal Cost of Congestion for IRD at PNode i.

B.2. Marginal IRU and IRD Cost Component

The Marginal IRU and IRD Cost Component is the same for all PNodes in each Balancing Authority Area in the Market Area. It is the Shadow Price of the power balance constraint in the IRU or IRD deployment scenario for the respective Balancing Authority Area at the optimal solution in the IFM. The power balance constraint for each Balancing Authority Area in the Market Area ensures that the physical law of conservation of Energy and deployed capacity (the sum of physical resource energy schedules from the base scenario plus the deployed IRU or IRD awards equals the IRU or IRD requirement minus the IRU or IRD demand relaxation plus the Net IRU or IRD Transfer) is accounted for in the solution of the IRU or IRD deployment scenario. The Marginal IRU or IRD Cost for the Transfer System Resources (TSRs) on each side of an EDAM Transfer is the Marginal IRU or IRD Cost of the respective Balancing Authority

Area. The Marginal IRU or IRD Cost may be different between two Balancing Authority Areas in the Market Area when EDAM Transfers between these Balancing Authority Areas are scheduled at their respective scheduling limits. The Marginal IRU or IRD Cost difference between the Balancing Authority Areas on either side of a specific EDAM Transfer generates EDAM Transfer revenue.

B.3. Marginal Congestion Component for IRU and IRD

The CAISO calculates the Marginal Cost of Congestion for IRU and IRD at each PNode as the net contribution of the Shadow Prices of the binding Transmission Constraints in the IRU or IRD deployment scenarios at the optimal solution for IFM, weighed by the respective Power Transfer Distribution Factors, as follows:

$$MCC_i^{(IRU)} = -\sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF_{i,j,m,k}^{(IRU)}\, \mu_{m,k}^{(IRU)}$$

$$MCC_i^{(IRD)} = -\sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF_{i,j,m,k}^{(IRD)}\, \mu_{m,k}^{(IRD)}$$

Where:

- i is the Pnode index.
- m is the Transmission Constraint index in the Market Area; transmission constraints outside the Market Area are not enforced.
- k is the constraint case index; zero (0) indicates the base case where all transmission and generation facilities are in service, whereas a positive case indicates a preventive transmission or generation contingency case, as applicable.
- j is the transmission component index of Transmission Constraint m. When Transmission Constraint m is a Nomogram, there can be more than one transmission components in it; otherwise, there is only one transmission component.
- K is the number of constraint cases, besides the base case.
- M is the number of Transmission Constraints.
- J_m is the number of transmission components of Transmission Constraint m.

- $PTDF_{i,j,m,k}^{(IRU)}$ and $PTDF_{i,j,m,k}^{(IRD)}$ is the Power Transfer Distribution Factor (PTDF) for PNode i on transmission component j of Transmission Constraint m in constraint case k in the IRU or IRD deployment scenario; it is the power flow contribution on that transmission component j when an increment of power is injected at PNode i and an equivalent amount of power is withdrawn at the Reference Bus. For Market Area Intertie resources at a Scheduling Point, and TSRs at a Transfer Location, the PTDF to an intertie constraint or intertie scheduling limit at that Scheduling Point is +1 for an import and –1 for an export. The CAISO does not consider the effect of Transmission Losses in the calculation of PTDFs; they depend only on the network configuration. Furthermore, the difference between the PTDFs at two PNodes with respect to any binding Transmission Constraint, and thus the difference between the Marginal Cost of Congestion for IRU or IRD at these PNodes, is independent from the selection of the Reference Bus. The PTDFs in the IRU or IRD deployment scenarios are different from the ones in the base scenario of the IFM because although the network configuration is the same, the Reference Bus is different; furthermore, the binding constraints in the base and the IRU or IRD deployment scenarios may be different.
- $c_{j,m}$ is the constraint coefficient for transmission component j of Transmission Constraint m when Transmission Constraint m is a Nomogram; otherwise, this constraint coefficient is always one.
- $\mu_{m,k}^{(IRU)}$ and $\mu_{m,k}^{(IRD)}$ is the Shadow Price of Transmission Constraint m in constraint case k at the IRU or IRD deployment scenario in the optimal solution of the IFM.

C. Locational Marginal Price for Reliability Capacity

The CAISO shall calculate the Locational RCU Price and Locational RCD Price at Generation PNodes, Scheduling Points, and Aggregated Pricing Nodes, as provided in the CAISO Tariff. The Locational RCU Price and Locational RCD Price at PNodes, Scheduling Points, and Aggregated Pricing Nodes include separate components for the Marginal RCU or RCD Cost, Marginal RCU or RCD Cost of Congestion, and Marginal RCU or RCD Cost of Losses, respectively. As provided in Section 6.5.3.2.2, Locational RCU Prices and Locational RCD Prices are calculated and posted for each hour of the Day-Ahead Market.

There is a single Locational Marginal Price for Reliability Capacity that applies to both Reliability Capacity Up and Reliability Capacity Down at any given Location in the Market Area.

C.1. Locational RCU and RCD Price Composition

In each hour of the Day-Ahead Market, the CAISO calculates the Locational RCU Price and Locational RCD Price for each PNode, which is based on the RCU and RCD Bids of sellers selected in the Day-Ahead Market as calculated below. The CAISO uses a Reference Bus for the calculation of the Locational RCU Price and Locational RCD Price. The Reference Bus is the distributed demand forecast in the Market Area, used in the AC power flow solution in RUC to distribute the deviations for Transmission Losses between iterations, and in sensitivity calculations that yield rates for Marginal Losses and the Power Transfer Distribution Factors. If the CAISO Market solution reverts to a DC power flow solution, the Reference Bus is not used because Transmission Losses are not included. Nevertheless, the CAISO reflects the Transmission Losses for the Market Area in the DC power flow solution by adjusting the load by the average loss factor. For each PNode, the CAISO determines separate components of the Locational RCU Price and Locational RCD Price for the Marginal RCU and RCD Cost, Marginal Cost of Congestion for RCU and RCD, and Marginal Cost of Losses for RCU and RCD, as follows:

$$LMP_i^{(RUC)} = MEC_i^{(RUC)} + MCC_i^{(RUC)} + MCL_i^{(RUC)}$$

where:

- i is the PNode index.
- $MEC_i^{(RUC)}$ is the Locational RCU Price and Locational RCD Price component representing the Marginal Reliability Capacity Cost at PNode i.
- $MCC_i^{(RUC)}$ is the Locational RCU Price and Locational RCD Price component representing the Marginal Cost of Congestion for RCU and RCD at PNode i.
- $MCL_i^{(RUC)}$ is the Locational RCU Price and Locational RCD Price component representing the Marginal Cost of Losses for RCU and RCD at PNode i.

C.2. Marginal Reliability Capacity Cost Component

The Marginal Reliability Capacity Cost Component is the same for all PNodes in each Balancing Authority Area in the Market Area. It is the Shadow Price of the power balance constraint for the respective

Balancing Authority Area at the optimal solution in the RUC. The power balance constraint for each Balancing Authority Area in the Market Area ensures that the physical law of conservation of Energy (the sum of physical resource energy schedules from the IFM plus the deployed Reliability Capacity awards equals the demand forecast plus the Net Reliability Capacity Transfer) is accounted for in the RUC solution. The Marginal Reliability Capacity Cost for the Transfer System Resources (TSRs) on each side of an EDAM Transfer is the Marginal Reliability Capacity Cost of the respective Balancing Authority Area. The Marginal Reliability Capacity Cost may be different between two Balancing Authority Areas in the Market Area when EDAM Transfers between these Balancing Authority Areas are scheduled at their respective scheduling limits. The Marginal Reliability Capacity Cost difference between the Balancing Authority Areas on either side of a specific EDAM Transfer generates EDAM Transfer revenue.

C.3. Marginal Congestion Component for RCU and RCD

The CAISO calculates the Marginal Cost of Congestion for RCU and RCD at each PNode as the net contribution of the Shadow Prices of the binding Transmission Constraints at the optimal solution for RUC, weighed by the respective Power Transfer Distribution Factors, as follows:

$$MCC_i^{(RUC)} = -\sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF_{i,j,m,k}\, \mu_{m,k}^{(RUC)}$$

where:

- i is the PNode index.
- m is the Transmission Constraint index in the Market Area; transmission constraints outside the Market Area are not enforced.
- k is the constraint case index; zero (0) indicates the base case where all transmission and generation facilities are in service, whereas a positive case indicates a preventive transmission or generation contingency case, as applicable.
- j is the transmission component index of Transmission Constraint m. When Transmission Constraint m is a Nomogram, there can be more than one transmission components in it; otherwise, there is only one transmission component.
- K is the number of constraint cases, besides the base case.
- M is the number of Transmission Constraints.

- J_m is the number of transmission components of Transmission Constraint m.
- $PTDF_{i,j,m,k}$ is the Power Transfer Distribution Factor (PTDF) for PNode i on transmission component j of Transmission Constraint m in constraint case k; it is the power flow contribution on that transmission component j when an increment of power is injected at PNode i and an equivalent amount of power is withdrawn at the Reference Bus. For Market Area Intertie resources at a Scheduling Point, and TSRs at a Transfer Location, the PTDF to an intertie constraint or intertie scheduling limit at that Scheduling Point is +1 for an import and –1 for an export. The CAISO does not consider the effect of Transmission Losses in the calculation of PTDFs; they depend only on the network configuration. Furthermore, the difference between the PTDFs at two PNodes with respect to any binding Transmission Constraint, and thus the difference between the Marginal Cost of Congestion for RCU and RCD at these PNodes, is independent from the selection of the Reference Bus. The PTDFs in the RUC are the same as the ones in the IFM base scenario because the network configuration is the same; however, the binding constraints in the RUC may be different from the ones in the IFM.
- $c_{j,m}$ is the constraint coefficient for transmission component j of Transmission Constraint m when Transmission Constraint m is a Nomogram; otherwise, this constraint coefficient is always one.
- $\mu_{m,k}^{(RUC)}$ is the Shadow Price of Transmission Constraint m in constraint case k at the optimal solution of the RUC.

D. Marginal Loss Component for RCU and RCD

The CAISO calculates the Marginal Cost of Losses for RCU and RCD at each PNode as the product of the Marginal Reliability Capacity Cost Component and the rate for Marginal Losses at that PNode, as follows:

$$MCL_i^{(RUC)} = -MEC_i^{(RUC)} \frac{\partial L}{\partial P_i}$$

Where the rate for Marginal Losses at PNode i ($\partial L/\partial P_i$) is the sensitivity (partial derivative) of system losses (L) to an increment of power injected at that PNode (P_i) and absorbed by the Reference Bus for

the RUC. This calculation reflects the area interchange control feature of the AC power flow where the net scheduled interchange (NSI) of a Balancing Authority Area in the FNM is kept constant while the iterative solution distributes loss deviation from the previous iteration to the Reference Bus for the RUC. Consequently, the Marginal Cost of Losses for RCU and RCD of the TSRs that model a Market Transfer at a Transfer Location between two Balancing Authority Areas in the Market Area may be different because these TSRs belong to different Balancing Authority Areas. The CAISO sets the Marginal Cost of Losses for RCU and RCD for both of these TSRs to the average rate for Marginal Losses between the two so that there is no difference between the Marginal Cost of Losses for RCU and RCD between the TSRs on either side of a specific Market Transfer. The Marginal Losses on transmission facilities outside the Market Area are ignored in the calculation of the Marginal Cost of Losses for RCU and RCD.

Appendix F Rate Schedules

Schedule 1

Grid Management Charge

Part A - Monthly Calculation of Grid Management Charge (GMC)

The GMC consists of the following separate service charges: (1) the Market Services Charge; (2) the System Operations Charge; and (3) the CRR Services Charge. The GMC revenue requirement, determined in accordance with Part C of this Schedule 1, shall be allocated to the service charges specified in Part A of this Schedule 1 as follows: forty-nine (49) percent to Market Services; forty-nine (49) percent to System Operations; and two (2) percent to CRR Services. Starting in 2017 and every three (3) years thereafter, the CAISO will conduct an updated cost of service study, in consultation with stakeholders and using costs from the previous year. In conducting each cost of service study, the CAISO will recalculate the three service charge percentages and the rates for the fees and charges that constitute the Grid Management Charge as set forth in Section 11.22. In addition, the cost of service study results will be used to update the RC Funding Percentage used to calculate the annual RC Funding Requirement, as well as the real time percentages of the Market Services and System Operations service charges used to calculate the EIM Administrative Charges. The cost of service study results will also be used to update the real-time market percentage used to calculate the EDAM System Operations charge. If, based on the cost of service study results, the service category revenue requirement allocation percentages or the level of fees and charges have changed, the CAISO will submit tariff amendments to reflect such changes pursuant to Section 205 of the FPA.

1. The rate for the Market Services Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by the forecast annual gross absolute value of MW per hour of Ancillary Services capacity awarded in the Day-Ahead and Real-Time Markets, MWh of Energy cleared in the Day-Ahead market, MWh of Imbalance Reserves cleared in the Day-Ahead market, MWh of Reliability capacity cleared in the Day-Ahead market, Virtual Demand Award, Virtual Supply Award, and FMM Instructed Imbalance Energy and RTD Instructed Imbalance Energy, less the forecast annual gross absolute value of such Energy as may be excluded for a load following MSS pursuant to an MSS agreement, Standard Ramping Energy, Regulation Energy, Ramping Energy Deviation, Residual Imbalance Energy, Exceptional Dispatch Energy and Operational Adjustments for the Day-Ahead and Real-Time.
2. The rate for the System Operations Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by forecast annual gross absolute value of MWh of real-time energy flows on the ISO Controlled Grid, net of amounts excluded pursuant to Part E of this Schedule.
3. The rate for the CRR Services Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by the forecast annual sum of awarded MW of CRRs per hour.

The rates for the foregoing charges shall be adjusted automatically each year, effective January 1 for the following twelve (12) months, in the manner set forth in Part D of this Schedule.

Part B - Quarterly Adjustment, If Required

Each component rate of the GMC will be adjusted automatically on a quarterly basis, up or down, so that

* * * * *

Attachment B-1 – Marked Tariff Language – Effective Dec. 21, 2023

Day-Ahead Market Enhancements and Extended Day-Ahead Market

California Independent System Operator Corporation

August 22, 2023

33.1 General Provisions~~[Not Used]~~

Section 1 will apply to EDAM Market Participants in addition to the provisions in this Section 33.1, unless limited in their application by this Section 33.1.

Participation in, operation of, and Settlement of the Extended Day-Ahead Market will be subject to the provisions of Section 33, and to all other provisions of the CAISO Tariff to the extent those provisions are applicable to the Extended Day-Ahead Market. The provisions of Section 33 will apply only to the Extended Day-Ahead Market.

EDAM Market Participants must comply with the provisions of Section 33, and other applicable provisions of the CAISO Tariff to the extent such provisions:

(a) expressly refer to Section 33 or EDAM Market Participants,

(b) are cross-referenced in Section 33, or

(c) are not limited in applicability to the CAISO Controlled Grid, the CAISO Balancing Authority Area, or CAISO Markets other than the Day-Ahead Market or Real-Time Market.

If there is an inconsistency between a provision in Section 33 and another provision of the CAISO Tariff regarding the rights or obligations of EDAM Market Participants, except in their capacity as EIM Market Participants under Section 29, the provisions in Section 33 will prevail to the extent of the inconsistency.

If there is an inconsistency between a provision in Section 33 and a provision in Section 29, the provisions of Section 33 will prevail with respect to participation in the Day-Ahead Market and the provisions of Section 29 will prevail with respect to participation in the Real-Time Market, provided that the provisions of both Sections 33 and 29 will be given equal consideration such that the provisions applicable as an EDAM Market Participant and EIM Market Participant may be reconciled where provisions apply to participation in both the Day-Ahead Market and the Real-Time Market.

33.1.1 Suspension of EDAM Entity Participation

The CAISO may, within 60 days following an EDAM Entity Implementation Date for an EDAM Entity, and pursuant to the terms of a Market Notice, temporarily suspend the participation of that EDAM Entity in the Day-Ahead Market within the EDAM Entity Balancing Authority Area for a period not to exceed 60 days if market or system operational issues adversely impact any portion of the EDAM Area, provided that the CAISO may continue operation of the Day-Ahead Market in

the rest of the EDAM Area without the participation of the EDAM Entity for a reasonable additional period of time in order to implement a resolution of the market or system operational issues.

If the CAISO is not able to identify a resolution of the EDAM-related market or system operational issues within 60 days after issuance of the Market Notice of temporary suspension of EDAM participation by an EDAM Entity, the CAISO may, upon issuance of a subsequent Market Notice, terminate participation by the EDAM Entity in the Day-Ahead Market and may extend the suspension of EDAM participation by the EDAM Entity for a time sufficient to process the termination of the EDAM Addendum to EIM Entity Agreement. The CAISO may reinstate EDAM operations after a temporary suspension of EDAM participation by an EDAM Entity by issuing a Market Notice announcing the intended reinstatement no less than 5 days in advance of the reinstatement date.

33.1.1.1 EDAM Entity Action.

In the event the CAISO issues a Market Notice of the temporary suspension of EDAM participation by an EDAM Entity, the EDAM Entity will either (a) undertake manual operation of its Balancing Authority Area without reliance on the Day-Ahead Market or (b) continue to submit EDAM Bids, forecast information, and the associated Meter Data to enable continued operation of the Day-Ahead Market until the CAISO issues a subsequent Market Notice either that (i) the cause of the temporary suspension has been resolved and the EDAM Entity has been reinstated, in which case EDAM participation by the EDAM Entity will return to normal, or (ii) EDAM participation by the EDAM Entity has been terminated.

In the event the CAISO issues a Market Notice of the temporary suspension of EDAM participation by an EDAM Entity, the EDAM Entity will either (a) not continue participation as an EIM Entity if its Balancing Authority Area is under manual operation or (b) continue participation as an EIM Entity unless otherwise directed in accordance with Section 29.1(d), specifically to submit EIM Base Schedules and the associated Meter Data to enable continued operation of the Real-Time Market until the CAISO issues a

subsequent Market Notice either that (i) the cause of the temporary suspension has been resolved and the EDAM Entity has been reinstated, in which case EDAM participation by the EDAM Entity will return to normal; or (ii) EDAM participation by the EDAM Entity has been terminated, in which case the EDAM Entity will continue participation in the EIM as an EIM Entity.

33.1.2.1 CAISO Action.

In the event the CAISO issues a Market Notice of the temporary suspension of EDAM participation by an EDAM Entity, the CAISO will (i) prevent EDAM Transfers and separate the EDAM Entity Balancing Authority Area from operation of the Day-Ahead Market in the EDAM Area in accordance with the provisions of the Business Practice Manual for the Extended Day-Ahead Market, (ii) suspend Settlement of Day-Ahead Market charges with respect to the EDAM Entity in accordance with the provisions of the Business Practice Manual for the Extended Day-Ahead Market, and (iii) issue a subsequent Market Notice either that the cause of the temporary suspension has been resolved and the EDAM Entity has been reinstated, in which case EDAM participation by the EDAM Entity will return to normal, or EDAM participation by the EDAM Entity has been terminated.

33.2 Access To EDAM~~[Not Used]~~

Section 2 will not apply to EDAM Market Participants; rather, the specific provisions of this Section 33.2 will apply to EDAM Market Participants.

The CAISO will provide open and non-discriminatory access to the Day-Ahead Market, including the Extended Day-Ahead Market for Balancing Authorities that also participate in the Energy Imbalance Market in accordance with the CAISO Tariff. Only EIM Entities may be EDAM Entities, while EIM Entities who do not become EDAM Entities will have no obligation to participate in the Extended Day-Ahead Market and may continue to participate solely in the Energy Imbalance Market.

33.2.1 EDAM Entity Implementation Agreement.

A Balancing Authority that seeks to become an EDAM Entity must first execute an EDAM Entity Implementation Agreement with the CAISO that establishes the EDAM Entity Implementation

Date, an obligation to sign an EDAM Addendum to EIM Entity Agreement, the onboarding fee for its implementation, and the scope of work required for its participation in the EDAM. A prospective EDAM Entity that has not yet executed an EDAM Addendum to EIM Entity Agreement may terminate its EDAM Entity Implementation Agreement at any time and for any reason in accordance with the terms of the EDAM Entity Implementation Agreement.

33.2.2 Implementation Date.

The CAISO and the prospective EDAM Entity shall work together to determine the EDAM Entity Implementation Date based on the complexity and compatibility of the Balancing Authority's transmission and technology systems with the CAISO systems and the planned timing of the CAISO's implementation of software enhancements. The EDAM Entity Implementation Date must be not less than six months and not more than twenty-four months after the date that the EDAM Entity Implementation Agreement between the CAISO and the Balancing Authority becomes effective in accordance with its terms. Once established, the EDAM Entity may request a change in the EDAM Entity Implementation Date to account for any circumstances that may affect the implementation timeline.

33.2.3 Market Simulation and Parallel Operations.

The CAISO and the prospective EDAM Entity will engage in (a) market simulation that accounts for the prospective EDAM Entity's implementation circumstances and (b) at least 30 days of parallel operations representing the Extended Day-Ahead Market to support the CAISO and the prospective EDAM Entity's implementation.

33.2.4 Reporting.

The CAISO will report on the CAISO Website periodically, but not less than once during market simulation, on progress towards completing the implementation activities and once again during parallel operations confirming completion of the implementation activities.

33.2.5 Implementation Activities.

The CAISO and the prospective EDAM Entity will complete the following implementation activities:

(A) **Execution of Necessary Agreements.** The prospective EDAM Entity has

complied with Section 33.2.1, executed any necessary agreements for operating as an EDAM Entity, and helped the CAISO secure necessary agreements with third party prospective EDAM Market Participants.

(B) **Operations Training.** Prior to the start of parallel operations as set forth in Section 33.2.3, all operations staff (including contractors or vendors) identified by the prospective EDAM Entity who will have responsibility for EDAM operations, market transactions and settlements, will have completed identified CAISO training modules.

(C) **Forecasting Capability.** The CAISO and, to the extent the prospective EDAM Entity will use its own forecasts or is otherwise required to provide forecasting information to the CAISO, the prospective EDAM Entity has demonstrated its respective forecasting capability through –

(i) the definition of day-ahead demand forecast boundaries based on the conforming and non-conforming load characteristics, as applicable;

(ii) the documentation of EDAM Entity's choice of day-ahead demand forecast provider and how the demand forecast will be completed;

(iii) the accuracy of the CAISO forecast of demand based on historical actual load data for the defined demand forecast boundaries;

(iv) the identification of weather stations locations used in forecasting, as applicable;

(v) the identification of the source of day-ahead Variable Energy Resource forecasts;

(vi) the accuracy of the day-ahead forecast of Variable Energy Resources;

(vii) the identification of all Hybrid Resources; and

(viii) the provision of CAISO historical data on day-ahead demand and renewable forecast information to fill the needed historical data period to produce the Imbalance Reserve requirements at the net load level.

(D) **Resource Sufficiency Evaluation.** The prospective EDAM Entity Scheduling

Coordinator demonstrates its ability to pass the Resource Sufficiency Evaluation for the prospective EDAM Entity's Balancing Authority Area.

(E) **Transmission Availability.** The prospective EDAM Entity confirms initial registration of the transmission rights of the EDAM Transmission Service Providers in its Balancing Authority Area available for EDAM Transfers or that otherwise may be scheduled in the Day-Ahead Market.

(F) **Historical Transmission Revenue Recovery.** The EDAM Entity provides the information and documentation necessary to account for the EDAM recoverable revenue pursuant to Section 33.26 associated with the EDAM Transmission Service Providers in its Balancing Authority Area.

(G) **Operating Procedures.** Prior to the start of parallel operations pursuant to Section 33.2.3, the CAISO and the prospective EDAM Entity have defined, completed, and tested operating procedures for the prospective EDAM Entity and its Scheduling Coordinator's participation in the Energy Imbalance Market.

(H) **System Readiness and Integration.**

(i) **System and Functional Testing.** The prospective EDAM Entity and the CAISO have tested the functional and system elements in accordance with functional and system testing documentation posted on the CAISO Website.

(ii) **Prospective EDAM Entity Identification.** The CAISO has established and the prospective EDAM Entity has tested all necessary SCIDs and Resource IDs established for the prospective EDAM Entity's Balancing Authority Area.

(iii) **Certificates and Access.** The prospective EDAM Entity has issued all necessary certificates to its employees, contractors and vendors that require system access to perform EDAM-related job functions.

(I) **Market Simulation and Structured Scenarios simulation.** The prospective EDAM Entity operations staff identified by the prospective EDAM Entity who will

have responsibility for EDAM operations, transactions and settlements, have executed and passed all structured scenarios provided by CAISO with all significant issues resolved.

(J) **Settlements.** The CAISO and the prospective EDAM Entity have demonstrated that –

(i) CAISO settlement statements and invoices match the operational data published to stakeholders or fed into settlement system and the resulting calculations correspond to the formulas defined in CAISO's tariff and Business Practice Manuals.

(ii) CAISO settlement statements and invoices allocates charges and credits to its customers accurately reflecting system and market data during parallel operations.

(K) **Parallel Operations Plan.** The period of parallel operations specified in Section 33.2.3 runs consistently and in accordance with the prospective EDAM Entity specific parallel operations plan.

33.2.6 Readiness.

No later than 10 days prior to the prospective EDAM Entity Implementation Date as established in the EDAM Entity Implementation Agreement, the CAISO will determine, in consultation with the prospective EDAM Entity, whether prospective EDAM Entity will be ready for the prospective EDAM Entity's participation in the Extended Day-Ahead Market on the EDAM Entity Implementation Date as contemplated by the implementation activities in Section 33.2.5.

33.2.7 Delay.

If the CAISO or the prospective EDAM Entity determines that either cannot proceed with implementation on the EDAM Entity Implementation Date, the CAISO and the prospective EDAM Entity will establish a new EDAM Entity Implementation Date as soon as it can be determined and reflect that date in an amended version of the EDAM Entity Implementation Agreement.

* * * * *

33.4 Roles And Responsibilities ~~[Not Used]~~

Section 4 will apply to EDAM Market Participants to the extent their roles and responsibilities are included in the Extended Day-Ahead Market, in addition to the provisions in this Section 33.4.

(a) Nothing in this Section 33 will alter the CAISO's responsibilities under the other sections of the CAISO Tariff, under any agreement not required by Section 33, or under NERC Reliability Standards, any other NERC requirements or criteria, or any other Applicable Reliability Criteria as the Balancing Authority for the CAISO Balancing Authority Area and the transmission operator for the CAISO Controlled Grid. During any interruption of the normal operation of the Day-Ahead Market, the CAISO as Balancing Authority will remain responsible for managing the resources in its Balancing Authority Area and the flows on transmission lines internal to the CAISO Balancing Authority Area, including imports and exports, for the duration of the interruption.

(b) Nothing in this Section 33 will alter an EDAM Entity's responsibilities under NERC Reliability Standards and any other NERC requirements or criteria as the Balancing Authority for the EDAM Entity Balancing Authority Area and, to the extent applicable, as the transmission operator for transmission facilities within its Balancing Authority Area. During any interruption of the normal operation of the Day-Ahead Market, the EDAM Entity as Balancing Authority will remain responsible in accordance with Section 33.7 for managing the resources in its Balancing Authority Area and the flows on internal transmission lines, including imports into and exports out of its Balancing Authority Area, for the duration of the interruption.

(c) An EDAM Transmission Service Provider will remain the transmission service provider in accordance with its tariff and will be responsible to manage transmission sales, reservations, and schedules on its transmission system in accordance with the EDAM Transmission Service Provider tariff.

(d) The CAISO will remain the transmission service provider for transmission capacity on the CAISO Controlled Grid in accordance with the CAISO Tariff.

33.4.1 EDAM Entity

An EDAM Entity must be a Balancing Authority registered and certified as such under the applicable authorities and execute an EDAM Addendum to EIM Entity Agreement no later than

ninety (90) days before the EDAM Entity Implementation Date. Upon receipt of such notice, the CAISO will undertake all necessary preparations to disable operation of the Day-Ahead Market within the EDAM Entity Balancing Authority Area, as outlined in the Business Practice Manual for the Extended Day-Ahead Market, including issuance of a Market Notice within five Business Days after receipt of such notice.

An EDAM Entity must:

(a) perform the obligations of an EDAM Entity in accordance with the EDAM Addendum to EIM Entity Agreement, Section 33, and other provisions of the CAISO Tariff that apply to EDAM Entities, subject to the limitations specified in Section 33.1;

(b) determine and inform the CAISO about all Load Serving Entities within the EDAM Entity's Balancing Authority Area necessary to enable operation of the Day-Ahead Market in its Balancing Authority Area;

(c) qualify as, or secure representation by, an EDAM Entity Scheduling Coordinator, provided that an EDAM Entity may not be represented by more than one EDAM Entity Scheduling Coordinator;

(d) provide the CAISO and its EDAM Entity Scheduling Coordinator with information regarding all Transmission Constraints of which it is aware;

(e) work with the CAISO to identify all resources within its Balancing Authority Area that do not currently participate in the Energy Imbalance Market pursuant to Section 29 so they can be represented in the Extended Day-Ahead Market as EDAM Resources and execute an EDAM Addendum to EIM Participating Resource Agreement pursuant to Section 33, which may be accomplished through execution of a separate EDAM Addendum to EIM Participating Resource Agreement or by including all or some of the resources under its EDAM Addendum to EIM Participating Resource Agreement;

(f) define Load Aggregation Points in its Balancing Authority Area and be responsible for serving the associated Demand, including for an EDAM Load Serving Entity in its Balancing Authority Area that will be separately responsible for serving the associated Demand;

(g) identify and inform the CAISO which resource types supported by the CAISO Markets are eligible to participate in the Day-Ahead Market as EDAM Resource Facilities;

(h) determine and inform the CAISO of EDAM Transmission Service Providers within the EDAM Entity Balancing Authority Area;

(i) serve as the entity that interacts with EDAM Transmission Service Providers within the EDAM Entity Balancing Authority Area; and

(j) inform the CAISO whether or not the EDAM Entity intends to utilize the CAISO's Demand Forecast consistent with Section 33.31.1.

33.4.2 EDAM Transmission Service Provider

An EDAM Transmission Service Provider must execute an EDAM Transmission Service Provider Agreement with the CAISO. An EDAM Transmission Service Provider that is not an EDAM Entity and no longer wishes to make transmission service available for use in the Day-Ahead Market may terminate the EDAM Transmission Service Provider Agreement pursuant to its terms only if such termination is concurrent with the termination of participation in the Day-Ahead Market by the EDAM Entity for the Balancing Authority Area within which the EDAM Transmission Service Provider operates or holds transmission rights.

An EDAM Transmission Service Provider must:

(a) perform the obligations of an EDAM Transmission Service Provider in accordance with the EDAM Transmission Service Provider Agreement, Section 33, and other provisions of the CAISO Tariff that apply to EDAM Transmission Service Providers;

(b) have provisions in effect in the EDAM Transmission Service Provider's tariff, as necessary or applicable, to enable operation of the Day-Ahead Market, including an obligation for customers of the EDAM Transmission Service Provider to have a Scheduling Coordinator for purposes of interfacing with the CAISO;

(c) use the EDAM Entity Scheduling Coordinator as the sole Scheduling Coordinator for the EDAM Transmission Service Provider;

(d) provide information about transmission capacity available to the Day-Ahead Market to its EDAM Entity Scheduling Coordinator and the CAISO; and

(e) ensure transmission customers of the EDAM Transmission Service Provider that will submit schedules in the Day-Ahead Market secure representation by a Scheduling Coordinator.

33.4.3 EDAM Entity Scheduling Coordinator

An EDAM Entity Scheduling Coordinator must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator, and enter into an EDAM Addendum to EIM Entity Scheduling Coordinator Agreement with the CAISO, which will satisfy the obligation to enter into a Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the EDAM Entity.

An EDAM Entity Scheduling Coordinator may represent a Market Participant other than an EDAM Entity if it enters into a Scheduling Coordinator Agreement under Section 4.5.1 with regard to such Market Participant or more than one EDAM Entity if it has certified to the CAISO in the manner described in the Business Practice Manual for the Extended Day-Ahead Market that it has informed each EDAM Entity it represents of the multiple representation. However, an EDAM Entity Scheduling Coordinator may not also be an EDAM Resource Scheduling Coordinator or a Scheduling Coordinator for a Participating Generator, Participating Load, Demand Resource Provider, or Load Serving Entity, unless the EDAM Entity Scheduling Coordinator is a transmission provider subject to the standards of conduct set forth in 18 C.F.R. § 358, is a governmental entity that agrees to comply with standards of conduct equivalent to those set forth in 18 C.F.R. § 358, or is a generation-only balancing authority that has implemented procedures equivalent to the protections offered under the standards of conduct that specifically include procedures addressing the no-conduit rule to preclude non-public transmission function information that may be received from being passed to employees that satisfy the definition of a "Marketing Function Employee."

33.4.4 EDAM Resource

The owner or operator of each resource in an EDAM Entity Balancing Authority Area is required to participate in the Day-Ahead Market and is required to register its resource with the CAISO as an EDAM Resource Facility if it is capable of delivering Energy, Imbalance Reserves, Reliability

Capacity, Flexible Ramping Product, other Ancillary Services, curtailable Demand, or Demand Response Services (or similar services) that may be committed in the Day-Ahead and committed for dispatch in the Real-Time Market as provided in the CAISO Tariff and the Business Practice Manual for the Extended Day-Ahead Market.

33.4.4.1 EDAM Addendum to EIM Participating Resource Agreement. An EDAM Resource must (a) perform the obligations of an EDAM Resource under the EDAM Addendum to EIM Participating Resource Agreement and Section 33, and (b) perform the obligations applicable to Market Participants and resources under the provisions of the CAISO Tariff described in Section 33.1. An EDAM Resource Facility must be listed in an executed EDAM Addendum to EIM Participating Resource Agreement.

33.4.4.2 EDAM Resource and the Energy Imbalance Market. An EDAM Resource Facility must also be registered as an EIM Resource pursuant to Section 29 and participate in the Real-Time Market as an EIM Participating Resource through representation by an EIM Participating Resource Scheduling Coordinator. Resource non-participation as provided under Section 29 is no longer an option.

33.4.5 EDAM Resource Scheduling Coordinator.

Each EDAM Resource must be represented by an EDAM Resource Scheduling Coordinator. An EDAM Resource Scheduling Coordinator must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator, and enter into an EDAM Addendum to EIM Participating Resource Scheduling Coordinator Agreement with the CAISO (in addition to an EIM Participating Resource Scheduling Coordinator Agreement if it has not done so already), which will satisfy the obligation to enter into a Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the EDAM Resource.

An EDAM Resource Scheduling Coordinator may represent more than one EDAM Resource or a Market Participant other than an EDAM Resource, but only if it enters into a Scheduling Coordinator Agreement under Section 4.5.1 with regard to such Market Participant. However, an EDAM Resource Scheduling Coordinator may not also be an EDAM Entity Scheduling Coordinator unless the EDAM Resource Scheduling Coordinator is a transmission provider

subject to the standards of conduct set forth in 18 C.F.R. § 358, is a governmental entity that agrees to comply with standards of conduct equivalent to those set forth in 18 C.F.R. § 358, or is a generation-only balancing authority that has implemented procedures equivalent to the protections offered under the standards of conduct that specifically include procedures addressing the no-conduit rule to preclude non-public transmission function information that may be received from being passed to employees that satisfy the definition of a "Marketing Function Employee."

An EDAM Resource Scheduling Coordinator must (a) perform the obligations of an EDAM Resource Scheduling Coordinator under the EDAM Addendum to EIM Participating Resource Scheduling Coordinator Agreement and Section 33, (b) perform the obligations of a Scheduling Coordinator under the provisions of the CAISO Tariff described in Section 33.1(c), (c) ensure that the entity it represents has obtained any transmission service necessary to participate in the Extended Day-Ahead Market under the terms of the CAISO Tariff or the tariff of another transmission service provider, as applicable, and (d) register in the manner set forth in the Business Practice Manual for the Extended Day-Ahead Market all EDAM Resources that it represents, provide such information to the EDAM Entity Scheduling Coordinator, and update such information with the CAISO in a timely manner.

33.4.6 EDAM Load Serving Entity

All Load in an EDAM Entity Balancing Authority Area must be represented by an EDAM Load Serving Entity. An EDAM Load Serving Entity will be responsible for Load in the Day-Ahead Market and the Real-Time Market, including the submission of Bids and Settlement of Demand, in accordance with Section 33 and Section 29, and must be represented by an EDAM Load Serving Entity Scheduling Coordinator.

33.4.7 EDAM Load Serving Entity Scheduling Coordinator

An EDAM Load Serving Entity Scheduling Coordinator must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator, and enter into a Scheduling Coordinator Agreement with the CAISO, which will satisfy the obligation to enter into a Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the

EDAM Load Serving Entity.

An EDAM Load Serving Entity Scheduling Coordinator may represent more than one EDAM Load Serving Entity or a Market Participant other than an EDAM Load Serving Entity, but only if it enters into a Scheduling Coordinator Agreement under Section 4.5.1 with regard to such Market Participant. However, an EDAM Load Serving Entity Scheduling Coordinator may not also be an EDAM Entity Scheduling Coordinator unless the EDAM Load Serving Entity Scheduling Coordinator either is a transmission provider subject to the standards of conduct set forth in 18 C.F.R. § 358, a governmental entity that agrees to comply with standards of conduct equivalent to those set forth in 18 C.F.R. § 358, or a generation-only balancing authority that has implemented procedures equivalent to the protections offered under the standards of conduct that specifically include procedures addressing the no-conduit rule to preclude non-public transmission function information that may be received from being passed to employees that satisfy the definition of a "Marketing Function Employee".

An EDAM Load Serving Entity Scheduling Coordinator must (a) perform the obligations of an EDAM Load Serving Entity Scheduling Coordinator under the applicable Scheduling Coordinator Agreement and Section 33, (b) perform the obligations of a Scheduling Coordinator under the provisions of the CAISO Tariff described in Section 33.1, (c) ensure that Load it represents has secured any transmission service necessary to participate in the Extended Day-Ahead Market under the terms of the applicable EDAM Transmission Service Provider tariff, and (d) register the EDAM Demand that it represents in the manner set forth in the Business Practice Manual for the Extended Day-Ahead Market, provide such information to the EDAM Entity Scheduling Coordinator, and update such information with the CAISO in a timely manner.

33.4.8 Scheduling Coordinator Representation

The Scheduling Coordinator for an EDAM Entity must be the same as the Scheduling Coordinator for the corresponding EIM Entity to ensure alignment between representation of the Balancing Authority Area in the Day-Ahead Market and the Real-Time Market. The Scheduling Coordinator for an EDAM Resource must be the same as the Scheduling Coordinator for the corresponding EIM Participating Resource to ensure alignment between representation of resources in the Day-

Ahead Market and the Real-Time Market. Similarly, an EDAM Load Serving Entity Scheduling Coordinator will be responsible for Settlement of the Demand in the Real-Time Market it represents in the Day-Ahead Market. If the Demand represented by an EDAM Load Serving Entity Scheduling Coordinator is also associated with an EIM Sub-Entity, the Scheduling Coordinator must also represent the Demand for the EIM Sub-Entity in the Real-Time Market.

* * * * *

APPENDIX B.27

EDAM ADDENDUM TO EIM ENTITY AGREEMENT

Effective [Date], [Full Legal Name] ("[Short Legal Name]") and the California Independent System Operator Corporation ("CAISO") (collectively the "Parties") make and enter into this EDAM Addendum to the Parties' [Date] EIM Entity Agreement (the "Agreement").

WHEREAS:

A. Pursuant to the Agreement, [Short Legal Name] participates as an EIM Entity in the CAISO's Real-Time Market and provides Energy Imbalance Market services within the EIM Entity Balancing Authority Area, including Real-Time transfers of Energy among the CAISO Balancing Authority Area and other EIM Entity Balancing Authority Areas;

B. The CAISO also operates the Day-Ahead Market pursuant to the CAISO Tariff, which the CAISO will extend to an EIM Entity that enters into an EDAM Entity Implementation Agreement; and

C. [Short Legal Name] has entered into an EDAM Entity Implementation Agreement to extend its participation to the CAISO's Day-Ahead Market and to provide Extended Day-Ahead Market services within the EDAM Entity Balancing Authority Area, including Day-Ahead transfers of Energy, Reliability Capacity, and Imbalance Reserves among the CAISO Balancing Authority Area and other EDAM Entity Balancing Authority Areas.

NOW, THEREFORE, for good and sufficient consideration, the receipt of which is hereby acknowledged, the Parties agree that the Agreement is hereby supplemented as follows:

1. **Agreement to be Bound by CAISO Tariff.** Section 33 of the CAISO Tariff is incorporated into the Agreement and made a part thereof.

2. **Interpretation.** All references in the Agreement to the "EIM" or the "Energy Imbalance Market" will also be read as references to the "EDAM" or the "Extended Day-Ahead Market." All references in the Agreement to the "Real-Time Market" will also be read as references to the "Day-Ahead Market." All references in the Agreement to an "EIM Entity" will also be read as references to an "EDAM Entity." All references in the Agreement to "EIM Entity Scheduling Coordinator(s)" will also be read as references to the "EDAM Entity Scheduling Coordinator(s)." All references to "non-participating resources" will also be read as references to "EDAM Resources." All references in the Agreement to Sections 29 or 29.1(d) of the CAISO Tariff will also be read as references to Sections 33 or 33.1.1 of the CAISO Tariff, respectively.

3. **Effective Date and Termination.** This EDAM Addendum will be effective as of the later of the date it is executed by the Parties and shall remain in full force and effect until terminated pursuant to the same process as is set forth in Section 3.2 of the Agreement. If [Short Legal Name] terminates its participation as an EDAM Entity, it may continue to participate as an EIM Entity under the terms of the Agreement.

4. **Miscellaneous.** Except as expressly modified by this EDAM Addendum, all other terms and conditions of the Agreement shall remain unchanged and in full force and effect.

[Full Legal Name]

By: _____

Printed Name: _____

Title: _____

Date: _____

California Independent System Operator Corporation

By: _____

Printed Name: _____

Title: _____

Date: _____

APPENDIX B.28

EDAM ADDENDUM TO EIM ENTITY SCHEDULING COORDINATOR AGREEMENT

Effective [Date], [Full Legal Name] ("[Short Legal Name]") and the California Independent System Operator Corporation ("CAISO") (collectively the "Parties") make and enter into this EDAM Addendum to the Parties' [Date] EIM Entity Scheduling Coordinator Agreement (the "Agreement").

WHEREAS:

A. Pursuant to the Agreement, [Short Legal Name] is certified as an EIM Entity Scheduling Coordinator by the CAISO under the certification procedure referenced in Section 29 of the CAISO Tariff;

B. The CAISO also operates the Day-Ahead Market pursuant to the CAISO Tariff;

C. [Short Legal Name] has chosen to extend its role as a Scheduling Coordinator in the EIM to the CAISO Day-Ahead Market so that it can represent an EDAM Entity under the terms and conditions set forth in Section 33 of the CAISO Tariff; and

D. [Short Legal Name] has applied for certification or has been certified as an EDAM Entity Scheduling Coordinator by the CAISO under the certification procedure referenced in Section 33 of the CAISO Tariff.

NOW, THEREFORE, for good and sufficient consideration, the receipt of which is hereby acknowledged, the Parties agree that the Agreement is hereby supplemented as follows:

1. **Agreement to be Bound by CAISO Tariff.** Section 33 of the CAISO Tariff is incorporated into the Agreement and made a part thereof.

2. **Interpretation.** All references in the Agreement to the "EIM" or the "Energy Imbalance Market" will also be read as references to the "EDAM" or the "Extended Day-Ahead Market." All references in the Agreement to "EIM Entity Scheduling Coordinator(s)" will also be read as references to the "EDAM Entity Scheduling Coordinator(s)." All references in the Agreement to Section 29 of the CAISO Tariff will also be read as references to Section 33 of the CAISO Tariff.

3. **Effective Date and Termination.** This EDAM Addendum will be effective as of the later of the date it is executed by the Parties and shall remain in full force and effect until terminated pursuant to the same process as is set forth in Section 3.2 of the Agreement. If [Short Legal Name] terminates its participation as an EDAM Entity Scheduling Coordinator, it may continue to participate as an EIM Entity Scheduling Coordinator under the terms of the Agreement.

4. **Miscellaneous.** Except as expressly modified by this EDAM Addendum, all other terms and conditions of the Agreement shall remain unchanged and in full force and effect.

[Full Legal Name]

By: _____

Printed Name: _____

Title: _____

Date: _____

California Independent System Operator Corporation

By: _____

Printed Name: _____

Title: _____

Date: _____

APPENDIX B.29

EDAM ADDENDUM TO EIM PARTICIPATING RESOURCE AGREEMENT

Effective [Date], [Full Legal Name] ("[Short Legal Name]") and the California Independent System Operator Corporation ("CAISO") (collectively the "Parties") make and enter into this EDAM Addendum to the Parties' [Date] EIM Participating Resource Agreement (the "Agreement").

WHEREAS:

A. Pursuant to the Agreement, [Short Legal Name] has participated or will participate as an EIM Participating Resource in the CAISO's Real-Time Market and is located in an EDAM Entity Balancing Authority Area;

B. The CAISO also operates the Day-Ahead Market pursuant to the CAISO Tariff; and

C. [Short Legal Name] extends its participation to the CAISO's Day-Ahead Market in accordance with the EDAM Entity's open access transmission tariff or the tariff of another transmission service provider within the EDAM Entity Balancing Authority Area.

NOW, THEREFORE, for good and sufficient consideration, the receipt of which is hereby acknowledged, the Parties agree that the Agreement is hereby supplemented as follows:

1. **Agreement to be Bound by CAISO Tariff.** Section 33 of the CAISO Tariff is incorporated herein and made a part hereof.

2. **Interpretation.** All references in the Agreement to the "EIM" or the "Energy Imbalance Market" will also be read as references to the "EDAM" or the "Extended Day Ahead Market." All references in the Agreement to an "EIM Entity" will also be read as references to an "EDAM Entity." All references in the Agreement to "EIM Participating Resource(s)" will also be read as references to the "EDAM Resource(s)." All references in the Agreement to "EIM Resources" will also be read as references to "EDAM Resource Facilities." All references in the Agreement to an "EIM Participating Resource Scheduling Coordinator" will also be read as references to an "EDAM Resource Scheduling Coordinator." All references in the Agreement to Section 29 of the CAISO Tariff will also be read as references to Section 33 of the CAISO Tariff.

3. **EDAM Resource Facilities.** Schedule 1 of the Agreement will be updated to include all EDAM Resource Facilities not already included in Schedule 1 as an EIM Resource.

4. **Effective Date and Termination.** This EDAM Addendum will be effective as of the later of the date it is executed by the Parties and shall remain in full force and effect until terminated pursuant to the same process as is set forth in Section 3.2 of the Agreement. If [Short Legal Name] terminates its participation as an EDAM Resource, it may continue to participate as an EIM Participating Resource under the terms of the Agreement.

5. **Miscellaneous.** Except as expressly modified by this EDAM Addendum, all other terms and conditions of the Agreement shall remain unchanged and in full force and effect.

[Full Legal Name]

By: _____

Printed Name: _____

Title: _____

Date: _____

California Independent System Operator Corporation

By: _____

Printed Name: _____

Title: _____

Date: _____

APPENDIX B.30

EDAM ADDENDUM TO EIM PARTICIPATING RESOURCE SCHEDULING COORDINATOR AGREEMENT

Effective [Date], [Full Legal Name] ("[Short Legal Name]") and the California Independent System Operator Corporation ("CAISO") (collectively the "Parties") make and enter into this EDAM Addendum to the Parties' [Date] EIM Participating Resource Scheduling Coordinator Agreement (the "Agreement").

WHEREAS:

A. Pursuant to the Agreement, [Short Legal Name] is certified as an EIM Participating Resource Scheduling Coordinator by the CAISO under the certification procedure referenced in Section 29 of the CAISO Tariff and represents EIM Participating Resources in an EDAM Entity Balancing Authority Area;

B. [Short Legal Name] extends its role as an EIM Participating Resource Scheduling Coordinator to the CAISO Day-Ahead Market so that it can represent EDAM Resources under the terms and conditions set forth in Section 33 of the CAISO Tariff; and

C. [Short Legal Name] has applied for certification or has been certified as an EDAM Resource Scheduling Coordinator by the CAISO under the certification procedure referenced in Section 33 of the CAISO Tariff.

NOW, THEREFORE, for good and sufficient consideration, the receipt of which is hereby acknowledged, the Parties agree that the Agreement is hereby supplemented as follows:

1. **Agreement to be Bound by CAISO Tariff.** Section 33 of the CAISO Tariff is incorporated into the Agreement and made a part thereof.

2. **Interpretation.** All references in the Agreement to the "EIM" or the "Energy Imbalance Market" will also be read as references to the "EDAM" or the "Extended Day-Ahead Market." All references in the Agreement to the "Real-Time Market" will also be read as references to the "Extended Day-Ahead Market." All references in the Agreement to "EIM Participating Resources" will also be read as references to "EDAM Resources." All references in the Agreement to "EIM Participating Resource Scheduling Coordinator(s)" will also be read as references to the "EDAM Resource Scheduling Coordinator(s)." All references in the Agreement to Section 29 of the CAISO Tariff will also be read as references to Section 33 of the CAISO Tariff.

3. **Effective Date and Termination.** This EDAM Addendum will be effective as of the later of the date it is executed by the Parties and shall remain in full force and effect until terminated pursuant to the same process as is set forth in Section 3.2 of the Agreement. If [Short Legal Name] terminates its participation as an EDAM Resource Scheduling Coordinator, it may continue to participate as an EIM Participating Resource Scheduling Coordinator under the terms of the Agreement.

4. **Miscellaneous.** Except as expressly modified by this EDAM Addendum, all other terms and conditions of the Agreement shall remain unchanged and in full force and effect.

[Full Legal Name]

By: _____

Printed Name: _____

Title: _____

Date: _____

California Independent System Operator Corporation

By: _____

Printed Name: _____

Title: _____

Date: _____

Appendix B.31 EDAM Entity Implementation Agreement

THIS EXTENDED DAY-AHEAD MARKET ENTITY IMPLEMENTATION AGREEMENT ("Agreement") is established this _____ day of _____, _____, and is accepted by and between:

(1) [Full legal name] having its registered and principal executive office at [address] ("[Short Legal Name]" or "EDAM Entity"),

and

(2) California Independent System Operator Corporation, a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate, ("CAISO").

The EDAM Entity and the CAISO each are hereinafter referred to as the "Parties."

Whereas:

A. The CAISO operates the Day-Ahead Market pursuant to the CAISO Tariff, and will extend the Day-Ahead Market to an EIM Entity that executes and performs in accordance with an EDAM Entity Implementation Agreement.

B. [Short Legal Name] is an EIM Entity, or is in a concurrent implementation process to become an EIM Entity, and has requested to participate in the CAISO's Day-Ahead Market as an EDAM Entity.

C. The Parties acknowledge that the rules and procedures governing participation in the CAISO's Day-Ahead Market as an EDAM Entity are set forth in the provisions of the CAISO Tariff as filed with the Federal Energy Regulatory Commission ("FERC") and that implementation as an EDAM Entity requires corresponding revisions to [Short Legal Name's] Open Access Transmission Tariff/retail distribution tariff and the execution of associated service agreements;

D. Implementation of participation by [Short Legal Name] in the CAISO's Day-Ahead Market as an EDAM Entity requires the CAISO to incur costs to set up its business and software systems on behalf of [Short Legal Name].

E. [Short Legal Name] has requested the CAISO to conduct or cause to be performed work to implement [Short Legal Name] as an EDAM Entity into the CAISO systems, and [Short Legal Name] will reimburse the CAISO for the actual costs incurred.

F. The Parties are entering into this Agreement to set forth the terms upon which the CAISO will timely configure its systems to incorporate [Short Legal Name] as an EDAM Entity on or before [date] ("EDAM Entity Implementation Date").

NOW, THEREFORE, in consideration of the mutual covenants contained herein, the Parties agree as follows:

ARTICLE I

DEFINITIONS AND INTERPRETATION

1.1 Master Definitions Supplement. All terms and expressions used in this Agreement shall have the same meaning as those contained in the Master Definitions Supplement to the CAISO Tariff.

1.2 Rules of Interpretation. The following rules of interpretation and conventions shall apply to this Agreement:

(a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;

(b) the singular shall include the plural and vice versa;

(c) the masculine shall include the feminine and neutral and vice versa;

(d) "includes" or "including" shall mean "including without limitation";

(e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;

(f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;

(g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;

(h) unless the context otherwise requires, any reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;

(i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;

(j) any reference to a day, week, month or year is to a calendar day, week, month or year;

(k) unless the context requires otherwise, "or" is used in the conjunctive sense; and

(l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

ARTICLE II

RESPONSIBILITIES OF EDAM ENTITY AND CAISO

2.1 Scope of Responsibilities. The CAISO shall conduct or cause to be performed changes to the CAISO business and software systems, in accordance with the CAISO Tariff, to allow [Short Legal Name] to participate in the CAISO's Day-Ahead Market as an EDAM Entity. The

scope of the implementation will include planning and project management; full network modeling of resources; system integration and testing; metering and settlements; and operations readiness and training. The CAISO shall also provide [Short Legal Name] a project plan of implementation activities, including a schedule by which information and data will be required to be sent to the CAISO; testing to be performed by [Short Legal Name]; and training to meet the EDAM Entity Implementation Date.

2.2 Implementation Deposit and Cost Allocation. Consistent with Section 33.11.5 of the CAISO tariff, [Short Legal Name] will provide a deposit and pay the actual costs of the implementation, including any actual amounts in excess of the initial deposit. The CAISO will provide invoices and refunds on a timely basis. Any difference between the deposit(s) made toward the implementation of [Short Legal Name] and associated administrative costs, and the actual cost of the implementation of [Short Legal Name] shall be paid by or refunded to [Short Legal Name], in accordance with Article V of this Agreement.

2.3 Technical Data. [Short Legal Name] will provide the CAISO technical data to facilitate the implementation in the Day-Ahead Market as an EDAM Entity and assumptions used for the data, such as system conditions, existing and planned generation, and unit modeling. The CAISO shall not be responsible for any additional costs, including, without limitation, costs of new or additional facilities, system upgrades, or schedule changes, that may be incurred by [Short Legal Name] as a result of implementation in the Day-Ahead Market as an EDAM Entity.

2.4 Compliance with CAISO Tariff Requirements for an EDAM Entity. Prior to the EDAM Entity Implementation Date, [Short Legal Name] will satisfy all requirements of the CAISO Tariff applicable to an EDAM Entity, including: (1) demonstrating that [Short Legal Name] satisfies all qualifications for participation as an EDAM Entity; (2) showing that [Short Legal Name] is authorized to make transmission available in its Balancing Authority Area consistent with the CAISO Tariff and the applicable transmission service tariffs, contracts, rules, procedures or other arrangements; (3) entering into an addendum to its EIM Entity Agreement with the CAISO governing [Short Legal Name's] participation in the Extended Day-Ahead Market; and (4) securing representation by an EDAM Entity Scheduling Coordinator.

ARTICLE III

TERM AND TERMINATION

3.1 Effective Date. This Agreement shall be effective as of the later of the date it is executed by the Parties or the date it is accepted for filing and made effective by FERC (if applicable) and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.

3.2 Termination

3.2.1 Termination by CAISO. The CAISO may terminate this Agreement by giving written notice of termination pursuant to Section 33.1 of the CAISO Tariff or in the event that [Short Legal Name] commits any material default under this Agreement or Section 33 of the CAISO Tariff that, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given [Short Legal Name] written notice of the default, unless the default is excused by reason of Uncontrollable Forces in accordance with Article IX of this Agreement. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if (1) the filing of the notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

3.2.2 Termination by EDAM Entity. In the event that [Short Legal Name] no longer wishes to participate in the CAISO's Extended Day-Ahead Market as an EDAM Entity pursuant to the CAISO Tariff, it may terminate this Agreement on giving the CAISO not less than thirty (30) days written notice. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if (1) the request to file a notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within thirty (30) days of receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination or upon the next production date of the Full-Network Model release following the thirty (30) days after the CAISO's receipt of [Short Legal Name]'s notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

3.3 No Termination Charge. With the exception of the implementation costs, the CAISO shall not levy an exit fee or other charge associated with CAISO systems, procedures, or other changes required by the termination of [Short Legal Name]'s participation in the Extended Day-Ahead Market as of the effective date of such notice, provided that [Short Legal Name] obligations incurred under this Agreement shall survive termination until satisfied.

ARTICLE IV

CAISO TARIFF

4.1 Agreement Subject to CAISO Tariff. This Agreement shall be subject to Section 33 of the

CAISO Tariff and all other provisions of the CAISO Tariff applicable to an EDAM Entity.

ARTICLE V

COSTS AND ACCOUNTING

5.1 Costs. The CAISO shall maintain records and accounts of all costs incurred in performing the implementation of the EDAM Entity in sufficient detail to allow verification of all costs incurred, including associated overheads.

5.2 Settlement of Deposit(s). The deposit provided in accordance with Section 2.2 of this Agreement shall be applied to the prudent costs of the CAISO in implementing [Short Legal Name] as an EDAM Entity in the Day-Ahead Market. If the actual costs of the implementation of [Short Legal Name] are greater than the initial deposit provided by [Short Legal Name], the CAISO will invoice [Short Legal Name] for an additional deposit amount to cover expenses. Payment of invoices shall be due no later than thirty (30) days after the date of receipt. Any invoice payment past due will accrue interest, per annum, calculated in accordance with 5 C.F.R. 1315.10.

At the end of the implementation, the CAISO will provide a report that details deposit(s) received, actual costs incurred, and applicable interest earnings (on deposit balance) for each implementation project. Interest will be calculated at the end of the implementation project, from the time the deposit(s) was received until the implementation is completed. The calculation will be based on the average earning of the bank account, in which the deposit is held, on the remaining amount of the deposit. Any unused deposit remaining after the implementation is completed plus interest on the remaining deposit will be returned to [Short Legal Name] within ninety (90) calendar days after the implementation is completed; the CAISO and [Short Legal Name] approve the completion; and all required documents for the refund are received by the CAISO. All refunds will be processed following the CAISO's generally accepted accounting practices. Any deadline for CAISO action will be tolled to the extent [Short Legal Name] has not provided the CAISO with the appropriate documents to facilitate an eligible refund.

In the event this agreement is terminated by either party or both parties after [Short Legal Name]'s implementation has begun, then the CAISO will make every attempt to halt work and related costs on the implementation as soon as practical and begin the refund process for any payments provided by [Short Legal Name] in excess of costs incurred by the CAISO, if applicable.

5.3 Audit. [Short Legal Name] shall have the right, upon reasonable notice, within a reasonable time at the CAISO's offices and at its own expense, to audit the CAISO's records as necessary and as appropriate in order to verify costs incurred by the CAISO. Any audit requested by [Short Legal Name] shall be completed, and written notice of any audit dispute provided to the CAISO representative, within one hundred eighty (180) calendar days following receipt by [Short Legal Name] of the CAISO's notification of the final costs of the implementation of [Short Legal Name].

ARTICLE VI

DISPUTE RESOLUTION

6.1 Dispute Resolution. The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to [Short Legal Name] and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE VII

REPRESENTATIONS AND WARRANTIES

7.1 Representation and Warranties. Each Party represents and warrants that the execution, delivery and performance of this Agreement has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.

7.2 Necessary Approvals. [Short Legal Name] represents that all necessary rights, leases, approvals, permits, licenses, easements, access to operate in compliance with this Agreement have been or will be obtained by [Short Legal Name] prior to the effective date of this Agreement, including any arrangement with any third party Balancing Authorities.

ARTICLE VIII

LIABILITY

8.1 Liability. The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to [Short Legal Name] and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE IX

UNCONTROLLABLE FORCES

9.1 Uncontrollable Forces Tariff Provisions. Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to [Short Legal Name] and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE X

MISCELLANEOUS

10.1 Assignments. Either Party may assign or transfer any or all of its rights or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights or obligations under this Agreement as if said successor in interest were an original Party to this Agreement.

10.2 Notices. Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to [Short Legal Name] and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.

10.3 Waivers. Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.

10.4 Governing Law and Forum. This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that

any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.

10.5 Consistency with Federal Laws and Regulations. This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.

10.6 Merger. This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.

10.7 Severability. If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.

10.8 Amendments. This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the Federal Power Act ("FPA") and pursuant to FERC's rules and regulations promulgated thereunder, and [Short Legal Name] shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.

10.9 Electronic Signatures. The Parties agree that this Agreement may be executed by either handwritten signature or digitally signed using Adobe Sign, Adobe E-Sign, or DocuSign. A digital signature is the same as a handwritten signature and shall be considered valid and acceptable.

10.10 Counterparts. This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.

California Independent System Operator Corporation

By: _____

Name: _____

Title: _____

Date: _____

[NAME OF PROSPECTIVE EDAM ENTITY]

By: _____

Name: _____

Title: _____

Date: _____

SCHEDULE 1

NOTICES

[Section 10.2]

[Short Legal Name]

Name of Primary

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

CAISO

Name of Primary

Representative: Regulatory Contracts

Title: N/A

Address: 250 Outcropping Way

City/State/Zip Code: Folsom, CA 95630

Email address: RegulatoryContracts@caiso.com

Phone: (916) 351-4400

Fax: (916) 608-5063

Name of Alternative

Representative: Christopher J. Sibley

Title: Manager, Regulatory Contracts

Address: 250 Outcropping Way

City/State/Zip Code: Folsom, CA 95630

Email address: csibley@caiso.com

Phone: (916) 608-7030

Fax: (916) 608-5063

Appendix B.32 EDAM Load Serving Entity Agreement (EDAMLSEA)

THIS EXTENDED DAY-AHEAD MARKET LOAD SERVING ENTITY AGREEMENT ("AGREEMENT") is established this _____ day of _____, _____ and is accepted by and between:

[Full legal name] ("EDAM Load Serving Entity"), **[legal description]** having its registered and principal executive office at [**address**],

and

California Independent System Operator Corporation ("CAISO"), a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate.

The EDAM Load Serving Entity and the CAISO are hereinafter referred to as the "Parties."

Whereas:

A. The CAISO operates the Day-Ahead Market and Real-Time Market pursuant to the CAISO Tariff.

B. The EDAM Load Serving Entity is responsible for Load within an EDAM Entity Balancing Authority Area not represented by an EDAM Entity and authorized by the EDAM Entity to represent its Load in the Day-Ahead Market and Real-Time Market; and

C. The Parties wish to enter into this Agreement to establish the terms and conditions for participation in the CAISO's Day-Ahead Market and Real-Time Market by the EDAM Load Serving Entity in accordance with Section 33 and Section 29 of the CAISO Tariff.

NOW THEREFORE, in consideration of the mutual covenants set forth herein, the Parties agree as follows:

ARTICLE I

DEFINITIONS AND INTERPRETATION

1.1 Master Definitions Supplement. All terms and expressions used in this Agreement shall have the same meaning as those contained in the Master Definitions Supplement to the CAISO Tariff.

1.2 Rules of Interpretation. The following rules of interpretation and conventions shall apply to this Agreement:

(a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;

(b) the singular shall include the plural and vice versa;

(c) the masculine shall include the feminine and neutral and vice versa;

(d) "includes" or "including" shall mean "including without limitation";

(e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;

(f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;

(g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;

(h) unless the context otherwise requires, any reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;

(i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;

(j) unless the context otherwise requires, "or" is used in the conjunctive sense;

(k) any reference to a day, week, month or year is to a calendar day, week, month or year; and

(l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

[***1.3 EDAM Load Serving Entity's Non-Jurisdictional Status.*** *The CAISO acknowledges that the EDAM Load Serving Entity is a exempt/non-jurisdictional entity as described in section 201(f) of the Federal Power Act, 16 U.S.C. 824(f), and understands that this Agreement does not extend the authority that FERC has over the EDAM Load Serving Entity apart from any authority it has to interpret or enforce this Agreement.*]

ARTICLE II

RESPONSIBILITIES OF EDAM LOAD SERVING ENTITY

2.1 EDAM Load Serving Entity Scheduling Coordinator. The EDAM Load Serving Entity shall be represented by an EDAM Load Serving Entity Scheduling Coordinator, which may be the EDAM Load Serving Entity or another entity certified by the CAISO to perform the functions of an EDAM Load Serving Entity Scheduling Coordinator.

2.2 EDAM Load Serving Entity Information. The EDAM Load Serving Entity shall provide information regarding its Load to the CAISO for Extended Day-Ahead Market purposes, in accordance with the CAISO Tariff and applicable Business Practice Manuals. The EDAM Load Serving Entity is responsible for the accuracy and completeness of this information.

ARTICLE III

TERM AND TERMINATION

3.1 Effective Date. This Agreement shall be effective as of the later of the date it is executed by the Parties or the date it is accepted for filing and made effective by FERC, if such FERC filing is required, and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.

3.2 Termination

3.2.1 Termination by CAISO. Subject to Section 10.2, the CAISO may terminate this Agreement by giving written notice of termination in the event that (i) the EDAM Load Serving Entity commits any material default under this Agreement and/or the CAISO Tariff which, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given written notice of the default, unless excused by reason of Uncontrollable Forces in accordance with Article IX of this Agreement, or (ii) the EDAM Entity for the Balancing Authority Area in which the EDAM Load Serving Entity is located terminates participation in the CAISO's Extended Day-Ahead Market. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement was filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the filing of the notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if filed with FERC, or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

3.2.2 Termination by EDAM Load Serving Entity. In the event that the EDAM Load Serving Entity no longer wishes to participate in the CAISO's Extended Day-Ahead Market, it may terminate this Agreement, on giving the CAISO not less than ninety (90) days written notice. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the request to file a notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within thirty (30) days of receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if such notice is required to be filed with FERC, or upon ninety (90) days after the CAISO's receipt of the EDAM Load Serving Entity's notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

ARTICLE IV

CAISO TARIFF

4.1 Agreement Subject to CAISO Tariff. This Agreement shall be subject to Section 33 and Section 29 of the CAISO Tariff, which shall be deemed to be incorporated herein. The EDAM Load Serving Entity shall abide by, and shall perform all of the obligations under the CAISO Tariff placed on EDAM Load Serving Entities in respect of all matters set forth therein.

ARTICLE V

COSTS

5.1 Operating and Maintenance Costs. The EDAM Load Serving Entity shall be responsible for all its costs incurred in connection with meeting its obligations under this Agreement.

ARTICLE VI

DISPUTE RESOLUTION

6.1 Dispute Resolution. The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Load Serving Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE VII

REPRESENTATIONS AND WARRANTIES

7.1 Representation and Warranties. Each Party represents and warrants that the execution, delivery and performance of this Agreement has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.

7.2 Necessary Approvals. The EDAM Load Serving Entity represents that all necessary rights, leases, approvals, permits, licenses, easements, access to operate in compliance with this Agreement have been or will be obtained by the EDAM Load Serving Entity prior to the effective date of this Agreement, including any arrangement with the EDAM Entity for the Balancing Authority Area in which the EDAM Load Serving Entity is located and any third party Balancing Authorities.

ARTICLE VIII

LIABILITY

8.1 Liability. The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EDAM Load Serving Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE IX

UNCONTROLLABLE FORCES

9.1 Uncontrollable Forces Tariff Provisions. Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Load Serving Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE X

MISCELLANEOUS

10.1 Assignments. Either Party may assign or transfer any or all of its rights or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the

CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest were an original Party to this Agreement.

10.2 Notices. Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Load Serving Entity and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1 of this Agreement. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.

10.3 Waivers. Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.

10.4 Governing Law and Forum. This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.

10.5 Consistency with Federal Laws and Regulations. This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.

10.6 Merger. This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.

10.7 Severability. If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.

10.8 Amendments. This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and

regulations promulgated thereunder, and the EDAM Load Serving Entity shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.

[***10.9 Federal Provisions.*** *The CAISO hereby affirmatively agrees to incorporate into this Agreement the federal law provisions as provided by the EDAM Load Serving Entity and previously agreed to by the CAISO.*]

10.10 Electronic Signatures. The Parties agree that this Agreement may be executed by either handwritten signature or digitally signed using Adobe Sign, Adobe E-Sign, or DocuSign. A digital signature is the same as a handwritten signature and shall be considered valid and acceptable.

10.11 Counterparts. This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.

California Independent System Operator Corporation

By: _____

Name: _____

Title: _____

Date: _____

[NAME OF EDAM LOAD SERVING ENTITY]

By: _____

Name: _____

Title: _____

Date: _____

SCHEDULE 1

NOTICES

[Section 10.2]

EDAM Load Serving Entity

Name of Primary

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

CAISO

Name of Primary

Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative

Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Appendix B.33 EDAM Transmission Service Provider Agreement (EDAMTSPA)

THIS EXTENDED DAY-AHEAD MARKET TRANSMISSION SERVICE PROVIDER AGREEMENT ("AGREEMENT") is established this _____ day of _____, _____ and is accepted by and between:

[Full legal name] ("EDAM Transmission Service Provider"), **[legal description]** having its registered and principal executive office at [**address**],

and

California Independent System Operator Corporation ("CAISO"), a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate.

The EDAM Transmission Service Provider and the CAISO are hereinafter referred to as the "Parties."

Whereas:

A. The CAISO operates the Day-Ahead Market for Energy pursuant to the CAISO Tariff;

B. The EDAM Transmission Service Provider is a transmission service provider that owns transmission or has transmission service rights on an EDAM Intertie or within an EDAM Entity Balancing Authority Area, provides transmission service, and that makes transmission service available for use in the Day-Ahead Market through an EDAM Entity. (The term "EDAM Transmission Provider" does not include network integration transmission service customers or other transmission customers of an EDAM Transmission Service Provider, EDAM Legacy Contract Rights or EDAM Transmission Ownership Rights); and

C. The Parties wish to enter into this Agreement to establish the terms and conditions for participation in the CAISO's Day-Ahead Market by the EDAM Transmission Service Provider in accordance with Section 33 of the CAISO Tariff.

NOW THEREFORE, in consideration of the mutual covenants set forth herein, the Parties agree as follows:

ARTICLE I

DEFINITIONS AND INTERPRETATION

1.1 Master Definitions Supplement. All terms and expressions used in this Agreement shall have the same meaning as those contained in the Master Definitions Supplement to the CAISO Tariff.

1.2 Rules of Interpretation. The following rules of interpretation and conventions shall apply to this Agreement:

(a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;

(b) the singular shall include the plural and vice versa;

(c) the masculine shall include the feminine and neutral and vice versa;

(d) "includes" or "including" shall mean "including without limitation";

(e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;

(f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;

(g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;

(h) unless the context otherwise requires, any reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;

(i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;

(j) unless the context otherwise requires, "or" is used in the conjunctive sense;

(k) any reference to a day, week, month or year is to a calendar day, week, month or year; and

(l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

ARTICLE II

RESPONSIBILITIES OF EDAM TRANSMISSION SERVICE PROVIDER

2.1 Agreement Subject to CAISO Tariff. This Agreement shall be subject to Section 33 of the CAISO Tariff, which shall be deemed to be incorporated herein. The EDAM Transmission Service Provider shall abide by, and shall perform all of the obligations under the CAISO Tariff placed on EDAM Transmission Service Providers in respect of all matters set forth therein.

ARTICLE III

TERM AND TERMINATION

3.1 Effective Date. This Agreement shall be effective as of the later of the date it is executed by the Parties or the date it is accepted for filing and made effective by FERC, if such FERC filing is required, and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.

3.2 Termination

3.2.1 Termination by CAISO. Subject to Section 9.2, the CAISO may terminate this Agreement by giving written notice of termination in the event that (i) the EDAM Transmission Service Provider commits any material default under this Agreement and/or the CAISO Tariff which, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given, to the EDAM Transmission Service Provider, written notice of the default, unless excused by reason of Uncontrollable Forces in accordance with Article VII of this Agreement, or (ii) the EDAM Entity for the Balancing Authority Area in which the EDAM Transmission Service Provider is located terminates participation in the CAISO's Extended Day-Ahead Market. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement was filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the filing of the notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if filed with FERC, or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

3.2.2 Termination by EDAM Transmission Service Provider. In the event that the EDAM Transmission Service Provider no longer wishes to make transmission service available for use in the Day-Ahead Market through an EDAM Entity, it may terminate this Agreement on giving the CAISO not less than one-hundred and eighty (180) days written notice and so long as such termination is concurrent with the termination of participation in the Day-Ahead Market by the EDAM Entity for the Balancing Authority Area within which the EDAM Transmission Service Provider operates or holds transmission rights. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the request to file a notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within thirty (30) days of receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if such notice is required to be filed with FERC, or upon ninety (90) days after the CAISO's receipt of the EDAM Transmission Service Provider's notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

ARTICLE IV

COSTS

4.1 Operating and Maintenance Costs. The EDAM Transmission Service Provider shall be responsible for all its costs incurred in connection with meeting its obligations under this Agreement.

ARTICLE V

DISPUTE RESOLUTION

5.1 Dispute Resolution. The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall

adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Transmission Service Provider, and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE VI

REPRESENTATIONS AND WARRANTIES

6.1 Representation and Warranties. Each Party represents and warrants that the execution, delivery and performance of this Agreement by it have been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.

6.2 Necessary Approvals. The EDAM Transmission Service Provider represents that all necessary rights, leases, approvals, permits, licenses, easements, access to operate in compliance with this Agreement have been or will be obtained by the EDAM Transmission Service Provider prior to the effective date of this Agreement, including any arrangement with the EDAM Entity within which the EDAM Transmission Service provider operates or holds transmission rights or third party Balancing Authorities.

ARTICLE VII

LIABILITY

7.1 Liability. The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EDAM Transmission Service Provider, and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE VIII

UNCONTROLLABLE FORCES

8.1 Uncontrollable Forces Tariff Provisions. Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Transmission Service Provider, and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE IX

MISCELLANEOUS

9.1 Assignments. Either Party may assign or transfer any or all of its rights or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest were an original Party to this Agreement.

9.2 Notices. Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff,

provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EDAM Transmission Service Provider, and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.

9.3 Waivers. Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.

9.4 Governing Law and Forum. This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.

9.5 Consistency with Federal Laws and Regulations. This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.

9.6 Merger. This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.

9.7 Severability. If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.

9.8 Amendments. This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the EDAM Transmission Service Provider shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate

fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.

9.9 Electronic Signatures. The Parties agree that this Agreement may be executed by either handwritten signature or digitally signed using Adobe Sign, Adobe E-Sign, or DocuSign. A digital signature is the same as a handwritten signature and shall be considered valid and acceptable.

9.10 Counterparts. This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.

California Independent System Operator Corporation

By: _____

Name: _____

Title: _____

Date: _____

[NAME OF EDAM TRANSMISSION SERVICE PROVIDER]

By: _____

Name: _____

Title: _____

Date: _____

SCHEDULE 1

NOTICES

[Section 9.2]

EDAM Transmission Service Provider

Name of Primary

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative

Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

CAISO

Name of Primary

Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative

Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Attachment B-2 – Marked Tariff Language – Effective May 1, 2025

Day-Ahead Market Enhancements and Extended Day-Ahead Market

California Independent System Operator Corporation

August 22, 2023

Section 4

4. Roles and Responsibilities

* * * * *

4.5 Responsibilities of a Scheduling Coordinator

4.5.1 Scheduling Coordinator Certification

Only Scheduling Coordinators that the CAISO has certified as having met the requirements of this Section 4.5.1 may participate in the ~~CAISO's Energy and Ancillary Services markets~~Day-Ahead Market or Real-Time Market or ~~and~~ submit Supply Plans or RA Plans. Scheduling Coordinators offering Ancillary Services shall additionally meet the requirements of Section 8.

Each Scheduling Coordinator shall:

(a) demonstrate to the CAISO's reasonable satisfaction that it is capable of performing the functions of a Scheduling Coordinator under this CAISO Tariff including (without limitation) the functions specified in Sections 4.5.3 and 4.5.4 as applicable;

(b) identify each of the Eligible Customers (including itself if it trades for its own account) which it is authorized to represent as Scheduling Coordinator and confirm that the metering requirements under Section 10 are met in relation to each Eligible Customer that it represents under this CAISO Tariff;

(c) identify each of the Convergence Bidding Entities that it is authorized to represent as Scheduling Coordinator;

(d) confirm that each of the End-Use Customers it represents is eligible for service as a Direct Access End User;

(e) confirm that none of the Wholesale Customers it represents is ineligible for wholesale transmission service pursuant to the provisions of FPA Section 212(h);

(f) demonstrate to the CAISO's reasonable satisfaction that it meets the financial criteria set out in Section 12;

(g) enter into a Scheduling Coordinator Agreement with the CAISO; and

(h) provide NERC tagging data, as applicable.

* * * * *

4.5.3 Responsibilities of a Scheduling Coordinator

Each Scheduling Coordinator shall be responsible for:

4.5.3.1 Obligation to Pay

Paying the CAISO's charges in accordance with this CAISO Tariff;

4.5.3.2 Submit Bids and Interchange Schedules

4.5.3.2.1 Submitting Bids, including Self-Schedules, ~~for Energy~~ in CAISO Markets that relate to the Market Participants for which it serves as Scheduling Coordinator;

4.5.3.2.2 Submitting Interchange Schedules prepared in accordance with all NERC, WECC and CAISO requirements, including providing E-Tags for all applicable transactions pursuant to WECC practices. The CAISO shall not accept E-Tags for ten-minute recallable reserve transactions (i.e., transactions with a WECC energy product code of "C-RE"). The CAISO is not, and shall not be listed as, the "Purchasing Selling Entity" for purposes of E-Tags. Title to Energy shall pass directly from the entity that holds title when the Energy enters the CAISO Controlled Grid to the entity that removes the Energy from the CAISO Controlled Grid, in each case in accordance with the terms of this CAISO Tariff.

4.5.3.3 Modifications in Demand Supply

Coordinating and allocating modifications in Demand and exports and Generation and imports at the direction of the CAISO in accordance with this CAISO Tariff;

4.5.3.4 Inter-SC Trades

Submitting any applicable Inter-SC Trades that the Market Participants intend to have settled through the CAISO Markets, pursuant to this CAISO Tariff;

4.5.3.5 Tracking and Settling Trades

Tracking and settling all intermediate trades, including bilateral transactions and Inter-SC Trades, among the entities for which it serves as Scheduling Coordinator;

4.5.3.6 Ancillary Services

Providing Ancillary Services in accordance with Section 8;

4.5.3.7 [Not Used]

4.5.3.8 Business Practice Manuals

Complying with all CAISO Business Practice Manuals and ensuring compliance by each of the Market Participants which it represents with all applicable provisions of the Business Practice Manuals;

4.5.3.9 Interruptible Imports

Identifying any Interruptible Imports included in its Bids or Inter-SC Trades;

4.5.3.10 Participating Intermittent Resources

Submitting Bids, including Self-Schedules, for Participating Intermittent Resources consistent with the CAISO Tariff;

4.5.3.11 Day-Ahead Market Published Schedules and Awards

Starting-up units and timely achieving specified operating levels in response to Dispatch Instructions, in accordance with CAISO published Schedules and awards;

4.5.3.12 Financial Responsibility

Assuming financial responsibility for all Schedules, AS Awards and Dispatch Instructions issued in the CAISO Markets, and all Virtual Awards in accordance with the provisions of this CAISO Tariff;

4.5.3.13 Compliance with Environmental Constraints, Operating Permits and Applicable Law

Submitting Bids so that any service provided in accordance with such Bids does not violate environmental constraints, operating permits or applicable law. All submitted Bids must reflect resource limitations and other constraints as such are required to be reported to the CAISO Control Center;

4.5.3.14 Tax Compliance

Providing, as described in the Business Practice Manuals, resale certificates or other proof acceptable to CAISO that its purchases of energy are exempt from any sales and use taxes that otherwise might apply; and

4.5.3.15 SQMD Plan

Complying with the SQMD Pan for eligible entities it serves pursuant to Section 10.3.7.

4.5.3.16 RA Plans and Supply Plans

Providing RA Plans for LSEs or CPEs for which it serves as Scheduling Coordinator and providing Supply Plans for Resource Adequacy Resources for which it serves as Scheduling Coordinator. If a CPE is also a Load Serving Entity and the CPE and Load Serving Entity are represented by the same Scheduling Coordinator, that Scheduling Coordinator must use distinct Scheduling Coordinator ID Codes for its activities related to the CPE and Load Serving Entity functions.

4.5.4 Operations of a Scheduling Coordinator

4.5.4.1 Maintain Twenty-four (24) Hour Scheduling Centers

Each Scheduling Coordinator other than a Scheduling Coordinator that represents only Convergence Bidding Entities shall operate and maintain a twenty-four (24) hour, seven (7) days per week, scheduling center. Each Scheduling Coordinator shall designate a senior member of staff as its scheduling center manager who shall be responsible for operational communications with the CAISO and who shall have sufficient authority to commit and bind the Scheduling Coordinator.

4.5.4.2 [Not Used]

4.5.4.3 Dynamic Scheduling

4.5.4.3.1 Dynamic Scheduling of Imports

Scheduling Coordinators may submit Bids for imports of Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services ~~Energy and Ancillary Services~~ for which associated Energy is delivered from Dynamic System Resources located outside of the CAISO Balancing Authority Area, provided that: (a) such dynamic scheduling is technically feasible and consistent with NERC and WECC reliability standards and any requirements of the NRC, (b) all operating, technical, and business requirements for dynamic scheduling functionality, as set forth in the Dynamic Scheduling Protocol in Appendix M or posted in standards on the CAISO Website, are satisfied, (c) the Scheduling Coordinator for the Dynamic System Resource executes a Dynamic Scheduling Agreement for Scheduling Coordinators as provided in Appendix B.5 with the CAISO for the operation of dynamic scheduling functionality, and (d) all affected Balancing Authorities each execute with the CAISO a Dynamic Scheduling Host Balancing Authority Operating Agreement as provided in Appendix B.9, or a special operating agreement particular to the operation of dynamic functionality.

4.5.4.3.2 Dynamic Scheduling of Exports of Energy

Scheduling Coordinators may submit Bids for Dynamic Schedules of exports of Energy from Generating Units located in the CAISO Balancing Authority Area, provided that: (a) such dynamic scheduling is technically feasible and consistent with NERC and WECC reliability standards and any requirements of the NRC, (b) all operating, technical, and business requirements for dynamic scheduling functionality, as set forth in the Dynamic Scheduling Protocol in Appendix M or posted in standards on the CAISO Website, are satisfied, (c) the Scheduling Coordinator for the Generating Unit executes a Dynamic Scheduling Agreement for Scheduling Coordinators as provided in Appendix B.5 with the CAISO for the operation of dynamic scheduling functionality, and (d) all affected Balancing Authorities each execute with the CAISO an operating agreement particular to the operation of dynamic functionality. Scheduling Coordinators may not submit Bids for Dynamic Schedules of exports of Ancillary Services from resources located in the CAISO Balancing Authority Area, nor may Scheduling Coordinators submit Bids for Dynamic Schedules of exports from Loads located in the CAISO Balancing Authority Area.

4.5.4.4 Termination of Scheduling Coordinator Agreement and Suspension of Certification

(a) A Scheduling Coordinator's Scheduling Coordinator Agreement may be terminated by the CAISO on written notice to the Scheduling Coordinator:

(i) if the Scheduling Coordinator no longer meets the requirements for eligibility set out in Section 4.5 and fails to remedy the default within a period of five (5) Business Days after the CAISO has given written notice of the default;

(ii) if the Scheduling Coordinator fails to pay any sum under this CAISO Tariff and fails to remedy the default within a period of five (5) Business Days after the CAISO has given written notice of the default;

(iii) if the Scheduling Coordinator commits any other default under this CAISO Tariff or any of the CAISO Business Practice Manuals which, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given it written notice of the default; or

(iv) if the Scheduling Coordinator does not participate in the CAISO's markets for Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services ~~Energy~~

~~or Ancillary Services~~ for a period of twelve (12) consecutive months and fails to comply with the provisions of Section 4.5.4.4.2 within 120 days after the CAISO has given it written notice of the CAISO's intent to terminate its Scheduling Coordinator Agreement.

(b) A Scheduling Coordinator's Scheduling Coordinator Agreement may be terminated by the Scheduling Coordinator on sixty (60) days written notice to the CAISO, provided that such notice shall not be effective to terminate the Scheduling Coordinator Agreement until the Scheduling Coordinator has complied with all applicable requirements of Section 4.5.2.

(c) The CAISO shall, following termination of a Scheduling Coordinator Agreement and within thirty (30) days of being satisfied that no sums remain owing by the Scheduling Coordinator under the CAISO Tariff, return or release to the Scheduling Coordinator, as appropriate, any money or credit support provided by such Scheduling Coordinator to the CAISO under Section 12.

4.5.4.4.1 Pending the effective date of termination of service pursuant to Section 4.5.4.5.1, the CAISO will suspend the certification of a Scheduling Coordinator which has received a notice of termination under Section 4.5.4.4(a) and the Scheduling Coordinator will not be eligible to participate in the CAISO's markets for Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services~~Energy and Ancillary Services markets~~.

4.5.4.4.2 A Scheduling Coordinator that has received a notice of the CAISO's intent to terminate its Scheduling Coordinator Agreement for failure to participate in the CAISO's markets for ~~Energy and Ancillary Services~~ Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services for a period of twelve (12) consecutive months pursuant to Section 4.5.4.4(a)(iv) will avoid having its Scheduling Coordinator Agreement terminated and will have its certification reinstated if it completes the testing and training required for Scheduling Coordinator certification as set forth in the applicable Business Practice Manual within 120 days after the CAISO's issuance of the notice of intent to terminate.

4.5.4.5 Notification of Termination

The CAISO shall, promptly after providing written notice of default to a Scheduling Coordinator as

specified in Section 4.5.4.4(a), notify the Scheduling Coordinators that could be required to represent End User Eligible Customers of the Scheduling Coordinator under Section 4.5.4.6.2 if the default is not cured. The CAISO shall, as soon as reasonably practicable following the occurrence of any of the events specified in Section 4.5.4.4, notify the Scheduling Coordinator and the Scheduling Coordinators that could be required to represent End User Eligible Customers of the defaulting Scheduling Coordinator, and the UDCs, and shall as soon as reasonably practicable after the issuance of such notice of termination post such notice on the CAISO Website. Termination of the Scheduling Coordinator Agreement will automatically remove the Scheduling Coordinator's certification under Section 4.5 and Section 8.4.

4.5.4.5.1 Filing of Notice of Termination

Any notice of termination given pursuant to Section 4.5.4.4 shall also be filed by the CAISO with FERC, if required by FERC rules, if the non-compliance is not remedied within the period specified in Section 4.5.4.4, and it shall be effective in accordance with FERC rules.

4.5.4.6 Continuation of Service on Termination

4.5.4.6.1 Option for Eligible Customers to choose a new Scheduling Coordinator

When the CAISO suspends the certification of a Scheduling Coordinator pending termination, Eligible Customers of the defaulting Scheduling Coordinator shall be entitled to select another Scheduling Coordinator to represent them. The CAISO will post notice of any suspension on the CAISO Website. Until the CAISO is notified by another Scheduling Coordinator that it represents an Eligible Customer of the defaulting Scheduling Coordinator, the Eligible Customer of the defaulting Scheduling Coordinator will receive interim service in accordance with Section 4.5.4.6.2.

4.5.4.6.2 Interim Service

The CAISO shall maintain a list of Scheduling Coordinators willing to represent Eligible Customers of a defaulting Scheduling Coordinator, which list may be differentiated by UDC service area. Scheduling Coordinators who indicate to the CAISO their desire to be on such list shall be placed thereon by the CAISO in random order.

(a) When the CAISO suspends the certification of a Scheduling Coordinator in accordance with Section 4.5.4.4.1, Eligible Customers of the defaulting Scheduling Coordinators shall be assigned to all Scheduling Coordinators on the list established pursuant to this

Section 4.5.4.6.2 in a non-discriminatory manner to be established by the CAISO, and each Eligible Customer shall thereafter be represented by the Scheduling Coordinator to which it is assigned unless and until it selects another Scheduling Coordinator in accordance with Section 4.5.4.6.1, subject to this Section 4.5.4.6.2 subsection (b).

(b) Unless the CAISO is notified by another Scheduling Coordinator that it represents an Eligible Customer of a defaulting Scheduling Coordinator within seven (7) days of the notice of termination being posted on the CAISO Website, the Scheduling Coordinator to which that Eligible Customer has been assigned in accordance with subsection (a) may establish a reasonable minimum period for service, not to exceed thirty (30) days.

(c) In the event no Scheduling Coordinator indicates its willingness to represent Eligible Customers of a defaulting Scheduling Coordinator, the UDC that has the obligation to serve End-Use Customers of the Eligible Customer, if any, shall arrange to serve those End-Use Customers of such Eligible Customers that are located within the service area of the UDC. Such service will be provided in a manner consistent with that which the UDC provides, pursuant to the rules and tariffs of the Local Regulatory Authority, for its bundled End-Use Customers.

(d) This Section shall not in any way require a UDC to provide or arrange for Scheduling Coordinator service for wholesale Eligible Customers.

* * * * *

4.6.3 Requirements for Certain Participating Generators

4.6.3.1 Participating Generators Directly Connected to a Distribution System

With regard to any Generating Unit directly connected to a Distribution System, a Participating Generator shall comply with applicable UDC tariffs, requirements of the Local Regulatory Authority, interconnection requirements and generation agreements. With regard to a Participating Generator's Generating Units directly connected to a Distribution System, the CAISO and the UDC or MSS, as applicable, will coordinate to develop procedures to avoid conflicting CAISO and UDC or MSS, as applicable, operational

directives.

4.6.3.2 Exemption for Generating Units Less Than One (1) MW

A Generator with a Generating Unit directly connected to a Distribution System will be exempt from compliance with this Section 4.6 and Section 10.1.3 in relation to that Generating Unit provided that (i) the rated capacity of the Generating Unit is less than one (1) MW, and (ii) the Generator does not use the Generating Unit to participate in the CAISO Markets. This exemption in no way affects the calculation of or any obligation to pay the appropriate charges or to comply with all the other applicable Sections of this CAISO Tariff. A Generating Unit with a rated capacity of less than 500 kW, unless the Generating Unit is (a) participating in an aggregation agreement approved by the CAISO or (b) a storage resource with a rated capacity of 100 kW or more, is not eligible to participate in the CAISO Markets and the Generator is not a Participating Generator for that Generating Unit.

With regard to any Generating Unit directly connected to a UDC system, a Participating Generator shall comply with applicable UDC tariffs, interconnection requirements and generation agreements. With regard to a Participating Generator's Generating Units directly connected to a UDC system, the CAISO and the UDC will coordinate to develop procedures to avoid conflicting CAISO and UDC operational directives. With regard to Regulatory Must-Take Generation, the CAISO will honor applicable terms and conditions of existing agreements, including Existing QF Contracts, as specified in Section 4.6.3.2. Qualifying Facilities that are not Regulatory Must-Take Generation subject to an Existing QF Contract shall comply with the requirements applicable to Participating Generators, as specified in Section 4.6.3.3.

4.6.3.3 Qualifying Facilities and Combined Heat and Power Resources

The owner or operator of (1) a Qualifying Facility, (2) a resource that is subject to an Amended QF Contract, or (3) a Combined Heat and Power Resource may satisfy the requirements of Section 4.6, to the extent applicable, by entering into Net Scheduled Participating Generator Agreement (Net Scheduled PGA) with the CAISO, in which case it shall comply with the provisions of the Net Scheduled PGA and Section 4.6.3.4. In order to be eligible to enter into the Net Scheduled PGA, a Participating Generator must demonstrate to the CAISO (a) that its Generating Unit (1) has established QF status pursuant to PURPA, (2) is a party to an Amended QF Contract; or (3) is a CHP Resource and (b) that the Self-provided Load of the Participating Generator that is served by the resource either (1) has and continues

through the term of the Net Scheduled PGA to have, standby service from a UDC or MSS Operator under terms approved by the Local Regulatory Authority or FERC, as applicable, or (2) is curtailed concurrently with any Outage of the Generation serving that Self-provided Load in an amount sufficient to cover that Outage.

4.6.3.4 Participating Generator with a Net Scheduled PGA

A Participating Generator that is eligible for and has entered into a Net Scheduled Participating Generator Agreement shall be subject to the provisions of this Section 4.6.3.4, as reflected in the terms of the Net Scheduled PGA.

4.6.3.4.1 Revenue Metering for a Net Scheduled Generating Unit

In accordance with the terms of the Net Scheduled PGA and Section 10.1.3.3, a Participating Generator that has entered into a Net Scheduled PGA may net the revenue metering value for the Generation produced by each Net Scheduled Generating Unit listed in the Net Scheduled PGA and the revenue metering value for the Demand of the Self-provided Load that is (i) served by the Net Scheduled Generating Unit and (ii) electrically located on the same side of the Point of Demarcation.

4.6.3.4.2 Telemetry for a Net Scheduled Generating Unit

A Participating Generator that has entered into a Net Scheduled PGA may satisfy the provisions of Section 7.6.1(d) for the installation of telemetry by installing telemetry at the Point of Demarcation for the purpose of recording the net impact of the Net Scheduled Generating Unit upon the CAISO Controlled Grid; provided that the installed telemetry satisfies the technical, functional, and performance requirements for telemetry set forth in the CAISO Tariff and the applicable Business Practice Manual.

4.6.3.4.3 Market and Settlement Processes for a Net Scheduled Generating Unit

For bidding, scheduling, billing, and Settlement purposes regarding the Net Scheduled Generating Unit Self-provided Load of a Participating Generator that has entered into a Net Scheduled PGA, measurements of Generation or Demand of the Net Scheduled Generating Unit shall be made at the Point of Demarcation. In all other respects, the Generation and Load of the Net Scheduled Generating Unit shall be subject to the applicable provisions of the CAISO Tariff regarding bidding, scheduling, billing, and Settlements.

4.6.3.4.4 Operating Requirements for a Net Scheduled Generating Unit

A Participating Generator that has entered into a Net Scheduled PGA shall abide by CAISO Tariff provisions regarding the CAISO's ability to dispatch or curtail Generation from the Net Scheduled Generating Units listed in its Net Scheduled PGA. The CAISO shall only dispatch or curtail a Net Scheduled Generating Unit of the Participating Generator: (a) to the extent the Participating Generator bids Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services ~~Energy or Ancillary Services~~ from the Net Scheduled Generating Unit into the CAISO Markets or the Energy is otherwise available to the CAISO under Section 40, subject to the restrictions on Dispatch Instructions or Operating Instructions set forth below; or (b) if the CAISO must dispatch or curtail the Net Scheduled Generating Unit in order to respond to an existing or imminent System Emergency or condition that would compromise CAISO Balancing Authority Area integrity or reliability as provided in Sections 7 and 7.6.1.

The CAISO will not knowingly issue a Dispatch Instruction or Operating Instruction to a Participating Generator that has entered into a Net Scheduled PGA that: (1) requires a Participating Generator to reduce its Generation below the delineated minimum operating limit, other than in a System Emergency; (2) conflicts with operating limitations provided to the CAISO by the Participating Generator; or (3) results in damage to the Participating Generator's equipment, provided that any such equipment limitation has been provided to the CAISO and incorporated in the Participating Generator's operating limitations. If the Participating Generator: (1) receives a Schedule which requires operation below the minimum operating limit, and (2) deviates from that Schedule to continue to operate at the minimum operating limit, it will not be subject to any penalties or sanctions as a result of operating at the minimum operating limit. The Participating Generator's consequences for deviating from Schedules in Real-Time will be governed by the CAISO Tariff.

The CAISO shall have the authority to coordinate and approve Generation Outage schedules for the Generating Unit(s) listed in a Net Scheduled PGA, in accordance with the provisions of Section 9.

4.6.3.5 [Not Used]

* * * * *

4.7 Relationship Between CAISO and Participating Loads

The CAISO shall only accept Bids for Supply of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services ~~Energy or Ancillary Services~~ or Submissions to Self-Provide Ancillary Services from Loads if such Loads are those of a Participating Load that has entered into a Participating Load Agreement with the CAISO and which meet standards adopted by the CAISO and published on the CAISO Website. The CAISO shall not accept submitted Bids for Supply of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services ~~Energy or Ancillary Services~~ from a Participating Load other than through a Scheduling Coordinator. The CAISO shall not accept Bids from Scheduling Coordinators for Participating Loads using the Non-Generator Resource model unless the resource owner or operator undertakes in writing, by entering into a Participating Load Agreement, to comply with all applicable provisions of this CAISO Tariff as they may be amended from time to time.

* * * * *

4.9.4 MSS Operator Responsibilities

The MSS Operator's MSS Agreement with the CAISO shall obligate the MSS Operator to comply with all provisions of the CAISO Tariff, as amended from time to time, applicable to the UDCs, including, without limitation, the applicable provisions of Section 4.4 and Section 7.7. In addition, recognizing the CAISO's responsibility to promote the efficient use and reliable operation of the CAISO Controlled Grid and the CAISO Balancing Authority Area consistent with the Applicable Reliability Criteria, each MSS Operator shall:

4.9.4.1 operate and maintain its facilities, in accordance with applicable safety and reliability standards, regulatory requirements, applicable operating guidelines, applicable rates, tariffs, statutes and regulations governing their provision of service to their End-Use Customers and Good Utility Practice so as to avoid any material adverse impact on the CAISO Controlled Grid, it being understood that, if the MSS Operator does not so operate and maintain its facilities and the CAISO concludes, after notice is provided to the MSS Operator, that such failure impairs or threatens to impair the reliability of the CAISO Controlled Grid, the CAISO may suspend MSS status, in accordance with this Section 4.9, until the MSS Operator demonstrates the ability and willingness to so operate and maintain its facilities;

4.9.4.2 provide the CAISO each year with a schedule of upcoming maintenance of facilities forming part of the MSS that will affect, or is reasonably likely to affect, the CAISO Controlled Grid in accordance with Section 9.3.6;

4.9.4.3 coordinate with the CAISO, Participating TOs, and Generators to ensure that the CAISO Controlled Grid Critical Protective Systems, including relay systems, are installed and maintained in order to function on a coordinated and complementary basis with the protective systems of the MSS, Participating TOs, and Generators, and notify the CAISO as soon as is reasonably possible of any condition that it becomes aware of that may compromise the CAISO Controlled Grid Critical Protective Systems;

4.9.4.4 be responsible for any Reliability Must-Run Generation and Voltage Support required for reliability of the MSS, including the responsibility for any costs of such Reliability Must-Run Generation, and Voltage Support and may satisfy this requirement through Generating Units owned by the MSS Operator or under contract to the MSS Operator; and

4.9.4.5 [Not Used]

4.9.4.6 be responsible for Congestion Management and transmission line Outages within or at the boundary of the MSS, and all associated costs of actions the MSS Operator has to take to resolve such Congestion internal to the MSS and not be responsible for Congestion Management elsewhere, except to the extent that a Scheduling Coordinator is delivering Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services ~~Energy, Ancillary Services, or RUC Capacity~~ to or from the MSS. An MSS Operator must notify and communicate with the CAISO regarding transmission line Outages to the extent such Outages impact the CAISO Controlled Grid.

4.9.5 Scheduling by or on Behalf of a MSS Operator

All Bids, including but not limited to Self-Schedules, submitted on behalf of an MSS Operator for the delivery of Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services to Loads connected to the MSS and for the delivery of Energy and Ancillary Services from Generating Units forming part of the MSS or System Units shall be submitted by a Scheduling Coordinator that complies with all applicable provisions of the CAISO Tariff, which Scheduling Coordinator may be the MSS Operator, provided that the MSS Operator complies with all applicable requirements for Scheduling Coordinators. A Scheduling

Coordinator shall separately identify Bids that it submits on behalf of an MSS Operator.

4.9.5.1 Without limiting the foregoing, the Scheduling Coordinator for the MSS must submit gross generation information for the System Unit, Generating Unit, and information regarding imports, exports and Gross Loads to the CAISO in the format and in accordance with the timelines applicable to other Scheduling Coordinators.

4.9.5.2 The Scheduling Coordinator for the MSS will designate, in discrete quantities and with prices for Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services~~both Ancillary Services and Energy~~: (1) Bids in the Day-Ahead Market and Real-Time Market (including Bids for internal Generation and internal Demand within the MSS), (2) Submissions to Self-Provide Ancillary Services or Bids for Regulation, Spinning Reserve, and Non-Spinning Reserve, capacity and associated Bid for Energy, or (3) any feasible combination thereof.

4.9.5.3 MSS Demand Forecast

The Scheduling Coordinator for the MSS shall provide CAISO with Demand forecasts of the MSS. To the extent that the Scheduling Coordinator does not provide requisite Demand Forecast for the MSS it represents, the CAISO shall produce a Demand Forecast for each MSS Load Take-Out Point.

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4.9.13 MSS Elections and Participation in CAISO Markets

MSS Operators must make an election or choice on ~~four~~ three (43) issues that govern the manner in which the MSS participates in the CAISO Markets. The MSS Operator must choose either: (i) net Settlements or gross Settlements, (ii) to Load follow or not Load follow with its generating resources, ~~(iii) to have its Load participate in the RUC procurement process or not have its Load participate in the RUC procurement process;~~ and (iiiv) whether or not to charge the CAISO for their Emissions Costs as provided in Section 11.7.4. The MSS Operator shall make annual elections regarding these ~~four~~ three (34) sets of options pursuant to the timeline specified for such elections in the Business Practice Manuals. ~~The default for the first twelve (12) months after this Section 4.9.13 and Section 36 become effective shall be: (1) non Load following; (2) gross Settlement; and (3) to opt-in to the RUC procurement process. In~~

~~subsequent years, the~~The MSS Operator's prior year election will be the default if the MSS Operator does not make a timely election, unless the MSS Operator has been found to have violated Load following ~~or RUC opt out~~ requirements and is no longer eligible for making such elections. If the MSS Operator fails to elect net Settlement as specified in Section 11.2.3.2, the default mechanism for all MSS Settlements shall be gross Settlement as specified in Section 11.2.3.1.

The Load following and ~~,~~ net or gross Settlement~~, and RUC procurement~~ elections of an MSS Operator change certain aspects of, but do not preclude, the participation of the MSS in the CAISO Markets. An MSS Operator may: (i) bid to supply Energy to, or purchase Energy from, the CAISO Markets, (ii) bid to provide available capacity in RUC, and (iii) bid or make a Submission to Self-Provide an Ancillary Service from a System Unit or from individual Generating Units, Participating Loads or Proxy Demand Resources within the MSS. An MSS Operator also may purchase Ancillary Services from CAISO or third parties to meet its Ancillary Service Obligations under the CAISO Tariff.

4.9.13.1 Gross or Net Settlement

An MSS Operator has the option to settle with the CAISO on either a gross basis or a net basis for its Load and generating resources. This election shall be made annually for a period consistent with annual CRR Allocation. If the MSS Operator elects net Settlement, then CRRs would be allocated on MSS net Load and the MSS may choose the MSS LAP as its CRR Sink in the first tiers of CRR Allocation. If the MSS Operator elects gross Settlement, then CRRs would be allocated on a gross Load basis and the MSS may not choose the MSS LAPs as its CRR Sink in the first tiers of CRR Allocation.

4.9.13.2 Load-Following or Non Load-Following Election

The MSS Operator has the option to elect to operate a System Unit or Generating Units in the MSS to follow its Load, provided that: (a) the Scheduling Coordinator for the MSS Operator shall remain responsible for purchases of Energy in accordance with the CAISO Tariff if the MSS Operator does not operate its System Unit or Generating Units and bid or schedule imports into the MSS, to match the metered Demand in the MSS and exports from the MSS; and (b) if the deviation between Generation and imports into the MSS and metered Demand and exports from the MSS exceeds the MSS Deviation Band, then the Scheduling Coordinator for the MSS Operator shall pay the additional amounts specified in Section 11.7. If an MSS Operator elects Load-following and net Settlements, all generating resources

within the MSS must be designated as Load-following resources. If an MSS Operator elects Load-following and gross Settlements, generating resources within the MSS can be designated as either Load-following or non-Load-following resources. Consistent with these requirements, the MSS Operator may also modify the designation of generating resources within the MSS within the timing requirements specified for such Master File changes as described in the Business Practice Manuals.

If the MSS Operator has elected gross Settlement and is a Load-following MSS: (i) it must designate in the Master File which of its generating resources are Load-following resources, (ii) it must complying with the additional bidding requirements in Section 30.5.2.5, and (iii) the generation resources designated as Load-following resources cannot set Real-Time prices. However, Load-following resources will be eligible to receive Bid Cost Recovery to ensure that the price paid for Energy dispatched by the CAISO is not less than the MSS Operator's accepted Bid price. Bid Cost Recovery for a Load-following MSS resource is only applicable to generation capacity provided to the CAISO Markets by that MSS resource and is not applicable for the generating capacity that is designated or used by an MSS Operator to follow its own Load.

An MSS Operator may designate RMR Resources as Load-following. Load-following RMR Resources must be available to the CAISO for Dispatch up to the RMR Contract Capacity specified in the RMR Contract. Energy shall be accounted for as a delivery from the MSS to the CAISO for the purposes of determining if the MSS Operator followed its metered Demand and exports from the MSS as described in this Section 4.9.13.2 except that Energy from an RMR Resources in a Day-Ahead Schedule can be used for Load-following to satisfy Day-Ahead scheduled Demand like any other non-RMR Resource Load-following resource. If no RMR Dispatch Notice is received for a Load-following RMR Resource, such Load-following RMR Resource may participate in the CAISO Markets as any other non-RMR Load-following resource subject to Section 30.5.2.5.

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4.12 Relationship of CAISO and Resource-Specific System Resources

The CAISO shall not accept Bids for any Resource-Specific System Resource otherwise than through a

Scheduling Coordinator. The CAISO shall further not be obligated to provide Bid Cost Recovery to any Resource-Specific System Resource unless the relevant Resource-Specific System Resource owner undertakes in writing, by entering into a Resource-Specific System Resource Agreement, to comply with all applicable provisions of this CAISO Tariff as they may be amended from time to time, including, without limitation, the applicable provisions of this Section 4.12. Except as otherwise provided in this Section 4.12, Resource-Specific System Resources shall have the same rights and obligations as other System Resources, including the ability to have Bids submitted for either full or partial output from the RSSR, provided that a Bid must be for at least the Minimum Load of the resource in order to be eligible for Bid Cost Recovery.

4.12.1 General Responsibilities

4.12.1.1 Operate Pursuant to Relevant Provisions of CAISO Tariff

Resource-Specific System Resource owners shall operate, or cause their facilities to be operated, in accordance with the relevant provisions of this CAISO Tariff, including but not limited to the following.

(i) A Resource-Specific System Resource shall only be eligible for Bid Cost Recovery if the Resource-Specific System Resource has complied with a Start-Up Instruction or Dispatch Instruction issued by the CAISO as specified in Section 11.8.

(ii) In order to be eligible for Bid Cost Recovery, a Resource-Specific System Resource owner shall ensure that its Scheduling Coordinator makes an election for Default Start-Up Bids and Default Minimum Load Bids pursuant to Sections 30.4 and 30.5.2.4.

(iii) A Resource-Specific System Resource owner shall ensure that any Ancillary Services Bids submitted by its Scheduling Coordinator are submitted in accordance with Section 30.5.2.6.

(iv) Owners of Dynamic Resource-Specific System Resources that are Resource Adequacy Resources shall comply with additional availability requirements to the extent required by Section 40.6.5.1.

(v) Each Resource-Specific System Resource owner shall immediately inform the CAISO, through its respective Scheduling Coordinator and using the CAISO's outage management system as described in Section 9, of any change or potential change in the

current status of any Resource-Specific System Resource that may affect a submitted Bid. This will include, but not be limited to, any change in status of equipment that could affect the maximum output of a Resource-Specific System Resource, the Minimum Load of a Resource-Specific System Resource, or the ability of a Resource-Specific System Resource to provide Ancillary Services in accordance with its Bid.

(vi) In the event that a Resource-Specific System Resource owner cannot meet its ~~Generation schedule as specified in the~~ Day-Ahead Schedule, or comply with a Dispatch Instruction, whether due to a Resource-Specific System Resource trip or the loss of a piece of equipment causing a reduction in capacity or output, the Resource-Specific System Resource owner shall notify the CAISO, through its Scheduling Coordinator, at once. If a Resource-Specific System Resource owner will not be able to meet a time commitment or requires the cancellation of a Resource-Specific System Resource Start-Up, it shall notify the CAISO, through its Scheduling Coordinator, at once.

4.12.1.2 Operate Pursuant to Relevant Operating Procedures

Resource-Specific System Resource owners shall operate, or cause their Resource-Specific System Resources and associated facilities to be operated, in accordance with the relevant Operating Procedures and Business Practice Manuals established by the CAISO.

4.12.2 Identification of Resource-Specific System Resources

Each Resource-Specific System Resource owner shall provide data identifying each of its Resource-Specific System Resources and such information regarding the capacity and the operating characteristics of the Resource-Specific System Resource as may be reasonably requested from time to time by the CAISO. All information provided to the CAISO regarding the operational and technical constraints in the Master File must be an accurate reflection of the design capabilities of the resources and its constituent equipment when operating at maximum sustainable performance over Minimum Run Time, recognizing that resource performance may degrade over time. Information registered in the Master File by a Scheduling Coordinator must also conform to any additional definitional requirements in Appendix A as may exist as to that information. ~~All information provided to the CAISO regarding the operation and technical constraints in the Master File shall be accurate and actually based on physical characteristics of~~

~~the resource.~~ Pursuant to Sections 8.9 and 8.10, the CAISO may verify, inspect and test the capacity and operating characteristics of the resource provided to the CAISO.

4.12.3 Telemetry Data to Demonstrate Compliance

The Resource-Specific System Resource owner shall provide SCADA data by telemetry to the CAISO EMS at the Resource-Specific System Resource owner's expense in order to demonstrate compliance with CAISO Start-Up Instructions in order to be eligible for BCR. Telemetry data from Dynamic Resource-Specific System Resources shall be provided in accordance with the requirements of the CAISO's Dynamic Scheduling Protocol in Appendix M. For Non-Dynamic Resource-Specific System Resources, the Resource-Specific System Resource owner shall have the option of providing the required telemetry data by transmittal directly to the CAISO EMS in accordance with the CAISO's standards for direct telemetry or by means of transmittal to the CAISO EMS through the EMS of its Host Balancing Authority Area by use of the inter-control center communications protocol (ICCP).

4.12.4 Recordkeeping

Resource-Specific System Resource owners shall provide to the CAISO such information and maintain such records as are reasonably required by the CAISO to implement the provisions of the CAISO Tariff applicable to Resource-Specific System Resources.

4.12.5 Access Rights

A Resource-Specific System Resource owner shall, at the request of the CAISO and upon reasonable notice, provide access to its facilities and records (including those relating to communications and telemetry) as necessary to permit the CAISO to perform such testing as is necessary to test the accuracy of any telemetry equipment upon which the Resource-Specific System Resource owner's performance is measured.

4.13 DRPs, RDRRs, and PDRs

4.13.1 Relationship Between CAISO and DRPs

Consistent with Section 30.6, the CAISO shall only accept Bids from Reliability Demand Response Resources and Proxy Demand Resources if such Reliability Demand Response Resources or Proxy Demand Resources are represented by a Demand Response Provider that has entered into a Demand Response Provider Agreement with the CAISO, has accurately provided the information required in the

Demand Response System, has satisfied all Reliability Demand Response Resource or Proxy Demand Resource registration requirements, and has met standards adopted by the CAISO and published on the CAISO Website. Reliability Demand Response Resources and Proxy Demand Resources may not participate in a Distributed Energy Resource Aggregation. The CAISO shall not accept ~~submitted~~ Bids ~~for Energy or Ancillary Services~~ from a Demand Response Provider other than through a Scheduling Coordinator, which Scheduling Coordinator may be the Demand Response Provider itself or another entity. Proxy Demand Response Resources providing Ancillary Services must submit Meter Data for the interval preceding, during, and following the Trading Interval(s) in which they were awarded Ancillary Services for the purposes of determining settlement pursuant to Section 8.10.8.

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4.17 Distributed Energy Resource Aggregations

4.17.1 Relationship with Distributed Energy Resource Providers

The CAISO will accept Bids ~~for Energy or Ancillary Services~~ from Distributed Energy Resource Aggregations ~~or submissions of Energy Self-Schedules from Distributed Energy Resource Aggregations,~~ only if such Distributed Energy Resource Aggregations are represented by a Distributed Energy Resource Provider that has entered into a Distributed Energy Resource Provider Agreement with the CAISO to comply with all applicable provisions of the CAISO Tariff as they may be amended from time to time. The CAISO will not accept Bids ~~for Energy or Ancillary Services~~ from a Distributed Energy Resource Aggregation other than through a Scheduling Coordinator. The Scheduling Coordinator may be the Distributed Energy Resource Provider itself or another entity.

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4.17.4 Identification of Distributed Energy Resources

Each Distributed Energy Resource Provider will provide information, as described in the Business Practice Manual, identifying each of its Distributed Energy Resource Aggregations and such information

regarding the location, capacity, operating characteristics and applicable Generation Distribution Factors of its Distributed Energy Resource Aggregation(s) as may be reasonably requested from time to time by the CAISO, and when the information changes due to the removal, addition, or modification of a Distributed Energy Resource or Distributed Curtailment Resource within the Distributed Energy Resource Aggregation. All information provided to the CAISO by a Distributed Energy Resource Provider regarding the operational and technical characteristics of its Distributed Energy Resource Aggregation(s) must be an accurate reflection of the design capabilities of the resources and its constituent equipment when operating at maximum sustainable performance over Minimum Run Time, recognizing that resource performance may degrade over time. Information registered in the Master File by a Scheduling Coordinator must also conform to any additional definitional requirements in Appendix A as may exist as to that information.~~accurate.~~

As further described in the Business Practice Manual, the CAISO will share any necessary information and data about the Distributed Energy Resources comprising a Distributed Energy Resource Aggregation with the applicable Utility Distribution Company or Metered Subsystem. The Utility Distribution Company or Metered Subsystem will have an opportunity to provide written comments within thirty (30) days regarding the accuracy of the information about Distributed Energy Resources comprising a Distributed Energy Resource Aggregation(s) or raise concerns with respect to whether the Distributed Energy Resources (1) are participating in another Distributed Energy Resource Aggregation; (2) are participating as a Proxy Demand Response resource or a Reliability Demand Response Resource; (3) do not comply with applicable Utility Distribution Company tariffs or requirements of the relevant Local Regulatory Authority; (4) receive compensation from retail programs for capacity, Energy, or other services that would be offered to the CAISO Markets; or (5) may pose a significant threat to the safe and reliable operation of the Distribution System, if operated as part of a Distributed Energy Resource Aggregation. The Utility Distribution Company or Metered Subsystem review of criterion (5) must be limited to those impacts resulting from the aggregation, exclusive of issues previously considered during the interconnection study process for each Distributed Energy Resource. The CAISO will provide the Distributed Energy Resource Provider with the Utility Distribution Company or Metered Subsystem's written comments and any other information regarding the Distributed Energy Resources provided by the

Utility Distribution Company or Metered Subsystem to CAISO, and the Distributed Energy Resource Provider will resolve any concerns with the Utility Distribution Company or Metered Subsystem prior to the CAISO allowing the individual Distributed Energy Resource to participate in a Distributed Energy Resource Aggregation. Parties may resolve any disputes regarding any issues related to the distribution utility review process with the applicable Governmental Authority for the Utility Distribution Company or Metered Subsystem or under Section 13 of the CAISO tariff, as applicable to the dispute.

4.17.4.1 Modifications to Distributed Energy Resource Aggregations

The Distributed Energy Resource Provider will notify the CAISO of any changes to the information it provided during the registration process due to the removal, addition, or modification of a Distributed Energy Resource or Distributed Curtailment Resource within the Distributed Energy Resource Aggregation. The Distributed Energy Resource Provider also will notify the CAISO of any changes to its Distributed Energy Resource Aggregation's physical or operational characteristics. The CAISO will notify the applicable Utility Distribution Company or Metered Subsystem of any changes, and the Utility Distribution Company or Metered Subsystem will have fourteen (14) days to provide the CAISO any written comments raising concerns under Section 4.17.4.

4.17.5 Characteristics of Distributed Energy Resource Aggregations

4.17.5.1 Size Limits

A Distributed Energy Resource Aggregation will be no smaller than 100kW. A Distributed Energy Resource Aggregation that includes Distributed Energy Resources located at different PNodes will be no larger than 20 MW.

4.17.5.2 Metering and Telemetry

Scheduling Coordinators shall submit to the CAISO Actual Settlement Quality Meter Data or Estimated Settlement Quality Meter Data for Distributed Energy Resource Aggregations they represent for each Settlement Period in an Operating Day. Distributed Energy Resources and Distributed Curtailment Resources participating in a Distributed Energy Resource Aggregation will be directly metered pursuant to a meter that complies with any applicable Utility Distribution Company tariff and any standards of the relevant Local Regulatory Authority or, if no such tariff exists or no standards have been set by that Local Regulatory Authority, the metering standards as further detailed in the CAISO's Business Practice

Manual. Distributed Energy Resource Providers must make Settlement Quality Meter Data from individual Distributed Energy Resources and Distributed Curtailment Resources comprising a Distributed Energy Resource Aggregation available to the CAISO upon request.

Distributed Energy Resource Providers shall provide information regarding Distributed Energy Resource Aggregation(s) with a rated capacity of 10 MW or greater or, if the Distributed Energy Resource Aggregation(s) provides Ancillary Services, through telemetry to the CAISO's EMS in accordance with the CAISO's standards for direct telemetry and consistent with the requirement for telemetry set forth in Section 7.6.1. Distributed Energy Resource Providers are not required to have their own direct telemetry on each DER, and may acquire the data required to provide the CAISO with accurate telemetry data for the DERA by any means, including calculation.

4.17.6 Operating Requirements

Distributed Energy Resource Aggregations will respond to (1) CAISO Dispatch Instructions and (2) instructions from the Utility Distribution Company to maintain the safety and reliability of the Distribution System. The CAISO may dispatch a Distributed Energy Resource Aggregation to the extent the Distributed Energy Resource Aggregation bids or schedules ~~Energy or Ancillary Services~~ into the CAISO Markets and receives an award. The CAISO may also issue an Exceptional Dispatch Instruction for the Distributed Energy Resource Aggregation for reliability pursuant to Section 34.10. Distributed Energy Resource Aggregations shall respond to Dispatch Instructions consistent with Generation Distribution Factors for the Distributed Energy Resource Aggregation.

Each Distributed Energy Resource Provider will operate its Distributed Energy Resource Aggregation(s) in a manner consistent with limitations or operating orders established by the Utility Distribution Company or Metered Subsystem. Scheduling Coordinators for Distributed Energy Resources Providers shall submit Outages to the CAISO as necessary to reflect any distribution constraints impacting Distributed Energy Resources that comprise a Distributed Energy Resource Aggregation under its control. The CAISO shall have the authority to coordinate and approve Outage schedules for the Distributed Energy Resource Aggregation(s) listed in a Distributed Energy Resource Provider Agreement, in accordance with the provisions of Section 9. Where the Utility Distribution Company requires its own direct communication with the Distributed Energy Resource Provider for the safety and reliability of the Distribution System,

those communication and data protocols will be established in Schedule 4 to the Distributed Energy Resource Provider Agreement.

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Section 6

6. Communications

6.1 Methods of Communication

6.1.1 Full-Time Communications Facility Requirements

Each Scheduling Coordinator, Utility Distribution Company, Participating TO, Participating Generator, Balancing Authority (to the extent the agreement between the Balancing Authority and the CAISO so provides), and MSS Operator must provide a communications facility manned twenty-four (24) hours a day, seven (7) days a week capable of receiving Dispatch Instructions issued by the CAISO.

6.1.2 Information Transfer from Scheduling Coordinator to CAISO

Unless otherwise agreed by the CAISO, Scheduling Coordinators who wish to submit Bids into CAISO Markets ~~for Energy or Ancillary Services to the CAISO~~ must submit the information to the CAISO's secure communication system. Scheduling Coordinators that wish to submit Dynamic Schedules or Bids for Ancillary Services to the CAISO must also comply with the applicable requirements of Sections 4.5.4.3, 8.3.7, and 8.4.5.

6.1.3 Submitting Information to the Secure Communication System

For Scheduling Coordinators submitting information to the CAISO's secure communication system, each such Scheduling Coordinator shall establish a network connection with the CAISO's secure communication system. Link initialization procedures shall be necessary to establish a connection to the CAISO's secure communication system. In order to log in, each Scheduling Coordinator will be furnished a digital certificate by the CAISO.

6.1.3.1 The CAISO will make available data templates and validation rules information that provides a description of the templates which will be utilized to enter data into the CAISO's secure communication system.

6.1.4 Information Transfer from CAISO to Scheduling Coordinator

Unless otherwise agreed between a Scheduling Coordinator and the CAISO, the CAISO shall furnish scheduling information to Scheduling Coordinators by electronic transfer as described in Section 6. If electronic data transfer is not available, the information may be furnished by facsimile. If it is not possible to communicate with the Scheduling Coordinator using the primary means of communication, an alternate means of communication shall be selected by the CAISO.

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Section 7

7. System Operations Under Normal and Emergency Conditions

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7.6 Normal System Operations

7.6.1 Actions for Maintaining Reliability of CAISO Controlled Grid

The CAISO shall obtain the control over Generating Units that it needs to control the CAISO Controlled Grid and maintain reliability by ensuring that sufficient Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services are procured through the CAISO Markets. When the CAISO responds to events or circumstances, it shall first use the generation control it is able to obtain from ~~the Energy and Ancillary Services Bids it has received~~market processes to respond to the operating event and maintain reliability. Only when the CAISO has used the Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services ~~Energy and Ancillary Services~~ that are available to it and that are ~~under such Energy and Ancillary Services Bids which prove to be~~ effective in responding to the problem and the CAISO is still in need of additional control over Generating Units, shall the CAISO assume supervisory control over other Generating Units. It is expected that at this point, the operational circumstances will be so severe that a Real-Time system problem or emergency condition could be in existence or imminent.

Each Participating Generator shall take, at the direction of the CAISO, such actions affecting such Generator as the CAISO determines to be necessary to maintain the reliability of the CAISO Controlled Grid. Such actions shall include (but are not limited to):

(a) compliance with Dispatch Instructions including instructions to deliver Energy and Ancillary Services in Real-Time pursuant to the AS Awards, Day-Ahead Schedules and FMM Schedules, and FMM AS Awards;

(b) compliance with the system operation requirements set out in this Section 7;

(c) notification to the CAISO of the persons to whom an instruction of the CAISO should be directed on a 24-hour basis, including their telephone and facsimile numbers; and

(d) the provision of communications, telemetry and direct control requirements, including the establishment of a direct communication link from the control room of the Generator to the CAISO in a manner that ensures that the CAISO will have the ability, consistent with this CAISO Tariff, to direct the operations of the Generator as necessary to maintain the reliability of the CAISO Controlled Grid, except that a Participating Generator will be exempt from CAISO requirements imposed in accordance with this subsection (d) with regard to any Generating Unit with a rated capacity of less than ten (10) MW, unless that Generating Unit is certified by the CAISO to provide Ancillary Services.

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7.7.7 Removal of Bids in the Event of a Market Disruption, to Prevent a Market Disruption, or to Minimize the Extent of a Market Disruption

(a) Types of Bids. The types of Bids that the CAISO may remove are Bids that are not feasible based on the misalignment of resource-specific conditions and physical constraints represented in the Master File, current outage information, and the Bid itself.

(b) Removal of a Portion of a Bid. The CAISO may remove part of a Bid, but retain other parts of the Bid for the applicable CAISO Market run and interval for the same or a different product, and may retain parts of the Bid for subsequent CAISO Market runs or

intervals.

(c) **Removal of a Bid Pursuant to Section 7.7.6(a)(2).** If a ~~particular Energy or Ancillary Service~~ Bid must be removed pursuant to Section 7.7.6(a)(2), the CAISO will remove the entire Bid for that particular service and market.

(d) **Resubmittal of Bids.** The Scheduling Coordinator may resubmit removed Bids in subsequent CAISO Markets, provided the Scheduling Coordinator complies with any operator instructions regarding the subject Bids.

(e) **RUC Bids.** In the event the CAISO removes a Bid from an IFM run, the RUC Availability Bid associated with the removed IFM Bid may still be accepted for the corresponding RUC run, unless the CAISO determines that the RUC Availability Bid is the cause of the disruption.

(f) **RTM Bids.** If the CAISO removes a Bid in the advisory RTUC or RTD runs during the Real-Time Market, the CAISO may still use the removed Bid in the binding runs of the Real-Time Market for the same interval if the problems previously experienced with the Bid do not arise.

(g) **Energy Component of Ancillary Services Bids.** If the CAISO removes an Ancillary Services Bid submitted to the Real-Time Market, the CAISO may retain the associated Energy Bid for that CAISO Market run.

(h) **Settlement Consequences of Removal of Bids**

(1) **Day-Ahead Market.** In the event that a Bid is removed from the Day-Ahead Market, the Scheduling Coordinator whose Bid is removed will not be subject to Settlement for the Day-Ahead Market for the affected service.

(2) **Ancillary Services.** In the case of Ancillary Services Bids, including Submissions to Self-Provide an Ancillary Service, that are removed from the Day-Ahead Market, the Scheduling Coordinator will not receive Settlement for the Ancillary Services in the Day-Ahead Market and will not receive an opportunity cost payment in the Day-Ahead Market for the offered service.

(3) **Exceptional Dispatch.** In the event that a Bid is removed from a CAISO Market

run or interval, the CAISO may subsequently be required to issue an Exceptional Dispatch for the resource, in which case the Scheduling Coordinator will receive Exceptional Dispatch Settlement as provided in Section 11.5.6.

(4) **Demand Bids.** In the event that a Demand Bid is removed from the Day-Ahead Market, because no Demand Bids for load can be submitted in the Real-Time Market, Scheduling Coordinators for the load not cleared in the Day-Ahead Market will be settled as Uninstructed Imbalance Energy as provided in Section 11.5.2.

(i) **Reporting to Affected Scheduling Coordinators.** To the extent practicable, the CAISO will contact a Scheduling Coordinator's representative before removing a Bid and advise the representative of the issues encountered with the Bid as soon as practicable, but no later than three (3) Business Days, after the applicable Bid was removed and will provide information specifying when its Bid was removed and the nature of the disruption.

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Section 8

8. Ancillary Services

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8.3 Procurement; Certification and Testing; Contracting Period

8.3.1 Procurement of Ancillary Services

The CAISO shall operate competitive Day-Ahead and Real-Time Markets to procure Ancillary Services. The Security Constrained Unit Commitment (SCUC) and Security Constrained Economic Dispatch (SCED) applications used in the Integrated Forward Market (IFM) and the Real-Time Market (RTM) shall calculate optimal resource commitment, Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services Awards and Schedules at least cost to End-Use Customers consistent with maintaining System

Reliability. Any Scheduling Coordinator representing resources, System Units, Participating Loads, Proxy Demand Resources or imports of System Resources may submit Bids into the CAISO's Ancillary Services markets provided that it is in possession of a current certificate for the resources concerned. Regulation Up, Regulation Down, and Operating Reserves necessary to meet CAISO requirements not met by self-provision will be procured by the CAISO as described in this CAISO Tariff. The amount of Ancillary Services procured in the IFM is net of (i) Self-Provided Ancillary Services from resources internal to the CAISO Balancing Authority Area (which includes Pseudo-Ties of Generating Units to the CAISO Balancing Authority Area) and Dynamic System Resources certified to provide Ancillary Services and (ii) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The amount of Ancillary Services procured in the Real-Time Market is net of (i) available awarded Day-Ahead Ancillary Services, (ii) Self-Provided Ancillary Services from resources internal to the CAISO Balancing Authority Area (which includes Pseudo-Ties of Generating Units to the CAISO Balancing Authority Area) and Dynamic System Resources certified to provide Ancillary Services, (iii) additional Operating Reserves procured in the FMM, and (iv) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The CAISO may procure incremental Ancillary Services in the Real-Time Market based in part on a determination during the FMM that any Ancillary Services capacity awarded or self-provided in the Day-Ahead Market is not available as a result of a resource constraint or Transmission Constraints. Resource constraints may include but are not limited to an Outage of a resource or Ramp Rate constraints. Incremental procurement in the Real-Time Market will exclude Ancillary Services Capacity the CAISO has determined is not available.

The CAISO will manage the Energy from both CAISO-procured and Self-Provided Ancillary Services as part of the FMM and Real-Time Dispatch. In the Day-Ahead Market, the CAISO procures one-hundred (100) percent of its Ancillary Service requirements based on the Day-Ahead Demand Forecast net of Self-Provided Ancillary Services. After the Day-Ahead Market, the CAISO procures additional Ancillary Services needed to meet system requirements from all resources in the Real-Time Market. The amount of Ancillary Services procured in the Real-Time Market is based on the CAISO Forecast of BAA Demand for the CAISO ~~CAISO's requirements for Ancillary Services~~ for the Operating Hour net of Self-Provided Ancillary Services.

Awards of AS in the RTM to Non-Dynamic System Resources are for the entire next Operating Hour. The CAISO procurement of Ancillary Services from all other resources in the Real-Time Market is for a fifteen (15) minute FMM interval. The CAISO's procurement of Ancillary Services from Non-Dynamic System Resources, Dynamic System Resources and internal Generation (which includes Generation from Generating Units that are Pseudo-Ties to the CAISO Balancing Authority Area) in the Real-Time Market is based on the Ancillary Service Bids submitted or generated in the RTM consistent with the requirements in Section 30. The CAISO may also procure Ancillary Services pursuant to the requirements in Section 42.1 and as permitted under the terms and conditions of a Reliability Must-Run Contract.

The CAISO will contract for long-term Voltage Support service with owners of Reliability Must-Run Units under Reliability Must-Run Contracts. These requirements and standards apply to all Ancillary Services whether self-provided or procured by the CAISO.

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8.4 Technical Requirements for Providing Ancillary Services

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8.4.1.1 Regulation

A resource offering Regulation must have the following operating characteristics and technical capabilities:

(a) it must be capable of being controlled and monitored by the CAISO EMS by means of the installation and use of a standard CAISO direct communication and direct control system, a description of which and criteria for any temporary exemption from which, the CAISO shall publish on the CAISO Website;

(b) it must be capable of achieving at least the Ramp Rates (increase and decrease in MW/minute) stated in its Bid for the full amount of Regulation capacity offered;

(c) the Regulation capacity offered must not exceed the maximum Ramp Rate (MW/minute)

of that resource times ten (10) minutes;

(d) the resource to CAISO Control Center telemetry must, in a manner meeting CAISO standards, include indications of whether the resource is on or off CAISO EMS control at the resource terminal equipment;

(e) the resource must be capable of the full range of movement within the amount of Regulation capability offered without manual resource operator intervention of any kind;

(f) each Ancillary Service Provider must ensure that its CAISO EMS control and related SCADA equipment for its resource are operational throughout the time period during which Regulation is required to be provided;

(g) Regulation capacity offered must be dispatchable on a continuous basis for at least sixty (60) minutes in the Day-Ahead Market and at least thirty (30) minutes in the Real-Time Market after issuance of the Dispatch Instruction. The CAISO will measure continuous Energy from the time a resource reaches its award capacity. In the Real-Time Market, where a storage resource using the Non-Generator Resource model will not have sufficient State of Charge to meet its Ancillary Services Schedule, Imbalance Reserves Award, or RUC Award, the CAISO will dispatch the storage resource to have sufficient State of Charge to meet its Ancillary Services Schedule, Imbalance Reserves Award, or RUC Award. Scheduling Coordinators for Non-Generator Resources located within the CAISO Balancing Authority Area that require Energy from the Real-Time Market to offer their full capacity as Regulation may request the use of Regulation Energy Management as described in Section 8.4.1.2; and

(h) Regulation capacity offered must meet or exceed the minimum performance threshold of twenty-five (25) percent measured accuracy as specified in Section 8.2.3.1.1.

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Section 11

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11.2 Settlement of Day-Ahead Market Transactions

All transactions in the IFM and RUC as specified in the Day-Ahead Schedule, AS Awards and RUC Awards, respectively, are financially binding and will be settled based on the Day-Ahead LMP, ASMP or RUC Price for the relevant Location for the specific resource or transaction identified for the Bid. The CAISO will settle the costs of Demand, Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services ~~capacity, Energy and Ancillary Services~~ as separate Settlement charges and payments for each Settlement Period ~~of the Day-Ahead Schedule, Day-Ahead AS Award or RUC Award,~~ as appropriate.

11.2.1 IFM Settlements

11.2.1.1 IFM Payments for Supply of Energy and Imbalance Reserves

For each Settlement Period for which the CAISO clears Energy transactions in the IFM, the CAISO shall pay the relevant Scheduling Coordinator for the MWh quantity of Supply of Energy from all Generating Units, Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, Distributed Energy Resource Aggregations and System Resources in an amount equal to the IFM LMP at the applicable PNode or Aggregated PNode multiplied by the MWh quantity specified in the Day-Ahead Schedule for Supply (which consists of the Day-Ahead Scheduled Energy).

For each Settlement Period for which the CAISO clears Imbalance Reserves transactions in the IFM, the CAISO pays Scheduling Coordinators representing Generating Units, Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, Distributed Energy Resource Aggregations and System Resources the product of the: (a) Locational IRU Price or Locational IRD Price at the applicable PNode or Aggregated PNode; and (b) MW quantity of the awarded IRU or IRD.

For each Settlement Period for which the CAISO clears Imbalance Reserves transactions in the IFM, the CAISO pays the congestion revenue from Transmission Constraints binding in the up and down deployment scenarios for Imbalance Reserves calculated per Section 31.3.1.6.4 to the EDAM Entity Scheduling Coordinator to distribute per the EDAM Entity's OATT or, for the CAISO BAA, as specified in

Section 11.2.4.

11.2.1.1.1 Greenhouse Gas in the IFM

Scheduling coordinators for resources that receive an IFM attribution to serve Demand in a GHG Regulation Area will receive a GHG settlement in the applicable Settlement Period. The GHG settlement is the product of the IFM attribution to serve Demand in a specific GHG Regulation Area and the applicable IFM Marginal GHG Cost for that respective GHG Regulation Area. For a resource within a GHG Regulation Area that does not receive an attribution to served Demand in another GHG Regulation Area, the cost of GHG compliance is embedded in the resource's LMP.

11.2.1.2 IFM Charges for Demand at LAPS

For each Settlement Period that the CAISO clears Energy transactions in the IFM, except as specified in Section 30.5.3.2 and except for Participating Loads, which shall be subject to the charges specified in 11.2.1.3, the CAISO shall charge Scheduling Coordinators for the MWh quantity of Demand scheduled at an individual LAP in the Day-Ahead Schedule, in an amount equal to the IFM LMP for the applicable LAP multiplied by the MWh quantity scheduled in the Day-Ahead Schedule at the relevant LAP. The applicable Default LAP IFM LMP is as described in Section 27.2.2. For Scheduling Coordinators whose Demand scheduled at the individual LAP is subject to an upward price correction as specified in Section 11.21, the CAISO will use the Price Correction Derived LMP to settle the MWh quantity of Demand scheduled in the Day-Ahead Schedule at the relevant LAP.

11.2.1.3 IFM Charges for Demand by Participating Loads, Including Aggregated Participating Load

For each Settlement Period that the CAISO clears Energy transactions in the IFM for Demand by Participating Loads, the CAISO shall charge the Scheduling Coordinators an amount equal to the MWh quantity of Demand scheduled in the Day-Ahead Schedule for the relevant Participating Load at the PNode (or Custom LAP, in the case of Aggregated Participating Load), multiplied by the IFM LMP at that PNode (or Custom LAP, in the case of Aggregated Participating Load). The Custom LAP Price is determined as described in Section 27.2.2. For Scheduling Coordinators whose Demand scheduled at the individual PNode or Custom LAP is subject to an upward price correction as specified in Section 11.21, the CAISO will use the Price Correction Derived LMP to settle the MWh quantity scheduled in the

Day-Ahead Schedule for that Scheduling Coordinator at the relevant PNode or Custom LAP.

11.2.1.4 IFM Charges for Energy Exports at Scheduling Points

For each Settlement Period that the CAISO clears Energy transactions in the IFM, the CAISO shall charge Scheduling Coordinators for the Energy export MWh quantity at individual Scheduling Points scheduled in the Day-Ahead Schedule, an amount equal to the IFM LMP for the applicable Scheduling Point multiplied by the MWh quantity at the individual Scheduling Point scheduled in the Day-Ahead Schedule. For Scheduling Coordinators whose exports scheduled at the individual Scheduling Points is subject to an upward price correction as specified in Section 11.21, the CAISO will use the Price Correction Derived LMP to settle the MWh quantity of Energy exports scheduled in the Day-Ahead Schedule at the relevant Scheduling Point.

11.2.1.5 IFM Congestion Credit for ETCs, TORs, and Converted Rights

For all Points of Receipt and Points of Delivery pairs associated with a valid and balanced ETC Self-Schedule, TOR Self-Schedule or Converted Rights Self-Schedule, the CAISO shall not impose any charge or make any payment to the Scheduling Coordinator related to the MCC associated with such Self-Schedules. For each Scheduling Coordinator, the CAISO shall determine the applicable IFM Congestion Credit, which can be positive or negative, as the sum of the products of the quantity scheduled in the Day-Ahead Schedule and the MCC at each eligible Point of Receipt and Point of Delivery associated with the valid and balanced portions of that Scheduling Coordinator's ETC, TOR, and Converted Rights Self-Schedules.

11.2.1.6 Allocation of IFM Marginal Losses Surplus Credit

On each Settlement Statement, the CAISO shall apply the IFM Marginal Losses Surplus Credit to each Scheduling Coordinator for the period of each Settlement Statement. For each Settlement Period, the IFM Marginal Losses Surplus Credit shall be the product of the IFM Marginal Losses Surplus rate ($/MWh) and the MWh of Measured Demand for the relevant Scheduling Coordinator net of that Scheduling Coordinator's (1) Measured Demand associated with a TOR Self-Schedule subject to the IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules as provided in Section 11.2.1.7; and (2) Measured Demand associated with a TOR Self-Schedule subject to the RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules as provided in Section 11.5.7.2.

The IFM Marginal Losses Surplus rate shall be equal to the total IFM Marginal Losses Surplus ($) divided by the sum of the total MWh of Measured Demand in the CAISO Balancing Authority Area for the relevant Settlement Period net of (1) any Measured Demand associated with a TOR Self-Schedule subject to the IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules as provided in Section 11.2.1.7; and (2) any Measured Demand associated with a TOR Self-Schedule subject to the RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules as provided in Section 11.5.7.2.

11.2.1.7 IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules

For all Points of Receipt and Points of Delivery pairs associated with a valid and balanced TOR Self-Schedule submitted pursuant to an existing agreement between the TOR holder and either the CAISO or a Participating TO as specified in Section 17.3.3, the CAISO shall not impose any charge or make any payment to the Scheduling Coordinator related to the MCL associated with such TOR Self-Schedules and will instead impose any applicable losses charges as specified in the existing agreement between the TOR holder and either the CAISO or a Participating TO applicable to the relevant TOR. In any case in which the TOR holder has an existing agreement regarding its TORs with either the CAISO or a Participating TO, the provisions of the agreement shall prevail over any conflicting provisions of this Section 11.2.1.7. Where the provisions of this Section 11.2.1.7 do not conflict with the provisions of the agreement, the provisions of this Section 11.2.1.7 shall apply to the subject TORs. For each Scheduling Coordinator, the CAISO shall determine the applicable IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules, which can be positive or negative, as the sum of the products of the quantity scheduled in the Day-Ahead Schedule and the MCL at each eligible Point of Receipt and Point of Delivery associated with the valid and balanced portions of that Scheduling Coordinator's TOR Self-Schedules.

11.2.1.8 Charges for Unavailable Imbalance Reserves

As provided in this Section 11.2.1.8, the CAISO charges resources with Imbalance Reserves Awards when some portion of the Imbalance Reserves Award is unavailable to the CAISO. Charges assessed pursuant to this Section 11.2.1.8 for unavailable IRU and IRD awards are subtracted from the separate allocations of IRU and IRD costs, respectively, pursuant to Section 11.2.1.9.

11.2.1.8.1 Charges for Unavailable IRU awards

A resource's unavailable IRU quantity is the amount, if any, by which the resource's Day-Ahead Schedule for Supply plus Ancillary Services Awards other than for Regulation Down plus the IRU award minus the Five-Minute Imbalance Reserve Quantity exceeds the resource's Upper Economic Limit as adjusted by applicable Outages in the FMM. The CAISO charges a resource with an unavailable IRU quantity the product of the unavailable quantity and the higher of the FMM Flexible Ramp Up Price or the resource's Locational IRU Price.

11.2.1.8.2 Charges for Unavailable IRD awards

A resource's unavailable IRD quantity is the amount, if any, by which the resource's Lower Economic Limit as adjusted by applicable Outages in the FMM exceeds the resource's Day-Ahead Schedule for Supply minus the Ancillary Services Awards for Regulation Down minus the IRD award plus the Five-Minute Imbalance Reserve Quantity. The CAISO charges a resource with an unavailable IRD quantity the product of the unavailable quantity and the higher of the FMM Flexible Ramp Down price or the resource's Locational IRD Price.

11.2.1.8.3 Priority of Charges When a Resource is Unavailable for both Imbalance Reserves and Reliability Capacity

For Settlement Periods in which a resource receives both a RUC Award and Imbalance Reserves Award and is unavailable in the RTM, or only bids a portion of its combined award in the RTM, the CAISO first applies charges per Section 11.2.2.2 to the quantity of unavailable Reliability Capacity and then applies charges per this Section 11.2.1.8 to the remaining unavailable capacity. If a resource has an Ancillary Services Award, RUC Award, and Imbalance Reserves Award in the same Settlement Period and is unavailable in the RTM, then the CAISO first determines any unavailable quantities pursuant to this Section 11.2.1.8.3 and then applies the rescission rules in Section 11.10.9.

11.2.1.9 Allocation of Imbalance Reserves Costs

The CAISO allocates the separate costs of IRU and IRD through distinct two-tiered allocations. For IRU, the costs allocated include the direct costs of procuring IRU, as reflected by the summation of the product of each Imbalance Reserves Award for IRU and its Locational IRU Price, and the congestion revenue calculated per Section 31.3.1.6.4 from transmission constraints binding in the up deployment scenario for Imbalance Reserves. For IRD, the costs allocated include both the direct costs, as reflected by the

summation of the product of each Imbalance Reserves Award for IRD and its Locational IRD Price, of procuring IRD and the congestion revenue calculated per Section 31.3.1.6.4 from transmission constraints binding in the down deployment scenario for imbalance reserves.

A Scheduling Coordinator's allocation of IRU costs in tier 1 is the product of its IRU tier 1 cost allocation quantity, as specified in Section 11.2.1.9.1, and its IRU tier 1 cost allocation price, as specified in Section 11.2.1.9.3.

A Scheduling Coordinator's allocation of IRD costs in tier 1 is the product of its IRD tier 1 cost allocation quantity, as specified in Section 11.2.1.9.2, and its IRD tier 1 cost allocation price, as specified in Section 11.2.1.9.4.

The CAISO allocates the costs of Imbalance Reserves procurement not recovered through the IRU or IRD tier 1 cost allocations to Scheduling Coordinators in Tier 2 in proportion to their metered Demand in the interval for which the CAISO procured the Imbalance Reserves.

For ETC and TOR self-schedules, the CAISO treats quantities above the valid and balanced portion as metered Demand subject to cost allocation in Tier 2.

11.2.1.9.1 IRU Tier 1 Cost Allocation Quantity

A Scheduling Coordinator's total IRU tier 1 cost allocation quantity is the sum of the tier 1 quantities for the entities it represents specified as follows.

The IRU tier 1 cost allocation quantity for Generating Units, Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, Distributed Energy Resource Aggregations and System Resources that are not scheduled as a Wheeling Through transaction is the higher of: (a) zero; and (b) the difference between the Energy portion of the Day-Ahead Schedule and the FMM Upper Economic Limit (as adjusted by Outages, a reduction in VER forecast from the Day-Ahead Market to FMM, or the E-Tag transmission profile used by the Real-Time Market).

For non-Participating Load, the IRU tier 1 cost allocation quantity is its negative Uninstructed Imbalance Energy quantity, if any.

The IRU tier 1 cost allocation quantity for an entity exporting Energy, excluding wheel through transactions, is the higher of: (a) zero; and (b) the difference between the FMM self-schedule and Energy portion of the Day-Ahead Schedule.

11.2.1.9.2 IRD Tier 1 Cost Allocation Quantity

A Scheduling Coordinator's total IRD tier 1 cost allocation quantity is the sum of the tier 1 quantities for the entities it represents, specified as follows.

The IRD tier 1 cost allocation quantity for Generating Units, Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, Distributed Energy Resource Aggregations and System Resources that are not scheduled as a Wheeling Through transaction is the higher of: (a) zero; and (b) the difference between the FMM Lower Economic Limit (as adjusted by Outages, a reduction in VER forecast from the Day-Ahead Market to FMM, or the E-Tag transmission profile used by the Real-Time Market) and the Energy portion of the Day-Ahead Schedule.

For non-Participating Load, the IRD tier 1 cost allocation quantity is its positive Uninstructed Imbalance Energy quantity, if any.

The IRD tier 1 cost allocation quantity for an entity exporting Energy from the CAISO Balancing Authority Area is the higher of: (a) zero; and (b) the difference between the Energy portion of the Day-Ahead Schedule and the E-Tag transmission profile used by the Real-Time Market).

11.2.1.9.3 IRU Tier 1 Cost Allocation Price

The IRU tier 1 cost allocation price in an interval is the lower of: (a) the total IRU cost, as adjusted by charges assessed per Section 11.2.1.8.1, divided by the total MWs of IRU procured; and (b) the total IRU cost, as adjusted by charges assessed per Section 11.2.1.8.1, divided by the total IRU tier 1 allocation quantity.

11.2.1.9.4 IRD Tier 1 Cost Allocation Price

The IRD tier 1 cost allocation price in an interval is the lower of: (a) the total IRD cost, as adjusted by charges assessed per Section 11.2.1.8.2, divided by the total MWs of IRD procured; and (b) the total IRD cost, as adjusted by charges assessed per Section 11.2.1.8.2, divided by the total IRD tier 1 allocation quantity.

11.2.1.9.5 Imbalance Reserves Cost Allocation to MSSs

The CAISO allocates costs of Imbalance Reserves to a MSS in the same fashion as any other Scheduling Coordinator irrespective of the MSS's election, per Section 4.9.13, of net Settlements or gross Settlements.

The CAISO allocates costs of Imbalance Reserves to a MSS that has elected, per Section 4.9.13, to Load follow with its generating resources based on the MSS's net portfolio Uninstructed Deviations in tier 1 and tier 2 of the IRU and IRD cost allocation based on the MSS's net portfolio Uninstructed Deviations.

11.2.2 Calculation of Hourly RUC Compensation

For each Settlement Period and resource, Scheduling Coordinators shall receive RUC Compensation, which is the sum of the RUC Availability Payment as determined pursuant to Section 11.2.2.1 and the RUC Bid Cost Recovery amount as determined in Section 11.8.3.

11.2.2.1 Settlement of RUC Availability Payment

Scheduling Coordinators shall receive RUC Availability Payments for all eligible capacity awarded in the RUC process. ~~Resource Adequacy Capacity and~~ RMR Capacity ~~are~~ is not eligible for RUC Availability Payments in the DAM. The RUC Availability Payment shall be calculated for each resource ~~based on~~as the product of the RCU Availability Quantity and the RUC Price for RCU or the product of the RCD Availability Quantity and the RUC Price for RCD. ~~product of the RUC Price and the RUC Availability Quantity for the relevant Settlement Period.~~ The RUC Availability Payment amounts are allocated through the RUC Compensation Costs allocation in Section 11.8.6.5.

The CAISO provides a RUC Availability Payment to a Scheduling Coordinator for a MSS the same as any other Scheduling Coordinator irrespective of the MSS's election, per Section 4.9.13, of net Settlements or gross Settlements.

11.2.2.2 Rescission of RUC Availability Payment

Rescission of all or a portion of the RUC Availability Payment for a resource as defined in Section 31.5.7 shall be settled in accordance with this Section 11.2.2.2.

11.2.2.2.1 Undispatchable RUC Capacity

The CAISO rescinds the RUC Availability Payment in a Settlement Interval for Undispatchable Capacity related to Reliability Capacity.

In a settlement interval, a Generating Unit, Participating Load, Proxy Demand Resource, System Unit or System Resource has Undispatchable Capacity for RCU to the extent the Energy portion of the Day-Ahead Schedule plus Ancillary Services Awards other than for Regulation Down plus the IRU award plus the RCU award exceeds the lower of the resource's Upper Economic Limit or upper operating limit.

In a settlement interval, a Generating Unit, Participating Load, Proxy Demand Resource, System Unit or System Resource has Undispatchable Capacity for RCD to the extent the resource's Lower Economic Limit exceeds the Energy portion of the Day-Ahead Schedule minus the Ancillary Services Awards for Regulation Down minus the IRD award minus the RCD award.

The CAISO evaluates a Multi-Stage Generating Resource for Undispatchable Capacity related to Reliability Capacity for the entire Generating Unit and not for the MSG Configuration.

~~If a Scheduling Coordinator has Undispatchable Capacity that it is obligated to supply to the CAISO during a Settlement Interval, the RUC Availability Payment, if applicable for any non-Resource Adequacy Capacity, for the amount of Energy that cannot be delivered from the Generating Unit, Participating Load, Proxy Demand Resource, System Unit or System Resource for the Settlement Interval shall be rescinded. If a Partial Resource Adequacy Resource is providing RUC Capacity from both the non-Resource Adequacy Capacity and the Resource Adequacy Capacity the payment rescission will occur for the non-Resource Adequacy Capacity prior to eliminating any capacity for the Resource Adequacy Capacity of the Partial Resource Adequacy Resource.~~

11.2.2.2.2 ~~Undelivered RUC Capacity~~[Not Used]

~~The CAISO will rescind a resource's RUC Availability Payment, or portion thereof, when the resource's total metered output is less than Expected Energy by more than the Tolerance Band and less than the RUC Schedule. For purposes of this calculation, total metered output will not include Energy provided or reduced as a result of AGC signals.~~

11.2.2.2.3 Allocation of Rescinded RUC Availability Payments Due to Non-Performance

RUC Availability Payments rescinded due to ~~non-performance~~Undispatchable Capacity are subtracted from the RUC Compensation Costs allocated per Section 11.8.6.5.3.

~~shall be allocated to Scheduling Coordinators in the proportion of their Net Negative Uninstructed Deviations to the total Net Negative CAISO Demand Deviation.~~

11.2.3 IFM Energy Charges and Payments for Metered Subsystems

11.2.3.1 Gross Energy Settlement for Metered Subsystems

For Scheduling Coordinators that submit Bids for MSS Operators that have selected gross Energy Settlement, CAISO shall settle Energy, the MSS Demand and MSS Supply, in the Day-Ahead Schedules

pursuant to Section 11.2.3.1.1 and 11.2.3.1.2.

11.2.3.1.1 IFM Charges for MSS Demand under Gross Energy Settlement

The CAISO shall charge Scheduling Coordinators that submit Bids for MSS Operators that have selected or are subject to gross Energy Settlement an amount equal to the product of the MWh quantity of Demand internal to the MSS in its Day-Ahead Schedule at the price at the Default LAP where the MSS LAP is located.

11.2.3.1.2 IFM Payments for MSS Supply under Gross Energy Settlement

The CAISO shall pay Scheduling Coordinators that submit Bids for MSS Operators that have selected or are subject to gross Energy Settlement an amount equal to the product of the MWh quantity of Supply from the MSS in its Day-Ahead Schedule at the corresponding PNode and the applicable IFM LMP.

11.2.3.1.3 IFM Payments for MSSs providing Imbalance Reserves

A MSS that receives an Imbalance Reserves Award will be settled per Section 11.2.1.1 irrespective of that MSS's election under Section 4.9.13 of net or gross Settlement.

11.2.3.2 Net Energy Settlement for Metered Subsystems

For Scheduling Coordinators that submit Bids for MSS Operators that have selected net Energy Settlement, the CAISO shall settle the net MSS Demand and MSS Supply in the Day-Ahead Schedules pursuant to Section 11.2.3.2.1 and 11.2.3.2.2.

11.2.3.2.1 IFM Charges for MSS Demand under Net Energy Settlement

The CAISO shall charge Scheduling Coordinators that submit Bids for MSS Operators that have selected net Energy Settlement an amount equal to the product of the net MSS Demand in the Day-Ahead Schedule and the IFM MSS Price. The net MSS Demand is the quantity of MSS Demand that exceeds MSS Generation for the applicable MSS.

11.2.3.2.2 IFM Payment for MSS Supply under Net Energy Settlement

The CAISO shall pay Scheduling Coordinators that submit Bids for MSS Operators that have selected net Energy Settlement an amount equal to the product of the net MSS Supply in the Day-Ahead Schedule and the weighted average price of all IFM LMPs for all applicable PNodes within the relevant MSS. The net MSS Supply is the quantity of MSS Generation that exceeds the MSS Demand for the applicable MSS. The weights used to compute the weighted average LMPs shall be equal to MSS Generation

scheduled in the Day-Ahead Schedule.

11.2.4 CRR Settlements

The CAISO will pay or charge CRR Holders as further specified in this Section 11.2.4 and its subsections.

11.2.4.1 Calculation of the IFM Congestion Charge

For each Settlement Period of the IFM, the CAISO will calculate the IFM Congestion Charge as the IFM MCC amount for all scheduled Demand and Virtual ~~Supply~~ Demand Awards, minus the IFM MCC amount for all scheduled Supply and Virtual Supply Awards.

The IFM MCC amount for all scheduled Demand and Virtual Demand Awards is the sum of part (a), part (b), and part (c) of this Section 11.2.4.1.

The IFM MCC amount for all scheduled Supply and Virtual Supply Awards is the sum of part (d), part (e) and part (f) of this Section 11.2.4.1.

Part (a) is the sum of the products of the IFM MCC of Energy and the total ~~of the~~ MWh of Demand scheduled in the Day-Ahead Schedule and Virtual ~~Supply~~ Demand Awards at all the applicable PNodes and Aggregated Pricing Nodes for the Settlement Period.

Part (b) is the sum of the products of the MCC for the Locational IRU Price and the nodally distributed Upward Imbalance Reserves Requirement specified in Section 31.3.1.6.3.2, as adjusted by any procurement relaxation specified in Section 31.3.1.6.2.

Part (c) is the sum of the products of the MCC for the Locational IRD Price and the nodally distributed Downward Imbalance Reserves Requirement specified in Section 31.3.1.6.3.2, as adjusted by any procurement relaxation specified in Section 31.3.1.6.2.

Part (d) is ~~The IFM MCC amount for all scheduled Supply and Virtual Supply Awards is~~ the sum of the products of the IFM MCC and the total of the MWh of Supply scheduled in the Day-Ahead Schedule and the Virtual Supply Awards at all the applicable PNodes for the Settlement Period.

Part (e) is the sum of the products of the MCC for the Locational IRU Price and the IRU Awards.

Part (f) is the sum of the products of the MCC for the Locational IRD Price and the IRD Awards.

11.2.4.1.1 [Not Used]

11.2.4.1.2 Calculation of Hourly CRR Congestion Fund

The CAISO calculates an Hourly CRR Congestion Fund for every Transmission Constraint that is

congested in the IFM in a Settlement Period. The Hourly CRR Congestion Fund specific to a particular binding Transmission Constraint in a given Settlement Period is the sum of the: (a) portion of the IFM Congestion ~~Fund~~ Charge in that Settlement Period attributable to congestion on the Transmission Constraint to which the Hourly CRR Congestion Fund~~congestion fund~~ corresponds; (b) charges specific to the Transmission Constraint calculated pursuant to Section 11.2.4.4.1; and (c) CRR revenue adjustments the CAISO may make pursuant to Sections 11.2.4.6 or 11.2.4.7 that are associated with the Transmission Constraint.

11.2.4.2 Settlement Calculation for the Different CRR Types

For the purposes of settling the various CRR Types, the CAISO will calculate the Settlement of CRRs as described in this Section 11.2.4.2. When a CRR Source or CRR Sink is a LAP, the CAISO will use the Load Distribution Factors used in the IFM to produce the LAP Price at which it will settle the CRR. When a CRR Source or CRR Sink is a Trading Hub, the CAISO will use the weighting factors used in the IFM, and in the CRR Allocation and CRR Auction processes, to produce the Trading Hub prices that it will use to settle the various CRR Types.

11.2.4.2.1 [Not Used]

11.2.4.2.2 [Not Used]

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11.2.6 DAME Transition Period

11.2.6.1 Opting In to DAME Transitional Measures

The CAISO applies DAME Transitional Measures to RA Capacity and Flexible RA Capacity provided from Resource Adequacy Resources if the CAISO receives notice, in the form and manner specified in the Business Practice Manual, from both the resource's Scheduling Coordinator and the LSE's Scheduling Coordinator that they mutually elect for the CAISO to apply DAME Transitional Measures to the RA Capacity and Flexible RA Capacity the resource provides on behalf of the LSE.

An election for DAME Transitional Measures is tied to a specific resource/LSE pair and applies to all RA Capacity and Flexible RA Capacity shown on behalf of the LSE on a monthly Supply Plan for the

resource submitted during the DAME Transition Period. The same resource may be part of multiple resource/LSE pairs subject to DAME Transitional Measures.

The CAISO applies DAME Transitional Measures to a resource/LSE pair retroactive to the effective date of this Section 11.2.6 if the Scheduling Coordinators for the resource and LSE complete the DAME Transitional Measures election process within sixty (60) days of the effective date of this Section 11.2.6. If the Scheduling Coordinators for a resource and LSE complete the DAME Transitional Measures election process for a resource/LSE pair more than sixty (60) days after the effective date of this Section 11.2.6, then the CAISO applies DAME Transitional Measures to the resource/LSE pair prospectively starting with the first Trading Day of the month after the month in which the Scheduling Coordinators completed the election process. Upon mutual consent of the Scheduling Coordinator for both the resource and LSE, a resource/LSE pair may end application of DAME Transitional Measures before the end of the DAME Transition Period. Such early termination of DAME Transitional Measures does not preclude re-electing application of DAME Transitional Measures later within the DAME Transition Period.

11.2.6.2 Calculating Quantity of Overlapping Capacity in a Settlement Period

As specified in this Section 11.2.6.2, the CAISO determines in each Settlement Period how much of the RA Capacity and Flexible RA Capacity subject to DAME Transitional Measures overlaps separately with the subject resource's Imbalance Reserves Award for IRU, RUC Award for RCU, Imbalance Reserves Award for IRD, and RUC Award for RCD.

11.2.6.2.1 Overlapping Capacity for IRU

The quantity of overlapping IRU is the lower of the: (1) Imbalance Reserves Award for IRU; or (2) higher of the RA Capacity or Flexible RA Capacity shown on that resource's monthly Supply Plan minus the Energy Schedule minus the Ancillary Services Awards other than for Regulation Down. Provided, however, that the quantity of overlapping IRU cannot be less than zero.

11.2.6.2.2 Overlapping Capacity for RCU

The quantity of overlapping RCU is the lower of the: (1) RUC Award for RCU; or (2) higher of the RA Capacity or Flexible RA Capacity shown on that resource's monthly Supply Plan minus the Energy Schedule minus the Ancillary Services Awards other than for Regulation Down minus the Imbalance Reserves Award for IRU. Provided, however, that the quantity of overlapping RCU cannot be less than

zero.

11.2.6.2.3 Overlapping Capacity for IRD

The quantity of overlapping IRD is the lower of the: (1) Imbalance Reserves Award for IRD; or (2) Energy Schedule minus the award for Regulation Down minus the higher of the RA Capacity or Flexible RA Capacity shown on that resource's monthly Supply Plan. Provided, however, that the quantity of overlapping IRD cannot be less than zero.

11.2.6.2.4 Overlapping Capacity for RCD

The quantity of overlapping RCD is the lower of the: (1) RUC Award for RCD; or (2) Energy Schedule minus the award for Regulation Down minus the Imbalance Reserves Award for IRD minus the higher of the RA Capacity or Flexible RA Capacity shown on that resource's monthly Supply Plan. Provided, however, that the quantity of overlapping RCD cannot be less than zero.

11.2.6.3 Settlement of Overlapping Capacity Subject to DAME Transitional Measures

11.2.6.3.1 Settlement of Overlapping IRU

The CAISO allocates the revenue from the overlapping IRU, calculated as the product of the quantity of overlapping IRU and the applicable Locational IRU Price, partially to the Scheduling Coordinator for the LSE and partially to the Scheduling Coordinator for the resource.

The CAISO allocates the opportunity cost component of that revenue, calculated as the integral of the positive difference between the Energy LMP and the Energy Bid over the capacity range of the overlapping IRU, to the Scheduling Coordinator for the resource.

The CAISO allocates the balance of the revenue from the overlapping IRU to the Scheduling Coordinator for the LSE. If the resource is part of multiple resource/LSE pairs subject to DAME Transitional Measures, then the CAISO allocates that balance of the revenue to the LSEs in proportion to the higher of each LSE's RA Capacity or Flexible RA Capacity obligation met by that resource.

11.2.6.3.2 Settlement of Overlapping RCU

The CAISO allocates the revenue from the overlapping RCU, calculated as the product of the quantity of overlapping RCU and the applicable RUC Price for RCU, to the Scheduling Coordinator for the LSE.

If the resource is part of multiple resource/LSE pairs subject to DAME Transitional Measures, then the CAISO allocates that revenue to the LSEs in proportion to the higher of each LSE's RA Capacity or

Flexible RA Capacity obligation met by that resource.

11.2.6.3.3 Settlement of Overlapping IRD

The CAISO allocates the revenue from the overlapping IRD, calculated as the product of the quantity of overlapping IRD and the applicable Locational IRD Price, partially to the Scheduling Coordinator for the LSE and partially to the Scheduling Coordinator for the resource.

The CAISO allocates the opportunity cost component of that revenue, calculated as the integral of the positive difference between the Energy Bid over the capacity range of the overlapping IRD and the Energy LMP, to the Scheduling Coordinator for the resource.

The CAISO allocates the balance of the revenue from the overlapping IRD to the Scheduling Coordinator for the LSE. If the resource is part of multiple resource/LSE pairs subject to DAME Transitional Measures, then the CAISO allocates that balance of the revenue to the LSEs in proportion to the higher of each LSE's RA Capacity or Flexible RA Capacity obligation met by that resource.

11.2.6.3.4 Settlement of Overlapping RCD

The CAISO allocates the revenue from the overlapping RCD, calculated as the product of the quantity of overlapping RCD and the applicable RUC Price for RCD, to the Scheduling Coordinator for the LSE.

If the resource is part of multiple resource/LSE pairs subject to DAME Transitional Measures, then the CAISO allocates that revenue to the LSEs in proportion to the higher of each LSE's RA Capacity or Flexible RA Capacity obligation met by that resource.

11.2.6.4 Information Provision for RA Capacity Not Subject to DAME Transitional Measures

For RA Capacity and Flexible RA Capacity not subject to DAME Transitional Measures either because the capacity is not covered by a valid election under Section 11.2.6.1 or because the DAME Transition Period has expired, the CAISO provides the Scheduling Coordinator for LSEs whose RA and Flexible RA obligations are met with that capacity information regarding the opportunity costs described in Section 11.2.6.3.1 and 11.2.6.3.3 and the Imbalance Reserves and Reliability Capacity revenue from that overlapping capacity.

11.3 Settlement of Virtual Awards

11.3.1 Virtual Supply Awards

The CAISO will pay each Scheduling Coordinator with Virtual Supply Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the Day-Ahead LMP at the Eligible PNode or Eligible Aggregated PNode multiplied by the MWhs of Virtual Supply Awards. Virtual Supply Awards subject to price correction will be settled as specified in Section 11.21.

The CAISO will charge each Scheduling Coordinator with Virtual Supply Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the product of the MWhs of Virtual Supply Awards and the simple average of the four FMM LMPs for the applicable Trading Hour at the Eligible PNode or Eligible Aggregated PNode.

The CAISO pays or charges, depending on whether the value is positive or negative, the product of the virtual Forecasted Movement quantity and the difference between the FMM Flexible Ramp Up Price and the FMM Flexible Ramp Down Price.

~~multiplied by the MWhs of Virtual Supply Awards.~~

11.3.2 Virtual Demand Awards

The CAISO will charge each Scheduling Coordinator with Virtual Demand Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the Day-Ahead Market LMP at the Eligible PNode or Eligible Aggregated PNode multiplied by the MWhs of Virtual Demand Awards. Virtual Demand Awards subject to price correction will be settled as specified in Section 11.21.

The CAISO will pay each Scheduling Coordinator with Virtual Demand Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the product of the MWhs of Virtual Demand Awards and the simple average of the four FMM LMPs for the applicable Trading Hour at the Eligible PNode or Eligible Aggregated PNode.

The CAISO pays or charges, depending on whether the value is positive or negative, the product of the virtual Forecasted Movement quantity and the difference between the FMM Flexible Ramp Up Price and the FMM Flexible Ramp Down Price.~~multiplied by the IFM MWhs of Virtual Demand Awards.~~

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11.5.2 Uninstructed Imbalance Energy

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11.5.2.2 Hourly Real-Time Demand Settlement

The Default LAP Hourly Real-Time Price will apply to CAISO Demand and MSS Demand under net Settlement of imbalance energy, except for CAISO Demand not settled at the Default LAP as provided in Section 30.5.3.2, and per the methodology as may be further defined in the Business Practice Manuals. For each Settlement Interval, the differences between the Day-Ahead Scheduled CAISO Demand and m~~M~~etered Demand (MWh) is settled at the Default LAP Hourly Real-Time Price or the Custom LAP Hourly Real-Time Price, as appropriate. For each Default LAP, the CAISO calculates the applicable Default LAP Hourly Real-Time Price as the weighted average LMP of the four Default LAP FMM LMPs and the twelve (12) five-minute Default LAP RTD LMPs. The CAISO calculates the weighted average LMP for each Default LAP as the summation of the weighted average ~~S~~MEC, the weighted average MCC, and the weighted average MCL for that Default LAP. The CAISO calculates the weighted average ~~S~~MEC, MCC, and MCL for each applicable Trading Hour based on the four applicable Default LAP FMM ~~S~~MECs, MCCs, and MCLs, respectively, and the twelve (12) applicable Default LAP RTD ~~S~~MECs, MCCs, and MCLs, respectively. For each Custom LAP, the CAISO calculates the applicable Custom LAP Hourly Real-Time Price as the weighted average LMP of the four Custom LAP FMM LMPs and the twelve (12) five-minute Custom LAP RTD LMPs. The CAISO calculates the weighted average LMP for each Custom LAP as the summation of the weighted average ~~S~~MEC, the weighted average MCC, and the weighted average MCL for that Custom LAP. The CAISO calculates the weighted average ~~S~~MEC, MCC, and MCL for each applicable Trading Hour based on the four applicable Custom LAP FMM ~~S~~MECs, MCCs, and MCLs, respectively, and the twelve (12) applicable Custom LAP RTD ~~S~~MECs, MCCs, and MCLs, respectively. In calculating the weighted average ~~S~~MEC, MCC, and MCL for each hour for either the Default LAPs or Custom LAPs, the CAISO determines the weights based on the difference between Day-Ahead Schedules at the applicable LAP and the CAISO Forecast of BAA Demand for the CAISO~~CAISO~~

~~Forecast of CAISO Demand~~ used in the FMM multiplied by the relevant FMM LMP at the applicable LAP plus the difference between the CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast of CAISO Demand~~ used in the FMM and the CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast of CAISO Demand~~ used in the RTD multiplied by the relevant RTD LMP at the applicable LAP divided by the sum of the difference between Day-Ahead Schedules at the applicable LAP and the CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast of CAISO Demand~~ used in the FMM plus the difference between the CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast of CAISO Demand~~ used in the FMM and the CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast of CAISO Demand~~ used in the RTD. Furthermore, the Default LAP Hourly Real-Time Prices and the Custom LAP Hourly Real-Time Prices will be bounded by the maximum and the lowest LMP and its components, for the applicable Trading Hour from those relevant intervals at the relevant LAP. If the calculated price exceeds the upper boundary or is below the lower boundary, then the Default LAP Hourly Real-Time Price or the Custom LAP Hourly Real-Time Price, as appropriate, instead will be calculated based on a weighted average price with the weightings based on gross deviations (absolute value of each deviation).

The Hourly Real-Time LAP Prices are determined by the requirements in Section 27.2.2.2.

11.5.2.3 Revenue Neutrality Resulting from Changes in LAP Load Distribution Factors

Any resulting revenue from changes in the LAP Load Distribution Factors between the Day-Ahead Market and the Real-Time Dispatch shall be allocated to metered CAISO Demand in the corresponding ~~Default~~ LAP within the CAISO Balancing Authority Area and metered EDAM Demand in the corresponding LAP within an EDAM Entity Balancing Authority Area.

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11.5.4 Imbalance Energy Pricing; Non-Zero Offset Amount Allocation

11.5.4.1 EIM Transfers and Offset Allocations

EIM Transfer revenue will be collected when one Balancing Authority Area in the EIM Area provides Energy to another Balancing Authority Area in the EIM Area and the associated EIM Transfer System

Resource prices differ. Congestion revenue will be collected when a Transmission Constraint or intertie scheduling limit binds at different locations of the transmission system and the LMP varies across a Balancing Authority Area in the EIM Area and across FMM and RTD LMPs from source to sink within and across the EIM Area. The CAISO will collect neutrality amounts to recover differences between Real-Time Market payments made and Real-Time Market payments received within Balancing Authority Areas in the EIM Area. The CAISO will allocate EIM Transfer revenue, Real-Time Congestion revenue, and offsets to an EIM Entity Balancing Authority Area or the CAISO Balancing Authority Area as provided below.

11.5.4.1.1 Real-Time Imbalance Energy Offset

(a) **Financial Value of EIM Transfers.** For each Balancing Authority Area in the EIM Area, the CAISO will calculate the Real-Time Market financial value of EIM Transfers as the product of the EIM Transfer MWh, either positive or negative, and the ~~System~~ Marginal Energy Cost~~, plus a greenhouse gas financial value credit calculated as the product of the portion of the EIM Transfers that do not correspond to a greenhouse gas compliance obligation under the regulations administered by the California Air Resources Board and the Marginal Greenhouse Gas Cost~~.

(b) **Initial Calculation.** The CAISO will initially calculate the Real-Time Imbalance Energy Offset to be recovered on a 5-minute basis for each Balancing Authority Area in the EIM Area as the sum of the financial value of EIM Transfers and the Settlement amounts for FMM Instructed Imbalance Energy and RTD Instructed Imbalance Energy, Uninstructed Imbalance Energy, ~~Greenhouse Gas Emissions Cost Revenue,~~ and Unaccounted For Energy, and for the CAISO and EDAM Entity Balancing Authority Areas with Convergence Bidding, Real-Time Virtual Bid Settlement, plus the Real-Time Ancillary Services Congestion revenues for the CAISO, and Virtual Awards settlements in the Real-Time Market in accordance with Section 11.3, less the Real-Time Congestion Offset and less the Real-Time Marginal Cost of Losses Offset, and excluding the Marginal GHG Cost.

(c) **Allocation.** The CAISO will allocate the adjusted Real-Time Imbalance Energy Offset:

(1) for the CAISO Balancing Authority Area, to Scheduling Coordinators in the CAISO Balancing Authority Area according to Measured Demand; and

(2) for EIM Entity Balancing Authority Areas, to the applicable EIM Entity Scheduling Coordinator.

(d) **Residual Neutrality Amounts.** The CAISO will allocate any residual Real-Time Imbalance Energy Offset amount to Scheduling Coordinators in the EIM Area based upon EIM Measured Demand.

11.5.4.1.2~~1~~ Real-Time Congestion Offset.

(a) **Contribution to Marginal Cost of Congestion.** For each Settlement Period of the RTM, the CAISO shall calculate the contribution of each Balancing Authority Area in the EIM Area to the Marginal Cost of Congestion at each resource location and intertie in the EIM Area for each Balancing Authority Area based on the location of the Transmission Constraints in each Balancing Authority Area, EIM ~~External~~ Interties, and constraints enforced outside of the EIM Area needed to manage that Balancing Authority Area's responsibilities.

(b) **Real-Time Congestion Offset.** For each Settlement Period of the RTM, the CAISO shall calculate the Real-Time Congestion Offset for each Balancing Authority Area in the EIM Area as –

(1) the sum of the product of the contribution of that Balancing Authority Area as determined in subsection (a) of this section, the Marginal Cost of Congestion component of the Locational Marginal Price at each resource location in the EIM Area, and the imbalance energy at that resource location, including Virtual Bids at that resource location;

(2) minus any Virtual Bid adjustment as determined in accordance with section 11.5.4.1.1(d)~~;~~ and

(3) including any marginal Congestion adjustment to account for schedules associated with EDAM Legacy Contracts, EDAM Transmission Ownership Rights under Section 33.16 and Section 33.17 and registered EDAM Transmission

Service Provider transmission customer rights under Section 33.18.

~~(c) **Treatment of EIM Internal Interties.**~~

~~(1) **Characterization of Transmission Rights.** As the terms are used for the purposes assigning congestion revenue to a Balancing Authority Area pursuant to section (c)(3), the CAISO or an EIM Entity provides –~~

~~(A) transmission "to" an EIM Internal Intertie if a transaction using that transmission must compete at that location with transactions using transmission that is not provided by the CAISO or an EIM Entity;~~

~~(B) transmission "through" an EIM Internal Intertie if a transaction using that transmission does not compete at that location with transactions using transmission that is not provided by the CAISO or an EIM Entity.~~

~~(2) **EIM Intertie that Operates Only as an EIM Internal Intertie.** In performing the calculation in subsection (a) of this section in the case of an EIM Intertie that operates only as an EIM Internal Intertie, the CAISO shall determine a Balancing Authority Area's contribution to the Congestion at the intertie by –~~

~~(A) dividing the congestion revenue equally to each side of the intertie as determined by the Balancing Authority Area boundary at that intertie; then~~

~~(B) allocating the congestion revenue divided in subsection (c)(12)(A) of this section to each side of the intertie among the Balancing Authority Areas that share that side of the intertie in proportion to the Balancing Authority Area's contribution to the EIM Transfer limit.~~

~~(3) **EIM Intertie that Operates Both as an EIM Internal Intertie and an EIM External Intertie or a Scheduling Point.** In performing the calculation in subsection (a) of this section in the case of an EIM Intertie that operates both as an EIM Internal Intertie and an EIM External Intertie or Scheduling Point, the CAISO shall determine a Balancing Authority Area's contribution to the Congestion at the intertie by –~~

~~(A) assigning congestion revenue attributable to a constraint at the EIM Internal Intertie associated with the CAISO's or an EIM Entity's provision of transmission to the EIM Internal Intertie to the Balancing Authority Areas in the EIM Area that provide transmission to the EIM Internal Intertie in proportion to each EIM Entity's contribution to the EIM Transfer limit;~~

~~(B) assigning congestion revenue attributable to a constraint at the EIM Internal Intertie associated with the CAISO's or an EIM Entity's provision of transmission through the EIM Internal Intertie to the Balancing Authority Areas in the EIM Area that provide transmission through the EIM Internal Intertie in accordance with the calculation in subsection (c)(2) of this section; and~~

~~(C) assigning congestion revenue attributable to the EIM External Intertie or the Scheduling Point to the Balancing Authority Area in the EIM Area that manages the transmission rights on that intertie.~~

~~(4) **EIM Intertie that Operates Only as an EIM External Intertie.** In performing the calculation in subsection (a) of this section in the case of an EIM Intertie that operates only as an EIM External Intertie, the CAISO shall determine a Balancing Authority Area's contribution to the Congestion at the intertie by allocating the congestion revenue to the Balancing Authority Area in the EIM Area that manages the intertie.~~

(c~~d~~) **Virtual Bid Adjustment.**

(1) **Individual Constraint Calculation.** For each Transmission Constraint in an EIM Entity Balancing Authority Area, the CAISO will calculate a Virtual Bid adjustment as the product of that Transmission Constraint's FMM Shadow Price and the lesser of –

(A) the Flow Impact of Virtual Bids and

(B) the Flow Impacts of all Day-Ahead Scheduled Energy and EIM Base

Schedules less the Flow Impacts of FMM Schedules,

but not less than zero.

(2) **EIM Entity Balancing Authority Area Calculation.** Each EIM Entity Balancing Authority Area's Virtual Bid adjustment shall be the sum of the individual Transmission Constraint calculation for all Transmission Constraints within that EIM Entity Balancing Authority Area.

(d~~e~~) **Allocation.** The CAISO will allocate –

(1) the Real-Time Congestion Offset for each EIM Entity Balancing Authority Area to the applicable EIM Entity Scheduling Coordinator;

(2) the Real-time Congestion Offset for the CAISO Balancing Authority Area in accordance with Section 11.5.4.2; and

(3) the Virtual Bid adjustment from each individual constraint calculation to each Scheduling Coordinator who submitted Virtual Bids based on that Scheduling Coordinator's Virtual Award's pro rata share of the gross positive Congestion revenues received by all Virtual Awards from that Transmission Constraint.

11.5.4.1.3~~2~~ Real-Time Marginal Cost of Losses Offset

(a) **Calculation.** The CAISO will calculate the Real-Time Marginal Cost of Losses Offset for each Balancing Authority Area as the sum of the product of the Marginal Cost of Losses component of the LMP and all positive or negative FMM Instructed Imbalance Energy, RTD Instructed Imbalance Energy, Uninstructed Imbalance Energy, and Unaccounted For Energy in the Balancing Authority Area.

(b) **Allocation.** The CAISO will allocate the amounts determined according to ~~section~~ Section 11.5.4.1.3~~2~~(a) –

(1) for the CAISO Balancing Authority Area, according to ~~section~~ Section 11.5.4.2; and

(2) for EIM Entity Balancing Authority Areas, to the applicable EIM Entity Scheduling Coordinator.

11.5.4.1.4 Real-Time Marginal Greenhouse Gas Cost Offset.

The CAISO will calculate a five-minute Real-Time Marginal GHG Cost Offset amount in relation to each GHG Regulation Area. The five-minute Real-Time Marginal GHG Cost Offset amount will equal the product of FMM IIE, RTD IIE, UIE and UFE within a GHG Regulation Area, including Schedules for Virtual Awards; GHG attributions associated with the GHG Regulation Area and the applicable Marginal GHG Cost. The CAISO will allocate the Real-Time Marginal GHG Cost Offset amount to a GHG Regulation Area's metered Demand.

11.5.4.1.5 EIM Transfer Revenue.

(a) **Calculation.** The CAISO will calculate EIM Transfer revenue when the net EIM Transfer scheduling limit is reached in the Real-Time Market as the separation of the Marginal Energy Cost of the binding Balancing Authority Area in the EIM Area from the Marginal Energy Cost of an adjacent Balancing Authority Area in the EIM Area that is attributed to an EIM Transfer System Resource.

(b) **Allocation.** The CAISO will allocate EIM Transfer revenue by dividing the revenue equally to the Balancing Authorities on each side of the EDAM Internal Intertie as defined by the Balancing Authority Area boundary at that intertie, except when the CAISO has been notified during the implementation of the Real-Time Market within an EIM Entity Balancing Authority Area of an agreement between both EIM Entities on either side of a EIM Transfer that a different allocation for some portion of the transfer revenue is required to give effect to a pre-existing commercial arrangement, which will then be sub-allocated–

(1) for the CAISO Balancing Authority Area in accordance with the CAISO Tariff in the CAISO Balancing Authority Area, including allocation to Scheduling Coordinators for Existing Contract rights and Transmission Ownership Rights holders consistent with the terms of the agreements concerning use of the transmission facilities supporting the EIM Transfer;

(2) for an EIM Entity Balancing Authority Area that does not participate in the Day-Ahead Market in accordance with the associated EIM Transmission Service Provider tariff; and

(3) for an EIM Entity Balancing Authority Area that participates in the Day-Ahead Market depending on whether the transmission across an EIM Intertie is made available by: (a) an EDAM Entity pursuant to Section 33.18.2, 2.1 or Section 33.18.2.2.3, in which case the CAISO will allocate the EIM Transfer revenue to the EIM Entity Scheduling Coordinator for further allocation by the EIM Transmission Service Provider in accordance with its tariff, (b) an EDAM Transmission Service Provider customer pursuant to Section 33.18.2.2, in which case the CAISO will allocate the EIM Transfer revenue directly to the Scheduling Coordinator for the EDAM Transmission Service Provider customer, or (c) an EDAM Legacy Contact or EDAM Transmission Ownership Right pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Legacy Contact or EDAM Transmission Ownership Right holder, respectively.

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11.5.7 Congestion Credit and Marginal Credit of Losses Credit

11.5.7.1 RTM Congestion Credit for ETCs and TORs

The CAISO shall not apply charges or payments to Scheduling Coordinators related to the MCC associated with all Points of Receipt and Points of Delivery pairs associated with valid and balanced ETC Self-Schedules or TOR Self-Schedules after the Day-Ahead Market. The balanced portion for each ETC or TOR contract for each Settlement Interval will be based on the difference between: (1) the minimum of (a) the total Demand, (b) the total ETC or TOR Supply Self-Schedule submitted in RTM, including changes after twenty (20) minutes before the applicable Trading Hour if such change is permitted by the Existing Contract, or (c) the Existing Contract maximum capacity as specified in the TRTC Instructions; and (2) the valid and balanced portion of the Day-Ahead Schedule. In determining the balanced portions, the CAISO evaluates the amounts based on the following variables: (a) for exports and imports, the CAISO shall use the schedule quantity specified in the Interchange schedule used for check out between

CAISO and other Balancing Authority Areas; (b) for CAISO Demand, the CAISO shall use the Gross Load associated with the applicable ETC or TOR; and (c) for all Generation the CAISO shall use the quantity specified in the Dispatch Instructions. For each Scheduling Coordinator, the CAISO shall determine for each Settlement Interval the applicable RTM Congestion Credit for FMM Instructed Imbalance Energy or RTD Instructed Imbalance Energy, which can be positive or negative, as the sum of the product of the relevant MWh quantity and the applicable weighted average MCC at each Point of Receipt and Point of Delivery associated with the valid and balanced portions of that Scheduling Coordinator's ETC or TOR Self-Schedules. The weights in the two markets will be based on the absolute values of the (a) deviation of the FMM Schedule or the CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast of CAISO Demand~~ used in the FMM from Day-Ahead Schedules and (b) deviation of the RTD schedule or the CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast of CAISO Demand~~ used in the RTD from Day-Ahead Schedules.

11.5.7.2 RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules

For all Points of Receipt and Points of Delivery pairs associated with a valid and balanced TOR Self-Schedule submitted to the RTM pursuant to an existing agreement between the TOR holder and either the CAISO or a Participating TO as specified in Section 17.3.3, the CAISO shall not impose any charge or make any payment to the Scheduling Coordinator related to the MCL associated with such TOR Self-Schedules and will instead impose any applicable charges for losses as specified in the existing agreement between the TOR holder and either the CAISO or a Participating TO applicable to the relevant TOR. In any case in which the TOR holder has an existing agreement regarding its TORs with either the CAISO or a Participating TO, the provisions of the agreement shall prevail over any conflicting provisions of this Section 11.5.7.2. Where the provisions of this Section 11.5.7.2 do not conflict with the provisions of the agreement, the provisions of this Section 11.5.7.2 shall apply to the subject TORs. The balanced portion of the TOR Self-Schedule after the Day-Ahead Market is the same balanced quantity mentioned in this Section 11.5.7.2 for the TOR Self-Schedule. For each Scheduling Coordinator, the CAISO shall determine for each Settlement Interval the applicable RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules for FMM Instructed Imbalance Energy and RTD Instructed Imbalance Energy, which can be positive or negative, as the sum of the product of the relevant MWh quantity and the weighted

average MCL at each of the eligible Points of Receipt and Points of Delivery associated with the valid and balanced portions of that Scheduling Coordinator's TOR Self-Schedules. The weights in the two markets will be based on the absolute values of the: (a) deviation of the FMM Schedule or the CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast Of CAISO Demand~~ used in the FMM from Day-Ahead Schedules; and (b) deviation of the RTD schedule or the CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast Of CAISO Demand~~ used in the RTD from Day-Ahead Schedules. For losses that the CAISO shall charge pursuant to Section 17.3.3, the specific loss charge amount shall be the product of: (a) the specific loss percentage as may be specified in an applicable agreement between the TOR holder and the CAISO or an existing agreement between the TOR holder and a Participating TO; (b) the weighted average ~~S~~MEC price from the FMM and RTD markets with weights based on the absolute values of (1) deviation of FMM schedule or CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast Of CAISO Demand~~ used in the FMM from Day-Ahead Schedules and (2) deviation of RTD schedule or CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast Of CAISO Demand~~ used in the RTD from Day-Ahead Schedules; and (c) the balanced contract quantity mentioned in Section 11.5.7.1.

11.5.8 Settlement for Emergency Assistance

This Section 11.5.8 shall apply to Settlement for emergency assistance provided to or by the CAISO, not EIM Assistance Energy Transfer Surcharges. In any case in which the CAISO has entered into an agreement regarding emergency assistance, which agreement has been accepted by FERC, the provisions of the agreement shall prevail over any conflicting provisions of this Section 11.5.8. Where the provisions of this Section 11.5.8 do not conflict with the provisions of the FERC-accepted agreement, the provisions of this Section 11.5.8 shall apply to the subject emergency assistance.

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11.5.9 Flexible Ramping Product

The CAISO will settle the Flexible Ramping Product as set forth in Section 11.25.

11.5.10 Greenhouse Gas in the RTM

Resources that receive a FMM or RTD attribution to serve Demand in a GHG Regulation Area will receive a GHG settlement. The GHG settlement is the product of the FMM or RTD attribution to serve Demand in a specific GHG Regulation Area and the applicable FMM or RTD Marginal GHG Cost for that respective GHG Regulation Area. A resource's FMM GHG settlement for a specific GHG Regulation Area reflects any imbalance from the resource's IFM GHG attribution for that GHG Regulation Area. A resource's RTD GHG settlement for a specific GHG Regulation Area reflects any imbalance from the resource's FMM GHG attribution for that GHG Regulation Area. For a resource within a GHG Regulation Area that does not receive an attribution to served Demand in another GHG Regulation Area, the cost of GHG compliance is embedded in the resource's LMP.

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11.8.1.2 Real-Time Self-Commitment Period

A Real-Time Market Self-Commitment Period for a Bid Cost Recovery Eligible Resource shall consist of all consecutive Dispatch Intervals not in an IFM Commitment Period or a RUC Commitment Period where the Bid Cost Recovery Eligible Resource has a Self-Schedule or, except for Self-Provided Ancillary Services for Non-Spinning Reserve by a Short Start Unit, has a non-zero amount of Self-Provided Ancillary Services. A Real-Time Market Self-Commitment Period for a Bid Cost Recovery Eligible Resource may not be less than the relevant MUT (rounded up to the next 15-minute Commitment Interval) when considered jointly with any adjacent IFM Self-Commitment Period. For example, if a Bid Cost Recovery Eligible Resource self-commits at time h, the self-commitment will be extended to Commitment Interval h + MUT, unless an IFM or RUC Commitment Period exists starting after hour h, in which case the self-commitment will be extended to Commitment Interval h + min (MUT, t), where t represents the time interval between the Real-Time Market Self-Commitment Period and the IFM or RUC Commitment Period. A Real-Time Market Self-Commitment Period for a Bid Cost Recovery Eligible Resource may not be apart from an IFM or RUC Commitment Period by less than the relevant MDT (rounded up to the next 15-minute Commitment Interval). ~~For example, if a Bid Cost Recovery Eligible Resource self-commits at time T1 and has a RUC Schedule at time T2 < T1, the Real-Time Market Self-~~

~~Commitment Period will be extended to the interim Commitment Intervals if T1 - T2< MDT. The number of Real-Time Market Self-Commitment Periods for a Bid Cost Recovery Eligible Resource within a Trading Day, when considered jointly with any adjacent IFM Self-Commitment Period, may not exceed the relevant MDS (or MDS + 1 if the first Real-Time Market Self-Commitment Period is the continuation of a Real-Time Market Commitment Period from the previous Trading Day). For example, if a Bid Cost Recovery Eligible Resource self-commits at time T1 and has a RUC Schedule at time T2 > T1, the Real-Time Market Self-Commitment Period will be extended to the interim Commitment Intervals if an additional Real-Time Market Start-Up at T1 would violate the MDS constraint.~~ To determine whether an extension of the RTM Self-Commitment Period applies for Multi-Stage Generating Resources, the CAISO will ensure that the respective Minimum Run Time and Minimum Down Time for both the Generating Unit and MSG Configuration levels are simultaneously respected.

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11.8.2 IFM Bid Cost Recovery Amount

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11.8.2.1 IFM Bid Cost Calculation

For each Settlement Interval, the CAISO shall calculate IFM Bid Cost for each Bid Cost Recovery Eligible Resource as the algebraic sum of the IFM Start-Up Cost, IFM Transition Cost, IFM Minimum Load Cost, IFM Pump Shut-Down Cost, IFM Energy Bid Cost, IFM Pumping Cost, ~~and~~ IFM AS Bid Cost, IFM GHG Bid Cost, and IFM Imbalance Reserves Bid Cost. For Multi-Stage Generating Resources, in addition to the specific IFM Bid Cost rules described in Section 11.8.2.1, the CAISO will apply the rules described in Section 11.8.1.3 to further determine the applicable MSG Configuration-based CAISO Market Start-Up Bid Cost, Transition Bid Cost, and Minimum Load Bid Cost in any given Settlement Interval. For Multi-Stage Generating Resources, the incremental IFM Start-Up Costs, IFM Minimum Load Costs, and IFM Transition Costs to provide Energy Scheduled in the Day-Ahead Schedule or awarded RUC or Ancillary

Service capacity for an MSG Configuration other than the self-scheduled MSG Configuration are determined by the IFM rules specified in Section 31.3. For RMR Resources, the CAISO shall calculate the IFM Bid Cost as the algebraic sum of the IFM Start-Up Cost adjusted to remove Opportunity Costs, IFM Transition Cost adjusted to remove Opportunity Costs, IFM Minimum Load Costs adjusted to remove Opportunity Costs, IFM Energy Bid Cost adjusted to remove Opportunity Costs, and IFM AS Bid Cost. The CAISO will also adjust the IFM Bid Costs for RMR Resources, to remove any bid adder that includes costs that were recovered under the RMR Contract.

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11.8.2.1.7 IFM Transition Cost

For each Settlement Interval, the IFM Transition Costs shall be based on the MSG Configuration to which the Multi-Stage Generating Resource is transitioning and is allocated to the CAISO Commitment Period of that MSG Configuration.

11.8.2.1.7.1 IFM Transition Cost Applicability

Within any eligible IFM CAISO Commitment Period determined pursuant to the rules specified in Section 11.8.1.3, the CAISO shall apply the IFM Transition Costs for the Settlement Intervals in which the Multi-Stage Generating Resource is actually transitioning from the "from" MSG Configuration and reaches the Minimum Load as registered in the Master File, or if applicable, as modified pursuant to Section 9.3.3, of the "to" MSG Configuration to which the Multi-Stage Generating Resource is transitioning, subject to the Tolerance Band.

11.8.2.1.8 IFM Imbalance Reserves Bid Cost

For any Settlement Interval, the IFM Imbalance Reserves Bid Cost shall be the product of the IRU Bid price and IRU Bid quantity (as reduced by the unavailable IRU quantity calculated per Section 11.2.1.8.1) plus the product of the IRD Bid price and IRD Bid quantity (as reduced by the unavailable IRD quantity calculated per Section 11.2.1.8.2).

11.8.2.1.9 IFM GHG Bid Cost

For each Settlement Interval, the IFM GHG Bid Cost shall be the product of the IFM GHG Award from

each accepted IFM GHG Bid Adder for a relevant GHG Regulation Area and the applicable Marginal GHG Cost divided by the number of Settlement Intervals in a Trading Hour.

11.8.2.2 IFM Market Revenue

The CAISO will apply the following rules to calculate a Bid Cost Recovery Eligible Resource's IFM Market Revenue used for purposes of calculating its IFM Bid Cost Shortfalls and IFM Bid Cost Surpluses calculated pursuant to Section 11.8.2, and for purposes of allocating the Bid Cost Uplift pursuant to Section 11.8.6. The IFM Market Revenue calculations for both CAISO IFM Commitment Periods and Self-Committed Periods will be subject to the Day-Ahead Metered Energy Adjustment Factor pursuant to the rules specified in Section 11.8.2.5.

11.8.2.2.1 CAISO IFM Commitment

For any Settlement Interval in a CAISO IFM Commitment Period the IFM Market Revenue for a Bid Cost Recovery Eligible Resource is the algebraic sum of the five~~two~~ products specified below. In the case of a Multi-Stage Generating Resource, the CAISO will calculate the market revenue at the Generating Unit or Dynamic Resource-Specific System Resource level.

(1) The product of the delivered MWh in the relevant Day-Ahead Schedule in that Trading Hour (where for Pumped-Storage Hydro Units and Participating Load operating in the pumping mode or serving Load the MWh is negative), and the relevant IFM LMP, divided by the number of Settlement Intervals in a Trading Hour.

(2) The product of the IFM AS Award from each accepted IFM AS Bid and the relevant Resource-Specific ASMP, divided by the number of Settlement Intervals in a Trading Hour.

(3) The product of IFM GHG Award and relevant Marginal GHG Cost, divided by the number of Settlement Intervals in a Trading Hour.

(4) The product of the IRU award (as reduced by the unavailable IRU quantity calculated per Section 11.2.1.8.1) and the Locational IRU Price.

(5) The product of the IRD award (as reduced by the unavailable IRD quantity calculated per Section 11.2.1.8.2) and the Locational IRD Price.

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11.8.3 RUC Bid Cost Recovery Amount

For purposes of determining the RUC Unrecovered Bid Cost Uplift Payments as determined in Section 11.8.5 and for the purposes of allocating Net RUC Bid Cost Uplift as described in Section 11.8.6.5, the CAISO shall calculate the RUC Bid Cost Shortfall or the RUC Bid Cost Surplus as the algebraic difference between the RUC Bid Cost and the RUC Market Revenues for each Bid Cost Recovery Eligible Resource for each Settlement Interval. The RUC Bid Costs shall be calculated pursuant to Section 11.8.3.1 and the RUC Market Revenues shall be calculated pursuant to Section 11.8.3.2. The CAISO will include Bid Cost Recovery costs related to Short Start Units committed in Real-Time because of awarded RUC Capacity in RTM Compensation Costs. The CAISO excludes RUC Bid Costs and RUC Market Revenues from calculations under this Section 11.8.3 to the extent the costs or revenues relate to RA Capacity that overlaps with a RUC Award for RCU or RUC Award for RCD as calculated per the methodology identified in Section 11.2.6.2.2 or Section 11.2.6.2.4, respectively.

11.8.3.1 RUC Bid Cost Calculation

For each Settlement Interval, the CAISO shall determine the RUC Bid Cost for a Bid Cost Recovery Eligible Resource as the algebraic sum of the RUC Start-Up Cost, RUC Transition Cost, RUC Minimum Load Cost, and RUC Availability Bid Cost. For Multi-Stage Generating Resources, in addition to the specific RUC Bid Cost rules described in Section 11.8.3.1, the rules described in Section 11.8.1.3 will be applied to further determine the applicable MSG Configuration-based CAISO Market Start-Up Bid Costs, Transition Bid Costs, and Minimum Load Bid Costs. For Multi-Stage Generating Resources, the incremental RUC Start-Up Costs, RUC Minimum Load Costs, and RUC Transition Costs to provide RUC awarded capacity for an MSG Configuration other than the self-scheduled MSG Configuration are determined by the RUC optimization rules in specified in Section 31.5. For each Settlement Interval, the CAISO shall determine the RUC Bid Cost for an RMR Resource as the algebraic sum of the RUC Start-Up Cost adjusted to remove Opportunity Costs and Variable Start-Up Operations and Maintenance Adders, and RUC Transition Cost adjusted to remove Opportunity Costs and Variable Start-Up Operations and Maintenance Adders.

11.8.3.1.1 RUC Start-Up Cost

The RUC Start-Up Cost for any Settlement Interval in a RUC Commitment Period shall consist of Start-Up Bid Cost of the Bid Cost Recovery Eligible Resource for the applicable RUC Commitment Period divided by the number of Settlement Intervals in the applicable RUC Commitment Period. For each Settlement Interval, only the RUC Start-Up Cost in a CAISO RUC Commitment Period is eligible for Bid Cost Recovery. The CAISO will determine the RUC Start-Up Cost for a Multi-Stage Generating Resource based on the MSG Configuration committed by the CAISO in RUC.

The following rules shall be applied in sequence and shall qualify the RUC Start-Up Cost in a RUC Commitment Period:

(a) The RUC Start-Up Cost for a RUC Commitment Period is zero if there is an IFM Commitment Period within that RUC Commitment Period.

(b) The RUC Start-Up Cost for a RUC Commitment Period is zero if the Bid Cost Recovery Eligible Resource is manually pre-dispatched under an RMR Contract prior to the Day-Ahead Market or is flagged as an RMR Dispatch in the Day-Ahead Schedule anywhere within that RUC Commitment Period.

(c) The RUC Start-Up Cost for a RUC Commitment Period is zero if there is no RUC Start-Up at the start of that RUC Commitment Period because the RUC Commitment Period is the continuation of an IFM Commitment Period, RUC Commitment Period, or RTM Commitment Period from the previous Trading Day.

(d) The RUC Start-Up Cost for a RUC Commitment Period is zero if the Start-Up is delayed beyond the RUC Commitment Period in question or cancelled by the Real-Time Market prior to the Bid Cost Recovery Eligible Resource starting its start-up process.

(e) If a RUC Start-Up is terminated in the Real-Time within the applicable RUC Commitment Period through an Exceptional Dispatch Shut-Down Instruction issued while the Bid Cost Recovery Eligible Resource is starting up, the RUC Start-Up Cost is prorated by the ratio of the Start-Up Time before termination over the RUC Start-Up Time.

(f) The RUC Start-Up Cost for a RUC Commitment Period is qualified if an actual Start-Up occurs within that RUC Commitment Period. An actual Start-Up is detected when the relevant metered Energy in the applicable Settlement Intervals indicates that the resource

is Off before the time the resource is instructed to be On as specified in its Start-Up Instruction and is On in the Settlement Intervals that fall within the CAISO RUC Commitment Period. The CAISO will determine whether the resource is On for this purpose based on whether its metered Energy is at or above the resource's Minimum Load as registered in the Master File, or if applicable, as modified pursuant to Section 9.3.3.

(g) The RUC Start-Up Cost shall be qualified if an actual Start-Up occurs. An actual Start-Up is detected when the relevant metered Energy in the applicable Settlement Intervals indicates the unit is Off before the time the resource is instructed to be On as specified in its Start Up Instruction and is On in the Settlement Intervals that fall within the CAISO RUC Commitment Period.

11.8.3.1.2 RUC Minimum Load Cost

The RUC Minimum Load Cost for the applicable Settlement Interval shall be the Minimum Load Bid Cost of the Bid Cost Recovery Eligible Resource, divided by the number of Settlement Intervals in a Trading Hour. For each Settlement Interval, only the RUC Minimum Load Cost in a CAISO RUC Commitment Period is eligible for Bid Cost Recovery. The RUC Minimum Load Cost for any Settlement Interval is zero if: (1) the Bid Cost Recovery Eligible Resource is manually pre-dispatched under a Legacy RMR Contract or the resource is flagged as an RMR Dispatch in the Day-Ahead Schedule in that Settlement Interval; (2) the Bid Cost Recovery Eligible Resource is not committed or Dispatched in the Real-time Market in the applicable Settlement Interval; or (3) the applicable Settlement Interval is included in an IFM Commitment Period. For the purposes of determining RUC Minimum Load Cost for a Bid Cost Recovery Eligible Resource, recovery of the RUC Minimum Load Cost is subject to the Real-Time Performance Metric as specified in Section 11.8.4.4. For Multi-Stage Generating Resources, the commitment period is further determined based on application of section 11.8.1.3. The RUC Minimum Load Cost calculation will be subject to the Shut-Down State Variable and disqualified as specified in Section 11.17.2.

11.8.3.1.3 RUC Availability Bid Cost

The RUC Availability Bid Cost is calculated as the product of the RUC Award with the relevant RUC Availability Bid price, divided by the number of Settlement Intervals in a Trading Hour. ~~The RUC~~

~~Availability Bid Cost for a Bid Cost Recovery Eligible Resource for a Settlement Interval is zero if the Bid Cost Recovery Eligible Resource is operating below its RUC Schedule, and also has a negative Uninstructed Imbalance Energy (UIE) magnitude in that Settlement Interval in excess of: (1) five (5) MWh divided by the number of Settlement Intervals in the Trading Hour; or (2) three percent (3%) of its maximum capacity divided by the number of Settlement Intervals in a Trading Hour.~~ The CAISO will determine the RUC Availability Bid Cost based on the ~~Multi-Stage Generating Resource Generating Unit level~~MSG Configuration. The RUC Availability Cost for a Bid Cost for an RMR Resource for a Settlement Interval is zero.

11.8.3.1.4 RUC Transition Cost

For each Settlement Interval, the RUC Transition Costs shall be based on the MSG Configuration to which the Multi-Stage Generating Resource is transitioning and is allocated to the CAISO commitment period of that MSG Configuration.

11.8.3.1.4.1 RUC Transition Costs Applicability

Within any eligible RUC CAISO Commitment Period determined pursuant to the rules specified in Section 11.8.1.3, the CAISO shall apply the RUC Transition Costs for the Settlement Intervals in which the Multi-Stage Generating Resource is actually transitioning from the “from” MSG Configuration and reaches the Minimum Load as registered in the Master File, or if applicable, as modified pursuant to Section 9.3.3, of the “to” MSG Configuration to which the Multi-Stage Generating Resource is transitioning, subject to the Tolerance Band.

11.8.3.2 RUC Market Revenues

For any Settlement Interval, the RUC Market Revenue for a Bid Cost Recovery Eligible Resource is the RUC Availability Payment as specified in Section 11.2.2.1 divided by the number of Settlement Intervals in a Trading Hour. ~~If the RUC Availability Bid Cost of a BCR Eligible Resource is reduced to zero (0) in a Settlement Interval because of Uninstructed Deviation as stated in Section 11.8.3.1.3, then the RUC Market Revenue for that resource for that Settlement Interval shall also be set to zero (0) since the resource is subject to rescission of RUC Availability Payments as specified in Section 31.5.7.~~ The CAISO will determine the RUC Market Revenues for Multi-Stage Generating Resources based on the Generating Unit level.

11.8.3.3 RUC Bid Cost Recovery for Metered Subsystem

11.8.3.3.1 MSS Elected Gross Settlement

For an MSS Operator that has elected gross Settlement, regardless of other MSS optional elections (Load following or RUC opt-in or out), the RUC Bid Cost and the RUC Market Revenue are calculated similarly to non-MSS resources on an individual resource basis as described in Sections 11.8.3.1 and 11.8.3.2, respectively.

11.8.3.3.2 MSS Elected Net Settlement

For an MSS Operator that has elected net Settlement, regardless of other MSS optional elections (Load following or RUC opt-in or out), the RUC Bid Costs and RUC Market Revenue are combined with RTM Bid Cost and RTM Market Revenue on an MSS level, consistent with the Energy Settlement as calculated according to Section 11.8.4.3.2.

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11.8.4 RTM Bid Cost Recovery Amount

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11.8.4.1 RTM Bid Cost Calculation

For each Settlement Interval, the CAISO shall calculate RTM Bid Cost for each Bid Cost Recovery Eligible Resource, as the algebraic sum of the RTM Start-Up Cost, RTM Minimum Load Cost, RTM Transition Cost, RTM Pump Shut-Down Cost, RTM Energy Bid Cost, RTM Pumping Cost, ~~and~~ RTM AS Bid Cost, and RTM GHG Bid Cost. For each Settlement Interval, the CAISO shall calculate RTM Bid Cost for each RMR Resource as the algebraic sum of the RTM Start-Up Cost adjusted to remove Opportunity Costs and Variable Start-Up Operations and Maintenance Adders, RTM Transition Costs adjusted to remove Opportunity Costs and Variable Start-Up Operations and Maintenance Adders, RTM Energy Bid Cost adjusted to remove Opportunity Costs and Variable Energy Operations and Maintenance Adders, and RTM AS Bid Cost. For Multi-Stage Generating Resources, in addition to the specific RTM

Bid Cost rules described in Section 11.8.4.1, the rules described in Section 11.8.1.3 will be applied to further determine the applicable MSG Configuration-based CAISO Market Start-Up Bid Cost, Transition Bid Cost, and Minimum Load Bid Cost, in a given Settlement Interval. For Multi-Stage Generating Resources, the incremental RTM Start-Up Cost, RTM Minimum Load Cost, and RTM Transition Cost to provide RTM committed Energy or awarded Ancillary Services capacity for an MSG Configuration other than the self-scheduled MSG Configuration are determined by the RTM optimization rules in specified in Section 34.

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11.8.4.1.7 RTM Transition Cost

For each Settlement Interval, the RTM Transition Costs shall be based on the MSG Configuration to which the Multi-Stage Generating Resource is transitioning and are allocated to the CAISO commitment period of that MSG Configuration.

11.8.4.1.7.1 RTM Transition Cost Applicability

Within any eligible RTM CAISO Commitment Period determined pursuant to the rules specified in Section 11.8.1.3, the CAISO shall apply the RTM Transition Costs for the Settlement Intervals in which the Multi-Stage Generating Resource is actually transitioning from the "from" MSG Configuration and reaches the Minimum Load as registered in the Master File, or if applicable, as modified pursuant to Section 9.3.3, of the "to" MSG Configuration to which the Multi-Stage Generating Resource is transitioning, subject to the Tolerance Band.

11.8.4.1.8 RTM GHG Bid Cost

For each Settlement Interval, the RTM GHG Bid Cost shall be the product of the RTM GHG Award from each accepted RTM GHG Bid Adder for a relevant GHG Regulation Area and the applicable Marginal GHG Cost.

11.8.4.2 RTM Market Revenue Calculations

11.8.4.2.1 For each Settlement Interval in a CAISO Real-Time Market Commitment Period, the RTM Market Revenue for a Bid Cost Recovery Eligible Resource is the algebraic sum of the elements listed

below in this Section. For Multi-Stage Generating Resources the RTM Market Revenue calculations will be made at the Generating Unit level.

(a) The sum of the products of the FMM or RTD Instructed Imbalance Energy (including Minimum Load Energy of the Bid Cost Recovery Eligible Resource committed in RUC and where for Pumped-Storage Hydro Units and Participating Load operating in the pumping mode or serving Load, the MWh is negative), except Standard Ramping Energy, Residual Imbalance Energy, Exceptional Dispatch Energy, Derate Energy, MSS Load following Energy, Ramping Energy Deviation and Regulation Energy, with the relevant FMM and RTD LMP, for each Dispatch Interval in the Settlement Interval. These amounts are subject to the Real-Time Performance Metric and the Persistent Deviation Metric as described in Sections 11.8.4.4 and 11.17, respectively.

(b) The product of the Real-Time Market AS Award from each accepted Real-Time Market AS Bid in the Settlement Interval with the relevant ASMP, divided by the number of fifteen (15)-minute Commitment Intervals in a Trading Hour (4), and prorated to the duration of the Settlement Interval.

(c) The relevant tier-1 No Pay charges for that Bid Cost Recovery Eligible Resource in that Settlement Interval.

(d) The Forecasted Movement and Uncertainty Awards Settlement Amounts as calculated pursuant to Section 11.25 are included in the RTM Market Revenues calculation, not including:

(1) the amounts rescinded pursuant to Section 11.25.3;

(2) Forecasted Movement revenue when there are changes in Self-Schedules across consecutive Trading Hours; and

(3) Forecasted Movement revenue when there are changes in EIM Base Schedules across consecutive Trading Hours without Economic Bids.

(e) The product of RTM GHG Award from each accepted RTM GHG Bid Adder and relevant Marginal GHG Cost in that Settlement Interval.

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11.8.6.5 Allocation of RUC Compensation Costs

11.8.6.5.1 Calculation of RUC Compensation Costs

For each Trading Hour of the RUC, the CAISO shall calculate the RUC Compensation Costs separately for RCU and RCD as the sum of the RUC Availability Payments for either RCU or RCD. The RUC Compensation Costs for RCU additionally include

~~and~~ the hourly Net RUC Bid Cost Uplift.

11.8.6.5.2 Calculation of the Hourly Net RUC Bid Cost Uplift

For each Trading Hour of the RUC, the hourly Net RUC Bid Cost Uplift is determined as the sum over the Settlement Intervals in that Trading Hour of the product of any positive Net RUC Bid Cost Uplift remaining in the Settlement Interval after the sequential netting in Section 11.8.6.2 and the application of the uplift ratio as determined in Section 11.8.6.3. ~~Consistent with Section 31.5.2.2, Scheduling Coordinators for MSS Operators that have opted out of RUC participation, or opt-out of RUC by default as a result of having elected to Load follow, will not be subject to any RUC Bid Cost Uplift allocation.~~ Scheduling Coordinators for MSS Operators that ~~have opted into RUC, and consequently also~~ are non-Load following and under gross Settlement~~, will~~ receive the allocation of hourly Net RUC Bid Cost Uplift like all other Scheduling Coordinators.

11.8.6.5.3 Allocation of the RUC Compensation Costs

The CAISO allocates the sum of the RUC Compensation Costs as specified below.

A Scheduling Coordinator's allocation of RCU costs in tier 1 is the product of the RCU tier 1 cost allocation quantity, as specified in Section 11.8.6.5.3.1, and the RCU tier 1 cost allocation price, as specified in Section 11.8.6.5.3.3.

A Scheduling Coordinator's allocation of RCD costs in tier 1 is the product of the RCD tier 1 cost allocation quantity, as specified in Section 11.8.6.5.3.2, and the RCD tier 1 cost allocation price, as specified in 11.8.6.5.3.4.

The CAISO allocates the costs of Reliability Capacity procurement not recovered through the RCU or

RCD tier 1 cost allocations to Scheduling Coordinators in proportion to their metered Demand in the Trading Hour- for which the CAISO procured the Imbalance Reserves.

11.8.6.5.3.1 RCU Tier 1 Cost Allocation Quantity

A Scheduling Coordinator's total RCU tier 1 cost allocation quantity is the sum of the tier 1 quantities, specified as follows.

For a Scheduling Coordinator with net Virtual Supply Awards in a Trading Hour, the RCU tier 1 cost allocation quantity associated with its Virtual Supply is the higher of: (a) zero; or (b) the Scheduling Coordinator's net Virtual Awards, if the Balancing Authority Area in which that Scheduling Coordinator is located has net Virtual Supply.

For a Scheduling Coordinator with under-scheduled Load in a Trading Hour, the RCU tier 1 cost allocation quantity associated with its under-scheduled Load is the net negative metered Demand, excluding net negative Demand associated with balanced ETC/TOR rights and negative deviation for Participating Load resulting from a market dispatch.

11.8.6.5.3.2 RCD Tier 1 Cost Allocation Quantity

A Scheduling Coordinator's total RCD tier 1 cost allocation quantity is the sum of the tier 1 quantities, specified as follows.

For a Scheduling Coordinator with net Virtual Demand Awards in a Trading Hour, the RCD tier 1 cost allocation quantity associated with its Virtual Demand is the lower of: (a) zero; or (b) the Scheduling Coordinator's net Virtual Awards, if the Balancing Authority Area in which that Scheduling Coordinator is located has net Virtual Demand.

For a Scheduling Coordinator with over-scheduled Load in a Trading Hour, the RCD tier 1 cost allocation associated with its over-scheduled Load is the net positive metered Demand, excluding net positive demand associated with balanced ETC/TOR rights and positive deviation for Participating Load resulting from a market dispatch.

11.8.6.5.3.3 RCU Tier 1 Cost Allocation Price

The RCU tier 1 cost allocation price for a Trading Hour is the lower of: (a) the RUC Compensation Costs for RCU, as adjusted by payment rescissions applied per Section 11.2.2.2, divided by the total MWs of RCU awards; and (b) the RUC Compensation Costs for RCU to meet Measured Demand divided by

the sum of each Scheduling Coordinator's RCU tier 1 cost allocation quantity in that Trading Hour.

11.8.6.5.3.4 RCD Tier 1 Cost Allocation Price

The RCD tier 1 cost allocation price for a Trading Hour is the lower of: (a) the RUC Compensation Costs for RCD, as adjusted by payment rescissions applied per Section 11.2.2.2, divided by the total MWs of RCD awards; and (b) the RUC Compensation Costs for RCD to meet Measured Demand divided by the sum of each Scheduling Coordinator's RCD tier 1 cost allocation quantity in that Trading Hour

11.8.6.5.3.5 Reliability Capacity Cost Allocation to MSSs

The CAISO allocates costs of Reliability Capacity to a MSS the same as any other Scheduling Coordinator irrespective of the MSS's election, per Section 4.9.13, of net Settlements or gross Settlements.

The CAISO does not allocate costs of Reliability Capacity from either tier 1 or tier 2 to a MSS that has elected, per Section 4.9.13, to Load follow with its generating resources.

11.8.6.5.3.6 Reliability Capacity Cost Allocation to Holders of ETCs or TORs

The CAISO excludes from tier 1 and tier 2 allocations for both RCU and RCD the valid and balanced portion of ETC and TOR self-schedules. The CAISO does not exclude from the Reliability Capacity cost allocations any quantities above the valid and balanced portion of ETC or TOR self-schedules.

~~**11.8.6.5.3.1 Allocation of the First Tier**~~

~~Hourly RUC Compensation Costs are allocated in the first tier as follows:~~

~~(i) The amount of RUC Compensation Costs allocated to each Scheduling Coordinator is equal to the product of the RUC Bid Cost Uplift rate and the RUC obligation for the Scheduling Coordinator. Participating Load will not be subject to the first-tier allocation of RUC Compensation Costs to the extent that the Participating Load's Net Negative CAISO Demand Deviation in that Trading Hour is incurred pursuant to a CAISO directive to consume in a Dispatch Instruction.~~

~~(ii) The RUC Bid Cost Uplift rate is equal to the lower of (a) the RUC Compensation Costs to meet Measured Demand divided by the sum of each Scheduling Coordinator's Net Negative CAISO Demand Deviation and any positive net system-wide Virtual Supply~~

~~Awards in that Trading Hour, or (b) the RUC Compensation Cost divided by the total RUC Award, for all Scheduling Coordinators in that Trading Hour.~~

~~(iii) The RUC obligation for each Scheduling Coordinator is equal to the sum of the Net Negative CAISO Demand Deviation for the Scheduling Coordinator in that Trading Hour and any RUC Bid Cost obligation for Virtual Supply Awards for the Scheduling Coordinator.~~

~~(iv) The portion of the RUC Compensation Costs to meet Measured Demand are equal to the RUC Compensation Cost minus the excess load share, where the excess load share is equal to the product of (a) the RUC Compensation Cost divided by total RUC Capacity and (b) the maximum of zero (0) or the amount by which the CAISO Forecast of CAISO Demand exceeds Measured Demand.~~

~~(v) For each Scheduling Coordinator with positive net Virtual Supply Awards, the RUC Bid Cost obligation for Virtual Supply Awards is equal to the product of (a) the positive net Virtual Supply Awards for the Scheduling Coordinator divided by the sum of each Scheduling Coordinator's positive net Virtual Supply Awards and (b) any positive net system-wide Virtual Supply Awards. For each Scheduling Coordinator with non-positive net Virtual Supply Awards, the RUC Bid Cost obligation for Virtual Supply Awards is zero (0).~~

~~**11.8.6.5.3.2 Allocation in the Second Tier**~~

~~In the second tier, the Scheduling Coordinator shall be charged an amount equal to any remaining RUC Compensation Costs in proportion to the Scheduling Coordinator's metered CAISO Demand in any Trading Hour, including any RUC Compensation Costs that were not recovered in the first tier pursuant to Section 11.8.6.5.3.1.~~

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11.10.6 Upward Ancillary Services Neutrality Adjustment

For each Settlement Period the difference between the upwards Ancillary Service cost and the sum of the total Ancillary Services obligation and neutrality adjustments will be allocated to all Scheduling

Coordinators in proportion to their upward Ancillary Service Obligation (before taking into consideration the Inter-SC Trades of Ancillary Services). The CAISO shall exclude EDAM Transfers and EIM Transfers between the CAISO and an EDAM Entity, or an EIM Entity, from the calculation of the upwards Ancillary Service Obligation for this neutrality adjustment. The upwards Ancillary Service cost is the sum of the upward Ancillary Services payments made pursuant to Sections 11.10.1.1, 11.10.1.2, and 11.10.3.1. The total upward Ancillary Services obligation and neutrality adjustments is the sum of the requirements in Sections 11.10.2.2.2, 11.10.2.2.3, 11.10.3.1, 11.10.3.4, 11.10.4.1, and 11.10.4.4.

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11.14 Neutrality

The CAISO shall be authorized to levy additional charges or make additional payments as special adjustments in regard to:

(a) amounts required to reach an accounting trial balance of zero in the course of the Settlement process in the event that the charges calculated as due from CAISO Debtors are lower than payments calculated as due to the CAISO Creditors for the same Trading Day, which includes any amounts required to round up any invoice amount expressed in dollars and cents to the nearest whole dollar amount. These charges will be allocated amongst the Scheduling Coordinators who traded on that Trading Day pro rata to their Measured Demand in MWh of Energy for that Trading Day on a monthly basis. In the event that the charges due from CAISO Debtors are higher than the payments due to CAISO Creditors, the CAISO shall allocate a payment to the Scheduling Coordinators who traded on that Trading Day pro rata to their Measured Demand in MWh of Energy for that Trading Day on a monthly basis; and

(b) awards payable by or to the CAISO pursuant to good faith negotiations or CAISO ADR Procedures that the CAISO is not able to allocate to or to collect from a Market Participant or Market Participants in accordance with Section 13.5.3. These charges will be allocated among Scheduling Coordinators over an interval determined by the CAISO

and pro rata based on EDAM Measured Demand during that interval, if the dispute concerned the IFM, EIM Measured Demand during that interval, if the dispute concerned the Real-Time Market or RUC, or otherwise Measured Demand during that interval.

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11.25 Settlement of Flexible Ramping Product

11.25.1 Settlement of Forecasted Movement

11.25.1.1 Generally

The CAISO will settle Forecasted Movement for a direction as specified in this Section 11.25.1 by Balancing Authority Area for each Balancing Authority Area that has a distinct Uncertainty Requirement for that direction, as specified in Section 44.2.4.1, and separately will settle Forecasted Movement for a direction as specified in this Section 11.25.1 for the group of Balancing Authority Areas that shares a common Uncertainty Requirement for that direction, as specified in Section 44.2.4.1.

11.25.1.2 FMM.

~~The CAISO will settle FMM Forecasted Movement with Scheduling Coordinators as follows, where upward movement is a positive amount and downward movement is a negative amount:~~

~~(a) the product of the Forecasted Movement calculated for each resource pursuant to Section 44.3 in MWhs and the FMM FRUP; plus~~

~~(b) the product of the Forecasted Movement calculated for each resource pursuant to Section 44.3 in MWhs and the product of the FMM FRDP and negative one.~~

The CAISO settles FMM Forecasted Movement with Scheduling Coordinators as the product of: (a) the difference between the FMM Forecasted Movement quantity and the DAM Forecasted Movement Quantity or Base Schedule Forecasted Movement quantity; and (b) the difference between the FMM Flexible Ramp Up Price and the FMM Flexible Ramp Down Price.

11.25.1.3 RTD.

~~The CAISO will settle RTD Forecasted Movement with Scheduling Coordinators as follows, where upward movement is a positive amount and downward movement is a negative amount:~~

~~(a) the product of the difference between the RTD Forecasted Movement and the FMM Forecasted Movement for the relevant Settlement Interval, both calculated for each resource pursuant to Section 44.3 in MWhs, and the RTD FRUP, less any rescission amounts pursuant to section 11.25.3; plus~~

~~(b) the product of the difference between the RTD Forecasted Movement and the FMM Forecasted Movement for the relevant Settlement Interval, both calculated for each resource pursuant to Section 44.3 in MWhs, and the product of the RTD FRDP and negative one, less any rescission amounts pursuant to section 11.25.3.~~

The CAISO settles RTD Forecasted Movement with Scheduling Coordinators as the product of: (a) the difference between the RTD Forecasted Movement quantity and the FMM Forecasted Movement Quantity; and (b) the difference between the RTD Flexible Ramp Up Price and the RTD Flexible Ramp Down Price.

11.25.1.4 Allocation of Residual Forecasted Movement Settlements.

For Balancing Authority Areas that share a common Uncertainty Requirement for a direction, as specified in Section 44.2.4.1, the CAISO allocates the algebraic sum of the funds remaining after it settles Forecasted Movement for a direction pursuant to Sections 11.3.1, 11.3.2, and 11.25.1 to each Scheduling Coordinator's metered CAISO Demand, metered EDAM Demand, or metered EIM Demand in proportion to its share of the sum of metered CAISO Demand, metered EDAM Demand, and metered EIM Demand within that group of Balancing Authority Areas sharing a common Uncertainty Requirement.~~the CAISO will settle amounts remaining after settlement of Forecasted Movement pursuant to Section 11.25.1 to each Scheduling Coordinator based on its EIM Demand or metered CAISO Demand in proportion to the total EIM Demand and metered CAISO Demand within that group of Balancing Authority Areas sharing a common Uncertainty Requirement~~.

For a Balancing Authority Area that has a distinct Uncertainty Requirement for a direction, as specified in Section 44.2.4.1, the CAISO allocates the algebraic sum of the funds remaining after it settles Forecasted Movement for a direction pursuant to Sections 11.3.1, 11.3.2, and 11.25.1 to each Scheduling Coordinator's metered Demand in proportion to its share of the sum of metered Demand within that single Balancing Authority Area.~~the CAISO will settle amounts remaining after settlement of Forecasted~~

~~Movement pursuant to Section 11.25.1 to each Scheduling Coordinator based on its EIM Demand or metered CAISO Demand in proportion to the total EIM Demand or metered CAISO Demand within that single Balancing Authority Area.~~

The allocation to Scheduling Coordinators is a charge if the algebraic sum of funds remaining is negative and a payment if the algebraic sum is positive.

11.25.2 Settlement of Uncertainty Requirement

11.25.2.1 Payment to Resources.

11.25.2.1.1 FMM Uncertainty Awards

For a resource with an IRU Award, the CAISO applies a deviation settlement as the product of the Flexible Ramp Up Price and the difference between the upward Five-minute Imbalance Reserve Quantity and the upward FMM Uncertainty Award.

For a resource with an IRD Award, the CAISO applies a deviation settlement as the product of the Flexible Ramp Down Price and the difference between the downward Five-minute Imbalance Reserve Quantity and downward FMM Uncertainty Award.

If a resource has no Imbalance Reserves Award, then the CAISO settles upward and downward Uncertainty Awards as the product of the Uncertainty Award and the Flexible Ramp Up Price, in the case of an upward Uncertainty Award, or the Flexible Ramp Down Price, in the case of a downward Uncertainty Award.

11.25.2.1.2 RTD Uncertainty Awards

The CAISO settles RTD Uncertainty Awards with Scheduling Coordinators as the algebraic sum of the upward uncertainty awards defined in part (a) of this Section 11.25.2.1.2 and the downward uncertainty awards defined in part (b) of this Section 11.25.2.1.2.

(a) Upward Uncertainty Awards – the product of the RTD Flexible Ramp Up Price and the difference between the upward RTD Uncertainty Award quantity and the upward FMM Uncertainty Award quantity for the relevant Settlement Interval, both calculated for each resource pursuant to Section 44.2 in MWhs, less any rescission amounts pursuant to section 11.25.3.

(b) Downward Uncertainty Awards – the product of the RTD Flexible Ramp Down Price and the difference between the downward RTD Uncertainty Award quantity and the downward FMM Uncertainty Award quantity for the relevant Settlement Interval, both calculated for each resource pursuant to Section 44.2 in MWhs, less any rescission amounts pursuant to section 11.25.3.

~~On a daily basis, the CAISO will settle awards to resources for providing the Uncertainty Requirement at the applicable FRUP or FRDP less any payment rescission for each interval pursuant to Section 11.25.3.~~

11.25.2.2 Allocation of Costs of Uncertainty Movement Procured.

11.25.2.2.1 Settlement Process.

(a) **Generally.** The CAISO will settle Uncertainty Awards for a direction as specified in this Section 11.25.2.2 by Balancing Authority Area for each Balancing Authority Area that has a distinct Uncertainty Requirement for that direction, as specified in Section 44.2.4.1, or separately will settle Uncertainty Awards for a direction as specified in this Section 11.25.2.2 for the group of Balancing Authority Areas that shares a common Uncertainty Requirement for that direction, as specified in Section 44.2.4.1.

(b) **Daily.** The CAISO will initially—

(1) allocate the cost of the Uncertainty Awards for a direction on a daily basis according to the categories as set forth in Sections 11.25.2.2.2 and 11.25.2.2.3 within the group of Balancing Authority Areas that shares a common Uncertainty Requirement for that direction or within a Balancing Authority Area that has a distinct Uncertainty Requirement for that direction, as applicable; and

(2) allocate the daily amounts to Scheduling Coordinators

as set forth in Section 11.25.2.2.4.

(c) **Monthly.** The CAISO will resettle the costs of the Uncertainty Awards by—

(1) reversing the daily allocation;

(2) assigning the monthly costs of the Uncertainty Awards to Peak Flexible Ramp Hours and Off-Peak Flexible Ramp Hours;

(3) separately allocating the monthly Peak Flexible Ramp Hours amounts and Off-Peak Flexible Ramp Hours amounts to the categories as set forth in Sections 11.25.2.2.2 and 11.25.2.2.3 within the group of Balancing Authority Areas that shares a common Uncertainty Requirement for that direction or within a Balancing Authority Area that has a distinct Uncertainty Requirement for that direction, as applicable; and

(4) allocating the monthly amounts in each category to Scheduling Coordinators as set forth in Section 11.25.2.2.4.

11.25.2.2.2 Allocation of Charges to Categories.

(a) **Determination of Uncertainty Movement for Resources.** For each interval, the CAISO will calculate the net Uncertainty Movement of each resource according to the following categories:

(1) for Supply resources other than non-Dynamic System Resources as the difference between the Dispatch Instruction of the binding interval in the next RTD run and the first advisory RTD interval in the current run.

(2) for non-Dynamic System Resources and export schedules as the difference between the schedule used in the RTD (accounting for ramp) for the binding interval in the next RTD run and the schedule used for the first advisory interval

in the current RTD run.

(b) **RTD Uncertainty Movement.** The CAISO will determine the total net RTD Uncertainty Movement for each category separately for the group of Balancing Authority Areas that shares a common Uncertainty Requirement for that direction or a Balancing Authority Area that has a distinct Uncertainty Requirement for that direction, as applicable—

(1) for the category of Supply resources, which shall not include non-Dynamic System Resources, as the net sum of the five-minute Uncertainty Movement determined pursuant to Section 11.25.2.2.2 of all the Supply resources in the category.

(2) for the category of Intertie resources, which shall comprise non-Dynamic System Resources and exports, as the net sum of the five-minute Uncertainty Movement determined pursuant to Section 11.25.2.2 of all the non-Dynamic System resources and export schedules.

(3) for the non-Participating Load category, as the difference between –

(A) the CAISO Forecast of BAA Demand ~~CAISO Forecast of CAISO Demand, the CAISO forecast of Balancing Authority Area EIM Demand, or the CAISO forecast of EIM Area EIM Demand, as applicable,~~ of the binding interval in the next RTD run; and

(B) CAISO Forecast of BAA Demand ~~the CAISO Forecast of CAISO Demand, the CAISO forecast of Balancing Authority Area EIM Demand, or the CAISO forecast of EIM Area EIM Demand, as applicable,~~ for the first advisory interval in the current RTD run.

* * * * * *

11.29.5.3 Data Files

Settlement Statements relating to each Scheduling Coordinator, CRR Holder, Black Start Generator or Participating TO will be accompanied by data files of supporting information that includes the following for

each Settlement Period of the Trading Day:

(a) the aggregate quantity (in MWh) of Energy supplied or withdrawn by the Scheduling Coordinator Metered Entities represented by the Scheduling Coordinator;

(b) the aggregate quantity (in MW) and type of Ancillary Services capacity provided or purchased;

(c) the relevant prices that the CAISO has applied in its calculations;

(d) details of the scheduled quantities of Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services accepted by the CAISO in the Day-Ahead Market and the RTM;

(e) details of FMM Instructed Imbalance Energy or RTD Imbalance Energy and penalty payments;

(f) details of any payments or charges associated with the CRR Auctions; and

(g) detailed calculations of all fees, charges and payments allocated among Scheduling Coordinators and each Scheduling Coordinator's share.

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11.29.17.2 Payment Default Allocation

11.29.17.2.1 Methodology for Allocating Payment Default Amounts

Each payment default amount allocated to CAISO Creditors through a shortfall allocation pursuant to Section 11.29.17.1 and that remains unpaid by the defaulting CAISO Debtor will be allocated on the next practicable Invoices to the Default-Invoiced SCIDs to which the percentage shares calculated pursuant to Section 11.29.17.2.7 for the current calendar quarter apply, excluding the CAISO Debtor that has not paid the payment default amount, pursuant to the following methodology:

(a) Twenty (20) percent of the payment default amount will be allocated to the Default-Invoiced SCIDs in proportion to the net amounts that were payable in each applicable calendar quarter (and averaged within such calendar quarter) to the Default-Invoiced SCIDs over the applicable Default Look-Back Periods. For Market Participants subject to Default Election option 1, these net amounts will be calculated on an SCID-by-SCID

basis. For Market Participants that are eligible for and have chosen Default Election option 2, these net amounts will be calculated by consolidating all of the data for the applicable SCIDs, recognizing any offsetting effect of an individual SCID's positive or negative dollar amount in the consolidated total.

(b) Thirty (30) percent of the payment default amount will be allocated to the Default-Invoiced SCIDs in proportion to the sum of the absolute values of the dollar amounts shown on their Invoices payable or receivable in each applicable calendar quarter (and averaged within such calendar quarter) over the applicable Default Look-Back Periods, after excluding dollar amounts shown on the Invoices for payments and charges for GMC, RMR, and Wheeling Access Charge costs, and after excluding the billing of Access Charges and the payment of Transmission Revenue Requirements to Participating Transmission Owners. For Market Participants subject to Default Election option 1, the sum of the absolute values of the dollar amounts shown on their Invoices payable or receivable in each applicable calendar quarter will be calculated on an SCID-by-SCID basis. For Market Participants that are eligible for and have chosen Default Election option 2, the absolute values of the net sum of the dollar amounts shown on their Invoices payable or receivable in each applicable calendar quarter will be calculated by consolidating all of the data for the applicable SCIDs, recognizing any offsetting effect of an individual SCID's positive or negative dollar amount in the consolidated total.

(c) Fifty (50) percent of the payment default amount will be allocated to the Default-Invoiced SCIDs in proportion to the largest of the following five (5) amounts calculated in MWh for every month in each applicable calendar quarter (and averaged within such calendar quarter) for each Default-Invoiced SCID over the applicable Default Look-Back Periods:

(1) Cleared Day-Ahead Schedules to supply Energy, plus Day-Ahead Ancillary Services Awards and qualified Self-Provided Ancillary Services, plus scheduled supply obligation for Ancillary Services (including imports but excluding RUC

~~Schedules~~Awards), plus Virtual Supply Awards;

(2) Metered Generation, plus Real-Time Interchange Import Schedules, plus Real-Time Ancillary Services Awards and qualified Self-Provided Ancillary Services, plus FMM Ancillary Services Awards and qualified Self-Provided Ancillary Services, plus Real-Time supply obligation for Ancillary Services;

(3) Cleared Day-Ahead Schedules for Demand (including Demand served by Pumped-Storage Hydro Units and exports) multiplied by one-hundred three (103) percent to reflect Transmission Losses, plus scheduled demand obligation for Ancillary Services, plus Virtual Demand Awards;

(4) Metered Load multiplied by one-hundred three (103) percent to reflect Transmission Losses, plus Real-Time Interchange Export Schedules, plus Real- Time demand obligation for Ancillary Services; or

(5) The greater of (A) the quantity of CRRs acquired in CRR Auctions or transferred through the Secondary Registration System (excluding CRRs acquired in CRR Allocations) or (B) Inter-SC Trades of Energy.

For Market Participants subject to Default Election option 1, each of the five (5) amounts calculated in MWh for every month in each applicable calendar quarter (and averaged within such calendar quarter) will be calculated on an SCID-by-SCID basis. For Market Participants that are eligible for and have chosen Default Election option 2, each of the five (5) amounts calculated in MWh for every month in each applicable calendar quarter (and averaged within such calendar quarter) will be calculated by consolidating all of the data for the applicable SCIDs.

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Section 27

In the Day-Ahead and Real-Time time frames the CAISO operates a series of procedures and markets that together comprise the CAISO Markets Processes. In the Day-Ahead time frame, the CAISO conducts the Market Power Mitigation (MPM) process, the Integrated Forward Market (IFM) and the Residual Unit Commitment (RUC) process. In the Real-Time time frame, the CAISO does the following: 1) accepts the Economic Bids and Self-Schedules used in the Real-Time Market procedures, 2) conducts the MPM process for the RTM, 3) accepts and awards HASP Block Intertie Schedules for Energy and Ancillary Services, 4) provides HASP Advisory Schedules for Energy and Ancillary Services for Bids that do not create a HASP Block Intertie Schedule, 5) conducts the Real-Time Unit Commitment (RTUC), 6) conducts the Short-Term Unit Commitment (STUC), 7) conducts the Fifteen Minute Market (FMM), and 8) conducts the five-minute Real-Time Dispatch (RTD). As appropriate, the CAISO Markets Processes utilize transmission and Security Constrained Unit Commitment and dispatch algorithms in conjunction with a Base Market Model adjusted as described in Sections 27.5.1 and 27.5.6 to optimally commit, schedule and Dispatch resources and determine marginal prices for Energy, Imbalance Reserves, Ancillary Services and RUC Capacity. Congestion Revenue Rights are available and entitle holders of such instruments to a stream of hourly payments or charges associated with revenue the CAISO collects or pays from the Marginal Cost of Congestion component of hourly Day-Ahead LMPs for Energy, Locational IRU Prices, and Locational IRD Prices. Through the operation of the CAISO Markets Processes the CAISO develops Day-Ahead Schedules, Imbalance Reserves Awards, Day-Ahead AS Awards and RUC Schedules, HASP Block Intertie Schedules for Energy and AS Awards, HASP Advisory Schedules, FMM Energy Schedules, and FMM Ancillary Services Awards, Real-Time AS Awards and Dispatch Instructions to ensure that sufficient supply resources are available in Real-Time to balance Supply and Demand and operate in accordance with Reliability Criteria.

27.1 LMPs and Ancillary Services Marginal Prices

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27.1.1 Locational Marginal Prices for Energy

As further described in Appendix C, the LMP for Energy at any PNode is the marginal cost of serving the next increment of Demand at that PNode calculated by the CAISO through the operations of the CAISO Markets considering, as described further in the CAISO Tariff, among other things, modeled Transmission Constraints (including Remedial Action Schemes), transmission losses, the performance characteristics of resources, and Bids submitted by Scheduling Coordinators and as modified through the Locational Market Power Mitigation process. The LMP at any given PNode is comprised of four~~three~~ marginal cost components: the ~~System~~ Marginal Energy Cost (~~S~~MEC); Marginal Cost of Losses (MCL); ~~and~~ Marginal Cost of Congestion (MCC); and Marginal Greenhouse Gas Cost. Through the IFM the CAISO calculates LMPs for each Trading Hour of the next Trading Day. Through the FMM the CAISO calculates distinct financially binding fifteen-minute LMPs for each of the four fifteen-minute intervals within a Trading Hour. Through the Real-Time Dispatch, the CAISO calculates five-minute LMPs for each of the twelve (12) five (5) minute Dispatch Intervals of each Trading Hour. The CAISO uses the FMM or RTD LMPs for Settlements of the Real-Time Market.

27.1.1.1 ~~System~~ Marginal Energy Cost

The ~~System~~ Marginal Energy Cost (~~S~~MEC) component of the LMP reflects the marginal cost of providing Energy from a designated reference Location. For this designated reference Location the CAISO will utilize a distributed Reference Bus whose constituent PNodes are weighted in proportions referred to as Reference Bus distribution factors. The ~~S~~MEC shall be the same throughout the ~~system.~~Balancing Authority Area.

27.1.1.2 Marginal Cost of Losses

For all PNodes and Aggregated PNodes in the CAISO Balancing Authority Area, including Scheduling Points, the use of the Base Market Model adjusted as described in Sections 27.5.1 and 27.5.6 in the DAM and the RTM processes incorporates Transmission Losses. At each PNode or Aggregated PNode, the Marginal Cost of Losses is the ~~System~~ Marginal Energy Cost multiplied by the Marginal Loss factor at that PNode or Aggregated PNode. The Marginal Cost of Losses at a Location (PNode or APNode) may be positive or negative depending on whether an increase in Demand at that Location marginally increases or decreases the cost of Transmission Losses, using the distributed Reference Bus to balance it. The Marginal Loss factors are determined through a process that calculates the sensitivities of Transmission

Losses with respect to changes in injection at each Location in the FNM. For CAISO Controlled Grid facilities outside the CAISO Balancing Authority Area, the CAISO shall assess the cost of Transmission Losses to Scheduling Coordinators using each such facility based on the quantity of losses agreed upon with the neighboring Balancing Authority multiplied by the LMP at the PNode of the Transmission Interface with the neighboring Balancing Authority Area. The MCLs calculated for Locations within the CAISO Balancing Authority Area shall not reflect the cost of Transmission Losses on those facilities.

27.1.1.3 Marginal Cost of Congestion

The Marginal Cost of Congestion at a PNode reflects the net contributiona ~~linear combination~~ of the Shadow Prices of the binding Transmission Constraints (including Remedial Action Schemes) at the optimal solution~~in the network~~, weighted~~multiplied~~ by the corresponding Power Transfer Distribution Factors (PTDFs), ~~and coefficient relevant to the transmission segment within that constraint, which~~ as~~is~~ described in Appendix C. The Marginal Cost of Congestion for a Transmission Constraint may be positive or negative depending on whether a power injection at that Location marginally increases or decreases Congestion.

27.1.1.3.1 Marginal GHG Cost

The Marginal GHG Cost at a PNode reflects the allocation of a GHG Transfer for a GHG Regulation Area as described in Appendix C. The Marginal GHG Cost for a GHG Regulation Area may be positive or zero depending on the resources receiving an attribution of GHG Transfers for that GHG Regulation Area.

27.1.1.4 Disconnected Pricing Node or Aggregated Pricing Node

In the event that a Pricing Node or Aggregated Pricing Node becomes electrically disconnected from the market model during a CAISO Market run, the LMP, including the ~~System~~ Marginal Energy Cost, Marginal Cost of Congestion, ~~and~~ Marginal Cost of Losses, and Marginal Greenhouse Gas Cost at the closest electrically connected Pricing Node will be used as the LMP at the affected location. The CAISO will include the impact of the disconnected Pricing Node on any modeled Remedial Action Scheme in determining the LMP.

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27.1.2 Ancillary Service Prices

27.1.2.1 Ancillary Service Marginal Prices – Sufficient Supply

As provided in Section 8.3, Ancillary Services are procured and awarded through the IFM and the FMM, and the CAISO also accepts and awards HASP Block Intertie Schedules for Ancillary Services in HASP. Ancillary Services awarded through HASP are made financially binding in the FMM. The IFM calculates hourly Day-Ahead Ancillary Service Awards and establishes Ancillary Service Marginal Prices (ASMPs) for the accepted Regulation Up, Regulation Down, Spinning Reserve and Non-Spinning Reserve Bids. The IFM co-optimizes Energy, Imbalance Reserves, and Ancillary Services subject to resource, network and regional constraints. In the HASP, the CAISO accepts and awards Ancillary Services from HASP Block Intertie Schedules for the next Trading Hour as described in Section 34.2. The CAISO calculates the price for the settlement of Ancillary Services accepted and awarded in HASP based on the FMM ASMP as described herein and further described in Section 34.4. The FMM process that is performed every fifteen (15) minutes establishes fifteen (15) minute Ancillary Service Schedules, Awards, and prices for the upcoming quarter of the given Trading Hour. ASMPs are determined by first calculating Shadow Prices of Ancillary Services for each Ancillary Service type and the applicable Ancillary Services Regions. The Ancillary Services Shadow Prices are produced as a result of the co-optimization of Energy and Ancillary Services through the IFM and the Real-Time Market, subject to resource, network, and requirement constraints. The Ancillary Services Shadow Prices represent the marginal cost of the relevant binding regional constraints at the optimal solution, or the reduction of the combined Energy and Ancillary Service procurement cost associated with a marginal relaxation of that constraint. If the constraint for an Ancillary Services Region is not binding, the corresponding Ancillary Services Shadow Price in the Ancillary Services Region is zero (0). During periods in which supply is sufficient, the ASMP for a particular Ancillary Service type and Ancillary Services Region is then the sum of the Ancillary Services Shadow Prices for the specific type of Ancillary Service and all the other types of Ancillary Services for which the subject Ancillary Service can substitute, as described in Section 8.2.3.5, for the given Ancillary Service Region and all the other Ancillary Service Regions that include that given Ancillary Service Region. During periods in which supply is insufficient, the ASMP for a particular Ancillary Service type and Ancillary Services Region will reflect the Scarcity Reserve Demand Curve Values set forth in

Section 27.1.2.3.

27.1.2.2 Opportunity Cost in ASMP

The Ancillary Services Shadow Price, which, as described above, is a result of co-optimizing procurement of Energy, Imbalance Reserves, and Ancillary Services, ~~the Energy and Ancillary Service co-optimization,~~ includes the foregone opportunity cost of the marginal resource, if any, for not providing Energy, Imbalance Reserves, or Ancillary Services ~~or other types of Ancillary Services~~ the marginal resource is capable of providing in the relevant market. The ASMPs determined by the IFM or FMM optimization process for each resource whose Ancillary Service Bid is accepted will be no lower than the sum of (i) the Ancillary Service capacity Bid price submitted for that resource, and (ii) the foregone opportunity cost of Energy or Imbalance Reserves in the IFM or Energy and FRP in the FMM for that resource. The foregone opportunity cost of Energy or Imbalance Reserves for this purpose is measured as the positive difference between the price in the relevant market for the given product ~~IFM or FMM LMP~~ at the resource's Pricing Node and the resource's Bid price~~Energy Bid price~~ in the relevant market for the given product. If the ~~resource's Energy~~ Bid price for the resource is higher than the LMP, the opportunity cost measured for this calculation is $0. If a resource has submitted an Ancillary Service Bid but no Energy Bid and ~~is under an obligation to offer Energy in the Day-Ahead Market (e.g. a non-hydro Resource Adequacy Resource)~~this Tariff obligates the resource to submit Bids for Energy in the Day-Ahead Market, then the CAISO inserts an Energy Bid at its Default Energy Bid ~~will be used,~~ and the CAISO calculates its opportunity cost ~~will be calculated accordingly~~based on that Default Energy Bid. If a resource has submitted an Ancillary Service Bid but no Energy Bid and is not under an obligation to offer Energy in the Day-Ahead Market, its Energy opportunity cost measured for this calculation is $0 since it cannot be dispatched for Energy. For Self-Scheduled Hourly Block Bids for Ancillary Services awarded in the Real-Time Market, the opportunity cost measured for this purpose is $0 because, as provided in Section 34.2.3, the CAISO cannot Schedule Energy in the Real-Time Market from the Energy Bid under the same Resource ID as the submitted Ancillary Service Bid.

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27.1.2.4 Opportunity Cost in LMPs for Energy

In the event that there is insufficient supply to meet an Ancillary Services procurement requirement in a particular Ancillary Service Region or Sub-Region, the Ancillary Services Shadow Prices will rise automatically to the Scarcity Reserve Demand Curve Values in that Ancillary Service Region or Sub-Region. LMPs for Energy will reflect the forgone opportunity cost of the marginal resource, if any, for not providing ~~the scarce Ancillary Services consistent with the CAISO's co-optimization design~~other products procured in the IFM.

* * * * *

27.1.4 Locational IRU Price and Locational IRD Price

As further described in Appendix C, the Locational IRU Price or Locational IRD Price at any PNode is the marginal cost of procuring the next increment of IRU or IRD, respectively, at that PNode calculated by the CAISO through the operations of the CAISO Markets considering, as described further in the CAISO Tariff, among other things, modeled Transmission Constraints (including Remedial Action Schemes), the performance characteristics of resources, and Imbalance Reserves Bids submitted by Scheduling Coordinators as modified by the IFM MPM. The Locational IRU Price or Locational IRD Price at a PNode is comprised of two marginal cost components: (1) the Shadow Price of the IRU or IRD procurement constraint for the relevant BAA in the EDAM Area; and (2) the MCC for IRU or IRD.

27.1.5 Locational RCU Price and Locational RCD Price

As further described in Appendix C, the Locational RCU Price or Locational RCD Price at any PNode is the marginal cost of procuring the next increment of RCU or RCD, respectively, at that PNode calculated by the CAISO through the operations of the CAISO Markets considering, as described further in the CAISO Tariff, among other things, modeled Transmission Constraints (including Remedial Action Schemes), the performance characteristics of resources, and RUC Availability Bids submitted by Scheduling Coordinators as modified by the RUC MPM. The Locational RCU Price or Locational RCD Price at a PNode is comprised of three marginal cost components: (1) the Shadow Price of the RUC

power balance constraint for the relevant BAA in the EDAM Area; (2) the Marginal Cost of Losses; and (3) the MCC for RCU or RCD.

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27.4.3.4 Protection of TOR, ETC and Converted Rights Self-Schedules in the IFM

In accordance with the submitted and accepted TRTC Instructions, valid Day-Ahead TOR Self-Schedules, Day-Ahead ETC Self-Schedules and Day-Ahead Converted Rights Self-Schedules shall not be adjusted in the IFM in response to an insufficiency of Effective Economic Bids. The scheduling parameters associated with the TOR, ETC, or Converted Rights Self-Schedules will be set to values higher than the scheduling parameter associated with relaxation of an enforced internal and Intertie Transmission Constraint as specified in Section 27.4.3.2, so that when there is a congested Transmission Constraint that would otherwise subject a Supply or Demand resource submitted in a valid and balanced ETC, TOR or Converted Rights Self-Schedule to adjustment in the IFM, the IFM software will relax the Transmission Constraint rather than curtail the TOR or ETC Self-Schedule. This priority will be adhered to by the operation of the IFM Market Clearing software, and if necessary, by adjustment of Schedules after the IFM has been executed and the results have been reviewed by the CAISO operators.

27.4.3.5 Effectiveness Threshold

The CAISO Markets software includes a lower effectiveness threshold setting that governs whether the software will consider a bid “effective” for managing congestion on a congested Transmission Constraint, which in the case of Nomograms will be applied to the individual flowgates that make up the Nomogram, rather than to the Nomogram itself. For the purposes of applying these thresholds in procuring Imbalance Reserves Awards under Section 31.3.1.6.3, the CAISO considers the product of the shift factor and the Deployment Factor.

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27.13 Aggregate Capability Constraint

At the request of the Interconnection Customer, the CAISO may enforce an Aggregate Capability Constraint for Generating Facilities with Co-located Resources that reflects a Generating Facility's maximum and minimum capability or a portion of that capability for purposes of Day-Ahead Market Awards, Real-Time Market Awards, and Real-Time Dispatch as described in the CAISO's Business Practice Manuals. If the combined PMax of Co-located Resources associated with a single Generating Facility would exceed the Interconnection Service Capacity of that Generating Facility, the Interconnection Customer may request that the CAISO enforce an Aggregate Capability Constraint or multiple Aggregate Capability Constraints at the Generating Facility as described in the CAISO's Business Practice Manuals. If the Interconnection Customer requests that the CAISO enforce multiple Aggregate Capability Constraints, the CAISO will enforce an Aggregate Capability Constraint at the Generating Facility level and subordinate Aggregate Capability Constraints at the level of Resource IDs. If the Interconnection Customer does not elect an Aggregate Capability Constraint(s), the combined PMax of the Co-located Resources registered in the Master File for that Generating Facility may not exceed the Generating Facility's Interconnection Service Capacity. EIM Participating Resource Scheduling Coordinators also may request that the CAISO enforce an Aggregate Capability Constraint or multiple Aggregate Capability Constraints for Co-located Resources, subject to the prior written approval of the applicable EIM Entity Balancing Authority that enforcing an Aggregate Capability Constraint(s) for Co-located Resources does not create a threat to safety or reliability.

As described in the CAISO's Business Practice Manuals the CAISO may relax enforcement of subordinate Aggregate Capability Constraints in its Real-Time Market prior to relaxing enforcement of the system energy-balance constraint specified in Sections 27.4.3.3.4 to ensure there is sufficient Supply to meet the CAISO Forecast of CAISO Demand.

Notwithstanding Section 34.13, a Generating Facility whose Co-located Resources, including Variable Energy Resources, do not comply with Dispatch Instructions such that their output exceeds the Interconnection Service Capacity of the Generating Facility, will be ineligible for the Aggregate Capability Constraint. In such cases, the CAISO will adjust the PMaxes of those Co-located Resources

proportionate to each Generating Unit's capacity such that the sum of the PMax values equals the Interconnection Service Capacity of the Generating Facility, or as requested by the Interconnection Customer so long as the total value does not exceed the Interconnection Service Capacity of the Generating Facility.

Similar to other Generating Facilities with multiple Resource IDs, the CAISO will have no liability with respect to Co-located Resources or their Scheduling Coordinators if Co-located Resources do not comply with Dispatch Instructions and infringe on Interconnection Service Capability used by other Co-located Resources at a Generating Facility.

In the event that Co-located Resources in an EIM Entity Balancing Authority area do not comply with Dispatch Instructions such that their output exceeds the interconnection service capacity for the Co-located Resources, the CAISO will ask the applicable EIM Entity Balancing Authority whether it will revoke its prior approval of enforcing the Aggregate Capability Constraint for such Co-located Resources.

The following resources are not eligible to use the Aggregate Capability Constraint: Multi-Stage Generators, Pseudo-Tie Resources, Proxy Demand Response, Pumped Storage Hydro Units, Metered Subsystems, and Use-Limited Resources.

Scheduling Coordinators may not offer or self-provide Ancillary Services into the CAISO's Markets or receive Uncertainty Awards from Generating Units, EDAM Resources, or EIM Resources that are subject to Aggregate Capability Constraints until the CAISO issues a Market Notice stating this restriction will no longer apply. The Pricing Node for the Generating Units, EDAM Resources or EIM ~~Participating~~ Resources subject to an Aggregate Capability Constraint will be their Point of Interconnection.

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Section 29

29. Energy Imbalance Market

29.1 General Provisions.

(a) **Operation of EIM.** Pursuant to Section 29, the CAISO shall expand operation and settlement of the Real-Time Market to provide for the purchase and sale of balancing Energy in any Balancing Authority Area for which the Balancing Authority executes an EIM Entity Agreement with the CAISO. Operation and Settlement of the Real-Time Market in an EIM Entity Balancing Authority Area for which the Balancing Authority executes an EDAM Entity Agreement with the CAISO is supplemented by Section 33.

(b) **EIM Tariff Obligations.** EIM Market Participants shall comply with –

(1) the provisions of Section 29; and

(2) other provisions of the CAISO Tariff that apply to the extent such provisions –

(A) expressly refer to Section 29 or EIM Market Participants;

(B) are cross referenced in Section 29; or

(C) are not limited in applicability to the CAISO Controlled Grid, the CAISO Balancing Authority Area, or CAISO Markets other than the Real-Time Market.

(c) **Inconsistency Between Provisions.** If there is an inconsistency between a provision in Section 29 and another provision of the CAISO Tariff regarding the rights or obligations of EIM Market Participants, except in their capacity as EDAM Market Participants under Section 33, the provision in Section 29 shall prevail to the extent of the inconsistency. If there is an inconsistency between a provision in Section 29 and a provision in Section 33, the provisions of Section 33 will prevail with respect to participation in the Day-Ahead Market and the provisions of Section 29 will prevail with respect to participation in the Real-Time Market, provided that the provisions of both Sections 33 and 29 will be given equal consideration such that the provisions applicable as an EIM Market Participant and EDAM Market Participant may be reconciled where provisions apply to participation in both the Real-Time Market and the Day-Ahead Market.

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29.2 EIM Entity and EIM Sub-Entity Access to the Real-Time Market

(a) **In general.** The CAISO shall –

(1) provide open and non-discriminatory access to the Real-Time Market, including the Energy Imbalance Market, in accordance with the provisions of the CAISO Tariff; and

(2) make available for use in the Real-Time Market the transmission capacity that is available in Real-Time –

(A) on the CAISO Controlled Grid; and

(B) for which an EIM Entity or EIM Sub-Entity provides EIM Transmission Service Information pursuant to Section 29.17.

(b) **Implementation of Access as an EIM Entity.**

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(7) **Readiness Criteria.**

(A) **Prospective EIM Entity Full Network Model Integration.** The network model data of the prospective EIM Entity is integrated into the Full Network Model such that –

(i) the Load, EIM Internal Intertie and EIM External Interties and Generating Unit definition in the Full Network Model is consistent with the Load, EIM Internal Intertie and EIM External Interties and Generating Unit definition in the prospective EIM Entity network model file that it delivered to the CAISO;

(ii) the SCADA measurements used in the prospective EIM Entity's EMS model match the measurements observed by the CAISO through the CAISO EMS;

(iii) the State Estimator solution is equivalent or superior to the prospective EIM Entity's state estimator solution for its Balancing Authority Area; and

(iv) the physical representation of the prospective EIM Entity network matches the Base Market Model that accounts for non-conforming load, behind-the-meter generation, Pseudo-Ties, and Dynamic Schedules, and third party transmission service provider and path operator information that the CAISO agrees is used to support EIM Transfers and Real-Time Dispatch in the Energy Imbalance Market, as applicable.

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(K) **Additional Criteria**

(i) **Execution of Necessary Agreements.** The prospective EIM Entity has complied with Section 29.4(c)(2) and executed any necessary agreements for operating as an EIM Entity, including any non-disclosure agreements required for the exchange of information.

(ii) **Operating Procedures.** Prior to the start of parallel operations pursuant to Section 29.2(b)(4)(B), the CAISO and the prospective EIM Entity have defined, completed, and tested operating procedures for the prospective EIM Entity and its Scheduling Coordinator's participation in the Energy Imbalance Market.

(iii) **Identification of EIM Available Balancing Capacity.** The prospective EIM Entity has identified EIM ~~Participating~~ Resources and non-participating resources that it intends to

designate in the EIM Resource Plan as EIM Available Balancing Capacity.

(iv) **Flexible Capacity Requirements.** The CAISO has received and stored all historical data from the prospective EIM Entity necessary and sufficient for the CAISO to perform the flexible ramp requirement, and the CAISO has established flexible capacity requirements for the prospective EIM Entity's Balancing Authority Area and for the combined EIM Area including the prospective EIM Entity.

(v) **Monitoring.** Sufficient and adequate data is available to the CAISO and the Department of Market Monitoring to enable market monitoring as of the Implementation Date.

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29.4 Roles and Responsibilities

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(b) **EIM Entity.**

(1) **Balancing Authority Obligations.**

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(3) **EIM Entity Obligations.** An EIM Entity shall –

(A) perform the obligations of an EIM Entity in accordance with the EIM Entity Agreement, Section 29, and other provisions of the CAISO Tariff that ~~by their terms~~ apply to EIM Entities, subject to the limitations

specified in Section 29.1(b)(2)(C);

(B) ensure that each EIM Transmission Service Provider in its Balancing Authority Area has provisions in effect in the EIM Transmission Service Provider's transmission tariff, as necessary or applicable, to enable operation of the Real-Time Market in its Balancing Authority Area;

(C) qualify as or secure representation by no more than one EIM Entity Scheduling Coordinator;

(D) review and validate information about available transmission capacity submitted to it by an EIM Transmission Service Provider and transmit such validated information to its EIM Entity Scheduling Coordinator;

(E) provide the CAISO and its EIM Entity Scheduling Coordinator with information regarding the transmission capacity available to the Real-Time Market, including any information regarding Transmission Constraints of which it is aware;

(F) define Load Aggregation Points in its Balancing Authority Area;

(G) determine and inform the CAISO which resource types are eligible to participate in the Real-Time Market as resources and which transmission service providers or holders of transmission rights are EIM Transmission Service Providers; and

(H) inform the CAISO whether or not the EIM Entity intends to utilize the CAISO's Demand Forecast consistent with Section 29.34(d).

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29.7 EIM Operations Under Normal and Emergency Conditions.

(a) **CAISO Controlled Grid Operations.** Section 7 shall not apply to EIM Market Participants in their capacities as such.

(b) **Normal EIM Operations.** The CAISO shall administer the transmission capacity made

available to the Real-Time Market to manage Energy imbalances in the EIM Area under normal operations.

(c) **Load Curtailment.** The CAISO will not issue Dispatch Instructions to an EIM Entity Scheduling Coordinator or an EIM Sub-Entity Scheduling Coordinator with respect to Load or Demand that has not been bid into the Real-Time Market.

(d) **Dispatch Instructions for EIM ~~Participating~~ Resources.** The CAISO will not issue Dispatch Instructions to an EIM Participating Resource Scheduling Coordinator with respect to Supply that has not been bid into the Real-Time Market.

(e) **EIM Transfers.** The CAISO will use Transfer System Resources to~~shall~~ manage EIM Transfers as aggregate Dynamic Schedules with each EIM Entity Balancing Authority Area, which –

(1) shall not require individual resource E-Tags;

(2) shall not constitute inadvertent Energy;

(3) shall reflect intra-hour incremental EIM Transfers between the CAISO Balancing Authority Area and each EIM Entity Balancing Authority Area;

(4) shall be updated by the CAISO within 60 minutes after the end of each Operating Hour to include the integrated Energy during the hour for the sum of all EIM Transfers between each Balancing Authority Area in the EIM Area in accordance with WECC business practices for purposes of inadvertent Energy accounting; and

(5) shall be subsequently updated as necessary consistent with the requirements of WECC, NERC, and North American Energy Standards Board standards and business practices.

(f) **Dynamic Imbalance Schedule to Net EIM Transfers.** The CAISO will use Transfer System Resources to –

(1) model changes in the net five-minute scheduled EIM Transfers that result from Real-Time Dispatch as a Dynamic Schedule between the CAISO and EIM Entity for AGC control accuracy; and

(2) calculate the dynamic net scheduled EIM Transfers for the CAISO and each EIM Entity Balancing Authority Area and derive from these dynamic net scheduled EIM Transfers the Dynamic Schedules on EIM Internal Interties for E-Tag purposes.

(g) **EIM Manual Dispatch.**

(1) The EIM Entity may issue an EIM Manual Dispatch to an EIM ~~Participating~~ Resource or a non-participating resource in its Balancing Authority Area, outside of the Market Clearing of the Real-Time Market, when necessary to address reliability or operational issues in the EIM Entity Balancing Authority Area that the CAISO is not able to address through normal economic Dispatch and Congestion Management. The EIM Entity may issue an EIM Manual Dispatch to any EIM ~~Participating~~ Resource or a non-participating resource in its Balancing Authority Area regardless of whether an EIM Sub-Entity Scheduling Coordinator has rights to issue an EIM Manual Dispatch to such EIM ~~Participating~~ Resource or non-participating resource.

(2) If authorized by the EIM Entity, the EIM Sub-Entity may issue an EIM Manual Dispatch to an EIM ~~Participating~~ Resource or a non-participating resource for which it is registered as the EIM Sub-Entity Scheduling Coordinator when necessary to address reliability or operational issues in its service territory that the CAISO is not able to address through normal economic Dispatch and Congestion Management, provided that such ability by the EIM Sub-Entity shall not prevent the EIM Entity from issuing an EIM Manual Dispatch to any EIM ~~Participating~~ Resource or a non-participating resource in its Balancing Authority Area, and the most recent EIM Manual Dispatch shall take precedence over any prior EIM Manual Dispatch issued to the EIM ~~Participating~~ Resource. Any financial or operational impact on an EIM Sub-Entity resulting from an EIM Manual Dispatch issued by the EIM Entity shall be resolved in accordance with the applicable tariff or contractual arrangements between the EIM Entity and the

EIM Sub-Entity.

(h) **EIM Entity and EIM Sub-Entity Actions in Response to an EIM Manual Dispatch.** If the EIM Entity or EIM Sub-Entity issues an EIM Manual Dispatch to address circumstances on its system –

(1) the EIM Entity shall immediately inform the CAISO, as specified in the Business Practice Manual for the Energy Imbalance Market, if the EIM Entity Balancing Authority Area is under manual operation;

(2) the EIM Entity or EIM Sub-Entity shall immediately inform the CAISO of the EIM Manual Dispatch issued to any EIM ~~Participating~~ Resource or non-participating resource by submitting the EIM Manual Dispatch instruction for the affected resource to the CAISO as specified in the Business Practice Manual for the Energy Imbalance Market; and

(3) the EIM Entity or EIM Sub-Entity remains responsible for informing the Reliability Coordinator of the circumstances creating the need for the EIM Manual Dispatch and may enforce Transmission Constraints, as may be required.

(i) **CAISO Actions in Response to Notification of EIM Manual Dispatch.** Upon receipt of notice of an EIM Manual Dispatch, the CAISO shall –

(1) reflect the EIM Manual Dispatch in the Real-Time Market;

(2) disregard an EIM Manual Dispatch in the determination of the Locational Marginal Price; and

(3) treat an EIM Manual Dispatch to an EIM Participating Resource or non-participating resource as FMM or RTD Instructed Imbalance Energy for Settlement.

(j) **EIM Disruption.**

(1) **Declaration.** The CAISO may declare an interruption of EIM Entity participation in the Real-Time Market when in its judgment –

(A) operational circumstances (including a failure of the Real-Time Market operation to produce feasible results in the EIM Area or other CAISO

Market Disruption) in the EIM Area have caused or are in danger of causing an abnormal system condition in the CAISO Balancing Authority Area or an EIM Balancing Authority Area that requires immediate action to prevent loss of Load, equipment damage, or tripping system elements that might result in cascading Outages, or to restore system operation to meet Applicable Reliability Criteria; or

(B) communications between the CAISO and EIM Market Participants are disrupted and prevent an EIM Entity, EIM Entity Scheduling Coordinator, EIM Sub-Entity, EIM Sub-Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator from accessing CAISO systems to submit or receive information.

(2) **CAISO Response to EIM Disruption.** If the CAISO declares an interruption of EIM Entity participation in the Real-Time Market, the CAISO may in its judgment, among other things-

(A) separate the affected EIM Entity Balancing Authority Area from the EIM Area and maintain the Real-Time Market for other Balancing Authority Areas in the EIM Area by enforcing a net transfer constraint for the affected Balancing Authority Area to separate it from the remainder of the EIM Area;

(B) reduce or suspend EIM Transfers between one or more Balancing Authority Areas in the EIM Area including the CAISO Balancing Authority Area and in accordance with Section 33.7.5 as applicable to EDAM Transfers, and communication and coordination with all impacted EIM Entities to assess and mitigate potential issues within the EIM Area;

(C) instruct one or more EIM Entities to maintain system balance within their Balancing Authority Area without RTM Dispatch; or

(D) in addition or as an alternative, use market results in the Real-Time Market in accordance with Section 7.7.9 or take any of the actions

specified in Section 7.7.6 with respect to the Real-Time Market, except that if Section 7.7.6 calls for the use of Day-Ahead Market results, the CAISO will use:

(i) the price specified in the EIM Entity's open access transmission tariff as the LMP;

(ii) the EIM Entity's or EIM Sub-Entity's EIM Base Schedule as the schedule;

(iii) the EIM Bid Adder from the most recent corresponding interval that is available as the EIM Bid Adder; and

(iv) the emissions rate set by the California Air Resources Board for an unspecified source multiplied by the daily Greenhouse Gas Allowance Price.

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29.9 Outages and Critical Contingencies.

(a) **Applicability of Section 9.** Section 9 shall not apply to EIM Market Participants except as referenced in Section 29.9.

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(e) **Forced Outages.** An EIM Entity Scheduling Coordinator and an EIM Sub-Entity Scheduling Coordinator shall comply with the reporting provisions of Section 9 with regard to Forced Outages of transmission facilities within the EIM Entity Balancing Authority Area or within the EIM Sub-Entity area they represent and an EIM Participating Resource Scheduling Coordinator shall comply with the reporting provisions of Section 9 with regard to Forced Outages of Generating Units it represents as EIM Resources. The applicable provisions of Section 9 as to Forced Outages on transmission facilities and

Generating Units include, but are not limited to, Sections 9.3.6.4.1(b), 9.3.6.4.1(c), 9.3.6.4.1(d), 9.3.6.4.2(2), 9.3.6.4.2(3), and 9.3.10.

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29.11 Settlements and Billing for EIM Market Participants.

(a) **Applicability.** Section 29.11, rather than Section 11, shall apply to the CAISO Settlement with EIM Entity Scheduling Coordinators, EIM Sub-Entity Scheduling Coordinators, and EIM Participating Resource Scheduling Coordinators, except as otherwise provided, but not to other Scheduling Coordinators. Settlement of the Real-Time Market with EDAM Entity Scheduling Coordinators, EDAM Resource Scheduling Coordinators, and EDAM Load Serving Entity Scheduling Coordinators is also governed by Section 33.11. Settlement under Section 33.11 results in outcomes not produced for EIM Market Participants that are not EDAM Market Participants, including Settlement of Demand within an EDAM Entity Balancing Authority Area, Settlement of Supply from EDAM Resources that would otherwise be settled as non-participating resources in an EIM Entity Balancing Authority Area, sequential netting of Bid Cost Recovery from the RUC to the RTM, and Settlement of transfer revenue associated with an EDAM Transfer limit established in accordance with Section 33.7 and Section 33.18.

(b) **Imbalance Energy.**

(1) **FMM Instructed Imbalance Energy.**

(A) **Calculation.**

(i) **EIM Participating Resources.** The CAISO will calculate an EIM Participating Resource's FMM Instructed Imbalance Energy in the same manner as it calculates FMM Instructed Imbalance Energy under Section 11.5.1.1, except that references to the Day-Ahead Schedule in the relevant Appendix A definitions shall be deemed references to the EIM Base Schedule, unless the

EIM Participating Resource is also an EDAM Resource (in which case the Day-Ahead Schedule will be referenced), and that the CAISO will include any Energy from an EIM Manual Dispatch of the EIM Participating Resource in the FMM that is identified by the EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator prior to the start of the FMM.

(ii) **Non-Participating Resources.** The CAISO will calculate the FMM Instructed Imbalance Energy of non-participating resources in an EIM Entity Balancing Authority Area in the same manner as it calculates FMM Instructed Imbalance Energy under Section 11.5.1.1, except that references to the Day-Ahead Schedule in the relevant Appendix A definitions shall be deemed references to the EIM Base Schedule, and that the CAISO will include any Energy from an EIM Manual Dispatch or EIM Auto-Match of the EIM non-participating resource in the FMM that is identified by the EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator prior to the start of the FMM.

(B) **Settlement.** The CAISO will settle –

(i) the FMM Instructed Imbalance Energy with the EIM Participating Resource Scheduling Coordinator for EIM Participating Resources; and

(ii) with the applicable EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator for non-participating resources in an EIM Entity Balancing Authority Area.

(2) **RTD Instructed Imbalance Energy.**

(A) **Calculation.**

(i) **EIM Participating Resources.** The CAISO will calculate an EIM Participating Resource's RTD Instructed Imbalance Energy

in the same manner in which it calculates RTD Instructed Imbalance Energy under Sections 11.5.1.2 and 11.5.5, except that the CAISO will include any Energy from an EIM Manual Dispatch of the EIM Participating Resource in the RTD that is identified by the EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator.

(ii) **Non-Participating Resources.** The CAISO will calculate the RTD Instructed Imbalance Energy of non-participating resources in an EIM Entity Balancing Authority Area in the same manner in which it calculates RTD Instructed Imbalance Energy under Section 11.5.1.2 and 11.5.5, except that the CAISO will include any Energy from an EIM Manual Dispatch or EIM Auto-Match of the EIM non-participating resource in the RTD that is identified by the EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator.

(B) **Settlement.** The CAISO will settle the RTD Instructed Imbalance Energy –

(i) with the EIM Participating Resource Scheduling Coordinator for EIM Participating Resources; and

(ii) with the applicable EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator for non-participating resources in an EIM Entity Balancing Authority Area.

(3) **Uninstructed Imbalance Energy.**

(A) **EIM Participating Resources.**

(i) **Calculation.** For EIM Participating Resources and an EIM Entity Balancing Authority Area's dynamic import/export schedules with external resources, the CAISO will calculate Uninstructed Imbalance Energy in the same manner in which it calculates

Uninstructed Imbalance Energy under Section 11.5.2.1.

(ii) **Settlement.** The CAISO will settle the Uninstructed Imbalance Energy with the EIM Participating Resource Scheduling Coordinator, the EIM Entity Scheduling Coordinator, or the EIM Sub-Entity Scheduling Coordinator, as applicable.

(B) **Non-Participating Resources.**

(i) **Calculation.** For non-participating resources in an EIM Entity Balancing Authority Area, the CAISO will calculate Uninstructed Imbalance Energy in accordance with Section 11.5.2, except that the CAISO will treat an EIM Base Schedule as a Day-Ahead Schedule and the CAISO will treat an EIM Manual Dispatch and an EIM Auto-Match as a Dispatch Instruction.

(ii) **Settlement.** The CAISO will settle the Uninstructed Imbalance Energy for non-participating resources in an EIM Entity Balancing Authority Area at the applicable RTD Locational Marginal Price in accordance with Section 11.5.2.1 with the applicable EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator and will treat EIM Entity Balancing Authority Demand in the same manner as the CAISO treats CAISO Demand under that Section.

(C) **Non-Participating Load.**

(i) **Calculation.** For non-participating Load in an EIM Entity Balancing Authority Area, the CAISO will calculate Uninstructed Imbalance Energy in accordance with Section 11.5.2.2, except that the CAISO will determine deviations based on the EIM Base Load Schedule unless associated with an EDAM Balancing Authority Area (in which case the CAISO will reference the Day-Ahead Schedule).

(ii) **Settlement.** The CAISO will settle Uninstructed Imbalance Energy for non-participating Load in an EIM Entity Balancing Authority Area at the applicable Default LAP Hourly Real-Time Price in accordance with Section 11.5.2.2 with the applicable EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator and will treat EIM Entity Balancing Authority Demand in the same manner as the CAISO treats CAISO Demand under that Section.

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(e) **Neutrality Accounts.**

(1) **In General.** The CAISO will collect neutrality amounts from EIM Market Participants to recover differences in Real-Time Market payments made and Real-Time Market payments received.

(2) **Real-Time Congestion Offset.** The CAISO will assess EIM Entity Scheduling Coordinators a Real-Time Congestion Offset allocation calculated pursuant to Section 11.5.4.1.2~~1~~.

(3) **Real-Time Imbalance Energy Offset Allocation.** The CAISO will assess EIM Entity Scheduling Coordinators a Real-Time Imbalance Energy Offset allocation calculated pursuant to Section 11.5.4.1.1.

(4) **Real-Time Marginal Cost of Losses Offset.** The CAISO will allocate the Real-Time Marginal Cost of Losses Offset to EIM Entity Scheduling Coordinators pursuant to Section 11.5.4.1.3~~2~~.

(5) **Marginal Greenhouse Gas Cost Offset.** The CAISO will allocate the Marginal Greenhouse Gas Cost Offset to a GHG Regulation Area's metered Demand pursuant to Section 11.5.4.1.4.

(6) **EIM Transfer Revenue.** The CAISO will allocate EIM Transfer revenue to EIM

Entity Scheduling Coordinators pursuant to Section 11.5.4.1.5.

(7~~5~~) **Other Neutrality Adjustments.** The CAISO will levy additional charges on or make additional payments to EIM Market Participants as adjustments in accordance with Section 11.14.

(f) **Real-Time Bid Cost Recovery.**

(1) **In General.** The CAISO will provide EIM Participating Resources RTM Bid Cost Recovery. The CAISO will net RUC Bid Cost Shortfalls and RUC Bid Cost Surpluses in accordance with Section 11.8.5 for EIM Participating Resources that are also EDAM Resources.

(2) **Calculation of Real-Time Bid Cost Recovery.** The CAISO will calculate Real-Time Bid Cost Recovery in accordance with Section 11.8.4, except that the CAISO will treat a non-zero EIM Base Schedule of an EIM Participating Resource as an IFM Self-Schedule and the corresponding intervals as IFM self-commitment intervals.

(3) **Application of Real-Time Performance Metric.**

The CAISO will adjust the RTM Energy Bid Cost, the RTM Market Revenues, and RTM Minimum Load Costs determined pursuant to Section 29.11(f)(2) by multiplying the Real-Time Performance Metric with those amounts for the applicable Settlement Interval pursuant to the rules specified in Section 11.8.4.4 and its subsections, except that the CAISO will treat an EIM Base Schedule as a Day-Ahead Schedule.

(4) **Allocation of EIM Entity RTM Bid Cost Uplift.**

(A) **Calculation of Charge.** The Net RTM Bid Cost Uplift will be determined for each EIM Entity Balancing Authority Area in accordance with the methodology set forth in Section 11.8.6.

(B) **Settlement.** The CAISO will assess the Net RTM Bid Cost Uplift calculated for each EIM Entity Balancing Authority Area to the applicable EIM Entity Scheduling Coordinator in accordance with Section

11.8.6.6.(ii).

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(i) **EIM Administrative Charge.**

(1) **In General.** The CAISO will charge EIM Market Participants an EIM Administrative Charge consisting of the real-portions of the Market Services Charge and the System Operations Charge.

(2) **Market Services Charge.** The Market Services Charge shall be the product of the Market Services Charge for each Scheduling Coordinator as calculated according to the formula in Appendix F, Schedule 1, Part A, the real-time market percentage as calculated in the cost of service study according to Appendix F, Schedule 1, Part A, and the sum of Gross FMM Instructed Imbalance Energy (excluding FMM Manual Dispatch Energy) and Gross RTD Instructed Imbalance Energy (excluding RTD Manual Dispatch Energy Standard Ramping Deviation, Ramping Energy Deviation, Residual Imbalance Energy, and Operational Adjustments).

(3) **System Operations Charge.** The System Operations Charge shall be the product of the System Operations Charge for each Scheduling Coordinator, as calculated according to the formula in Appendix F, Schedule 1, Part A, the real-time market percentage as calculated in the cost of service study conducted according to Appendix F, Schedule 1, Part A, and the absolute difference between metered energy and the EIM Base Schedules.

(4) **Minimum EIM Administrative Charge.** The CAISO will calculate the minimum EIM Administrative Charge as the product of the sum of the real-time activities associated with market services charge and the real-time activities chart associated with system operations, as well as –

(A) five percent of the total gross absolute value of Supply of all EIM Market Participants; plus

(B) five percent of the total gross absolute value of Demand of all EIM Market Participants.

(5) **Withdrawing EIM Entity.** If the EIM Entity notifies the CAISO of its intent to terminate participation in the Energy Imbalance Market and requests suspension of the Energy Imbalance Market in its Balancing Authority Area under Section 29.4(b)(4), the CAISO will charge the EIM Entity the minimum EIM Administrative Charge calculated under Section 29.11(i)(4) during the notice period.

(6) **Application of Revenues.** The CAISO will apply revenues received from the EIM Administrative Charge against the costs to be recovered through the Grid Management Charge as described in Appendix F, Schedule 1, Part A.

(7) **EDAM Administrative Charge.** An EIM Market Participant that is also an EDAM Market Participant will pay the EDAM Administrative Charge and will not pay the EIM Administrative Charge.

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(r) **EIM Transfer System Resource Settlement.**

(1) **EIM Transfer System Resource Registration.** The CAISO will provide each EIM Entity with financially binding Settlement of Energy transfer schedule changes from its respective base schedules between EIM Entity Balancing Authority Areas, unless the EIM Entity Balancing Authority Areas are also EDAM Entity Balancing Authority Areas in which case transfer schedule changes will be referenced from the Day-Ahead Schedule for the EDAM Transfer, and will –

(A) establish for each EIM Entity that shares an EIM Internal Intertie a to/from EIM Transfer Ssystem Rresource pricing location in their respective EIM Entity Balancing Authority Area;

(B) associate with each to/from EIM Transfer Ssystem Rresource pricing location, a unique base EIM Transfer Ssystem Rresource that accounts

for Energy transfer schedule changes between EIM Entity Balancing Authority Areas;

(C) require each EIM Entity Scheduling Coordinator to submit EIM Base Schedules and E-Tags that identifies Energy transfer schedule changes at the registered base EIM Transfer Ssystem Rresource; and

(D) reject EIM Base Schedule changes at the to/from EIM Transfer Ssystem Rresource pricing location not associated with the registered base EIM Transfer Ssystem Rresource.

(2) **Settlement for EIM Transfer System Resource Changes.** The CAISO will settle EIM Transfer Ssystem Rresource changes established pursuant to Section 29.11(r)(1) as –

(A) FMM Instructed Imbalance Energy or RTD Instructed Energy based on the Settlement Interval in which the E-Tag is received, without regard for other Energy types identified in Sections 11.5.1.1 or 11.5.2.2, or as an Operational Adjustment if the E-Tag is received after the end of the Operating Hour for purposes of Energy accounting in accordance with the applicable WECC business practices;

(B) based on the difference between the E-Tag and the EIM Transfer Ssystem Rresource base schedule;

(C) at the relevant FMM or RTD Locational Marginal Price at each unique EIM Transfer Ssystem Rresource pricing location associated with the base EIM Transfer Ssystem Rresource; and

(D) including any contribution that the base EIM Transfer Ssystem Rresource might have on the RTM Bid Cost Recovery pursuant to Section 29.11(f).

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29.17 EIM Transmission System

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(f) **EIM Transfer Availability.**

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(6) **EIM Transfer Limit Constraints.** The CAISO's Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch shall enforce the EIM Transfer limit and the associated physical limit at each EIM Internal Intertie.

(7) **EIM Transfer Limits at EDAM Interties.** The CAISO will not re-optimize EDAM Transfer limits established in accordance with Section 33.16, Section 33.17, and Section 33.18 in the Real-Time Market, and will establish separate EIM Transfer limits to represent other transmission capacity from the Day-Ahead Market at each EDAM Internal Intertie.

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29.29 EIM Relationship to EDAM ~~[Not Used]~~

The provisions of this Section 29 apply to EIM Market Participants and EDAM Market Participants, in addition to Section 33, which includes requirements applicable to EDAM Market Participants that are not applicable to EIM Market Participants.

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29.31 Day-Ahead.

EIM Entity Scheduling Coordinators, EIM Sub-Entity Scheduling Coordinators and EIM Participating

Resource Scheduling Coordinators may not submit Bids in the CAISO's Day-Ahead Market on behalf of EIM Market Participants that they represent in their capacity as an EIM Entity Scheduling Coordinator, EIM Sub-Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator, unless participation in the Day-Ahead Market is enabled within an EIM Entity Balancing Authority Area in accordance with Section 33, in which case participation in the Day-Ahead Market by EDAM Market Participants is governed by Section 33 and execution of the associated agreement in Appendix B is required to support participation in the Day-Ahead Market.

29.32 Greenhouse Gas Regulation and GHG~~EIM~~ Bid Adders.

(a) GHG Bid Adders.

(1) In General. EDAM Resource Scheduling Coordinators, EIM Participating Resource Scheduling Coordinators, and Scheduling Coordinators for resources within the CAISO Balancing Authority Area will have an opportunity to recover costs of compliance with GHG regulations adopted by a state jurisdiction that has priced GHG emissions as part of a state GHG reporting and reduction program.

(2) Bid Adders. The Fifteen-Minute Market and Real-Time Dispatch will use GHG Bid Adders submitted by EDAM Resource Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators for resources located outside of a specific GHG Regulation Area to optimize the attribution of GHG Transfers into that GHG Regulation Area.

The Fifteen-Minute Market and Real-Time Dispatch will use GHG Bid Adders submitted by EDAM Resource Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators for resources located within the GHG Regulation Area of the State of Washington to optimize the attribution of GHG Transfers into GHG Regulation Areas outside of the State of Washington.

The Fifteen-Minute Market and Real-Time Dispatch will use GHG Bid Adders submitted by EDAM Resource Scheduling Coordinators, EIM Participating Resource Scheduling Coordinators, and Scheduling Coordinators for resources

located within the GHG Regulation Area of the State of California to optimize the attribution of GHG Transfers into GHG Regulation Areas outside of the State of California.

For purposes of this Section 29.32, GHG Regulation Areas will reflect the Pricing Nodes of the CAISO Balancing Authority Area, an EDAM Entity Balancing Authority Area or an EIM Entity Balancing Authority Area within the GHG boundary as defined by a state jurisdiction that has priced GHG emissions as part of a state GHG reporting and reduction program. GHG Regulation Areas modeled in the Fifteen-Minute Market and Real-Time Dispatch may include Pricing Nodes in addition to Pricing Nodes for GHG Regulation Areas modeled in the Day Ahead Market, because the EIM Area may include EIM Entity Balancing Authority Areas located within the GHG boundary area as defined by a state jurisdiction that has priced GHG emissions as part of a state GHG reporting and reduction program that are not participating in the Day-Ahead Market.

Scheduling Coordinators, EDAM Resource Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators for resources located inside a specific GHG Regulation Area will not submit GHG Bid Adders to serve Demand within that GHG Regulation Area.

Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into the CAISO Balancing Authority Area that register in the Master File that their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of California will not submit GHG Bid Adders.

EDAM Resource Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into an EDAM Entity Balancing Authority Area with Demand in the State of California that register in the Master File that

their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of California will not submit GHG Bid Adders.

EDAM Resource Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into an EDAM Balancing Authority Area with Demand in the State of Washington that register in the Master File that their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of Washington will not submit GHG Bid Adders.

EIM Participating Resource Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into an EIM Balancing Authority Area with Demand in the State of California that register in the Master File that their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of California will not submit GHG Bid Adders.

EIM Participating Resource Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into an EIM Balancing Authority Area with Demand in the State of Washington that register in the Master File that their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of Washington will not submit GHG Bid Adders.

(A) Bid Submission.

EDAM Resource Scheduling Coordinators for resources located outside of a GHG Regulation Area may submit a separate GHG Bid Adder as an hourly Bid component specific to each GHG Regulation Area.

EIM Participating Resource Scheduling Coordinators for resources located outside of a GHG Regulation Area may submit a separate GHG Bid Adder as an hourly Bid component specific to each GHG Regulation Area.

Scheduling Coordinators for resources located within the GHG Regulation Area of the State of California may submit a GHG Bid Adder

as an hourly Bid component for the GHG Regulation Area outside of the State of California.

Scheduling Coordinators for resources located within the GHG Regulation Area of the State of Washington may submit a GHG Bid Adder as an hourly Bid component for the GHG Regulation Area outside of the State of Washington.

GHG Bid Adders will consist of a price and MW quantity. The price included in the EIM Bid Adder will not be less than $0/MWh and not greater than 110% of the resource's GHG maximum compliance cost as determined in accordance with Section 29.32(a)(3).

(B) Default Treatment. If a resource located outside of a specific GHG Regulation Area does not have a GHG Bid Adder, the Fifteen-Minute Market and Real-Time Dispatch will not select the resource for attribution into that GHG Regulation Area.

(3) Determination of EIM Maximum GHG Bid Adder.

The CAISO will calculate maximum daily GHG Bid Adders for each EDAM Resource, each EIM Resource, and each resource located within the CAISO Balancing Authority Area in relation to GHG Regulation Areas, as applicable, based on the resource's highest average heat rate on its heat rate curve, the applicable Greenhouse Gas Allowance Price, and the resource's applicable emission rate. The CAISO will perform this calculation in accordance with the provisions of the applicable Business Practice Manual. The CAISO will also provide for an option to negotiate a maximum daily GHG Bid Adder for each GHG Regulation Area in accordance with the provisions of the applicable Business Practice Manual.

(4) GHG Bid Adder Price. The price included in the GHG Bid Adder will not be less than $0/MWh. The sum of the GHG Bid Adder price and the Energy Bid price may not exceed the Soft Energy Bid Cap unless the sum of a resource's relevant maximum daily GHG Bid Adder and Default Energy Bid as adjusted pursuant to Section 30.11 exceeds the Soft Energy Bid Cap. In this case, the sum of a resource's GHG Bid Adder and Energy Bid price may not exceed the sum of the relevant maximum daily GHG Bid Adder and the resource's Default Energy Bid or the Hard Energy Bid Cap, whichever is lower.

(b) Consideration of GHG Bid Adders in Market Clearing.

(1) Dispatch of Resources with Nonzero GHG Bid Adders.

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will take into account GHG Bid Adders in selecting Energy produced by EDAM Resources located outside of a specific GHG Regulation Area up to the associated MW quantity included in the GHG Bid Adder to serve Demand within that GHG Regulation Area.

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will take into account GHG Bid Adders in selecting Energy produced by resources located within the GHG Regulation Area of the State of California up to the associated MW quantity included in the GHG Bid Adder to serve Demand in the GHG Regulation Area outside the State of California.

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will take into account GHG Bid Adders in selecting Energy produced by resources located within the GHG Regulation Area of the State of Washington up to the associated MW quantity included in the GHG Bid Adder to serve Demand in the GHG Regulation Area outside the State of Washington.

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will not consider GHG Bid Adders when selecting EDAM Resource Facilities, EIM Resources, or resources located within the CAISO Balancing Authority Area to serve Demand outside of GHG Regulation Areas.

(2) Maximum GHG MW Attribution Quantity.

The Fifteen-Minute Market and Real-Time Dispatch will limit the total GHG attribution to an EDAM Resource Facility located outside GHG Regulation Areas to serve Demand in GHG Regulation Areas to a value equal to the lower of (i) the MW value in the EDAM Resource's GHG Bid Adder, (ii) the EDAM Resource's upper Economic Bid minus the EDAM Resource Facility's Day-Ahead Energy Schedule plus the EDAM Resource Facility's total Day-Ahead Market GHG attribution, considering any applicable derates and Ancillary Services capacity reservations, for the relevant Operating Hour, or (iii) the EDAM Resource Facility's Real-Time Market Energy Schedule.

The Fifteen-Minute Market and Real-Time Dispatch will limit the maximum GHG Bid Adder MW quantity of an EIM Participating Resource located outside GHG Regulation Areas to a value equal to the lower of (i) the MW value in the EIM Participating Resource's GHG Bid Adder; (ii) the EIM Participating Resource's dispatchable Bid range between the EIM Participating Resource's EIM Base Schedule and the EIM Participating Resource's effective upper Economic Bid, considering any applicable derates and Ancillary Services capacity reservations, for the relevant Operating Hour, or (iii) the EIM Participating Resource's Real-Time Market Energy Schedule.

The Fifteen-Minute Market and Real-Time Dispatch will limit the maximum GHG Bid Adder MW quantity of a resource located within the CAISO Balancing Authority Area to serve Demand in a GHG Regulation Area outside of the State of California to a value equal to the lower of (i) the MW value in the resource's GHG Bid Adder; (ii) the resource's upper Economic Bid minus the resources's Day-Ahead Energy Schedule plus the EDAM Resource's total Day-Ahead Market GHG attribution, considering any applicable derates and Ancillary Services capacity reservations, for the relevant Operating Hour, or (iii) the resource's Real-Time Market Energy Schedule.

(3) Dispatch of EIM Participating Resources Bid Adders of Zero. The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will not dispatch resources located outside a GHG Regulation Area for delivery into that GHG Regulation Area if the MW quantity included in the GHG Bid Adder is zero.

(c) GHG Marginal Cost.

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will take into account Energy Bids and GHG Bids, optimally select resources located outside of a GHG Regulation Area to support GHG Transfers into a GHG Regulation Area until the total MW of GHG Transfers into the respective GHG Regulation Area is fully allocated. The Shadow Price of this allocation constraint is the Marginal GHG Cost for the respective GHG Regulation Area.

(d) Compensation.

EIM Resource Scheduling Coordinators and EDAM Resource Scheduling Coordinators will receive GHG settlements pursuant to Section 11. When the Real-Time Market attributes a resource located outside of a GHG Regulation Area to support a GHG Transfer to serve Demand in a GHG Regulation Area, the applicable Scheduling Coordinator for the resource will receive a payment equaling the product of the GHG

Transfer to the GHG Regulation Area attributed to the resource in the Real-Time Market at the applicable Real-Time Market Marginal GHG Cost for that GHG Regulation Area.

29.32.1 GHG Net Export Constraint

The CAISO's Security Constrained Economic Dispatch in the Fifteen-Minute Market and Real-Time Dispatch will apply a net export constraint for EDAM Entity and EIM Entity Balancing Authority Areas that do not overlap with a GHG Regulation Area. This constraint will limit the aggregate attribution of EDAM Resource Facilities within a specific EDAM Entity Balancing Authority Area or EIM Participating Resources within an EIM Entity Balancing Authority Area such that the aggregate attribution does not exceed the net exports from that Balancing Authority Area. This constraint will also limit the aggregate attribution of resources within a specific GHG Regulation Area to serve Demand in another GHG Regulation Area such that the attribution may not exceed the net exports from these resources' native Balancing Authority Areas. This constraint will not restrict the Real-Time Market from attributing capacity located outside of a specific GHG Regulation Area obligated to serve Demand within that GHG Regulation Area that is registered with the CAISO in accordance with the applicable Business Practice Manual. The CAISO will not enforce this constraint for any Balancing Authority Area in the EIM Area and during any Real-Time Market interval in which the CAISO Balancing Authority Area, an EDAM Entity Balancing Authority Area, or an EIM Entity Balancing Authority Area with Demand in a GHG Regulation Area is deficient in the upward direction for purposes of the capacity or flexibility tests described Section 29.34.

29.32.2 Data Availability

(a) Notification. The CAISO will notify an EDAM Resource Scheduling Coordinator of the portion of the FMM Energy Schedule and the portion of the RTD Energy Dispatch that support a GHG Transfer to serve Demand in a GHG Regulation Area as part of the Real-Time Market results publication.

The CAISO will notify an EIM Participating Resource Scheduling Coordinator of the portion of the FMM Energy Schedule and the portion of the RTD Energy Dispatch that

support a GHG Transfer to serve Demand in a GHG Regulation Area as part of the Real-Time Market results publication.

The CAISO will notify the Scheduling Coordinator for a resource located in the CAISO Balancing Authority Area of the portion of the resource's FMM Energy Schedule and the portion of the RTD Energy Dispatch that support a GHG Transfer to serve Demand in a GHG Regulation Area as part of the Real-Time Market results publication.

(b) Disclosure. The CAISO may disclose information related to GHG Transfers to a Government Authority, so long as such information does not disclose confidential information of any individual Market Participant.

~~(a) **EIM Bid Adders.**~~

~~(1) **In General.** EIM Participating Resources will have an opportunity to recover costs of compliance with California Air Resources Board greenhouse gas regulations, which may include the cost of allowances, uncertainty on the final resource specific emission factor, and other costs of greenhouse gas regulation compliance.~~

~~(2) **EIM Bid Adder.**~~

~~(A) **Bid Submission.** EIM Participating Resource Scheduling Coordinators for EIM Participating Resources located in an EIM Entity Balancing Authority Area outside of California may submit an EIM Bid Adder as a separate hourly Bid component to recover costs of compliance with California Air Resources Board greenhouse gas regulations, which must include a price and quantity and the price portion of which must be equal to or less than 110% of the EIM Participating Resource's greenhouse gas maximum compliance cost as determined in accordance with section 29.32(a)(3).~~

~~(B) **Default Treatment.** If an EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California does not submit an EIM Bid Adder, the CAISO will assume that the EIM Participating~~

Resource will not be selected for delivery to the CAISO Balancing Authority Area.

(3) **Determination of EIM Greenhouse Gas Maximum Cost.** Each day the CAISO will determine the greenhouse gas maximum compliance cost for each EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California as set forth in the EIM Business Practice Manual, based on:

(A) the EIM Resource's highest incremental heat rate; the applicable Greenhouse Gas Allowance Price; and the EIM Participating Resource's emission rate, as set forth in the applicable U.S. Environmental Protection Agency publication and registered in the Master File; or

(B) a price determined in accordance with the negotiated rate option procedures in section 39.7.1.3.1; or,

(C) with respect to, and only with respect to, Bids at EIM External Interties, the carbon dioxide equivalent emission rate of the resource with the highest such rate in the WECC region and the applicable Greenhouse Gas Allowance Price index.

(4) **EIM Bid Adder Price.** The price included in the EIM Bid Adder shall not be less than $0/MWh and the sum of the price component of the EIM Bid Adder and the Energy cost portion of the Bid cannot exceed $1000/MWh.

(b) **Consideration of EIM Bid Adders in Market Clearing.**

(1) **Dispatch of EIM Participating Resources with Nonzero Bid Adders.** The CAISO's Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch shall take into account EIM Bid Adders in selecting Energy produced by EIM Participating Resources located in an EIM Entity Balancing Authority Area outside of California for import into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California up to the associated MW quantity included in the EIM Bid Adder, but not when selecting EIM Participating Resources to serve Load outside of the

combined area of the CAISO Balancing Authority Area and other EIM Entity Balancing Authority Areas within California.

(2) **EIM Participating Resources EIM Bid Adder MW Quantity.** The CAISO's Real-Time Unit Commitment and Real-Time Dispatch will limit the maximum EIM Bid Adder MW quantity of an EIM Participating Resource to a value equal to the EIM Participating Resource's dispatchable Bid range between the EIM Participating Resource's Base Schedule and the EIM Participating Resource's effective upper economic Bid, considering any applicable derates and ancillary services capacity reservations, for the relevant Operating Hour.

(3) **Dispatch of EIM Participating Resources Bid Adders of Zero.** The CAISO's Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch shall not dispatch EIM Participating Resources outside the CAISO Balancing Authority Area for delivery into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California if the MW quantity included in the EIM Bid Adder is zero.

(c) **Effect on Locational Marginal Price.** Using the methodology described in Appendix C, the CAISO will include the Marginal Greenhouse Gas Cost as a negative component in the Locational Marginal Prices for EIM Entity Balancing Authority Areas not subject to a greenhouse compliance obligation under the regulations administered by the California Air Resources Board in addition to those specified in Appendix C and Section 27.

(d) **Notice to EIM Participating Resource.** The CAISO will notify the EIM Participating Resource Scheduling Coordinator through the Dispatch Instruction of the megawatt quantity of any Energy of an EIM Participating Resource located in an EIM Entity Balancing Authority Area outside of California that is deemed to have been imported into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California as a result of the Market Clearing of the Real-Time Market.

(e) **Compensation.** The CAISO will allocate the Net Imbalance Energy Export optimally to EIM Participating Resource Scheduling Coordinators and will distribute Greenhouse Gas

~~Emission Cost Revenues to EIM Participating Resources pursuant to that allocation.~~

~~(f) **Reporting Requirements.** The CAISO will report to each EIM Participating Resource Scheduling Coordinator the portion of the FMM Energy Schedule and the portion of RTD Energy Dispatch that is associated with Energy deemed to have been imported to the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California from all EIM Resources as part of the Real-Time Market results publication from each of its EIM Resources.~~

29.33 [Not Used]

29.34 EIM Operations

(a) **In General.** Section 34, as supplemented by provisions in Section 29.34, will govern the operation of the Real-Time Market within the EIM Area. Operation of the Real-Time Market within the EDAM Area is further supplemented by Section 33, which produces outcomes that satisfy or modify certain requirements otherwise applicable to EIM Market Participants, including a Day-Ahead Schedule instead of a submitted EIM Base Schedule and an initial EIM Base Load Schedule, pools of Balancing Authority Areas for purposes of the EIM Resource Sufficiency Evaluation, and Energy transfers between Balancing Authority Areas with equal scheduling priority to Demand.

(b) **Applicability.** EIM Entity Scheduling Coordinators, EIM Sub-Entity Scheduling Coordinators, and EIM Participating Resource Scheduling Coordinators will submit EIM Base Schedules and other necessary information to the CAISO for use in the Real-Time Market pursuant to Section 29.34 and not pursuant to Section 34.

(c) **Submission Deadlines.** If an EIM Entity Scheduling Coordinator, EIM Sub-Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator fails to submit an EIM Base Schedule according to the timelines established in this Section 29.34, the CAISO will not accept the EIM Base Schedule or use it in the Real-Time Market.

(d) **Demand Forecast.**

(1) **In General.** In accordance with procedures set forth in the Business Practice

Manual for the Energy Imbalance Market, the CAISO shall develop short-term and mid-term Demand Forecasts by Demand Forecast zone within each EIM Entity Balancing Authority Area, separately from the CAISO Balancing Authority Area, and, as needed for the EDAM Upward Pool or EDAM Downward Pool.

(2) **Short Term Forecast.** The CAISO's short-term Demand Forecast for an EIM Entity Balancing Authority Area shall produce a value every five minutes for the duration of the CAISO's Dispatch horizon, which has five-minute granularity and extends several Dispatch Intervals.

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(l) **EIM Resource Sufficiency Evaluation – Capacity Test.**

(1) **Requirement.**

The Supply, as applicable and as detailed in Business Practice Manuals, included in—

(A) the EIM Resource Plan must meet the Demand Forecast for each EIM Entity Balancing Authority Area, and

(B) the RUC Schedules, the HASP Advisory Schedules and HASP Intertie Block Schedules or the FMM Schedules must meet the Demand Forecast for the CAISO Balancing Authority Area.

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(m) **EIM Resource Sufficiency Evaluation – Flexibility Test.**

(1) **Review.**

(A) **Individual EIM Entity Balancing Authority Areas.** The CAISO will review the EIM Resource Plan for an EIM Entity Balancing Authority Area pursuant to the process set forth in the Business Practice Manual

for the Energy Imbalance Market and verify that it has sufficient Bids for Ramping capability, accounting for Sections 29.34(l)(2)(A)(iii), 29.34(l)(2)(A)(iv), 29.34(l)(2)(B)(iv) and 29.34(l)(2)(D), to meet the EIM Entity Balancing Authority Area upward and downward Ramping requirements within a one percent or one MW tolerance, as adjusted pursuant to Sections 29.34(m)(2), (3), and (~~5~~7).

(B) **CAISO Balancing Authority Area.** The CAISO will review the RUC Schedules, the HASP Advisory Schedules and HASP Intertie Block Schedules or the FMM Schedules in the CAISO Balancing Authority Area pursuant to the process set forth in the Business Practice Manual for the Energy Imbalance Market and verify that it has sufficient Bids for Ramping capability, accounting for Sections 29.34(l)(2)(A)(iii), 29.34(l)(2)(A)(iv) and 29.34(l)(2)(B)(iv), to meet the CAISO Balancing Authority Area upward and downward Ramping requirements within a one percent or one MW tolerance, as adjusted pursuant to Sections 29.34(m)(2), (3), and (~~5~~7), provided that the benefit of the exclusion of the export schedules which may be curtailed in accordance with Section 34.12.4(a) or 34.12.4(b) will be reflected in the upward capacity test results for the CAISO Balancing Authority Area.

(C) **EIM Resource Sufficiency Evaluation for the Balancing Authority Areas in the EDAM Area**. Consistent with Section 33.31.1.4, the CAISO will evaluate resource sufficiency of the Balancing Authority Areas in the EDAM Area solely pursuant to this Section 29.34(m). The CAISO will consider all Day-Ahead Market awards for Energy, Imbalance Reserves, and Reliability Capacity as supply prior to testing an individual Balancing Authority Area in the EDAM Area for EIM resource sufficiency. The CAISO will evaluate the EDAM Upward Pool to verify that it has sufficient Bids and Ramping capability to meet the Upward Uncertainty

Requirement for the EDAM Upward Pool within a one percent or one MW tolerance, as adjusted pursuant to Sections 29.34(m)(2)-(5). The CAISO will evaluate the EDAM Downward Pool to verify that it has sufficient Bids and Ramping capability to meet the Downward Uncertainty Requirement for the EDAM Downward Pool within a one percent or one MW tolerance, as adjusted pursuant to Sections 29.34(m)(2)-(5). A Balancing Authority in the EDAM Area not included in the EDAM Upward Pool or EDAM Downward Pool will be evaluated in the same manner as an individual EIM Balancing Authority Area.

(D) **Power Balance Constraint and Load Conformance Considerations.** The CAISO, pursuant to the process set forth in the Business Practice Manual for the Energy Imbalance Market, will consider the quantity of any power balance constraint relaxation in the Real-Time Market solution, while excluding from consideration any constraint relaxation due to Load conformance in the Real-Time Market solution, in the determination of whether sufficient Bids for Ramping capability are available to meet the upward and downward Ramping requirements in accordance with this Section 29.34(m)(1).

(2) **Determination of ~~EIM~~ Diversity Benefits.** The CAISO will calculate separately the upward and downward EIM D~~d~~iversity B~~b~~enefits as the difference between the sum of the upward and downward Uncertainty Requirements for all Balancing Authority Areas in the EIM Area, and the Uncertainty Requirement for the EIM Area. The Diversity Benefits for a Balancing Authority Area in the EDAM Area is its proportional amount of the difference between the sum of each Balancing Authority Area's individual Imbalance Reserve requirement and the EDAM Area Imbalance Reserve requirements, with the CAISO calculating the Imbalance Reserve requirements for each Balancing Authority Area independently and for the EDAM Area as a whole.

(3) **Effects of ~~EIM~~ Diversity Benefits for EIM Entities that Are Not Balancing Authorities in the EDAM Area.** For each Balancing Authority Area in the EIM Area that is not a Balancing Authority Area in the EDAM Area, the CAISO will reduce the upward and downward Uncertainty Requirements by the Balancing Authority Area's pro rata share of the upward and downward EIM D~~d~~iversity B~~b~~enefit in the EIM Area as may be limited by –

(A) the available net import EIM Transfer capability into that Balancing Authority Area in the case of an upward Uncertainty Requirement; and

(B) the available net export EIM Transfer capability from that Balancing Authority Area in the case of a downward Uncertainty Requirement.

(4) **Effect of Diversity Benefit for Balancing Authority Areas that Are Within the Pool of EDAM Balancing Authority Areas.** For each Balancing Authority Area that is included in the pool of Balancing Authority Areas in the EDAM Area as provided in Section 33.31.1.4, the EIM RSE will hold a portion of the Diversity Benefit from allocation and reflect this quantity as additional global procurement of Imbalance Reserves for the EDAM Area as provided in the Business Practice Manuals for purposes of the EIM RSE. If the pool of Balancing Authority Areas in the EDAM Area is subdivided for purposes of accepting the assistance Energy transfer product as provided in Section 29.34(n)(3)(C), each sub-pool will carry with it and leverage the Diversity Benefit of the entities within the sub-pool.

(5) **Effect of Diversity Benefit for Balancing Authority Areas in the EDAM Area that Are not Within the Pool of EDAM Balancing Authority Areas.** The EIM RSE will consider the effects of dynamic transfers from the members of the EDAM Upward Pool and EDAM Downward Pool to the Balancing Authority Area not included in the pool as provided in Section 33.31.1.4, pursuant to the procedures the Business Practice Manuals.

(~~4~~6) **Determination of Flexible Ramping Sufficiency Credit.** The CAISO will calculate for each Balancing Authority Area in the EIM Area, the upward flexible

Ramping sufficiency credit as the outgoing EIM Transfer from that area and the downward flexible Ramping sufficiency credit as the incoming EIM transfer into that area.

(7~~5~~) **Effect of Flexible Ramping Sufficiency Credit.** The CAISO will reduce the upward Uncertainty Requirement of a Balancing Authority Area in the EIM Area by its upward flexible Ramping sufficiency credit, and will reduce the downward Uncertainty Requirement of a Balancing Authority Area in the EIM Area by its downward flexible Ramping sufficiency credit.

(n) **Effect of EIM Resource Capacity or Flexibility Insufficiency.**

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(3) **Assistance Energy Transfers.**

(A) **In General.** A Balancing Authority Area in the EIM Area may obtain assistance Energy transfers into its Balancing Authority Area prior to December 31, 2025 if its Scheduling Coordinator has submitted to the Master File a designation to accept automatically incremental EIM Transfer imports and pay the associated EIM Assistance Energy Transfer Surcharge following the failure of the upward capacity test in Section 29.34(l) or the upward flexibility test in Section 29.34(m) in accordance with the timelines and procedures included in the Business Practice Manual for the Energy Imbalance Market. Consistent with the requirements in the Business Practice Manual, the CAISO will issue a m~~M~~arket n~~N~~otice prior to the CAISO Balancing Authority Area accepting assistance Energy transfers as provided in this section, with such election to remain in effect unless the CAISO issues a m~~M~~arket n~~N~~otice at least 5 Business Days prior to withdrawing or resuming its participation.

(B) **Assistance Energy Transfer Product.** If a participating Balancing Authority Area in the EIM Area has opted-in to receive assistance Energy transfers consistent with the process requirements set forth in the Business Practice Manuals and the participating Balancing Authority Area fails the upward capacity test in Section 29.34(l) or the upward flexibility test in Section 29.34(m) then—

(i) the Balancing Authority Area will not be subject to the capacity test or flexibility test failure consequences in Section 29.34(n);

(ii) the Balancing Authority Area will pay the EIM Assistance Energy Transfer Surcharge according to Section 29.11(t).

(C) **Access to the Assistance Energy Transfer Product for pooled Balancing Authority Areas within the EDAM Area.** A Balancing Authority Area in the EDAM Area that is pooled together with other Balancing Authority Areas within the EDAM Area as part of the EDAM Upward Pool or EDAM Downward Pool pursuant to Section 33.31.1.4 may elect to receive assistance Energy transfers. If the Balancing Authority Areas in the EDAM Area that are pooled together for purposes of the EIM RSE do not uniformly elect to receive assistance Energy transfers, then the EDAM Upward Pool will be subdivided into two sub-pools: those Balancing Authority Areas in the EDAM Area that elect to receive assistance Energy transfers and those Balancing Authority Areas in the EDAM Area that do not elect to receive assistance Energy transfers. If the EDAM Upward Pool, or its sub-pool as applicable, elects to receive assistance Energy transfers and fails the upward flexibility test in Section 29.34(m) then:

(i) The EDAM Upward Pool, or its sub-pool as applicable, will not be subject to the failure consequences of Section 29.34(n)(1)(B) or Section 29.34(n)(2)(B); and

(ii) the EDAM Upward Pool, or sub-pool as applicable, will receive an assistance Energy transfer and will be assessed the EIM Assistance Energy Transfer Surcharge according to Section 29.11(t), with any revenue or Surcharges distributed to the EDAM Upward Pool to be allocated *pro-rata* to the members of the EDAM Upward Pool, or sub-pool as applicable, that received the assistance Energy transfers.

(D~~C~~) **Sunset Period**. This Section 29.34(n), together with Section 29.11(t), will terminate on December 31, 2025.

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(r) **Use of EIM Available Balancing Capacity.**

(1) **In General.** The CAISO will use EIM Available Balancing Capacity identified in the EIM Resource Plan to address power balance constraint infeasibilities in the EIM Balancing Authority Area for which the EIM Available Balancing Capacity is designated by the responsible EIM Entity Scheduling Coordinator, while simultaneously participating in Congestion Management.

(2) **EIM Resource Sufficiency Evaluations.** The CAISO will not apply the EIM Available Balancing Capacity towards its evaluation of the resource sufficiency tests specified in Section 29.34(k), (l), and (m).

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Section 30

30.1 Bids, Including Self-Schedules

Scheduling Coordinators shall submit Bids to participate in the CAISO Markets, as well as any Self-Schedules, ETC Self-Schedules, TOR Self-Schedules, or Self-Provided Ancillary Services. Bidding rules for each type of resource are contained in this Section 30 and additional specifications regarding bidding practices are contained in the Business Practice Manuals posted on the CAISO Website. Bids will consist of various components described in this Section 30 through which the Scheduling Coordinator provides information regarding the parameters and conditions pursuant to which the Bid may be optimized by the CAISO Markets.

30.1.1 Day-Ahead Market

Bids submitted in the DAM apply to the twenty-four (24) hours of the next Trading Day (23 or 25 hours on the Daylight Savings transition days) and are used in both the IFM and RUC. Bids for the Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve service in the Day-Ahead Market must be received by Market Close for the Day-Ahead Market. The Bids shall include information for each of the twenty-four (24) Settlement Periods of the Trading Day. Failure to provide the information within the stated time frame shall result in the Bids being declared invalid by the CAISO. Scheduling Coordinators may submit Bids for the DAM as early as seven (7) days ahead of the targeted Trading Day.

30.1.2 Real-Time Market

Economic Bids and Self-Schedules submitted in the RTM apply to a single Trading Hour and are used for all market processes of the RTM. The CAISO will require Scheduling Coordinators to honor their Day-Ahead Ancillary Services Awards when submitting Ancillary Services Bids in the RTM. Bids for Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve service for each Settlement Period must be received at least seventy-five minutes prior to the commencement of that Settlement Period. The Bids shall include information for only the relevant Settlement Period. Failure to provide the information within the stated timeframe shall result in the Bids being declared invalid and rejected by the CAISO.

30.2 Bid Types

There are ~~three~~ four types of Bids: Energy Bids (which include Virtual Bids), Ancillary Services Bids, Imbalance Reserves Bids, and RUC Availability Bids. Energy Bids that are not Virtual Bids, and Ancillary Services Bids ~~Each Bid type~~ can be submitted as either an Economic Bid or a Self-Schedule ~~(except for RUC Availability Bids and Virtual Bids, which cannot be self-scheduled)~~. All other bid types must be submitted as Economic Bids. Economic Bids specify prices for MW amounts of capacity or MWh amounts of Energy. Self-Schedules do not have any prices associated for MW or MWh. Energy Bids, including both Economic Bids and Self-Schedules (where Self-Schedules are otherwise permitted), may be either Supply Bids, Demand Bids, Virtual Supply Bids, or Virtual Demand Bids. Ancillary Services Bids, ~~and~~ RUC Availability Bids, and Imbalance Reserves Bids are Supply Bids only. Ancillary Services may be self-provided by providing a Submission to Self-Provide an Ancillary Service and having that submission accepted by the CAISO. Rules for submitting the ~~three~~ four types of Bids vary by the type of resource to which the Bid applies as described in Section 30.5 and as further required in each CAISO Markets process as specified in Sections 31, 33, and 34.

* * * * *

30.5 Bidding Rules

30.5.1 General Bidding Rules

(a) All Bids submitted by Scheduling Coordinators ~~Energy and Ancillary Services Bids of each Scheduling Coordinator submitted~~ to the DAM for the following Trading Day shall be submitted at or prior to 10:00 a.m. on the day preceding the Trading Day, but no sooner than seven (7) days prior to the Trading Day. All Energy and Ancillary Services Bids of each Scheduling Coordinator submitted to the RTM for the following Trading Day shall be submitted starting from the time of publication~~, at 1:00 p.m. on the day preceding the Trading Day,~~ of DAM results for the Trading Day, and ending seventy-five (75) minutes prior to each applicable Trading Hour in the RTM. Scheduling Coordinators may submit only one set of Bids to the RTM for a given Trading Hour, which the CAISO uses for all Real-Time Market processes. ~~The CAISO will not accept any Energy or Ancillary~~

~~Services Bids for the following Trading Day between 10:00 a.m. on the day preceding the Trading Day and the publication, at 1:00 p.m. on the day preceding the Trading Day, of DAM results for the Trading Day~~;

(b) Bid prices submitted by a Scheduling Coordinator for Energy accepted and cleared in the IFM and scheduled in the Day-Ahead Schedule may be increased or decreased in the RTM . Bid prices for Energy submitted but not scheduled in the Day-Ahead Schedule may be increased or decreased in the RTM. Incremental Bid prices for Energy associated with Day-Ahead AS or RUC Awards in Bids submitted to the RTM may be revised.

(c) A Scheduling Coordinator may submit in the Real-Time Market new daily Start-Up Bids, Minimum Load Bids, and Transition Bids for resources and MSG Configurations for which the Scheduling Coordinator previously submitted such Bids in the Day-Ahead Market, except for: (1) Trading Hours in which a resource or MSG Configuration has received a Day-Ahead Schedule or has received a Start-Up Instruction in RUC; and (2) Trading Hours that span the Minimum Run Time of the resource or MSG Configuration after the CAISO has committed the resource or the Scheduling Coordinator has self-committed the resource in the RTM.

(d) Scheduling Coordinators may revise ETC Self-Schedules for Supply in the RTM to the extent such a change is consistent with TRTC Instructions provided to the CAISO by the Participating TO in accordance with Section 16.

(e) Scheduling Coordinators may revise TOR Self-Schedules for Supply only in the HASP to the extent such a change is consistent with TRTC Instructions provided to the CAISO by the Non-Participating TO in accordance with Section 17. Energy associated with awarded Ancillary Services capacity cannot be offered in the Real-Time Market separate and apart from the awarded Ancillary Services capacity.

(f) Scheduling Coordinators may submit Energy Bids, AS Bids and RUC Bids in the DAM that are different for each Trading Hour of the Trading Day.

(g) Bids for Energy or capacity that are submitted to one CAISO Market, but are not

accepted in that market are no longer a binding commitment and Scheduling Coordinators may submit Bids in a subsequent CAISO Market at a different price.

(h) The CAISO shall be entitled to take all reasonable measures to verify that Scheduling Coordinators meet the technical and financial criteria set forth in Section 4.5.1 and the accuracy of information submitted to the CAISO pursuant to this Section 30.

(i) In order to retain the priorities specified in Section 31.4 and 34.12 for scheduled amounts in the Day-Ahead Schedule associated with ETC and TOR Self-Schedules or Self-Schedules associated with Regulatory Must-Take Generation, a Scheduling Coordinator must submit to the Real-Time Market ETC or TOR Self-Schedules, or Self-Schedules associated with Regulatory Must-Take Generation, at or below the Day-Ahead Schedule quantities associated with the scheduled ETC, TOR, or Regulatory Must-Take Generation Self-Schedules. If the Scheduling Coordinator fails to submit such Real-Time Market ETC, TOR, or Regulatory Must-Take Generation Self-Schedules, the defined scheduling priorities of the ETC, TOR, or Regulatory Must-Take Generation Day-Ahead Schedule quantities may be subject to adjustment in the HASP and the Real-Time Market as further provided in Sections 31.4 and 34.12 in order to meet operating conditions.

(j) For Multi-Stage Generating Resources that receive a Day-Ahead Schedule, RUC Award~~,~~ ~~are awarded a RUC Schedule~~, or ~~receive an~~ Ancillary Services Award, the Scheduling Coordinator must submit an Energy Bid in the Real-Time Market for the same Trading Hour(s). If the Scheduling Coordinator submits an Economic Bid for such Trading Hour(s), the Economic Bid must be for either: the same MSG Configuration scheduled or awarded in the Integrated Forward Market, or the MSG Configuration committed in RUC. If the Scheduling Coordinator submits a Self-Schedule in the Real-Time Market for such Trading Hour(s), then the Energy Self-Schedule may be submitted in any registered MSG Configuration, including the MSG Configuration awarded in the Day-Ahead Market, that can support the awarded Ancillary Services (as further required by Section 8).

(k) Scheduling Coordinators for Multi-Stage Generating Resources may submit into the Real-Time Market bids from up to six (6) MSG Configurations in addition to the MSG

Configuration scheduled or awarded in the Integrated Forward Market and Residual Unit Commitment, provided that the MSG Transitions between the MSG Configurations bid into the Real-Time Market are feasible and the transition from the previous Trading Hour are also feasible.

(l) For the Trading Hours that Multi-Stage Generating Resources do not have a CAISO Schedule or award from a prior CAISO Market run, the Scheduling Coordinator can submit up to six (6) MSG Configurations into the RTM.

(m) A Scheduling Coordinator cannot submit a Bid to the CAISO Markets for a MSG Configuration into which the Multi-Stage Generating Resource cannot transition due to lack of Bids for the specific Multi-Stage Generating Resource in other MSG Configurations that are required for the requisite MSG Transition.

(n) In order for Multi-Stage Generating Resource to meet any Resource Adequacy must-offer obligations, the responsible Scheduling Coordinator must submit either an Economic Bid or Self-Schedule for at least one MSG Configuration into the Day-Ahead Market and Real-Time Market that is capable of fulfilling that Resource Adequacy obligation, as feasible. The Economic Bid shall cover the entire capacity range between the maximum bid-in Energy MW and the higher of Self-Scheduled Energy MW and the Multi-Stage Generating Resource plant-level PMin as registered in the Master File.

(o) For any given Trading Hour, a Scheduling Coordinator may submit Self-Schedules and/or Submissions to Self-Provide Ancillary Services in only one MSG Configuration for each Generating Unit.

(p) In any given Trading Hour in which a Scheduling Coordinator has submitted a Self-Schedule for a Multi-Stage Generating Resource, the Scheduling Coordinator may also submit Bids for other MSG Configurations provided that they concurrently submit Bids that enable the applicable CAISO Market to transition the Multi-Stage Generating Resource to other MSG Configurations.

(q) If in any given Trading Hour the Multi-Stage Generating Resource was awarded Regulation or Operating Reserves in the IFM, any Self-Schedules or Submissions to Self-

Provide Ancillary Services the Scheduling Coordinator submits for that Multi-Stage Generating Resource in the RTM must be for the same MSG Configuration for which Regulation or Operating Reserve is Awarded in IFM for that Multi-Stage Generating Resource in that given Trading Hour.

(r) If a Multi-Stage Generating Resource has received a binding RUC Start-Up Instruction as provided in Section 31, any Self-Schedule or Submission to Self-Provide Ancillary Services in the RTM must be in the same MSG Configuration committed in RUC.

(s) If in any given Trading Hour the Multi-Stage Generating Resource is scheduled for Energy in the IFM, any Self-Schedules the Scheduling Coordinator submits for that Multi-Stage Generating Resource in the RTM must be for the same MSG Configuration for which Energy is scheduled in IFM for that Multi-Stage Generating Resource in that given Trading Hour.

(t) For a Multi-Stage Generating Resource, the Bid(s) submitted for the resource's configuration(s) shall collectively cover the entire capacity range between the maximum bid-in Energy MW and the higher of the Self-Scheduled Energy MW and the Multi-Stage Generating Resource plant-level PMin as registered in the Master File. This rule shall apply separately to the Day-Ahead Market and the Real-Time Market.

(u) A Scheduling Coordinator may submit a Self-Schedule Hourly Block for the RTM as an import to or an export from the CAISO Balancing Authority Area and may also submit Self-Scheduled Hourly Blocks for Ancillary Services imports. Such a Bid shall be for the same MWh quantity for each of the four (4) fifteen (15)-minute intervals that make up the applicable Trading Hour.

(v) A Scheduling Coordinator may submit a Variable Energy Resource Self-Schedule for the RTM can be submitted from a Variable Energy Resource. A Scheduling Coordinator can use either the CAISO forecast for Expected Energy in the RTM or can provide its own forecast for Expected Energy pursuant to the requirements specified in Section 4.8.2. The Scheduling Coordinator must indicate in the Master File whether it is using its own forecast or the CAISO forecast for its resource in support of the Variable Energy Self-

Schedule. The Scheduling Coordinator is not required to include the same MWh quantity for each of the four (4) fifteen (15)-minute intervals that make up the applicable Trading Hour for the Variable Energy Resource Self-Schedule include. If an external Variable Energy Resource that is not using a forecast of its output provided by the CAISO submits a Variable Energy Resource Self-Schedule and the Expected Energy is not delivered in the FMM, the Scheduling Coordinator for the Variable Energy Resource will be subject to the Under/Over Delivery Charge as described in Section 11.31. Scheduling Coordinators for Dynamically Scheduled Variable Energy Resources that provide the CAISO with a two (2)-hour rolling forecast with five (5)-minute granularity can submit Variable Energy Resource Self-Schedules.

(w) Scheduling Coordinators can submit Economic Hourly Block Bids to be considered in the HASP and to be accepted as binding Schedules with the same MWh award for each of the four (4) FMM intervals. Scheduling Coordinator can also submit Economic Hourly Block Bids for Ancillary Services. As specified in Section 11, a cleared Economic Hourly Block Bid is not eligible for Bid Cost Recovery.

(x) Scheduling Coordinators can submit Economic Hourly Block Bids with Intra-Hour Option. If accepted in the HASP, such a Bid creates a binding schedule with same MWh awards for each of the four (4) FMM intervals. After that, the RTM can optimize such schedules for economic reasons once through an FMM during the Trading Hour. As specified in Section 11, a cleared Economic Hourly Block Bid with Intra-Hour Option is not eligible for Bid Cost Recovery.

(y) A Scheduling Coordinator submitting Bids to the RTM is not required to submit a Self-Schedule Hourly Block, a Variable Energy Resource Self-Schedule, an Economic Hourly Block Bid, or an Economic Hourly Block Bid with Intra-Hour Option, and may instead choose to participate in the RTM through Economic Bids or Self-Schedules.

(z) For a Wheeling Through Self Schedule to be eligible as a Priority Wheeling Through for a given month, the Scheduling Coordinator must notify the CAISO of the MW quantity of the power supply contract MW supporting the export Self-Schedule of the Priority

Wheeling Through transaction and confirm it meets the eligibility requirements to support a Priority Wheeling Through. The Scheduling Coordinator must provide such information to the CAISO by 45 days prior to the applicable month.

(aa) A Scheduling Coordinator for a CAISO Balancing Authority Area resource will indicate through a resource parameter as prescribed in the Business Practice Manual that it has sold capacity to an out-of-balancing authority area Load Serving Entity, and no CAISO Load Serving Entity has a right to such capacity. If the Scheduling Coordinator does not indicate this status, the resource cannot be a designated resource for an export Self-Schedule at Scheduling Points backed by non-Resource Adequacy Capacity. The CAISO will notify a Scheduling Coordinator hourly, to the extent practicable, that its resource, which is flagged to support an export, is designated by another entity to support export Self-Schedules at Scheduling Points backed by non-Resource Adequacy Capacity. Upon receiving the notice, the Scheduling Coordinator for the designated resource shall notify the CAISO if it does not have a contractual commitment to support such export Self-Schedule or does not have a reasonable expectation to be available to support the export Self Schedule. The Scheduling Coordinator for the designated resource and the Scheduling Coordinator for the export Self-Schedule shall designate a resource to support such export only if the resource is expected to have sufficient available capacity to support the export quantity throughout the entire hour. For Variable Energy Resources, this requirement can only be satisfied if the resource's forecasted output for each of the applicable four (4) fifteen (15) minute intervals in the applicable hour for which a bid has been submitted, based on the most recent forecast for that hour, is for Generation that is equal to or greater than the Self Schedule export quantity. The designated capacity must be the deliverable capacity of a resource with Full Capacity Deliverability Status, Partial Capacity Deliverability Status, or Interim Deliverability Status that is shown on the CAISO's NQC list.

(bb) In addition to meeting any obligations applicable to Resource Adequacy Resources, a Scheduling Coordinator for a resource supporting Self-Schedules of exports at

Scheduling Points backed by non-Resource Adequacy Capacity shall submit a RUC Availability Bid for RCU ~~$0/MW RUC Availability Bid~~ for a quantity equal to or greater than the quantity of the export.

(cc) The Scheduling Coordinator for the resource shall offer Energy Bids into the Real-Time Market to support Self-Schedules of exports at Scheduling Points backed by non-Resource Adequacy Capacity.

(dd) The positive difference in quantity between the higher of a designated resource's Day-Ahead Schedule or a designated resource's RUC Schedule and the ~~RUC Schedule~~Day-Ahead Schedule of the corresponding Self-Schedule at a Scheduling Point backed by non-Resource Adequacy Capacity cannot back additional exports at a Scheduling Point backed by non-Resource Adequacy Capacity scheduled in the Real-Time Market.

(ee) A Scheduling Coordinator shall not schedule an import Self-Schedule to support an export Self-Schedule of exports at Scheduling Points explicitly sourced by non-Resource Adequacy Capacity. The transaction is properly scheduled as a Wheeling Through transaction as described in section 30.5.4.

30.5.2 Supply Bids

30.5.2.1 Common Elements for Supply Bids

In addition to the resource-specific Bid requirements of this Section, all Supply Bids must contain the following components: Scheduling Coordinator ID Code; Resource Location or Resource ID, as appropriate; MSG Configuration ID, as applicable; PNode or Aggregated Pricing Node as applicable; Energy Bid Curve, as applicable; Self-Schedule component; Ancillary Services Bid; RUC Availability Bid as applicable; Imbalance Reserves Bid as applicable; ~~,~~ the CAISO Market to which the Bid applies; Trading Day to which the Bid applies; Priority Type (if any), and a Transaction ID as created by the CAISO. Supply Bids offered in the CAISO Markets must be monotonically increasing. Energy Bids in the RTM must also contain a Bid for Ancillary Services to the extent the resource is certified and capable of providing Ancillary Service in the RTM up to the registered certified capacity for that Ancillary Service less any Day-Ahead Ancillary Services Awards.

Scheduling Coordinators must submit the applicable Supply Bid components, including Self-Schedules,

for the submitted MSG Configuration.

Scheduling Coordinators submitting Bids for Scheduling Points must adhere to the E-Tagging requirements outlined in Section 30.5.7.

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30.5.2.5 Supply Bids for Metered Subsystems

Consistent with the bidding rules specified in this Section 30.5, Scheduling Coordinators that represent MSS Operators may submit Bids ~~for Energy and Ancillary Services~~, including Self-Schedules and Submissions to Self-Provide an Ancillary Service, to the DAM. All Bids to supply Energy by MSS Operators must identify each Generating Unit on an individual unit basis. The CAISO will not accept aggregated Generation Bids without complying with the requirements of Section 4.9.12 of the CAISO Tariff. All Scheduling Coordinators that represent MSS Operators must submit Demand Bids at the relevant MSS LAP. Scheduling Coordinators that represent MSS Operators must comply with Section 4.9 of the CAISO Tariff. ~~Scheduling Coordinators that represent MSS Operators that have opted out of RUC participation pursuant to Section 31.5 must Self-Schedule one hundred percent (100%) of the Demand Forecast for the MSS.~~ For an MSS that elects Load following, the MSS Operator shall also self-schedule or bid Supply to match the Demand Forecast. All Bids for MSSs must be identify each Generating Unit on an individual unit basis or a System Unit. For an MSS that elects Load following consistent with Section 4.9.13.2, the Scheduling Coordinator for the MSS Operator must include the following additional information with its Bids: the Generating Unit(s) that are Load following; the range of the Generating Unit(s) being reserved for Load following; whether the quantity of Load following capacity is either up or down; and, if there are multiple Generating Units in the MSS, the priority list or distribution factors among the Generating Units. The CAISO will not dispatch the resource within the range declared as Load following capacity, leaving that capacity entirely available for the MSS to dispatch. The CAISO uses this information in the IFM runs and the RUC to simulate MSS Load following. The Scheduling Coordinator for the MSS Operator may change these characteristics through the Bid submission process in the RTM. If the Load following resource is also an RMR Unit, the MSS Operator must not specify the RMR Contract

Capacity specified in the RMR Contract as Load following up or down capacity to allow the CAISO to access such capacity for RMR Dispatch.

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30.5.2.8 RUC Availability Bids

Scheduling Coordinators may submit RUC Availability Bids to seek a RUC Award. ~~for specific Generating Units capacity that is not Resource Adequacy Capacity or CPM Capacity in the DAM. Scheduling Coordinators for Resource Adequacy Capacity or CPM Capacity must participate in RUC to the extent that such capacity is not reflected in an IFM Schedule but need not submit RUC Availability Bids. Resource Adequacy Capacity participating in RUC will be optimized using a zero dollar ($0/MW-hour) RUC Availability Bid.~~ Scheduling Coordinators submit separate RUC Availability Bids for RCU and RCD. For Multi-Stage Generating Resources, the RUC Availability Bids shall be submitted at the MSG Configuration. ~~Capacity that does not have Bids for Supply of Energy in the IFM will not be eligible to participate in the RUC process.~~ The RUC Availability Bid ~~component~~ is a MW- quantity ~~of non-Resource Adequacy Capacity~~ in $/MW per hour. The value for the $/MW per hour component of the Bid must be between 0 and 250.

Resources offering Energy Bids, other than Virtual Bids, to the IFM must submit a RUC Availability Bid for RCU at a quantity no less than the quantity of the Energy Bid.

30.5.2.9 Imbalance Reserves Bids

Scheduling Coordinators may submit Imbalance Reserves Bids to seek an Imbalance Reserves Award. Scheduling Coordinators submit separate Imbalance Reserves Bids for IRU and IRD. For Multi-Stage Generating Resources, the Imbalance Reserves Bids shall be submitted at the MSG Configuration level. The Imbalance Reserves component is MW-quantity in $/MW per hour. The value for the $/MW per hour component of the Bid must be between 0 and 55.

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30.5.8.2 Real-Time Market.

Scheduling Coordinators may submit Demand Bids, Export Bids, Virtual Bids, and Bids for Non-Resource-Specific System Resources above the Soft Energy Bid Cap, not to exceed the Hard Energy Bid Cap, for any Trading Hour of the Real-Time Market in which

(a) The conditions in Section 30.5.8.1 applied to the same Trading Hour of the Day-Ahead Market; or

(b) (1) The CAISO has accepted a Bid for the applicable Trading Hour of the Real-Time Market with an Energy Bid price that exceeds the Soft Energy Bid Cap pursuant to Section 30.7.12, not including Bids from Reliability Demand Response Resources, or (2) the Maximum Import Bid Price exceeds the Soft Energy Bid Cap

30.5.9 GHG Bid Adders

Scheduling Coordinators for resources located within a GHG Regulation Area may submit GHG Bid Adders to serve Demand within another GHG Regulation Area in accordance with Sections 29.32 and 33.32.

30.6 Bidding and Scheduling of PDRs and RDRRs

30.6.1 Bidding and Scheduling of PDRs

Unless otherwise specified in the CAISO Tariff and applicable Business Practice Manuals, and subject to Section 30.6.3, the CAISO will treat Bids for Energy and Ancillary Services on behalf of Proxy Demand Resources like Bids for Energy and Ancillary Services on behalf of other types of supply resources. The CAISO will only accept the following types of Bids from Proxy Demand Resources:

(i) Economic Bids for Energy or Ancillary Services;

(ii) submissions to Self-Provide Ancillary Services;

(iii) submissions of Energy Self-Schedules from Proxy Demand Resources that have provided Submissions to Self-Provide Ancillary Services;

(iv) submissions of Energy Self-Schedules in the Real-Time Market up to the Proxy Demand Resource's Day-Ahead Market Schedule in the same Trading Hour; ~~and~~

(v) RUC Availability Bids; and

(vi) Imbalance Reserves Bids.

A Scheduling Coordinator for a Demand Response Provider representing a Proxy Demand Resource may Self-Provide Ancillary Services for which it is certified. The Demand Response Provider's Demand Response Services for Proxy Demand Resources will be bid separately and independently from the LSE's underlying Demand Bid.

30.6.1.1 Bidding and Scheduling of PDRs in the Real-Time Market

Pursuant to Section 4.13.3, Scheduling Coordinators for Proxy Demand Resources may submit Economic Bids for Energy and Ancillary Services in the Real-Time Markets. Pursuant to Section 30.5.1(s), Scheduling Coordinators for Proxy Demand Resources may submit Economic Hourly Block Bids to be considered in the HASP, and to be accepted as binding Schedules with the same MWh award for each of the four FMM intervals. A cleared Economic Hourly Block Bid is not eligible for Bid Cost Recovery. Scheduling Coordinators for Proxy Demand Resources may not submit Economic Hourly Block Bids with an Intra-Hour Option.

30.6.1.2 Bidding and Scheduling of Proxy Demand Resources using the Load-Shift Methodology

Scheduling Coordinators for Proxy Demand Resources using the load-shift methodology described in Section 4.13.4.7 will submit separate Economic Bids for the curtailment Resource ID and the consumption Resource ID that comprise the Proxy Demand Resource. The CAISO will use reasonable efforts to optimize both Resource IDs to avoid sending conflicting Schedules.

The CAISO will only accept the following types of Bids for the curtailment Resource ID:

(i) Economic Bids for Energy or Ancillary Services;

(ii) submissions to Self-Provide Ancillary Services;

(iii) submissions of Energy Self-Schedules where the curtailment Resource ID has provided Submissions to Self-Provide Ancillary Services;

(iv) submissions of Energy Self-Schedules in the Real-Time Market up to curtailment Resource ID’s Day-Ahead Market Schedule in the same Trading Hour; and

(v) RUC Availability Bids; and

(vi) Imbalance Reserves Bids.

All Economic Bids for Energy for the curtailment Resource ID must be above the Market Clearing Prices established in Section 30.6.3. For the consumption Resource ID, the CAISO will only accept Economic Bids for Energy and submissions of Energy Self-Schedules in the Real-Time Market up to its Day-Ahead Market Schedule in the same Trading Hour. All Economic Bids for the consumption Resources must be below $0/MWh.

30.6.2 Bidding and Scheduling of RDRRs

Unless otherwise specified in the CAISO Tariff and applicable Business Practice Manuals, and subject to Section 30.6.3, the CAISO will treat Bids for Energy on behalf of Reliability Demand Response Resources like Bids for Energy on behalf of other types of supply resources. The CAISO will only accept Economic Bids for Energy from Reliability Demand Response Resources. A Scheduling Coordinator for a Demand Response Provider representing a Reliability Demand Response Resource may submit Economic Energy Bids for the Reliability Demand Response Resource only in the Day-Ahead Market and in the Real-Time Market, but may not submit Energy Self-Schedules for the Reliability Demand Response Resource, may not Self-Provide Ancillary Services from the Reliability Demand Response Resource, and may not submit RUC Availability Bids, ~~or~~ Ancillary Service Bids for the Reliability Demand Response Resource, or Imbalance Reserves Bids. The Demand Response Provider's Demand Response Services for Reliability Demand Response Resources will be bid separately and independently from the LSE's underlying Demand Bid.

30.6.2.1 Bidding and Scheduling of RDRRs in the Real-Time Market

Pursuant to Section 4.13.3, Scheduling Coordinators for Reliability Demand Response Resources may submit Economic Bids for Energy in the Real-Time Markets. Scheduling Coordinators for Reliability Demand Response Resources may submit Economic Hourly Block Bids to be considered in the HASP, and to be accepted as binding Schedules with the same MWh award for each of the four FMM intervals. A cleared Economic Hourly Block Bid is not eligible for Bid Cost Recovery. Scheduling Coordinators for Reliability Demand Response Resources may not submit Economic Hourly Block Bids with an Intra-Hour Option.

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30.7 Bid Validation

The CAISO shall validate submitted Bids pursuant to the procedures set forth in this Section 30.7 and the rules set forth in the Business Practice Manuals.

30.7.1 Scheduling Coordinator Access

Each Scheduling Coordinator will be provided access to the CAISO's secure communication system to submit, modify and cancel Bids prior to the close of both the DAM and RTM, as specified in Section 30.5.1. The CAISO shall provide information regarding submitted Bids including, but not be limited to, the following: (i) notification of acceptance; (ii) notification of validation; (iii) notification of rejection; (iv) notification of status; (v) notification of submission error(s); and (vi) default modification or generation of Bids, including as further provided below, if any, on behalf of Scheduling Coordinators.

30.7.2 Timing of CAISO Validation

Once a Bid is submitted to the CAISO Markets, the Bid is available for validation, which is conducted in multiple steps. Clean Bids will be generated after Market Close.

30.7.3 Day-Ahead Market Validation

30.7.3.1 Validation Prior to Market Close and Master File Update

The CAISO conducts Bid validation in three steps:

Step 1: The CAISO will validate all Bids after submission of the Bid for content validation which determines that the Bid adheres to the structural rules required of all Bids as further described in the Business Practices Manuals. If the Bid fails any of the content level rules the CAISO shall assign it a rejected status and the Scheduling Coordinator must correct and resubmit the Bid.

Step 2: After the Bids are successfully validated for content, but prior to the Market Close of the DAM, the Bids will continue through the second level of validation rules to verify that the Bid adheres to the applicable CAISO Market rules and if applicable, limits based on Master File data. If the Bid fails any level two validation rules, the CAISO shall assign the Bid as invalid and the Scheduling Coordinator must either correct or resubmit the Bid.

Step 3: If the Bid successfully passes validation in Step 2, it will continue through the third level of validation where the Bid will be analyzed based on its contents to identify any missing Bid

components that must be present for the Bid to be valid consistent with the market rules contained in Article III of this CAISO Tariff and as reflected in the Business Practice Manuals. At this stage the Bid will either be automatically modified for correctness and assigned a status of conditionally modified or modified, or if it can be accepted as is, the Bid will be assigned a status of conditionally valid, or valid. A Bid will be automatically modified and assigned a status of modified or conditionally modified Bid, whenever the CAISO inserts or modifies a Bid component. The CAISO will insert or modify a Bid component whenever (1) a Self-Schedule quantity is less than the lowest quantity specified as an Economic Bid for either an Energy Bid or Demand Bid, in which case the CAISO extends the Self-Schedule to cover the gap; ~~(2) for non-Resource Adequacy Resources, the CAISO will extend the Energy Bid Curve or, if the Scheduling Coordinator did not submit an Energy Bid Curve, use the Generated Bid to cover any capacity in a RUC Bid component, if necessary;~~ and (~~3~~2) for a Resource Adequacy Resource that is not a Use-Limited Resource, the CAISO will ~~extend the Energy Bid Curve or, if the Scheduling Coordinator did not submit an Energy Bid Curve, use the Generated Bid to cover any capacity in a RUC Bid component and, if necessary, up to the full registered Resource Adequacy Capacity~~submit Generated Bids for Reliability Capacity as specified in Section 40.6.8.

To the extent the Scheduling Coordinator for an Eligible Intermittent Resource fails to submit a Bid for RCU up to the quantity of its forecasted output based on the forecast referenced in Section 34.1.6 the CAISO generates a bid for RCU up to the forecasted output. The price of the generated bid is at the price included in the RUC Availability Bid for RCU, or at the Default Availability Bid if the Scheduling Coordinator did not submit any such Bid.

To the extent an RMR Resource fails to submit a Bid for RCU up to the quantity required in Section 31.5.1.2 the CAISO generates a bid for RCU up to the required quantity. The price of the generated bid is at the price included in the RUC Availability Bid for RCU, or at the Default Availability Bid if the Scheduling Coordinator did not submit any such Bid.

~~The CAISO will generate a Proxy Bid or extend an Energy Bid or Self-Schedule to cover any RUC Award or Day-Ahead Schedule in the absence of any Self-Schedule or Economic Bid components, or to fill in any gaps between any Self-Schedule Bid and any Economic Bid~~

~~components to cover a RUC Award or Day-Ahead Schedule. To the extent that an Energy Bid to the HASP/RTM is not accompanied by an Ancillary Services Bid, the CAISO will insert a Spinning Reserve and Non-Spinning Reserve Ancillary Services Bid at $ 0/MW for any certified Operating Reserve capacity. The CAISO will also generate a Self-Schedule Bid for any Generating Unit that has a Day-Ahead Schedule but has not submitted Bids in HASP/RTM, up to the quantity in the Day-Ahead Schedule.~~ Throughout the Bid evaluation process, the Scheduling Coordinator shall have the ability to view the Bid and may choose to cancel the Bid, modify and re-submit the Bid, or leave the modified, conditionally modified or valid, conditionally valid Bid as is to be processed in the designated CAISO Market. These validation rules apply to Bids submitted on behalf of Use Limited Resources. The purpose of the validation rules is not to increase the amount of capacity that a Use Limited Resource has offered into the CAISO Markets.

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30.7.3.5 Bid Validation Rules for Multi-Stage Generating Resources

If a Scheduling Coordinator does not submit a Bid in the Day-Ahead Market or Real-Time Market for a Multi-Stage Generating Resource with a Resource Adequacy must-offer obligation at a MSG Configuration that can meet the applicable Resource Adequacy must-offer obligation, the CAISO will create a Generated Bid for the default Resource Adequacy MSG Configuration. If the Multi-Stage Generating Resource is not capable of Start-Up in the default Resource Adequacy MSG Configuration, then the ISO will, based on feasibility of transitions, create a Generated Bid for every MSG Configuration that has a minimum output below the MW level of the Resource Adequacy must-offer obligation, which will cover the operating range from its minimum output to the minimum of its maximum output and the MW level of the Resource Adequacy must-offer obligation. In the event that the Scheduling Coordinator does not submit a Bid in compliance with section 30.5.1(p), the CAISO will create a Generated Bid for all of the capacity not bid into the CAISO Market between the maximum bid-in Energy MW and the higher of Self-Scheduled Energy MW and the Multi-Stage Generating Resource plant-level PMin. If the Scheduling Coordinator submits a Bid for the Multi-Stage Generating Resource, the CAISO will create this Generated

Bid for the registered MSG Configurations before the Market Close, and if it does not submit such a Bid the CAISO will create this Generated Bid after the Market Close. Any Generated Bid created by the CAISO for the default Resource Adequacy MSG Configuration will be in addition to the MSG Configurations bid into the Real-Time Market by the responsible Scheduling Coordinator. If the Scheduling Coordinator submits a Bid in the Day-Ahead Market or Real-Time Market for a MSG Configuration that is not the default Resource Adequacy MSG Configuration and that does not cover the full amount of the resource's Resource Adequacy requirements, the CAISO will create a Generated Bid for the full Resource Adequacy Capacity. Before the market closes, if a Scheduling Coordinator submits a Bid in the Day-Ahead Market or Real-Time Market for the default Resource Adequacy MSG Configuration of a Multi-Stage Generating Resource that only meets part of the resource's Resource Adequacy must-offer obligation, the CAISO will extend the last segment of the Energy Bid curve in the submitted Bid for the Multi-Stage Generating Resource up to the Multi-Stage Generating Resource's Resource Adequacy must-offer obligation. After the market closes, to the extent that no Bid is submitted into the Real-Time Market for a Multi-Stage Generating Resource scheduled in the Integrated Forward Market as required in Section 30.5 the CAISO will create a Self-Schedule for MSG Configuration equal to the Day-Ahead Schedule for that resource for the MSG Configuration scheduled in the IFM. To the extent a Multi-Stage Generating Resource is awarded Operating Reserves in the Day-Ahead Market and no Economic Energy Bids is submitted for that resource in the Real-Time Market, the CAISO will insert Proxy Energy Bid in the MSG Configuration that was awarded in the Day-Ahead Market to cover the awarded Operating Reserves. ~~To the extent that a Multi-Stage Generating Resources RUC Schedule is greater than its Day-Ahead Schedule, if the Scheduling Coordinator does not submit an Energy Bid in the RTM to cover the difference, then the CAISO will either create a Bid in the MSG Configuration awarded in RUC, or extend the Bid submitted by the Scheduling Coordinator before the Market Close. After the Market Close, the CAISO will create a Generated Bid if there is no Bid submitted for the resource for this difference.~~ The CAISO will validate that the combination of the Day-Ahead Ancillary Services Awards and Submissions to Self-Provide Ancillary Services are feasible with respect to the physical operating characteristics of the applicable MSG Configuration. The CAISO will reject Ancillary Services Bids or Submissions to Self-Provide Ancillary Services for MSG Configurations that are not certified to provide

Ancillary Services. For any given Multi-Stage Generating Resource, for any given CAISO Market and Trading Hour if one MSG Configuration's Bid fails the bid validation process, all other Bids for all other MSG Configurations are also invalidated.

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30.7.4 RTM Validation

RTM Bids will include the same validation process implemented in the DAM with the following additional rules. ~~except that the~~The CAISO will not validate the Bid before and again after the Master File Data update. RTM Bids are only validated based on the current Master File Data on the relevant Trading Day. The CAISO will insert a Generated Bid or extend an Energy Bid or Self-Schedule in the RTM to cover any Day-Ahead Schedule, RUC Award, or Imbalance Reserves Award ~~-~~in the absence of the required Self-Schedule or Economic Bid components, or to fill in any gaps between any Self-Schedule Bid and any Economic Bid components to cover a Day-Ahead Schedule, RUC Award, or Imbalance Reserves Award. To the extent that an Energy Bid to the HASP/RTM is not accompanied by an Ancillary Services Bid, the CAISO will insert a Spinning Reserve and Non-Spinning Reserve Ancillary Services Bid at $ 0/MW for any certified Operating Reserve capacity. The CAISO also will generate a Self-Schedule Bid for any Generating Unit that has a Day-Ahead Schedule but has not submitted Bids in HASP/RTM, up to the quantity in the Day-Ahead Schedule.

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30.7.12.5 Virtual Bids, Export Bids, Demand Bids, and Bids for Non-Resource-Specific System Resources

30.7.12.5.1 Bids for Non-Resource-Specific System Resources that are Resource Adequacy Resources

The CAISO will reduce Bids for Non-Resource-Specific System Resources that are Resource Adequacy Resources that exceed the Maximum Import Bid Price to the greater of the Soft Energy Bid Cap, the

Maximum Import Bid Price, or the highest-priced Energy Bid from a Resource-Specific System Resource that the CAISO has accepted for the applicable Trading Hour pursuant to Section 30.7.12.2.

30.7.12.5.2 Virtual Bids, Export Bids, Demand Bids, and Bids for Non-Resource-Specific System Resources that are not Resource Adequacy Resources

The CAISO will accept Virtual Bids, Export Bids, Demand Bids, and Bids for Non-Resource-Specific System Resources that are not Resource Adequacy Resources that exceed the Soft Energy Bid consistent with the conditions specified in Section 30.5.8. The CAISO will not accept Export Bids, Demand Bids, Virtual Bids, or Bids for Non-Resource-Specific System Resources that are not Resource Adequacy Resources that exceed the Hard Energy Bid Cap.

30.7.12.5.3 Maximum Import Bid Price

The CAISO calculates hourly Maximum Import Bid Prices for the Day-Ahead Market and Real-Time Market, separately, including for on-peak and off-peak hours. The CAISO calculates the Maximum Import Bid Price as 110 percent of the greater of the published bilateral electric index prices for the Mid-Columbia or Palo Verde trading hub locations, multiplied by an hourly shaping ratio. As detailed in the CAISO Business Practice Manual, the CAISO calculates the hourly shaping ratio for each hour by dividing the Day-Ahead Market ~~System~~ Marginal Energy Cost for the CAISO Balancing Authority Area in that hour of a previous representative Trading Day by the average Day-Ahead Market ~~System~~ Marginal Energy Cost for the CAISO Balancing Authority Area in all on-peak hours of the same previous representative Trading Day. If for any given Trading Hour the CAISO cannot calculate the Maximum Import Bid Price, the applicable Maximum Import Bid Price will be the most recently available calculated Maximum Import Bid Price.

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Section 31

31. Day-Ahead Market

The DAM consists of the following functions performed in sequence: Bid submission and validation, ~~the~~ IFM MPM, IFM, RUC MPM, and RUC.

Scheduling Coordinators may submit ~~Bids for~~ Energy Bids, Ancillary Services Bids, ~~and~~ RUC ~~Capacity~~Availability Bids, and Imbalance Reserves Bids for an applicable Trading Day. The CAISO ~~shall~~ issue~~s~~ Schedules for all Supply and Demand, including Participating Load, Reliability Demand Response Resources, and Proxy Demand Resources, pursuant to their Bids as provided in this Section 31. The CAISO also issues RUC Awards and Imbalance Reserves Awards to Scheduling Coordinators pursuant to their RUC Availability Bids and Imbalance Reserves Bids, respectively, as provided in this Section 31.

31.1 Bid Submission and Validation in the Day-Ahead Market

Bids, including Self-Schedules and Ancillary Services Bids, and Submissions to Self-Provide an Ancillary Service shall be submitted pursuant to the submission rules specified in Section 30. There is a single Bid submission in which Scheduling Coordinators' Bids are used for purposes of the DAM, which includes the IFM MPM, the IFM, the RUC MPM, and RUC. Scheduling Coordinators may submit Bids for the DAM as early as seven (7) days prior to the applicable Trading Day up to Market Close of the DAM for the applicable Trading Day. The CAISO will validate all Bids submitted to the DAM pursuant to the procedures set forth in Section 30.7. Scheduling Coordinators must submit Bids for participation in the IFM for Resource Adequacy Capacity as required in Section 40.

31.2 ~~Day-Ahead~~IFM MPM Process

After the Market Close of the DAM, ~~and after~~ the CAISO has validated the Bids pursuant to Section 30.7, and after the CAISO conducts the EDAM RSE, the CAISO ~~will~~ perform~~s~~ the IFM MPM process, which is a single market run that occurs prior to the IFM Market Clearing run. The ~~Day-Ahead~~IFM MPM process determines, pursuant to Section 31.2.3, which Energy Bids need to be mitigated to the applicable Default Energy Bids and which Imbalance Reserves Bids for IRU need to be mitigated to the IRU Default Availability Bid in the IFM ~~pursuant to Section 31.2.3~~. For Maximum Net Dependable Capacity of Legacy RMR Units, Energy Bids will be mitigated to the RMR Proxy Bids pursuant to Section 31.2.3. The ~~Day-~~

~~Ahead~~IFM MPM process optimizes resources to meet Demand reflected in Demand Bids, including Export Bids and Virtual Demand Bids, targets procurement of one hundred (100) percent of Imbalance Reserves requirements based on Bids submitted to the DAM, and ~~to procure~~procures one hundred (100) percent of Ancillary Services requirements based on Supply Bids submitted to the DAM. Virtual Bids and Bids from Demand Response Resources, Participating Load, and Hybrid Resources are considered in the MPM process, but are not subject to Bid mitigation. Energy storage resources whose PMax is less than five (5) MW are considered in the MPM process, but not subject to Bid mitigation. Bids from Participating Load resources that are not subject to Bid mitigation will also be considered in the IFM MPM process. The mitigated or unmitigated Bids and RMR Proxy Bids identified in the IFM MPM process for all resources that cleared in the IFM MPM are then passed to the IFM. The CAISO performs the IFM MPM process for the IFM~~DAM~~ for the twenty-four (24) hours of the targeted Trading Day.

31.2.1 ~~The Market Power Mitigation Process~~ Determining Competitive and Non-Competitive Congestion Components in the IFM

The IFM MPM process enforces all Transmission Constraints that are expected to be enforced in the relevant market, in the base case of meeting Demand and in the separate cases of modeling the dispatch of Energy from all capacity awarded IRU and IRD, and produces dispatch levels for all resources with submitted Bids and LMPs for all Locations. Bid mitigation is determined by decomposing the Congestion component of each LMP determined in the IFM MPM process into competitive Congestion and non-competitive Congestion components. The competitive Congestion component of each LMP is calculated as the sum of the product of the shift factor and the Shadow Price for all competitive Transmission Constraints and the non-competitive Congestion component of each LMP is calculated as the sum of the product of the shift factor and the Shadow Price for all non-competitive Transmission Constraints. The non-competitive Congestion component of an LMP can be based on a Transmission Constraint deemed non-competitive in the base case of meeting Demand or in the separate case of modeling the dispatch for Energy of all capacity awarded IRU. The Reference Bus used in the MPM process will be either: (1) the Midway 500kV bus if Path 26 flow is from north to south; or (2) the Vincent 500kV bus if Path 26 flow is from south to north. The treatment of a particular Transmission Constraint as competitive or non-

competitive for purposes of the IFM MPM process is determined pursuant to Section 39.7.2.

31.2.2 [Not Used]

31.2.3 IFM Bid Mitigation

31.2.3.1 Mitigation of Energy Bids

If the non-competitive Congestion component of an LMP calculated in an MPM process is greater than zero (0), then any resource at that Location that is dispatched in that MPM process is subject to Local Market Power Mitigation. Bids on behalf of any such resource, to the extent that they exceed the Competitive LMP plus the Competitive LMP Parameter at the resource's Location for the DAM or RTM process interval for which the MPM process applies, will be mitigated to the higher of the resource's Default Energy Bid (or RMR Proxy Bid for Legacy RMR Units), as specified in Section 39, or the Competitive LMP plus the Competitive LMP Parameter at the resource's Location for the DAM and RTM process interval for which the MPM process applies. To the extent a Multi-Stage Generating Resource is dispatched in the MPM process and the non-competitive Congestion component of the LMP calculated at the Multi-Stage Generating Resource's Location is greater than zero, for purposes of mitigation, all the MSG Configurations will be mitigated similarly and the CAISO will evaluate all submitted Energy Bids for all MSG Configurations based on the relevant Default Energy Bids for the applicable MSG Configuration. The CAISO will calculate the Default Energy Bids for Multi-Stage Generating Resources by submitted MSG Configuration. Any market Bids equal to or less than the Competitive LMP plus the Competitive LMP Parameter will be retained in the DAM and RTM process.

31.2.3.2 Mitigation of Bids for IRU

The CAISO applies Local Market Power Mitigation to Imbalance Reserves Bid for IRU if the resource for which that Bid was submitted could provide counter-flow to a Transmission Constraint deemed non-competitive pursuant to Section 39.7.2.2(B)(a) in the case of modeling the dispatch for Energy of the capacity awarded IRU. To the extent a Bid for IRU is subject to Local Market Power Mitigation and exceeds the Competitive Locational IRU Price plus the Competitive LMP Parameter, the CAISO mitigates the Bid to the higher of the: (i) resource's IRU Default Availability Bid; or (ii) Competitive Locational IRU Price plus the Competitive LMP Parameter.

31.3 Integrated Forward Market

After the IFM MPM and prior to RUC, the CAISO shall perform the IFM. The IFM (1) performs Unit Commitment and Congestion Management (2) clears mitigated or unmitigated Bids for Energy and Imbalance Reserves cleared in the MPM as well as Bids for Energy and Imbalance Reserves that were not cleared in the MPM process against bid-in Demand, taking into account transmission limits and honoring technical and inter-temporal operating constraints, such as Minimum Run Times (3) and procures Ancillary Services to meet one hundred (100) percent of the Ancillary Services requirements based on the CAISO Forecast of BAA Demand for the CAISO~~CAISO Forecast of CAISO Demand requirements~~. The IFM utilizes a set of integrated programs that: (1) determine Day-Ahead Schedules, Imbalance Reserves Awards, and AS Awards, and related LMPs and ASMPs; and (2) optimally commits resources that are bid in to the DAM. The IFM utilizes a SCUC algorithm that optimizes Start-Up Costs, Minimum Load Costs as modified pursuant to Section 30.7.10.2, if applicable, Transition Costs, and Energy Bids along with any Bids for Ancillary Services or Imbalance Reserves as well as Self-Schedules submitted by Scheduling Coordinators. The IFM selects the optimal MSG Configuration from a maximum of ten MSG Configurations of each Multi-Stage Generating Resource as mutually exclusive resources. If a Scheduling Coordinator submits a Self-Schedule or a Submission to Self-Provide Ancillary Services for a given MSG Configuration in a given Trading Hour, the IFM will consider the Start-Up Cost, Minimum Load Cost as modified pursuant to Section 30.7.10.2, if applicable, and Transition Cost associated with any Economic Bids for other MSG Configurations as incremental costs between the other MSG Configurations and the self-scheduled MSG Configuration. In such cases, incremental costs are the additional costs incurred to transition or operate in an MSG Configuration in addition to the costs associated with the self-scheduled MSG Configuration. The IFM also provides for the optimal management of Use-Limited Resources. The ELS Resources committed through the ELC Process conducted two days before the day the IFM process is conducted for the next Trading Day as described in Section 31.7 are binding.

31.3.1 Market Clearing and Price Determination

31.3.1.1 Integrated Forward Market Output

The IFM produces: (1) a set of hourly Day-Ahead Schedules, Imbalance Reserves Awards, AS Awards, and AS Schedules for all participating Scheduling Coordinators that cover each Trading Hour of the next Trading Day; and (2) the hourly LMPs for Energy and Imbalance Reserves and the ASMPs for Ancillary Services to be used for settlement of the IFM. For a Multi-Stage Generating Resource, the IFM produces a Day-Ahead Schedule for no more than one MSG Configuration per Trading Hour. In addition, the IFM will produce the MSG Transition and the MSG Configuration indicators for the Multi-Stage Generating Resource, which would establish the expected MSG Configuration in which the Multi-Stage Generating Resource will operate. During a transition, the committed MSG Configuration is considered to be the "from" MSG Configuration. The CAISO will publish the LMPs at each PNode as calculated in the IFM. In determining Day-Ahead Schedules, Imbalance Reserves Awards, AS Awards, and AS Schedules the IFM optimization will minimize total Bid Costs based on submitted and mitigated Bids while respecting the operating characteristics of resources, the operating limits of transmission facilities, and a set of scheduling priorities that are described in Section 31.4. In performing its optimization, the IFM first tries to complete its required functions utilizing Effective Economic Bids without adjusting Self-Schedules, and skips Ineffective Economic Bids and adjusts Self-Schedules only if it is not possible to balance Supply and Demand and manage Congestion in an operationally prudent manner with available Effective Economic Bids. The process and criteria by which the IFM adjusts Self-Schedules and other Non-priced Quantities are described in Sections 27.4.3, 31.3.1.3 and 31.4. The Day-Ahead Schedules are binding commitments, including the commitment to Start-Up, if necessary, to comply with the Day-Ahead Schedules. The CAISO will not issue separate Start-Up Instructions for Day-Ahead commitments. A resource's status, however, can be modified as a result of additional market processes occurring in the RTM.

31.3.1.2 Treatment of Ancillary Services Bids in IFM

~~As provided in Section 30.7.6.2 the~~In clearing the IFM, the CAISO ~~shall~~ co-optimizes awards from ~~the~~ Energy Bids, Imbalance Reserves Bids, and Ancillary Services Bids ~~in clearing the IFM~~. To the extent that capacity subject to an Ancillary Services Bid submitted in the Day-Ahead Market is not associated

with an Energy Bid or Imbalance Reserves Bid, there is no co-optimization, and therefore, no opportunity cost associated with that resource for that Bid for the purposes of calculating the Ancillary Services Marginal Price as specified in Section 27.1.2.2. ~~When the capacity associated with the Energy Bid overlaps with the quantity submitted in the Ancillary Services Bid, then the Energy Bid will be used to determine the opportunity cost, if any, in the co-optimization to the extent of the overlap. Therefore, t~~The capacity that will be considered when co-optimizing the procurement of Energy, Imbalance Reserves, and Ancillary Services from Bids in the IFM will consider capacity up to the total capacity of the resource as reflected in the Ancillary Services Bid as derated through the CAISO's outage management system pursuant to Section 9, if at all. In the case of Regulation, the capacity that will be considered is the lower of the capacity of the resource offered in the Ancillary Services Bid or the upper Regulation limit of the highest Regulating Range as contained in the Master File. For any Trading Hour within the period in which the Multi-Stage Generating Resource is transitioning from one MSG Configuration to another, the IFM will not award Ancillary Services and any Submission to Self-Provide Ancillary Services will be disqualified. Any Ancillary Services Awards in the IFM to Multi-Stage Generating Resources will carry through to the Real-Time Market in the same MSG Configuration that the Multi-Stage Generating Resource is awarded in the IFM.

31.3.1.3 Reduction of Self-Scheduled LAP Demand

In the IFM, to the extent the market software cannot resolve a non-competitive Transmission Constraint utilizing Effective Economic Bids such that self-scheduled Load at the LAP level would otherwise be reduced to relieve the Transmission Constraint, the CAISO Market software will adjust Non-Priced Quantities in accordance with the process and criteria described in Section 27.4.3. For this purpose the priority sequence, starting with the first type of Non-Priced Quantity to be adjusted, will be:

(a) Schedule the Energy from Self-Provided Ancillary Service Bids from capacity that is obligated to offer an Energy Bid under a must-offer obligation such as from an RMR Resource or a Resource Adequacy Resource. Consistent with Section 8.6.2, the CAISO Market software could also utilize the Energy from Self-Provided Ancillary Service Bids from capacity that is not under a must-offer obligation such as from an RMR Resource or

a Resource Adequacy Resource, to the extent the Scheduling Coordinator has submitted an Energy Bid for such capacity. The associated Energy Bid prices will be those resulting from the MPM process.

(b) Relax the constraint consistent with Section 27.4.3.1, and establish prices consistent with Section 27.4.3.2. No constraints, including Transmission Constraints, on Interties with adjacent Balancing Authority Areas will be relaxed in this procedure.

31.3.1.4 Eligibility to Set the Day-Ahead LMP

All Generating Units, Participating Loads, non-Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, System Resources, System Units, or Constrained Output Generators subject to the provisions in Section 27.7, with Bids, including Generated Bids, that are unconstrained due to Ramp Rates, MSG Transitions, Forbidden Operating Regions, or other temporal constraints are eligible to set the LMP, provided that (a) the Schedule for the Generating Unit or Resource-Specific System Resource is between its Minimum Operating Limit and the highest MW value in its Economic Bid or Generated Bid; or (b) the Schedule for the Participating Load, non-Participating Load, Proxy Demand Resources, Reliability Demand Response Resources, Non-Resource-Specific System Resource, or System Unit is between zero (0) MW and the highest MW value in its Economic Bid or Generated Bid. If (a) a resource's Schedule is constrained by its Minimum Operating Limit or the highest MW value in its Economic Bid or Generated Bid; (b) the CAISO enforces a resource-specific constraint on the resource due to an RMR Dispatch of a Legacy RMR Unit or Exceptional Dispatch; (c) the resource is constrained by a boundary of a Forbidden Operating Region or is Ramping through a Forbidden Operating Region; or (d) the resource's full Ramping capability is constraining its inter-hour change in Schedule, the resource cannot be marginal and thus is not eligible to set the LMP. Resources identified as MSS Load following resources are not eligible to set the LMP. A Constrained Output Generator will be eligible to set the hourly LMP if any portion of its Energy is necessary to serve Demand.

31.3.1.5 Treatment of Imbalance Reserves Bids in IFM

In considering Imbalance Reserves Bids in the IFM, the CAISO applies the following rules.

31.3.1.5.1 Eligible Resource Types

The CAISO only considers Imbalance Reserves Bids from Generating Units, Participating Loads, Proxy Demand Resources, Reliability Demand Response Resources, System Units, System Resources with a Resource ID defined in the CAISO Master File, and Physical Scheduling Plants.

31.3.1.5.2 Fifteen-Minute Dispatchability and Start-up

The CAISO disregards Imbalance Reserves Bids submitted for a resource that is not 15-minute dispatchable.

The CAISO disregards Imbalance Reserves Bids submitted for a resource that otherwise would be Off during the relevant period unless it has a Start-Up Time of 15 minutes or less.

31.3.1.5.3 Energy Bid Submission Requirement

The CAISO only considers Imbalance Reserves Bids to the extent the resource submitted an Energy Bid in the Day-Ahead Market with Economic Bids for a quantity no less than the quantity of Imbalance Reserves Bid.

31.3.1.5.4 Ramp Capability as Limitation on Imbalance Reserves Awards

The CAISO disregards an Imbalance Reserves Bid to the extent it exceeds the resource's maximum 30-minute ramp capability as determined by the ramp rate defined in the CAISO Master File for the operating range covered by the Bid.

31.3.1.5.5 Simultaneous Bids and Awards for IRU and IRD

A Scheduling Coordinator may offer Bids for both IRU and IRD on distinct portions of capacity for the same interval for the same resource. The CAISO may award the resource both IRU and IRD based on those Bids if it is feasible to provide both.

31.3.1.6 Imbalance Reserves Procurement

Subject to the procurement curve described in Section 31.3.1.6.1, the CAISO procures Imbalance Reserves to meet the Imbalance Reserves Requirement for each hour and creates separate Locational IRU Prices and Locational IRD Prices at each Node based on that procurement.

31.3.1.6.1 Establishing the Imbalance Reserves Requirement

As further described in the Business Practice Manual, the CAISO sets each Balancing Authority Area's Upward Imbalance Reserves Requirement and Downward Imbalance Reserves Requirement to capture

the anticipated levels of upward and downward Net Load Forecast deviations between the Day-Ahead Market and the Fifteen-Minute Market, respectively, within a specified confidence interval. The CAISO sets these values based on: (a) analysis of the differences between the load, wind, and solar forecasts utilized in the Day-Ahead Market and those used in the Fifteen-Minute Market, corresponding to the same time intervals; (b) production forecasts for EIRs in each Balancing Authority Area; and (c) the CAISO Forecast of BAA Demand. For each Balancing Authority Area participating in the Day-Ahead Market, the CAISO reduces the Balancing Authority Area's hourly Imbalance Reserves Requirement by its proportional allocation of the Diversity Benefit for EDAM.

31.3.1.6.2 Procurement Curve

In each run of the IFM, the CAISO procures IRU and IRD for each Balancing Authority Area participating in the Day-Ahead Market to meet their Upward Imbalance Reserves Requirement and Downward Imbalance Reserves Requirement, respectively, subject to a procurement curve. The procurement curves for IRU and IRD are calculated based on separate statistical analysis of the Upward Imbalance Reserve Requirement and Downward Imbalance Reserve Requirement for each EDAM Entity Balancing Authority Area to ensure the total cost of Imbalance Reserves Awards for IRU or IRD does not exceed the expected cost of violating Operating Reserve requirements. Provided, however, the upper bound of the procurement curve for both IRU and IRD is $55 per MW.

31.3.1.6.3 Imbalance Reserves Deliverability and Nodal Procurement

31.3.1.6.3.1 Nodal Procurement of Imbalance Reserves Awards

The CAISO optimizes procurement of Imbalance Reserves Awards such that, in the event modeled uncertainty arises fully for either the upward or downward directions, the Energy that would be dispatched from resource capacity corresponding to the Imbalance Reserves Awards, as adjusted by the applicable Deployment Factor, would not result in flows exceeding Transmission Constraints and scheduling limits, including EDAM Transfer limits, on transmission facilities identified in the Business Practice Manual.

31.3.1.6.3.2 Nodal Distribution of Requirements

The CAISO distributes the Upward Imbalance Reserves Requirement and Downward Imbalance Reserves Requirement to the Demand and Variable Energy Resources Locations within each Balancing

Authority Area participating in the Day-Ahead Market based on distribution factors derived from historical and/or forecasted information that reflect the relative contributions of Demand and Variable Energy Resources to the overall Imbalance Reserves Requirements.

31.3.1.6.4 Congestion Revenue from Procuring Imbalance Reserves

As further specified in the Business Practice Manual, the CAISO separately calculates Energy Congestion revenue displaced from meeting the Upward Imbalance Reserves Requirements and the Downward Imbalance Reserves Requirements as follows.

The CAISO calculates the Energy Congestion revenue displaced from meeting the Upward Imbalance Reserves Requirement by calculating for each resource for each Transmission Constraint binding in the case of modeling uncertainty in the upward direction the sum of the product of the: IRU award; Deployment Factor; Shift Factor from the resource location to the binding Transmission Constraint; and Shadow Price of the Transmission Constraint.

The CAISO calculates the Energy Congestion revenue displaced from meeting the Downward Imbalance Reserves Requirement by calculating for each resource for each Transmission Constraint binding in the case of modeling uncertainty in the downward direction the sum of the product of: IRD award; Deployment Factor; Shift Factor from the resource location to the binding Transmission Constraint; and Shadow Price of the Transmission Constraint.

31.3.1.6.5 Accounting for State of Charge in Awarding Ancillary Services and Imbalance Reserves to Non-Generator Resources

The IFM only awards an Ancillary Services Schedule or Imbalance Reserves Award to a storage resource using the Non-Generator Resource model to the extent its modeled State of Charge, as determined by a methodology defined in the Business Practice Manual, can support such schedule or award.

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31.3.4 RTM Bidding Obligations from Imbalance Reserves Awards

An Imbalance Reserves Award for an hour obligates the Scheduling Coordinator for the resource

receiving the award to submit Economic Bids for Energy to the Real-Time Market for the full range of awarded Imbalance Reserves.

The portion of the resource's Day-Ahead Schedule for Energy below a IRD award may be Self-Scheduled in the Real-Time Market.

The Scheduling Coordinator for a resource receiving an Imbalance Reserves Award in an hour cannot submit a Self-Schedule for Energy in the Real-Time Market for a quantity in excess of its Day-Ahead Schedule for Energy minus any awards for IRD and RCD.

By forty minutes prior to the applicable Trading Hour, a System Resource receiving an Imbalance Reserves Award that has not submitted an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures, with the quantity (or sum of quantities) of the transmission profile no less than the sum of the Imbalance Reserves Award and any Day-Ahead Schedule for Energy will result in the CAISO deeming the untagged portion of the Imbalance Reserves Award unavailable for purposes of Section 11.2.1.8.

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31.5 Residual Unit Commitment

The CAISO shall perform the RUC process after the IFM. As further specified in this Section 31.5, RUC procures RUC Capacity, which includes Reliability Capacity Up and Reliability Capacity Down, to address mismatches between the CAISO Forecast of BAA Demand and the physical capacity committed in the IFM.

~~In the event that the IFM did not commit sufficient resources to meet the CAISO Forecast of CAISO Demand and account for other factors such as Demand Forecast error, as described in the Business Practice Manuals, the RUC shall commit additional resources and identify additional RUC Capacity to ensure sufficient on-line resources to meet Demand for each hour of the next Trading Day.~~ RUC Capacity is selected by a SCUC optimization that uses the same Base Market Model used in the IFM adjusted as described in Section 27.5.1 and 27.5.6 to help ensure the deliverability of Energy from the RUC Capacity. That optimization procures RUC Capacity by Node and creates separate RUC Prices for

RCU and RCD by Node. In the case of Multi-Stage Generating Resources, the RUC will optimize Transition Costs in addition to the Start-Up and Minimum Load Costs. If a Scheduling Coordinator submits a Self-Schedule or a Submission to Self-Provide Ancillary Services for a given MSG Configuration in a given Trading Hour, the RUC will consider the Start-Up Cost, Minimum Load Cost, and Transition Cost associated with any Economic Bids for other MSG Configurations as incremental costs between the other MSG Configurations and the self-scheduled MSG Configuration. In such cases, incremental costs are the additional costs incurred to transition or operate in an MSG Configuration in addition to the costs associated with the self-scheduled MSG Configuration.

31.5.1 RUC Participation

31.5.1.1 Capacity Eligible for RUC Participation

~~RUC participation is voluntary for capacity that has not been designated as Resource Adequacy Capacity.~~ Scheduling Coordinators may make ~~such~~ capacity available for participation in RUC by submitting a RUC Availability Bid, provided the Scheduling Coordinator has also submitted an Energy Bid (other than a Virtual Bid) for such capacity into the IFM. As part of the Bid validation procedures specified in Section 30.7.3, the CAISO disregards RUC Availability Bids from capacity that is not accompanied in the IFM by an Energy Bid that is not a Virtual Bid. Virtual Bids are not eligible to participate in RUC. ~~Capacity from Non-Dynamic System Resources that has not been designated Resource Adequacy Capacity is not eligible to participate in RUC.~~ Non-Participating Load and Reliability Demand Response Resources are not eligible to participate in RUC. ~~Capacity from resources including System Resources that has been designated as qualified Resource Adequacy Capacity must participate in RUC.~~ RUC participation is required for Resource Adequacy Capacity ~~to the extent that Resource Adequacy Capacity is not committed following the IFM~~. System Resources with a Resource ID defined in the CAISO Master File are eligible to participate in RUC and will be considered on an hourly basis; that is, RUC will not observe any multi-hour block constraints. A Long Start Unit is eligible to participate in RUC to the extent it has submitted an Energy Bid to the Day-Ahead Market above PMin. In RUC the CAISO may commit a Multi-Stage Generating Resource with a Resource Adequacy must-offer obligation at any MSG Configuration with capacity equal to or greater than the MSG Configuration committed in the Integrated

Forward Market. RUC will observe the Energy Limits that may have been submitted in conjunction with Energy Bids to the IFM. Legacy RMR Unit capacity will be considered in RUC in accordance with Section 31.5.1.3. MSS resources may participate in RUC in accordance with Section 31.5.2.3. COG resources are accounted for in RUC, but may not submit or be paid RUC Availability Payments. The ELS Resources committed through the ELC Process conducted two days before the day the RUC process is conducted for the next Trading Day as described in Section 31.7 are binding.

31.5.1.2 RUC Availability Bids

With the exception of capacity from Eligible Intermittent Resources, Scheduling Coordinators may only submit RUC Availability Bids for capacity (above the Minimum Load as registered in the Master File) for which they are also submitting an Energy Bid (other than a Virtual Bid) to participate in the IFM. A Scheduling Coordinator representing an Eligible Intermittent Resource must submit RUC Availability Bids for RCU at a quantity equal to their forecasted output based on the forecast referenced in Section 34.1.6. ~~Any available Resource Adequacy Capacity, RMR Capacity, and CPM Capacity will be optimized at $0/MW in RUC. For Multi-Stage Generating Resources that fail to submit a $0/MW per hour for the Resource Adequacy Capacity, the CAISO will insert the $0/MW per hour for the resource's Resource Adequacy Capacity at the MSG Configuration level up to the minimum of the Resource Adequacy Capacity or the PMax of the MSG Configuration. Scheduling Coordinators may submit non-zero RUC Availability Bids for the portion of a resource's capacity that is not Resource Adequacy Capacity or CPM Capacity.~~ An RMR Resource must submit a RUC Availability Bid for RCU for their full RMR Capacity.

31.5.1.3 Legacy RMR Treatment

If a Legacy RMR Unit is determined to have a generation requirement for any Trading Hour of the next day, either by the MPM process or by the CAISO through a Manual RMR Dispatch, and if any portion of the generation requirement has not been cleared in the IFM, the entire portion of the generation requirement will be represented as a Legacy RMR Generation Self-Schedule in the RUC.

31.5.1.4 Eligibility to Set the RUC Price

All resources that are eligible for RUC participation as described in Section 31.5.1.1 with RUC Bids, other than resources with RUC Capacity resulting from RUC Availability Bids inserted pursuant to Section

31.5.1.5, that are unconstrained due to Ramp Rates or other temporal constraints, including MSG Transitions, are eligible to set the RUC Price, provided ~~that (a) the RUC Schedule for the Generating Unit or Resource-Specific System Resource is between its Minimum Operating Limit and the highest MW value in its Economic Bid or Generated Bid, or (b)~~ the Schedule for the eligible resource other than a Generating Unit or Resource-Specific System Resource is between zero (0) MW and the highest MW value in its Economic Bid or Generated Bid. If (a) a resource's Schedule is constrained by its Minimum Operating Limit or the highest MW value in its Economic Bid or Generated Bid, (b) the CAISO enforces a resource-specific constraint on the resource due to an RMR Dispatch Notice or Exceptional Dispatch or (c) the resource's full Ramping capability is constraining its inter-hour change in Schedule, the resource cannot be marginal and thus is not eligible to set the RUC Price. Resources identified as MSS Load following resources are not eligible to set the RUC Price.

31.5.1.5 RCU Bid Insertion for Exports and Eligible Intermittent Resources

The CAISO inserts RUC Availability Bids for RCU: (a) if an Economic Bid to export Energy is awarded in the IFM and is not accompanied by a RUC Availability Bid for RCU of at least the same quantity as the Economic Bid for Energy; (b) for Self-Schedules of exports not explicitly sourced by non-Resource Adequacy Capacity awarded in the IFM; and (c) for a Scheduling Coordinator representing an Eligible Intermittent Resource that fails to submit a RUC Availability Bid for RCU as required by Section 31.5.1.2. For parts (a) and (b), the quantity of the inserted Bid is the quantity of the Day-Ahead Schedule for Energy and the price of the inserted Bid is formulated to maintain the merit order of the resource's Energy Bid in the IFM. For part (c), the quantity of the inserted Bid is the quantity not covered by a RUC Availability Bid for RCU as required by Section 31.5.1.2 and the price of the inserted Bid is at the price included in the RUC Availability Bid for RCU or, if the Scheduling Coordinator did not submit any such Bid, at a price above the Default Availability Bid and below the RUC power balance constraint penalty price parameter specified in the Business Practice Manual.

31.5.2 ~~Metered Subsystem RUC Obligation~~[Not Used]

~~MSS Operators are permitted to make an annual election to opt-in or opt-out of RUC participation. MSS~~

~~Operators that elect to Load follow are automatically considered to opt-out of the RUC participation. Prior to the deadline for the annual CRR Allocation and CRR Auction process, as specified in Section 36, an MSS Operator that has selected not to Load follow shall notify the CAISO of its RUC participation option for the following CRR cycle.~~

31.5.2.1 ~~MSS Operator Opts-In to RUC Procurement~~[Not Used]

~~If the MSS Operator opts-in to the RUC procurement process, the Scheduling Coordinator for the MSS will be treated like any other Scheduling Coordinator that submits a Bid in the DAM with respect to RUC procurement by the CAISO and allocation of RUC costs. The CAISO will consider the CAISO Demand Forecast of the MSS Demand in setting the RUC procurement target, and the Scheduling Coordinator for the MSS will be responsible for any applicable allocation of costs related to the Bid Cost Recovery for RUC as provided in Section 11.8.~~

31.5.2.2 ~~MSS Operator Opts-Out RUC Procurement~~[Not Used]

~~If an MSS Operator opts out of the RUC procurement process, the CAISO shall not consider the CAISO Demand Forecast of the MSS Demand in setting the RUC procurement target, and will not commit resources in RUC to serve the MSS Demand. The MSS Operator shall be responsible for meeting the Supply requirements for serving its Demand in accordance with this Section 31.5.2.2, and it will be exempt from the allocation of costs related to the Bid Cost Recovery for RUC as provided in Section 11.8. The MSS that opts out of the CAISO's RUC procurement will have two options for meeting the Supply requirements for serving its Demand, which it will select on an hourly basis depending on how it submits Self-Schedules for its Demand in the DAM.~~

31.5.2.2.1 ~~Based on CAISO Demand Forecast~~[Not Used]

~~If the Scheduling Coordinator for the MSS submits Hourly Demand Self-Schedules in the DAM that are greater than or equal to the CAISO Demand Forecast for the MSS Demand, the Scheduling Coordinator will have met its Supply requirement for such hours and will be exempt from the allocation of costs related to the Bid Cost Recovery for RUC as provided in Section 11.8.~~

31.5.2.2.2 ~~Not Based on CAISO Demand Forecast~~[Not Used]

~~If the Scheduling Coordinator for the MSS submits Hourly Demand Self-Schedules in the DAM that are~~

~~less than the CAISO Demand Forecast for the MSS Demand, the Scheduling Coordinator will be exempt from the RUC cost allocation but will be monitored for its compliance with the Supply requirement based on the following performance criteria. If the MSS Demand Self-Schedule in the IFM for a given Trading Hour is less than the CAISO Demand Forecast for the MSS Demand and less than the actual metered Demand of the MSS for that Trading Hour, then penalty points will be accrued as follows: (i) if the difference between the actual metered Demand and the IFM Self-Schedule in any hour is greater than the lesser of two percent (2%) of the CAISO Demand Forecast for the MSS or five (5) MW, but less than the lesser of five percent (5%) or ten (10) MW, then the Scheduling Coordinator for the MSS will have one (1) penalty point against it for each occurrence; (ii) if the difference in any hour is more than the lesser of five percent (5%) or ten (10) MW, but less than the lesser of ten percent (10%) or twenty (20) MW, then the Scheduling Coordinator for the MSS will have two (2) penalty points against it for each occurrence; (iii) if the difference in any hour is more than the lesser of ten percent (10%) or twenty (20) MW, then the Scheduling Coordinator for the MSS will have five (5) penalty points against it for each occurrence. The maximum penalty points that can be accrued during a single Trading Day for each MSS will be five (5). A total of more than twenty (20) penalty points within twelve (12) consecutive months will require the MSS to opt-in to RUC for the remainder of the CRR Annual Cycle and for the following CRR Annual Cycle. The provisions in this Section 31.5.2.2.2 do not apply to an MSS Operator that has elected to Load follow, and only apply to non-Load following MSS Operators.~~

31.5.2.3 ~~MSS Option to Bid RUC Capacity~~ [Not Used]

~~The Scheduling Coordinator for the MSS Operator may submit RUC Availability Bids for the capacity of MSS resources and receive RUC Availability Payments and other RUC Compensation for such capacity selected in RUC, subject to the same bidding and operational requirements as any other resources providing RUC Capacity. This capability is not affected by the MSS Operator's decision to opt-in to or opt-out of RUC per Sections 31.5.2.1 and 31.5.2.2.~~

31.5.3 RUC Procurement Target

Subject to Sections 31.5.3.1 and 31.5.4, the RUC Procurement Target for each Balancing Authority Area

participating in the Day-Ahead Market is based on the relationship between the CAISO Forecast of BAA Demand for that BAA and the Supply cleared in the IFM for that Trading Hour (excluding Virtual Supply).

If the CAISO Forecast of BAA Demand exceeds the Supply cleared in the IFM for a Trading Hour (excluding Virtual Supply), then the RUC Procurement Target for that Balancing Authority Area is RCU in the amount of the excess Demand.

If the Supply (excluding Virtual Supply) cleared in the IFM for a Trading Hour exceeds the CAISO Forecast of BAA Demand, then the RUC Procurement Target for that Balancing Authority Area is RCD in the amount of the excess Supply.

If the Supply (excluding Virtual Supply) cleared in the IFM for a Trading Hour equals the CAISO Forecast of BAA Demand, then the RUC Procurement Target for that Balancing Authority Area is zero RCU and zero RCD.

~~The procurement target for RUC in any given Trading Hour will be determined based on the next day's hourly CAISO Forecast of CAISO Demand less the Energy scheduled in the Day-Ahead Schedule, and accounting for other factors, as appropriate, such as Demand Forecast error and estimated incremental RTM Bids including those from Participating Intermittent Resources.~~ The adjustments listed in Sections 31.5.3.1 to 31.5.3.1.6 will be made to the CAISO Forecast of ~~CAISO~~ BAA Demand to account for the conditions as provided therein. ~~Adjustments may be made on a RUC Zone basis to ensure that RUC results in adequate local capacity procurement.~~ The RUC ~~procurement target~~ Procurement Target setting procedure is designed to meet the requirements of reliable grid operation without unnecessary over-procurement of RUC Capacity or over-commitment of resources. Additional detail on the process for setting the RUC Procurement Target ~~procurement target~~ is specified in the Business Practice Manuals.

31.5.3.1 CAISO Operator Review & Adjustment

The CAISO Operator reviews the CAISO Forecast of ~~CAISO~~ BAA Demand and all calculated adjustments as provided in Sections 31.5.3.1.1 through 31.5.3.1.6. The CAISO Operator shall accept, modify, or reject such adjustments based on Good Utility Practice. If the CAISO Operator determines it must modify the CAISO Forecast of ~~CAISO~~ BAA Demand, the CAISO Operator shall log sufficient information as to reason, Operating Hour, and specific modification(s) made to the CAISO Forecast of ~~CAISO~~ BAA

Demand.

31.5.3.1.1 RUC Net Short Conditions

The CAISO Operator may conform the CAISO Forecast of ~~CAISO~~ BAA Demand in the event the CAISO Operator has determined that additional capacity may need to be procured in RUC to meet anticipated Real-Time system conditions. The CAISO Operator will consider factors such as: CAISO Forecast of ~~CAISO~~ BAA Demand error; weather pattern that is expected to continue or change within the next Trading Day; generator outage resulting in different Supply availability than was bid into the Day-Ahead Market; fire that threatens transmission lines and/or corridors; the expectation that the amount of Generation committed in the IFM will not be sufficient to meet the anticipated Demand; and Reliability Coordinator next-day analysis of system conditions.

31.5.3.1.2 Demand Response Adjustments.

The CAISO shall account for Demand response that is clearly communicated to the CAISO as certain to be curtailed for the next Trading Day only for the two following types of Demand response: (1) Demand response triggered by a staged System Emergency event; and (2) Demand response that is triggered by a price or an event known in advance. If an LSE informs the CAISO of anticipated Demand response prior to Market Close of the DAM, the CAISO Forecast of ~~CAISO~~ BAA Demand used as the RUC procurement target will be reduced accordingly.

31.5.3.1.3 ~~MSS Adjustment~~[Not Used]

~~As specified in section 31.5.2.1, MSS Operators are permitted to make an annual election to opt-in or opt-out of RUC participation. If the MSS Operator opts-in to the RUC procurement process, the CAISO considers the CAISO's Demand Forecast of the MSS Demand in setting the RUC procurement target. If an MSS Operator opts-out of the RUC procurement process, the CAISO does not consider the CAISO's Demand Forecast of the MSS Demand in setting the RUC procurement target. An MSS Operator that has elected to opt-out of RUC, or has elected to Load follow and therefore has also elected to opt-out of RUC, is required to provide sufficient resources in the Day-Ahead Market, and in the case of a Load following MSS Operator, follow its Load within the MSS Deviation Band. To reflect these options and to prevent committing additional capacity or resources for any differences between the CAISO Demand~~

~~Forecast for the MSS and the MSS Self-Scheduled quantities in the IFM, the CAISO replaces the CAISO Demand Forecast for such MSS with the quantity of Demand in Self-Schedules submitted by the Scheduling Coordinator for the MSS in the IFM.~~

31.5.3.1.4 Eligible Intermittent Resource Adjustment

Scheduling Coordinators for Eligible Intermittent Resources may submit Bids, including Self-Schedules, in the Day-Ahead Market and the quantity ultimately scheduled from Eligible Intermittent Resources may differ from the CAISO forecasted deliveries from the Eligible Intermittent Resources. The CAISO may adjust the forecasted Demand either up or down for such differences by RUC Zone in which the Eligible Intermittent Resource resides. If the EIR's expected output participating in the Day-Ahead Market, as reflected in the EIR's Bid, including a Self-Schedule, or lack thereof, is less than CAISO's forecast of the EIR, the CAISO may make a Supply-side adjustment to the resource's expected output by using the CAISO's forecast of the EIR. If on the other hand, the EIR's expected output participating in the Day-Ahead Market, as reflected in the EIR's Bid, including a Self-Schedule, or lack thereof, is greater than the CAISO's forecast of the EIR, the CAISO may make a Demand side adjustment to the RUC Zone Demand equal to the difference between the EIR's Day-Ahead Schedule and the CAISO forecasted quantity.

31.5.3.1.5 Real-Time Expected Incremental Supply Self-Schedule Adjustment

In order to avoid over procurement of RUC, the CAISO shall, using a similar-day approach, estimate the RTM Self-Schedules for resources that usually submit RTM Self-Schedules that are greater than their Day-Ahead Schedules. The CAISO Operator may set the length of the Self-Schedule moving average window. Initially this moving average window shall be set by default to seven (7) days; in which case the weekday estimate is based on the average of five (5) most recent weekdays and the weekend estimate is based on the average of the two (2) most recent weekend days. To the extent weather conditions differ significantly from the historical days, additional adjustment may be necessary. After determining the estimate of Real-Time Self-Schedules, using a similar day forecasting approach, the CAISO adjusts the CAISO Forecast of ~~CAISO~~ BAA Demand of a RUC Zone based on the forecasted quantity changes in Supply as a result of Self-Schedules submitted in the RTM. This adjustment for forecasted Real-Time Self- Schedules may result in positive or negative adjustments. Demand adjustments to the CAISO

Forecast of ~~CAISO~~ BAA Demand result when there is a net forecast decrease in Real-Time Self-Schedule Supply relative to the Day-Ahead Schedule Supply. Supply adjustments to the individual resources occur when there is a net forecast increase in Real-Time Self-Schedule Supply relative to the Day-Ahead Schedule Supply of the individual resource.

31.5.3.1.6 Day-Ahead Ancillary Service Procurement Deficiency Adjustment

While the CAISO intends to procure one hundred percent (100%) of its forecasted Operating Reserve requirement in the IFM based on the CAISO Forecast of ~~CAISO~~ BAA Demand as specified in Section 8.3.1, the CAISO shall make adjustments to the CAISO Forecast of BAA ~~CAISO~~ Demand used in RUC to ensure sufficient capacity is available or resources committed in cases that the CAISO is unable to procure one hundred percent (100%) of its forecasted Operating Reserve requirement in the IFM; provided, however, that the CAISO shall not procure specific Ancillary Services products in RUC, nor will the RUC optimization consider AS-related performance requirements of available capacity.

31.5.3.2 RUC Zones

31.5.3.2.1 Use of RUC Zones

The CAISO shall adjust the CAISO Forecast of ~~CAISO~~ BAA Demand by RUC Zone for the conditions described in Sections 31.5.3.2 through 31.5.3.6. If any adjustments are made throughout the affected RUC Zone, such adjustments will be made consistent with the subset of system LDFs for the Nodes that define the RUC Zone(s). The CAISO will adjust the CAISO Forecast of ~~CAISO~~ BAA Demand of each affected RUC Zone, preserving the LDFs within each RUC Zone, but the relative weighting of the LDFs across the system will deviate from the original LDFs. ~~RUC costs will be pooled together to establish the RUC Compensation Costs. As described in Section 11. 6.1, Settlement of RUC Compensation Costs will not be on a RUC Zone basis.~~

31.5.3.2.2 Designation of RUC Zones

The CAISO shall define RUC Zones as areas that represent UDC or MSS Service Areas, Local Capacity Areas, or any other collection of Nodes. RUC Zones will be designated by the CAISO as necessary and to the extent that the CAISO has developed sufficient data on historical ~~CAISO~~ Demand in a BAA and weather conditions to allow it to perform Demand Forecasts. Once the CAISO has established RUC

zones, the mapping of RUC Zones to Nodes shall be static data and shall be maintained in the Master File. The CAISO may add new Nodes to a RUC Zone if new Nodes are added to the FNM. The status of each RUC Zone shall remain active for as long as the CAISO maintains regional forecasting capabilities, but once a RUC Zone is designated the CAISO will only adjust the CAISO Forecast of ~~CAISO~~ BAA Demand as necessary to address RUC procurement constraints and not as a normal course for all CAISO Market functions. The actual RUC Zones used by the CAISO in its operation of RUC are posted on the CAISO Website.

31.5.4 RUC Procurement Constraints

In addition to the resource constraints and Transmission Constraints employed by SCUC as discussed in Section 27.4.1, the CAISO shall employ the following ~~three~~ constraint~~s~~ in RUC:

(a) To ensure that sufficient RUC Capacity is procured to meet the CAISO Forecast of ~~CAISO~~ BAA Demand, the CAISO will enforce the power balance between the total Supply, which includes Day-Ahead Schedules and RUC Capacity, and the total Demand, which includes the CAISO Forecast of ~~CAISO~~ BAA Demand and IFM export Schedules. The CAISO may adjust the CAISO Forecast of ~~CAISO~~ BAA Demand to increase the RUC procurement target if there is AS Bid insufficiency in the IFM.

~~(b) To ensure that RUC will neither commit an excessive amount of Minimum Load Energy nor procure an excessive amount of RUC Capacity from Scheduling Points the CAISO will verify that the sum of Day-Ahead Schedules, Schedules of Generating Units, net imports, Participating Loads, and Proxy Demand Resources plus the Minimum Load Energy committed by RUC is not greater than a configurable percentage of the system CAISO Forecast of CAISO Demand.~~

~~(c) The CAISO can limit the amount of RUC Capacity it will procure from resources that could otherwise be started during the Operating Day based on operational factors such as: (1) historical confidence that a Short Start Unit actually starts when needed based on the assessment of the CAISO Operators of the historical performance of Short Start Units; (2) need to conserve the number of run-hours and number of starts per year for~~

~~critical loading periods; and (3) seasonal constraints such as Overgeneration. The CAISO will verify that the total Day-Ahead Schedules and RUC Capacity from such resources is not greater than a configurable percentage of the total available capacity of all such resources.~~

31.5.5 Selection and Commitment of RUC Capacity

Capacity that is not already scheduled in the IFM may be selected as RUC Capacity ~~through the RUC process of the DAM~~to meet a RUC Procurement Target.

31.5.5.1 Nodal Procurement and Deliverability of Reliability Capacity

RUC optimizes procurement of Reliability Capacity such that, in the event the Real-Time Market awards the incremental or decremental Energy Bids corresponding to the Reliability Capacity Awards, the dispatch of Energy from the Reliability Capacity in the market would not result in flows exceeding Transmission Constraints and scheduling limits, including EDAM Transfer limits.

The RUC optimization distributes an EDAM Entity's RUC procurement target to the Demand Locations within each EDAM Entity based on distribution factors derived from historical and/or forecasted information that reflect the relative contributions of Demand to the RUC procurement targets.

31.5.5.2 The RUC Optimization

The RUC optimization will select RUC Capacity and produce nodal RUC Prices by minimizing total Bid cost based on RUC Availability Bids and Start-Up, Minimum Load Bids and Transition Costs. ~~If RUC cannot schedule sufficient capacity to meet the RUC Procurement Target, a RUC Award or RUC Schedule will be issued to imports providing RA Capacity for the full amount of their RA Capacity.~~ RUC will not consider Start-Up, Minimum Load Bids, or Transition Costs for resources already committed in the IFM. ~~The RUC Capacity of a resource is the incremental amount of capacity selected in RUC above the resource's Day-Ahead Schedule. The resource's Day-Ahead Schedule plus its RUC Capacity comprise the resource's RUC Schedule.~~ The CAISO will only issue RUC Start-Up Instructions to resources committed in RUC that must receive a Start-Up Instruction in the Day-Ahead in order to be available to meet Real-Time Demand. RUC Schedules will be provided to Scheduling Coordinators even if a RUC Start-Up Instruction is not issued at that time. RUC shall not Shut Down resources scheduled through the

IFM ~~and~~ but RUC ~~will not~~ may commit a Multi-Stage Generating Resource to a lower MSG Configuration ~~that is unable to support the Energy scheduled in the IFM~~. If the RUC process cannot find a feasible solution given the resources committed in the IFM, the RUC process will adjust constraints as described in Section 31.5.4 to arrive at a feasible solution that accommodates all the resources committed in the IFM~~, and any necessary de-commitment of IFM committed units shall be effectuated through an Exceptional Dispatch~~.

31.5.5.3 Limitations on RUC Awards

A RUC Award is limited to a resource's 60-minute ramp capability. A RUC Award to a specific resource only can consist of RCU or RCD, and not both. RUC shall not Shut Down resources scheduled through the IFM. RUC shall not provide a RUC Award to a Multi-Stage Generating Resource that would require it to make an infeasible transition from the MSG Configuration applicable to its Day-Ahead Schedule to the MSG Configuration applicable to meeting the requirements of the potential RUC Award.

The RUC optimization applies a capacity constraint such that the sum of awards for Energy, upward Ancillary Services, IRU, and RCU does not exceed the resource's Upper Economic Limit or, in the case of an Eligible Intermittent Resource, the forecasted output based on the forecast referenced in Section 4.8.2.1.

The RUC optimization only awards a RUC Award to a storage resource using the Non-Generator Resource model to the extent its modeled State of Charge can support such schedule or award.

31.5.6 Eligibility for RUC Compensation

All RUC Capacity is eligible for the RUC Availability Payment except for: (i) RMR Capacity from RMR Resources; (ii) RUC Capacity resulting from RUC Availability Bids for exports inserted pursuant to Section 31.5.1.5; ~~Resource Adequacy Capacity;~~ and (iii) RUC Capacity that corresponds to the resource's Minimum Load, which is compensated through the Bid Cost Recovery as described in Section 11.8. Resources not committed in the IFM that are committed in RUC, including Condition 1 Legacy RMR Units that were not designated for RMR Dispatches and Resource Adequacy Resources, are also eligible for RUC Cost Compensation, which includes Start-Up, Transition Costs, and Minimum Load Cost compensation, and Bid Cost Recovery, subject to the resource actually following its Dispatch Instructions

as verified by the CAISO pursuant to procedures set forth in the Business Practice Manuals.

31.5.7 Rescission of Payments for RUC Capacity

If capacity committed in RUC provided from a Generating Unit, Participating Load, Proxy Demand Resource, System Unit or System Resource is Undispatchable Capacity ~~or Undelivered Capacity~~ during the relevant Settlement Interval, then the CAISO rescinds the payments ~~payments will be rescinded~~ as described in this Section 31.5.7 and settled in accordance with Section 11.2.2.2. If the CAISO determines that non-compliance of a Participating Load, Proxy Demand Resource, Generating Unit, System Unit or System Resource with an Operating Instruction or Dispatch Instruction from the CAISO, or with any other applicable technical standard under the CAISO Tariff, causes or exacerbates system conditions for which the WECC imposes a penalty on the CAISO, then the Scheduling Coordinator of such Participating Load, Proxy Demand Resource, Generating Unit, System Unit or System Resource shall be assigned that portion of the WECC penalty which the CAISO reasonably determines is attributable to such non-compliance, in addition to any other penalties or sanctions applicable under the CAISO Tariff. The rescission of payments in this Section 31.5.7 shall not apply to a capacity payment for any particular RUC Capacity if the RUC Availability Payment is less than or equal to zero (0).

~~**31.5.7.1 Rescission of Payments for Undispatchable RUC Capacity**~~

~~The CAISO shall calculate the Real-Time ability of each Generating Unit, Participating Load, Proxy Demand Resource, System Unit or System Resource to deliver Energy from or capacity committed in RUC for each Settlement Interval based on its maximum operating capability, actual telemetered output (or, in the case of Proxy Demand Resources, an estimate of actual output), and Operational Ramp Rate as described in Section 30.10, which for a Multi-Stage Generating Resource is evaluated by MSG Configuration. If the Undispatchable Capacity is capacity committed in RUC and is from a Generating Unit, System Unit or System Resource that is a Resource Adequacy Resource, there is no payment obligation to the CAISO for the Undispatchable Capacity. The CAISO will report the instance of non-compliance by the Resource Adequacy Resource to the appropriate Local Regulatory Authority.~~

~~**31.5.7.2 Rescission of Payments for Undeliverable RUC Capacity**~~

~~For each Settlement Interval in which a Generating Unit, Participating Load, Proxy Demand Resource,~~

~~System Unit or System Resource fails to supply Energy from capacity committed in RUC in accordance with a Dispatch Instruction, or supplies only a portion of the Energy specified in the Dispatch Instruction, the RUC Availability Payment will be reduced to the extent of the deficiency, in accordance with the provisions of Section 11.2.2.2.2, which for a Multi-Stage Generating Resource is evaluated for the Generating Unit and not by the MSG Configuration.~~

31.5.8 RTM Bidding Obligations from RUC Awards

A RUC Availability Award in an hour obligates the Scheduling Coordinator for the resource receiving the award to submit Economic Bids to the Real-Time Market for the full range of awarded Reliability Capacity. The portion of the resource's Day-Ahead Schedule for Energy below a RCD award may be Self-Scheduled in the Real-Time Market.

A resource receiving a RUC Availability Award in an hour cannot submit a Self-Schedule for Energy in the Real-Time Market for a quantity in excess of its Day-Ahead Schedule for Energy minus any awards for IRD and RCD.

Resources receiving a RUC Availability Award for RCU for which their Scheduling Coordinator has submitted an Energy Bid in the Day-Ahead Market to export outside the EDAM Area must provide a decremental Energy Bid to dispatch down the export schedule in the FMM if needed.

By forty minutes prior to the applicable Trading Hour, the Scheduling Coordinator for a System Resource receiving a RUC Award must submit an E-Tag (or set of E-Tags) that passes CAISO E-Tag validation procedures, with the quantity (or sum of quantities) of the transmission profile no less than the sum of the RUC Award and any Day-Ahead Schedule for Energy. Failure to meet this deadline results in the CAISO deeming the entire quantity of the RUC Award as Undispatchable Capacity for RUC for purposes of Section 11.2.2.2.1.

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31.9 RUC MPM Process

After the IFM and prior to RUC, the CAISO performs the RUC MPM.

31.9.1 Determining Competitive and Non-Competitive Congestion Components in RUC

The RUC MPM process produces potential RUC Availability Awards by enforcing all Transmission Constraints that are expected to be enforced in procuring Reliability Capacity to meet the CAISO Forecast of BAA Demand, with that forecast distributed to Demand Locations based on Load Distribution Factors, and based on unmitigated RUC Availability Bids. The RUC MPM uses as the Reference Bus either: (1) the Midway 500kV bus if Path 26 flow is from north to south; or (2) the Vincent 500kV bus if Path 26 flow is from south to north. The treatment of a particular Transmission Constraint as competitive or non-competitive for purposes of the RUC MPM process is determined pursuant to Section 39.7.2.

31.9.2 RUC Bid Mitigation

The CAISO applies Local Market Power Mitigation to Bids for RCU if the resource for which that Bid was submitted could provide counter-flow to a Transmission Constraint deemed non-competitive pursuant to the methodology outlined in Section 39.7.2.2(B)(a) in the case of modeling the dispatch of Energy from the capacity corresponding to RCU Awards. To the extent a Bid for RCU is subject to Local Market Power Mitigation and exceeds the Competitive RCU LMP plus the Competitive LMP Parameter, the CAISO mitigates the Bid to the higher of the: (i) resource's RCU Default Availability Bid; or (ii) Competitive RUC Price for RCU plus the Competitive LMP Parameter.

The CAISO does not mitigate RUC Availability Bids for RCD and does not mitigate RUC Availability Bids for RCU submitted on behalf of imports from outside the EDAM Area.

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Section 33

33. Extended Day-Ahead Market~~[Not Used]~~

Pursuant to Section 33, the CAISO will expand operation and Settlement of the Day-Ahead Market in an EIM Entity Balancing Authority Area for which the Balancing Authority executes an EDAM Addendum to EIM Entity Agreement with the CAISO.

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33.3 Local Furnishing PTO~~[Not Used]~~

The provisions applicable to transmission facilities owned by a Local Furnishing PTO or other Tax-Exempt PTO in CAISO Tariff Section 3 do not apply to the Extended Day-Ahead Market.

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33.5 Black Start~~[Not Used]~~

The provisions applicable to Black Start and system restoration in Section 5 do not apply to the Extended Day-Ahead Market.

33.6 Communications~~[Not Used]~~

Section 6 will apply to EDAM Market Participants and govern communications and information availability regarding EDAM Market Participants in the Day-Ahead Market, except as this Section 33.6 specifically provides.

33.6.1 Technical Requirements.

The EDAM Entity must satisfy the technical and communication requirements specified in the Business Practice Manual for the Extended Day-Ahead Market, which will be based on the Inter-Control Center Communication Protocol and Reliability Standards.

33.6.2 Communications and OASIS.

Section 6 will govern communications and information availability regarding the participation of EDAM Market Participants in the Day-Ahead Market except that (a) references to internal

resources will be deemed to include EDAM Resource Facilities, (b) references in Sections 6.2.2.1 and 6.5.2.1 to the CAISO Controlled Grid and references in Sections 6.5.4.2.2(a) and 6.5.5.1.1 to the CAISO Balancing Authority Area will be deemed references to the EDAM Area, and (c) the provisions of Section 6.3.1 that authorize the CAISO to communicate directly with Generators and Demand Response Providers to ensure System Reliability will not apply to Generators and Demand Response Providers in the EDAM Entity's Balancing Authority Area or pseudo-tied from an external Balancing Authority Area to the EDAM Entity Balancing Authority Area.

33.6.3 Loss of Communications.

The CAISO and each EDAM Entity, EDAM Entity Scheduling Coordinator, and EDAM Load Serving Entity Scheduling Coordinator will establish procedures to address an interruption of Day-Ahead Market communications, which will include steps to be taken to restore communications and address any impact on system or market operations as provided in Section 33. An EDAM Entity that loses communication with the CAISO remains responsible for managing its Balancing Authority Area without the Day-Ahead Market, and each EDAM Entity will have communication procedures to address such circumstances.

33.6.4 Variable Energy Resource Forecast Communications.

If the EDAM Resource Scheduling Coordinator for a Variable Energy Resource elects to use an independent forecasting service, it must make data transfer arrangements with the CAISO for the CAISO to receive the forecast in a format and on a schedule set forth in the Business Practice Manual for the Extended Day-Ahead Market.

33.6.5 Hybrid Resource Forecast Communications.

If the EDAM Resource Scheduling Coordinator for a Hybrid Resource elects to use an independent forecasting service, it must make data transfer arrangements with the CAISO for the CAISO to receive the forecast in a format and on a schedule set forth in the Business Practice Manual for the Extended Day-Ahead Market.

33.7 EDAM Operations Under Normal And Emergency Conditions~~[Not Used]~~

Section 7 of the CAISO Tariff will not apply to EDAM Market Participants; rather, the specific provisions of this Section 33.7 will apply to EDAM Market Participants.

33.7.1 Normal Operations

The CAISO will administer the transmission capacity made available to the Day-Ahead Market to support transfers of Energy, Reliability Capacity, and Imbalance Reserves in the EDAM Area under normal operations. The CAISO will issue a Day-Ahead Schedule only to an EDAM Entity Scheduling Coordinator or EDAM Load Serving Entity Scheduling Coordinator for Load in the Day-Ahead Market. The CAISO will issue a Day-Ahead Schedule to an EDAM Resource only if that resource has a Bid in the Day-Ahead Market, including Load participating as an EDAM Resource. The CAISO will have no authority to issue an Exceptional Dispatch to an EDAM Resource.

33.7.2 EDAM Transfer Modeling.

EDAM Transfers support both Energy and capacity transfers between Balancing Authority Areas in the EDAM Area. Each EDAM Transfer is modeled by a pair of export and import EDAM Transfer System Resources, one for each Balancing Authority Area on each side of the EDAM Internal Intertie with equal Energy schedules and/or capacity awards. EDAM Transfers include the exchange of Energy, Imbalance Reserves, Reliability Capacity, and ancillary services in support of the EDAM RSE at EDAM Internal Interties. The Ancillary Service transfers are declared by the Balancing Authority, not optimized in the IFM, and supported by designated transmission capacity. The CAISO will model individual constraints for each EDAM Transfer scheduling limit available on an EDAM Internal Intertie based on the transmission capacity made available under Section 33.18, and will enforce the scheduling limit for an EDAM Transfer in the Day-Ahead Market. The CAISO will calculate the net scheduled EDAM Transfers for the Balancing Authority Areas in the EDAM Area and derive from these net scheduled EDAM Transfers the schedules on EDAM Internal Interties for E-Tag purposes. The CAISO will communicate the EDAM Transfer limit to the EDAM Entity Scheduling Coordinator with each Balancing Authority Area in the EDAM Area for E-Tag purposes.

33.7.3 Manual Dispatch.

The EDAM Entity may issue a manual dispatch to an EDAM Resource in its Balancing Authority Area, outside of the Market Clearing of the Day-Ahead Market, and enforce Transmission

Constraints when necessary to address issues in the EDAM Entity Balancing Authority Area that the CAISO is unable to address through normal economic Dispatch and Congestion Management in accordance with the timelines and procedures in Business Practice Manual for the Extended Day-Ahead Market. The EDAM Entity Scheduling Coordinator will inform the CAISO of the manual dispatch through submission of a Self-Schedule or EIM Manual Dispatch, and if the EDAM Entity Balancing Authority Area is under manual operation. Upon receiving notice of a manual dispatch, the CAISO will reflect the manual dispatch in the applicable CAISO Market depending upon when the notice is received and only to the extent that reflection of the manual dispatch in the market is practicable.

33.7.4 EDAM Disruption.

The CAISO may declare an interruption of EDAM Entity participation in the Day-Ahead Market when in its judgment (a) operational circumstances (including a failure of the Day-Ahead Market operation to produce feasible results in the EDAM Area or other CAISO Market Disruption) in the EDAM Area have caused or are in danger of causing an abnormal system condition in the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area that requires immediate action, or (b) communications between the CAISO and EDAM Market Participants are disrupted and prevent an EDAM Entity, EDAM Entity Scheduling Coordinator, EDAM Load Serving Entity Scheduling Coordinator, or EDAM Resource Scheduling Coordinator from accessing CAISO systems to submit or receive information. The CAISO will reinstate normal operation of the Day-Ahead Market in the EDAM Area at such time as it determines that the conditions that caused the interruption of EDAM Entity participation in the Day-Ahead Market have been resolved.

33.7.4.1 CAISO Response to EDAM Disruption. If the CAISO declares an interruption of EDAM Entity participation in the Day-Ahead Market or the CAISO Balancing Authority Area in the EDAM Area, the CAISO may in its judgment, among other things:

(a) separate the affected EDAM Entity Balancing Authority Area or the CAISO Balancing Authority Area from the EDAM Area and maintain the Day-Ahead Market for other Balancing Authority Areas in the EDAM Area including the CAISO Balancing Authority Area, by enforcing a net transfer constraint for the affected Balancing Authority Area to

separate it from the remainder of the EDAM Area,

(b) reduce or suspend EDAM Transfers between one or more Balancing Authority Areas in the EDAM Area, including the CAISO Balancing Authority Area, in accordance with Section 33.7.5, and communicate and coordinate with impacted EDAM Entities to assess and potentially mitigate potential issues within the EDAM Area,

(c) instruct one or more EDAM Entities to maintain system balance within their Balancing Authority Area without Day-Ahead Market results, or take similar actions within the CAISO Balancing Authority Area,

(d) in addition or as an alternative, use market results in the Day-Ahead Market in accordance with Section 7.7.9 or take any of the actions specified in Section 7.7.6 or Section 7.7.7 with respect to the Day-Ahead Market, with reference to Section 29.7(j)(2)(D)(i) as necessary to establish an Administrative Price,

(e) suspend or limit the ability of all Scheduling Coordinators to submit Virtual Bids on behalf of Convergence Bidding Entities at specific Eligible PNodes or Eligible Aggregated PNodes, or at all Eligible PNodes or Eligible Aggregated PNodes, or

(f) postpone the publication of Day-Ahead Market results.

33.7.4.2 EDAM Entity Responsibility. In response to an interruption of EDAM Entity participation in the Day-Ahead Market by the CAISO, all EDAM Entities will follow NERC Reliability Standards applicable to their roles as Balancing Authorities in an effort to alleviate operational and system conditions and restore routine operations, and all EDAM Entity Scheduling Coordinators will promptly inform the CAISO of actions taken by the EDAM Entities they represent in response to an interruption of EDAM Entity participation in the Day-Ahead Market by the CAISO through updates to their Schedules, Interchange E-Tags, transmission limit adjustments, or Outage and derate information, as applicable. If the interruption of EDAM Entity participation results in the EDAM Entity not receiving a Day-Ahead Market Schedule, then the EDAM Entity must submit information to the RTM as required by Section 29 and applicable to an EIM Entity. If it is necessary for an EDAM Entity to reduce or suspend EDAM Transfers between one or more Balancing Authority

Areas in the EDAM Area, the EDAM Entity must communicate and coordinate with the CAISO and impacted EDAM Entities prior to curtailing EDAM Transfers or as soon as practicable, and should continue to communicate and coordinate with the CAISO and all EDAM Entities to assess and mitigate potential issues within the EDAM Area.

33.7.5 EDAM Transfer Priority Relative to Demand

EDAM Transfers will have a priority equal to Demand in the EDAM Area. If it is necessary for an EDAM Entity or the CAISO to reduce or suspend EDAM Transfers between one or more Balancing Authority Areas in the EDAM Area based on operational judgement and consistent with Good Utility Practice, the EDAM Entity will do so solely with respect to its Balancing Authority Area or the CAISO will do so solely with respect to its Balancing Authority Area, provided that the reduction or suspension is consistent with the EDAM Transmission Service Provider tariff or the CAISO Tariff, as applicable, and communicated to potentially impacted Balancing Authority Areas in the EDAM Area in advance, if practicable, or immediately following the reduction or suspension. This communication and subsequent coordination should continue among the CAISO and all potentially impacted EDAM Entities to assess and mitigate potential issues within the EDAM Area until resolution of the circumstances underlying the reduction or suspension in the Real-Time Market as may be reflected by information provided by the CAISO under Section 29.34(o). The CAISO will promptly adjust the EDAM Transfer limits or EIM Transfer limits associated with the reduction or suspension to reflect in the CAISO Markets the reduction or suspension directed by the EDAM Entity with respect to its Balancing Authority Area or the CAISO with respect to its Balancing Authority Area.

33.8 Ancillary Services~~[Not Used]~~

Ancillary services are not procured through the EDAM and the Ancillary Services provisions of Section 8 do not apply to the Extended Day-Ahead Market, including other CAISO Tariff sections that apply to the procurement and pricing of Ancillary Services. Each EDAM Entity will remain responsible for procuring and maintaining its own Ancillary Services to meet its Balancing Authority Area obligations and communicating these quantities to the CAISO as Self-Provided Ancillary Services through a Submission to Self-Provide an Ancillary Service.

33.9 Outages and Critical Contingencies~~[Not Used]~~

Section 9 does not apply to EDAM Market Participants except as referenced in this Section 33.9.

33.9.1 Maintenance Outages

An EDAM Entity, EDAM Transmission Service Provider, or transmission operator within the Balancing Authority Area shall remain responsible for performing engineering studies and approving Maintenance Outages under the applicable EDAM Transmission Service Provider tariff or the Reliability Standards, as applicable, within its EDAM Entity Balancing Authority Area on both transmission facilities and EDAM Resources. An EDAM Entity Scheduling Coordinator must submit notice of Maintenance Outages approved by that EDAM Entity to the CAISO by the means and in the manner set forth in the Business Practice Manual for the Extended Day-Ahead Market at least seven Business Days prior to the planned Outage. The CAISO implements Maintenance Outages submitted by that deadline in the Day-Ahead Market process and informs the EDAM Entity of any anticipated transmission overloads expected due to Maintenance Outages reported to the CAISO.

33.9.2 Forced Outages

EDAM Entity Scheduling Coordinators and EDAM Resource Scheduling Coordinators must report Forced Outages to the CAISO for Outages of transmission facilities within the EDAM Entity Balancing Authority Area they represent and Generating Units or other resources they represent as EDAM Resources, respectively, in accordance with the provisions of Section 9 regarding Forced Outage reporting, including Sections 9.3.6.4.1(b), 9.3.6.4.1(c), 9.3.6.4.1(d), 9.3.6.4.2(2), 9.3.6.4.2(3), and 9.3.10.

33.9.3 Transmission Limits

An EDAM Entity Scheduling Coordinator must notify the CAISO by the means and in the manner specified in the Business Practice Manual for the Extended Day-Ahead Market regarding transmission limits on the transmission capacity made available to the Day-Ahead Market within the EDAM Entity Balancing Authority Area that need to be enforced in the Day-Ahead Market.

33.10 EDAM Metering and Telemetry

Section 10 will apply in the EDAM unless otherwise noted in this Section 33.10. In the event of any

conflict, this Section 33.10 will apply.

Scheduling Coordinators must ensure compliance with this Section 33.10. The EDAM Entity Scheduling Coordinator will ensure compliance with this Section 33.10 for each Energy, Load, intertie, or other resource in its Balancing Authority Area unless that resource or Load has its own Scheduling Coordinator. The EDAM Entity will ensure each EDAM Market Participant in an EDAM Entity Balancing Authority Area becomes either a CAISO Metered Entity or a Scheduling Coordinator Metered Entity and complies with the requirements of Section 10.

33.10.1 Demand Metering

The EDAM Entity will ensure that any Load Aggregation Point in its Balancing Authority Area not represented by the EDAM Entity Scheduling Coordinator is metered separately so that the associated Demand may be settled.

33.10.2 EDAM Resource Metering

All EDAM Resource Facilities must be CAISO Metered Entities or Scheduling Coordinator Metered Entities and comply with Section 10. Scheduling Coordinators for EDAM Resources may elect to submit Meter Data in 5-minute or 15-minute intervals. Scheduling Coordinators for EDAM Resources that cannot meter the EDAM Resource's Energy every 15 minutes or faster may not submit Economic Bids or provide Ancillary Services, and must submit Self-Schedules in the EDAM and Real-Time Market.

33.10.3 EDAM Interties

EDAM Interties must have their Meter Data reported by either CAISO Metered Entities or Scheduling Coordinator Metered Entities. Each EDAM Entity Scheduling Coordinator for the EDAM Entity at the EDAM Intertie will be responsible for submitting Settlement Quality Meter Data in compliance with Section 10. EDAM Entity Scheduling Coordinators also must ensure the EDAM Intertie provides telemetry consistent with Section 33.10.4.

33.10.4 Telemetry

As described in the Business Practice Manual for the Extended Day-Ahead Market, Scheduling Coordinators for EDAM Interties and EDAM Resource Facilities, including without limitation Generating Units, storage resources, Distributed Energy Resources, and Demand Response

Resources, must satisfy communications, telemetry, and control requirements in a manner that ensures that the CAISO and EDAM Entities will have the ability, consistent with the CAISO Tariff, to monitor the EDAM Resource Facility as necessary to maintain reliability in their respective Balancing Authority Areas. An EDAM Resource Facility will be exempt from this Section 33.10.4 if it has a rated capacity of less than ten (10) MW, unless it is certified by the CAISO to provide Ancillary Services. For purposes of this calculation, aggregated resources will calculate their aggregated capacity and provide telemetry at the aggregate level. EDAM Resource Facilities must comply with any EDAM Entity or Local Regulatory Authority requirements in addition to this Section 33.10.4.

33.11 Settlements And Billing for EDAM Market Participants

Section 33.11, rather than Section 11, will apply to CAISO Settlement with EDAM Entity Scheduling Coordinators, EDAM Resource Scheduling Coordinators, EDAM Load Serving Entity Scheduling Coordinators and EDAM Market Participants, except as otherwise provided in this Section 33.11.

33.11.1 Transfer Revenue and Congestion Revenue Allocation

EDAM Transfer revenue will be collected when one Balancing Authority Area in the EDAM Area provides Energy, Imbalance Reserve, and/or Reliability Capacity to another Balancing Authority Area in the EDAM Area and the associated EDAM Transfer System Resource prices elements or components differ. Congestion revenue will be collected when a Transmission Constraint or intertie scheduling limit binds at different locations of the transmission system and the LMP varies across a Balancing Authority Area in the EDAM Area. The CAISO will allocate EDAM Transfer revenue and Congestion revenue attributed to an EDAM Entity Balancing Authority Area or the CAISO Balancing Authority Area as provided below.

33.11.1.1 Transfer Revenue

The CAISO will calculate and allocate EDAM Transfer revenue for Energy transfers, Imbalance Reserve transfers, and/or Reliability Capacity transfers for a Balancing Authority Area in the EDAM Area.

33.11.1.1.1 Energy Transfer Revenue

EDAM Transfer revenue for Energy occurs when the net EDAM Transfer scheduling limit

is reached in the Day-Ahead Market. This manifests as a separation of the Marginal Energy Cost of the binding Balancing Authority Area in the EDAM Area from the Marginal Energy Cost of an adjacent Balancing Authority Area in the EDAM Area that is attributed to an EDAM Transfer System Resource. The CAISO will allocate the EDAM Transfer revenue for Energy represented by EDAM Transfer System Resources equally between the Balancing Authority Areas, except when the CAISO has been notified during the implementation of the Day-Ahead Market within a prospective EDAM Entity Balancing Authority Area of an agreement between both EDAM Entities on either side of a EDAM Transfer that a different allocation for some portion of the EDAM Transfer revenue is required to give effect to a pre-existing commercial arrangement. The CAISO will then allocate the EDAM Transfer revenue for Energy directed to a Balancing Authority Area based upon whether the transmission across an EDAM Internal Intertie is made available by: (a) by an EDAM Entity pursuant to Section 33.18.2, in which case the CAISO will allocate the EDAM Transfer revenue to the EDAM Entity Scheduling Coordinator, (b) an EDAM Transmission Service Provider customer pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Transmission Service Provider customer, or (c) an EDAM Legacy Contract, Existing Contract, EDAM Transmission Ownership Right, or Transmission Ownership holder pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Legacy Contact, Existing Contract EDAM Transmission Ownership Right, or Transmission Ownership holder, respectively. An EDAM Entity will ensure EDAM Transfer revenue for Energy allocated to its EDAM Entity Scheduling Coordinator is thereafter allocated by all applicable EDAM Transmission Service Providers as may be detailed in the EDAM Transmission Service Provider tariff and business practices. EDAM Transfer revenue for Energy allocated to the CAISO Balancing Authority is further allocated according to the CAISO Tariff, unless allocated directly to a Scheduling Coordinator for a Transmission Ownership Rights holder or Existing Contract rights holder consistent with the terms of the agreement

concerning use of the transmission facilities supporting the EDAM Transfer.

33.11.1.1.2 Imbalance Reserve Transfer Revenue

The CAISO collects EDAM Transfer revenue for Imbalance Reserves when the transfer scheduling limit binds while optimizing capacity to meet the Imbalance Reserves Requirement for an EDAM Entity Balancing Authority Area or the CAISO Balancing Authority Area and manifests as price separation between the Shadow Price of the Imbalance Reserves procurement between the two Balancing Authority Areas at an EDAM Transfer location that is attributed to an EDAM Transfer System Resource. The CAISO calculates the hourly EDAM Transfer revenue for Imbalance Reserves as the product of the transfer quantity and the difference between the Locational IRU Price or Locational IRD Price, as appropriate, on either side of the binding limit. The CAISO will allocate the EDAM Transfer revenue for Imbalance Reserves equally between the Balancing Authority Areas, except when the CAISO has been notified during the implementation of the Day-Ahead Market within a prospective EDAM Entity Balancing Authority Area of an agreement between both EDAM Entities on either side of a EDAM Transfer that a different allocation for some portion of the EDAM Transfer revenue is required to give effect to a pre-existing commercial arrangement. The CAISO will then allocate the EDAM Transfer revenue for Imbalance Reserves directed to a Balancing Authority Area based upon whether the transmission across an EDAM Internal Intertie is made available by: (a) an EDAM Entity pursuant to Section 33.18.2, in which case the CAISO will allocate the EDAM Transfer revenue to the EDAM Entity Scheduling Coordinator, (b) an EDAM Transmission Service Provider customer pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Transmission Service Provider customer, or (c) an EDAM Legacy Contract, Existing Contract, EDAM Transmission Ownership Right, or Transmission Ownership holder pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Legacy Contact, Existing Contract EDAM Transmission Ownership Right, or

Transmission Ownership holder, respectively. An EDAM Entity will ensure that EDAM Transfer revenue for Imbalance Reserves allocated to its EDAM Entity Scheduling Coordinator is thereafter allocated by all applicable EDAM Transmission Service Providers as may be detailed in the EDAM Transmission Service Provider tariff. EDAM Transfer revenue for Imbalance Reserves allocated to the CAISO Balancing Authority is further allocated in the CAISO Balancing Authority Area according to the CAISO Tariff, unless allocated directly to a Scheduling Coordinator for a Transmission Ownership Rights holder or Existing Contract rights holder consistent with the terms of the agreement concerning use of the transmission facilities supporting the EDAM Transfer.

33.11.1.1.3 Reliability Capacity Transfer Revenue

EDAM Transfer revenue for Reliability Capacity occurs when the transfer scheduling limit binds while optimizing capacity to meet the RUC Procurement Target for an EDAM Entity Balancing Authority Area or the CAISO Balancing Authority Area and manifests as price separation between the Shadow Price of the Reliability Capacity procurement between the two Balancing Authority Areas at an EDAM Internal Intertie that is attributed to an EDAM Transfer System Resource. The CAISO calculates the hourly EDAM Transfer revenue for Reliability Capacity as the product of the transfer quantity and the difference between the RUC Price for RCU and the RUC Price for RCD, as applicable, on either side of the binding limit. The CAISO will allocate the EDAM Transfer revenue for Reliability Capacity equally between the Balancing Authority Areas, except when the CAISO has been notified during the implementation of the Day-Ahead Market within a prospective EDAM Entity Balancing Authority Area of an agreement between both EDAM Entities on either side of a EDAM Transfer that a different allocation for some portion of the EDAM Transfer revenue is required to give effect to a pre-existing commercial arrangement. The CAISO will then allocate the EDAM Transfer revenue for Reliability Capacity directed to a Balancing Authority Area based upon whether the transmission across an EDAM Internal Intertie is made available by: (a) an EDAM Entity pursuant to Section 33.18.2, in which case the CAISO will allocate the EDAM Transfer revenue to the

EDAM Entity Scheduling Coordinator, (b) an EDAM Transmission Service Provider customer pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Transmission Service Provider customer, or (c) an EDAM Legacy Contract, Existing Contract, EDAM Transmission Ownership Right, or Transmission Ownership holder pursuant to Section 33.18.2.2.2, in which case the CAISO will allocate the EDAM Transfer revenue to the Scheduling Coordinator for the EDAM Legacy Contact, Existing Contract EDAM Transmission Ownership Right, or Transmission Ownership holder, respectively. An EDAM Entity will ensure that EDAM Transfer revenue for Reliability Capacity allocated to its EDAM Entity Scheduling Coordinator is thereafter allocated by all applicable EDAM Transmission Service Providers as may be detailed in the EDAM Transmission Service Provider tariff and business practices. EDAM Transfer revenue for Reliability Capacity allocated to the CAISO Balancing Authority Area is further allocated in the CAISO Balancing Authority Area according to the CAISO Tariff, unless allocated directly to a Scheduling Coordinator for a Transmission Ownership Rights holder or Existing Contract rights holder consistent with the terms of the agreement concerning use of the transmission facilities supporting the EDAM Transfer.

33.11.1.2 Congestion Revenue

The CAISO will collect Congestion revenue based on price differences in the Marginal Cost of Congestion of the LMP across PNodes within the EDAM Area. For each Settlement Period of the DAM, the CAISO will calculate the contribution of each Balancing Authority Area in the EDAM Area to the Marginal Cost of Congestion at each resource location and intertie in the EDAM Area for each Balancing Authority Area based on the location of the Transmission Constraints in each Balancing Authority Area, EDAM Interties, and constraints enforced outside of the EDAM Area needed to manage that Balancing Authority Area's responsibilities. The CAISO will distribute the Congestion Charge revenue collected from the Transmission Constraints in each Balancing Authority Area in the EDAM Area, including any adjustment for the CAISO Balancing Authority Area in accordance with Section 11 and any adjustment for EDAM Entity Balancing Authority

Areas to account for schedules associated with EDAM Legacy Contracts, EDAM Transmission Ownership Rights and registered EDAM Transmission Service Provider transmission customer rights under Sections 33.16, 33.17, and 33.18, respectively, to the applicable Balancing Authority Area within which the Congestion occurred. An EDAM Entity will ensure that Congestion revenue allocated to its EDAM Entity Scheduling Coordinator is further allocated by all applicable EDAM Transmission Service Providers as may be detailed in the EDAM Transmission Service Provider tariff and business practices. Congestion revenue allocated to the CAISO Balancing Authority Area will be further allocated according to the CAISO Tariff, including Section 11.2.1 and Section 11.2.4.

33.11.2 EDAM RSE Failure Surcharge

A Balancing Authority Area in the EDAM Area must meet the requirements of the EDAM RSE for its Balancing Authority Area, as provided in Section 33.31.1.4. The applicable Scheduling Coordinator for each Balancing Authority Area in the EDAM Area that fails to meet all of the requirements of the EDAM RSE will be allocated the applicable EDAM RSE failure surcharge, as provided in Section 33.31.1.5.

33.11.2.1 Calculation of the EDAM RSE Failure Surcharges

33.11.2.1.1 EDAM RSE On-Peak Upward Failure Insufficiency Surcharge

If a Balancing Authority Area in the EDAM Area fails to satisfy all of the upward components of the EDAM RSE, as set forth in Section 33.31.1.3, during any hour within the sixteen-hour on-peak period, then the applicable Scheduling Coordinator for the Balancing Authority Area may be allocated the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge in each hour of the sixteen-hour on-peak period, with such surcharge established on a tiered structure, as provided in Section 33.31.1.5. The EDAM RSE On-Peak Upward Failure Insufficiency Surcharge will be calculated as the product of (a) the highest EDAM RSE Hourly Upward Deficiency Quantity during the sixteen-hour on-peak period of that day, (b) the greater of the published bilateral electric index prices for the applicable EDAM Trade Location, and (c) the EDAM RSE Failure Multiplier adjusted by the EDAM RSE Failure Scaling Factor. The EDAM RSE On-Peak Upward

Failure Insufficiency Surcharge applied in each hour of the sixteen-hour block will be adjusted by the EDAM RSE On-Peak Upward Credit amount for each hour the Balancing Authority Area satisfied all of the upward components of the EDAM RSE. In the event the EDAM RSE On-Peak Credit amount exceeds the surcharge amount, the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge will be zero.

33.11.2.1.2 EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge

If a Balancing Authority Area in the EDAM Area fails to satisfy all of the upward components of the EDAM RSE, as set forth in Section 33.31.1.3 in the upward direction during any hour within the off-peak period, then the applicable Scheduling Coordinator for the Balancing Authority Area may be allocated the EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge for each hour during the off-peak period in which there has been an upward failure. The EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge will be calculated as the product of (a) EDAM RSE Hourly Upward Deficiency Quantity; (b) the load-weighted average of the LMP of the LAP within that Balancing Authority Area and (c) the EDAM RSE Failure Multiplier.

33.11.2.1.3 EDAM RSE Downward Failure Insufficiency Surcharge

If a Balancing Authority Area in the EDAM Area fails to satisfy all of the downward components of the EDAM RSE during any hour, as set forth in Section 33.31.1.3, then the applicable Scheduling Coordinator for the Balancing Authority Area may be allocated the EDAM RSE Downward Failure Insufficiency Surcharge for each hour in which there has been a downward failure. The EDAM RSE Downward Insufficiency Charge will be calculated as the product of (a) the EDAM RSE Hourly Downward RSE Deficiency Quantity and (b) the Marginal Energy Cost of that Balancing Authority Area. If the EDAM RSE Hourly Downward Deficiency Quantity is greater than ten (10) MW, then the Balancing Authority Area will be assessed the EDAM RSE Downward Failure Insufficiency Surcharge for each hour in which there has been a downward failure. If the EDAM RSE Hourly Downward Deficiency Quantity is less than or equal to ten (10) MW, then there will be no EDAM RSE Downward Failure Insufficiency Surcharge during the

applicable hour given the *de minimis* nature of the failure.

33.11.2.2 EDAM RSE Surcharge Distribution

The CAISO will sum all EDAM RSE surcharge-related revenue on an hourly basis and distribute as follows:

33.11.2.2.1 EDAM RSE On-Peak Upward Failure Insufficiency Revenue Distribution

On an hourly basis, the CAISO will sum the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge revenue owed by Balancing Authority Areas with tier 2 or tier 3 upward failures of the EDAM RSE during the on-peak hours and distribute that revenue, pro rata, to the applicable Scheduling Coordinator for the Balancing Authority Areas in the EDAM Area that satisfied all upward components of the EDAM RSE in all of the sixteen on-peak hours of that Trading Day. If no Balancing Authority Area in the EDAM Area satisfied all of the upward components of the EDAM RSE in all of the sixteen on-peak hours of that Trading Day, then the CAISO will distribute the revenue collected on an hour-by-hour basis, pro rata, to the applicable Scheduling Coordinator for the Balancing Authority Areas that satisfied all of the upward components of the EDAM RSE in that on-peak hour. In both cases, the pro-rata distribution will be determined based on a Balancing Authority Area's total net EDAM Transfers in the export direction as the numerator and the total sum of the net EDAM Transfers in the export direction of Balancing Authority Areas that satisfied all of the upward components of the EDAM RSE upward tests as the denominator. If no Balancing Authority Area in the EDAM Area satisfied all of the upward components of the EDAM RSE in any single on-peak hour, then the CAISO will not collect the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge revenue from the applicable Scheduling Coordinator for the Balancing Authority Area in the EDAM Area for that single on-peak hour.

33.11.2.2.2 EDAM RSE Off-Peak Upward Failure Insufficiency Revenue Distribution

On an hourly basis, the CAISO will sum the EDAM RSE Off-Peak Upward Failure

Surcharge revenue owed by of the Balancing Authority Areas with tier 2 and tier 3 upward failures of the EDAM RSE during the off-peak hours and distribute that revenue to the applicable Scheduling Coordinator for the Balancing Authority Areas in the EDAM Area that satisfied all of the upward components of the EDAM RSE in all of the off-peak hours of that Trading Day. If no Balancing Authority Area in the EDAM Area satisfied all of the upward components of the EDAM RSE in all of the off-peak hours of that Trading Day, then the CAISO will distribute the revenue collected on an hour-by-hour basis, *pro rata*, to the applicable Scheduling Coordinator for the Balancing Authority Areas satisfied all of the upward components of the EDAM RSE in that off-peak hour. In both cases, the *pro rata* distribution will be determined based on a Balancing Authority Area's total net EDAM Transfers in the export direction as the numerator and the total net EDAM Transfers in the export direction of all Balancing Authority Areas that satisfied all of the upward components of the EDAM RSE as the denominator. If no Balancing Authority Area in the EDAM Area has satisfied all of the upward components of the EDAM RSE in any single off-peak hour, then the CAISO will not collect the EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge from the applicable Scheduling Coordinator for the Balancing Authority Area in the EDAM Area for that single off-peak hour.

33.11.2.2.3 EDAM RSE Downward Failure Insufficiency Revenue Distribution

On an hourly basis, the CAISO will sum the EDAM RSE Downward Failure Insufficiency revenue owed by Balancing Authority Areas in the EDAM Area that fail to satisfy all of the downward components of the EDAM RSE and distribute that revenue, *pro rata*, to the applicable Scheduling Coordinator for the Balancing Authority Areas in the EDAM Area that satisfied all downward components of the EDAM RSE for that Trading Day. If no Balancing Authority Area in the EDAM Area satisfied all of the downward components of the EDAM RSE over the twenty-four hour period of the Trading Day, then the CAISO will distribute the revenue collected on an hour-by-hour basis, *pro rata*, to the applicable Scheduling Coordinator for the Balancing Authority Areas that satisfied all of the downward components of the EDAM RSE in any single hour. In both cases, the *pro rata*

distribution will be determined based on the Balancing Authority Area total net EDAM Transfers in the import direction as the numerator and the total sum of the net EDAM Transfers in the import direction of Balancing Authority Areas that satisfied all of the downward components of the EDAM RSE downward tests as the denominator. If no Balancing Authority Area in the EDAM Area satisfied all of the downward components of the EDAM RSE in any single hour, then the CAISO will not collect the EDAM RSE Downward Failure Insufficiency Surcharge from the applicable Scheduling Coordinator for the Balancing Authority Area in the EDAM Area for that single hour.

33.11.2.3 EDAM RSE Surcharge Allocation

Revenue and costs arising from the EDAM RSE failure surcharge(s) distributed in accordance with Section 33.11.2.2 will be allocated to the CAISO Balancing Authority Area for sub-allocation in accordance with the CAISO Tariff and, for all other Balancing Authorities in the EDAM Area, to the applicable Scheduling Coordinator for any further sub-allocation in accordance with the requirements of the applicable tariffs and business practices of the entities within that EDAM Entity Balancing Authority Area.

33.11.3 Day-Ahead Market Settlement

The CAISO settles Day-Ahead Schedules and RUC Schedules issued to EDAM Market Participants as specified in this Section 33.11.3.

33.11.3.1 Settling Day-Ahead Schedules for Energy

The CAISO settles Day-Ahead Schedules for Energy issued to EDAM Market Participants as specified in Section 11.2.1.1 for Supply and as specified in Section 11.2.1.2 for Demand. The CAISO settles Energy Exports at an EDAM External Intertie as specified in Section 11.2.1.4. The CAISO settles EDAM Transfers of Energy by assessing both the importing and exporting Balancing Authority Areas. In the case of EDAM Entities, the CAISO assesses the Scheduling Coordinator representing the importing Balancing Authority Area a settlement equal to the product of the quantity of the import and the LMP at the relevant Scheduling Point pricing location and assesses the Scheduling Coordinator representing the exporting Balancing Authority Area a settlement equal to the product of the quantity of the export and the LMP at the relevant

Scheduling Point pricing location. If the CAISO is one of the importing or exporting Balancing Authority Areas, then the CAISO allocates the product of the export or import, as appropriate, and the LMP at the relevant Scheduling Point pricing location to CAISO Scheduling Coordinators as specified in Section 11 for allocating EDAM Transfers of Energy.

33.11.3.2 Settling Imbalance Reserves

The CAISO settles Imbalance Reserves Awards issued to EDAM Resources as specified in Sections 11.2.1.1.2, 11.2.1.8, and 11.25.2.1.1 as though the EDAM Resource were a Participating Generator.

The CAISO allocates the costs of procuring Imbalance Reserves in the EDAM as specified in Section 11.2.1.9 individually for each EDAM Entity with the exception that any reference to the CAISO Balancing Authority Area is a reference to the Balancing Authority Area of the relevant EDAM Entity.

In allocating the costs of Imbalance Reserves, the CAISO assesses both the importing and exporting Balancing Authority Areas for EDAM Transfers of Imbalance Reserves. In the case of EDAM Entities, the CAISO assesses the Scheduling Coordinator representing the importing Balancing Authority Area a settlement equal to the product of the quantity of the import and the Locational IRU Price or Locational IRD Price, as applicable, at the relevant Scheduling Point pricing location. In the case of EDAM Entities, the CAISO assesses the Scheduling Coordinator representing the exporting Balancing Authority Area a settlement equal to the product of the quantity of the export and the Locational IRU Price or Locational IRD Price, as applicable, at the relevant Scheduling Point pricing location. If the CAISO is one of the importing or exporting Balancing Authority Areas, then the CAISO allocates the product of the export or import, as appropriate, and the Locational IRU Price or Locational IRD Price, as applicable, at the relevant Scheduling Point pricing location to CAISO Scheduling Coordinators as specified in Section 11 for allocating EDAM Transfers of Imbalance Reserves.

33.11.3.3 Settling Reliability Capacity

The CAISO settles RUC Awards issued to EDAM Resources as specified in Section 11.2.2 as though the EDAM Resource were a Participating Generator or other seller of Energy or Ancillary

Services.

The CAISO allocates the costs of procuring Reliability Capacity in the EDAM as specified in Section 11.8.6.5.3.3 individually for each EDAM Entity with the exception that any reference to the CAISO Balancing Authority Area is a reference to the Balancing Authority Area of the relevant EDAM Entity. In allocating the costs of Reliability Capacity, the CAISO assesses both the importing and exporting Balancing Authority Areas for EDAM Transfers of Reliability Capacity. The CAISO assesses the importing Balancing Authority Area a charge equal to the product of the quantity of the import and the RUC Price for RCU or RUC Price for RCD, as applicable, at the relevant Scheduling Point pricing location. The CAISO assesses the exporting Balancing Authority Area a credit equal to the product of the quantity of the export and the RUC Price for RCU or RUC Price for RCD, as applicable, at the relevant Scheduling Point pricing location. If the CAISO is one of the importing or exporting Balancing Authority Areas, then the CAISO allocates the product of the export or import, as appropriate, and the RUC Price for RCU or RUC Price for RCD, as applicable, at the relevant Scheduling Point pricing location to CAISO Scheduling Coordinators as specified in Section 11 for allocating EDAM Transfers of Reliability Capacity.

33.11.3.4 Settling Ancillary Services

The EDAM does not procure Ancillary Services for EDAM Entity Balancing Authority Areas and the CAISO therefore does not settle charges or payments for Ancillary Services for the EDAM Entities in the Extended Day-Ahead Market. Ancillary Services provided by an EDAM Entity cannot be used to offset Ancillary Services obligations of a Scheduling Coordinator representing an entity with Ancillary Services obligations in the CAISO Balancing Authority Area.

33.11.3.5 IFM Bid Cost Recovery

EDAM Resources may receive Bid Cost Recovery for the IFM in accordance with Section 11.8. The CAISO allocates the IFM Bid Cost Uplift to Balancing Authority Areas in the EDAM Area, with the following rules in addition to any provisions in Section 11.8.

For a Balancing Authority Area with net Energy export transfer, the CAISO transfers a portion of the Balancing Authority Area's IFM Bid Cost Uplift amount to Balancing Authority Areas receiving

net Energy import transfers. For purposes of the foregoing, a Balancing Authority Area has net import transfers if the sum of the Balancing Authority Area's net Energy transfer and its net Imbalance Reserve transfer is in the import direction. If such sum is in the export direction, the Balancing Authority Area is deemed to have a net Energy export transfer.

The Balancing Authority Area IFM Bid Cost Uplift transfer adjustment amount will equal the product of the Balancing Authority Area hourly IFM Bid Cost Uplift amount and the ratio of the Balancing Authority Area's Day-Ahead net Energy export transfers and net Imbalance Reserve Up export transfers divided by Balancing Authority Area's Day-Ahead Schedules, Day-Ahead net Energy export transfers, net Imbalance Reserve Up export transfers and virtual demand, if applicable. The CAISO allocates the IFM Balancing Authority Area IFM Bid Cost Uplift transfer adjustment amount to Balancing Authority Areas with net transfers in the import direction. For each EDAM Entity Balancing Authority Area, the CAISO allocates the adjusted Balancing Authority Area IFM BCR amounts to the EDAM Entity for allocation under the applicable tariff and, for the CAISO Balancing Authority Area, pursuant to Section 11.8.6.

33.11.3.6 RUC Bid Cost Recovery

EDAM Resources may receive Bid Cost Recovery for RUC in accordance with Sections 11.8.3. For each Trading Hour, the CAISO calculates the RUC Bid Cost Uplift for each EDAM Entity and the CAISO Balancing Authority Area. The CAISO allocates the RUC Bid Cost Uplift to each EDAM Entity Balancing Authority Area according the methodology specified in Section 11.8.6.5 with the following adjustments.

For a Balancing Authority Area with net Reliability Capacity export transfer, the CAISO transfers a portion of the Balancing Authority Area's RUC Bid Cost Uplift amount to Balancing Authority Areas receiving net Reliability Capacity transfers. For purposes of the foregoing, a Balancing Authority Area receives net Reliability Capacity transfers if the sum of the Balancing Authority Area's net Reliability Capacity transfers is in the import direction. If such sum is in the export direction, the Balancing Authority Area is deemed to have a net Reliability Capacity export transfer.

The Balancing Authority Area RUC Bid Cost Uplift transfer adjustment amount will equal the

product of the Balancing Authority Area hourly RUC Bid Cost Uplift amount and the ratio of the Balancing Authority Area's net Reliability Capacity export transfers divided by Balancing Authority Area's Reliability Capacity Schedules. The CAISO allocates the IFM Balancing Authority Area IFM Bid Cost Uplift transfer adjustment amount to Balancing Authority Areas with net transfers in the import direction. For each EDAM Entity Balancing Authority Area, the CAISO allocates the adjusted Balancing Authority Area IFM BCR amounts to the EDAM Entity for allocation under its tariff and, for the CAISO Balancing Authority Area, pursuant to Section 11.8.6.

33.11.3.7 Greenhouse Gas in the IFM

Resources that receive a Day-Ahead attribution to serve Demand in a GHG Regulation Area will receive a GHG payment. The GHG payment is the product of the IFM obligation to serve Demand in a specific GHG Regulation Area and the IFM Marginal GHG Cost for that respective GHG Regulation Area. For a resource within a GHG Regulation Area that does not receive an attribution to served Demand in another GHG Regulation Area, the cost of GHG compliance is embedded in the resource's LMP.

33.11.3.8 EDAM Legacy Contracts, EDAM Ownership Rights, and Day-Ahead Schedules

Scheduling Coordinators who Self-Schedule Energy in the IFM using their qualified and registered EDAM Transmission Service Provider rights will settle at the LMP in a manner similar to all other Day-Ahead awards. Scheduling Coordinators who Self-Schedule Energy in the IFM using their qualified and registered EDAM Legacy Contract Rights or EDAM Transmission Ownership Rights will settle at the LMP in a manner similar to all other Day-Ahead awards, except the balanced portion of a Schedule associated with an EDAM Legacy Contract or an EDAM Transmission Ownership Right will be eligible for mitigation against Congestion costs in accordance with Section 33.16 and Section 33.17, and be settled as described in this Section 33.11.3.8. The CAISO will facilitate this mitigation by reversing the Marginal Cost of Congestion component of the LMP difference between the balanced source Day-Ahead Schedule and sink Day-Ahead Schedule. The CAISO will include these Congestion costs in the calculation of Day-Ahead Congestion revenue. In addition, long-term contracts with special marginal losses

provisions will have a similar Settlement mechanism apply to the Marginal Cost of Losses component of the LMP.

33.11.3.9 Neutrality

The CAISO will consider each component of the LMP to ensure neutrality within a Balancing Authority Area in the EDAM Area and across GHG Regulation Areas: Marginal Energy Cost, Marginal Cost of Congestion, Marginal Cost of Losses, and the applicable Marginal GHG Cost.

33.11.3.9.1 Marginal Loss Offset

The CAISO will calculate an hourly Day-Ahead marginal loss offset amount for each Balancing Authority Area. The hourly Day-Ahead marginal loss offset amount will equal the sum of the product of Day-Ahead Energy Schedules, including Schedules for Virtual Awards and transfer Energy schedules, and the Marginal Cost of Losses at their relevant pricing location. The CAISO will allocate the hourly Day-Ahead marginal loss offset amount to the EDAM Entity and, for the CAISO Balancing Authority Area, to Measured Demand. The hourly Day-Ahead marginal losses offset amount will also include any marginal losses reversal from balanced Schedule portions of EDAM Legacy Contracts, EDAM Transmission Ownership Rights, and Self-Schedules submitted in accordance with Section 33.18.2.2.1.

33.11.3.9.2 Marginal Greenhouse Gas Cost Offset

The CAISO will calculate an hourly Day-Ahead Marginal GHG Cost Offset amount in relation to each GHG Regulation Area. The hourly Day-Ahead Marginal GHG Cost Offset amount will equal the product of Day-Ahead Energy Schedules within the GHG Regulation Area, including Schedules for Virtual Awards; GHG attributions associated with the GHG Regulation Area and the applicable Marginal GHG Cost. The CAISO will allocate the Day-Ahead Marginal GHG Cost Offset amount to a GHG Regulation Area's metered Demand.

33.11.3.9.3 Marginal Congestion Offset

The CAISO will calculate an hourly Day-Ahead marginal Congestion offset revenue for

each EDAM Entity Balancing Authority Area. The hourly Day-Ahead marginal Congestion offset revenue will equal the sum of the product of Day-Ahead Energy Schedules, including Schedules for Virtual Awards and Energy transfer Schedules, and the Marginal Cost of Congestion contribution for each EDAM Entity Balancing Authority Area at its relevant pricing location and considering relevant intertie Transmission Constraints. The hourly Day-Ahead Congestion revenue amount will also account for any EDAM Legacy Contracts and EDAM Transmission Ownership Rights marginal Congestion adjustment amounts. The CAISO will allocate the hourly Day-Ahead marginal Congestion revenue amount to each EDAM Entity and the hourly Day-Ahead marginal Congestion revenue amount allocated to the CAISO Balancing Authority Area will be distributed first to CRRs and then to any surplus allocated to Measured Demand per the CAISO Tariff.

33.11.3.9.4 Marginal Energy Offset

The CAISO will calculate an hourly Day-Ahead marginal Energy offset amount for each EDAM Entity Balancing Authority Area. The Balancing Authority Area hourly Day-Ahead marginal Energy offset amount will equal the remainder of the hourly Day-Ahead Energy Settlement less the offset amounts attributed to the Balancing Authority Area Day-Ahead Marginal Cost of Losses, Balancing Authority Area Day-Ahead Marginal GHG Cost, and Balancing Authority Area Day-Ahead Marginal Cost of Congestion. The CAISO will allocate the hourly Day-Ahead marginal Energy offset amount to the EDAM Entity and for the CAISO Balancing Authority Area to metered Demand.

33.11.4 Real-Time Market Settlement

The CAISO settles EIM Market Participants in the RTM as specified in Sections 11.5, 11.8, 11.10, 11.25, 11.29, and all other aspects of Section 11 that pertain to the RTM and apply to EIM Market Participants. The CAISO settles EDAM Market Participants as EIM Market Participants assuming references to an EIM Base Schedule is a reference to a Day-Ahead Schedule with the following modifications.

33.11.4.1 Balancing Test Under-scheduling and Over-scheduling Charge

EDAM Entities are not subject to the balancing test in Section 29.34(k) and will not be eligible for revenue apportionment and allocation pursuant to Section 29.11(d)(3).

33.11.4.2 Fifteen-Minute Market (FMM) Imbalance Energy Settlement

Intertie Schedules awarded an Energy Schedule in the Day-Ahead Market that subsequently have an incremental/decremental FMM Schedule change in the RTM, and did not submit an E-Tag prior to the HASP, will be subject to the HASP reversal rule applied through Settlement according to Section 11.32.

33.11.4.3 Ancillary Services in the RTM

EDAM Entity Balancing Authority Areas will provide the RTM with total Ancillary Service self-provision. This RTM self-provision should equal the Day-Ahead self-provision or Day-Ahead self-provision plus any incremental Real-Time self-provision if Ancillary Service requirements increase in the RTM.

33.11.4.4 Intertie Deviations

The CAISO does not assess Under/Over Delivery Charges pursuant to Section 11.31 for intertie transactions at EDAM Internal Interties between EDAM Entities.

33.11.5 Implementation Fee

The CAISO will recover an implementation fee through the EDAM Entity Implementation Agreement to recover its costs incurred to onboard each EIM Entity into the Extended Day-Ahead Market based on the CAISO's cost of service. The CAISO will determine hourly rates for onboarding activity on an annual basis based on current aggregated and burdened labor rates. The majority of the onboarding costs will be labor costs; however, it is reasonable to assume some onboarding-specific non-labor costs. The CAISO will recover the cost to implement each EDAM Entity, which may vary depending on the size and complexity of the project. A $300,000 deposit will be collected from prospective EDAM Entities to cover the actual start-up costs incurred. If the deposit exceeds the actual cost incurred to provide onboarding services, the CAISO will refund the excess amount, including any Interest accrued on the remaining deposit. If the actual implementation costs exceed the deposit, additional deposits in $300,000 increments will be required, which the EDAM Entity must pay within thirty (30) days of receiving the invoice.

Any invoice payment past due will accrue interest, per annum, calculated in accordance with 5 C.F.R. § 1315.10. If the EDAM Entity fails to timely pay any undisputed costs, the CAISO will not be obligated to continue performing onboarding activities unless and until the EDAM Entity has paid all undisputed amounts. If an EDAM Entity terminates an implementation agreement after the prospective EDAM entity's onboarding has begun, the CAISO will make every attempt to halt work and stop incurring costs on implementation as soon as practical. Any implementation-related costs the CAISO incurs will be drawn against the deposit provided. The CAISO will invoice the prospective EDAM entity for any amounts over the onboarding deposit; invoices will be due no later than thirty (30) days after the date of receipt. The CAISO will provide a report that details deposit(s) received, actual costs incurred, and applicable interest earnings (on deposit balance) for each onboarding project and return any unused deposit remaining after onboarding, plus interest on the remaining deposit (based on the average interest rate earned), to the EDAM Entity within ninety (90) days after onboarding is completed and acknowledged by both the CAISO and EDAM Entity.

33.11.6 Administrative Charge

The CAISO will charge each EDAM Market Participant an EDAM Administrative Charge, which consists of the EDAM System Operations Charge and the Day-Ahead and Real-Time portions of the Market Services Charge, both volumetric charges. The CAISO will no longer collect the EIM Administrative Charge from an EDAM Market Participant. The Market Services Charge is described in Appendix F, Schedule 1, Part A. The EDAM System Operations Charge will be the product of the Systems Operations Charge, as calculated according to the formula in Appendix F, Schedule 1, Part A, real-time market percentage, as calculated in the cost of service study conducted according to Appendix F, Schedule 1, Part A, applied to metered values in MWh of Supply and Demand represented by the Scheduling Coordinator for the EDAM Market Participant.

33.11.7 Transmission Revenue Recovery.

The CAISO will allocate to each EDAM Entity and EDAM Load Serving Entity an EDAM Access Charge for recovery of EDAM recoverable revenue according to Section 33.26. The CAISO will

charge Market Participants for transmission service on the CAISO Controlled Grid according to Section 26.

33.11.8 Flexible Ramping Product.

The CAISO will allocate and settle payments and charges for the Flexible Ramping Product according to Section 11.25.

33.11.9 Settlement

With regard to the CAISO's assessment and payment of charges to, and collection of charges from, EDAM Market Participants pursuant to Sections 11 and 33.11, the CAISO will assess, pay, and collect such charges, address disputed invoices, assess, pay and collect Settlement-related fees and charges, including those under Sections 11.21, 11.28, and 11.29, and make any financial adjustments in accordance with the terms and schedule set forth in Section 11.

33.12 Creditworthiness

EDAM Entity Scheduling Coordinators, EDAM Load Serving Entity Scheduling Coordinators, and EDAM Resource Scheduling Coordinators must comply with the creditworthiness requirements of the CAISO Tariff. In the event EDAM Entity Scheduling Coordinators, EDAM Load Serving Entity Scheduling Coordinators, or EDAM Resource Scheduling Coordinators fail to satisfy the credit or other requirements in Section 12, the consequences specified in Section 12 will apply.

33.13 Dispute Resolution

Confirmation and validation of any dispute associated with the participation of EDAM Market Participants in the Day-Ahead Market is subject to Section 11.29.8 and will be managed through the CAISO's customer inquiry, dispute, and information system and as provided in the Business Practice Manual for the Extended Day-Ahead Market. EDAM Market Participants will be subject to dispute resolution pursuant to Section 13.

33.14 Force Majeure, Indemnity, Liabilities, and Penalties

The provisions of Section 14 regarding Uncontrollable Force, indemnity, liability, and penalties will apply to the participation of EDAM Market Participants in the Day-Ahead Market.

33.15 Regulatory Filings

The regulatory filings provisions of Section 15 will apply to the Extended Day Ahead Market.

33.16 EDAM Legacy Contracts

33.16.1 Administration.

Section 16 will apply to EDAM Market Participants as referenced in this Section 33.16. The CAISO will accommodate EDAM Legacy Contracts in accordance with Section 16 as required to implement this Section 33.16. With respect to applicable provisions of Section 16:

(a) references to Existing Contracts will be read as references to EDAM Legacy Contracts;

(b) references to a Participating TO will be read as references to an EDAM Entity;

(c) any applicable EDAM Transmission Service Providers in an EDAM Entity Balancing Authority Area must satisfy the requirements of Section 16 and this Section 33.16;

(d) references to the CAISO Controlled Grid will be read as references to EDAM Transmission Service Provider facilities; and

(e) references to the CAISO Balancing Authority or CAISO Balancing Authority Area will be read as references to an EDAM Entity Balancing Authority or EDAM Entity Balancing Authority Area, respectively.

33.16.2 Registration

The EDAM Entity for the Balancing Authority Area associated with a potential EDAM Legacy Contract will determine if the contract qualifies as an EDAM Legacy Contract and coordinate with the EDAM Legacy Contract rights holder and any applicable EDAM Transmission Service Providers to provide the CAISO with information and instructions as required by Section 16.4 and the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market.

33.16.3 Availability

An EDAM Legacy Contract rights holder, in coordination with the applicable EDAM Entity, may Self-Schedule all the capacity available under the terms of the contract, in which case none of the capacity will be available for EDAM Transfers. Alternatively, an EDAM Legacy Contract rights holder may Self-Schedule a portion of the capacity or none at all, in which case the unreserved capacity will be made available only for EDAM Transfers in accordance with Section 33.18.2.2.2

and the terms of the EDAM Legacy Contract. An EDAM Legacy Contract rights holder must be represented by a Scheduling Coordinator, which may be the EDAM Entity Scheduling Coordinator. The EDAM Legacy Contract rights holder must coordinate use of its rights with the EDAM Entity associated with the EDAM Legacy Contract, and communicate the transmission capacity available for EDAM Transfers to the CAISO in accordance with the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market.

33.16.4 Scheduling

A Scheduling Coordinator for an EDAM Legacy Contract rights holder must submit Self-Schedules consistent with the requirements of Section 16.6 and not Economic Bids associated with its Contract Reference Number. Validation of Self-Schedules associated with a Contract Reference Number will follow the procedures in Section 16.6.2, and such Self-Schedules will receive the priority established in Section 16.5 and the settlement treatment established in Section 16.6.3 according to the results of the validation rules and the registered characteristics of the rights.

33.16.5 Settlement

EDAM Transfer revenue will be settled with the Scheduling Coordinator for an EDAM Legacy Contract rights holder under Section 33.11.1. Congestion revenue associated with an EDAM Legacy Contract will be settled with the Scheduling Coordinator for an EDAM Legacy Contract rights holder under Section 33.11.3.8.

33.17 EDAM Transmission Ownership Rights

33.17.1 Administration

Section 17 will apply to EDAM Market Participants as referenced in this Section 33.17. The CAISO will administer EDAM Transmission Ownership Rights in accordance with Section 17 as required to implement this Section 33.17. With respect to applicable provisions of Section 17:

(a) references to Transmission Ownership Rights will be read as references to EDAM Transmission Ownership Rights;

(b) references to a Participating TO will be read as references to an EDAM Entity;

(c) any applicable EDAM Transmission Service Providers in an EDAM Entity Balancing

Authority Area must satisfy the requirements of Section 17 and this Section 33.17;

(d) references to the CAISO Controlled Grid will be read as references to EDAM Transmission Service Provider facilities; and

(e) references to the CAISO Balancing Authority or CAISO Balancing Authority Area will be read as references to an EDAM Entity Balancing Authority or EDAM Entity Balancing Authority Area, respectively.

33.17.2 Registration

The EDAM Entity for the Balancing Authority Area associated with the EDAM Transmission Ownership Rights will coordinate with the EDAM Transmission Ownership Rights holder to provide information and instructions as required by Section 17.1 and the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market.

33.17.3 Availability

An EDAM Transmission Ownership Rights holder may Self-Schedule all the capacity associated with its ownership interest and elect not to make any such capacity available for EDAM Transfers or other use by the market. Alternatively, an EDAM Transmission Ownership Rights holder may release a portion of the capacity for EDAM Transfers in accordance with Section 33.18.2.2.2 and, if the EDAM Transmission Ownership Rights holder is also a transmission service provider, the CAISO will afford its transmission customers similar treatment. An EDAM Transmission Ownership Rights holder or customer must be represented by a Scheduling Coordinator, which may be the EDAM Entity Scheduling Coordinator. The EDAM Transmission Ownership Rights holder must coordinate release of its rights with the EDAM Entity associated with the EDAM Transmission Ownership Rights, and communicate the available transmission capacity to the CAISO in accordance with the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market. Alternatively, an EDAM Transmission Ownership Rights holder may coordinate with the EDAM Entity to include all of its transmission ownership rights in the associated EDAM Transmission Service Information, in which case the transmission ownership rights would be made available pursuant to Section 33.18.

33.17.4 Scheduling

A Scheduling Coordinator for an EDAM Transmission Ownership Rights holder must submit Self-Schedules consistent with the requirements of Section 17.3 and not Economic Bids associated with EDAM Transmission Ownership Rights. Validation of Self-Schedules associated with EDAM Transmission Ownership Rights will follow the procedures in Section 17.3, and such Self-Schedules will receive the priority established in Section 17.2 and the settlement treatment established in Section 17.3.3 according to the results of the validation rules and the registered characteristics of the rights.

33.17.5 Settlement

EDAM Transfer revenue will be settled with the Scheduling Coordinator for the EDAM Transmission Ownership Rights under Section 33.11.1. Congestion revenue associated with an EDAM Transmission Ownership Right will be settled with the Scheduling Coordinator for the EDAM Transmission Ownership Rights under Section 33.11.3.8.

33.18 Tariff Transmission Service by EDAM Transmission Service Providers

An EDAM Entity must provide the CAISO with EDAM Transmission Service Information for the transmission system within its Balancing Authority Area and an EDAM Transmission Service Provider must make available for use in the Day-Ahead Market the transmission capacity supporting the network model data included in the CAISO's Full Network Model for the EDAM Entity Balancing Authority Area, as provided in this Section 33. The EDAM Transmission Service Provider must amend its tariff to the extent the EDAM Entity deems necessary to account for the transmission capacity it will make available in the Day-Ahead Market, provided such amendments are consistent with this Section 33.

33.18.1 Transmission at EDAM External Interties

An EDAM Transmission Service Provider with a transmission system located within an EDAM Entity Balancing Authority Area must coordinate with the EDAM Entity so that the transmission system is available to the Day-Ahead Market and the EDAM Entity has all necessary information to register the transmission service customers' transmission service rights within the EDAM Entity Balancing Authority Area and at EDAM External Interties with the CAISO and other EDAM Entities as provided under the EDAM Transmission Service Provider tariff. The EDAM Entity must also ensure association of an EIM Mirror System Resource in accordance with Section

33.30.9 if an EDAM External Intertie is with an EIM Entity Balancing Authority Area.

33.18.1.1 Qualification

Transmission service that qualifies for registration includes network integration transmission service or firm and conditional firm point-to-point transmission service from: (a) a source in an EDAM Entity Balancing Authority Area to an EDAM External Intertie location, (b) an EDAM External Intertie location to a sink within the EDAM Entity Balancing Authority Area, (c) a wheel through an EDAM Entity Balancing Authority Area from an EDAM External Intertie location to another EDAM External Intertie location, or (d) a source to a sink within an EDAM Entity Balancing Authority Area.

33.18.1.2 Registration

Qualified transmission services must be registered with the CAISO by the EDAM Entity in accordance with the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market, which may differ depending upon the duration of the transmission rights, *e.g.,* yearly, monthly, weekly or of a shorter duration. Network integration transmission service customers will follow the EDAM Transmission Service Provider tariff for designation and un-designation of network resources.

33.18.1.3 Scheduling

The Scheduling Coordinator for a transmission customer of an EDAM Transmission Service Provider must use its firm or conditional firm point-to-point transmission service rights or associated secondary network service, and network integration transmission service rights, to/from an EDAM External Intertie by submitting a Self-Schedule export/import transaction to/from an EDAM External Intertie, a Self-Schedule wheeling through transaction between two EDAM External Interties, or an internal source and sink in accordance with Section 33.18.2.2.1.

33.18.1.4 Permissible Intra-Day Transmission Schedule Changes

When a schedule associated with registered transmission service rights is submitted in accordance with the EDAM Transmission Service Provider tariff after the start of the Day-Ahead Market, it will be accommodated in the Real-Time Market. The EDAM Entity

Scheduling Coordinator for the EDAM Transmission Service Provider will ensure that the CAISO is notified of all such schedules submitted after the start of the Day-Ahead Market through submission of a Self-Schedule to the CAISO in accordance with Section 33.18.2.2.3.

33.18.1.5 Settlement

A Self-Schedule associated with registered firm or conditional firm point-to-point transmission service rights or network integration transmission service at EDAM External Interties or within an EDAM Entity Balancing Authority Area will be settled by the CAISO with the Scheduling Coordinator that submitted the Self-Schedule.

33.18.1.6 Resource Registration and Tagging

The EDAM Entity will be responsible for registration of System Resources associated with imports into its Balancing Authority Area at an EDAM External Intertie, and will provide the CAISO with a pre-market and after-the-fact E-Tag for transmission schedules associated with an import, export or wheel through its Balancing Authority Area at EDAM External Interties, unless a System Resource associated with an import is unknown and the import supports delivery of firm Energy in accordance with Section 33.30.8.2.

33.18.2 Transmission at EDAM Internal Interties

An EDAM Transmission Service Provider with a transmission system located within an EDAM Entity Balancing Authority Area must coordinate with the EDAM Entity and the EDAM Transmission Service Provider tariff so that the EDAM Entity will have all necessary information to register transmission service customers' transmission service at EDAM Internal Interties with the CAISO and other EDAM Entities in accordance with the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market, which processes may differ depending upon the duration of the transmission rights, *e.g.*, yearly, monthly, weekly or of a shorter duration. EDAM Transfers must be supported by firm or conditional firm point-to-point transmission service rights across an EDAM Internal Intertie, network integration transmission service associated with an import of a designated network resource across an EDAM Internal Intertie, or available transfer capability across an EDAM Internal Intertie. EDAM Legacy

Contracts may support EDAM Transfers only if registered under Section 33.16.2. EDAM Transmission Ownership Rights may support EDAM Transfers only if registered under Section 33.17.2. EDAM Transmission Service Provider rights may support EDAM Transfers as registered under this Section 33.18.2. An EDAM Entity Scheduling Coordinator must identify the transmission limits associated with the firm and conditional firm point-to-point transmission service capacity and network integration transmission service capacity that will be available to the Day-Ahead Market at EDAM Internal Interties to support EDAM Transfers and register those rights with the CAISO. The EDAM Entity Scheduling Coordinator responsible for submitting the E-Tag must communicate to the CAISO the transmission limits associated with the transmission service available under Section 33.18.2.1, Section 33.18.2.2 broken down into individual components for Section 33.18.2.2.1 through Section 33.18.2.2.3, and Section 33.18.2.3, in accordance with the procedures and timelines in the Business Practice Manual for the Extended Day-Ahead Market.

33.18.2.1 Transmission to Support Resource Sufficiency Provided by the EDAM Entity

An EDAM Transfer from the source Balancing Authority Area to the sink Balancing Authority Area to support the EDAM Resource Sufficiency Evaluation for the sink Balancing Authority Area must be supported by firm or conditional firm point-to-point transmission service or network integration transmission service across an EDAM Internal Intertie. An EDAM Entity may also account for delivery of Supply external to its Balancing Authority Area in the EDAM Resource Sufficiency Evaluation under Section 33.30.8; however, the transmission that may ultimately support delivery of the Supply is not known before the Day-Ahead Market and will not be available to support EDAM Transfers.

33.18.2.2 Transmission Provided by Transmission Customers

The Scheduling Coordinator must take one of three pathways described in Section 33.18.2.2 prior to Market Close of the Day-Ahead Market to schedule its firm and conditional firm point-to-point transmission service rights, or network integration

transmission service rights, at an EDAM Internal Intertie to support an EDAM Transfer which may or may not be required for the EDAM Resource Sufficiency Evaluation under Section 33.18.2.1.

33.18.2.2.1 Self-Schedule Associated with Registered Transmission

The Scheduling Coordinator for a transmission customer of an EDAM Transmission Service Provider may submit a Self-Schedule for Energy associated with its registered firm or conditional firm point-to-point transmission service rights or network integration transmission service rights prior to Market Close of the Day-Ahead Market. The Energy associated with the Self-Schedule will be settled by the CAISO with the Scheduling Coordinator for the registered transmission rights.

33.18.2.2.2 Release of the Transmission

The Scheduling Coordinator for a transmission customer of an EDAM Transmission Service Provider, EDAM Legacy Contract or EDAM Transmission Ownership Right must notify the CAISO and the EDAM Transmission Service Provider prior to 9:00 a.m. the morning of the Day-Ahead Market if it intends to release its long-term and monthly firm and conditional firm point-to-point registered transmission service rights across an EDAM Internal Intertie. The Scheduling Coordinator representing the transmission rights may determine, on a daily basis, whether to make the full amount or only a portion of its registered transmission service rights available for EDAM Transfers for that day only or a longer timeframe, provided such release is consistent with the registered transmission rights and the EDAM Transmission Service Provider tariff. Released transmission service rights cannot be reclaimed or scheduled for the duration of the trade date for which they have been released. The EDAM Entity Scheduling Coordinator associated with the EDAM Transmission Service Provider will ensure that information on such released transmission service rights is communicated to the CAISO for association with an EDAM Transfer System

Resource in accordance with the timelines and procedures in the Business Practice Manual for the Extended Day-Ahead Market. The released transmission capacity utilized by the Day-Ahead Market will be settled by the CAISO with the Scheduling Coordinator for the transmission rights.

33.18.2.2.3 Permissible Intra-Day Transmission Schedule Changes

If the Scheduling Coordinator for a transmission customer of an EDAM Transmission Service Provider does not release the transmission service rights or schedule its registered firm or conditional firm point-to-point transmission service rights under Section 33.18.2.2.1 or Section 33.18.2.2.2 prior to the Day-Ahead Market, the capacity will be made available for EDAM Transfers in the Day-Ahead Market, and the transmission customer may nonetheless later exercise its rights under the EDAM Transmission Service Provider tariff. If the transmission customer later submits a schedule associated with its registered transmission service rights in accordance with the EDAM Transmission Service Provider tariff, the EDAM Entity Scheduling Coordinator associated with the EDAM Transmission Service Provider will ensure that the CAISO is notified of all such transmission schedules through submission of a Self-Schedule to the CAISO by the EDAM Entity Scheduling Coordinator, which the CAISO will accommodate in the Real-Time Market. The Real-Time Market may re-dispatch if necessary to accommodate the late Self-Schedule of the associated transmission service rights and will afford the Self-Schedule submitted by the EDAM Entity Scheduling Coordinator equal priority to cleared Day-Ahead Schedules unless the CAISO receives instructions that the EDAM Transmission Service Provider that it has assigned the Self-Schedule associated with firm OATT rights, whether point to point, network integration transmission service, or conditional firm, a scheduling priority higher than cleared Day-Ahead Schedules in accordance with the EDAM Transmission Service Provider tariff. Self-Schedules submitted after the Day-Ahead Market will be settled with the EDAM

Entity Scheduling Coordinator.

33.18.2.3 Unsold Available Transfer Capability

The EDAM Entity Scheduling Coordinator will determine the amount of unsold firm available transfer capability at an EDAM Internal Intertie under the EDAM Transmission Service Provider tariff prior to 10:00 a.m. on the morning of the Day-Ahead Market, accounting for reserve sharing group obligations or other unique circumstances and arrangements as provided in the EDAM Transmission Service Provider tariff. The unsold transmission capability as communicated by the EDAM Entity Scheduling Coordinator will be available for EDAM Transfers. A single EDAM Entity Scheduling Coordinator, as agreed upon by the respective EDAM Transmission Service Providers at each EDAM Internal Intertie between Balancing Authority Areas in the EDAM Area will provide the CAISO with the available transfer capability associated with the EDAM Internal Interties for which it is responsible.

33.18.2.4 EDAM Transfer Limits Used for the Day-Ahead Market

The CAISO will communicate the quantity of transmission that the Day-Ahead Market utilized for EDAM Transfers to the EDAM Entity Scheduling Coordinator after Market Close of the Day-Ahead Market, which the EDAM Entity associated with the EDAM Transmission Service Provider will ensure the EDAM Transmission Service Provider will thereafter use to determine any remaining transmission to make available in accordance with its tariff and Section 29. A single EDAM Entity Scheduling Coordinator, as agreed upon by the respective EDAM Transmission Service Providers at each EDAM Internal Intertie between Balancing Authority Areas in the EDAM Area, will provide the CAISO with an after-the-fact E-Tag for transmission schedules associated with the EDAM Internal Interties for which it is responsible.

33.18.3 Contract Reference Number (CRN)

The CAISO will recognize EDAM Transmission Service Provider customer transmission rights as provided under the EDAM Transmission Service Provider tariff subject to the provisions of Section 33.18.1 and Section 33.18.2. The CAISO will assign a CRN for firm point-to-point or

network transmission rights with a duration of a month or longer and registered (a) at EDAM Internal Interties, which will be associated with an EDAM Transfer System Resource, (b) at EDAM External Interties, which will be associated with a System Resource or according to Section 33.30.8.2, or (c) within an EDAM Entity Balancing Authority Area, which will be associated with an internal source and specific internal sink.

33.18.3.1 Self-Schedules Associated with a CRN

A Scheduling Coordinator that submits a balanced Self-Schedule less than or equal to the capacity associated with the CRN in accordance with Section 33.18.2.2.1 will be assigned a scheduling priority in the Day-Ahead Market above a Self-Schedule not associated with a CRN in the Day-Ahead Market in accordance with Section 27.4.3.4, which will be afforded a scheduling priority equal to cleared Day-Ahead Self-Schedules in the Real-Time Market. Otherwise, the Self-Schedule will be assigned the same priority as a Self-Schedule in the Day-Ahead Market not associated with a CRN, and will be afforded a scheduling priority equal to cleared Day-Ahead Self-Schedules in the Real-Time Market. The CAISO will notify the Scheduling Coordinator if a Self-Schedule associated with a CRN is not balanced prior to the Market Close of the Day-Ahead Market, which the Scheduling Coordinator may update prior to the Market Close of the Day-Ahead Market. A Scheduling Coordinator that submits a balanced Self-Schedule less than or equal to the capacity associated with the CRN in accordance with Section 33.18.2.2.3 will be assigned a scheduling priority equal to cleared Day-Ahead Self-Schedules in the Real-Time Market unless the CAISO receives instructions from the EDAM Transmission Service Provider that it has assigned the balanced Self-Schedule associated with firm OATT rights a scheduling priority higher than cleared Day-Ahead Self-Schedules in accordance with the EDAM Transmission Service Provider tariff. All other Self-Schedules will be assigned the same priority as a Self-Schedule in the Real-Time Market not associated with a CRN.

(a) An EDAM Transfer System Resource registered to an EDAM Entity will account for capacity available to support EDAM Transfers and will not be

assigned a CRN, which may support a capacity release for optimization and the EDAM Resource Sufficiency Evaluation, as applicable.

(b) An EDAM Transfer System Resource registered to an EDAM Transmission Service Provider customer will support a Self-Schedule or capacity release and will be assigned a CRN.

(c) An internal source and sink registered to an EDAM Transmission Service Provider customer will support a Self-Schedule and will be assigned a CRN.

(d) Any portion of a CRN that is Self-Scheduled in the Day-Ahead Market will be available for the EDAM Resource Sufficiency Evaluation.

(e) Any portion of a CRN released in accordance with Section 33.18.2.2 may not be Self-Scheduled in the Day-Ahead Market and may not be Self-Scheduled by the EDAM Entity after the Market Close of the Day-Ahead Market under Section 33.18.1.4 or Section 33.18.2.2.3.

(f) Any portion of a CRN that is neither released in accordance with Section 33.18.2.2 nor Self-Scheduled in the Day-Ahead Market will be available in the Day-Ahead Market and may be Self-Scheduled by the EDAM Entity Scheduling Coordinator after the Market Close of the Day-Ahead Market under Section 33.18.1.4 or Section 33.18.2.2.3.

(g) Self-Schedules not associated with a CRN will be afforded the same priority as any other Self-Schedule in the Day-Ahead Market that does not have a CRN.

(h) The CAISO will not adjust a Self-Schedule in the Day-Ahead Market associated with a CRN under this Section 33.18.3 to accommodate a Self-Schedule in the Day-Ahead Market that is not associated with a CRN.

(i) Each EDAM Entity will be responsible for managing Transmission Constraints after the Day-Ahead Market according to Section 29, Section 33.7.5, and the EDAM Transmission Service Provider tariff.

33.18.3.2 Self-Schedules Associated with Short-Term Transmission Rights

The CAISO will also assign a CRN for firm transmission rights with a duration of less than a month pursuant to the registration process provided in the Business Practice Manual for the Extended Day-Ahead Market. Self-Schedules associated with a CRN representing shorter-duration transmission rights will be afforded the same physical and financial treatment as a CRN associated with a longer-duration transmission right under this Section 33.18.3.

33.18.3.3 Transmission Not Available in the Day-Ahead Market

If the CAISO is informed through the prospective EDAM Entity implementation process or by the EDAM Entity Scheduling Coordinator for the EDAM Transmission Service Provider that accommodation of incremental intra-day schedules in the Real-Time Market should be unavailable in the Day-Ahead Market according to the EDAM Transmission Service Provider tariff, the CAISO will accept a notification from the EDAM Entity Scheduling Coordinator associated with the EDAM Transmission Service Provider and will adjust Day-Ahead Market availability of the impacted transmission elements and the associated transmission service rights.

33.18.4 CAISO Transmission at EDAM Interties

The CAISO will provide transmission service on the CAISO Controlled Grid and at EDAM Interties in accordance with the CAISO Tariff to support the EDAM Resource Sufficiency Evaluation for the CAISO Balancing Authority Area and to support the EDAM Resource Sufficiency Evaluation for an EDAM Entity Balancing Authority Area. The CAISO will make Available Transfer Capability at EDAM Internal Interties on the CAISO Controlled Grid available as determined in accordance with Section 23 and Appendix L at the start of the Day-Ahead Market to support EDAM Transfers, including the assessment of any applicable charges. The CAISO will facilitate the availability of transmission capacity associated with Existing Contracts and Transmission Ownership Rights for EDAM Transfers if the rights holder makes the capacity available to the CAISO consistent with Section 33.16.2 or Section 33.17.2, as applicable, which will then be eligible to receive EDAM Transfer revenue and Congestion revenue settlement with the Scheduling Coordinator for the Existing Contracts and Transmission Ownership Rights under Section 33.11.1 and Section

33.11.2.

33.18.4.1 Wheels Through

The Scheduling Coordinator of Supply wheeled through the CAISO Balancing Authority Area and accounted for in the EDAM Resource Sufficiency Evaluation must demonstrate establishment of a Wheeling Through transaction across the CAISO Controlled Grid and have designated transmission service under Section 33.18.2.1 into an EDAM Entity Balancing Authority Area and on the CAISO Controlled Grid Section in accordance with Section 23 and Appendix L. An EDAM Entity may similarly account for delivery of Supply wheeled through the CAISO Balancing Authority Area for its EDAM Resource Sufficiency Evaluation to be delivered under Section 33.30.8; however, the transmission that may ultimately support delivery of the Supply will not be available to support EDAM Transfers because it is not known before the Market Close of the Day Ahead Market.

33.18.4.2 Exports From

The Scheduling Coordinator of Supply from a CAISO Participating Resource accounted for in the EDAM Resource Sufficiency Evaluation of an EDAM Entity Balancing Authority Area must demonstrate it has a contract with a resource that has non-Resource Adequacy available capacity from the CAISO Balancing Authority Area and has designated transmission service under Section 33.18.2.1 into an EDAM Entity Balancing Authority Area and on the CAISO Controlled Grid Section in accordance with Section 23 and Appendix L. An EDAM Entity may similarly account for delivery of Supply exported from the CAISO Balancing Authority Area in the EDAM Resource Sufficiency Evaluation to be delivered under Section 33.30.8; however, the transmission that may ultimately support delivery of the Supply will not be available to support EDAM Transfers because it is not known before the Market Close of the Day Ahead Market.

33.18.5 EDAM Transfer Priority

EDAM Transfers will have a priority equal to Demand in the EDAM Area and may be curtailed only as provided in Section 33.7.5. The Day-Ahead Market will include a constraint as provided in Section 33.27.3 to ensure each Balancing Authority in the EDAM Area meets its Balancing

Authority Area requirements before supporting EDAM Transfers.

33.19 Reliability Coordination

Reliability Coordination does not apply to the Extended Day-Ahead Market, although EDAM Market Participants may separately receive Reliability Coordination services according to Section 19.

33.20 Confidentiality

The confidentiality provisions in Section 20 will apply to participation of EDAM Market Participants in the Day-Ahead Market.

33.21 [Not Used]

33.22 Miscellaneous

Section 22 and the additional miscellaneous provisions of this Section 33.22 will apply to the EDAM.

To the extent that the CAISO would incur any tax liability as a result of the participation of EDAM Market Participants in the Day-Ahead Market, for example as market operator or as central counterparty to EDAM transactions, the CAISO will pass those taxes on to the EDAM Entity Scheduling Coordinator for the EDAM Entity Balancing Authority Area where the transactions triggered the tax liability.

Neither the CAISO nor the EDAM Entity is a "Purchasing Selling Entity" for purposes of E-Tags or EDAM Transfers, nor will either be listed as a "Purchasing Selling Entity" for purposes of E-Tags or EDAM Transfers.

Title to Energy in the Day-Ahead Market passes directly from the entity that holds title when the Energy enters the CAISO Controlled Grid or the transmission system of an EDAM Transmission Service Provider, whichever is first following Dispatch, to the entity that removes the Energy from the CAISO Controlled Grid or the transmission system of a EDAM Transmission Service Provider, whichever last precedes delivery to Load.

33.23 Transmission Service Requirements for EDAM Resources

This Section 33.23 applies only to EDAM Market Participants. Transmission service requirements on the CAISO Controlled Grid will continue in accordance with Section 23 and other provisions of the CAISO Tariff applicable to transmission service on the CAISO Controlled Grid.

An EDAM Resource Scheduling Coordinator must obtain transmission service from an EDAM Transmission Service Provider, which may be satisfied through the following options:

(a) The EDAM Resource is a designated network resource under the terms of an EDAM Transmission Service Provider tariff;

(b) The EDAM Resource reserves firm point-to-point transmission service of any duration under the terms of an EDAM Transmission Service Provider tariff, or

(c) The EDAM Resource is associated with an EDAM Legacy Contract or an EDAM Transmission Ownership Right.

If options (a), (b), or (c) above are not satisfied, the CAISO will notify the EDAM Entity associated with the EDAM Transmission Service Provider so that the EDAM Transmission Service Provider assesses a transmission charge based on the transmission rate for the lowest duration of firm transmission service offered under its tariff, which may be a daily firm or hourly firm transmission service. If the EDAM Transmission Service Provider offers daily firm point-to-point transmission service as the lowest granularity of firm transmission service, the transmission service charge would be evaluated based on the single highest-hour Real-Time Dispatch of the resource across the day for the amount in excess of reserved transmission service. If the EDAM Transmission Service Provider offers hourly firm point-to-point transmission service as the lowest granularity of firm transmission service, the transmission service charge would be evaluated based on each individual hourly Real-Time Dispatch of the resource for the day. If the Real-Time Dispatch for any hour across the day is above the transmission reservation, the CAISO will notify the EDAM Entity associated with the EDAM Transmission Service Provider and the EDAM Transmission Service Provider will assess the hourly transmission charge as described above. This Section 33.23 establishes a common methodology for a Scheduling Coordinator to secure transmission service from an EDAM Transmission Service Provider. The specific transmission service requirements and any associated transmission service charges or penalties will be determined in accordance with the EDAM Transmission Service Provider tariff.

33.24 Transmission Planning

The Extended Day-Ahead Market does not include transmission planning related functions or services and Section 24 does not apply to EDAM Market Participants.

33.25 Generator Interconnection

The Extended Day-Ahead Market does not include generator interconnection related functions or services

and Section 25 does not apply to EDAM Market Participants.

33.26 Transmission Revenue Recovery And Charges

Access Charges for Day-Ahead Market transactions serving Load within the CAISO Balancing Authority Area that use the CAISO Controlled Grid are governed by Section 26. Transmission service charges for Day-Ahead Market transactions serving Load within an EDAM Entity Balancing Authority Area are governed by the applicable EDAM Transmission Service Provider tariff. Transmission service charges for Day-Ahead Market transactions supported by EDAM Transfers are addressed in this Section 33.26. Transmission service charges for Real-Time Market transactions are governed by Section 11, Section 26, or Section 29.26, as applicable.

33.26.1 EDAM Access Charges

The EDAM Transmission Service Provider will forecast its EDAM projected recoverable revenue shortfall on an annual basis. The CAISO will determine an EDAM Access Charge for each Balancing Authority Area in the EDAM Area based on the aggregate inputs of each EDAM Transmission Service Provider in that Balancing Authority Area. The CAISO will assess the EDAM Access Charges, allocate revenues collected, and true-up actual revenue recovery through an EDAM Balancing Account.

33.26.1.1 Revenue Shortfall Allocated to Gross Load

To allocate an EDAM recoverable revenue shortfall, the CAISO will derive an annual rate specific to each EDAM Entity Balancing Authority Area:

(1) allocating each EDAM Transmission Service Provider revenue shortfall to the EDAM Balancing Authority Areas associated with the other EDAM Transmission Service Providers, on behalf of such other EDAM Transmission Service Providers, in proportion to

(a) the EDAM Transmission Service Provider's Gross Load divided by

(b) the total EDAM Area Gross Load minus Gross Load of the EDAM Transmission Service Provider;

(2) calculating the total revenue shortfall allocation; and

(3) dividing the total revenue shortfall by the EDAM Transmission Service

Provider's Gross Load.

33.26.1.2 Truing Up the Forecasted Revenue Shortfall

EDAM Entities associated with EDAM Transmission Service Providers and the CAISO will recover, on behalf of each such EDAM Transmission Service Provider, any delta, positive or negative, between the actual revenue shortfall and the amount of revenue it collected toward its EDAM recoverable revenue and include the delta in the following year's forecasted recoverable revenue.

33.26.2 Recoverable Revenue Shortfalls

Projected EDAM recoverable revenue shortfalls will consist of the sum of the following three components.

33.26.2.1 Component 1: Short-Term Firm and Non-Firm Point-to-Point Transmission and Wheeling Access Charge Revenues

The first EDAM revenue shortfall component is projected revenue shortfalls associated with the costs of historical transmission sales to third parties, excluding costs related to sales to the EDAM Entity marketing function associated with EDAM Transmission Service Providers. The following transmission products are eligible for historical revenue recovery: hourly non-firm point-to-point, daily non-firm point-to-point, weekly non-firm point-to-point, monthly non-firm point-to-point, hourly firm point-to-point, daily firm point-to-point, weekly firm point-to-point, and monthly firm point-to-point transmission service.

33.26.2.1.1 Calculating and Updating EDAM Recoverable Revenue

EDAM Entities associated with EDAM Transmission Service Providers will calculate, on behalf of each such EDAM Transmission Service Provider the EDAM recoverable revenue based on the EDAM Transmission Service Provider's average FERC-approved (or Local Regulatory Authority-approved) eligible transmission services for the preceding three years.

The total costs recoverable through the EDAM consist of the difference between the EDAM recoverable revenue and actual transmission recovered revenue eligible for recovery pursuant to this Section 33.26.

33.26.2.1.2 EDAM Recoverable Revenue Limits

The EDAM recoverable revenue for each EDAM Entity will not exceed the product of (a) EDAM recoverable revenue and (b) the ratio of exports from the EDAM Entity to the EDAM Area and exports from the EDAM Entity to locations outside of the EDAM Area.

33.26.2.2 Component 2: Percentage of New Transmission Revenue Requirement

The second EDAM recoverable revenue component is new Network Upgrade costs approved by the Local Regulatory Authority or FERC, as applicable. Eligible new costs include (a) costs resulting from reduced revenues from sales of non-firm and short-term firm transmission associated with the release of transmission capacity resulting from the expiration of EDAM Legacy Contracts, and (b) new Network Upgrades costs. Eligible new Network Upgrade costs are (a) those that increase transfer capability between EDAM Entity Balancing Authority Areas or between the CAISO Balancing Authority Area and an EDAM Entity Balancing Authority Area (b) energized after the EDAM Entity begins participation in the Day-Ahead Market. For each new Network Upgrade eligible for recovery, the EDAM Entity only may recover through the EDAM the percentage of its projected revenue equal to the EDAM Entity's ratio of (a) the non-firm and short-term firm point-to-point historical EDAM recoverable transmission revenues in Component 1 to (b) the EDAM Entity's total revenue requirement.

The CAISO will include examples of Network Upgrades that increase transfer capability and examples that do not in the EDAM Business Practice Manual. Network Upgrades increase transfer capability where they:

(a) increase total transfer capability;

(b) create a new interfaces;

(c) increase the simultaneous import limits at existing interfaces;

(d) result from an Interregional Transmission Project to increase transfer capability; or

(e) were identified through the WECC path rating process as increasing total transfer capability or creating new transmission interfaces

between EDAM Entity Balancing Authority Areas or between the CAISO Balancing Authority Area and an EDAM Entity Balancing Authority Area.

33.26.2.3 Component 3: Recovery of Transmission Costs Associated With EDAM Wheeling Through Volumes Net of Imports/Exports

The third EDAM recoverable component eligible for recovery is projected revenue shortfalls associated with wheeling through an EDAM Entity Balancing Authority Area or the CAISO Balancing Authority Area associated with an EDAM Transmission Service Provider in excess of the total net transfers of the EDAM Entity Balancing Authority Area. In periods where this excess occurs, the EDAM Entity, on behalf of the EDAM Transmission Service Provider, will be compensated for the transmission use supporting excess wheeling through the EDAM Transmission Service Provider or CAISO Participating TO at the EDAM Entity's non-firm hourly point to point transmission rate.

33.26.3 Assessing Access Charges and Allocating Revenues in the EDAM

The CAISO will assess an EDAM Access Charge to recover the EDAM projected recoverable revenue shortfalls to Gross Load in each EDAM Balancing Authority Area. Each EDAM Access Charge will recover the projected recoverable revenue shortfalls for the EDAM Balancing Authority Areas outside the Balancing Authority Area for that Access Charge, such that no EDAM Balancing Authority Area will be assessed its own projected recoverable revenue shortfalls. The CAISO will assess EDAM Access Charges based on the EDAM Balancing Authority Areas' Gross Loads. The CAISO will allocate revenues collected from the EDAM Access Charges to EDAM Entities on behalf of each such EDAM Transmission Service Provider, in proportion to its share of EDAM projected recoverable revenue shortfalls.

33.26.4 Documentation

As specified in the EDAM Business Practice Manual, EDAM Entities, on behalf of their EDAM Transmission Service Providers, will provide the CAISO all supporting documentation necessary to determine the local EDAM Access Charges in each Balancing Authority Area. At a minimum this documentation will include (a) the final order from FERC or the Local Regulatory Authority effecting their approved transmission rates; (b) the sums for each recoverable revenue

component and true-up; and (c) an authorized affidavit from each EDAM Transmission Service Provider attesting to the accuracy of the data provided. For each EDAM Transmission Service Provider, the CAISO will maintain on its website the current sum of each recoverable revenue component, the total true-up, and total eligible recovery. The CAISO will maintain on its website each EDAM Access Charge, including the rate, the Gross Load, and the total eligible recovery in that Balancing Authority Area.

33.27 CAISO Markets And Processes

The provisions of Section 27 that apply to the Day-Ahead Market will apply to EDAM Market Participants, except as provided in or inconsistent with this Section 33.27 or other provisions of Section 33. For purposes of applying this Section 33.27, the term CAISO Balancing Authority Area as used in Section 27 means the Market Area unless the context requires otherwise.

33.27.1 Transitional Process

For a period of six months following the EDAM Entity Implementation Date of a new EDAM Entity, the provisions of Section 27.4.3.2 and the second sentence of Section 27.4.3.4 will not apply to constraints that are within the Balancing Authority Area of the new EDAM Entity or affect EDAM Transfers between the Balancing Authority Area of the new EDAM Entity. For those intervals that experience infeasibilities described in those provisions, the CAISO will instead determine prices consistent with the provisions of Section 27, Section 31, and Appendix C, that would apply in the absence of Section 27.4.3.2 and the second sentence of Section 27.4.3.4 constraints.

In addition, for a period of six months following the EDAM Entity Implementation Date of a new EDAM Entity, when the transmission and/or power balance constraints as specified in Section 27.4.3.2 and the second sentence of Section 27.4.3.4 are relaxed, the CAISO will set the Flexible Ramping Product parameter for pricing purposes, for the new EDAM Entity Balancing Authority Area, at an amount between and including $0 and $0.01. Sixty days prior to the expiration of the transition period, the CAISO will post on the CAISO Website an assessment of whether an extension of the transition period, for up to an additional six months, is needed for the applicable EDAM Entity. The CAISO will post an update to such assessment prior to the expiration of the transition period should there be any changes to its posted conclusions. Any extensions of the

initial six-month transition period must be approved by FERC.

33.27.2 Locational Marginal Price Formation

The Locational Marginal Price for PNodes within each Balancing Authority Area in the EDAM Area will be determined in accordance with Appendix C.

33.27.3 Default Generation Aggregation Points

Each Balancing Authority Area in the EDAM Area will associate directly with PNodes of Balancing Authority Areas in WECC outside the EDAM Area through two non-overlapping default generation aggregations as described in Appendix C:

(1) a North DGAP, which includes the WECC northwest Balancing Authority Areas; and

(2) a South DGAP, which includes the WECC southwest Balancing Authority Areas' PNodes, except Mexico.

33.27.4 Power Balance Constraint Relaxation

The Extended Day-Ahead Market will include a constraint to ensure each EDAM Entity meets its Balancing Authority Area requirements before supporting EDAM Transfers. The constraint will not allow a simultaneous power balance constraint violation in the upward/downward direction with a net EDAM Transfer export/import beyond the net EDAM Transfer eligible for the EDAM RSE as established in Section 33.18.2.1.

33.27.5 IBAA and EDAM Entity Balancing Authority Areas

Section 27.5.3 will not apply to an EDAM Entity Balancing Authority Area.

33.28 Inter-SC Trades

EDAM Entity Scheduling Coordinators, EDAM Load Serving Entity Scheduling Coordinators, EDAM Resource Scheduling Coordinators and other Scheduling Coordinators in the Extended Day-Ahead Market may not submit Inter-SC Trades for transactions outside the CAISO Balancing Authority Area, and Section 28 will not apply to the Extended Day Ahead Market.

33.29 EDAM Relationship to EIM

EDAM Market Participants are also EIM Market Participants and the provisions in Section 29 apply in their capacity as EIM Market Participants. Operation of the Day-Ahead Market within an EDAM Entity Balancing Authority Area produces outcomes that satisfy or modify certain requirements otherwise

applicable to EIM Market Participants, including a Day-Ahead Schedule that will be referenced in the Real-Time Market instead of a submitted EIM Base Schedule and an initial EIM Base Load Schedule, pools of Balancing Authority Areas for purposes of the EIM Resource Sufficiency Evaluation, and capacity and Energy transfers between Balancing Authority Areas with equal priority to Demand.

33.30 Bids And Self-Schedule Submission

Scheduling Coordinators for EDAM Resources, EDAM Entities, Load Serving Entities, and other Day-Ahead Market Participants in the EDAM Area must submit Bids, including Self-Schedules, pursuant to this Section 33.30 as supplemented by Section 30.

33.30.1 Bids

A Scheduling Coordinator may submit a Bid in the Day-Ahead Market for an EDAM Resource eligible to participate in the Day-Ahead Market according to the EDAM Transmission Service Provider tariff and Section 33, while Scheduling Coordinators for EDAM Resources self-providing Ancillary Services must provide a Submission to Self-Provide Ancillary Services. Each EDAM Resource must comply with the general Bid rules in Section 30 as well as the specific Bid rules based on resource type, including without limitation owners or operators of Non-Generator Resources, Convergence Bidding Entities, Demand Response Providers, and Distributed Energy Resource Providers. Consistent with Section 30 and Appendix A, references to Bids include Self-Schedules, and references to Economic Bids exclude Self-Schedules.

33.30.2 Demand Bids

Only an EDAM Entity Scheduling Coordinator or an EDAM Load Serving Entity Scheduling Coordinator authorized by the EDAM Entity Scheduling Coordinator may submit a Demand Bid within the EDAM Entity's Balancing Authority Area. For EDAM Entities that have not yet enabled convergence bidding, the CAISO will limit Demand Bids in the Day-Ahead Market to the Energy Bids from EDAM Resources within the EDAM Entity's Balancing Authority Area.

33.30.3 Economic Bids at EDAM Interties

Except for resource-specific resources with an obligation to serve Demand in the EDAM Area described in Section 33.30.8, a Scheduling Coordinator for a designated resource associated with network integration transmission service of an EDAM Transmission Service Provider, or a

resource located outside of the EDAM Area at an EDAM External Intertie with the CAISO Balancing Authority Area, may not submit Economic Bids at EDAM External Interties or EDAM Internal Interties unless the submission of Economic Bids has been enabled in accordance with Section 29.34(i)(2). Scheduling Coordinators may submit Self-Schedules at any EDAM Intertie.

33.30.4 EDAM Entity Access to Bid Information

For the CAISO to conduct the EDAM Resource Sufficiency Evaluation pursuant to Section 33.31, an EDAM Entity will necessarily have access to certain data related to Bids, without pricing information, associated with the EDAM Resources within the Balancing Authority Area it represents and at EDAM Interties with other Balancing Authority Areas.

33.30.5 Start-Up and Minimum Load

For the determination of Proxy Start-Up Costs and Proxy Minimum Load Costs, the CAISO will utilize the Market Services Charge and System Operations Charge reflected in the EDAM Administrative Charge.

33.30.6 RUC Availability Bids for Variable Energy Resources

An EDAM Resource Scheduling Coordinator for a Variable Energy Resource must submit RUC Availability Bids as specified in Section 31.5.1.2 as if the Variable Energy Resource were an Eligible Intermittent Resource.

33.30.7 Convergence Bidding

For all EDAM Entity Balancing Authority Areas with convergence bidding, Convergence Bidding Entities may submit Virtual Bids pursuant to Section 30.9. The CAISO will settle Virtual Bids pursuant to Section 11.3.

33.30.7.1 Optional Transition Period

Each EDAM Entity may participate in the Day-Ahead Market without Virtual Bids in its Balancing Authority Area. Alternatively, each EDAM Entity may elect to forego a transition period and commence Day-Ahead Market participation with Virtual Bids in its Balancing Authority Area.

33.30.7.2 Bidding Rules

During the period that an EDAM Entity has not enabled convergence bidding, Load Serving Entities within the EDAM Entity Balancing Authority Area may not Bid or Self-Schedule Demand

above the amount of Supply within the EDAM Entity Balancing Authority Area. The CAISO will enforce this Demand limitation based on the available Supply, accounting for the difference between Variable Energy Resource Bids and their forecasts. Forecasts will account for each Variable Energy Resource's deliverable Energy based on system conditions and input from the each EDAM Entity.

33.30.7.3 Suspension or Limitation

The CAISO has the authority to suspend or limit convergence bidding pursuant to Section 7.9. Each EDAM Entity may recommend that the CAISO suspend convergence bidding in its Balancing Authority Area, provided that the CAISO will make the ultimate determination as to such recommendation.

33.30.8 Bids from External Resources

Resources located outside of the EDAM Area may participate in the Day-Ahead Market subject to certain requirements that depend on whether (a) the resource submits a Bid at an EDAM External Intertie or an EDAM Internal Intertie, (b) the intertie is with the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area, and (c) the resource's location is specific or non-specific. The EDAM Entity Scheduling Coordinator responsible for the interchange associated with these transactions must identify the supporting resource in an E-Tag submitted in accordance with Section 29.4(c)(4).

33.30.8.1 EDAM External Interties

A Scheduling Coordinator for a resource located outside of the EDAM Area may submit a Bid at an EDAM External Intertie with an EDAM Entity if the resource is pseudo-tied into the EDAM Entity Balancing Authority Area, is dynamically scheduled into the EDAM Entity Balancing Authority Area, or submits a Self-Schedule into the EDAM Entity Balancing Authority Area. An EDAM Entity will facilitate scheduling of export transactions from its Balancing Authority Area to EDAM External Interties pursuant to Section 33.18 and the EDAM Transmission Service Provider tariff or, in the case of the CAISO Balancing Authority Area, this CAISO Tariff. A Scheduling Coordinator for a resource located outside of the EDAM Area may submit a Bid at an EDAM External Intertie with

the CAISO Balancing Authority Area in accordance with the CAISO Tariff. Economic Bids at EDAM External Interties with the CAISO Balancing Authority Area must be capable of delivery under Section 33.30.8.2 to count towards the EDAM RSE.

33.30.8.2 Delivered Firm Energy Contracts

Bids from delivered firm Energy contracts may participate in the Day-Ahead Market. Such firm Energy contracts include but are not limited to arrangements pursuant to Service Schedule C of the Western Systems Power Pool Agreement, CAISO resource adequacy imports, and similar forward contracted Supply. All source-specific forward contracted supply will, if possible, be modeled in the EDAM Area and, when the source cannot be identified, modeling assumptions will be made regarding the source based on the best information available. Bids at an EDAM Intertie with the CAISO Balancing Authority Area will be submitted by the Scheduling Coordinator associated with a forward contract with a Load Serving Entity within the CAISO Balancing Authority Area.

33.30.8.3 Non-Source Specific E-Tag Requirements.

All Energy scheduled from non-resource-specific forward supply contracts under Section 33.30.8.2 must have a submitted E-Tag within three hours following publication of the Day-Ahead Market results. The CAISO will publish an EDAM Entity Balancing Authority Area's quantity of import Supply that does not have a Day-Ahead E-Tag for situational awareness. An EDAM Entity Scheduling Coordinator will have until 5 hours before the start of the Operating Hour to submit E-Tags and/or replace the capacity with other firm schedules or physical resources for schedules that lack a valid Day-Ahead E-Tag within the timeframe. If the EDAM Entity Scheduling Coordinator does not E-Tag the outstanding import schedules, including import EDAM Transfers, and fails to resupply by submitting additional incremental Energy Bids from internal supply EDAM Resources above the resource's Day-Ahead Schedule not encumbered by Day-Ahead capacity awards to cover the E-Tag insufficiency prior to the deadline, the CAISO will remove the EDAM Entity Balancing Authority Area from the group of Balancing Authority Areas that comprise the EDAM Upward Pool in accordance with Section 33.31.1.4.

33.30.9 Base Schedules Replaced by Day-Ahead Schedules

An EDAM Entity Scheduling Coordinator will not submit EIM Base Schedules and the CAISO will not provide an EIM Base Load Schedule for the EIM Entity Balancing Authority Area it represents in the Real-Time Market. Instead, the Day-Ahead Schedules for the EDAM Entity Balancing Authority Area will be used for the EIM Entity Balancing Authority Area in the Real-Time Market rather than submitted EIM Base Schedules and an EIM Base Load Schedule provided by the CAISO. EDAM Transfer schedules of Energy between Balancing Authority Areas in the EDAM Area will persist in the Real-Time Market with the corresponding Balancing Authority Areas in the EIM Area. EDAM Transfers of Energy will not be optimized in the Real-Time Market, but they will have equal scheduling priority with Demand. Day-Ahead import and export schedules at EDAM External Interties with Balancing Authority Areas in the EIM Area will also persist in the Real-Time Market and, if the import/export schedule is with another EIM Entity Balancing Authority Area, the Day-Ahead Schedule will be mirrored at the corresponding EIM Mirror System Resources for the Balancing Authority Areas in the Real-Time Market. Day-Ahead import and export schedules at EDAM External Interties will also not be optimized in the Real-Time Market, but they will have equal scheduling priority with Demand.

33.30.10 Information Available for Bidding by Gas-Fired Resources

The CAISO will publish advisory Day-Ahead Market results two days prior to the Trading Day in accordance with Section 6.5.2.2.3 to help inform gas procurement decisions by EDAM Resource Scheduling Coordinators that submit Bids from gas-fired EDAM Resource Facilities. An EDAM Resource Scheduling Coordinator must request this information before 05:00 a.m. of the Day-Ahead Market.

33.31 Extended Day-Ahead Market Requirements

The EDAM operates within the EDAM Area in accordance with Section 31, as supplemented by provisions in this Section 33.31. EDAM Market Participants must comply with Section 31 as applicable to their participation in the Day-Ahead Market.

33.31.1 EDAM Resource Sufficiency Evaluation (EDAM RSE)

Through the EDAM RSE, the CAISO will test each Balancing Authority Area in the EDAM Area,

including the CAISO Balancing Authority Area, prior to the DAM and the results of the EDAM RSE serve as inputs into the DAM and EDAM with the CAISO completing the EDAM RSE before the IFM MPM.

33.31.1.1 Timing of Advisory and Binding EDAM RSE Runs

The CAISO produces advisory results for each Balancing Authority Area in the EDAM Area for the EDAM RSE at approximately 6:00 a.m. and 9:00 a.m. on the day the CAISO runs the Day-Ahead Market for the next Trading Day; additional advisory results for the EDAM RSE will be provided to each Balancing Authority Area in the EDAM Area consistent with the process set forth in the Business Practice Manual for the Extended Day-Ahead Market. The CAISO conducts the binding EDAM RSE after the Day-Ahead Market submission process closes at approximately 10:00 a.m., after the CAISO has validated Bids pursuant to Section 33.30, and immediately prior to running the Day-Ahead Market. Results of the advisory and binding EDAM RSE will be made available in accordance with the procedures set forth in the Business Practice Manual for the Extended Day-Ahead Market.

33.31.1.2 Components of the EDAM RSE

The EDAM RSE uses existing CAISO market models with the goal of minimizing total cost of meeting Demand and relaxing the Energy and Imbalance Reserve procurement constraints, if they cannot be satisfied, by utilizing all available Bids in the Day-Ahead Market that are eligible for participation under Section 33.31 and validated under Section 33.30, excluding Virtual Bids, non-Participating Load Bids, and intertie transactions by resources that are not registered. The EDAM RSE will also utilize all Ancillary Service Bids, self-provision of ancillary service, and the forecasted output of Variable Energy Resources, together with any adjustments made pursuant to Section 33.31.4.1, in each Balancing Authority Area and for each hour of the Day-Ahead time horizon. EDAM Resources and intertie resources qualified to register, and registered, with the CAISO are eligible for the EDAM RSE upon satisfaction of the requirements and process set forth in the Business Practice Manuals for the Extended Day-Ahead Market. All internal resources in the CAISO Balancing Authority Area are eligible to be counted for purposes of the EDAM RSE without additional registration. The EDAM RSE reflects resource constraints based on registered

resource characteristics including, but not limited to, hydro resource and limited energy storage resource energy constraints, together with other available information as provided in the Business Practice Manuals, but does not enforce Transmission Constraints within each Balancing Authority Area. The result of the EDAM RSE is the quantity of upward sufficiency or downward insufficiency for each hour in the Day-Ahead time horizon for each Balancing Authority Area in the EDAM Area.

33.31.1.2.1 Resource Sufficiency Requirements in the EDAM

To perform the EDAM RSE, the CAISO will use the following inputs in performing the advisory runs and binding runs set forth in Section 31.3.1.6.1 as requirements for each Balancing Authority Area in the EDAM Area in accordance with the procedures set forth in the Business Practice Manuals, with the following requirements fixed at the time of the final binding EDAM RSE.

33.31.1.2.1.1 Forecast Requirement

The Demand Forecast and Variable Energy Resource forecast used in the 6:00 a.m. and 9:00 a.m. advisory run by the CAISO will be determined in accordance with Section 33.31.4 and the Business Practice Manual for the Extended Day-Ahead Market. The Demand Forecast and Variable Energy Resource forecast used in the final binding EDAM RSE will be the same forecasts the CAISO used in the 9:00 am advisory run, unless the timelines in the Business Practice Manual for the Extended Day-Ahead Market otherwise allow for adjustment.

33.31.1.2.1.2 Imbalance Reserves Requirement

The Imbalance Reserve requirement used in the 6:00 a.m. and 9:00 a.m. advisory run by the CAISO will be calculated in accordance with Section 33.31.3. The Imbalance Reserve requirement used in the final binding EDAM RSE will be the same requirement the CAISO used in the 9:00 a.m. advisory run unless the timelines in the Business Practice Manual for the Extended Day-Ahead Market otherwise allow for adjustment.

33.31.1.2.1.3 Ancillary Services Requirement

Each EDAM Entity must determine the requirements for ancillary services within its Balancing Authority Area consistent with its Balancing Authority obligations. The EDAM Entity Scheduling Coordinator must communicate the ancillary services requirements to the CAISO for use in the advisory and binding runs in accordance with the timelines set forth in the Business Practice Manuals. The ancillary services requirements used in the final binding EDAM RSE for each EDAM Entity will be the same requirement the CAISO used in the 9:00 a.m. advisory run unless the timelines in the Business Practice Manual for the Extended Day-Ahead Market otherwise allow for adjustment. The Ancillary Services requirements for the CAISO Balancing Authority Area will be determined under Section 8 and used in the final binding EDAM RSE.

33.31.1.2.2 Transfers Between Balancing Authority Areas in Support of EDAM RSE

The CAISO will account for EDAM Transfers that will occur between two Balancing Authority Areas in the EDAM Area in support of the EDAM RSE pursuant to Section 33.18.2.1 by transferring the EDAM RSE requirements from the importing Balancing Authority Area to the exporting Balancing Authority Area prior to performing the advisory and binding runs of the RSE in accordance with the timelines set forth in the Business Practice Manual for the Extended Day-Ahead Market.

33.31.1.3 Performance of the EDAM Resource Sufficiency Evaluation

The EDAM RSE will evaluate whether RSE-eligible supply is sufficient to meet each of the upward and downward components of the requirements established for the Balancing Authority Area, as provided in Section 33.31.1.2 in each hour of the Day-Ahead Market.

33.31.1.3.1 Demand Evaluation

Each Balancing Authority Area in the EDAM Area must meet its Demand Forecast and Variable Energy Resource forecast requirements as determined by

Section 33.31.1.2.1.1.

33.31.1.3.2 Imbalance Reserves Evaluation

Each Balancing Authority Area in the EDAM Area must meet its Imbalance Reserve Up and Imbalance Reserve Down requirements as determined by Section 33.31.1.2.1.2.

33.31.1.3.3 Ancillary Services Evaluation

Each Balancing Authority Area in the EDAM Area must meet its ancillary service requirements as determined by Section 33.31.1.2.1.3. The CAISO Balancing Authority Area must meet its Ancillary Service obligations as provided in Section 8.

33.31.1.4 Satisfaction of the EDAM RSE Requirements

A Balancing Authority Area in the EDAM Area will pass the final binding EDAM RSE if it meets all of the requirements in Section 33.31.1.3 for each hour of the Day-Ahead Market.

33.31.1.4.1 Inclusion in the EDAM Upward Pool

A Balancing Authority Area in the EDAM Area which passes the final binding EDAM RSE by satisfying the upward requirements of the demand evaluation described in Section 33.31.1.3.1, the Imbalance Reserve evaluation described in Section 33.31.1.3.2, and the ancillary services evaluation described in Section 33.31.1.3.3 in each hour of the Day-Ahead Market, together with any Balancing Authority Area that cured its failure to pass the EDAM RSE in the upward direction through the IFM and incurred the applicable surcharge(s) set forth in Section 33.31.1.5, will be placed into the EDAM Upward Pool. The Balancing Authority Areas in the EDAM Area placed in the EDAM Upward Pool will be collectively accounted for when performing the EIM Resource Sufficiency Evaluation, with the EDAM Upward Pool evaluated as a collective in accordance with Section 29.34(m) and not otherwise evaluated under Section 29.34(k)-(l).

33.31.1.4.2 Inclusion in the EDAM Downward Pool

A Balancing Authority Area in the EDAM Area which passes the final binding EDAM RSE by satisfying the downward requirements of the demand evaluation described in Section 33.31.1.3.1, the Imbalance Reserve evaluation described in Section 33.31.1.3.2, and the ancillary services evaluation described in Section 33.31.1.3.3 in each hour of the Day-Ahead Market, together with any Balancing Authority Area that has cured its failure to pass the EDAM RSE in the downward direction through the IFM and incurred the applicable surcharge set forth in Section 33.31.1.5 will be placed into the EDAM Downward Pool. The Balancing Authority Areas in the EDAM Area placed in the EDAM Downward Pool will be collectively accounted for when performing the EIM Resource Sufficiency Evaluation, with the EDAM Downward Pool evaluated as a collective in accordance with Section 29.34(m) and not otherwise evaluated under Section 29.34(k)-(l).

33.31.1.4.3 Exclusion from the EDAM Upward and Downward Pools

If a Balancing Authority Area in the EDAM Area is excluded from either the EDAM Upward Pool or EDAM Downward Pool then the Balancing Authority Area excluded from either the EDAM Upward Pool or the EDAM Downward Pool will be evaluated as an individual Balancing Authority Area for the EIM Resource Sufficiency Evaluation in accordance with Section 29.34(m) and not otherwise evaluated under Section 29.34(k)-(l).

33.31.1.5 Surcharge Upon Failure of the EDAM RSE

A Balancing Authority Area in the EDAM Area that fails the EDAM RSE in any hour of any day and in any direction is subject to the following surcharges, with any resulting surcharges distributed to the applicable Scheduling Coordinator as provided in Section 33.11.2.2:

33.31.1.5.1 EDAM RSE On-Peak Upward Failure Insufficiency Surcharge

A Balancing Authority Area in the EDAM Area that has failed to satisfy the

upward components of the EDAM RSE during the on-peak period will be subject to a three-tiered penalty structure as follows:

(i) In a tier 1 failure, the Balancing Authority Area failure is *de minimis* defined as the higher of 10 MW or an amount that is less than or equal to one percent of the Balancing Authority Area's upward Imbalance Reserve requirement for that hour, and the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge will not be calculated.

(ii) In a tier 2 failure, the Balancing Authority Area failure is above the *de minimis* failure amount and is less than or equal to fifty percent of the Balancing Authority Area's upward Imbalance Reserve requirement and the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge will be calculated as provided in Section 33.11.2.1.1.

(iii) In a tier 3 failure, the Balancing Authority Area failure is greater than fifty percent of the Balancing Authority Area's upward Imbalance Reserve requirement and the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge will be calculated as provided in Section 33.11.2.1.1.

33.31.1.5.2 EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge

The EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge will be calculated for each Balancing Authority Area that has failed the EDAM RSE during the off-peak period in the upward direction, as provided in Section 33.11.2.1.2. The EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge will not be calculated for a *de minimis* failure, defined as the higher of 10 MW or an amount that is less than or equal to one percent of the Balancing Authority Area's upward Imbalance Reserve requirement for that hour, as provided in Section 33.11.2.1.2.

33.31.1.5.3 EDAM RSE Downward Failure Insufficiency Surcharge

The EDAM RSE Downward Failure Insufficiency Surcharge will be calculated for each Balancing Authority Area in the EDAM Area that has failed the EDAM RSE

in the downward direction in any hour on any day, as provided in Section 33.11.2.1.3. The EDAM RSE Downward Failure Insufficiency Surcharge will not be calculated for a *de minimis* failure, defined as an amount that is greater than 10 MW in the hour, as provided in Section 33.11.2.1.3.

33.31.1.6 Timely Submission of Tags Necessary to Remain in EDAM Upward and Downward Pools

A Balancing Authority Area in the EDAM Area must comply with the tagging protocols set forth in Section 33.30.8.3 and the Business Practice Manuals to ensure imports and exports are timely tagged. A Balancing Authority Area in the EDAM Area that fails to timely E-tag imports or exports and does not otherwise re-supply from a firm schedule or physical source to cover for the untagged imports or exports for the operating hour following the process in the Business Practice Manual will be removed from the EDAM Upward Pool or the EDAM Downward Pool, respectively, for that Trading Hour. A Balancing Authority Area in the EDAM Area that is removed from the EDAM Upward Pool or the EDAM Downward Pool in accordance with this Section 33.31.1.6 will be evaluated as an individual Balancing Authority Area and will be allowed to share in the Diversity Benefits of the pool that it would have otherwise been a part of and as provided in Section 33.31.1.4.3.

33.31.2 Operation of the Day-Ahead Market in the EDAM Area

33.31.2.1 IFM MPM in the EDAM Area

The CAISO applies the IFM MPM specified in Section 31.2 to the EDAM Area.

33.31.2.2 IFM in the EDAM Area

The IFM procures Energy and Imbalance Reserves for EDAM Entity Balancing Authority Areas but does not procure Ancillary Services. EDAM Entities must self-provide their full Ancillary Services requirements to the IFM and cannot submit Economic Bids for Ancillary Services to the IFM.

The CAISO procures Energy across the EDAM Area as specified in Section 31.3.1. The CAISO procures Imbalance Reserves across the EDAM Area as specified in Sections 31.3.1.5 and

31.3.1.6. An EDAM Resource must meet the requirements applicable to Participating Generators to be eligible for Imbalance Reserves Awards and must meet all of the RTM Bidding Obligations specified in Section 31.3.4.

33.31.2.3 RUC MPM in the EDAM Area

The CAISO applies the RUC MPM specified in Section 31.9 to the EDAM Area, except that a reference to the CAISO Forecast of BAA Demand for the CAISO refers to the total CAISO Forecast of BAA Demand for all Balancing Authority Areas across the EDAM Area.

33.31.2.4 RUC in the EDAM Area

The CAISO procures Reliability Capacity across the EDAM Area as specified in Sections 31.5 and 31.9 with the following additional qualifications. An EDAM Resource must meet the requirements applicable to Participating Generators to be eligible for RUC Awards and must meet all of the RTM Bidding Obligations specified in Section 31.5.8. The CAISO procures Reliability Capacity across the EDAM Area as specified in Sections 31.5, except that a reference to the CAISO Forecast of BAA Demand for the CAISO refers to the total CAISO Forecast of BAA Demand for all Balancing Authority Areas across the EDAM Area. The CAISO does not have authority under Section 31.5.3.1 to adjust the CAISO Forecast of BAA Demand for an EDAM Balancing Authority Area.

33.31.3 Net Export EDAM Transfer Constraint

The Extended Day-Ahead Market will include a configurable constraint to permit a Balancing Authority Area in the EDAM Area to enable an hourly limit on the amount of net EDAM Transfer exports, where the total net export EDAM Transfer constraint cannot be reduced below the higher of zero or the transmission service made available to support a net export in the EDAM RSE under Section 33.18.2.1. The net export EDAM Transfer constraint limit is calculated as the available capacity of Supply Bids from resources eligible for the EDAM RSE, plus the available capacity of Supply Bids from resources not eligible for the EDAM RSE, multiplied by a configurable confidence factor, minus the EDAM RSE requirements as described in Section 33.31.1, minus a configurable non-exportable capacity margin. The CAISO or an EDAM Entity may elect to enable the net export EDAM Transfer constraint for its Balancing Authority Area prior

to 9:00 a.m. on the day before the Trading Day in accordance with the timelines and procedures in the Business Practice Manual for the Extended Day-Ahead Market. If an EDAM Entity or the CAISO elects to enable the constraint, then the CAISO applies the constraint across all IFM market processes, including deployment scenarios for IRU/IRD and the RUC. Once elected, the EDAM Entity or the CAISO can choose which hours in which the constraint can be applied to the Operating Day for which the IFM is run.

33.31.3.1 Confidence Factor

If there is observed risk of non-performance or non-delivery by Supply overall or from intertie schedules, then a Balancing Authority Area in the EDAM Area may register a confidence factor of less than 100%.

33.31.3.2 Reliability Margin

Once the upper-bound limit of the net EDAM Transfer export constraint is derived, the CAISO or the EDAM Entity may further reduce this limit for its Balancing Authority Area by an additional reliability margin that reflects an amount of non-exportable capacity held back in anticipation of needing to respond to reliability conditions as may be permitted under the EDAM Transmission Service Provider tariff or the CAISO Tariff, as applicable, including associated business practices. An EDAM Entity or the CAISO may specify a reliability margin to be used in the net export EDAM Transfer constraint for its Balancing Authority Area prior to 9:00 a.m. on the day before the Trading Day for each hour of that Trading Day in accordance with the procedures in the Business Practice Manual for the Extended Day-Ahead Market.

33.31.4 CAISO Forecast of BAA Demand and Variable Energy Resource Forecast for EDAM Entities

In accordance with procedures set forth in the Business Practice Manual for the Extended Day-Ahead Market, the CAISO develops a Demand Forecast and Variable Energy Resource forecast for each EDAM Entity. This forecast constitutes the CAISO Forecast of BAA Demand and the Variable Energy Resource forecast for that EDAM Entity unless the EDAM Entity elects, in accordance with procedures set forth in the Business Practice Manual for the Extended Day-Ahead Market, to submit its own forecast. The forecast option selected by the EDAM Entity will

be the same forecast option that is utilized in the Real-Time Market. A Demand Forecast submitted by the EDAM Entity that will be utilized as the CAISO Forecast of BAA Demand must contain the expected transmission loss as defined in the EDAM Entity's tariff. In the Day-Ahead Market, the CAISO Forecast of BAA Demand for a Balancing Authority Area modeled as Supply-only is zero. The Demand Forecast provided by the EDAM Entity that meets the procedures established in the Business Practice Manual constitutes that EDAM Entity's CAISO Forecast of BAA Demand and the Variable Energy Resource forecast provided by the EDAM Entity that meets the procedures established in the Business Practice Manual constitutes that EDAM Entity's Variable Energy Resource forecast.

33.31.4.1 Load Modification/Demand Response Programs

An EDAM Entity may elect to adjust its Demand Forecast to account for demand response programs administered in its Balancing Authority Area that do not qualify as EDAM Resource Facilities in accordance with procedures set forth in the Business Practice Manual for the Extended Day-Ahead Market. When enabled, the EDAM Entity will enable or deploy the demand response corresponding to the adjustment consistent with the applicable requirements for such demand response programs. If the EDAM RSE for the CAISO BAA is adjusted to reflect demand response resources participating in demand response programs administered in its Balancing Authority Area that do not qualify as RSE-eligible EDAM Resource Facilities, then the CAISO may adjust RUC participation to correspond to such adjustment in accordance with the procedures set forth in the Business Practice Manual for the Extended Day-Ahead Market. If such an adjustment is made, the CAISO will enable or deploy the demand response corresponding to the adjustment consistent with the applicable requirements for such demand response programs. Adjustments made pursuant to this Section 33.31.4.1 are subject to audit and monitoring as provided in Section 33.38.

33.31.5 Reserve Sharing Groups

The EDAM will accommodate ancillary service requirements that are satisfied through participation in a reserve sharing group. If multiple EDAM Entity Balancing Authority Areas participate in a reserve sharing group, they must identify the transmission that will be utilized to

ensure delivery of the shown reserve capacity, consistent with existing practices the entities may have in place today for delivery of the reserves. This transmission capacity will not be available for EDAM Transfers to ensure the deliverability of the reserve sharing obligations in the Real-Time.

33.31.6 Interchange Schedules

After Day-Ahead Market results are published, EDAM Entity Scheduling Coordinators must submit Interchange Schedules with other Balancing Authority Areas at the relevant EDAM Interties and must update these Interchange Schedules with any adjustments, when applicable. For each EDAM Intertie Bid that clears the IFM resulting in a 15-minute EDAM Intertie Schedule, the EDAM Entity Scheduling Coordinator must submit to the CAISO the corresponding hourly transmission profile and 15-minute Energy profiles from the respective E-Tags. The required transmission profiles and Energy profiles must reflect the Point of Receipt and Point of Delivery that was declared in the IFM Bid submittal, must be submitted at least 20 minutes before the start of the Operating Hour, and the EDAM Entity Scheduling Coordinator must provide an updated Energy profile to the extent required by Section 30.5.7.

33.32 Greenhouse Gas (GHG)

33.32.1 GHG Compliance Cost Recovery

EDAM Resource Scheduling Coordinators and Scheduling Coordinators for resources within the CAISO Balancing Authority Area will have an opportunity to recover costs of compliance with GHG regulations adopted by a state jurisdiction that has priced GHG emissions as part of a state GHG reporting and reduction program.

33.32.1.1 Bid Adders Used by the Integrated Forward Market

The Integrated Forward Market will use GHG Bid Adders submitted by EDAM Resource Scheduling Coordinators for EDAM Resource Facilities located outside of a specific GHG Regulation Area to optimize the attribution of GHG Transfers into that GHG Regulation Area. The Integrated Forward Market will use GHG Bid Adders submitted by EDAM Resource Scheduling Coordinators for EDAM Resource Facilities located within the GHG Regulation Area of the State of Washington to optimize the attribution of GHG Transfers

into GHG Regulation Areas outside of the State of Washington. The Integrated Forward Market will use GHG Bid Adders submitted by Scheduling Coordinators for resources located within the GHG Regulation Area of the State of California to optimize the attribution of GHG Transfers into GHG Regulation Areas outside of the State of California.

33.32.1.2 Bid Adders and GHG Regulation Areas

For purposes of Section 33.32, GHG Regulation Areas will reflect the Pricing Nodes of the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area within the GHG boundary as defined by a state jurisdiction that has priced GHG emissions as part of a state GHG reporting and reduction program.

EDAM Resource Scheduling Coordinators for EDAM Resource Facilities located inside a specific GHG Regulation Area will not submit GHG Bid Adders to serve Demand within that GHG Regulation Area. Scheduling Coordinators for resources located within the GHG Regulation Area of the State of California will not submit GHG Bid Adders to serve Demand within the GHG Regulation Area of California.

Scheduling Coordinators for resources with Pseudo-Tie arrangements or Dynamic Schedules into the CAISO Balancing Authority Area that register in the Master File that their resources' capacity is associated with serving Demand in the GHG Regulation Area within the State of California will not submit GHG Bid Adders.

33.32.1.3 Bid Submission

EDAM Resource Scheduling Coordinators for EDAM Resource Facilities located outside of GHG Regulation Areas may submit a separate GHG Bid Adder as an hourly Bid component specific to each GHG Regulation Area.

Scheduling Coordinators for resources located within the GHG Regulation Area of the State of California may submit a separate GHG Bid Adder as an hourly Bid component specific to each GHG Regulation Area located outside of the State of California. EDAM Resource Scheduling Coordinators for EDAM Resource Facilities within the GHG Regulation Area of the State of Washington may submit a separate GHG Bid Adder as an

hourly Bid component specific to each GHG Regulation Area located outside the State of Washington.

GHG Bid Adders will consist of a price and MW quantity. The price included in the GHG Bid Adder will not be less than $0/MWh and not greater than 110% of the resource's GHG maximum compliance cost as determined in accordance with Section 33.32.1.5.

33.32.1.4 Default Treatment.

If a resource located outside of a GHG Regulation Area does not have a GHG Bid Adder to serve Demand within a specific GHG Regulation Area, the Integrated Forward Market will not attribute the resource as supporting a GHG Transfer into that specific GHG Regulation Area.

33.32.1.5 Determination of Maximum GHG Bid Adder

The CAISO will calculate a maximum daily GHG Bid Adder for each EDAM Resource Facility and each resource located within the CAISO Balancing Authority Area in relation to GHG Regulation Areas, as applicable, based on the resource's highest average heat rate on its heat rate curve, the applicable GHG Allowance Price, and the resource's applicable emission rate. The CAISO will perform this calculation in accordance with the provisions of the applicable Business Practice Manual. The CAISO will also provide for an option for resources to negotiate a maximum GHG Bid Adder for each GHG Regulation Area in accordance with the provisions of the applicable Business Practice Manual.

33.32.1.6 GHG Bid Adder Price

The price included in the GHG Bid Adder will not be less than $0/MW. The sum of the GHG Bid Adder price and the Energy Bid price may not exceed the Soft Energy Bid Cap unless the sum of a resource's relevant maximum daily GHG Bid Adder and Default Energy Bid as adjusted pursuant to Section 30.11 exceeds the Soft Energy Bid Cap. In this case, the sum of a resource's GHG Bid Adder and Energy Bid price may not exceed the sum of the relevant maximum daily GHG Bid Adder and the resource's Default Energy Bid or the Hard Energy Bid Cap, whichever is lower.

33.32.2 Consideration of GHG Bid Adders in Market Clearing

33.32.2.1 Dispatch of Resources with Non-zero Bid Adders

The Integrated Forward Market will take into account GHG Bid Adders in selecting Energy produced by EDAM Resource Facilities located outside of a specific GHG Regulation Area up to the associated MW quantity included in the GHG Bid Adder to serve Demand within that GHG Regulation Area.

The Integrated Forward Market will take into account GHG Bid Adders in selecting Energy produced by resources located within the CAISO Balancing Authority Area up to the associated MW quantity included in the GHG Bid Adder to serve load Demand in the GHG Regulation Area located outside of the State of California.

The Integrated Forward Market will not consider GHG Bid Adders when selecting EDAM Resources to serve Demand outside of GHG Regulation Areas.

33.32.2.2 Maximum GHG Bid Adder MW Attribution

The Integrated Forward Market will limit the maximum MW attribution of an EDAM Resource Facility to serve Demand in a specific GHG Regulation Area to a value equal to lower of (i) the MW value in the resource's GHG Bid Adder; (ii) the dispatchable Bid range between the resource's GHG reference pass schedule and the resource's effective upper Economic Bid, considering any applicable derates and Ancillary Services capacity reservations, for the relevant Operating Hour; or (iii) the resource's Day-Ahead Energy Schedule for that Trading Hour.

The Integrated Forward Market will limit the maximum MW attribution of a resource located within the GHG Regulation Area of the State of California to serve load within a GHG Regulation Area outside of the State of California to a value equal to the lower of (i) the MW value in the resource's GHG Bid Adder; (ii) the resource's Day-Ahead Energy Schedule for that Trading Hour.

33.32.2.3 GHG Reference Pass

The GHG reference pass runs before the Integrated Forward Market. The GHG reference pass uses Day-Ahead Bids and Self-Schedules of resources to optimally clear

Supply and Demand Bids without GHG Transfers into GHG Regulation Areas. The GHG reference pass establishes GHG reference pass schedules for resources to determine what Dispatch would have occurred without GHG Transfers into GHG Regulation Areas. The GHG reference pass will not schedule capacity located outside of a GHG Regulation Area obligated to serve Demand within a GHG Regulation Area that is registered with the CAISO in accordance with the applicable Business Practice Manual, thereby allowing this capacity to support a GHG Transfer into a GHG Regulation Area in the Integrated Forward Market.

Resources with Pseudo-Tie arrangements or Dynamic Schedules into a Balancing Authority Area that includes Demand within a specific GHG Regulation Area will register in the Master File whether they are associated with Demand in that GHG Regulation Area. The GHG reference pass will not schedule Pseudo-Tie or dynamically scheduled resources to serve Demand outside of a specific GHG Regulation Area if they are associated with Demand in that GHG Regulation Area.

33.32.2.4 Dispatch of Resources with Bid Adders of Zero

The Integrated Forward Market will not dispatch resources located outside of a GHG Regulation Area for attribution to serve Demand in a GHG Regulation Area if the MW quantity included in the GHG Bid Adder is zero.

33.32.3 GHG Marginal Cost

The Integrated Forward Market will, taking into account Energy Bids and GHG Bids, optimally select resources located outside of a GHG Regulation Area to support GHG Transfers into a GHG Regulation Area until the total MW of GHG Transfers into the respective GHG Regulation Area is fully allocated. The Shadow Price of this allocation constraint is the Marginal GHG Cost for the respective GHG Regulation Area.

33.32.4 Compensation

When the Integrated Forward Market attributes a resource located outside of a GHG Regulation Area to support a GHG Transfer to serve Demand in a GHG Regulation Area, the EDAM Resource Scheduling Coordinator for the EDAM Resource Facility or Scheduling Coordinator for

the resource will receive a payment equaling the product of the GHG Transfer to a GHG Regulation Area attributed to the resource in the IFM and the IFM Marginal GHG Cost for that respective GHG Regulation Area.

33.32.5 GHG Net Export Constraint

The CAISO will apply an hourly GHG net export constraint in the Integrated Forward Market for EDAM Entity Balancing Authority Areas that do not overlap with a GHG Regulation Area. This constraint will limit the aggregate attribution of EDAM Resources within a specific EDAM Entity Balancing Authority Area such that the aggregate attribution does not exceed the net exports from that EDAM Entity Balancing Authority Area. This constraint will also limit the aggregate attribution of resources within a specific GHG Regulation Area to serve Demand in another GHG Regulation Area such that the attribution may not exceed the net exports from these resources' native Balancing Authority Areas. This constraint will not restrict the Integrated Forward Market from attributing capacity located outside of a specific GHG Regulation Area obligated to serve Demand within that GHG Regulation Area that is registered with the CAISO. In accordance with the applicable Business Practice manual, the CAISO will not enforce this constraint for any Balancing Authority Area in the EDAM Area and in any Trading Hour in which the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area with Demand in a GHG Regulation Area is deficient in the upward direction in the EDAM Resource Sufficiency Evaluation.

33.32.6 Data Availability

33.32.6.1 Notification

The CAISO will notify EDAM Resource Scheduling Coordinators for EDAM Resource Facilities and Scheduling Coordinators for resources within the CAISO Balancing Authority Area of their resources' GHG reference pass schedules. The CAISO will notify an EDAM Resource Scheduling Coordinator through the results of the Integrated Forward Market of the MW quantity of any Energy of an EDAM Resource Facility located in an EDAM Entity Balancing Authority Area outside of a specific GHG Regulation Area that supports a GHG Transfer to serve Demand in that GHG Regulation Area.

The CAISO will notify an EDAM Resource Scheduling Coordinator through the results of the Integrated Forward Market of the MW quantity of any Energy of an EDAM Resource Facility located in the GHG Regulation Area of the State of Washington that supports a GHG Transfer to serve Demand in a GHG Regulation Area outside of the State of Washington.

The CAISO will notify the Scheduling Coordinator for a resource located in the GHG Regulation Area of the State of California through the results of the Integrated Forward Market of the MW quantity of any Energy of a resource that supports a GHG Transfer to serve Demand in a GHG Regulation Area outside of the State of California.

33.32.6.2 Disclosure

The CAISO may disclose information related to GHG Transfers to a Governmental Authority, so long as such information does not disclose confidential information of any individual Market Participant.

33.33 [Not Used]

33.34 [Not Used]

33.35 Market Validation And Price Correction

The market validation and price correction provisions of Section 35 apply to the EDAM, except that, for a period not to exceed 180 days after an EDAM Entity Implementation Date, the time allowed for the CAISO's correction of Day-Ahead Market prices will be 10 Business Days.

33.36 Congestion Revenue Rights

Congestion Revenue Rights are not included in the Extended Day-Ahead Market, and the provisions of Section 36 will not apply to EDAM Market Participants.

33.37 Rules Of Conduct

All EDAM Market Participants will be subject to the provisions of Section 37 except for Section 37.2 and Section 37.4 to the extent it applies to Maintenance Outages.

33.38 Market Monitoring in EDAM

The CAISO Department of Market Monitoring is the market monitor for the EDAM and holds the same duties towards the EDAM as it holds under Appendix P, Section 5 towards the other CAISO Markets.

Any referral to FERC of a potential Market Violation or market design flaw will be made under the procedures established in Appendix P, Section 11 and Appendix P, Section 12, respectively. The obligations the CAISO holds towards the Department of Market Monitoring under Appendix P, Sections 3 and 4 apply equally to the Department of Market Monitoring in its role as market monitor for the EDAM. The CAISO Market Surveillance Committee holds the same duties towards the EDAM as it holds under Appendix O, Section 5 towards the CAISO Markets.

33.39 Local Market Power Mitigation in EDAM

The CAISO applies the Local Market Power Mitigation procedures set forth in Sections 31.2, 31.9, and 39.7 to the Extended Day-Ahead Market and uses the methods and standards for setting Default Energy Bids and Default Availability Bids in the Extended Day-Ahead Market as set forth in Section 39.7.

33.40 [Not Used]

33.41 [Not Used]

33.42 [Not Used]

33.43 [Not Used]

33.44 Flexible Ramping Product

The CAISO procures the Flexible Ramping Product in the EDAM Area as set forth in Section 44.

Section 34

34. Real-Time Market

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34.1.4 Real-Time Validation of Schedules and Bids

After the Market Close of the Real-Time Market, the CAISO performs a validation process consistent with the provisions set forth in Section 30.7 and the following additional rules. The CAISO will insert a Generated Bid to cover any RUC Award or Day-Ahead Schedule in the absence of any Self-Schedule or Economic Bid components, or to fill in any gaps between ~~any Self-Schedule Bid and any Economic Bid~~Bid components to cover a RUC Award or Day-Ahead Schedule for use in the RTM. Schedules and Bids submitted to the RTM to supply Energy and Ancillary Services will be considered in the various RTM processes, including the MPM process, the HASP, the STUC, the RTUC, the FMM and the RTD.

34.1.5 Mitigating Bids in the RTM

34.1.5.1 Generally

After the Market Close of the RTM, after the CAISO has validated the Bids pursuant to Section 30.7 and Section 34.1.4, and prior to conducting any other RTM processes, the CAISO conducts a MPM process. The results are used in the RTM optimization processes. Bids on behalf of Demand Response Resources, Participating Load, and Hybrid Resources are considered in the MPM process but are not subject to Bid mitigation. Energy storage resources whose PMax is less than five (5) MW are considered in the MPM process, but not subject to Bid mitigation.

34.1.5.2 Fifteen-Minute MPM

The CAISO conducts the MPM process as the first pass of each fifteen-minute interval in the RTUC horizon starting with the unmitigated Bid set as validated pursuant to Section 30.7 and Section 34.1.4. The MPM process produces results for each fifteen-minute interval of the RTUC horizon and thus may produce mitigated Bids for any given resource for any fifteen-minute interval in the RTUC run horizon that applies to any CAISO Market Process that is based on a specific RTUC run. The determination as to

whether a Bid is mitigated is made based on the non-competitive Congestion component of each LMP for each fifteen-minute interval of the RTUC run horizon, using the methodology set forth in Section 31.2.3 except that a resource may have a non-competitive Congestion component in a fifteen-minute interval based on a Transmission Constraint deemed non-competitive either in the base case for meeting Demand or in the separate cases of modeling the dispatch for~~of~~ Energy of all capacity awarded ~~for the capacity corresponding to~~ upward and downward Uncertainty Awards~~, respectively~~. If a Bid is mitigated in the MPM pass for a fifteen-minute interval in the RTUC run horizon, the mitigated Bid will be utilized in the corresponding binding HASP and FMM process for the fifteen-minute interval. If a Bid is not mitigated in a fifteen-minute MPM pass, the CAISO will still mitigate that Bid in subsequent fifteen-minute intervals of the RTUC horizon if the MPM pass for the subsequent intervals determine that mitigation is needed.

34.1.5.3 Real-Time Dispatch MPM

The RTD MPM process produces results for each five-minute interval of a Trading Hour. The determination as to whether a Bid is mitigated is made based on the non-competitive Congestion component of each LMP for each five-minute interval, using the methodology set forth in Section 31.2.3 except that a resource may have a non-competitive Congestion component in a five-minute interval based on a Transmission Constraint deemed non-competitive either in the base case for meeting Demand or in the separate cases of modeling the dispatch for Energy of all capacity awarded ~~of Energy for the capacity corresponding to~~ upward and downward Uncertainty Awards~~, respectively~~. The RTD MPM process is performed for a configurable number of RTD advisory intervals after the binding RTD interval, and the mitigated Bids are used in the corresponding RTD intervals of the following RTD.

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Section 39

39. Market Power Mitigation Procedures

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39.7 Local Market Power Mitigation for Energy Bids

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39.7.2 Competitive Path Designation

39.7.2.1 Timing of Assessments

For the DAM and RTM, the CAISO will make assessments and designations of whether Transmission Constraints are competitive or non-competitive as part of the MPM runs associated with the DAM and RTM, respectively. Only binding Transmission Constraints determined by the MPM process will be assessed in the applicable market.

39.7.2.2 Criteria

(A) Notwithstanding the provisions in Section 39.7.2.2(B), when the CAISO enforces the natural gas constraint pursuant to Section 27.11, the CAISO may deem selected internal constraints to be non-competitive for specific days or hours based on its determination that actual electric supply conditions may be non-competitive due to anticipated electric supply conditions in the Southern California Gas Company and San Diego Gas & Electric Company gas regions.

(B) Subject to Section 39.7.3, for the DAM and RTM, a Transmission Constraint will be non-competitive only if the Transmission Constraint fails the dynamic competitive path assessment pursuant to this Section 39.7.2.2.

(a) **Transmission Constraints for the ~~DAM~~ IFM** - As part of the MPM process associated with the ~~DAM~~IFM, the CAISO separately evaluates Transmission Constraints for the base scenario for meeting Demand, for the scenario of modeling the dispatch of Energy for the capacity corresponding to IRU Awards, and for the scenario of modeling the dispatch of Energy for the capacity corresponding to IRD Awards. The CAISO also evaluates Transmission Constraints for the scenario of modeling the dispatch of Energy for the capacity corresponding to RCU Awards. T~~t~~he CAISO will designate a Transmission

Constraint for the DAM as non-competitive when the fringe supply of counter-flow to the Transmission Constraint from all portfolios of suppliers that are not identified as potentially pivotal is less than the demand for counter-flow to the Transmission Constraint. For purposes of determining whether to designate a Transmission Constraint as non-competitive pursuant to this Section 39.7.2.2(B)(a):

(i) Counter-flow to the Transmission Constraint means the delivery of Power from a resource to the system load distributed reference bus. If counter-flow to the Transmission Constraint is in the direction opposite to the market flow of Power to the Transmission Constraint, the counter-flow to the Transmission Constraint is calculated as the shift factor multiplied by the resource's scheduled Power. Otherwise, counter-flow to the Transmission Constraint is zero.

(ii) Fringe supply of counter-flow to the Transmission Constraint means all available capacity from internal resources not controlled by the identified potentially pivotal suppliers and all internal Virtual Supply Awards not controlled by the identified potentially pivotal suppliers that provide counter-flow to the Transmission Constraint. Available capacity reflects the highest capacity of a resource's Energy Bid adjusted for Self-Provided Ancillary Services and derates.

(iii) Demand for counter-flow to the Transmission Constraint means all internal dispatched Supply and Virtual Supply Awards that provide counter-flow to the Transmission Constraint.

(iv) Potentially pivotal suppliers mean the three (3) portfolios of net sellers that control the largest quantity of counter-flow supply to the Transmission Constraint.

(v) Portfolio means the effective available internal generation capacity under the control of the Scheduling Coordinator and/or Affiliate determined pursuant to Section 4.5.1.1.12 and all effective internal Virtual Supply Awards of the Scheduling Coordinator and/or Affiliate. Effectiveness in supplying counter-flow is determined by scaling generation capacity and/or Virtual Supply Awards by the

shift factor from that location to the Transmission Constraint being tested.

(vi) A portfolio of a net seller means any portfolio that is not a portfolio of a net buyer. A portfolio of a net buyer means a portfolio for which the average daily net value of Measured Demand minus Supply over a twelve (12) month period is positive. The average daily net value is determined for each portfolio by subtracting, for each Trading Day, Supply from Measured Demand and then averaging the daily value for all Trading Days over the twelve (12) month period. The CAISO will calculate whether portfolios are portfolios of net buyers in the third month of each calendar quarter and the calculations will go into effect at the start of the next calendar quarter. The twelve (12) month period used in this calculation will be the most recent twelve (12) month period for which data is available. The specific mathematical formula used to perform this calculation will be set forth in a Business Practice Manual. Market Participants without physical resources will be deemed to be net sellers for purposes of this Section 39.7.2.2(a)(vi).

(vii) In determining which Scheduling Coordinators and/or Affiliates control the resources in the three (3) identified portfolios, the CAISO will include resources and Virtual Supply Awards directly associated with all Scheduling Coordinator ID Codes associated with the Scheduling Coordinators and/or Affiliates, as well as all resources that the Scheduling Coordinators and/or Affiliates control pursuant to Resource Control Agreements registered with the CAISO as set forth Section 4.5.1.1.13. Resources identified pursuant to Resource Control Agreements will only be assigned to the portfolio of the Scheduling Coordinator that has control of the resource or whose Affiliate has control of the resource pursuant to the Resource Control Agreements.

(b) **Transmission Constraints for the RTM** - As part of the MPM processes associated with the RTM, the CAISO separately evaluates Transmission Constraints for the base scenario for meeting Demand, for the scenario of modeling the dispatch of Energy for the

capacity corresponding to upward Uncertainty Awards, and for the scenario of modeling the dispatch of Energy for the capacity corresponding to downward Uncertainty Awards. The CAISO will designate a Transmission Constraint for the RTM as non-competitive when the sum of the supply of counter-flow from all portfolios of potentially pivotal suppliers to the Transmission Constraint and the fringe supply of counter-flow to the Transmission Constraint from all portfolios of suppliers that are not identified as potentially pivotal is less than the demand for counter-flow to the Transmission Constraint. For purposes of determining whether to designate a Transmission Constraint as non-competitive pursuant to this Section 39.7.2.2(b):

(i) Counter-flow to the Transmission Constraint has the meaning set forth in Section 39.7.2.2(B)(a)(i).

(ii) Supply of counter-flow from all portfolios of potentially pivotal suppliers to the Transmission Constraint means the minimum available capacity from internal resources controlled by the identified potentially pivotal suppliers that provide counter-flow to the Transmission Constraint. The minimum available capacity for the current market interval will reflect the greatest amount of capacity that can be physically withheld. The minimum available capacity is the lowest output level the resource could achieve in the current market interval given its dispatch in the last market interval and limiting factors including Minimum Load, Ramp Rate, Self-Provided Ancillary Services, Ancillary Service Awards (in the Real-Time Market only), derates, and Uncertainty Awards.

(iii) Potentially pivotal suppliers mean the three (3) portfolios of net sellers that control the largest quantity of counter-flow supply to the Transmission Constraint that can be withheld. Counter-flow supply to the Transmission Constraint that can be withheld reflects the difference between the highest capacity and the lowest capacity of a resource’s Energy Bid (not taking into account the Ramp Rate of the resource), measured from the Dispatch Operating Point for the

resource in the immediately preceding fifteen (15) minute FMM interval or the preceding five (5) minute RTD interval, as applicable (taking into account the Ramp Rate of the resource), adjusted for Self-Provided Ancillary Services/ Ancillary Service Awards, derates, and Uncertainty Awards in determining whether to designate a Transmission Constraint as non-competitive for the RTM. In determining whether to designate a Transmission Constraint as non-competitive for the RTM, counter-flow supply to the Transmission Constraint that can be withheld also reflects the PMin of each Short Start Unit with a Start-Up Time of sixty (60) minutes or less that was off-line in the immediately preceding fifteen (15) minute interval of the FMM. In determining whether to designate a Transmission Constraint as non-competitive for the FMM, counter-flow supply to the Transmission Constraint that can be withheld also reflects the PMin of each Short Start Unit with a Start-Up Time of fifteen (15) minutes or less that was off-line in the immediately preceding fifteen (15) minute interval.

(iv) Portfolio means the effective available internal generation capacity under the control of the Scheduling Coordinator and/or Affiliate determined pursuant to Sections 4.5.1.1.12 and 39.7.2.2(a)(vii). Effectiveness in supplying counter-flow is determined by scaling generation capacity by the shift factor from that location to the Transmission Constraint being tested.

(v) A portfolio of a net seller has the meaning set forth in Section 39.7.2.2(a)(vi).

(vi) Fringe supply of counter-flow to the Transmission Constraint means all available capacity from internal resources not controlled by the identified potentially pivotal suppliers that provide counter-flow to the Transmission Constraint. Available capacity reflects the highest capacity of a resource's Energy Bid (not taking into account the Ramp Rate of the resource), measured from the Dispatch Operating Point for the resource in the immediately preceding fifteen (15) minute interval of the FMM or five (5) minute interval of the RTD, as applicable (taking into account

the Ramp Rate of the resource), adjusted for Self-Provided Ancillary Services/ Ancillary Service Awards, derates, and Uncertainty Awards in determining whether to designate a Transmission Constraint as non-competitive for the RTM.

(vii) Demand for counter-flow to the Transmission Constraint means all internal dispatched Supply that provides counter-flow to the Transmission Constraint.

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39.7.4 Default Availability Bid for Imbalance Reserves and Reliability Capacity

The CAISO applies separate IRU Default Availability Bids and RCU Default Availability Bids.

A resource's IRU Default Availability Bid is the higher of: (a) $55/MWh; or (b) the IRU Negotiated Availability Bid.

A resource's RCU Default Availability Bid is the higher of: (a) $55/MWh; or (b) the RCU Negotiated Availability Bid.

A Scheduling Coordinator may choose to pursue both an IRU Negotiated Availability Bid and an RCU Negotiated Availability Bid.

39.7.4.1 Process for Establishing an IRU or RCU Negotiated Availability Bid

Scheduling Coordinators that elect the option of pursuing a Negotiated Availability Bid must submit a proposed value to apply either for IRU or RCU, depending on which type of Negotiated Availability Bid they have chosen to pursue. The proposed value must represent the costs of providing the underlying product. Within ten (10) Business Days of receipt, the CAISO will provide a written response. If the CAISO accepts the proposed Negotiated Availability Bid, it will generally become effective within eleven (11) Business Days from the date of acceptance by the CAISO and remain in effect until: (1) FERC modifies the Negotiated Availability Bid; (2) the CAISO and the Scheduling Coordinator modify the Negotiated Availability Bid by mutual agreement; or (3) the Negotiated Availability Bid expires, is terminated, or is modified pursuant to any agreed upon term or condition or pertinent FERC order.

If the CAISO does not accept the proposed Negotiated Availability Bid, the CAISO and the Scheduling

Coordinator shall enter a period of good faith negotiations that terminates sixty (60) days following the date of submission of a proposed Negotiated Availability Bid by a Scheduling Coordinator. If at any time during this period, the CAISO and the Scheduling Coordinator agree upon the Negotiated Availability Bid, it will generally become effective within eleven (11) Business Days of the date of agreement and remain in effect as if the CAISO accepted it initially.

If by the end of the sixty (60)-day period the CAISO and the Scheduling Coordinator fail to agree on the Negotiated Availability Bid, the Scheduling Coordinator has the right to file a proposed Negotiated Availability Bid with FERC pursuant to Section 205 of the Federal Power Act.

During the sixty (60)-day period following the submission of a proposed Negotiated Availability Bid by a Scheduling Coordinator, and pending FERC's acceptance in cases where the Scheduling Coordinator filed a proposed Negotiated Availability Bid with FERC pursuant to Section 205 of the Federal Power Act, the IRU Default Availability Bid or RCU Default Availability Bid for the resource is $55/MWh.

The CAISO may require the renegotiation of any Negotiated Availability Bids enacted pursuant to this Section 39.7.4.1 that have become outdated, are possibly erroneous, or for which the Scheduling Coordinator has changed. In the renegotiation process, the CAISO may review and propose modifications to such values, and may require the Scheduling Coordinator to provide updated information to support continuation of such values.

The CAISO shall make an informational filing with FERC of any Negotiated Availability Bids enacted pursuant to this Section 39.7.4.1 no later than seven (7) days after the end of the month in which the CAISO enacted the Negotiated Availability Bids.

39.7.4.2 Transition Period for Negotiated Availability Bids

The option to pursue a Negotiated Availability Bid will be unavailable until the CAISO certifies through a market notice it has gained sufficient operational experience with Imbalance Reserves and Reliability Capacity to validate that proposed Negotiated Availability Bids correspond reasonably to the underlying costs of providing the products. Such certification is deemed to have occurred if the CAISO does not issue the market notice within 18 months of the effective date of this Section 39.7.4.

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Section 40

40. Resource Adequacy Demonstration for all SCs in the CAISO BAA

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40.6 Requirements for SCs and Resources for LSEs

This Section 40.6 does not apply to Resource Adequacy Resources of Load-following MSSs. Scheduling Coordinators supplying Resource Adequacy Capacity shall make the Resource Adequacy Capacity listed in the Scheduling Coordinator's monthly Supply Plans under Section 40.4.7 available to the CAISO each hour of each day of the reporting month in accordance with this Section 40.6 and Section 9.3.1.3.

40.6.1 Day-Ahead Availability

Except as otherwise provided in Sections 40.6.1.1 and 40.6.4, Scheduling Coordinators supplying Resource Adequacy Capacity shall make such Resource Adequacy Capacity, available Day-Ahead to the CAISO as follows:

(1) Resource Adequacy Resources physically capable of operating must submit: (a) Economic Bids for Energy and/or Self-Schedules for all their Resource Adequacy Capacity and (b) Economic Bids for Ancillary Services and/or a Submission to Self-Provide Ancillary Services in the IFM for all of their Resource Adequacy Capacity that is certified to provide Ancillary Services. For Resource Adequacy Capacity that is certified to provide Ancillary Services and is not covered by a Submission to Self-Provide Ancillary Services, the resource must submit Economic Bids for each Ancillary Service for which the resource is certified. For Resource Adequacy Capacity subject to this requirement for which no Economic Energy Bid or Self-Schedule has been submitted, the CAISO shall insert a Generated Bid in accordance with Section 40.6.8. For Resource Adequacy

Capacity subject to this requirement for which no Economic Bids for Ancillary Services or Submissions to Self-Provide Ancillary Services have been submitted, the CAISO shall insert a Generated Bid in accordance with Section 40.6.8 for each Ancillary Service the resource is certified to provide.

(2) Resource Adequacy Resources must be available except for limitations specified in the Master File, legal or regulatory prohibitions or as otherwise required by this CAISO Tariff or by Good Utility Practice.

(3) Through the IFM co-optimization process, the CAISO will utilize available Resource Adequacy Capacity to provide Energy, Imbalance Reserves, or Ancillary Services in the most efficient manner to clear the Energy market, manage congestion and procure required Ancillary Services. In so doing, the IFM will honor submitted Energy Self-Schedules of Resource Adequacy Capacity unless the CAISO is unable to satisfy one hundred percent (100%) of the Ancillary Services requirements. In such cases, the CAISO may curtail all or a portion of a submitted Energy Self-Schedule to allow Ancillary Service-certified Resource Adequacy Capacity to be used to meet the Ancillary Service requirements. The CAISO will not curtail for the purpose of meeting Ancillary Service requirements a Self-Schedule of a resource internal to a Metered Subsystem that was submitted by the Scheduling Coordinator for that Metered Subsystem. If the IFM reduces the Energy Self-Schedule of Resource Adequacy Capacity to provide an Ancillary Service, the Ancillary Service Marginal Price for that Ancillary Service will be calculated in accordance with Section 27.1.2 using the Ancillary Service Bids submitted by the Scheduling Coordinator for the Resource Adequacy Resource or inserted by the CAISO pursuant to this Section 40.6.1, and using the resource's Generated Energy Bid to determine the Resource Adequacy Resource's opportunity cost of Energy. If the Scheduling Coordinator for the Resource Adequacy Resource believes that the opportunity cost of Energy based on the Resource Adequacy Resource's Generated Energy Bid is insufficient to compensate for the resource's actual opportunity cost, the

Scheduling Coordinator may submit evidence justifying the increased amount to the CAISO and to the FERC no later than seven (7) days after the end of the month in which the submitted Energy Self-Schedule was reduced by the CAISO to provide an Ancillary Service.

The CAISO will treat such information as confidential and will apply the procedures in Section 20.4 of this CAISO Tariff with regard to requests for disclosure of such information. The CAISO shall pay any higher opportunity costs approved by FERC.

(4) ~~A Resource Adequacy Resources must participate in the RUC to the extent that the resource has available Resource Adequacy Capacity that is not reflected in a Day-Ahead Schedule. Resource Adequacy Capacity participating in RUC will be optimized using a zero dollar ($0/MW-hour) RUC Availability Bid.~~Resource Adequacy Resources must submit RUC Availability Bids for RCU for their Resource Adequacy Capacity.

(5) ~~Capacity from Resource Adequacy Resources selected in RUC will not be eligible to receive a RUC Availability Payment.~~Resource Adequacy Resources eligible to provide Imbalance Reserves must submit Bids for IRU and IRD for all RA Capacity that meets its obligation pursuant to 40.6.1(1)(a) by submitting an Economic Bid.

40.6.1.1 Day-Ahead Availability - Specific RA Resource Types

(a) **Distributed Generation Facilities.** Distributed Generation Facilities shall comply with the IFM and RUC bidding requirements that apply to the same technology type of a resource connected to the CAISO Controlled Grid.

(b) **Non-Generator Resources**

(1) Non-Generator Resources that do not use Regulation Energy Management shall submit:

(A) Economic Bids or Self-Schedules into the IFM for all RA Capacity for all hours of the month the resource is physically capable of operating; and

(B) ~~$0/MW~~ RUC Availability Bids for both RCU and RCD for all RA Capacity for all hours of the month the resource is physically capable of operating,

(2) Non-Generator Resources using Regulation Energy Management shall submit Economic Bids or Self-Schedules into the IFM for all RA Capacity for Regulation for all hours of the month the resource is physically capable of operating.

(c) **Extremely Long-Start Resources.** Extremely Long-Start Resources that are Resource Adequacy Resources must make themselves available to the CAISO by complying with:

(1) the Extremely Long-Start Commitment Process under Section 31.7 or otherwise committing the ELS Resource upon instruction from the CAISO, if physically capable; and

(2) the applicable provisions of Section 40.6.1 regarding Day-Ahead availability for the Trading Days for which it was committed.

40.6.2 Real-Time Availability

(a) **General Requirement.** Except as otherwise provided in Section 40.6.4, for every Trading Hour in which a Resource Adequacy Resource receives a Day-Ahead Schedule for Energy, Imbalance Reserves, or Ancillary Services or a RUC Schedule, the Resource Adequacy Resource must submit Bids to the Real-Time Market for that Trading Hour that conform with the Resource Adequacy Resource's obligations under Section 40.6.1 for the Day-Ahead Market. Provided, however, that any reference in Section 40.6.1 to RUC bidding does not apply to the Real-Time Market bidding obligations.

(b) **Short Start Units.** Irrespective of their Day-Ahead Schedule for Energy, Day-Ahead Schedule for Ancillary Services, or RUC Schedule, Short Start Units must, for each Trading Hour, submit Bids to the Real-Time Market that conform to their obligations under Section 40.6.1 for the Day-Ahead Market. Provided, however, that any reference in Section 40.6.1 to RUC bidding does not apply to the Real-Time Market bidding obligations for Short Start Units. The CAISO may waive these availability obligations for a resource that is not a Long Start Unit or an Extremely Long-Start Resource that does not have an Day-Ahead Schedule or a RUC Schedule based on a procedure to be published on the CAISO Website. The CAISO will insert Generated Bids in accordance

with Section 40.6.8 for any Resource Adequacy Capacity subject to the above requirements for which the resource has failed to submit the appropriate bids to the RTM.

(c) **Long Start Units.** Long Start Units not committed in the Day-Ahead Market will be released from any further obligation to submit Self-Schedules or Bids for the relevant Operating Day. Scheduling Coordinators for Long Start Units are not precluded from self-committing the unit after the Day-Ahead Market and submitting a Self-Schedule or Wheeling-Out in the RTM, unless precluded by terms of their contracts.

(d) **Extremely Long-Start Resources.** Once an Extremely Long-Start Resource providing Resource Adequacy Capacity is committed by the CAISO, it shall comply, for the Trading Days for it was committed, with the Real-Time availability provisions in sub-sections (a) and (b) of this Section 40.6.2, including those provisions that otherwise apply only to Short Start Units.

(e) **Self-Schedules.** The CAISO will honor submitted Energy Self-Schedules of Resource Adequacy Capacity unless the CAISO is unable to satisfy one hundred (100) percent of its Ancillary Services requirements. In such cases, the CAISO may curtail all or a portion of a submitted Energy Self-Schedule to allow Ancillary Service-certified Resource Adequacy Capacity to be used to meet the Ancillary Service requirements, as long as such curtailment does not lead to a real-time shortfall in energy supply. If the CAISO reduces a submitted Real-Time Energy Self-Schedule for Resource Adequacy Capacity when that capacity is needed to meet an Ancillary Services requirement, the Ancillary Service Marginal Price for that capacity will be calculated in accordance with Sections 27.1.2 and 40.6.1.

(f) **Distributed Generation Facilities.** Distributed Generation Facilities shall comply with the RTM bidding requirements that apply to the same technology type of resource connected to the CAISO Controlled Grid.

(g) **Non-Generator Resources**

(1) Non-Generator Resources that do not use Regulation Energy Management shall

submit –

(A) Economic Bids or Self-Schedules into the RTM for any remaining RA Capacity scheduled in the IFM or RUC; and

(B) Economic Bids or Self-Schedules into the RTM for all RA Capacity not scheduled in the IFM,

(2) Non-Generator Resources using Regulation Energy Management that are not Use-Limited Resources under Section 40.4.6.1 shall submit Economic Bids or Self-Schedules into the RTM for any remaining RA Capacity from resource scheduled in IFM or RUC.

40.6.3 [Not Used]

40.6.4 Availability Requirements for Resources with Operational Limitations that are not Qualified Use-Limits

40.6.4.1 Must-Offer Obligation in DAM and RTM

Conditionally Available Resources (irrespective of Use-Limited Resource qualification) and Run-of-River Resources that provide Resource Adequacy Capacity and that are physically capable of operating must submit Self-Schedules or Bids in the Day-Ahead Market for their expected available Energy or their expected as-available Energy, as applicable, in the Day-Ahead Market and RTM up to the quantity of Resource Adequacy Capacity the resource is providing. Such resources shall also revise their Self-Schedules or submit additional Bids in RTM based on the most current information available regarding Expected Energy deliveries.

An Eligible Intermittent Resource providing Resource Adequacy Capacity may, but is not required to, submit Bids in the Day-Ahead Market.

40.6.4.2 RUC Availability Bids

The following resource types providing Resource Adequacy Capacity are not required to submit RUC Availability Bids for that capacity~~, but any such bids they do submit must be $0/MW RUC Availability Bids~~: Pumping Load, Reliability Demand Response Resources, Combined Heat and Power Resources, Regulatory Must-Take Generation, Non-Generator Resources using Regulation Energy Management,

Conditionally Available Resources, Run-of-River Resources, and Eligible Intermittent Resources.

40.6.4.3 Ancillary Services Bids from Participating Loads that is Pumping Load

The must-offer obligation for Participating Load that is Pumping Load is limited to submitting, for hours where underlying Load permits, Non-Spin Ancillary Services Bids and/or a Submission to Self-Provide Non-Spin Ancillary Services in the Day-Ahead Market for its Resource Adequacy Capacity that is certified to provide Non-Spinning Reserve Ancillary Service, and Economic Bids for Energy in the Real-Time Market for its Non-Spinning Reserve Capacity that receives an Ancillary Service Award in the Day-Ahead Market.

40.6.4.4 Proxy Demand Resources

(a) Short Start Proxy Demand Resources that provide Resource Adequacy Capacity shall submit ~~$0/MW~~ RUC Availability Bids for all of their Resource Adequacy Capacity for all hours of the month the resource is physically available~~; however, any RUC schedule for these resources will not be binding~~.

(b) Long Start Proxy Demand Resources are not required to submit Bids or Self Schedules in the RUC for their Resource Adequacy Capacity.

* * * * *

40.6.8 Use of Generated Bids

(a) **Day-Ahead Market.** Prior to completion of the Day-Ahead Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section 40.6.1 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid for Energy, Reliability Capacity, and Ancillary Services and will insert a Generated Bid for such capacity into the CAISO Day-Ahead Market.

(b) **Real-Time Market.** Prior to running the Real-Time Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section 40.6.2 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid and

will insert a Generated Bid for such capacity into the Real-Time Market.

(c) **Partial Bids for RA Capacity.** If a Scheduling Coordinator for an RA Resource submits a partial bid for the resource's RA Capacity, the CAISO will insert a Generated Bid only for the remaining RA Capacity. In addition, the CAISO will determine if all dispatchable Resource Adequacy Capacity from Short Start Units, not otherwise selected in the IFM or RUC, is reflected in a Bid into the Real-Time Market and will insert a Generated Bid for any remaining dispatchable Resource Adequacy Capacity for which the CAISO has not received notification of an Outage.

(d) **Exemptions.** Notwithstanding any of the provisions of Section 40.6.8, for the following resource types providing Resource Adequacy Capacity, the CAISO only inserts a Bid in the Day-Ahead Market or Real-Time Market where the generally applicable bidding rules in Section 30 call for bid insertion: Use-Limited Resource, Non-Generator Resource, Variable Energy Resource, Hydroelectric Generating Unit (including Run-of-River resources), Proxy Demand Resource, Reliability Demand Response Resource, Participating Load, including Pumping Load, Combined Heat and Power Resource, Conditionally Available Resource, Non-Dispatchable Resource, and resources providing Regulatory Must-Take Generation.

(e) **NRS-RA Resources.** The CAISO will submit a Generated Bid in the Day-Ahead Market for a Non-Resource-Specific System Resource in each RAAIM assessment hour, to the extent that the resource provides Resource Adequacy Capacity subject to the requirements of Section 40.6.1 and does not submit an outage request or Bid for the entire amount of that Resource Adequacy Capacity. Aside from where the generally applicable bidding rules in Section 30 call for Bid insertion, the CAISO will not submit a Generated Bid in the Real-Time Market for a Non-Resource-Specific System Resource that fails to meet its bidding obligations under Section 40.6.2. A Bid inserted for the Real-Time Market pursuant to the generally applicable bidding rules in Section 30 may not necessarily cover the full Real-Time Market obligation under Section 40.6.2 and the

resource may thus remain exposed to Non-Availability Charges.

(f) **Generated Bids for RUC.** The CAISO submits a Generated Bid for RUC Availability Bids for Resource Adequacy Resources for which a RUC Availability Bid was not submitted as required in Section 40.6.1(4). For RA Resources that submit a RUC Availability Bid for RCU with an insufficient quantity, the CAISO extends the quantity component of the Bid using the submitted price component of the Bid. For RA Resources that fail to submit any RUC Availability Bid for either RCU or RCD, the Generated Bid is for the required quantity at the Default Availability Bid.

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40.9.3 Availability Assessment

40.9.3.1 Local and System RA Capacity Availability

(a) **Availability Assessment Hours**

(1) Prior to the start of each Resource Adequacy Compliance Year, the CAISO shall establish and publish in the Business Practice Manual the Availability Assessment Hours applicable for resources providing local and/or system Resource Adequacy Capacity for each month of that year.

(2) The Availability Assessment Hours shall be a pre-defined set of five consecutive hours for each month that –

(A) correspond to the operating periods when high demand conditions typically occur and when the availability of Resource Adequacy Capacity is most critical to maintaining system reliability:

(B) vary by season as necessary so that the coincident peak load hour typically falls within the five-hour range each day during the month, based on historical actual load data; and

(C) apply to each Trading Day that is a weekday and not a federal holiday.

(b) **Must-Offer Availability Assessment.** The CAISO shall determine the extent to which each resource providing local and/or system Resource Adequacy Capacity made that capacity available to the CAISO each day during the Availability Assessment Hours by comparing –

(1) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids or Self-Schedules in the Day-Ahead Market and the Real-Time Market on a given day; and

(2) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource had a performance obligation to submit Economic Bids or Self-Schedules in the CAISO Markets under the must-offer requirements applicable under Section 40.6 on a given day, provided that Conditionally Available Resources will have RAAIM assessed as if the resource's performance obligation were defined in Sections 40.6.1 and 40.6.2 and irrespective of their expected available Energy or their expected as-available Energy.

(3) The CAISO's availability assessment under this Section 40.9.3.1 does not consider a RA Resource's compliance with any Imbalance Reserves or Reliability Capacity bidding obligation it holds.

40.9.3.2 Flexible RA Capacity Availability

(a) **Availability Assessment Hours.** The Availability Assessment Hours for a Flexible RA Resource shall be the same period as the must-offer obligation for the Flexible Capacity Category that is designated on the Resource Flexible RA Capacity Plan for that month, as set forth in Section 40.10.6.

(b) **Must-Offer Availability Assessment.** The CAISO shall determine the extent to which each Flexible RA Resource made that capacity available in each Availability Assessment

Hour of the day by comparing –

(A) the MWs of Flexible RA Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids in the Day-Ahead Market and the Real-Time Market on a given day; and

(B) the MWs of Flexible RA Capacity for which the Scheduling Coordinator for the resource had a performance obligation to submit Economic Bids in the CAISO Markets under the must-offer requirements applicable under Section 40.10.6 on a given day.

(C) The CAISO's availability assessment under this Section 40.9.3.2 does not consider a Flexible RA Resource's compliance with any Imbalance Reserves or Reliability Capacity bidding obligation it holds.

(c) **Flexible Capacity Category.** If a Flexible RA Resource is designated to provide Flexible RA Capacity and/or RA Substitute Capacity in more than one Flexible Capacity Category on the same day, the CAISO will assess the availability of the resource using the must-offer obligation for the highest quality of Flexible Capacity Category designated.

(d) **Start-Up Less Than 90 Minutes.** For resources with a start-up time less than 90 minutes, the CAISO will use the resource's MWs of capacity from zero to the EFC value to assess the availability of the designated Flexible RA Capacity; provided that the Scheduling Coordinator for the resource does not submit Self-Schedules for the capacity from zero to PMin or for any portion of the capacity under the must-offer obligation for Energy. If the Scheduling Coordinator for the resource submits a Self-Schedule, the CAISO will deduct the MW value of PMin from the calculation of the resource's Flexible RA Capacity availability,

(e) **Start-Up Greater Than 90 Minutes.** For resources with a start-up time greater than 90 minutes, the CAISO will use the MWs of capacity between the resource's PMin and EFC value in the availability assessment and validate whether the Scheduling Coordinator for

the resource submitted Economic Bids for all MWs designated on the Resource Flexible RA Capacity Plan.

(f) **Variable Energy Resources**

(1) **Flexible RA Capacity Equal to EFC.** If the Flexible RA Capacity designated on the monthly Resource Flexible RA Capacity Plan is equal to the resource's EFC value, the CAISO will assess the availability of the designated Flexible RA Capacity based on the Economic Bids for Flexible RA Capacity the Scheduling Coordinator for the resource submitted up to the MWs in the Variable Energy Resource forecast applicable under Section 4.8.2.

(2) **Flexible RA Capacity Less Than EFC.** If the Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan is less than the EFC value for the resource, the CAISO will assess availability using the ratio of the amount shown on the monthly plan to the relevant EFC value, and applies that ratio to the MWs of Economic Bids and the Variable Energy Resource forecast.

(3) **VER Forecast Less Than Flexible RA Capacity.** If the MWs in the Variable Energy Resource forecast are less than the MWs of Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan, and the Economic Bids are greater than or equal to the forecast amount for that hour, the resource is 100 percent available up to the forecast amount.

(4) **VER Forecast Greater Than Flexible RA Capacity.** If the MWs in the Variable Energy Resource forecast are greater than the MWs of Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan, the Scheduling Coordinator for the resource must submit Economic Bids equal to the forecast amount. If the Scheduling Coordinator for the resource submits Economic Bids for MWs above the forecast, or the resource generates above the forecast, the CAISO will limit the calculated availability to the forecast amount.

(5) **No Day-Ahead Market Obligation.** For Variable Energy Resources that do not

have an obligation to submit Economic Bids into the Day-Ahead Market, the CAISO will base the availability assessment of the Flexible RA Capacity only on the resource's Economic Bids in the Real-Time Market.

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40.9.6.2 Determination of Availability Incentive Payment

(a) **Self-Funding.** The Availability Incentive Payment will be funded entirely through the monthly Non-Availability Charges assessed. Availability Incentive Payments for Resource Adequacy Resources providing Flexible RA Capacity will be funded exclusively by Non-Availability Charges assessed against Resource Adequacy Resources providing Flexible RA Capacity.

(b) **Eligible Capacity.** The capacity of a Resource Adequacy Resource providing local, system or Flexible RA Capacity that is eligible to receive an Availability Incentive Payment shall be the resource's average monthly MWs of capacity that exceed the upper bound of the Availability Standard.

(c) **Calculation.**

(1) The monthly Availability Incentive Payment rate will equal the total Non-Availability Charges assessed for the month plus any unpaid funds under Section 40.9.6.2(d), divided by the total Resource Adequacy Capacity eligible to receive the Availability Incentive Payment that month.

(2) The Availability Incentive Payment rate shall not exceed three times the Non-Availability Charge rate.

(3) The Availability Incentive Payment the CAISO shall pay to each eligible resource shall equal the product of its eligible capacity and the Availability Incentive Payment rate.

(d) **Unpaid Funds.** Any Non-Availability Charge funds that are not distributed to Resource

Adequacy Resources eligible to receive Availability Incentive Payments in a month will be added to the funds available for Availability Incentive Payments in the next month and will continue to roll over to successive months until the end of the year. The CAISO distributes any unallocated funds remaining after the CAISO settles December monthly RAAIM Non-Availability Charges and Non-Availability Incentive Payments. The separate pool of undistributed Non-Availability Charge funds collected for local and/or system Resource Adequacy Capacity will be distributed to Load ~~Service~~ Serving Entities based on their load ratio share for the year. The separate pool of undistributed Non-Availability Charge funds collected for Flexible RA Capacity will be distributed to Load Serving Entities based on their overall ratio of obligation to demonstrate Flexible RA Capacity for the year.

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40.10.6 Flexible RA Capacity Must-Offer Obligation

40.10.6.1 Day-Ahead and Real-Time Availability

(a) **Must-Offer Obligation.** The Scheduling Coordinator for a resource supplying Flexible RA Capacity must submit Economic Bids for Energy for the full amount of the resource's Flexible RA Capacity, Bids for IRU and IRD for the full amount of the resource's Flexible RA Capacity that is eligible to Bid for Imbalance Reserves, and Economic Bids for Ancillary Services that are not flagged as Contingency Only in the Day-Ahead Market for the full amount of the resource's Flexible RA Capacity that is certified to provide Ancillary Services, in the Day-Ahead Market and the Real-Time Market for the applicable Trading Hours that is capable of being economically dispatched as follows, except as provided in Section 40.10.6.1(e) through(h) –

(1) Flexible Capacity Category for base ramping resources - the 17-hour period from 5:00 a.m. to 10:00 p.m., seven days a week;

(2) Flexible Capacity Category for peak ramping resources - the five-hour period determined for each season by the CAISO's Flexible Capacity Needs Assessment, seven days a week; and

(3) Flexible Capacity Category for super-peak ramping resources – the five-hour period determined for each season by the CAISO's Flexible Capacity Needs Assessment, weekdays, except holidays and as provided in Section 40.10.6.1(h), until the resource receives during the five-hour period of the must offer obligation and responds to five CAISO dispatches for Start-Up during the month, after which the resource will not be subject to a must-offer obligation as a super-peak ramping resource for the remainder of that month; however, any other must-offer obligations for Resource Adequacy Capacity will still apply.

(b) **Availability Requirement.** During the period of the applicable must-offer obligation, a Flexible RA Capacity Resource must be operationally available except for limitations specified in the Master File, legal or regulatory prohibitions or as otherwise required by this CAISO Tariff or by Good Utility Practice.

(c) **Co-optimization.** Through the IFM co-optimization process, the CAISO will utilize available Flexible RA Capacity to provide Energy, Imbalance Reserves, or Ancillary Services in the most efficient manner to clear the Energy market, manage congestion and procure required Ancillary Services.

(d) **Participation in RUC.** ~~A~~ The Scheduling Coordinator for a Flexible RA Capacity Resource must submit RUC Availability Bids for RCU for their Flexible RA Capacity. ~~must participate in the RUC to the extent that the resource has available Flexible RA Capacity that is not reflected in an IFM Schedule. Resource Adequacy Capacity participating in RUC will be optimized using a zero dollar ($0/MW-hour) RUC Availability Bid. Flexible RA Capacity selected in RUC will not be eligible to receive a RUC Availability Payment.~~

(e) **Use-Limited Resources.**

(1) A Use-Limited Resource providing Flexible RA Capacity must be capable of

responding to Dispatch Instructions and, consistent with its use-limitations, must submit Economic Bids for Energy for the full amount of its Flexible RA Capacity in the Day-Ahead Market and the Real-Time Market for the Trading Hours applicable to the resource's Flexible Capacity Category for that month for the Trading Hours that it is capable of being economically dispatched.

(2) The Scheduling Coordinator for the Use-Limited Resources designated as a combined resource under Section 40.10.3.2(b), 40.10.3.3(b) or 40.10.3.4(b) must submit Economic Bids for Energy for either resource for the full amount of the Flexible RA Capacity required by the applicable must-offer obligation; however, Economic Bids for Energy must be submitted for only one resource in the combination per Trade Day.

(f) **Short or Long Start Units.**

(1) Short Start Units providing Flexible RA Capacity that do not have an IFM Schedule or a RUC Schedule for any of their Resource Adequacy Capacity for a given Trading Hour are required to participate in the Real-Time Market consistent with the provisions in Section 40.6.2 that apply to Short Start Units providing RA Capacity.

(2) Long Start Units providing Flexible RA Capacity that do not have an IFM Schedule or a RUC Schedule for any of their Resource Adequacy Capacity for a given Trading Hour are required to participate in the Real-Time Market consistent with the provisions in Section 40.6.2 that apply to Long Start Units providing RA Capacity.

(3) If availability is required under Section 40.6.2, the Scheduling Coordinator for the resource must submit to the RTM for that Trading hour for which the resource is capable of responding to Dispatch Instructions: (i) Economic Bids for Energy for the full amount of the available Flexible RA Capacity, including capacity for which it has submitted Economic Bids for Ancillary Services; and (ii) Economic Bids for

Ancillary Services for the full amount of its Flexible RA Capacity that is certified to provide Ancillary Services and that did not receive a day-ahead award, and for each Ancillary Service for which the resource is certified, including capacity for which it has submitted Economic Bids for Energy.

(g) **Extremely Long-Start Resources.** Flexible RA Capacity Resources that are Extremely Long-Start Resources must be available to the CAISO by complying with the Extremely Long-Start Commitment Process under Section 31.7 or otherwise committing the resource upon instruction from the CAISO, if physically capable. Once an Extremely Long-Start Resource is committed by the CAISO, it is subject to the provisions of Section 40.10.6 regarding Day-Ahead Availability and Real-Time Availability for the Trading Days for which it was committed.

(h) **Non-Generator Resources, Regulation Energy Management.** Non-Generator Resources providing Flexible RA Capacity and Regulation Energy Management must submit Economic Bids for Regulation Up and Regulation Down for Trading Hours in the 17-hour period from 5:00 a.m. to 10:00 p.m., seven days a week and shall not submit Bids for Energy or other Ancillary Services.

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Section 44

44. Flexible Ramping Product

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44.3 Forecasted Movement

44.3.1 Generally~~.~~

The CAISO will determine the Forecasted Movement for each EIM Participating Resource, Generating

Unit, System Resource, Pumped Storage, Pseudo-Tie, Non-generating Resource, PDR, Participating Load, and any other resource that has a schedule or dispatch change in the Day-Ahead Market or Real-Time Market as described below.

44.3.2 RTD Forecasted Movement.

For the RTD, the Forecasted Movement for the resource ~~will be~~is the MW difference between the resource's non-binding dispatch instruction in the first five-minute advisory RTD interval and its Dispatch Instruction in the financially binding RTD interval, in the same RTD run.

44.3.3 FMM Forecasted Movement.

For FMM, the Forecasted Movement ~~will be~~is the difference between the resource's advisory FMM schedule in the first advisory FMM interval and its FMM Schedule in the financially binding FMM interval for the same applicable FMM run.

44.3.4 DAM Forecasted Movement

For DAM, the Forecasted Movement is the algebraic difference of the Day-Ahead Schedule between consecutive hours.

44.3.5 Virtual Forecasted Movement

For Virtual Awards, the Forecasted Movement is the algebraic difference of the Virtual Award between consecutive hours.

44.3.6 Base Schedule Forecasted Movement

For EIM Base Schedules, the Forecasted Movement is the algebraic difference of the submitted EIM Base Schedule, as adjusted in real time, between consecutive hours.

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Appendix A

Potential New Definitions

- Competitive Locational IRU Price

The Locational IRU Price minus the non-competitive Congestion components in the upward deployment scenario, as calculated pursuant to Section 31.2.1.

- Competitive RUC Price for RCU

The RUC Price for RCU minus the non-competitive Congestion components in the upward deployment scenario, as calculated pursuant to Section 31.9.1.

- DAME Transition Period

The three-year period that starts on the first Trading Day for which the CAISO procures either Imbalance Reserves or Reliability Capacity.

- DAME Transitional Measures

As specified in Section 11.2.6, the settlement provisions through which the CAISO shares the revenue of an Imbalance Reserves Award or Reliability Capacity Award to a Resource Adequacy Resource with the Scheduling Coordinator of the resource and the Scheduling Coordinator for the LSE that showed that resource on its Supply Plan

- Day-Ahead Marginal GHG Cost Offset

The amount calculated pursuant to Section 33.11.3.9.2 for purposes of determining the non-zero offset amount allocation.

- Default Generation Aggregation Point (DGAP)

The aggregation of Supply PNodes in a Balancing Authority Area outside of the Market Area, with Generation Distribution Factors that are proportional to the maximum capacity of the Supply resources at the Supply PNodes.

- Deployment Factor

As specified in the Business Practice Manual, the percentage of Imbalance Reserves Awards the CAISO models as being deployed for Energy for the purpose of modeling the deployment of Imbalance Reserves against Transmission Constraints. The CAISO establishes distinct Deployment Factors for Imbalance Reserves Up and Imbalance Reserves Down.

- Diversity Benefit

The quantity by which procurement requirements for Balancing Authority Areas that pass either the EDAM RSE or the EIM RSE can be relaxed, as described in Section 31.3.1.6.1 and Section 29.34(m)(2)-(5), respectively.

- Downward Imbalance Reserves Requirement

The extreme percentile of downward forecast error of the confidence interval described in Section 31.3.1.6.1.

- EDAM Access Charge

The Access Charge that provides for historical transmission revenue recovery through the Extended Day-Ahead Market pursuant to Section 33.26.

- EDAM Addendum to EIM Entity Agreement

An addendum to an EIM Entity Agreement between an EDAM Entity and the CAISO that constitutes an agreement to join and participate in the EDAM. A *pro forma* version of the EDAM Addendum to EIM Entity Agreement is set forth in Appendix B.

- EDAM Addendum to EIM Entity Scheduling Coordinator Agreement

An addendum to an EIM Entity Scheduling Coordinator Agreement that constitutes an agreement between an EDAM Entity Scheduling Coordinator and the CAISO. A *pro forma* version of the EDAM Addendum to EIM Entity Scheduling Coordinator Agreement is set forth in Appendix B.

- EDAM Addendum to EIM Participating Resource Agreement

An addendum to an EIM Participating Resource Agreement that constitutes an agreement between an

EDAM Resource and the CAISO. A *pro forma* version of the EDAM Addendum to EIM Participating Resource Agreement is set forth in Appendix B.

- EDAM Addendum to EIM Participating Resource Scheduling Coordinator Agreement

An addendum to an EIM Participating Resource Scheduling Coordinator Agreement that constitutes an agreement between an EDAM Resource Scheduling Coordinator and the CAISO. A *pro forma* version of the EDAM Addendum to EIM Participating Resource Scheduling Coordinator Agreement is set forth in Appendix B.

- EDAM Administrative Charge

The fee imposed on transactions in the EDAM, as described in Section 33.11.6.

- EDAM Area

The combined CAISO Balancing Authority Area and all EDAM Entity Balancing Authority Areas.

- EDAM Demand

Energy delivered to Load in an EDAM Entity Balancing Authority Area.

- EDAM Downward Pool

A pool comprised of each Balancing Authority Area in the EDAM Area that satisfies the downward components of the EDAM Resource Sufficiency Evaluation described in Section 33.31.1.3 in each hour of the Day-Ahead Market, together with each Balancing Authority Area in the EDAM Area that has cured its downward failure of the EDAM Resource Sufficiency Evaluation through the IFM and incurred the EDAM RSE Downward Failure Surcharge.

- EDAM Entity

A Balancing Authority that enters into an EDAM Addendum to EIM Entity Agreement with the CAISO to enable the operation of the Day-Ahead Market in addition to the Real-Time Market in the EDAM Entity Balancing Authority Area. The CAISO is not an EDAM Entity.

- EDAM Entity Implementation Agreement

An agreement between an EIM Entity seeking to become an EDAM Entity, or a Balancing Authority seeking to become an EDAM Entity concurrently with participation in the Energy Imbalance Market as an EIM Entity, and the CAISO, a *pro forma* version of which is set forth in Appendix B.

- EDAM Entity Implementation Date

The first Trading Day for an EDAM Entity in the Day-Ahead Market.

- EDAM Entity Scheduling Coordinator

An EDAM Entity, or a third party designated by the EDAM Entity, that is certified by the CAISO and has entered into an EDAM Entity Addendum to EIM Entity Scheduling Coordinator Agreement under which it is a Scheduling Coordinator and Market Participant and is responsible for meeting the requirements specified in Section 33 on behalf of the EDAM Entity.

- EDAM External Intertie

A point of interconnection between the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area and a Balancing Authority Area other than a Balancing Authority Area in the EDAM Area.

- EDAM Internal Intertie

A point of interconnection between the CAISO Balancing Authority Area or an EDAM Entity Balancing Authority Area and another Balancing Authority Area in the EDAM Area.

- EDAM Intertie

An EDAM Internal Intertie or EDAM External Intertie.

- EDAM Legacy Contract

A transmission service contract entered into with the EDAM Transmission Service Provider prior to the effective date of the EDAM Transmission Service Provider tariff or otherwise not governed by the terms of that tariff (including any contract entered into pursuant to such transmission service contract) as may be amended in accordance with its terms or by agreement between the parties thereto from time to time.

- EDAM Load Serving Entity

A Load Serving Entity other than the EDAM Entity within an EDAM Entity Balancing Authority Area that enters into an EDAM Load Serving Entity Agreement with the CAISO.

- EDAM Load Serving Entity Agreement

An agreement between an EDAM Load Serving Entity and the CAISO, a *pro forma* version of which is set forth in Appendix B.

- EDAM Load Serving Entity Scheduling Coordinator

An EDAM Load Serving Entity, or a third party designated by the EDAM Load Serving Entity, that is certified by the CAISO and has entered into a Scheduling Coordinator Agreement under which it is a

Scheduling Coordinator and Market Participant and is responsible for meeting the requirements specified in Section 33 on behalf of the EDAM Entity.

- EDAM Market Participant

An EDAM Entity, EDAM Entity Scheduling Coordinator, EDAM Resource, EDAM Resource Scheduling Coordinator, EDAM Load Serving Entity, EDAM Load Serving Entity Scheduling Coordinator, or EDAM Transmission Service Provider.

- EDAM Measured Demand

The metered CAISO Demand and metered EDAM Demand plus Real-Time Interchange Export Schedules from the Balancing Authority Areas in the EDAM Area, excluding that portion of Demand of Non-Generator Resources dispatched as Regulation through Regulation Energy Management and EDAM Transfers out of a Balancing Authority Area.

- EDAM Resource

An owner of, operator of, or seller of Energy from an EDAM Resource Facility located in an EDAM Entity Balancing Authority Area.

- EDAM Resource Facility

A resource that (1) can deliver Energy, Curtailable Demand, Demand Response Services, or similar services; (2) is a Generating Unit, a Load of a Participating Load, or a Demand Response Resource or other CAISO-qualified resource; (3) is located within an EDAM Entity Balancing Authority Area; and (4) is listed in, and subject to, an EDAM Addendum to EIM Participating Resource Agreement.

- EDAM Resource Scheduling Coordinator

The EDAM Resource, or a third party designated by the EDAM Resource, that is certified by the CAISO and enters into an EDAM Resource Scheduling Coordinator Agreement under which it is a Scheduling Coordinator and Market Participant and is responsible for meeting the requirements specified in Section 33 on behalf of the EDAM Resource.

- EDAM Resource Sufficiency Evaluation (EDAM RSE)

A set of tests that determines whether a Balancing Authority Area in the EDAM Area, including the CAISO Balancing Authority Area, has sufficient supply and reserves to satisfy the resource sufficiency

requirements described in Section 33.31.1.

- EDAM RSE Downward Failure Insufficiency Surcharge

The surcharge assessed to a Balancing Authority Area in the EDAM Area due to a failure of the EDAM RSE in the downward direction on any day and in any hour, as provided in Section 33.31.1.5.3.

- EDAM RSE Failure Multiplier

A tiered component of the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge. Where a Balancing Authority Area's EDAM RSE Hourly Upward Deficiency Quantity is *de minimis* (a tier 1 EDAM RSE failure), such threshold determined as the higher of 10 MW or one percent of the Balancing Authority Area's upward imbalance reserve requirement for that hour, the EDAM RSE Failure Multiplier is zero. Where a Balancing Authority Area's EDAM RSE Hourly Upward Deficiency Quantity is less than or equal to fifty percent of the Balancing Authority Area's upward Imbalance Reserve requirement (a tier 2 EDAM RSE failure), the EDAM RSE Failure Multiplier is 1.25. Where a Balancing Authority Area's EDAM RSE Hourly Upward Deficiency Quantity is greater than fifty percent of the Balancing Authority Area's upward Imbalance Reserve requirement (a tier 3 EDAM RSE failure), the EDAM RSE Failure Multiplier is 2. With respect to tier 2 or tier 3 EDAM RSE failure in the upward direction, the EDAM RSE Failure Multiplier is subject to an adder consisting of the EDAM RSE Failure Scaling Factor.

- EDAM RSE Failure Scaling Factor

An adder to the EDAM RSE Failure Multiplier calculated on a rolling basis to account for hours in which a Balancing Authority Area in the EDAM Area persistently fails the EDAM RSE in the upward direction over the preceding thirty days, with the EDAM RSE Failure Scaling Factor adding one percent to the EDAM RSE Failure Multiplier for every additional day during the preceding thirty-day period in which the Balancing Authority Area experienced a tier 2 or tier 3 failure of the EDAM RSE in the upward direction.

- EDAM RSE Hourly Downward Deficiency Quantity

The MW sum total of the downward failures during any single operating hour inclusive of the downward demand deficiency described in Section 33.31.1.3, the downward imbalance reserve deficiency described in Section 33.31.1.2, or the downward Ancillary Services deficiency described in Section 33.31.1.4.

- EDAM RSE Hourly Upward Deficiency Quantity

The MW sum total of the upward failures during any single operating hour inclusive of the upward demand deficiency described in Section 33.31.1.3.1, the upward imbalance reserve deficiency described in Section 33.31.1.2, or the upward ancillary services deficiency described in Section 33.31.1.4.

- EDAM RSE Off-Peak Upward Failure Insufficiency Surcharge

The surcharge assessed to a Balancing Authority Area in the EDAM Area due to a tier 2 or tier 3 failure of the EDAM RSE in the upward direction on any day Monday through Saturday in the off-peak hours of midnight to 6 a.m. or 10 p.m. to midnight, pacific time, and all hours on Sunday or any legal public holiday, as provided in Section 33.31.1.5.2.

- EDAM RSE On-Peak Upward Credit

A component of the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge to account for hours during the sixteen-hour on-peak period in which the Balancing Authority Area satisfies the upward requirements of the demand evaluation described in Section 33.31.1.3.1, the Imbalance Reserve evaluation described in Section 33.31.1.3.2, and the ancillary services evaluation described in Section 33.31.1.3.3, and determined as the product of the highest EDAM RSE Hourly Upward Deficiency Quantity of the day and the load-weighted average LMP of the LAP within that Balancing Authority Area in each passed hour.

- EDAM RSE On-Peak Upward Failure Insufficiency Surcharge

The surcharge assessed to a Balancing Authority Area in the EDAM Area due to a tier 2 or tier 3 failure of the EDAM RSE in the upward direction on any day Monday through Saturday during the sixteen-hour on-peak block from 6 a.m. to 10 p.m., pacific time, as provided in Section 33.31.1.5.1.

- EDAM System Operations Charge

The System Operations Charge for the Extended Day-Ahead Market described in Section 33.11.6.

- EDAM Trade Location

The major bilateral trading hubs where energy is traded day-ahead for sixteen-hour on-peak blocks and at which there is sufficient liquidity to allow the CAISO to utilize the day-ahead hub price for the sixteen-hour on-peak block as a means to index the EDAM RSE On-Peak Upward Failure Insufficiency Surcharge, as identified in the Business Practice Manuals for the Extended Day-Ahead Market.

- EDAM Transfer

The scheduled transfer of Energy, Imbalance Reserves, or Reliability Capacity in the Day-Ahead Market between an EDAM Entity Balancing Authority Area and the CAISO Balancing Authority Area, or between EDAM Entity Balancing Authority Areas, using transmission capacity made available through the Extended Day-Ahead Market.

- EDAM Transfer System Resource

A Transfer System Resource used to model an Energy and/or capacity Market Transfer between two Balancing Authority Areas in the Extended Day-Ahead Market.

- EDAM Transmission Ownership Right

Ownership rights by a third-party on transmission facilities within an EDAM Entity Balancing Authority Area that are not subject to an EDAM Transmission Service Provider tariff.

- EDAM Transmission Service Information

Information provided by an EDAM Entity to the CAISO about transmission capacity available for use in the Extended Day-Ahead Market.

- EDAM Transmission Service Provider

An EDAM Entity or other party that owns transmission or has transmission service rights on an EDAM Intertie or within an EDAM Entity Balancing Authority Area, provides transmission service, and that makes transmission service available for use in the Day-Ahead Market through an EDAM Entity. This definition does not include network integration transmission service customers or other transmission customers of an EDAM Transmission Service Provider, EDAM Legacy Contract Rights or EDAM Transmission Ownership Rights.

- EDAM Transmission Service Provider Agreement

An agreement between an EDAM Transmission Service Provider and the CAISO, a *pro forma* version of which is set forth in Appendix B.

- EDAM Upward Pool

A pool comprised of each Balancing Authority Area in the EDAM Area that satisfies the upward components of the EDAM Resource Sufficiency Evaluation described in Section 33.31.1.3 in each hour of the Day-Ahead Market, together with each Balancing Authority Area in the EDAM Area that has cured its upward failure of the EDAM Resource Sufficiency Evaluation through the IFM and incurred the EDAM RSE On-Peak Upward Failure Surcharge or the EDAM RSE Off-Peak Upward Failure Surcharge. The CAISO Balancing Authority Area will be included in the EDAM Upward Pool upon satisfaction of the upward components of the EDAM Resource Sufficiency Evaluation described in Section 33.31.1.3 in each hour of the Day-Ahead Market or upon cure through the IFM and incurrence of the EDAM RSE On-Peak Upward Failure Surcharge or the EDAM RSE Off-Peak Upward Failure Surcharge.

- EIM Resource Sufficiency Evaluation

A test that determines whether the CAISO Balancing Authority Area and each EIM Entity Balancing Authority Areas has sufficient supply and reserves to meet forecasted Demand and uncertainty for the EIM, as described in Section 29.34(l)-(n).

- Extended Day-Ahead Market (EDAM)

The Day-Ahead Market for EDAM Market Participants, as set forth in Section 33 of the CAISO Tariff.

- Five-Minute Imbalance Reserve Quantity

For a resource with an Imbalance Reserves Award, the five-minute ramp capable portion of the award measured as the MW quantity of the resource's ramp capability above the Day-Ahead hourly Energy schedule, in the case of IRU, or below that schedule, in the case of IRD. The ramp capability is determined based on the Master File-registered ramp rate used to optimize the day-ahead market.

- Flexible Ramping Product

The product procured pursuant to Section 44 to meet flexible ramping needs to meet Forecasted Movement and Uncertainty Requirements.

- Generic Generation Aggregation Point (GGAP)

The aggregation of the Default Generation Aggregation Points of Balancing Authority Areas outside the

Market Area. The CAISO uses a northwest GGAP for Scheduling Points in the northwestern U.S. and a southwest GGAP for Scheduling Points in the southwestern U.S.

- Greenhouse Gas (GHG)

Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and other fluorinated greenhouse gases as defined by regulations of the California Air Resources Board and the Washington Department of Ecology.

- GHG Bid Adder

A component of a Bid from a Supply resource located outside of a GHG Regulation Area composed of a MW quantity and price that provides the Supply resource an opportunity to recover costs of compliance with GHG regulations adopted by the California Air Resources Board and the Washington Department of Ecology. There can be different GHG Bid Adders for different GHG Regulation Areas.

- GHG Regulation Area

The Nodes of the CAISO Balancing Authority Area, an EDAM Entity Balancing Authority Area, or an EIM Entity Balancing Authority Area within the GHG boundary as defined by a state jurisdiction that has priced greenhouse gas emissions as part of a state carbon reduction law or regulation.

- GHG Transfer

The algebraic difference (positive for imports and negative for exports) between Energy Demand and Supply in a GHG Regulation Area as modeled by the CAISO in its Integrated Forward Market, Fifteen-Minute Market, and Real-Time Dispatch.

- IFM Imbalance Reserves Bid Cost

The Bid Costs of a Bid for Imbalance Reserves, as calculated pursuant to Section 11.8.2.1.8.

- Imbalance Reserves

IRU and IRD

- Imbalance Reserves Award

IRD and IRU awarded to a resource for a given fifteen-minute interval.

- Imbalance Reserves Bid

The quantity (MW) and price ($/MW per hour) at or above which a Generating Unit, System Resource,

System Unit, Participating Load, or Proxy Demand Resource has agreed to sell IRU or IRD for a specified interval of time to the CAISO to meet the Imbalance Reserves Requirement.

- Imbalance Reserves Cost

The costs included in a bid to provide Imbalance Reserves submitted per Section 30.5.2.9 and as modified pursuant to Section 30.7.3

- Imbalance Reserves Down (IRD)

Decremental capacity procured to meet the Downward Imbalance Reserves Requirement.

- Imbalance Reserves Requirement

The Upward Imbalance Reserves Requirement and the Downward Imbalance Reserves Requirement

- Imbalance Reserves Up (IRU)

Incremental capacity procured to meet the Upward Imbalance Reserves Requirement.

- IRU Default Availability Bid

The price to which an Imbalance Reserves Bid for IRU is mitigated, as specified in Section 39.7.4.

- IRU Negotiated Availability Bid

A method of calculating an IRU Default Availability Bid based on a negotiation with the CAISO pursuant to Section 39.7.4.1.

- Locational IRD Price

The marginal cost ($/MWh) of providing the next increment of IRD at a PNode consistent with binding Transmission Constraints.

- Locational IRU Price

The marginal cost ($/MWh) of providing the next increment of IRU at a PNode consistent with binding Transmission Constraints.

- Locational RCD Price

The marginal cost ($/MWh) of providing the next increment of RCD at a PNode consistent with binding Transmission Constraints.

- Locational RCU Price

The marginal cost ($/MWh) of providing the next increment of RCU at a PNode consistent with binding

Transmission Constraints.

- Lower Economic Limit

The higher of a resource's Self-Schedule quantity or Minimum Load. For a Non-Generator Resource, the Lower Economic Limit is the MW quantity at the bottom of the submitted Energy Bid Curve.

- Market Area

The EDAM Area for purposes of the Day-Ahead Market and the EIM Area for purposes of the Real-Time Market.

- Market Area Intertie

An EDAM Intertie or EIM Intertie.

- Market Transfer

The exchange of Energy or a capacity product (Regulation, contingency reserves, Imbalance Reserves, or Reliability Capacity) in the Market Area. A Market Transfer is modeled as a pair of logical intertie resources at the relevant intertie that consist of an export resource on the source Balancing Authority Area side of the Market Transfer and an import resource on the sink Balancing Authority Area side of the Market Transfer. Market Transfers include EDAM Transfers and EIM Transfers.

* * * * *

- Net Market Transfer

The net of all import and export Market Transfers between a Balancing Authority Area in the Market Area and all other Balancing Authority Areas in the Market Area. Each Net Market Transfer consists of a positive net export amount and a corresponding negative net import amount, with the sum of the Net Market Transfers of all Balancing Authority Areas in the Market Area netting to zero. A Net Market Transfer does not include imports from or exports to Balancing Authority Areas outside of the Market Area.

- Negotiated Availability Bid

Either an IRU Negotiated Availability Bid or an RCU Negotiated Availability Bid.

- Net Load Forecast

The demand forecast for a BAA minus the forecast of wind and solar output for the BAA during the interval.

- Non-VER Physical Supply

The physical supply of Energy available to the CAISO net of potential Supply from VERs electrically located in a BAA in the EDAM Area.

- RCD Availability Quantity

A RCD Award (MW) excluding any RCD Capacity that is actually unavailable due to a unit derate or Outage.

- RCU Availability Quantity

A RCU Award (MW) excluding any RCU Capacity that is actually unavailable due to a unit derate or Outage.

- RCU Default Availability Bid

The price to which an RUC Availability Bid for RCU is mitigated, as specified in Section 39.7.4.

- RCU Negotiated Availability Bid

A method of calculating an RCU Default Availability Bid based on a negotiation with the CAISO pursuant to Section 39.7.4.1.

- Real-Time Marginal GHG Cost Offset

The amount calculated pursuant to Section 11.5.4.1.4 for purposes of determining the non-zero offset amount allocation.

- Reliability Capacity

RCU and RCD

- Reliability Capacity Down (RCD)

Decremental capacity procured to meet any negative difference between Net Load Forecast and Non-VER Physical Supply with a market award.

- Reliability Capacity Up (RCU)

Incremental capacity procured to meet any positive difference between the Net Load Forecast and Non-VER Physical Supply with a market award.

- RUC Procurement Target

The quantity of either RCU or RCD the CAISO procures of behalf of each EDAM Entity or the CAISO, as specified in Sections 31.5.3 and 31.5.4.

- Transfer Location

A PNode at a boundary between Balancing Authority Areas in the Market Area where Market Transfers are defined.

- Transfer System Resource (TSR)

A System Resource used to model an Energy and/or capacity Market Transfer between two Balancing Authority Areas in the Market Area which is modeled by a pair of export and import Transfer System Resources, one for each Balancing Authority Area on either side of the Market Transfer, with equal Energy Schedules and/or capacity awards.

- Upper Economic Limit

The highest operating level submitted in a resource's Energy Bid.

- Upward Imbalance Reserves Requirement

The extreme percentile of upward forecast error of the confidence interval described in Section 31.3.1.6.1.

Appendix A

Potential Amended Definitions

- Aggregate Capability Constraint

A constraint that reflects the combined maximum and the combined minimum capability of Generating Units that comprise a single Generating Facility so that the capability does not exceed the Generating Facility's Interconnection Service Capacity or charging capacity specified in its Generator Interconnection Agreement. For EDAM Resource Facilities, a constraint that reflects the combined maximum and the combined minimum capability of individual EDAM Resource Facilities that constitute a single resource. In the case of EIM ~~Participating~~ Resources, a constraint that reflects the combined maximum and the combined minimum capability of individual EIM ~~Participating~~ Resources or non-participating resources that constitute~~mprise~~ a single resource.

- Base Market Model

A computer based model of the CAISO Controlled Grid, and for purposes of the Extended Day-Ahead Market, including the prospective EDAM Entity and EDAM Entity Balancing Authority Area(s), and for purposes of the Energy Imbalance Market, including the prospective EIM Entity and EIM Entity Balancing Authority Area(s), that is derived from the Full Network Model as described in Section 27.5.1 and that, as described further in Section 27.5.6, is used as the basis for formulating the market models used in the operation of each of the CAISO Markets.

- Bid

Either (1) an offer, including a Self-Schedule, submitted by a Scheduling Coordinator for a specific resource, conveyed through several components that apply differently to the different types of service offered to or demanded from any of the CAISO Markets for the Demand of Energy ~~Supply~~ or the supply of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services ~~Demand of Energy or Ancillary Services, including Self-Schedules, submitted by Scheduling Coordinators for specific resources, conveyed through several components that apply differently to the different types of service offered to or demanded from any of the CAISO Markets~~; or (2) a Virtual Bid.

- Bid Costs

The costs for resources manifested in the Bid components submitted, which include the Start-Up Bid

Cost, Minimum Load Bid Cost, Energy Bid Cost, Transition Bid Cost, Pump Shut-Down Cost, Pumping Cost, Ancillary Services Bid Cost, ~~and~~ RUC Availability Payment, and Imbalance Reserves Costs.

- CAISO Forecast of ~~CAISO~~ BAA Demand

The forecast of a ~~CAISO~~ Balancing Authority Area's Demand for the CAISO and EDAM Entities made by the CAISO in conjunction with EDAM Entities for use in the CAISO Markets.

- CAISO Markets

Any of the markets administered by the CAISO under the CAISO Tariff, including, without limitation, the DAM, EDAM, RTM, EIM, transmission, and Congestion Revenue Rights market.

- CAISO Metered Entity

Pursuant to Section 10.1, an eligible entity that has elected that the CAISO will collect and process its Revenue Quality Meter Data directly from CAISO certified revenue quality meters. Eligible entities include:

(a) any one of the following entities that is directly connected to the CAISO Controlled Grid:

i. a Generator other than a Generator that sells all of its Energy (excluding any Station Power that is netted pursuant to Section 10.1.3) and Ancillary Services to the Utility Distribution Company or Small Utility Distribution Company in whose Service Area it is located;

ii. an MSS Operator; or

iii. a Utility Distribution Company or Small Utility Distribution Company; and

(b) any one of the following entities:

i. a Participating Generator;

ii. a Participating TO in relation to its Tie Point Meters with other TOs or Balancing Authority Areas;

iii. a Participating Load;

iv. a Participating Intermittent Resource;

v. an EDAM Resource;

vi. an EIM Participating Resource; or

vii. a utility that requests that Unaccounted For Energy for its Service Area be calculated separately, in relation to its meters at points of connection of its Service Area with the systems of other utilities.

- CAISO Protocols

The rules, protocols, procedures and standards promulgated by the CAISO (as amended from time to time) to be complied with by the CAISO, Scheduling Coordinators, Participating TOs and all other Market Participants in relation to the operation of the CAISO Controlled Grid and the participation in the ~~markets for Energy and Ancillary Services~~ CAISO Markets in accordance with the CAISO Tariff.

- Co-located Resources

A Generating Unit with a unique Resource ID that is part of a Generating Facility with other Generating Units, an EDAM Resource Facility with a unique Resource ID that is part of a single resource with other EDAM Resource Facilities, or ~~A~~an EIM ~~Participating~~ Resource with a unique Resource ID that is part of a single resource with other EIM ~~Participating~~ Resources.

- Connected Entity

A Participating TO or any party that owns or operates facilities that are electrically interconnected with the CAISO Controlled Grid, or, for purposes of scheduling and operating the Day-Ahead Market only, electrically connected with the transmission system of an EDAM Transmission Service Provider, or, for purposes of scheduling and operating the Real-Time Market only, electrically connected with the transmission system of an EIM Transmission Service Provider.

- Contingency

A potential Outage that is unplanned, viewed as possible or eventually probable, which is taken into

account when considering approval of other requested Outages or while operating the CAISO Balancing Authority Area, an EDAM Entity Balancing Authority Area, or an EIM Entity Balancing Authority Area. Contingencies include potential Outages due to Remedial Action Schemes.

- Curtailable Demand

Demand from a Participating Load or Aggregated Participating Load that can be curtailed at the direction of the CAISO in the Real-Time Dispatch of the CAISO Controlled Grid, or, for purposes of scheduling and operating the Day-Ahead Market only, in the EDAM Area, or, for purposes of scheduling and operating the Real-Time Market only, in the EIM Area.

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- EIM Administrative Charge

The fee imposed on transactions in the ~~e~~Energy ~~i~~Imbalance ~~m~~Market as described in Section 29.11(i)(1).

- [Not Used] ~~**EIM Bid Adder**~~

~~A Bid component composed of a MW quantity and price that provides EIM Participating Resources an opportunity to recover costs of compliance with California Air Resources Board greenhouse gas regulations.~~

- EIM Demand

Energy delivered to Load internal to an EIM Entity Balancing Authority Area.

- EIM Downward Available Balancing Capacity

Any downward capacity from an EIM ~~Participating~~ Resource~~s~~ or a non-participating resource that an EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator has identified in the EIM Resource Plan as available to address power balance and transmission constraint violations in the EIM

Balancing Authority Area.

- EIM Manual Dispatch

A Dispatch by an EIM Entity or EIM Sub-Entity to an EIM ~~Participating~~ Resource or a non-participating resource for which it is responsible, outside of Market Clearing of the Real-Time Market.

- EIM Mirror System Resource

A System Resource at a Scheduling Point registered to an EIM Entity for mirroring CAISO or EDAM Entity intertie schedules at that Scheduling Point, when the associated Energy is generated at, wheeled through, or consumed at the corresponding EIM Entity Balancing Authority Area.

- EIM Resource Plan

The combination of EIM Base Schedules for Demand, Generation, and Interchange, the ancillary services plans of the EIM Entity, and the Bid ranges of EIM ~~Participating~~ Resources, as specified in more detail in Section 29.34(e)(4).

- EIM Upward Availability Balancing Capacity

Any upward capacity from an EIM ~~Participating~~ Resources or a non-participating resource that an EIM Entity Scheduling Coordinator or EIM Sub-Entity Scheduling Coordinator has identified in the EIM Resource Plan as available to address power balance and transmission violations in the EIM Balancing Authority Area.

- End-Use Customer or End-User

A consumer of electric power who consumes such power to satisfy a Load directly connected to the CAISO Controlled Grid, a Distribution System, or, for purposes of scheduling and operating the Day-Ahead Market only, the transmission system of an EDAM Transmission Service Provider who does not resell the power, or, for purposes of scheduling and operating the Real-Time Market only, the transmission system of an EIM Transmission Service Provider who does not resell the power.

- Forecasted Movement

A resource's change or Virtual Award's change in forecasted output between market intervals as described in Section 44.3.

- Generating Unit

An individual electric generator and its associated plant and apparatus whose electrical output is capable of being separately identified and metered or a Physical Scheduling Plant that, in either case, is: (a) located within the CAISO Balancing Authority Area (which includes a Pseudo-Tie of a generating unit to the CAISO Balancing Authority Area), or, for purposes of scheduling and operating the Day-Ahead Market only, an EDAM Entity Balancing Authority Area, or, for purposes of scheduling and operating the Real-Time Market only, an EIM Entity Balancing Authority Area; (b) connected to the CAISO Controlled Grid, either directly or via interconnected transmission, or distribution facilities or via a Pseudo-Tie; and (c) capable of producing and delivering net Energy (Energy in excess of a generating station's internal power requirements).

- Generator

The seller of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services produced by a Generating Unit.

- Greenhouse Gas Emission Cost Revenue

The revenues associated with the MWh compensation paid to a ~~an EIM Participating R~~resource that has Energy supporting a GHG Transfer to ~~deemed delivered to~~ a GHG Regulation Area ~~compliance area~~ priced at the Marginal Greenhouse Gas Cost multiplied by -1.

- Gross Load

Demand (adjusted for distribution losses) of End-Use Customer Loads directly connected to the transmission facilities or directly connected to the Distribution System of a Utility Distribution Company or MSS Operator located in a PTO Service Territory, or End Use Customer Loads directly connected to the Distribution System or transmission facilities of an EDAM Transmission Service Provider in an EDAM Entity Balancing Authority Area. Gross Load includes Load served by Excess Behind the Meter

Production. Excess Behind the Meter Production shall not be netted against End-Use Customer Load in determining Gross Load. Gross Load excludes:

(1) Load with respect to which the Wheeling Access Charge is payable;

(2) Load that is exempt from the Access Charge pursuant to Section 4.1 of Appendix I;

(3) Load of an individual retail customer served by its own onsite Generating Unit or energy storage device, or as authorized by Section 218 of the California Public Utilities Code;

(4) Onsite Load served by a qualifying small power production facility or qualifying cogeneration facility, as those terms are defined in the FERC's regulations implementing Section 201 of the Public Utility Regulatory Policies Act of 1978; and

(5) Load secured by Standby Service from a Participating TO under terms approved by a Local Regulatory Authority or FERC, as applicable, or can be curtailed concurrently with an Outage of the Generating Unit serving the Load.

Gross Load forecasts consistent with filed Transmission Revenue Requirements will be provided by each Participating TO to the CAISO. For purposes of this definition, Generating Units, storage devices, and Loads will be considered onsite where they share, or are sub-metered behind, the same meter.

- IFM Bid Cost

The sum of a BCR Eligible Resource's IFM Start-Up Cost, IFM Minimum Load Cost , IFM Pump Shut-Down Cost, IFM Transition Cost, IFM Pumping Cost, IFM Energy Bid Cost, ~~and~~ IFM AS Bid Cost and IFM Imbalance Reserves Bid Cost.

- Interchange

Imports and exports between the CAISO Balancing Authority Area and other Balancing Authority Areas, and, for purposes of scheduling and operating the Day-Ahead Market only, between an EDAM Entity Balancing Authority Area and another Balancing Authority Area, and, for purposes of scheduling and operating the Real-Time Market only, between an EIM Entity Balancing Authority Area and another Balancing Authority Area.

- Interchange Schedule

A final agreed-upon schedule of Energy to be transferred between the CAISO Balancing Authority Area and another Balancing Authority Area, including an EDAM Entity Balancing Authority Area or an EIM Entity Balancing Authority Area, and, for purposes of scheduling and operating the Day-Ahead Market only, between an EDAM Entity Balancing Authority Area and another EDAM Entity Balancing Authority Area, and, for purposes of scheduling and operating the Real-Time Market only, between an EIM Entity Balancing Authority Area and another Balancing Authority Area.

- Interconnection Facilities

~~The Participating TO's Interconnection Facilities and the Interconnection Customer's Interconnection Facilities.~~ Collectively, Interconnection Facilities include all facilities and equipment between the Generating Facility and the Point of Interconnection, including any modification, additions or upgrades that are necessary to physically and electrically interconnect the Generating Facility to the transmission system ~~CAISO Controlled Grid~~. Interconnection Facilities are sole use facilities and shall not include Distribution Upgrades, Stand Alone Network Upgrades or Network Upgrades.

- Load Serving Entity (LSE)

Any entity (or the duly designated agent of such an entity, including, e.g., a Scheduling Coordinator), including a load aggregator or power marketer, that (a) (i) serves End Users within the CAISO Balancing Authority Area or the EDAM Area and (ii) has been granted authority or has an obligation pursuant to state or local law, regulation, or franchise to sell electric energy to End Users located within the CAISO Balancing Authority Area or the EDAM Area; (b) (i) is an End User, (ii) has been granted authority pursuant to state or local law or regulation to serve its own Load through the purchase of electric energy from an entity that does not qualify as a Load Serving Entity, and (iii) serves its own Load through purchases of electric energy from an entity that does not qualify as a Load Serving Entity with respect to such purchases of electric energy, or (c) is a federal power marketing authority that serves End Users. Notwithstanding the above, an entity is not a Load Serving Entity under this definition solely because it provides electric energy at no cost to its tenants or because it purchases or sells electric energy from a

generating resource pursuant to a state or local law or regulation that permits the generating resource to make direct sales of electric energy to an End User, the rates, terms, and conditions of which sale are not subject to regulation by a Local Regulatory Authority.

- Marginal Cost of Congestion (MCC)

The component of LMP, Locational IRU Price, Locational IRD Price, Locational RCU Price, or Locational RCD Price at a PNode that accounts for the cost of congestion, as measured between that Node and a Reference Bus.

- Marginal Greenhouse Gas Cost (Marginal GHG Cost)

The marginal cost of compliance with GHG regulations for a GHG Transfer into a GHG Regulation Area. ~~The marginal cost of GHG compliance when serving load in a GHG compliance area by an EIM Participating Resource not located within the GHG compliance area.~~

- Market Participant

An entity, including a Scheduling Coordinator, who: (1) participates in the CAISO Markets through the buying, selling, transmission, or distribution of Energy, capacity, or Ancillary Services into, out of, or through the CAISO Controlled Grid; (2) is a CRR Holder or Candidate CRR Holder; (3) is a Convergence Bidding Entity; (4) for purposes of scheduling and operating the Day-Ahead Market only, is an EDAM Market Participant; or (5~~4~~)~~,~~ for purposes of scheduling and operating the Real-Time Market only, is an EIM Market Participant.

- Net Imbalance Energy Export

The Net Imbalance Energy Export is the net Imbalance Energy imported into the CAISO Balancing Authority Area from EDAM Entity Balancing Authority Areas or EIM Entity Balancing Authority Areas.

- Network Upgrades

The additions, modifications, and upgrades to the CAISO Controlled Grid or EDAM transmission system

~~required~~ at or beyond the Point of Interconnection and Distribution System ~~to accommodate the interconnection of the Generating Facility to the CAISO Controlled Grid~~. ~~Network Upgrades shall consist of Delivery Network Upgrades and Reliability Network Upgrades.~~ Network Upgrades do not include Distribution Upgrades or Interconnection Facilities.

- Node

A point in the Full Network Model representing a physical location within the CAISO Balancing Authority Area, the CAISO Controlled Grid, the EDAM Area, or the EIM Area, which includes the Load and Generating Unit busses in the EDAM Area or EIM Area (which includes a Pseudo-Tie of a Generating Unit to a Balancing Authority Area in the EDAM Area or EIM Area), and at the Intertie busses between (i) the CAISO Balancing Authority Area, an EDAM Entity Balancing Authority Area, or an EIM Entity Balancing Authority Area and (ii) an interconnected Balancing Authority Area.

- Notional CRR Value

For a given CRR in a Settlement Period, the sum of: (1) the product of: (a~~A~~) the MCC of Energy at the CRR Sink minus the MCC of Energy at the CRR Source~~;~~ and (b~~B~~) the MW quantity for that Settlement Period; (2) the product of (a) the MCC of Locational IRU Price at the CRR Sink minus the MCC of Locational IRU Price at the CRR Source and (b) the MW quantity for that Settlement Period; and (3) the product of (a) the MCC of Locational IRD Price at the CRR Sink minus the MCC of Locational IRD Price at the CRR Source and (b) the MW quantity for that Settlement Period. The Notional CRR Value for a CRR Obligation can be a non-positive value for a Settlement Period but cannot be less than zero (0) for a CRR Option. ~~The CAISO sets the Notional CRR Value for a CRR Option in a given Settlement Period to zero (0) if the products of the MW quantity of the CRR Option and the difference between the MCC at the CRR Sink and MCC at the CRR Source is a negative amount.~~

- Participating Generator

A Generator or other seller of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services through a Scheduling Coordinator over the CAISO Controlled Grid (1) from a Generating Unit with a rated capacity of 1 MW or greater, (2) from a Generating Unit with a rated capacity of 500 kW up to 1 MW for

which the Generator elects to be a Participating Generator, (3) from a storage resource with a rated capacity of 100 kW or greater, or (4) from a Generating Unit providing Ancillary Services or submitting Energy Bids through an aggregation arrangement approved by the CAISO, which has undertaken to be bound by the terms of the CAISO Tariff, in the case of a Generator through a Participating Generator Agreement, Net Scheduled PGA, or Pseudo-Tie Participating Generator Agreement.

- Point of Interconnection

The point, as set forth in Appendix A to the Large Generator Interconnection Agreement or Attachment 3 to the Small Generator Interconnection Agreement, where the Interconnection Facilities connect to the CAISO Controlled Grid. For Generating Facilities connected to the Distribution System, the Point of Interconnection is the point at which the Generating Facility connects to the CAISO Controlled Grid. For an EDAM Resource Facility, the Point of Interconnection is the point at which the EDAM Resource Facility connects to the EDAM Transmission Service Provider's transmission facilities. For an EIM ~~Participating~~ Resource or non-participating resource, the Point of Interconnection is the point at which the EIM ~~Participating~~ Resource or non-participating resource connects to an EIM Transmission Service Provider's transmission facilities~~Entity's transmission facilities~~.

- Point(s) of Delivery (POD) or Withdrawal

Point(s) within the CAISO Balancing Authority Area, or for purposes of scheduling and operating the Day-Ahead Market only, the EDAM Area where Energy and Ancillary Services are made available to a receiving party under this CAISO Tariff, or, for purposes of scheduling and operating the Real-Time Market only, the EIM Area where Energy and Ancillary Services are made available to a receiving party under this CAISO Tariff.

- Point(s) of Receipt (POR) or Injection

Point(s) within the CAISO Balancing Authority Area, or for purposes of scheduling and operating the Day-Ahead Market only, the EDAM Area where Energy and Ancillary Services are made available to a delivering party under this CAISO Tariff, or, for purposes of scheduling and operating the Real-Time

Market only, the EIM Area where Energy and Ancillary Services are made available by a delivering party under this CAISO Tariff.

- Real-Time Congestion Offset

The amount calculated pursuant to Section 11.5.4.1.2~~1~~ for purposes of determining the non-zero offset amount allocation.

- Reference Bus

The Location(s) in the EDAM Area or the EIM Area relative to which mathematical quantities relating to a powerflow solution will be calculated.

- Residual Unit Commitment (RUC)

The process conducted by the CAISO in the Day-Ahead Market after the IFM has been executed to address mismatches between the CAISO Forecast of BAA Demand and the physical capacity committed in the IFM. ~~ensure sufficient Generating Units, System Units, System Resources, Participating Loads, and Proxy Demand Resources are committed to meet the CAISO Forecast of CAISO Demand.~~

- RMR Dispatch

The quantity of Energy, Imbalance Reserves, Reliability Capacity, or Ancillary Services that is mandated by the CAISO to be delivered in a given market for a resource by a Legacy RMR Unit under a Legacy RMR Contract or by an RMR Resource under an RMR Contract.

- RUC Availability Bid

The quantity (MW) and price ($/MW per hour) at or above which a Generating Unit, System Resource, System Unit, Participating Load, or Proxy Demand Resource has agreed to sell ~~capacity~~ RUC Capacity for a specified interval of time to the CAISO to meet the Residual Unit Commitment requirement.

- RUC Award

~~The portion of the RUC Capacity from resources eligible to receive RUC Availability Payments, exclusive of Minimum Load, capacity designated as RMR, and capacity under resource adequacy requirements as specified in Section 40.~~The quantity of RCU or RCD awarded to a resource by the RUC for a Settlement

Period.

- RUC Capacity

~~The positive difference between the RUC Schedule and the greater of the Day-Ahead Schedule and the Minimum Load level of a resource~~RCU or RCD.

- RUC Price

The Locational RCU Price or Locational RCD Price.

~~The price calculated by the RUC optimization for each Trading Hour of the next Trading Day which reflects the price ($/MW per hour) for the next increment of RUC Capacity at a specified PNode for each Trading Hour.~~

- RUC Schedule

~~The total MW per hour amount of capacity committed by RUC including the MW per hour amounts committed in the Day-Ahead Schedule.~~The net of the Day-Ahead Schedule and the RUC Award in a given hour.

- RUC Zone

A forecast region representing a UDC or MSS Service Area, Local Capacity Area, or other collection of Nodes for which the CAISO has developed sufficient historical CAISO Demand and relevant weather data to perform a Demand Forecast for such area, for which as further provided in Section 31.5.3.2 the CAISO may adjust the CAISO Forecast of ~~CAISO~~ BAA Demand to ensure that the RUC process produces adequate local capacity procurement.

- Scheduling Coordinator

An entity certified by the CAISO for the purposes of undertaking the functions specified in Section 4.5.3, including any entity certified by the CAISO as an EDAM Entity Scheduling Coordinator, EDAM Resource Scheduling Coordinator, EDAM Load Serving Entity Scheduling Coordinator, or a Scheduling Coordinator for the purposes of undertaking the functions specified in Section 33, and including any entity certified by the CAISO as an EIM Entity Scheduling Coordinator or an EIM Participating Resource Scheduling Coordinator for the purposes of undertaking the functions specified in Section 29.

- Scheduling Coordinator Metered Entity

Pursuant to Section 10.1, an eligible entity that has elected that its Scheduling Coordinator will process and submit its Settlement Quality Meter Data to the CAISO. Eligible entities include:

i. a Generator, including Participating Generators and QFs;

ii. a Utility Distribution Company or Small Utility Distribution Company;

iii. a Participating Intermittent Resource;

iv. an EDAM Entity, EDAM Resource, or EDAM Load Serving Entity;

~~i~~v. an EIM Entity or EIM Participating Resource;

vi. a Proxy Demand Resource or Reliability Demand Response Resource;

vii. a Distributed Energy Resource;

viii. an End User; and

ix~~viii~~. Tie Point Meters with other Transmission Owners or Balancing Authority Areas.

- Scheduling Point

A Location in the Base Market Model at which Scheduling Coordinators may submit ~~i~~intertie Bids in the CAISO Markets.

- State Estimator

A computer software program that provides the CAISO with a near Real-Time assessment of system conditions within the CAISO Balancing Authority Area, including portions of the CAISO Balancing Authority Area where Real-Time information is unavailable, and, for purposes of the Extended Day-Ahead Market, including the prospective EDAM Entity and EDAM Entity Balancing Authority Area(s), and, for purposes of the Energy Imbalance Market, including the prospective EIM Entity and EIM Entity Balancing Authority Area(s).

- ~~System~~ Marginal Energy Cost (~~S~~MEC)

The component of the LMP that reflects the marginal cost of providing Energy from a designated reference Location.

- System Resource

A group of resources, single resource, or a portion of a resource located outside of the ~~CAISO Balancing Authority Area~~Market Area, ~~or, for purposes of scheduling and operating the Real-Time Market only, outside of an EIM Entity Balancing Authority Area,~~ or an allocated portion of a Balancing Authority Area's portfolio of generating resources that are either a static Interchange Schedule or directly responsive to that Balancing Authority Area's Automatic Generation Control (AGC) capable of providing Energy and/or Ancillary Services to the CAISO Balancing Authority Area, or, for purposes of the Extended Day-Ahead Market only, to an EDAM Entity Balancing Authority Area(s), or, for purposes of scheduling and operating the Real-Time Market only, to an EIM Entity Balancing Authority Area, provided that if the System Resource is providing Regulation to the CAISO it is directly responsive to AGC.

- Undelivered Capacity

Ancillary Services capacity ~~that receives an AS Award and Self-Provided Ancillary Services capacity, or capacity committed in RUC~~ that was dispatched by the CAISO to provide Energy but where a certain percentage or more of the Expected Energy was not provided in Real-Time, which percentage is determined as specified in the applicable Business Practice Manual.

- Undispatchable Capacity

Ancillary Services capacity that receives an AS Award and Self-Provided Ancillary Services capacity, or capacity committed in RUC, that is not available for use due to a derate or Outage of the resource. Undispatchable Capacity includes AS Awards for Spinning Reserve and Non-Spinning Reserve capacity that are not available for use due to Ramp Rate constraints (e.g., operational Ramping ability is lower than Operating Reserve Ramp Rate). For RUC Capacity, Undispatchable Capacity also includes RUC Capacity for which the resource does not have Bids to the Real-Time Market required of the RUC Award.

- Wholesale Customer

A person wishing to purchase Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services at a Bulk Supply Point or a Scheduling Point for resale.

- Wholesale Sales

The sale of Energy, Imbalance Reserves, Reliability Capacity, and Ancillary Services at a Bulk Supply Point or a Scheduling Point for resale.

Appendix C

Locational Marginal Price

A. Locational Marginal Price for Energy

The CAISO shall calculate the price of Energy at Generation PNodes, Scheduling Points, and Aggregated Pricing Nodes, as provided in the CAISO Tariff. The CAISO establishes Trading Hub prices and LAPs as provided in the CAISO Tariff. The LMPs at PNodes, ~~including~~ Scheduling Points, and Aggregated Pricing Nodes include separate components for the M~~m~~arginal ~~cost of~~ Energy Cost, Marginal Cost of Congestion, ~~and~~ Marginal Cost of Losses, and Marginal GHG Cost. As provided in Sections 6.5.3.2.2 and 6.5.5.2.4, ~~Day-Ahead Market~~ LMPs are calculated and posted ~~on a Day-Ahead basis~~ for each hour of the Day-Ahead Market and for each interval of the Real-Time Market.

A.1 LMP Composition in the Day-Ahead Market and the Real-Time Market

In each hour of the Day-Ahead Market, each 15-minute interval of the Fifteen-Minute Market, and each 5-minute interval of the Real-Time Dispatch, t~~T~~he CAISO calculates the LMP for each PNode, which is based on the Bids of sellers and buyers selected in the Day-Ahead or Real-Time Market as calculated below. The CAISO ~~designates~~ uses a ~~distributed~~ Reference Bus~~, r,~~ for the calculation of the Locational Marginal Prices. The Reference Bus in the base scenario is the distributed load in the Market Area used in the AC power flow solution to distribute the deviations for Transmission Losses between iterations, and in sensitivity calculations that yield rates for Marginal Losses and the Power Transfer Distribution Factors. If the CAISO Market solution reverts to a DC power flow solution, the Reference Bus is not used because Transmission Losses are not included. Nevertheless, the CAISO reflects the Transmission Losses for the Market Area in the DC power flow solution by adjusting the load by the average loss factor. The Locational Marginal Prices are not determined by resources that are not eligible to set the Locational Marginal Price as defined in Sections 31.3.1.4 and 34.20.2.3. For each ~~bus other than the Reference Bus~~PNode, the CAISO determines separate components of the LMP for the Marginal Energy Cost, Marginal Cost of Congestion, Marginal Cost of Losses, and Marginal GHG Cost, as follows ~~System Marginal Cost, Marginal Cost of Congestion, and Marginal Cost of Losses relative to the Reference Bus, consistent with the following equation~~:

~~$LMP_i = SMEC_i + MCC_i + MCL_i$~~

~~$LMP_r = SMEC_r$~~

$LMP_i = MEC_i + MCC_i + MCL_i + MCG_i$

where:

- i is the PNode index.
- MEC_i~~SMEC$_r$~~ is the LMP component representing the ~~marginal cost of Energy~~Marginal Energy Cost at ~~the Reference Bus, r (System Marginal Energy Cost)~~PNode i.
- MCC_i~~MCC$_i$~~ is the LMP component representing the Marginal Cost of Congestion at ~~bus~~PNode i~~i relative to the Reference Bus~~.
- MCL_i ~~MCL$_i$~~ is the LMP component representing the Marginal Cost of Losses at PNode i~~bus *i* relative to the Reference Bus~~.
- MCG_i is the LMP component representing the Marginal GHG Cost at PNode i.

~~**B.LMP Composition in the Real-Time Market**~~

~~In each 15-minute interval and each 5-minute interval of the Fifteen Minute Market and Real-Time Dispatch, respectively, the CAISO calculates the LMP for each PNode, based on the Bids of sellers and buyers selected in those markets as specified in the FMM Schedule and 5-minute Real-Time Dispatch Instructions. The CAISO designates a Reference Bus, r, for calculation of the System Marginal Energy Cost ($SMECr$), which is the shadow price of the system power balance constraint. The CAISO uses the distributed load in the EIM Area as the Reference Bus to calculate loss sensitivities and shift factors used to linearize the power balance and Transmission Constraints. Resources that have constraints that prevent them from being marginal are not eligible to set the Locational Marginal Price. For each bus other than the Reference Bus, the CAISO determines separate components of the LMP for the marginal cost of Energy, Marginal Cost of Congestion, Marginal Cost of Losses, and Marginal Greenhouse Gas Cost relative to the Reference Bus, consistent with the following equation:~~

~~$LMP_i = SMEC_r + MCC_i + MCL_i + MCG_i$~~

~~$LMP_r = SMEC_r$~~

~~where:~~

- ~~MCG_i is the LMP component representing Marginal Greenhouse Gas Cost.~~

~~For each PNode within an EIM Entity Balancing Authority Area, the LMP shall include a fourth component, the EIM Bid Adder component.~~

A.2~~C.~~ ~~The System~~ Marginal Energy Cost Component of the LMP ~~(Day-Ahead and Real-Time Market)~~

The ~~S~~MEC ~~shall be~~is the same for ~~each location throughout the system~~all PNodes in each Balancing Authority Area in the Market Area. The ~~S~~MEC is the ~~sensitivity~~Shadow Price of the power balance constraint for the respective Balancing Authority Area at the optimal solution. The power balance constraint for each Balancing Authority Area in the Market Area ensures that the physical law of conservation of Energy (the sum of Generation and imports equals the sum of Demand, including exports and Transmission Losses, plus the Net Market Transfer) is accounted for in the ~~network~~ market solution. The MEC for the Transfer System Resources (TSRs) on each side of the Market Transfer that they model is the MEC of the respective Balancing Authority Area. The MEC may be different between two Balancing Authority Areas in the Market Area when Market Transfers between these Balancing Authority Areas are scheduled at their respective scheduling limits. The MEC difference between the Balancing Authority Areas on either side of a specific Market Transfer generates Market Transfer revenue. ~~This system level power balance constraint is enforced over the CAISO Balancing Authority Area for the Day-Ahead Market and over the EIM Area in the Real-Time Market. For the designated reference location the CAISO will utilize a distributed Load Reference Bus for which constituent PNodes are weighted using the Reference Bus distribution factors. The Load distributed Reference Bus distribution factors are based on the Load Distribution Factors at each PNode that represents cleared Load in the Integrated Forward Market or forecast Load for MPM, RUC and RTM. In the Integrated Forward Market, in the event that the market is not able to clear based on the use of a distributed load Reference Bus, the CAISO will use a distributed generation Reference Bus for which the constituent nodes and the weights are determined economically within the running of the Integrated Forward Market based on available economic bids. In the event that the CAISO employs a distributed generation Reference Bus, it will notify Market Participants of which Integrated Forward Market runs required the use of this backstop mechanism. A distributed Load Reference Bus will be used for RUC and RTM regardless of whether a distributed~~

~~Generation Reference Bus were used in the corresponding Integrated Forward Market run. If the market clearing problem is limited by the system-level power balance constraint, the market clearing process would create a Shadow Price for the power balance constraint only when the relaxation of the constraint would result in a reduction in the total cost to operate the system.~~

A.3~~D.~~ Marginal Congestion Component of the LMP~~Calculations (Day-Ahead and Real-Time)~~

The CAISO calculates the Marginal Cost~~s~~ of Congestion at each ~~bus~~ PNode as ~~a component of the bus-level LMP. The Marginal Cost of Congestion (MCCi) component of the LMP at bus i is calculated in the Day-Ahead Market using the equation~~ the net contribution of the Shadow Prices of the binding Transmission Constraints at the optimal solution, weighed by the respective Power Transfer Distribution Factors, as follows:

$$MCC_i = -\sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF_{i,j,m,k}\, \mu_{m,k} - \sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF^{(IRU)}_{i,j,m,k}\, \mu^{(IRU)}_{m,k}$$

$$- \sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF^{(IRD)}_{i,j,m,k}\, \mu^{(IRD)}_{m,k} \sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF_{i,j,k}\, \mu_{m,k}$$

~~where~~Where:

- i is the~~a~~ PNode index.
- ~~n is a node index.~~
- m is the Transmission C~~c~~onstraint ~~or monitored element~~ index in the Market Area; transmission constraints outside the Market Area are not enforced.
- k is the constraint case index; zero (0) indicates the base case where all transmission and generation facilities are in service, whereas a positive case indicates a preventive transmission or generation contingency case, as applicable~~, both in the base case for meeting Demand and in the case of modeling the dispatch of Energy for the capacity corresponding to the Uncertainty Awards~~.
- ~~g is the generation contingency case.~~
- ~~Og is the node index associated with the generator contingency case g.~~

- j is the transmission component index of Transmission Constraint m. When Transmission Constraint m is a Nomogram, there can be more than one transmission components in it; ~~When Transmission Constraint m is any other Transmission Constraint~~ otherwise, there is~~shall be~~ only one transmission component.
- ~~N is the number of preventive contingencies.~~
- K is the number of ~~preventive transmission contingencies, both in the base case for meeting Demand and in the case of modeling the dispatch of Energy for the capacity corresponding to the Uncertainty Awards~~ constraint cases, besides the base case.
- ~~Kg is the number of preventive generation contingencies.~~
- M is the number of Transmission Constraints ~~monitored elements, both in the base case for meeting Demand and in the case of modeling the dispatch of Energy for the capacity corresponding to the Uncertainty Awards~~.
- J_m~~Jm~~ is the number of transmission components of~~for~~ Transmission C~~c~~onstraint m.
- $PTDF_{i,j,m,k}$, $PTDF^{(IRU)}_{i,j,m,k}$, and $PTDF^{(IRD)}_{i,j,m,k}$~~$PTDF_{i,j,k}$~~ is the Power Transfer Distribution Factor (PTDF) for ~~the bus~~PNode i on transmission component j of ~~the~~ Transmission Constraint m in constraint case k in the base, IRU deployment, or IRD deployment scenario, respectively ~~k which represents~~; it is the flow contribution on~~across~~ that transmission component j when an increment of power is injected at PNode~~bus~~ i and an equivalent amount of power is withdrawn at the Reference Bus. For Market Area Intertie Resources at a Scheduling Point, and TSRs at a Transfer Location, the PTDF to an intertie constraint or intertie scheduling limit at that Scheduling Point is +1 for an import and –1 for an export. The CAISO does not consider the effect of Transmission L~~l~~osses in the ~~determination~~ calculation of PTDFs; they depend only on the network configuration. Furthermore, the difference between the PTDFs at two PNodes with respect to any binding Transmission Constraint, and thus the difference between the MCCs of the LMPs at these PNodes, is independent from the selection of the Reference Bus.

- ~~$c_{j,m}$~~ $C_{j,m}$ is the constraint coefficient for ~~the~~ transmission component j of Transmission C~~c~~onstraint m. ~~W~~when Transmission C~~c~~onstraint m is a Nomogram~~,~~; otherwise, this constraint~~represents the relevant~~ coefficient is ~~for that component. When constraint m is any other Transmission Constraint, this coefficient will~~ always ~~be~~ one.
- $\mu_{m,k}$, $\mu_{m,k}^{(IRU)}$, and $\mu_{m,k}^{(IRD)}$ is the ~~constraint~~ Shadow Price ~~on~~of Transmission C~~c~~onstraint m in constraint case k in the base, IRU deployment, or IRD deployment scenario, respectively~~and is equivalent to the reduction in system cost expressed in $/MWh that results from a marginal increase of the capacity on constraint m. If the market-clearing problem is limited by any Transmission Constraint including Interties, branch groups, flowgates, nomograms, and Energy Imbalance Market-related transmission constraints (EIM Transfer constraints and power balance constraint for a Balancing Authority Area), the market clearing process would create a Shadow Price for the Transmission Constraint, only when the relaxation of the constraint would result in a reduction in the total cost to operate the system~~.
- ~~μ_m^k is the constraint Shadow Price on constraint m in the preventive transmission contingency case k and is equivalent to the reduction in system cost expressed in $/MWh that results from a marginal increase of the capacity on constraint m in the preventive transmission contingency case k. If the market-clearing problem is limited by any Transmission Constraint including Interties, branch groups, flowgates, nomograms, and Energy Imbalance Market-related transmission constraints (EIM Transfer constraints and power balance constraint for a Balancing Authority Area), the market clearing process would create a Shadow Price for the Transmission Constraint, only when the relaxation of the constraint would result in a reduction in total cost to operate the system.~~
- ~~μ_m^g is the constraint Shadow Price on constraint m in the preventive generator contingency case g and is equivalent to the reduction in system cost expressed in $/MWh that results from a marginal increase of the capacity on constraint m in the preventive generator contingency case g. If the market-clearing problem is limited by any~~

~~Transmission Constraint including Interties, branch groups, flowgates, nomograms, and Energy Imbalance Market-related transmission constraints (EIM Transfer constraints and power balance constraint for a Balancing Authority Area), the market clearing process would create a Shadow Price for the Transmission Constraint, only when the relaxation of the constraint would result in a reduction in the total cost to operate the system.~~

- ~~$\delta_{Og,i}$ is the binary parameter that identifies the node with a generator outage under generator contingency case g. This parameter is one for all nodes in index i when i is the outage node Og associated with a generator contingency case g. This parameter is zero for all nodes in index i when i is not the outage node Og associated with the generator contingency case g.~~
- ~~$PTDF^{k}_{i,m}$ is the Power Transfer Distribution Factor for the bus i on transmission component m under the preventive contingency case k, which represents the flow across that transmission component m when an increment of power is injected at bus i and an equivalent amount of power is withdrawn at the Reference Bus. The CAISO does not consider the effect of losses in the determination of PTDFs.~~
- ~~$PTDF^{g}_{i,m}$ is the Power Transfer Distribution for the bus i on transmission component m under the generator contingency case g, which represents the flow across that transmission component m when an increment of power is injected at bus i and an equivalent amount of power is withdrawn at the Reference Bus. The CAISO does not consider the effect of losses in the determination of PTDFs.~~
- ~~$PTDF^{g}_{n,m}$ is the Power Transfer Distribution Factor for the bus n on transmission component m under the generator contingency case g, which represents the flow across that transmission component m when an increment of power is injected at bus n and an equivalent amount of power is withdrawn at the Reference Bus. The CAISO does not consider the effect of losses in the determination of PTDFs.~~
- ~~$GLDF_{Og,n}$ is the generation loss distribution factor in the preventive generator contingency case g. The value is negative one when n is Og. This value is zero when n is not Og, and~~

when n is not associated with a frequency response capable generator. This value is the committed generator maximum capacity at n divided by the sum of the maximum capacity from all committed frequency response capable generators when n is not Og and n is associated with a frequency response capable generator.

The MCC at PNodes in an EIM Entity Balancing Authority Area j in the Real Time Market includes an additional contribution from the shadow price of the power balance constraint for that Balancing Authority Area, λ_j, as follows:

$$MCC_i = \lambda_j - \sum_{m=1}^{M} PTDF_{ij} \cdot \mu_m - \sum_{k=1}^{K} \sum_{m=1}^{M} PTDF_{i,m}^{k} \mu_m^k - \sum_{g=1}^{K_g} \sum_{m=1}^{M} \left(PTDF_{i,m}^{g} + \delta_{O_g,i} \sum_{n=1}^{N} PTDF_{n,m}^{g} GLDF_{O_g,n} \right) \mu_m^g$$

A power balance constraint is not formulated for the CAISO Balancing Authority Area alone in the RTM.

The shadow price of the power balance constraint for EIM Entity Balancing Authority Area j (λ_j) has the following contributions:

a) the shadow price of the EIM Transfer distribution constraint (φ_j), which distributes the EIM Transfer for Balancing Authority Area j to Energy transfers on interties with other Balancing Authority Areas in the EIM Area; and

b) the shadow price of the EIM Transfer scheduling limit for Balancing Authority Area j, upper (ν_j) or lower (ξ_j):

$$\lambda_j = \varphi_j - \nu_j + \xi_j$$

Where λ_j is zero for the CAISO Balancing Authority Area since the power balance constraint is not formulated for it.

The difference between the shadow prices of the EIM Transfer distribution constraints for two Balancing Authority Areas j and k in the EIM Area has the following contributions from any intertie l used for energy transfers between these two Balancing Authority Areas:

a) the EIM Transfer schedule cost that applies to that intertie l (σ_l);

b) the shadow price of the Energy transfer schedule limit from Balancing Authority Area j to Balancing Authority Area k that applies to that intertie l, upper limit (ρ_l) or lower limit (σ_l); and

c) the shadow price of the scheduling limit that constrains both Energy transfers and additional schedules to Balancing Authority Area j on that intertie l, upper limit (ζ_l) or lower limit (η_l):

$$\varphi_j - \varphi_k = -\sigma_l - \rho_l + \sigma_l + \zeta_l - \eta_l$$

There may be multiple scheduling limits under (c) above that constrain schedules on a given EIM Intertie.

A.4E. Marginal Losses Component Calculationof the LMP

The CAISO calculates the Marginal Cost of Losses ($MCLi$) at each PNode bus i as the product of the MEC and the rate for Marginal Losses at that PNode, as follows described in Section 27.1.1.2. The MCL component of the LMP at any bus i within the CAISO's Balancing Authority Area is calculated in the Day-Ahead Market and the Real-Time Market using the equation:

$$MCL_i = -MEC_i \frac{\partial L}{\partial P_i}$$

The MCL component of the LMP at any bus i within an EIM Balancing Authority Area is calculated in the Real-Time Market using the equation:

$$MCL_i = MLF_i * (SMEC_i + \lambda_j - \psi)$$

Where the rate for Marginal Losses at PNode i ($\partial L / \partial P_i$) is the sensitivity (partial derivative) of system losses (L) to an increment of power injected at that PNode (P_i) and absorbed by the Reference Bus. This calculation reflects the area interchange control feature of the AC power flow where the net scheduled interchange (NSI) of a Balancing Authority Area in the FNM is kept constant while the iterative solution distributes loss deviation from the previous iteration to the Reference Bus. Consequently, the rate for Marginal Losses of the TSRs that model a Market Transfer at a Transfer Location between two Balancing Authority Areas in the Market Area may be different because these TSRs belong to different Balancing Authority Areas. The CAISO sets the MCL for both of these TSRs to the average rate for Marginal Losses between the two so that there is no MCL difference between the TSRs on either side of a specific Market Transfer. The Marginal Losses on transmission facilities outside the Market Area are ignored in the calculation of the MCL.

- $MLFi$ (the marginal loss factor for PNode i to the system Reference Bus) = - $\partial L/\partial G_i$,

  Where:

~~L = system losses;~~

~~G_i = "generation injected" at PNode i; and~~

~~$\partial L/\partial G_i$ is the partial derivative of system losses with respect to generation injection at bus i.~~

- ~~$SMEC_r$ is the marginal cost of Energy at the Reference Bus r (System Marginal Energy Cost).~~
- ~~λ_j = the shadow price of the power balance constraint for the Balancing Authority Area in which the bus is located; and~~
- ~~ψ = the shadow price of the EIM export allocation constraint.~~

~~The MCL at PNodes in an EIM Entity Balancing Authority Area j in the Real Time Market includes additional contributions from the shadow price of the power balance constraint for that Balancing Authority Area (λ_j) and the shadow price of the net imbalance energy export allocation constraint for greenhouse gas regulation (ψ):~~

~~$$MCL_i = MLF_i * (SMEC_r + \lambda_j - \psi)$$~~

A.5~~F.~~ Marginal Greenhouse Gas Cost Component of the LMP

The CAISO employs a GHG model in the DAM and RTM as described in Sections 29.32 and 33.32. The GHG model calculates an optimal GHG Transfer for each GHG Regulation Area. If the GHG Transfer for a GHG Regulation Area is an import, it is allocated optimally to resources outside that GHG Regulation Area based on those resources' GHG Bid Adders. In that case, the Marginal GHG Cost for all PNodes in a specific GHG Regulation Area is the Shadow Price of the GHG Transfer allocation constraint for that GHG Regulation Area and it represents the marginal cost of GHG regulation for net import transfer into that GHG Regulation Area. If the GHG Transfer is an export, the GHG Transfer allocation constraint is not binding, all GHG attributions are zero for that GHG Regulation Area, and the Marginal GHG Cost for all PNodes in that GHG Regulation Area is zero. The Marginal GHG Cost outside of all GHG Regulation Areas is always zero. Furthermore, the Marginal GHG Cost of a TSR is always zero, even when its Transfer Location is within or at the border of a GHG Regulation Area, because the associated GHG regulation cost is collected from the LMP settlement of all physical resources within the GHG Regulation Area and paid explicitly to the respective resources outside the GHG Regulation Area with GHG Attributions for that GHG Regulation Area.

~~For EIM Participating Resources within an EIM Entity Balancing Authority Area and Energy imported to or exported from an EIM Entity Balancing Authority Area, the CAISO will include the Marginal Greenhouse Gas Cost in dispatching Energy from the relevant EIM Participating Resources to serve load in the CAISO Balancing Authority Area. The CAISO will allocate the Net Imbalance Energy Export optimally to EIM Participating Resources. This allocation does not depend on the location of the EIM Entity Participating Resource; *i.e.* the CAISO does not use a shift factor in the allocation. If the Net Imbalance Energy Export from all EIM Entity Balancing Authority Areas as a group is negative or zero, there is no associated Net Imbalance Energy Export allocation or Marginal Greenhouse Gas Cost. Otherwise the Net Imbalance Energy Export constraint is binding with a Shadow Price (ψ). The market-clearing process produces a Shadow Price for the Net Imbalanced Energy Export constraint only when the relaxation of the constraint would result in reduction in the total cost to operate the system. The CAISO determines the Marginal Greenhouse Gas Cost component of the LMP at a PNode in an EIM Entity Balancing Authority Area and LMPs for imports and exports between that EIM Entity Balancing Authority Area and a non-EIM Balancing Authority Area as the negative of the Shadow Price of the Net Imbalance Energy Export constraint.~~

A.6~~G.~~ Trading Hub Price Calculation

The CAISO calculates Existing Zone Generation Trading Hub prices, as provided in Section 27.3, based on the LMP calculations described in this Attachment and in Section 27.2.

A.7~~H.~~ Load Aggregation Point~~Zone~~ Price Calculation

The CAISO calculates LAP prices as described in Section~~s~~ 27.2.2.

A.8~~I.~~ Intertie Scheduling Point Price Calculation

The CAISO calculates LMPs for intertie resources at Scheduling Points, which are represented in the FNM as PNodes or aggregations of PNodes~~,~~ external to the Market ~~CAISO Balancing Authority~~ Area (*i.e.*, at the boundary of a Balancing Authority Area inside the Market Area with a Balancing Authority Area outside the Market Area), through the same process that is used to calculate LMPs for PNodes within the Market~~CAISO Balancing Authority~~ Area. In some cases, facilities that are part of the CAISO Controlled Grid but are external to the CAISO Balancing Authority Area connect some i~~I~~ntertie Scheduling Points to the CAISO Balancing Authority Area, and in these cases, the Scheduling Points are within external Balancing Authority Areas. In ~~both of~~ these cases, the Scheduling Points are represented in the FNM at

the relevant Locations and used to schedule imports and exports to/from the CAISO Balancing Authority Area. The MCC of the LMP at a Scheduling Point includes contributions from binding intertie constraints and intertie scheduling limits that constrain import/export Schedules at the relevant Scheduling Point. Normally, System Resources are registered at a Scheduling Point to a Balancing Authority Area in the Market Area to model Energy or capacity imports/exports from/to a Balancing Authority Area outside the Market Area. In this case, the CAISO distributes the import/export Energy Schedule or capacity award of the System Resource to the Default Generation Aggregation Point (DGAP) of the Balancing Authority Area outside the Market Area that is the source/sink. If the source/sink Balancing Authority Area is unknown at the time the CAISO Market runs, the CAISO distributes the import/export Energy Schedule or capacity award of the relevant System Resource to the Generic Generation Aggregation Point (GGAP) for the relevant Scheduling Point, and the MCL and MCC of the LMP of the System Resource reflect the Marginal Losses and Congestion at the relevant DGAP or GGAP, respectively.

In certain cases, System Resources are registered at a Scheduling Point to a Balancing Authority Area in the Market Area to model Energy imports/exports from/to another Balancing Authority Area inside the Market Area. This occurs because of differences in the Market Area between the Day-Ahead Market and the Real-Time Market when a Balancing Authority Area is outside the EDAM Area in the Day-Ahead Market, but inside the EIM Area in the Real-Time Market. In this case, the day-ahead Energy schedule of the relevant System Resource is distributed in the Real-Time Market to the DGAP of the source/sink Balancing Authority Area that is in the EIM Area, but cancelled with an opposite base Energy schedule of an EIM Mirror System Resource at the same Scheduling Point with the same distribution. The EIM Mirror System Resource belongs to the source/sink Balancing Authority Area and its base Energy schedule matches the day-ahead Energy schedule of the System Resource it mirrors. The EIM Mirror System Resource that mirrors a System Resource has an export base schedule that matches the day-ahead import schedule of its mirrored System Resource, or a base import schedule that matches the day-ahead export schedule of its mirrored System Resource. The LMPs of the EIM Mirror System Resource and the System Resource it mirrors are different in general because the MEC, MCL, and MCC components differ since the two resources belong to different Balancing Authority Areas in the Market Area. ~~The CAISO places injections and withdrawals at the Scheduling Point PNodes to represent Bids and Schedules~~

~~whose supporting physical injection and withdrawal locations may be unknown, and the LMPs for Settlement of accepted Bids are established at the Scheduling Point PNodes.~~

A.8~~I~~.1 Intertie Scheduling Point Price Calculation for IBAAs

A.8~~I~~.1.1 Scheduling Point Prices

As described in Section 27.5.3, the CAISO's FNM includes a full model of the network topology of each IBAA. The CAISO will specify Resource IDs that associate Intertie Scheduling Point Bids and Schedules with supporting injection and withdrawal locations on the FNM. These Resource IDs may be specified by the CAISO based on the information available to it, or developed pursuant to a Market Efficiency Enhancement Agreement. Once these Resource IDs are established, the CAISO will determine Intertie Scheduling Point LMPs based on the injection and withdrawal locations associated with each Intertie Scheduling Point Bid and Schedule by the appropriate Resource ID. In calculating these LMPs the CAISO follows the provisions specified in Section 27.5.3 regarding the treatment of Transmission Constraints and losses on the IBAA network facilities. Unless otherwise required pursuant to an effective MEEA, the default pricing for all imports from the IBAA(s) to the CAISO Balancing Authority Area will be based on the SMUD/TID IBAA Import LMP and all exports to the IBAA(s) from the CAISO Balancing Authority Area will be based on the SMUD/TID IBAA Export LMP. The SMUD/TID IBAA Import LMP will be calculated based on modeling of supply resources that assumes all supply is from the Captain Jack substation as defined by WECC. The SMUD/TID IBAA Export LMP will be calculated based on the Sacramento Municipal Utility District hub that reflects Intertie distribution factors developed from a seasonal power flow base case study of the WECC region using an equivalencing technique that requires the Sacramento Municipal Utility District hub to be equivalenced to only the buses that comprise the aggregated set of load resources in the IBAA, with all generation also being retained at its buses within the IBAA. The resulting load distribution within each aggregated set of load resources within the IBAA defines the Intertie distribution factors for exports from the CAISO Balancing Authority Area.

A.8~~I~~.1.2 Applicable Marginal Loss<u>es</u> Adjustment

For import Schedules to the CAISO Balancing Authority Area at the southern terminus of the California-Oregon Transmission Project at the Tracy substation or at the applicable Scheduling Point that connects the CAISO Balancing Authority and the Western Area Power Administration system, the CAISO will

replace the Marginal Cost of Losses at the otherwise applicable source for such Schedules with the Marginal Cost of Losses at the Tracy substation or at the applicable Scheduling point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system, provided that the Scheduling Coordinators certify as discussed further below that the Schedules originate from transactions that use: (a) the California-Oregon Transmission Project; or (b) transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA. In addition, as described further below, the Scheduling Coordinator must certify that the Schedules are subject to: (a) charges for losses by the Western Area Power Administration for the use of transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA; or (b) charges for losses by the Transmission Agency of Northern California for the use of the California-Oregon Transmission Project. The CAISO will establish Resource IDs that are to be used only to submit Bids, including Self-Schedules, for the purpose of establishing Schedules that are eligible for this loss adjustment.

Prior to obtaining such Resource IDs, the relevant Scheduling Coordinator shall certify that it will only use this established Resource ID for Bids, including Self-Schedules, that originate from transactions that use: (a) the California-Oregon Transmission Project; or (b) transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA. In addition, the Scheduling Coordinator must certify that the Schedules are subject to: (a) charges for losses by the Western Area Power Administration for the use of transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA; or (b) Transmission Agency of Northern California for the use of the California-Oregon Transmission Project. Further, by actually using such Resource ID, the Scheduling Coordinator represents that such Bids, including Self-Schedules, that originate from transactions that use: (a) the California-Oregon Transmission Project; or (b) transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA. In addition, the Scheduling Coordinator must certify that the Schedules are subject to: (a) charges for losses by the Western Area Power Administration for the use of transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA; or (b) Transmission Agency of Northern California for the use of the California-Oregon Transmission Project. Schedules and Dispatches settled under such Resource IDs shall be subject to an LMP which has accounted for the Marginal Cost of Losses as if there were an actual physical generation facility at the

Tracy Scheduling Point or at the applicable Scheduling Point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system as opposed to the Marginal Cost of Losses under the IBAA LMPs specified in Section I.1.1 of this Appendix. The CAISO may request information on a monthly basis from such Scheduling Coordinators to verify these certifications. Any such request shall be limited to transactions that use the designated Resource IDs during the six month prior period to the date of the request. The CAISO will calculate a re-adjustment of the Marginal Cost of Losses at the Tracy substation or at the applicable Scheduling Point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system to reflect the otherwise applicable source for such Schedules for any Settlement Interval in which the CAISO has determined that the Scheduling Coordinator's payments did not reflect transactions that meet the above specified certification requirements. Any amounts owed to the CAISO for such Marginal Cost of Losses re-adjustments will be recovered by the CAISO from the affected Scheduling Coordinator by netting the amounts owed from payments due in subsequent Settlements Statements until the outstanding amounts are fully recovered. For export Schedules from the CAISO Balancing Authority Area at the southern terminus of the California-Oregon Transmission Project at the Tracy substation or at the applicable Scheduling Point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system, the CAISO will replace the Marginal Cost of Losses at the otherwise applicable sink for such Schedules with the Marginal Cost of Losses at the Tracy substation or at the applicable Scheduling Point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system, provided that the Scheduling Coordinator certifies, as discussed below, where the export Schedules use: (a) the California-Oregon Transmission Project; or (b) any transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA. In addition, the Scheduling Coordinator must certify that the affected Schedules are charged losses by: (a) the Western Area Power Administration for the use of transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA; or (b) Transmission Agency of Northern California for the use of the California-Oregon Transmission Project. The CAISO will establish Resource IDs that are to be used only to submit Bids, including Self-Schedules, for the purpose of establishing Schedules that are eligible for this loss adjustment. Prior to obtaining such Resource IDs, the relevant Scheduling Coordinator shall certify that it will only use this established

Resource ID for Bids, including Self-Schedules, where the export Schedules use: (a) the California-Oregon Transmission Project; or (b) any transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA. In addition the Scheduling Coordinator must certify that the affected Schedules are charged losses by: (a) the Western Area Power Administration for the use of transmission facilities owned by the Western Area Power Administration within the SMUD/TID IBAA; or (b) Transmission Agency of Northern California for the use of the California-Oregon Transmission Project. Further, by actually using such Resource ID, the Scheduling Coordinator represents that such Bids, including Self-Schedules, are used for the above specified conditions.

Schedules and Dispatches settled under such Resource IDs shall be subject to an LMP which has accounted for the Marginal Cost of Losses as if there were an actual physical generation facility at the Tracy Scheduling Point or at the applicable Scheduling Point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system as opposed to the Marginal Cost of Losses under the IBAA LMPs specified in Section I.1.1 of this Appendix. The CAISO may request information on a monthly basis from such Scheduling Coordinators to verify that schedules for such Resource IDs meet the above specified conditions. Any such request shall be limited to transactions that use the designated Resource IDs during the six month prior period to the date of the request.

The CAISO will calculate a re-adjustment of the Marginal Cost of Losses at the Tracy substation or at the applicable Scheduling Point that connects the CAISO Balancing Authority Area and the Western Area Power Administration system to reflect the otherwise applicable sink for such Schedules for any Settlement Interval in which the CAISO has determined that the Scheduling Coordinator's payments did not reflect transactions that met the above specified conditions. Any amounts owed to the CAISO for such Marginal Cost of Losses re-adjustments will be recovered by the CAISO from the affected Scheduling Coordinator by netting the amounts owed from payments due in subsequent Settlements Statements until the outstanding amounts are fully recovered.

B. Locational Marginal Price for Imbalance Reserves

The CAISO shall calculate the Locational IRU Price and Locational IRD Price at Generation PNodes, Scheduling Points, and Aggregated Pricing Nodes, as provided in the CAISO Tariff. The Locational IRU Price and Locational IRD Price at PNodes, Scheduling Points, and Aggregated Pricing Nodes include

separate components for the Marginal IRU or IRD Cost, and the Marginal IRU or IRD Cost of Congestion, respectively. As provided in Section 6.5.3.2.2, Locational IRU Prices and Locational IRD Prices are calculated and posted for each hour of the Day-Ahead Market. There are different Locational Marginal Prices for IRU and IRD at any given Location in the Market Area.

B.1. Locational IRU and IRD Price Composition

In each hour of the Day-Ahead Market, the CAISO calculates the Locational IRU Price and Locational IRD Price for each PNode, which is based on the IRU and IRD Bids of sellers selected in the Day-Ahead Market as calculated below. The CAISO uses a Reference Bus for the calculation of the Locational IRU Price and Locational IRD Price. The Reference Bus for the Locational IRU Price is the distributed IRU requirement in the Market Area, whereas the Reference Bus for the Locational IRD Price is the distributed IRD requirement in the Market Area. The Reference Bus is used in sensitivity calculations that yield the Power Transfer Distribution Factors. The CAISO does not employ an AC power flow in the IRU and IRD deployment scenarios in the IFM. The Transmission Constraints in the IRU and IRD deployment scenarios are formulated as linear extensions of the Transmission Constraints in the base scenario using the AC power flow solution for the base scenario. Therefore, there is no marginal loss component in the Locational IRU Price and Locational IRD Price. For each PNode, the CAISO determines separate components of the Locational IRU Price and Locational IRD Price for the Marginal IRU and IRD Cost, and the Marginal Cost of Congestion for IRU and IRD, as follows:

$$LMP_i^{(IRU)} = MEC_i^{(IRU)} + MCC_i^{(IRU)}$$

$$LMP_i^{(IRD)} = MEC_i^{(IRD)} + MCC_i^{(IRD)}$$

where:

- i is the PNode index.
- $MEC_i^{(IRU)}$ is the Locational IRU Price component representing the Marginal IRU Cost at PNode i.
- $MCC_i^{(IRU)}$ is the Locational IRU Price component representing the Marginal Cost of Congestion for IRU at PNode i.
- $MEC_i^{(IRD)}$ is the Locational IRD Price component representing the Marginal IRD Cost at PNode i.
- $MCC_i^{(IRD)}$ is the Locational IRD Price component representing the Marginal Cost of Congestion for

IRD at PNode i.

B.2. Marginal IRU and IRD Cost Component

The Marginal IRU and IRD Cost Component is the same for all PNodes in each Balancing Authority Area in the Market Area. It is the Shadow Price of the power balance constraint in the IRU or IRD deployment scenario for the respective Balancing Authority Area at the optimal solution in the IFM. The power balance constraint for each Balancing Authority Area in the Market Area ensures that the physical law of conservation of Energy and deployed capacity (the sum of physical resource energy schedules from the base scenario plus the deployed IRU or IRD awards equals the IRU or IRD requirement minus the IRU or IRD demand relaxation plus the Net IRU or IRD Transfer) is accounted for in the solution of the IRU or IRD deployment scenario. The Marginal IRU or IRD Cost for the Transfer System Resources (TSRs) on each side of an EDAM Transfer is the Marginal IRU or IRD Cost of the respective Balancing Authority Area. The Marginal IRU or IRD Cost may be different between two Balancing Authority Areas in the Market Area when EDAM Transfers between these Balancing Authority Areas are scheduled at their respective scheduling limits. The Marginal IRU or IRD Cost difference between the Balancing Authority Areas on either side of a specific EDAM Transfer generates EDAM Transfer revenue.

B.3. Marginal Congestion Component for IRU and IRD

The CAISO calculates the Marginal Cost of Congestion for IRU and IRD at each PNode as the net contribution of the Shadow Prices of the binding Transmission Constraints in the IRU or IRD deployment scenarios at the optimal solution for IFM, weighed by the respective Power Transfer Distribution Factors, as follows:

$$MCC_i^{(IRU)} = -\sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF_{i,j,m,k}^{(IRU)}\, \mu_{m,k}^{(IRU)}$$

$$MCC_i^{(IRD)} = -\sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF_{i,j,m,k}^{(IRD)}\, \mu_{m,k}^{(IRD)}$$

Where:

- i is the Pnode index.
- m is the Transmission Constraint index in the Market Area; transmission constraints outside the Market Area are not enforced.

- k is the constraint case index; zero (0) indicates the base case where all transmission and generation facilities are in service, whereas a positive case indicates a preventive transmission or generation contingency case, as applicable.
- j is the transmission component index of Transmission Constraint m. When Transmission Constraint m is a Nomogram, there can be more than one transmission components in it; otherwise, there is only one transmission component.
- K is the number of constraint cases, besides the base case.
- M is the number of Transmission Constraints.
- J_m is the number of transmission components of Transmission Constraint m.
- $PTDF_{i,j,m,k}^{(IRU)}$ and $PTDF_{i,j,m,k}^{(IRD)}$ is the Power Transfer Distribution Factor (PTDF) for PNode i on transmission component j of Transmission Constraint m in constraint case k in the IRU or IRD deployment scenario; it is the power flow contribution on that transmission component j when an increment of power is injected at PNode i and an equivalent amount of power is withdrawn at the Reference Bus. For Market Area Intertie resources at a Scheduling Point, and TSRs at a Transfer Location, the PTDF to an intertie constraint or intertie scheduling limit at that Scheduling Point is +1 for an import and –1 for an export. The CAISO does not consider the effect of Transmission Losses in the calculation of PTDFs; they depend only on the network configuration. Furthermore, the difference between the PTDFs at two PNodes with respect to any binding Transmission Constraint, and thus the difference between the Marginal Cost of Congestion for IRU or IRD at these PNodes, is independent from the selection of the Reference Bus. The PTDFs in the IRU or IRD deployment scenarios are different from the ones in the base scenario of the IFM because although the network configuration is the same, the Reference Bus is different; furthermore, the binding constraints in the base and the IRU or IRD deployment scenarios may be different.

- $c_{j,m}$ is the constraint coefficient for transmission component j of Transmission Constraint m when Transmission Constraint m is a Nomogram; otherwise, this constraint coefficient is always one.
- $\mu_{m,k}^{(IRU)}$ and $\mu_{m,k}^{(IRD)}$ is the Shadow Price of Transmission Constraint m in constraint case k at the IRU or IRD deployment scenario in the optimal solution of the IFM.

C. Locational Marginal Price for Reliability Capacity

The CAISO shall calculate the Locational RCU Price and Locational RCD Price at Generation PNodes, Scheduling Points, and Aggregated Pricing Nodes, as provided in the CAISO Tariff. The Locational RCU Price and Locational RCD Price at PNodes, Scheduling Points, and Aggregated Pricing Nodes include separate components for the Marginal RCU or RCD Cost, Marginal RCU or RCD Cost of Congestion, and Marginal RCU or RCD Cost of Losses, respectively. As provided in Section 6.5.3.2.2, Locational RCU Prices and Locational RCD Prices are calculated and posted for each hour of the Day-Ahead Market. There is a single Locational Marginal Price for Reliability Capacity that applies to both Reliability Capacity Up and Reliability Capacity Down at any given Location in the Market Area.

C.1. Locational RCU and RCD Price Composition

In each hour of the Day-Ahead Market, the CAISO calculates the Locational RCU Price and Locational RCD Price for each PNode, which is based on the RCU and RCD Bids of sellers selected in the Day-Ahead Market as calculated below. The CAISO uses a Reference Bus for the calculation of the Locational RCU Price and Locational RCD Price. The Reference Bus is the distributed demand forecast in the Market Area, used in the AC power flow solution in RUC to distribute the deviations for Transmission Losses between iterations, and in sensitivity calculations that yield rates for Marginal Losses and the Power Transfer Distribution Factors. If the CAISO Market solution reverts to a DC power flow solution, the Reference Bus is not used because Transmission Losses are not included. Nevertheless, the CAISO reflects the Transmission Losses for the Market Area in the DC power flow solution by adjusting the load by the average loss factor. For each PNode, the CAISO determines separate components of the Locational RCU Price and Locational RCD Price for the Marginal RCU and RCD Cost, Marginal Cost of Congestion for RCU and RCD, and Marginal Cost of Losses for RCU and RCD, as follows:

$$LMP_i^{(RUC)} = MEC_i^{(RUC)} + MCC_i^{(RUC)} + MCL_i^{(RUC)}$$

where:

- i is the PNode index.
- $MEC_i^{(RUC)}$ is the Locational RCU Price and Locational RCD Price component representing the Marginal Reliability Capacity Cost at PNode i.
- $MCC_i^{(RUC)}$ is the Locational RCU Price and Locational RCD Price component representing the Marginal Cost of Congestion for RCU and RCD at PNode i.
- $MCL_i^{(RUC)}$ is the Locational RCU Price and Locational RCD Price component representing the Marginal Cost of Losses for RCU and RCD at PNode i.

C.2. Marginal Reliability Capacity Cost Component

The Marginal Reliability Capacity Cost Component is the same for all PNodes in each Balancing Authority Area in the Market Area. It is the Shadow Price of the power balance constraint for the respective Balancing Authority Area at the optimal solution in the RUC. The power balance constraint for each Balancing Authority Area in the Market Area ensures that the physical law of conservation of Energy (the sum of physical resource energy schedules from the IFM plus the deployed Reliability Capacity awards equals the demand forecast plus the Net Reliability Capacity Transfer) is accounted for in the RUC solution. The Marginal Reliability Capacity Cost for the Transfer System Resources (TSRs) on each side of an EDAM Transfer is the Marginal Reliability Capacity Cost of the respective Balancing Authority Area. The Marginal Reliability Capacity Cost may be different between two Balancing Authority Areas in the Market Area when EDAM Transfers between these Balancing Authority Areas are scheduled at their respective scheduling limits. The Marginal Reliability Capacity Cost difference between the Balancing Authority Areas on either side of a specific EDAM Transfer generates EDAM Transfer revenue.

C.3. Marginal Congestion Component for RCU and RCD

The CAISO calculates the Marginal Cost of Congestion for RCU and RCD at each PNode as the net contribution of the Shadow Prices of the binding Transmission Constraints at the optimal solution for RUC, weighed by the respective Power Transfer Distribution Factors, as follows:

$$MCC_i^{(RUC)} = -\sum_{k=0}^{K}\sum_{m=1}^{M}\sum_{j=1}^{J_m} c_{j,m}\, PTDF_{i,j,m,k}\, \mu_{m,k}^{(RUC)}$$

where:

- i is the PNode index.
- m is the Transmission Constraint index in the Market Area; transmission constraints outside the Market Area are not enforced.
- k is the constraint case index; zero (0) indicates the base case where all transmission and generation facilities are in service, whereas a positive case indicates a preventive transmission or generation contingency case, as applicable.
- j is the transmission component index of Transmission Constraint m. When Transmission Constraint m is a Nomogram, there can be more than one transmission components in it; otherwise, there is only one transmission component.
- K is the number of constraint cases, besides the base case.
- M is the number of Transmission Constraints.
- J_m is the number of transmission components of Transmission Constraint m.
- $PTDF_{i,j,m,k}$ is the Power Transfer Distribution Factor (PTDF) for PNode i on transmission component j of Transmission Constraint m in constraint case k; it is the power flow contribution on that transmission component j when an increment of power is injected at PNode i and an equivalent amount of power is withdrawn at the Reference Bus. For Market Area Intertie resources at a Scheduling Point, and TSRs at a Transfer Location, the PTDF to an intertie constraint or intertie scheduling limit at that Scheduling Point is +1 for an import and –1 for an export. The CAISO does not consider the effect of Transmission Losses in the calculation of PTDFs; they depend only on the network configuration. Furthermore, the difference between the PTDFs at two PNodes with respect to any binding Transmission Constraint, and thus the difference between the Marginal Cost of Congestion for RCU and RCD at these PNodes, is independent from the selection of the Reference Bus. The PTDFs in the RUC are the same as the ones in the

IFM base scenario because the network configuration is the same; however, the binding constraints in the RUC may be different from the ones in the IFM.

- $c_{j,m}$ is the constraint coefficient for transmission component j of Transmission Constraint m when Transmission Constraint m is a Nomogram; otherwise, this constraint coefficient is always one.
- $\mu_{m,k}^{(RUC)}$ is the Shadow Price of Transmission Constraint m in constraint case k at the optimal solution of the RUC.

D. Marginal Loss Component for RCU and RCD

The CAISO calculates the Marginal Cost of Losses for RCU and RCD at each PNode as the product of the Marginal Reliability Capacity Cost Component and the rate for Marginal Losses at that PNode, as follows:

$$MCL_i^{(RUC)} = -MEC_i^{(RUC)} \frac{\partial L}{\partial P_i}$$

Where the rate for Marginal Losses at PNode i ($\partial L/\partial P_i$) is the sensitivity (partial derivative) of system losses (L) to an increment of power injected at that PNode (P_i) and absorbed by the Reference Bus for the RUC. This calculation reflects the area interchange control feature of the AC power flow where the net scheduled interchange (NSI) of a Balancing Authority Area in the FNM is kept constant while the iterative solution distributes loss deviation from the previous iteration to the Reference Bus for the RUC. Consequently, the Marginal Cost of Losses for RCU and RCD of the TSRs that model a Market Transfer at a Transfer Location between two Balancing Authority Areas in the Market Area may be different because these TSRs belong to different Balancing Authority Areas. The CAISO sets the Marginal Cost of Losses for RCU and RCD for both of these TSRs to the average rate for Marginal Losses between the two so that there is no difference between the Marginal Cost of Losses for RCU and RCD between the TSRs on either side of a specific Market Transfer. The Marginal Losses on transmission facilities outside the Market Area are ignored in the calculation of the Marginal Cost of Losses for RCU and RCD.

Appendix F Rate Schedules

Schedule 1

Grid Management Charge

Part A - Monthly Calculation of Grid Management Charge (GMC)

The GMC consists of the following separate service charges: (1) the Market Services Charge; (2) the System Operations Charge; and (3) the CRR Services Charge. The GMC revenue requirement, determined in accordance with Part C of this Schedule 1, shall be allocated to the service charges specified in Part A of this Schedule 1 as follows: forty-nine (49) percent to Market Services; forty-nine (49) percent to System Operations; and two (2) percent to CRR Services. Starting in 2017 and every three (3) years thereafter, the CAISO will conduct an updated cost of service study, in consultation with stakeholders and using costs from the previous year. In conducting each cost of service study, the CAISO will recalculate the three service charge percentages and the rates for the fees and charges that constitute the Grid Management Charge as set forth in Section 11.22. In addition, the cost of service study results will be used to update the RC Funding Percentage used to calculate the annual RC Funding Requirement, as well as the real time percentages of the Market Services and System Operations service charges used to calculate the EIM Administrative Charges. The cost of service study results will also be used to update the real-time market percentage used to calculate the EDAM System Operations charge. If, based on the cost of service study results, the service category revenue requirement allocation percentages or the level of fees and charges have changed, the CAISO will submit tariff amendments to reflect such changes pursuant to Section 205 of the FPA.

1. The rate for the Market Services Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by the forecast annual gross absolute value of MW per hour of Ancillary Services capacity awarded in the Day-Ahead and Real-Time Markets, MWh of Energy cleared in the Day-Ahead market, MWh of Imbalance Reserves cleared in the Day-Ahead market, MWh of Reliability capacity cleared in the Day-Ahead market, Virtual Demand Award, Virtual Supply Award, and FMM Instructed Imbalance Energy and RTD Instructed Imbalance Energy, less the forecast annual gross absolute value of such Energy as may be excluded for a load following MSS pursuant to an MSS agreement, Standard Ramping Energy, Regulation Energy, Ramping Energy Deviation, Residual Imbalance Energy, Exceptional Dispatch Energy and Operational Adjustments for the Day-Ahead and Real-Time.

2. The rate for the System Operations Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by forecast annual gross absolute value of MWh of real-time energy flows on the ISO Controlled Grid, net of amounts excluded pursuant to Part E of this Schedule.

3. The rate for the CRR Services Charge will be calculated by dividing the annual GMC revenue requirement allocated to this service category by the forecast annual sum of awarded MW of CRRs per hour.

The rates for the foregoing charges shall be adjusted automatically each year, effective January 1 for the following twelve (12) months, in the manner set forth in Part D of this Schedule.

Part B - Quarterly Adjustment, If Required

Each component rate of the GMC will be adjusted automatically on a quarterly basis, up or down, so that

* * * * *

Attachment C – DAME Final Proposal

Day-Ahead Market Enhancements and Extended Day-Ahead Market

California Independent System Operator Corporation

August 22, 2023

Day-Ahead Market Enhancements

Revised Final Proposal

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Day-Ahead Market Enhancements: Revised Final Proposal

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Executive Summary

This proposal is the product of extensive stakeholder engagement and addresses design elements and concerns raised by stakeholders and industry experts in the development of an imbalance reserve product to enhance the day-ahead market. The purpose is to develop a day-ahead market feature that economically and reliably addresses net load variability and uncertainty observed in the ISO and Western markets. After extensive stakeholder deliberations, the proposal is to:

- Introduce an imbalance reserve product in the integrated forward market that procures flexible reserves to cover uncertainty in the net load forecast between day-ahead and real-time markets, as well as real-time ramping needs not covered by hourly day-ahead market schedules.
- Enhance the residual unit commitment process to enable resources to economically bid compatible with an extended day-ahead market structure and enable the procurement of downward dispatch capability.

The need for the imbalance reserve product stems from the increased demand and supply uncertainty and variability, in part due to the growing penetration of variable energy resources (VERs). The inherent uncertainty in VER forecasting necessitates flexible reserves that can respond quickly to changing system conditions. Although the proposed imbalance reserve product is unique among similar products adopted in other ISO and RTOs, it is designed specifically to address the issues and opportunities seen in Western markets with the accelerated penetration, magnitude and diversity of variable energy resources, not yet seen in other markets. In addition, experience with the existing flexible ramping product currently in place in the real-time market, including the Western Imbalance Energy Market, has highlighted the need to ensure that such ramping products evaluate a resource's ability to provide the product based on resource characteristics and limitations on the transmission system. The Western grid has also experienced significant weather related uncertainty that, although challenging, highlights the benefits of optimizing diversity of system needs and conditions across the larger footprint. This proposal reflects these learnings and includes additional requirements necessary to address the unique challenges posed by the increasing presence of storage resources that also play an important role in the ISO's ability to maintain system reliability. Some have noted that prior versions of the proposal were overly and unnecessarily complex. The most recent extended stakeholder process confirmed that the complexity of issues faced in Western energy markets necessitates an evolution from the limited designs of similar products adopted elsewhere.

The imbalance reserve product defined in this proposal is also essential to an extended day-ahead market (EDAM) as it best ensures EDAM entities, including the ISO, can benefit from the footprint-wide diversity in the day-ahead market's optimization. This proposal addresses the unique requirements of an extended day-ahead market design that seeks to ensure transfers determined in that market are both economic and reliable, which is also a unique feature as compared to similar products previously adopted elsewhere.

Throughout the development of this proposal, we have conducted numerous meetings, outreach efforts, and consultations, involving stakeholders from various backgrounds. One important outcome and

evolution coming out of this effort is that the design includes a number of configurable parameters and features that can evolve over time. This configurability was explicitly developed in response to stakeholder feedback that given the unique and innovative nature of this proposal, it is necessary to have off-ramps and an ability to pivot quickly should we face unintended adverse consequences. Although the configurable nature of the proposed design has garnered support from a number of stakeholders, it has also raised concerns regarding transparency on how the parameters will be set at the start, how they will evolve or change, and what discretion the ISO will have in making those changes. This proposal includes a commitment and explanation of the detailed information, workshops and stakeholder engagement that the CAISO will conduct to tune the configurable elements of the design, both during testing, implementation and after go live. The proposal also indicates a commitment to work with the Department of Market Monitoring to independently report on the performance of alternative parameters and settings before and after implementation.

The extensive stakeholder input and participation in this initiative evolved the revised final proposal to provide an overall design that will produce a more efficient, economic and effective market outcome. The additional stakeholder process produced a number of changes and clarifications included in the revised final proposal. These include:

- Implement flexibility to define which transmission constraints to enforce in the deployment scenarios to evaluate the deliverability of a resource awarded the product. This will allow the CAISO flexibility to adjust the transmission constraints enforced in the deployment scenarios in response to optimization performance, market performance, or operational experience. This will also enable the CAISO to work with EDAM balancing authority area operators to define the critical constraints to be enforced in the deployment scenarios in their balancing authority area. This modification addresses stakeholder concerns about the computational performance and market impact of the nodal approach to procurement of imbalance reserves.
- Implement a tunable parameter to control the proportion of imbalance reserve awards deployed with resulting flows in the deployment scenarios. These deployment scenarios test imbalance reserves against transmission constraints by assuming that 100% of imbalance reserve awards are converted to energy. This parameter enables adjustments to the percentage of imbalance reserve deployment, addressing concerns about potential excessive congestion, virtual arbitrage, and associated costs.
- Expand the imbalance reserve product to include the 30-minute ramp-capable portion of the resource. This is less restrictive than the previous 15-minute ramping restriction and is less costly because it requires fewer resources to provide imbalance reserves.
- Include a mechanism to collect congestion revenue rent on imbalance reserve flows and redistribute it to entities entitled to the congestion revenue. This mechanism will involve calculating displaced congestion revenue from imbalance reserve flows and redistributing it according to existing processes.
- Include a demand curve for the product that limits the price for the product to $55/MW, which is comparable to the reserves replacement costs based on the 80th percentile of historical

operating reserves bids submitted to the CAISO, comparable to the methodological approach of the Mid-Continent ISO with a similar product.

- Commitment to evaluating the need to add a layer of regional uncertainty to the nodal uncertainty approach. This evaluation will address stakeholder concerns that the approach to distributing uncertainty in the deployment scenarios is flawed because it does not account for differences in uncertainty across locations.
- Inclusion of an "opt-in" transitional resource adequacy true-up mechanism. This mechanism will allow entities to choose to have specific imbalance reserve and reliability capacity payments that overlap with resource adequacy capacity settled by the ISO.

Summary of Proposed Design

Changes to the Integrated Forward Market to include Imbalance Reserve Product

Under these enhancements, the day-ahead market's integrated forward market would continue to co-optimize energy and ancillary services, but would also include imbalance reserves within the same co-optimization to reserve resources' flexible ramping capability for real-time dispatch and commit resources needed to provide this ramping capability. Imbalance reserves would ensure the day-ahead market schedules sufficient flexible reserves to meet net load imbalances and ramping needs that materialize between the day-ahead and real-time markets.

The day-ahead market currently lacks a product that procures flexible reserves to address day-ahead to real-time uncertainty. Without a day-ahead flexible reserve product, uncertainty around imbalances that may materialize in real-time poses operational risks. To address such risk, market operators have historically taken manual actions outside of the market framework to procure additional capacity in the day-ahead timeframe. Specifically, grid operators increase the demand forecast used in the day-ahead market's residual unit commitment process. Although this results in the residual unit commitment process committing additional units to address uncertainty between the day-ahead and real-time markets, persistent and systematic out-of-market actions taken by CAISO operators signal a gap in the CAISO's market design. The absence of the ability to co-optimize the procurement of imbalance reserves with energy and ancillary services results in less optimal and less economic energy and ancillary services schedules. In addition, there is currently no price to signal the value of the uncertainty covered by manual grid operators' adjustments to the demand forecast used in the residual unit commitment process. The introduction of imbalance reserves in the integrated forward market will greatly decrease the need for grid operator adjustments to the demand forecast used in the residual unit commitment process, creating a more efficient and effective market outcome.

Imbalance reserves would be procured in the upward direction (imbalance reserves up) and downward direction (imbalance reserves down). The quantity of imbalance reserves the market would procure would be based on the historical uncertainty in the day-ahead load, solar, and wind forecasts. Only resources that can be dispatched in the fifteen-minute market would be eligible to provide imbalance reserves. Imbalance reserve awards would be capped at the resource's 30-minute ramping capability. Suppliers would provide price and quantity bids separately for imbalance reserves up and imbalance reserves down that the market would use to determine optimal imbalance reserve awards. The market

would consider certain transmission constraints to ensure imbalance reserves are deliverable in the day-ahead timeframe to locations where uncertainty historically materializes. An imbalance reserve demand curve will decrease the procurement of imbalance reserves at higher costs by assessing the trade-off between the incremental cost and operational value of the reserves.

Settlement of the Imbalance Reserve Product

Resources awarded imbalance reserves would receive a day-ahead payment at the product's locational marginal price. Ramping capability provided by imbalance reserve awards in the day-ahead market would be settled against the flexible ramping product in the real-time market. The market would recover the costs of imbalance reserves, including congestion costs, through cost allocations that collect payments from entities based on their contribution to the need for procuring the product.

Changes to the Residual Unit Commitment Process

As supply and demand variability increased, operators increasingly adjusted requirements in the residual unit commitment process to ensure sufficient additional resource capacity is committed to meet net demand uncertainty between day-ahead and real-time markets, without considering resources' flexible ramping or dispatch capabilities. Like other ISO/RTO markets, the original purpose of the residual unit commitment process is to procure capacity for two reasons: (1) to address the difference between market-cleared load schedules and demand forecasts, and (2) to replace cleared virtual supply with physical resources. The residual unit commitment process remains an essential part of the day-ahead market and continues to procure capacity for these reasons. With the integrated forward market procuring flexible ramping capabilities needed to address load and resource uncertainty, operators will no longer need to bias the residual unit commitment procurement target for uncertainty.

This proposal also considers enhancements to the current residual unit commitment process. CAISO would continue to run the process after the integrated forward market co-optimizes energy, ancillary services, and imbalance reserves. Reserves awarded in this process would be called *reliability capacity*. In addition to procuring upward capacity, this process would also procure downward capacity if the procurement target is less than the demand cleared in the integrated forward market.

All resources currently eligible for the residual unit commitment process would be eligible to provide reliability capacity, including storage. Reliability capacity awards would be capped at the resource's 60-minute ramping capability. Suppliers would provide separate price and quantity bids for reliability capacity up and down, which the market would use to determine optimal awards. Like today, the process would continue to consider transmission constraints to ensure reliability capacity is deliverable in the day-ahead timeframe. Resources awarded reliability capacity would receive a day-ahead payment at the product's locational marginal price.

In addition to procuring downward dispatch capability, this proposal enhances the residual unit commitment process by establishing the binding configuration for multi-stage generating resources.

Currently, resource adequacy resources are required to bid at $0/MW prices and are not compensated for scheduled capacity determined in the residual commitment process. The proposal allows resource adequacy resources to bid non-zero prices into the process, better optimizing reliability capacity in the

context of an extended day-ahead market. As all resources, including resource adequacy capacity resources, can bid to offer reliability capacity and localized scarcity could occur due to congestion constraints, the proposal includes local market power mitigation measures for reliability capacity offers through an additional market pass.

Resources receiving an imbalance reserve or reliability capacity award would be obligated to provide economic energy bids in the real-time market for the quantity of their awards.

Integration of the Imbalance Reserve Product and Reliability Capacity in the EDAM

Imbalance reserves would optimize the scheduling of flexible reserves across the EDAM footprint to meet each EDAM participants' net load uncertainty and real-time ramping needs while maximizing the diversity benefit of a large market footprint. The EDAM contemplates that participants must meet both their load and uncertainty requirements as part of the residual imbalance energy. The proposed imbalance reserves provide the EDAM resource sufficiency evaluation a consistent method for evaluating and addressing uncertainty needs in each EDAM balancing area. By including the product in the integrated forward market, the EDAM can minimize the costs across the larger footprint and maximize the ability to optimize the diversity of load, transmission limitations and resources characteristics and availability. Additionally, reliability capacity up and down would be procured in the EDAM to ensure each EDAM participant has sufficient physical supply scheduled in the day-ahead timeframe to meet their balancing area's load forecast.

1. Changes from Final Proposal and Responses to Stakeholder Feedback

The CAISO published the Day-Ahead Market Enhancements (DAME) final proposal on January 11, 2023, intending to bring it to the CAISO Board of Governors and WEIM Governing Body for a decision in February. However, in response to concerns raised by stakeholders, ISO management decided to extend the DAME stakeholder process for a limited period to address lingering stakeholder concerns with the proposal. The main concerns were over design details regarding how the imbalance reserves are procured. Specifically, stakeholders raised concern with the BAA level at which the imbalance reserve products were to be procured and the degree to which transmission constraints would be modeled to ensure deliverability. Some continued to question which of the day-ahead market processes should procure imbalance reserves (i.e., IFM or RUC). The extended stakeholder process was intended to facilitate more discussion on key design elements and allow the ISO and stakeholders additional time to consider all stakeholder input. This would enable them to make informed judgments on the final design. Management limited the time for extending the process because the inclusion of the imbalance reserve product in the day-ahead market is a critical element of the EDAM market design and further delays in solidifying the DAME design would be problematic for the EDAM efforts.

The CAISO solicited stakeholder presentations and held its first public meeting in this extended stakeholder process on February 27, 2023. The Western Power Trading Forum, Vistra, and CAISO staff presented their views on the proposed imbalance reserve product. At the second public meeting on March 7, 2023, CAISO staff, Vistra, and Southern California Edison presented their views on alternative designs. At the third public meeting on March 8, 2023, CAISO staff and WPTF presented their views on alternatives and the proposed design. Finally, the Market Surveillance Committee considered DAME at its March 10, 2023 meeting, with presentations by CAISO staff and MSC members Scott Harvey and Jim Bushnell. In all, the CAISO dedicated approximately 20 hours of public meetings to this extended stakeholder process, with robust participation from a wide array of market participants.[1]

On March 20, 2023, the CAISO published a comparison matrix to highlight the differences and tradeoffs between the various design options considered in the workshops.[2] Although there are many possible variations of each approach, the basic descriptions of these options are as follows:

- **Nodal approach** - procuring imbalance reserves within the IFM (co-optimized with energy and ancillary services) and using deployment scenarios to ensure the awards are transmission feasible if deployed as energy.
- **Zonal approach** - procuring imbalance reserves within the IFM (co-optimized with energy and ancillary services) using zonal procurement similar to ancillary services.

[1] Presentations and recordings from these meetings can be found at: https://stakeholdercenter.caiso.com/StakeholderInitiatives/Day-ahead-market-enhancements

2 http://www.caiso.com/InitiativeDocuments/ComparisonMatrix-Day-AheadMarketEnhancements.pdf. Please note that WPTF provided a redlined version of the matrix from their perspective in their stakeholder comments.

- **SCE approach** - procuring imbalance reserves within the RUC (co-optimized with reliability capacity) using nodal procurement to respect transmission constraints, with a fallback option of keeping imbalance reserves in the IFM but modeling less than full deployment of the imbalance reserves in the deployment scenarios.

On March 30, 2023, stakeholders submitted written comments to provide feedback on what modifications the CAISO should consider for DAME based on the workshop discussions. This stakeholder feedback informed the creation of a draft revised final proposal, published by the CAISO on April 6, 2023. A stakeholder meeting was held on April 7, 2023, to discuss the draft revised final proposal. An additional stakeholder workshop was held on April 17, 2023, for the discussion of DAME policy related to energy storage resources, in which both CAISO staff and the California Energy Storage Alliance (CESA) made presentations.

On April 18, 2023, the CAISO published an addendum to the draft revised final proposal reflecting updates to the imbalance reserve demand curve and related changes based on stakeholder feedback. The material described within that addendum is incorporated in this proposal. On April 24, 2023, stakeholders provided written comments on the draft revised final proposal. These comments were considered in the creation of this revised final proposal. The changes made to this revised final proposal are as follows:

- **Replaces the hybrid demand curve approach with a capped imbalance reserve demand curve for all EDAM BAAs.** The Draft Revised Final Proposal included a hybrid design for the CAISO BAA imbalance reserve requirement. However, the ISO no longer recommends this approach after further evaluation revealed potential issues. Instead, the ISO will implement an imbalance reserve demand curve for all EDAM BAAs, including CAISO BAA, capping the imbalance reserve up and down demand curve values at $55/MWh. The calculation of the imbalance reserve demand curve will resemble that of the flexible ramping product demand curve but will use $247/MWh as the basis for calculating the various segments of the demand curve. Demand curves will be calculated each hour and determined separately for each EDAM entity. The demand curve represents the relationship between the price of imbalance reserves and the quantity the market is willing to procure, allowing the market to determine whether to meet all or some of the upward and downward uncertainty requirements. By capping the demand curve values, market participants can gradually adapt to the new market design, allowing for a smoother transition. The ISO will closely monitor the market to ensure the demand curve cap does not unintentionally affect market efficiency or suppress essential price signals. As the market matures, it will be crucial to review and adjust the demand curves periodically.
- **Revises local market power mitigation and the imbalance reserve bid cap in connection with the change above.** The newly proposed demand curve negates the effect of local market power mitigation for imbalance reserves, as the mitigated bid has the same value as the cap of the demand curve. However, the ISO still intends to implement local market power mitigation procedures in its market software, should the need arise where the parameters for the demand curve or the mitigated bids change in a way that makes the mitigation binding. The newly

proposed demand curve also initiates a reduction in the imbalance reserve offer cap from $247/MWh to $55/MWh.

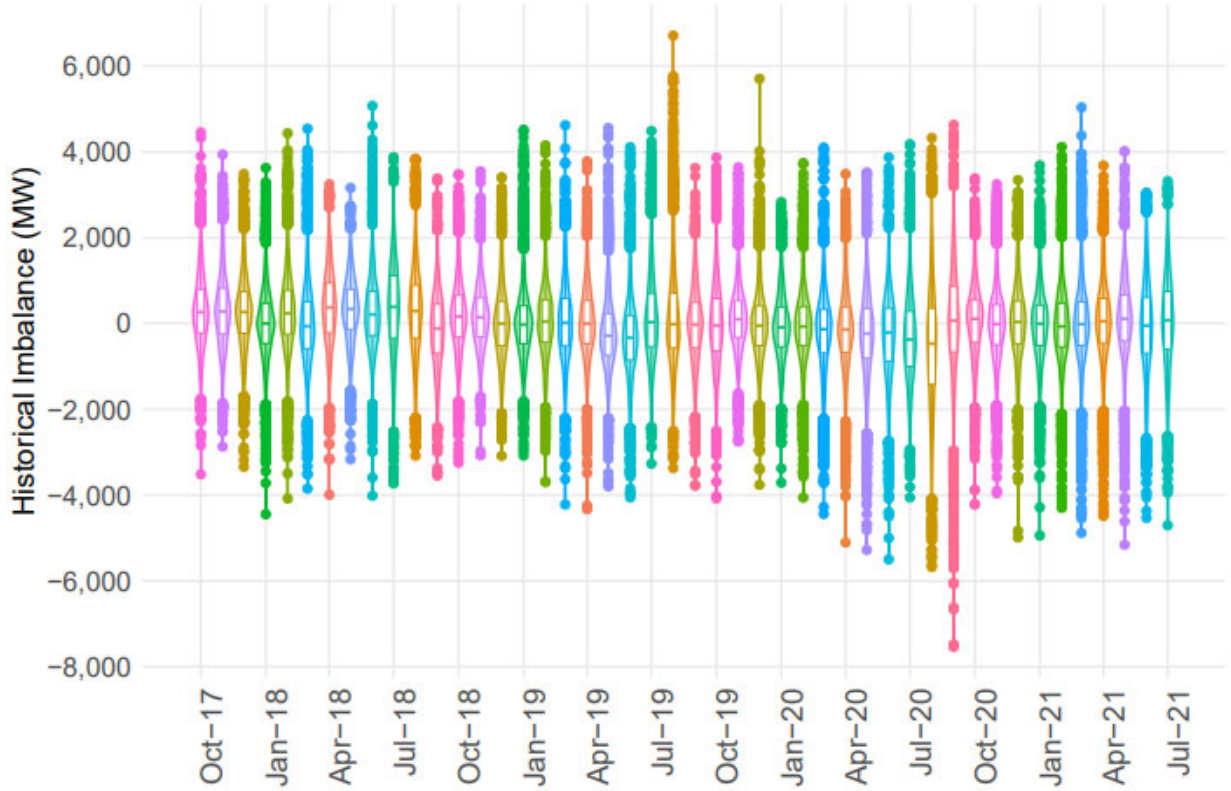
- **Confirms new requirements for storage resources' state of charge to support imbalance reserve awards in the day-ahead market, updates the multipliers used in the "envelope constraints" from 0.2 to 0.85, and commits to an ongoing evaluation and discussion of these topics.** Further analysis revealed that a higher multiplier was necessary to strike a balance between the participation of storage resources in imbalance reserves and the operational need to maintain state of charge to support imbalance reserve awards throughout the day. Stakeholders requested more time to evaluate the new envelope equations, their impact on existing constraints, and the best methodologies for setting multipliers. The policy commits to ongoing evaluation and discussions of these topics prior to implementation and inclusion in the ISO business practice manuals. This proposal also clarifies that RUC participation for non-RA resources is optional.
- **Clarifies an exception to the joint authority classification of this initiative.** Section 3.1 proposes a bidding obligation for California RA resources, specifically a day-ahead must-offer obligation for RA capacity eligible to provide imbalance reserves. These resources must offer imbalance reserves for the portion of their energy bid that is not self-scheduled. This element will remain under the sole authority of the Board, with no role for the WEIM Governing Body.

2. Need for Day-Ahead Market Enhancements

Historically, the CAISO balancing authority area consisted of a predictable generation fleet and a predictable load. Resources were scheduled hourly in the day-ahead market with relatively predictable real-time load and ramping needs. Over the last 10 years, variable energy resources (i.e., wind and solar resources) have become more prevalent. While these resources are critical in meeting renewable energy and greenhouse gas emission goals, they also introduce supply uncertainty and can create challenging conditions for system operators. Rather than the relatively predictable load conditions, system operators must manage the more unpredictable and variable net load differences.

Changes between day-ahead market schedules and real-time market schedules are commonly referred to as energy imbalances. Energy imbalances can occur for two reasons. First, the day-ahead market schedules energy in hourly time increments compared to 15- and 5-minute energy schedules in the real-time market. These granularity differences cause imbalances because the real-time market schedules fluctuate within the hour while the day-ahead market schedules are fixed for the hour. In other words, the real-time market can require faster, more granular intra-hour ramping capability when compared to the ramp rate needed to simply transition from one hourly schedule to the next. Second, there is uncertainty in the day-ahead net load forecast. The day-ahead net load forecast cannot perfectly predict the actual net load during the operating day. Any differences between the day-ahead forecast and what actually occurred results in imbalances. Figure 1 illustrates a monthly trend in day-ahead imbalances, calculated as the difference between the net load forecasted in the day-ahead market and the net load forecasted in the fifteen-minute market.

Figure 1: Monthly Trend of Day-Ahead Net Load Imbalance



Source: Day-Ahead Market Enhancements Analysis, page 7

The real-time market must manage energy imbalances that occur between the day-ahead and real-time markets. The real-time market will continue to serve this purpose under the redesigned day-ahead market. This proposal introduces a new day-ahead market product called "imbalance reserves" to better accommodate net load imbalances. The new day-ahead market will co-optimize energy, ancillary services, and imbalance reserves, and will preserve the sequential integrated forward market and residual unit commitment structure.

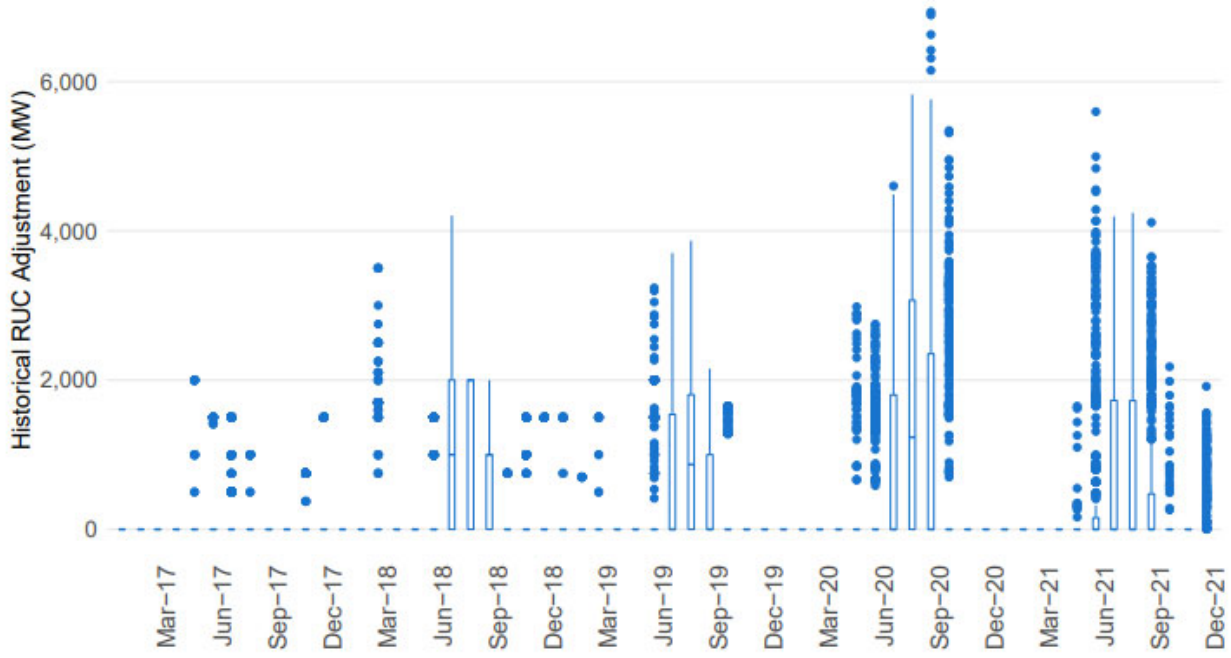
2.1. Improve Market Efficiency

Changes between the day-ahead market and real-time market are inevitable. Energy imbalances occur for many reasons including weather changes, outages, and forecasting uncertainty. Ultimately, the system operator is responsible for responding to energy imbalances between the day-ahead and real-time to ensure load is served reliably at all times.

Large imbalances between the day-ahead and real-time market can result in challenging conditions for system operators. When there is a risk that imbalances are too large to address through the real-time market, system operators must rely on out-of-market actions to cover these imbalances. CAISO operators have had to make upward adjustments to the forecast used in the RUC process for the last several years to ensure system reliability (see Figure 2). These operator adjustments to the RUC forecast have increased in frequency and magnitude over the last several years. CAISO system operators

manually increase the RUC forecast because they need to procure capacity in addition to the supply scheduled in the IFM to address the high net load uncertainty.

Figure 2: Monthly Distribution of Operator Adjustments to RUC Forecast



Source: Day-Ahead Market Enhancements Analysis, page 12

CAISO system operators have to rely on systematic out-of-market actions because the IFM lacks a product that is optimized with energy and ancillary services that procures flexible reserves to cover net load uncertainty. Procuring flexible reserves to meet net load uncertainty through imbalance reserves, as opposed to through out-of-market actions such as operator adjustments to the RUC forecast, will provide substantial benefits:

- **Imbalance reserves will be co-optimized with energy and ancillary services in the IFM, as opposed to procured separately in RUC.** Co-optimization of imbalance reserve procurement with energy and ancillary services will help maximize the value of these reserves by resulting in more optimal unit commitment decisions and more optimal allocation of system ramping capability. In addition, marginal prices will consider the opportunity costs of not providing the other products. For example, if a resource is economic for energy but is held back to provide imbalance reserves instead, the marginal prices will ensure that resource earns sufficient revenue from providing imbalance reserves to cover the opportunity cost of not selling energy. In this way, the resource is indifferent to receiving an incremental energy schedule or imbalance reserve award.
- **Flexible reserves will be procured based on costs represented by imbalance reserves bids.** Today, resource adequacy resources that are required to participate in RUC must do so with a bid price of $0 for all resource adequacy capacity. Furthermore, resource adequacy resources do not receive compensation when the marginal clearing price of RUC supply is non-zero.

However, there are costs to make resources available in the real-time market. These costs can include gas-scheduling costs, costs to set up a hydro system, opportunity costs from other market opportunities, and transmission costs for imports. Resource adequacy resources do not recover these costs through market payments; they must recover these costs through resource adequacy contract payments. It is more efficient, for both the overall system and individual resources, to procure flexible reserves using bids and compensate resources for those flexible reserves through direct market payments. Load serving entities can factor in these expected revenues for resources they procure for meeting their resource adequacy obligation in the contract negotiations. Using bids allows the market optimization to consider costs when scheduling and committing units, leading to better economic outcomes. Marginal prices are a more appropriate mechanism to compensate resources for their availability than fixed contract payments because it results in compensation that reflects when and where the reserves are most valued.

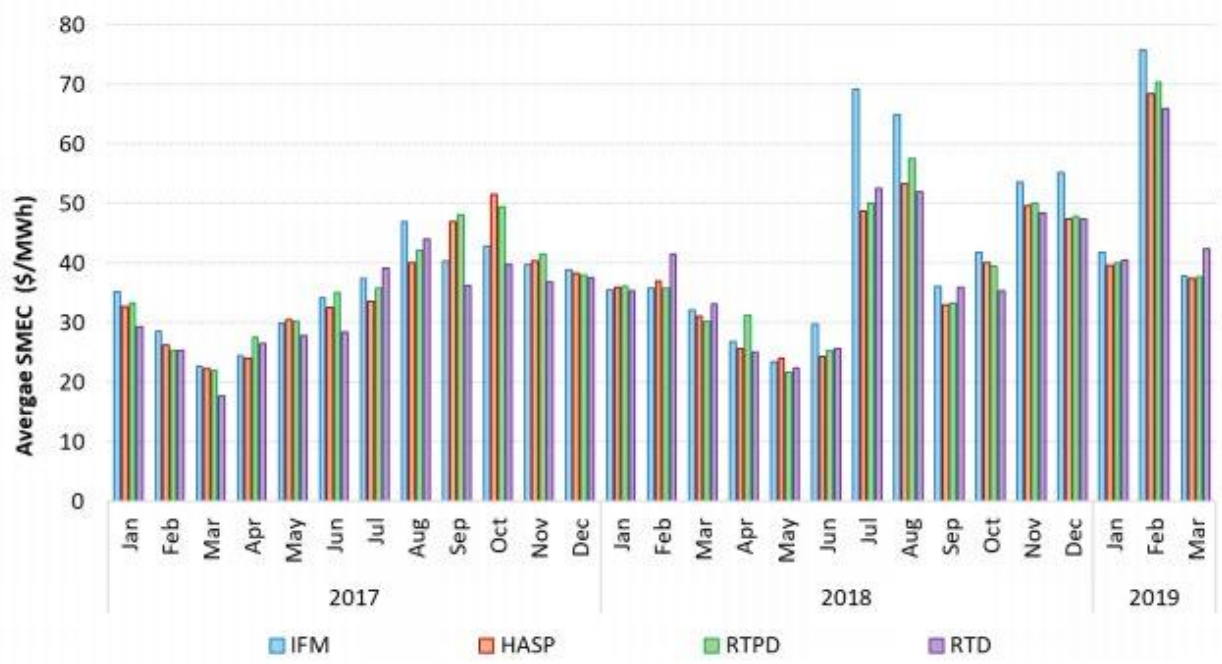
- **Imbalance reserves ensure the system has sufficient ramping capability.** By being co-optimized with energy, imbalance reserves allow the market optimization to consider the full ramping needs of the system (for energy and uncertainty). In addition, because imbalance reserves are 15-minute dispatchable, they are designed to be more flexible than RUC supply, because they are procured to meet the ramping needs that materialize in real-time. There is no assurance the supply committed or scheduled in RUC is sufficient to meet faster ramping needs.
- **Deliverability of capacity through imbalance reserves is more sophisticated than the deliverability of capacity procured through RUC adjustments.** Unlike like RUC adjustments, imbalance reserve deployment scenarios ensure that flexible reserves are deliverable to locations on the system where uncertainty needs are anticipated.
- **Procuring flexible reserves in the IFM better ensures that IFM export schedules are feasible.** Relying on RUC adjustments to procure supply pushes the RUC procurement target farther away from the IFM solution. This can lead to export schedules that were cleared in IFM no longer being feasible in RUC. Because imbalance reserves are expected to significantly reduce the use of RUC adjustments, export schedules cleared in the IFM have a lower chance of being curtailed in RUC.
- **Imbalance reserves will encourage more 15-minute non-EDAM import schedules.** The opportunity to sell imbalance reserves into the CAISO market should encourage non-EDAM importers to set up their system resources as 15-minute dispatchable. This would give the CAISO real-time market additional flexibility.
- **Imbalance reserves align CAISO resource adequacy resources with other EDAM participants.** Imbalance reserves are the mechanism by which the EDAM establishes each participating BAAs uncertainty requirements. It would not be desirable in EDAM for the CAISO BAA to continue to procure additional supply to meet uncertainty through RUC adjustments.

2.2. Price Performance Analysis Report

The CAISO completed a comprehensive report titled *Price Performance Analysis* that summarized and analyzed price formation in the CAISO markets.[3] The report identified factors that contribute to price differences between the day-ahead and real-time markets and proposed solutions to mitigate potential inefficiencies.

As a part of this effort, the report analyzed imbalances across market runs. The greatest magnitude of imbalance occurs between the day-ahead and fifteen-minute market (as opposed to between the fifteen-minute market and the five-minute market). These imbalances can be as large as 6,000 MW in a single hour. The *Price Performance Analysis* report indicated that large imbalances between the day-ahead and real-time market occur because of load forecast error and variable energy resource output changes. As shown in Figure 3, the "IFM prices are persistently higher than real-time prices starting in 2018 and continue in 2019."[4] CAISO believes this occurs because operators use out-of-market actions to procure additional capacity to meet potentially large imbalances. These out-of-market actions may then lead to less efficient and accurate pricing in the real-time market relative to the day-ahead market.

Figure 3: Pricing Differences across Day-Ahead and Real-Time Markets (Jan 2017 - Mar 2019)



Source: Price Performance Report, Page 22

Sustained price differences are a signal that the market is not functioning optimally. The actions the CAISO must take outside of the market to ensure grid reliability contribute to price differences. While

[3] CAISO Energy Markets Price Performance Report. September 23, 2019. http://www.caiso.com/Documents/FinalReport-PricePerformanceAnalysis.pdf

[4] Ibid., page 22

the CAISO must operate the system reliably, the CAISO also recognizes that consistent out-of-market actions signal there may be gaps in the current market design. Ultimately, the CAISO's goal is to produce a market solution that accurately reflect costs and system conditions, and is consistent with reliable operations.

The *Price Performance Analysis* report identifies the Day-Ahead Market Enhancements initiative as an opportunity to address the large imbalances between markets and reduce operator out-of-market actions. One of the goals of this initiative is to identify and implement enhancements to the day-ahead market design that will enhance price convergence between markets.

2.3. Deliverability Challenges of Flexible Ramping Product

For the last several years, FRP deliverability has been a concern. The *2019 Price Performance Analysis* discussed the deliverability challenges with CAISO's flexible ramping product.[5] This report documented how FRP capacity could be stranded due to congestion management of internal constraints within an EIM area. This documentation included examples of cases when flexible ramp capacity was stranded because resources were held back to mitigate congestion on internal constraints.

The *2021 Annual Report on Market Issues and Performance*[6] issued by the Department of Market Monitoring also highlighted deliverability challenges with FRP.[7] The report noted that implementing nodal procurement for flexible ramping product could help address the issue of low FRP prices due to procurement of stranded flexible ramp. The report explained that stranded flexible ramp could occur because of WEIM transfer constraints or internal congestion. For example, the report noted that the Northwest region of the WEIM has limited transfer capability out of the region, which can lead to stranded flexible ramping capacity. This issue is highlighted through example intervals and figures, which show the potential for upward flexible ramping capacity to be procured in the region beyond what is actually accessible for the surrounding system.

These findings motivated CAISO to develop its nodal procurement approach for the flexible ramping product as a way to avoid procuring undeliverable reserves. Moreover, this experience now informs the ISO's perspective that any viable approach to procure imbalance reserves must consider deliverability.

2.4. Imbalance Reserves Role in EDAM

The benefit of EDAM is to utilize diverse resources across balancing authority areas to meet load and operational needs across the west more efficiently.[8] Imbalance reserves will be an important component of the EDAM in doing this and increasing its benefits for the following reasons:

- **Reduces each EDAM BAAs individual net load uncertainty requirements and capacity procurement through the EDAM diversity benefit.** By pooling the uncertainty risk over a wider

[5] Ibid, pp. 78-80 and 121.
[6] http://www.caiso.com/Documents/2021-Annual-Report-on-Market-Issues-Performance.pdf
[7] Ibid, pp. 121-125.
[8] More information about the EDAM stakeholder process can be found at: http://www.caiso.com/StakeholderProcesses/Extended-day-ahead-market

geographic footprint, the EDAM reduces the flexible reserves needed to meet each individual BAA's uncertainty because uncertainty is not expected to materialize coincidently across the larger and more geographically diverse EDAM market footprint.

- **Builds confidence in energy transfers between BAAs scheduled in the day-ahead market through a common market product to address forecast net load uncertainty in the day-ahead timeframe.** EDAM participants can be assured they can rely on other BAAs in the EDAM to support their transfer obligations because of a common day-ahead market imbalance reserve product.
- **Imbalance reserves will more efficiently reserve resource capacity by allowing balancing authority areas access to resources across the EDAM.** In addition to reducing the overall amount of reserves needed to address net load forecast uncertainty in the day-ahead timeframe, imbalance reserves will more efficiently select the resources to provide these reserves. It will provide EDAM BAAs access to resources that can potentially provide these reserves at lower cost than their own resources. In addition, it will provide additional revenue opportunities to balancing authority areas with these more efficient and flexible resources. Imbalance reserve transfers will be firm, ensuring a BAA can access any imbalance reserves to meet its net load uncertainty that come from another BAA.
- **Imbalance reserves establish a consistent treatment of uncertainty in the EDAM resource sufficiency evaluation.** This ensures that each BAA's uncertainty needs are evaluated equitably.

As with the existing day-ahead market, reliability capacity is needed in the EDAM to ensure physical supply is committed to cover differences in cleared physical supply and each BAA's net load forecast. The integrated forward market is a financial market where bid-in load clears against bid-in supply while also meeting the ancillary services and imbalance reserve requirements. On the other hand, the residual unit commitment is a physical market that clears physical supply to meet the BAA's load forecast. The EDAM will facilitate reliability capacity transfers between BAAs to minimize the cost of ensuring there is enough physical supply in the EDAM footprint to meet each BAA's load forecast.

2.5. Imbalance Reserve Net Benefits

The CAISO commissioned a study to estimate EDAM benefits. As part of that study, in response to stakeholder requests, CAISO requested a sensitivity study to elaborate on the role of imbalance reserves in the EDAM benefit. The CAISO published this study on November 15, 2022 and held a public webinar to discuss the study results on November 18, 2022.[9]

The study results showed the imbalance reserve is an important component in realizing the inter-regional dispatch efficiency. The study found that without the imbalance reserve component, the EDAM

[9] The study presentation materials can be found at http://www.caiso.com/Documents/Presentation-CAISO-Extended-Day-Ahead-Market-Benefits-Study.pdf and the webinar can be accessed at https://www.westernenergyboard.org/webinar-energy-strategies-findings-of-edam-benefits-study-sponsored-by-caiso/.

benefit would be about 60% lower. In addition, removing the imbalance product from the EDAM market was estimated to reduce the benefit to California by $120 million annually.

Figure 1: Annualized EDAM Operational Savings with and without Imbalance Reserves

Study Summary: Annualized Operational Savings
($M/year)

Scenario	California	Other Western States	TOTAL
West-wide EDAM	$214	$329	**$543**
No Imbalance Product	$86	$120	**$206**

Source: CAISO EDAM Benefits Study, page 22

3. Proposed Day-Ahead Market Enhancements

Section 3 describes the proposed day-ahead market enhancements. This section is organized as follows:

- Section 3.1 provides an overview of the proposed changes and the various bidding obligations, including obligations specific to resource adequacy resources.
- Section 3.2 describes the proposed changes to the market power mitigation pass for the integrated forward market.
- Section 3.3 describes the proposed changes to the integrated forward market.
- Section 3.4 introduces and describes an additional market pass to perform local market power mitigation for the residual unit commitment process.
- Section 3.5 describes the proposed changes to the residual unit commitment process.

3.1 Overview

The day-ahead market would consist of four sequential market passes:

1. IFM market power mitigation (MPM) pass
2. Integrated forward market (IFM) pass
3. RUC market power mitigation pass
4. Residual unit commitment (RUC) pass

Today, the IFM market power mitigation pass identifies and mitigates potentially uncompetitive energy bids to ensure market prices remain competitive. Nothing is scheduled or committed in the IFM market power mitigation pass. Any bids that are mitigated in the IFM MPM pass are used in the integrated forward market. This proposal would include mitigation of imbalance reserve offers in the IFM market power mitigation pass.

Today, the integrated forward market uses supply and demand bids to determine the amount of energy the day-ahead market will clear. Convergence bids, also known as virtual supply and virtual demand bids, can participate in this financial market. The integrated forward market also procures ancillary services and commits resources to meet the CAISO BAA's ancillary service requirements. The integrated forward market co-optimizes energy and ancillary services to produce financially binding day-ahead schedules and ancillary services awards. This proposal introduces an imbalance reserves up and down product to the integrated forward market. Imbalance reserves would be procured based on historical net load imbalance between the day-ahead and real-time markets.

This proposal also includes a new market power mitigation pass before the residual unit commitment to assess the competitiveness of reliability capacity offers. In the event the RUC market power mitigation pass detects the potential for market power, reliability capacity bids would be mitigated. Any mitigated bids would be used as inputs to the residual unit commitment process.

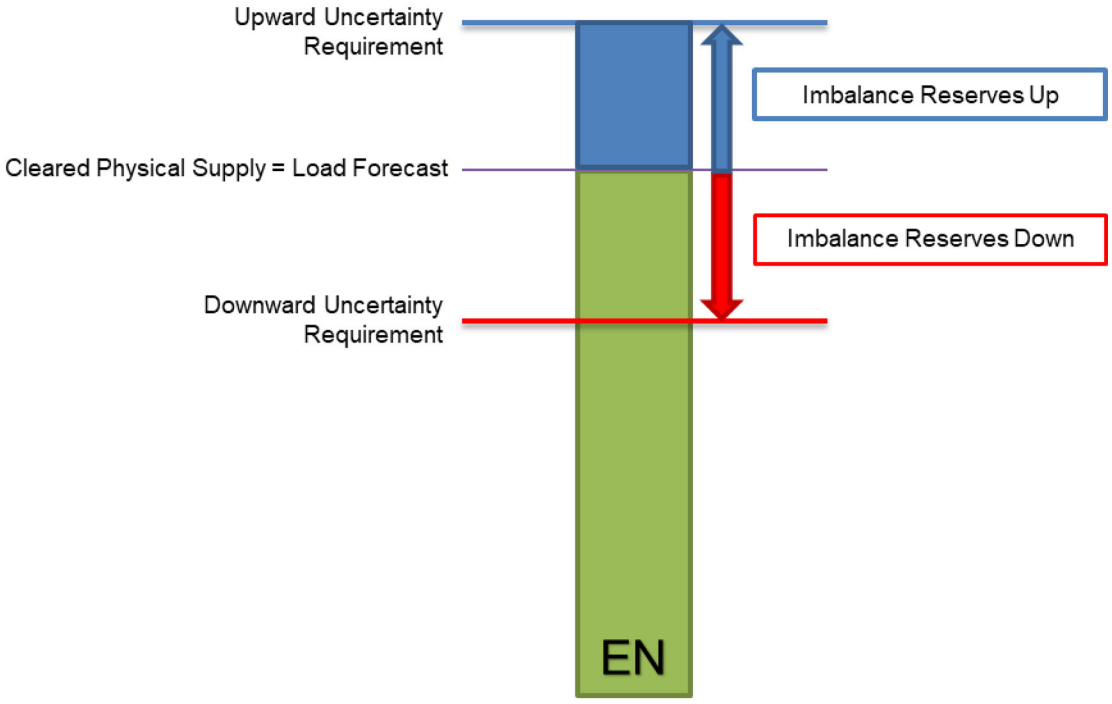
Today, the residual unit commitment process bridges the gap between the CAISO's load forecast and the physical energy cleared in the integrated forward market by procuring incremental supply that was not scheduled or committed in the integrated forward market. This additional supply ensures there is sufficient physical supply available to meet the day-ahead load forecast. In addition, this proposal enhances the residual unit commitment process to procure downward dispatch capability when the physical supply cleared in the integrated forward market exceeds the load forecast.

New Day-Ahead Market Products

This proposal introduces imbalance reserves as a new market product to address net load uncertainty and granularity differences between the day-ahead and real-time markets. Imbalance reserves would minimize the need for out-of-market actions and appropriately value a resource's flexible reserves. This proposal also enhances the residual unit commitment process by adding a downward reliability capacity product.

Figures 3, 4 and 5 illustrate the proposed relationship between energy and imbalance reserves (procured in the integrated forward market) and reliability capacity (procured in the residual unit commitment process). Figure 3 illustrates a scenario where the integrated forward market clears physical supply equal to the BAA's load forecast. The market would procure imbalance reserves to cover upward and downward uncertainty requirements. The day-ahead market would not need to procure reliability capacity in the residual unit commitment process.

Figure 3: Day-ahead market products when physical supply equals load forecast



However, rarely does physical supply clear equal to the BAA's load forecast. Several factors would contribute to the need for the residual unit commitment to procure reliability capacity. The drivers for reliability capacity up would be:

- Bid-in load clears the integrated forward market less than the CAISO load forecast
- Virtual supply clears the integrated forward market in excess of virtual demand

The drivers for reliability capacity down would be:

- Bid-in load clears the integrated forward market greater than the CAISO load forecast
- Virtual demand clears the integrated forward market in excess of virtual supply

These drivers could also offset each other. For example, virtual demand may clear to address under-scheduled load and virtual supply may clear to address under-scheduled variable energy resources.

Figure 5 illustrates the proposed relationship between energy, imbalance reserves, and reliability capacity when the cleared physical supply is greater than the BAA's load forecast. When this occurs, the residual unit commitment would procure reliability capacity up to provide upward dispatch capability, relative to the energy schedules, to meet the load forecast. The integrated forward market would still procure the full imbalance reserve requirements to meet the upward and downward uncertainty.

Figure 5: Day-ahead market products when physical supply is less than load forecast

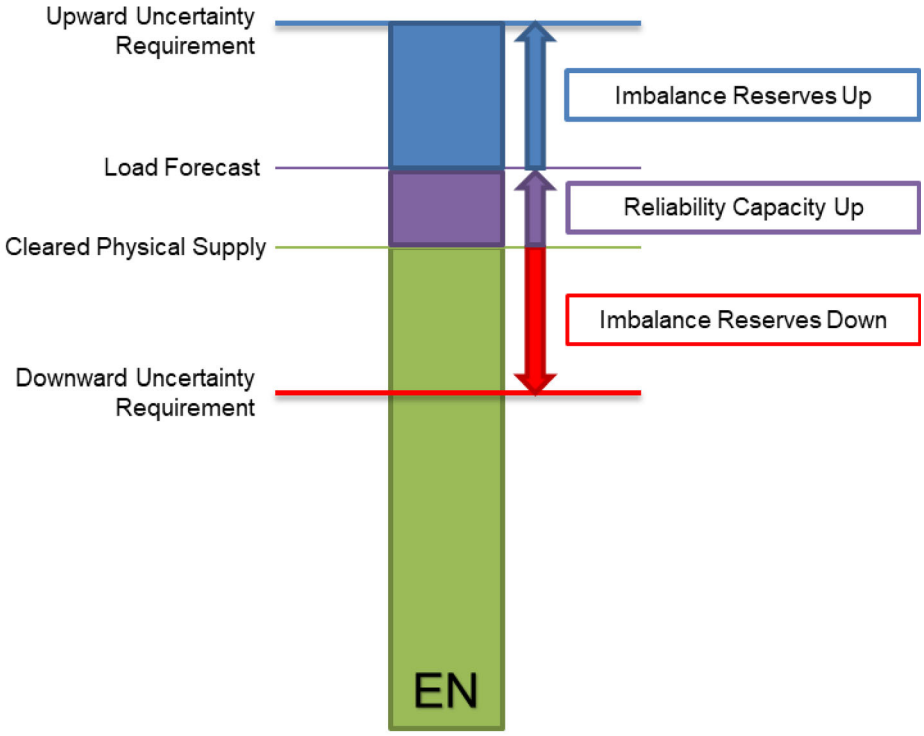
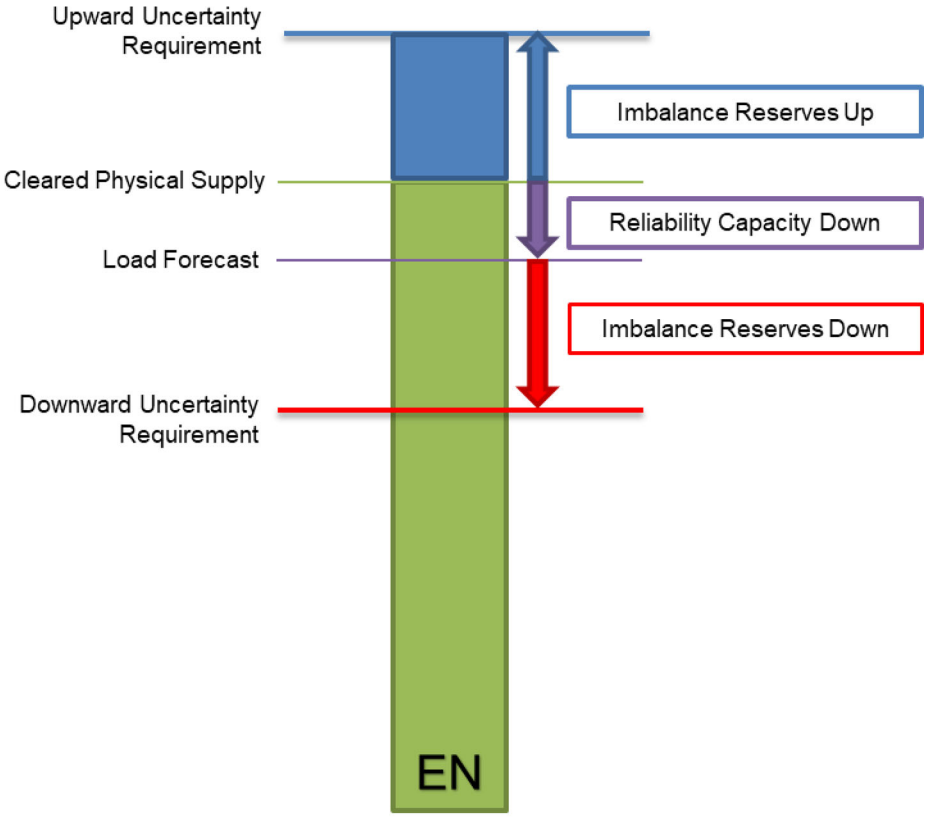


Figure 6 illustrates this relationship when the cleared physical supply is less than the BAA's load forecast. When this occurs, the residual unit commitment would procure reliability capacity down to provide downward dispatch capability, relative to the energy schedules, to meet the load forecast. The integrated forward market would still procure the full imbalance reserve requirements to meet the upward and downward uncertainty.

Figure 6: Day-ahead market products when physical supply is greater than load forecast



The load forecast and the amount of uncertainty determines the amount of physical energy and dispatch capability from physical resources needed to ensure reliability.

Table 1 summarizes the proposed day-ahead market products. It also includes the existing day-ahead market products for completeness.

Table 1: Proposed and existing day-ahead market products

Title	Acronym	Purpose	Eligibility*	Procured In	Status
Energy	EN	Energy schedules cleared to meet bid-in demand	All resources	IFM	Existing
Reliability Capacity Up	RCU	Incremental supply procured to meet the positive difference between the load forecast and cleared physical supply	Physical resources based on 60-minute ramp capability	RUC	Replaces RUC awards
Reliability Capacity Down	RCD	Decremental supply procured to meet the negative difference between the load	Physical resources based on 60-minute ramp capability	RUC	Proposed

Title	Acronym	Purpose	Eligibility*	Procured In	Status
		forecast and cleared physical supply			
Imbalance Reserves Up	IRU	Incremental reserves procured to meet the upward uncertainty requirement	15-minute dispatchable physical resources, award based on 30-minute ramp capability	IFM	Proposed
Imbalance Reserves Down	IRD	Decremental reserves procured to meet the downward uncertainty requirement	15-minute dispatchable physical resources, award based on 30-minute ramp capability	IFM	Proposed
Ancillary Services	AS	Incremental reserves procured and reserved to meet real-time regulation and contingency reserve requirements	Resources certified to provide the respective service	IFM	Existing

Differences between Imbalance Reserve and Reliability Capacity

Some stakeholders have questioned why the day-ahead market needs both imbalance reserves and reliability capacity. While both these market products procure reserves in the day-ahead market, they serve different purposes and procure reserves based on different resource characteristics and system needs.

There could be perfect certainty between day-ahead and real-time markets and the market would still need reliability capacity. That is because the integrated forward market is a financial market (as opposed to a physical market) that clears based on demand bids instead of a demand forecast. Therefore, the integrated forward market can clear supply at a different quantity than the BAA demand forecast. Reliability capacity is procured in RUC to meet that difference. In addition, the integrated forward market allows for virtual bids, which are not backed by physical resources. If virtual bids clear the market, reliability capacity is procured in RUC to ensure there are sufficient physical resources to meet the BAA demand forecast.

The day-ahead market would procure reliability capacity based only on the load forecast. Assuming no operator load biasing, the reliability capacity procurement requirement does not address net load forecast uncertainty between the day-ahead timeframe and real-time. In contrast, the day-ahead market would procure imbalance reserve to cover this net load uncertainty. Imbalance reserves also provide additional ramping capability for real-time five-minute ramping needs that can be greater than the ramp capability procured in the day-ahead market.

If the integrated forward market clears physical resource supply up the day-ahead load forecast, then RUC would not schedule reliability capacity because there would already be enough scheduled supply

(assuming that supply could meet the load forecast based on RUC's 60-minute ramp modeling.) However, the actual real-time net load and associated ramping needs could be much greater if net load comes in above or below the day-ahead forecast. These ramping needs can also be highly variable and can be greater than that scheduled by RUC's modeling of ramping for 60-minute granularity net load changes.

Imbalance reserves addresses this by procuring upward and downward resource ramping capability to meet differences in net load in each real-time market 15-minute interval that are different than that scheduled to be met in 60-minute granularity RUC schedules.

Procuring only imbalance reserves and not procuring reliability capacity is not an option because imbalance reserves should be procured relative to the day-ahead forecast, not the IFM market cleared load. If reliability capacity did not exist, then imbalance reserves would be procured to the wrong reference. In the initial DAME straw proposal, the ISO considered whether to eliminate reliability capacity and have imbalance reserves procured relative to the IFM market cleared load. It was decided this method could not guarantee there was sufficient physical supply to meet the forecasted demand, and that the relative quantity of imbalance reserves would have been unnecessarily high, and so abandoned this approach.

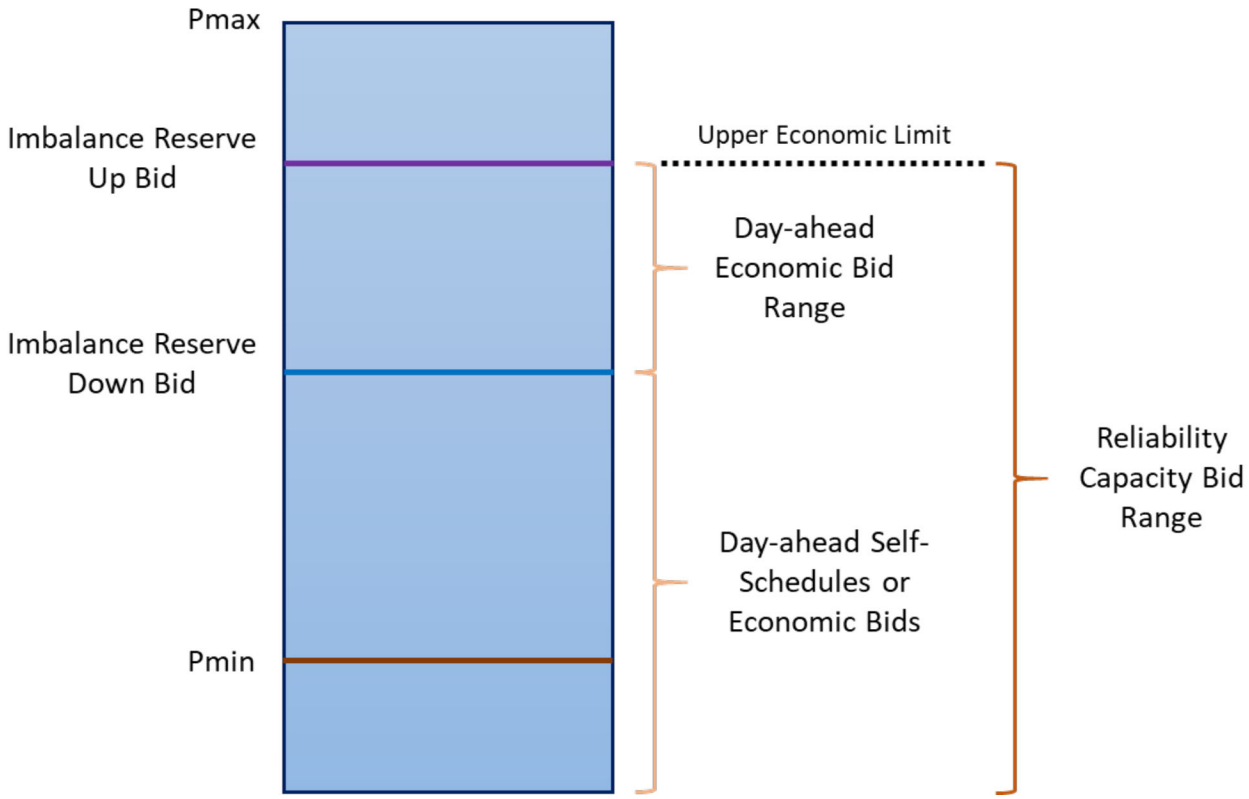
Day-Ahead Bidding Rules for Imbalance Reserves and Reliability Capacity

Eligible resources would submit bids for imbalance reserves (see Appendix A for eligibility by resource type). In order to bid for imbalance reserves, resources must provide an energy bid in the day-ahead market and must economically bid the portion of the energy bid that overlaps with the imbalance reserve bid. Figure 7 provides an illustration of this bidding requirement.

Eligible resources would also submit bids for reliability capacity (see Appendix A for eligibility by resource type). Resources need to provide an energy bid in the day-ahead market to bid for reliability capacity but do not need to overlap with the economically bid portion of the energy bid. As part of EDAM, all resources offering energy bids in the IFM (and thus included in the EDAM resource sufficiency evaluation) must submit bids for reliability capacity up at the same quantity as their energy bid plus ancillary service self-provision. This ensures all resources shown in the EDAM RSE are fully available for use in RUC, including excess supply that participants offered above their RSE requirements.

The total quantity of energy, imbalance reserves, and reliability capacity scheduled on a resource would be capped based on the resource's upper economic limit. The upper economic limit is the highest operating level submitted in the resource's energy bid.

Figure 7: Day-Ahead Bidding Rules for Imbalance Reserves and Reliability Capacity



Real-Time Bidding Obligations based on Day-Ahead Awards

Resources that receive an energy schedule, ancillary service awards, reliability capacity awards, or imbalance reserve awards in the day-ahead market will have real-time market bidding obligations. Resources must provide economic energy bids for the full range of their reliability capacity and imbalance reserve awards in the real-time market. Real-time must-offer obligations apply in the hours that a resource has a reliability capacity or imbalance reserve award.

The purpose of the real-time must-offer obligation is to provide economic bids to the real-time market. Economic bids enable the real-time market to re-dispatch resources to meet real-time system conditions and imbalances. Real-time self-schedules do not provide the real-time market with the ability to re-dispatch the resource.

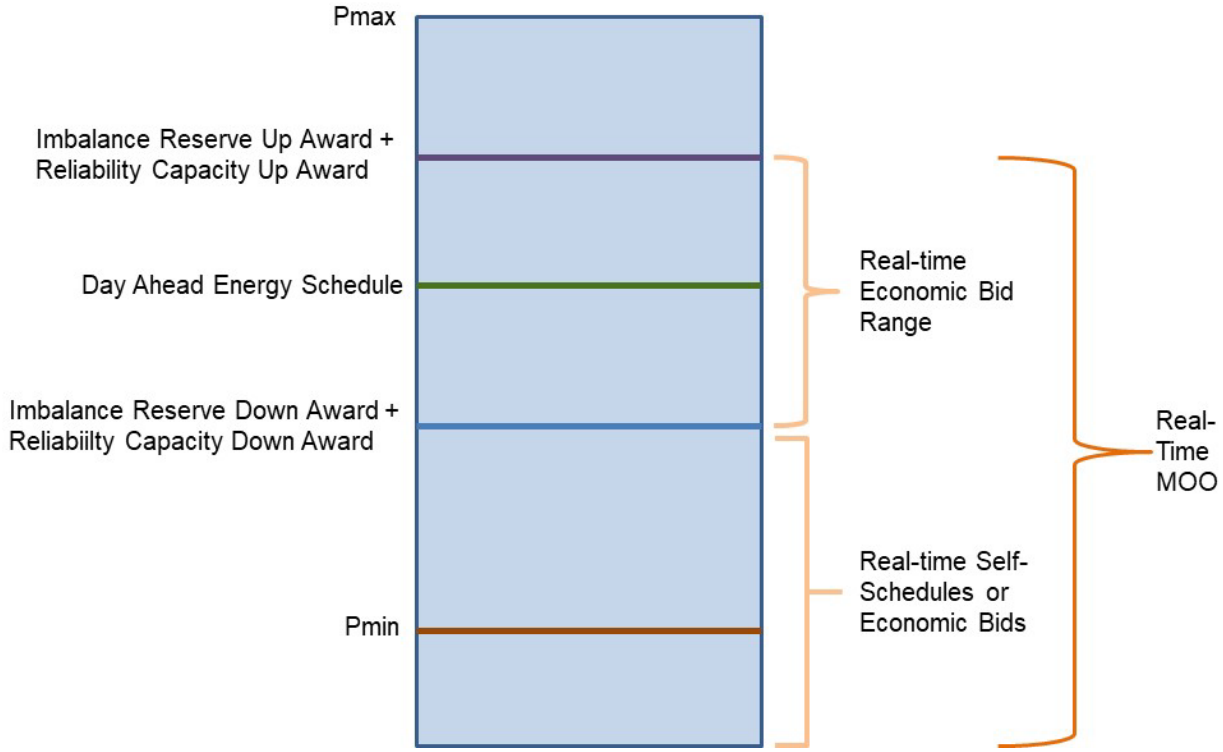
The minimum real-time bidding obligations are illustrated in Figure 8. A resource must submit economic bids above its day-ahead energy schedule by the amount of imbalance reserves up and reliability capacity up awarded. The resource is not required to submit additional bids up to its Pmax but may elect to do so. This ensures there are sufficient economic offers to allow the real-time market to dispatch the resource above or below its day-ahead energy schedule.

Any portion of this resource's day-ahead energy schedule below the imbalance reserves down and reliability capacity down awards can be either self-scheduled or economically bid. A resource cannot submit a self-schedule that exceeds its energy schedule less its imbalance reserves down and reliability

capacity down awards. This ensures that there are sufficient economic offers to allow the real-time market to dispatch the resource below its day-ahead energy schedule.

A resource that can be committed in the real-time market can submit start up and minimum load bids to enable the market to re-optimize the unit commitment decision. This is not a requirement because the resource can elect to self-schedule a portion of its output.

Figure 8: Real-time Bidding Obligations



Day-Ahead Must-Offer Obligations for Resource Adequacy Resources

The following summarizes the resource adequacy must-offer obligations for the day-ahead market.

CAISO BAA resource adequacy resources will continue to be required to economically bid or self-schedule their resource adequacy capacity into the integrated forward market. This applies all hours of the month the resource is physically available. Resources providing system and local resource adequacy will continue to be required to economically bid or self-provide ancillary services.

Resources providing resource adequacy capacity that are currently required to submit RUC availability bids will be required to bid their resource adequacy capacity into the residual unit commitment for reliability capacity up. Bids for reliability capacity down will be optional. The CAISO will not require that resource adequacy resources offer resource adequacy capacity into RUC with $0 availability bids.

Instead, resource adequacy capacity can be bid into RUC at any price between the bid floor and bid cap.[10]

Resource adequacy capacity would be leveraged to facilitate a day-ahead must-offer obligation for imbalance reserves. This proposal would require that all RA capacity eligible to provide imbalance reserves (i.e., 15 minute dispatchable) have a must-offer obligation for imbalance reserves for the portion of their energy bid that is not self-scheduled (i.e., economically bid). Thus, this must-offer obligation would apply to all flex RA capacity since flex RA capacity is 15-minute dispatchable and already required to economically bid in the day-ahead market. System RA capacity that is eligible for imbalance reserves would maintain its ability to self-schedule or economically bid for energy, but any portion of the energy bid that is economic must be accompanied by an imbalance reserve offer. System RA capacity that is not eligible for imbalance reserve would have no change to their existing must-offer requirements from this rule. These must-offer requirements would maximize participation of RA capacity in imbalance reserve to increase competitiveness of the product, improve congestion management, reduce concerns about physical withholding, and help the CAISO BAA pass the EDAM resource sufficiency evaluation. At the same time, these must-offer requirements do not prevent any RA capacity from self-scheduling – an option that stakeholders expressed was extremely important. Imbalance reserve must-offer obligations would not be subject to RAAIM (Resource Adequacy Availability Incentive Mechanism) penalties.

Real-Time Must-Offer Obligations for Resource Adequacy Resources

This proposal maintains the CAISO BAA resource adequacy real-time must-offer obligation. Today, certain resource adequacy resources have an obligation to bid or self-schedule in the real-time market even if they do not receive an IFM schedule or binding RUC commitment. The CAISO enforces these obligations through its tariff and through mechanisms like bid insertion, which enables the market to generate real-time bids for eligible resource adequacy capacity that did not submit bids and is not on outage.

This proposal would initially implement DAME with the resource adequacy real-time must-offer obligation in place. After some future operational experience with EDAM, the CAISO could engage stakeholders to re-discuss whether an ISO-enforced resource adequacy real-time must-offer obligation continues to be needed.

Mechanism to Protect RA Capacity in EDAM

Some stakeholders from the CAISO BAA have expressed concerns about asymmetrical participation between CAISO and other BAAs in EDAM that center around the CAISO resource adequacy program's day-ahead and real-time must-offer obligations. Whereas non-CAISO BAAs are only obligated to offer into the EDAM market sufficient supply to pass their resource sufficiency evaluation, the CAISO resource adequacy program obligates all resource adequacy capacity to offer into the day-ahead market. The CAISO load serving entities would have no mechanism to "hold back" or "protect" a certain portion of

[10] RCU/RCD payments that overlap with RA capacity would be subject to reverse settlement as described in Section 3.5.

their resource adequacy capacity from supporting firm EDAM transfers. The EDAM proposal considers a net export transfer constraint to address this concern.

3.2 Market Power Mitigation Pass for IFM Changes

In the market power mitigation pass for IFM, the market would use unmitigated bids to clear bid-in load, bid-in supply, imports, exports, ancillary services requirements, and the imbalance reserve requirements. Binding transmission constraints in the base scenario (cleared bid-in load), the imbalance reserve up deployment scenario, and the imbalance reserve down deployment scenario would be evaluated for competitiveness. This proposal would continue use of the dynamic competitive path assessment (DCPA) to determine whether a transmission constraint is competitive.

Today, resources that can provide counter-flow to an uncompetitive constraint in the base scenario have their energy bids subject to mitigation. That would not change in this proposal. However, with the introduction of upward and downward deployment scenarios in the integrated forward market, this proposal would mitigate energy bids from resources that can provide counter-flow to an uncompetitive constraint in these deployment scenarios as well. This is because energy marginal prices have congestion contributions from binding constraints in the deployment scenarios.[11]

Resources that can provide counter-flow to an uncompetitive constraint in the upward deployment scenario would also have their imbalance reserve up bid mitigated. Imbalance reserve up marginal prices have congestion contributions only from binding constraints in the upward deployment scenario.[12] This proposal would not mitigate imbalance reserve down bids. This proposal would also not mitigate the imbalance reserve up bids of non-EDAM intertie resources certified to provide imbalance reserves, consistent with current policy for energy bid mitigation.

Local market power mitigation of energy and imbalance reserve up would be based on the same optimization, bids, set of binding constraints, and set of shift factors. The supply of counter flow for a binding transmission constraint in the upward deployment scenario would be the product of the negative shift factor and the energy schedule plus the imbalance reserve up award.[13]

CAISO provided detailed examples of local market power mitigation applied to energy and imbalance reserve offers.[14] The examples show that while energy mitigation alone does help mitigate market power exercised through imbalance reserve bids, it does not fully prevent it. Because energy and imbalance reserve up are fungible, the market will attempt to reorient energy and imbalance reserve schedules to avoid awarding resources with high priced imbalance reserve bids in favor of awarding

[11] See the DAME technical description. The terms $\sum SF_{i,m,t}\,\mu^{(u)}{}_{m,t}$ and $\sum SF_{i,m,t}\,\mu^{(d)}{}_{m,t}$ represent how transmission constraints in the upward and downward deployment scenarios contribute to the LMP.
[12] Id. The term $\sum SF_{i,,}\,\mu^{(u)}{}_{m,t}$ represents how transmission constraints in the upward deployment scenario contribute to the IRU marginal price.
[13] Detailed description of the RSI calculation is provided in the DAME technical description.
[14] http://www.caiso.com/InitiativeDocuments/Appendix-C-Third-Revised-Straw-Proposal-Day-Ahead-Market-Enhancements.pdf

them energy schedules. However, this forces the market to schedule energy on a resource with higher bid costs, which drives up the total production cost. In this way, suppliers could utilize their position on the grid to exercise local market power, driving up costs to the system and increasing their market payments above competitive levels.

Today, the CAISO mitigates energy offers to the greater of what it calls *default energy bids* or the *competitive locational marginal price*.[15] Default energy bids are the CAISO's estimate of a resource's marginal cost. The competitive locational marginal price is the marginal price of energy minus the non-competitive congestion components at the location of the mitigated resource. The competitive locational marginal price represents the going rate for competitive energy at the relevant location and ensures resources are mitigated only to the extent needed to resolve market power for higher-priced bids.

This proposal maintains this method of determining mitigated bid prices for energy offers and extends this method to imbalance reserve up offers. This proposal would mitigate imbalance reserve up offers to the higher of a *default availability bid* or the competitive locational marginal price for imbalance reserve up. The latter would be derived as the marginal price of imbalance reserve minus the non-competitive congestion components from binding constraints in the imbalance reserve up deployment scenario at the location of the mitigated resource. This proposal would also include a Negotiated Rate Option, under which the CAISO would use information provided by the Scheduling Coordinator to determine the negotiated default availability bid. The Negotiated Rate Option would be available to Scheduling Coordinators once the CAISO has sufficient operational knowledge of, and experience with, imbalance reserve bids. The CAISO expects it will need approximately one year of operational experience with the new products before it will be able to support the Negotiated Rate Option. Further details on the Negotiated Rate Option would be communicated in the CAISO's Business Practice Manuals.

Default availability bids would be distinct from default energy bids. Default energy bids (DEBs) are specific to each resource and are generally designed to approximate a resource's variable costs of providing energy, using any of the five methodology options the CAISO offers.[16] The variable costs of providing energy can be approximated based on generally understood criteria such as generator performance data, fuel costs, and opportunity costs. However, costs related to a resource's ability to provide reserves are more nebulous. Estimating the variable costs of each resource to provide reserves is subject to significant uncertainty.

Therefore, this proposal considers a static system-wide default availability bid for imbalance reserve mitigation when DAME is first implemented. This default availability bid would be the same price for all

[15] If the resource's unmitigated energy bid were less than the default energy bid or the competitive locational marginal price, there would be no modification to the resource's bid.
[16] LMP option, negotiated rate option, variable cost option, hydro DEB option, storage DEB option. See attachment D of the Business Practice Manual for Market Instruments - https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Market%20Instruments.

resources and across all market intervals. It would provide a mitigation "floor" that balances the need to protect consumers against market power but also protect producers against excessive mitigation by forcing offers below their costs. The imbalance reserve up default availability bid would be set conservatively using a high percentile value of historical spinning reserve bids. After the CAISO and market participants gain operational experience with imbalance reserves, and more information is available on the costs of offering imbalance reserves under competitive conditions, the CAISO could re-engage with stakeholders to develop a more rigorous default availability bid methodology.

The CAISO proposes the default availability bid for imbalance reserves be set to $55/MWh. This represents greater than the 80th percentile of spinning reserve bids using historical data (see Table 2). Spinning reserve bids is a reasonable approximation of a resource's cost to provide reserves. CAISO will investigate whether spinning reserve bid prices are related to prevailing gas prices to potentially make the default bid scalable by gas prices.

Table 2: Spinning Reserve Bid Prices (Jan - Jun 2022)

Type	Spinning Reserve Bid Price ($/MWh)
50 Percentile	$1.90
60 Percentile	$5.00
70 Percentile	$21.70
80 Percentile	$50.00
90 Percentile	$100.00

Note that changes made to the imbalance reserve demand curve negate the effect of local market power mitigation for imbalance reserves, as the default availability bid has the same value as the cap of the demand curve. However, the ISO still intends to implement local market power mitigation procedures in its market software, should the need arise where the parameters for the demand curve or the mitigated bids change in a way that makes the mitigation binding.

3.3 Integrated Forward Market Changes

Today, the integrated forward market obtains a full market solution using mitigated bids from the market power mitigation pass. The integrated forward market solves the optimal unit commitment to clear bid-in load, bid-in supply, imports, exports, and ancillary services requirements. This proposal enhances the day-ahead market by introducing an imbalance reserves product that is co-optimized and procured in the integrated forward market.

Energy (EN)

The energy (EN) schedule would be the same day-ahead market schedule that results from the current integrated forward market. The integrated forward market would continue to determine energy schedules by clearing physical and virtual supply against bid-in load and virtual demand. Energy would continue to be priced at each node resulting in a locational marginal price. Resources with a day-ahead energy schedule would continue to re-bid (self-schedule or economically bid) the energy into the real-time market.

Ancillary Services

The day-ahead market currently procures 100 percent of the expected requirement for four ancillary services:

- Regulation up is procured from certified resources that can respond to the 4 second automated generation control signal to address increases in the net load that occur within a five minute dispatch interval.[17]
- Regulation down is procured from certified resources that can respond to the 4 second automated generation control signal to address decrease in the net load that occur within a five minute dispatch interval.
- Spinning reserves are procured from certified resources that are synchronized to the grid and can be called upon if a contingency event occurs.
- Non-spinning reserves are procured from certified resources that either are or are not synchronized to the grid and can be called upon if a contingency event occurs.

This proposal considers no changes to ancillary service procurement. Ancillary services would continue to be procured on a system and regional basis as opposed to a nodal basis and subject to the existing cascading procurement rules where regulation up can substitute for spinning and non-spinning reserves, and spinning reserve can substitute for non-spinning reserve.[18]

Imbalance Reserves (IRU/IRD)

Imbalance reserves would ensure the integrated forward market schedules sufficient dispatch capability to meet net load imbalances between the day-ahead and real-time markets. These imbalances are caused by uncertainty in the day-ahead net load forecast and granularity differences between hourly day-ahead market and fifteen-minute real-time market schedules. Imbalance reserves would be comprised of imbalance reserves up (IRU) that provide upward dispatch capability and imbalance reserves down (IRD) that provide downward dispatch capability. An imbalance reserve schedule would

[17] In addition, there is a mileage requirement for regulation up and regulation down, representing the expected amount of system-wide resource operating point travel needed to provide the service.
[18] The CAISO may consider an initiative in 2023 to explore collapsing the current spin and non-spin requirement into a single contingency reserve requirement. This initiative would also examine removing the current cascading rule between upward ancillary service products.

result in an obligation to provide economic energy bids to the real-time market. The market may schedule a resource to provide both IRU and IRD.

The integrated forward market would co-optimize and procure imbalance reserves to meet an hourly imbalance reserve requirement. The market would use imbalance reserve deployment scenarios to ensure imbalance reserves are transmission-feasible to the locations the uncertainty is expected to materialize if they are fully deployed. The market would price imbalance reserves at each node, resulting in locational marginal prices that reflect transmission constraints.

Imbalance reserves would enable the day-ahead market to compensate resources that provide flexible reserves to meet net load uncertainty and ramping needs. Today, system operators frequently take out-of-market actions, including increasing the load forecast used in RUC, to secure additional supply to increase the ramp capability available to the real-time market and to address uncertainty between the day-ahead and real-time markets. System operators are taking such actions because of the increased net load variability and uncertainty resulting from increasing amounts of weather-dependent supply and demand. Imbalance reserves would reduce the need for these out-of-market actions and would create a market price signal for day-ahead flexible reserves.

The day-ahead market would only award imbalance reserves to resources that are dispatchable in the fifteen-minute market. Although the day-ahead market will schedule imbalance reserves hourly, the maximum award would be based on a resource's 30-minute ramp capability. Offline resources could be awarded imbalance reserves if the resource has a start-up time of 15 minutes or less. This proposal would make these parameters adjustable in response to stakeholder feedback that these requirements may be overly restrictive. The CAISO would monitor the performance of the imbalance reserve product once implemented to assess whether allowing for longer start-up times or longer ramp horizons is necessary or desirable.

Imbalance Reserve Requirement

This section provides a high-level overview of the method used to calculate the imbalance reserve requirements in the day-ahead market. This method intends to align with the approach proposed for the real-time market flexible ramping product requirements.[19]

Historical data would be used to identify the load, wind, and solar forecast error between the day-ahead market and fifteen-minute markets. These historical forecast errors would then be used to determine the imbalance reserves up and down requirement based on the prevailing load, wind, and solar forecasts for each hour of each day using statistical regression. This proposal considers use of quantile regression to determine the imbalance reserve requirements. A quantile regression estimates quantiles of a dependent variable conditional on the values of a set of independent variables. A quantile regression is preferred to standard linear regression in this case because the imbalance reserve requirements are based on relatively extreme high and low (i.e., 97.5 and 2.5 percentile) observations of

[19] CAISO Flexible Ramping Product Refinements initiative. Appendix C – Quantile Regression Approach. http://www.caiso.com/InitiativeDocuments/AppendixC-QuantileRegressionApproach-FlexibleRampingProductRequirements.pdf

forecast error, as opposed to the average forecast error. Furthermore, the quantile regression produces a polynomial function of the forecast that can be evaluated at the forecast for the relevant hour of the trading day, thus yielding an imbalance reserve requirement that does not only depend on historical forecast error, but also on the VER forecast used in the IFM and the demand forecast used in RUC.

Separate regressions need to be run using load, solar, and wind as dependent variables and then the estimated parameters are combined using the identity Net Load = Load – Wind – Solar. Calculating an imbalance reserve up requirement would then involve the following steps:

1. Use quantile regression to estimate parameters of load forecast, month, and hour on the 97.5 percentile of load imbalance
2. Use quantile regression to estimate parameters of wind forecast, month, and hour on the 2.5 percentile of wind imbalance
3. Use quantile regression to estimate parameters of solar forecast, month, and hour on the 2.5 percentile of solar imbalance
4. Combine estimated parameters from steps 1-3 using the identity Net Load = Load – Wind – Solar

However, the method above systematically over-estimates the 97.5 percentile of net load imbalance because a 97.5 percentile net load imbalance (using the identity Net Load = Load – Wind – Solar) would not simultaneously have 97.5 percentile load imbalance *and* 2.5 percentile wind imbalance *and* 2.5 percentile solar imbalance at the same time. Therefore, the output values from the three quantile regressions are synthesized using a formula for the Net Load and they go through an additional quantile regression to produce the final imbalance reserve up requirement polynomial (see link in Footnote 14 for more detail). A similar process is undertaken to calculate the imbalance reserve down requirement. This results in an independent imbalance reserve up and imbalance reserve down requirement for each hour in the day-ahead market.

The CAISO would implement the quantile regression such that the percentiles used (2.5 and 97.5) are configurable so the CAISO could make adjustments after gaining operational experience.

In the EDAM, the CAISO intends to calculate the imbalance reserve requirement for each EDAM BAA separately using historical data specific to the BAA. The CAISO would develop a process for collecting load, wind, and solar forecast data from EDAM entities during the EDAM onboarding process so the CAISO can calculate an accurate imbalance reserve requirement when the EDAM entity goes live in the market.

Imbalance Reserve Demand Curve

Introduction

The market uses penalty prices to establish the priority of different schedules and constraints and to set market prices when schedules or constraints need to be relaxed when there is insufficient supply to satisfy requirements. Previous DAME proposals have suggested various penalty price structures, ranging from demand curves to graduated penalty prices that relax the imbalance reserve requirement as the

cost increases, to strict penalty prices that protect the full imbalance reserve requirement at higher costs.

The Draft Revised Final Proposal published on April 6, 2023 proposed for the CAISO BAA a hybrid design for the imbalance reserve requirement, dividing it equally between a demand curve and high penalty prices. This addressed concerns of prioritizing LPT exports over imbalance reserves for the CAISO BAA's net load uncertainty, ensuring more predictable export volumes. The demand curve followed the flexible ramping product's design. The hybrid model was exclusive to the CAISO BAA, as other EDAM BAAs would be subject solely to the imbalance reserve demand curve due to the absence of intertie bidding.

New Proposal

The ISO no longer recommends the hybrid approach for the CAISO BAA. Further evaluation of this approach revealed that it could lead to high prices that exceed the operational benefit of the product. Given the updated RUC proposal that allows the market to signal that exports may not be feasible in real-time, the CAISO BAA's exposure to unpredictable export volumes is reduced. One continued concern is that the cost of curtailing these exports in real-time might be high. CAISO will monitor the situation and make adjustments if necessary after implementation.

In response to stakeholder feedback, the ISO will replace the previous proposal and instead implement an imbalance reserve demand curve for all EDAM BAAs, including the CAISO BAA, and cap the imbalance reserve up and down demand curve values at $55.[20] The calculation of the imbalance reserve demand curve will resemble that of the flexible ramping product demand curve. The principle is that CAISO would calculate demand curves by determining the amount of the imbalance reserve requirement that should be relaxed at different price levels to ensure the cost of imbalance reserve awards does not exceed the expected cost of foregoing them. However, instead of the $1,000/MWh cost used in the flexible ramping product calculation, the avoidance cost of imbalance reserves will be set to $247/MWh, which is the lowest penalty price for violating contingency reserve requirements. Although $247/MWh is the basis for calculating the various segments of the demand curve, no steps of the demand curve will exceed the administrative ceiling of $55/MWh for the imbalance reserve product. Demand curves will be calculated each hour and determined separately for each EDAM entity.

Demand Curve

A demand curve represents the relationship between the price of imbalance reserves and the quantity that the market is willing to procure. It shows how the market's willingness to procure imbalance reserves changes with the price, helping to establish an appropriate price level while considering the expected cost of not procuring them.

[20] $55/MWh represents a high-percentile replacement cost of spinning reserves, which can be deployed in real-time in response to net load forecast error. This is similar to the approach of Midcontinent Independent System Operator, in which their Ramp Capability Up product demand curve uses a "cost of violation" equivalent to the first step of their spinning reserve demand curve.

The imbalance reserve demand curve establishes the price of not fulfilling the imbalance reserve requirement for a given hourly interval. This allows the market to determine whether to meet all or some of the upward and downward uncertainty requirements. The market makes this determination by assessing the trade-off between the cost and the value of an incremental unit of imbalance reserves.

If the imbalance reserve price is lower than the expected cost of not meeting the uncertainty requirement, the market will continue to procure imbalance reserves. Conversely, if the imbalance reserve price is higher than the expected cost of not meeting the uncertainty requirement, no additional imbalance reserves will be procured to cover it.

Implementation and Monitoring

By capping the demand curve values at the default bid price for imbalance reserve mitigation, market participants can gradually gain experience and adapt to the new market design. This approach allows for a smoother transition, reducing the likelihood of unforeseen issues or price spikes that could arise from a more aggressive initial implementation. However, the ISO emphasizes the importance of closely monitoring the DAME/EDAM market to ensure that the demand curve cap does not unintentionally stifle market efficiency or suppress price signals that are essential for maintaining system reliability. As the market matures and more operational experience is gained, it will be crucial to periodically review and adjust the demand curves to better reflect the true value of imbalance reserves and the associated scarcity conditions. This process should involve ongoing collaboration between the ISO, market participants, and other stakeholders to identify potential improvements and to make informed adjustments to market rules and design based on empirical evidence.

Other Considerations

This revised demand curve approach also simplifies the DAME design by decreasing the necessity for local market power mitigation of upward imbalance reserves. Since the $55/MWh administrative cap on imbalance reserves is equivalent to the proposed upward imbalance reserve mitigation price, there is no need to apply local market power mitigation to imbalance reserve bids. However, the ISO plans to develop the local market power mitigation functionality to apply to upward imbalance reserve bids in the DAME implementation, even if the functionality is not immediately employed. This will provide the flexibility for local market power mitigation to be deployed if the future need arises to adjust the imbalance reserve demand curve calculation. This revised approach also means the imbalance reserve offer cap would be reduced from $247/MWh to $55/MWh.

Some additional considerations are listed below:

- The uncertainty requirement used in the demand curve would include the EDAM diversity benefit.
- There would be separate demand curves for imbalance reserve up and down for each hour and for each BAA in the EDAM footprint.
- The EDAM resource sufficiency evaluation (RSE) would not use the imbalance reserve demand curve that will be used in the IFM. Instead, the RSE will penalize any imbalance reserve requirement relaxation at a high penalty price to ensure that all economic imbalance reserve

bids are fully used before incurring an imbalance reserve shortfall, which would result in failing the RSE in that direction.

Imbalance Reserve Deliverability

Under this proposal, the market would consider transmission constraints when awarding imbalance reserves in the integrated forward market to ensure they are deliverable if deployed in real-time. The proposed approach is similar to the upward and downward deployment scenarios developed in the flexible ramping product refinements initiative. The integrated forward market would solve the base scenario and deployment scenarios simultaneously to ensure all scenarios are transmission feasible. The deployment scenarios would result in nodal imbalance reserves that ensure scheduled day-ahead physical supply can meet the uncertainty requirements if deployed without violating transmission constraints.

The upward deployment scenario would ensure supply and imbalance reserves up awards are deliverable to where upward net load uncertainty may materialize. The downward deployment scenario would ensure supply less imbalance reserves down awards are deliverable to where the downward net load uncertainty may materialize. The net load uncertainty that materializes occurs at load nodes and variable energy resource nodes. The CAISO will use allocation factors derived by historical data to distribute the IRU/IRD requirements among load and VER nodes.

Some stakeholders have urged this proposal adopt a zonal approach to imbalance reserves procurement, similar to ancillary services. Stakeholders argue a zonal approach would simplify the market design and would reduce the need for additional elements like local market power mitigation. The ISO published a comparative matrix to highlight some of the tradeoffs between these approaches.[21]

This proposal continues to put forth nodal procurement of imbalance reserves, with some modifications. First, the CAISO will implement functionality that allows for the flexible activation/deactivation of individual transmission constraints in deployment scenarios. This modification addresses stakeholder concerns that if market simulation or operational experience reveals the need to enforce fewer constraints in deployment scenarios because of lower computational performance or market performance, the ISO can do so. Additionally, this will enable CAISO to collaborate with EDAM BAAs that may have lower frequency and quantity of binding constraints than the CAISO BAA to identify the most critical constraints to enforce, so as not to reduce computational performance with negligible market impact.

This proposal also would implement a tunable parameter to define the proportion of imbalance reserve awards that are "deployed" with resulting flows in the deployment scenarios. For example, if the parameter is set to 0.5, the market will still procure the full imbalance reserve requirement, but only half of each imbalance reserve award supply injection and demand withdrawal will be modeled against transmission constraints in the deployment scenarios at each location. This modification should help mitigate stakeholder concerns about excessive congestion costs resulting from the deployment

[21] Ibid footnote 2.

scenarios. The ISO plans to set the parameter initially to "1," resulting in the full deployment of imbalance reserves. This is because there are opposing concerns that modeling only a subset of imbalance reserve flows will reduce the robustness of EDAM transfers because transfer capacity could be overly consumed by energy. Nonetheless, if market simulation or operational experience supports lower deployment of imbalance reserve flows, the ISO will have a parameter to control that.

Imbalance Reserves from Intertie Resources

Hourly intertie resources would not eligible for IRU/IRD awards because they are not 15-minute dispatchable. However, 15-minute or dynamic intertie resources could offer imbalance reserves if they are certified to do so. To be certified to provide imbalance reserves, intertie resources would have to be registered with a resource ID defined in the CAISO Master File. This is so the market can certify the resource's ramp capability and capacity constraints to ensure the market awards are accurate. The market would not allow intertie resources to bid for imbalance reserves with only a transaction ID. The corresponding intertie schedule must be tagged after RUC with a transmission profile equal to the sum of the day-ahead energy schedule, plus the imbalance reserve award, if any.

Bidding Rules

The CAISO proposes the following bidding rules for products procured in the integrated forward market:

- Market participants would submit separate bids for energy, ancillary services (regulation up, regulation down, regulation up/down mileage, spinning reserves, and non-spinning reserves), imbalance reserves up, and imbalance reserves down.
- The bidding deadline would continue to be 10:00AM, at which point the day-ahead market closes.
- The current bid structure for energy and ancillary services would not change.
- Imbalance reserve bids could have different hourly price/quantity pairs but only a single price/quantity pair in each hour.
- The imbalance reserve bid quantity (MW) must be greater than zero and will be limited to the resource's maximum 30-minute ramp capability.[22]
- The imbalance reserve up and down bid prices will be capped at $55/MWh.
- All resources with imbalance reserve awards would be subject to bid insertion in the real-time market. This means that resources that do not submit the real-time energy bids that are required based on their imbalance reserve award will have economic energy bids[23] inserted for them at their Default Energy Bid in the real-time market.

IFM Payments and Charges

This proposal would not change day-ahead charges and payments for load, ancillary services, virtual supply, virtual demand, physical supply, imports, and exports. These would continue to be settled for

[22] The market will enforce dynamic ramp capability constraints for resources with dynamic ramp rates.
[23] The CAISO Tariff refers to these as Generated Bids.

differences between the day-ahead energy schedule and real-time market energy schedule at the relevant market prices.

This proposal considers the following day-ahead payments for resources that are awarded imbalance reserve awards:

- Resources that receive an imbalance reserve up award will be paid the locational marginal price for imbalance reserves up.
- Resources that receive an imbalance reserve down award will be paid the locational marginal price for imbalance reserves down.

The CAISO does not propose a direct settlement for imbalance reserve charges but instead will distribute the costs based on a cost allocation as described in the section below.

Imbalance Reserve Cost Allocation

Imbalance reserves are deployed when system conditions change between day-ahead and real-time, which requires the re-dispatch of available resources in real time. For example, if a generator or an import is unable to meet its day-ahead energy schedule, another resource must be scheduled in FMM to replace the lost supply. If a variable energy resource submits a self-schedule and its real-time forecast exceeds its day-ahead schedule, all else being equal, a dispatchable resource will need to be re-dispatched in real-time below its day-ahead schedule.

Imbalance reserves up/down costs will be allocated as follows:

Imbalance Reserves Up

- Tier 1
    - Generation: MAX(0, Day-ahead energy schedule – FMM upper economic limit as affected by de-rates and reduction in VER forecast (if applicable))[24]
    - Load: Negative uninstructed imbalance energy
    - Imports: MAX(0, Day-ahead energy schedule – FMM upper economic limit as affected by e-Tag transmission profile)
    - Exports: MAX(0, FMM self-schedule – Day-ahead energy schedule)
- Tier 2
    - Metered demand

The price used for the imbalance reserve up tier 1 cost allocation is the minimum of the imbalance reserve up price and the imbalance reserve up derived price. The imbalance reserve up derived price is the imbalance reserve up cost divided by the imbalance reserve up tier 1 allocation quantity.

[24] The determinant is the portion of the day-ahead schedule that is rendered undeliverable because of a de-rate or reduction in VER forecast. The priority order of the capacity services are (from highest to lowest priority): regulation, spin, non-spin, IRU, RCU.

Imbalance Reserves Down

- Tier 1
  - Generation: MAX(0, FMM lower economic limit as affected by rerates or self-schedules – Day-ahead energy schedule)
  - Load: Positive uninstructed imbalance energy
  - Imports: MAX(0, FMM self-schedule – Day-ahead energy schedule)
  - Exports: MAX(0, Day-ahead energy schedule – e-Tag transmission profile)
- Tier 2
  - Metered demand

The price used for the imbalance reserve down tier 1 cost allocation is the minimum of the imbalance reserve down price and the imbalance reserve down derived price. The imbalance reserve down derived price is the imbalance reserve down cost divided by the imbalance reserve down tier 1 allocation quantity.

Energy storage resources (using either the Non-Generator Resource model or the proposed Energy Storage Resource mode) would be considered under the "Generation" component of the cost allocations above.

This proposal considers a cost allocation instead of a direct settlement for a few reasons. First, the cost allocation aligns with flexible ramping product such that the cost allocation is based on the drivers of uncertainty. Second, there would be challenges in determining which loads and resources to charge at each nodal location and in what proportion since demand does not bid to buy imbalance reserves and imbalance reserve requirements are determined on a system level. The CAISO acknowledges the implications this has on congestion revenue rights and discusses this further in Section 4.2.

Imbalance Reserve Unavailability No Pay

Capacity that is not available in real time reduces the available supply of real-time energy and flexible ramping product and drives up their price. A stronger incentive than a no-pay mechanism is needed to ensure resources follow through on their must-offer obligations. Resources should be penalized commensurate with the harm they cause to the system by not being available. The CAISO proposes to implement the following unavailability penalties for imbalance reserves:

Imbalance reserves up: Resources with an upper economic limit in FMM that does not support their day-ahead energy + IRU award less the 5-minute ramp-capable portion[25] will be charged the higher of the RTPD FRU price or the IRU price.

[25] This term is included so that a resource is not charged no pay and a deviation settlement for ramp when the resource is unavailable. In Section 4.1 discusses the proposed settlement of ramp deviation.

Imbalance reserves down: Resources with a lower economic limit in FMM that does not support their day-ahead energy - IRD award plus the 5-minute ramp-capable portion will be charged the higher of the RTPD FRD price or the IRD price.

These unavailability penalties provide a strong incentive to deliver imbalance reserves and reflect the full cost of unavailability. That is because suppliers can be charged the cost of real-time flexible ramping product, whose price may spike because of a shortage of flexible capacity, for the portion of their award that was not provided. Resources that receive both a reliability capacity and imbalance reserve award and are not available, or only bid a portion of their combined award, will have the unavailability charge applied first to reliability capacity and then to imbalance reserves.

Bid Cost Recovery

Currently, bid cost recovery is calculated separately for the day-ahead and real-time market. This would not change in this proposal. However, the revenue and bid costs from imbalance reserve awards would be included in the calculation of day-ahead bid cost recovery. Resources committed in the integrated forward market, including resources that are scheduled for imbalance reserves, would be eligible to receive day-ahead bid cost recovery.

Application of Grid Management Charge to Imbalance Reserves

The market services charge of the grid management charge covers the cost of bidding and clearing the market. Currently, the market services charge is applied to ancillary services awards in the day-ahead market and real-time market. Suppliers include this cost in the bid price for ancillary services. The market services charge is not applied to the flexible ramping product because suppliers do not submit bids for that product. Since bids can be submitted for imbalance reserves, the market services charge would be applied for imbalance reserve awards. Suppliers would include this cost in their bids.

Exports and Imbalance Reserves

Export Protection

One of the benefits of imbalance reserves is they should reduce the quantity of export schedules curtailed in the RUC process. That is because implementing imbalance reserves should greatly reduce the use of manual operator adjustments to the RUC forecast. Operator RUC adjustments push the RUC procurement further away from the IFM results, which increases the risk that an export scheduled in IFM would be reduced in RUC.

High-Priority (PT) Self-Scheduled Export Rules

High-priority (PT) self-scheduled exports are supported by a resource with non-RA capacity bid into the day-ahead market. It is feasible that a resource with non-RA capacity could both support a PT export and receive an imbalance reserve award in the day-ahead market. That is because there is no direct link between the supporting resource's output and the export quantity.

For example, assume an exporting scheduling coordinator bids a 100MW PT export that is supported by a non-RA resource with a 100MW energy bid and 20MW imbalance reserve up bid. The PT export would

pass the day-ahead market validation because its supporting resource has sufficient energy bids to cover the export quantity. Assume the IFM results in the non-RA resource receiving an 80MW energy schedule and a 20MW imbalance reserve up award. In the real-time market, the non-RA resource submits a 100MW economic energy bid. This real-time energy bid is consistent with the resource's real-time bidding obligations based on its day-ahead schedule (80MW energy + 20MW imbalance reserve up). Assuming the PT export rebid in the real-time market, this real-time time energy bid also enable the PT export to pass the real-time market validation.

Again, this outcome is enabled by the fact there is no direct link between the supporting resource's output and the export quantity. The supporting resource just needs to submit sufficient bids in the day-ahead and real-time market. In the example above, presumably the market deemed it optimal to award the supporting resource 20MW of imbalance reserves and instead "support" the remaining 20MW of the export with energy with a different resource in the bid stack.

In the Market Enhancements for Summer 2021 Readiness stakeholder initiative[26], the CAISO implemented a rule that non-RA resources designated to support a PT export must bid into RUC up to the export self-scheduled quantity. Under this initiative, non-RA resources designated to support a PT export would be required to bid for reliability capacity up to the export self-scheduled quantity.

3.4 Market Power Mitigation Pass for RUC

Reliability capacity up and down awards would be priced in RUC at locational marginal prices that have marginal congestion contributions from binding constraints. All resources (including RA resources) would have the ability to offer non-zero prices for reliability capacity up and down in RUC. Therefore, it would be appropriate to perform local market power mitigation for reliability capacity up bids in RUC.[27] This would be achieved by adding a new market power mitigation pass after IFM and before RUC.

The market power mitigation pass for RUC would use unmitigated reliability capacity bids to procure reliability capacity to meet the CAISO demand forecast. The demand forecast would be distributed to load nodes in the market footprint using load distribution factors. Transmission constraints would be enforced using the same shift factors from IFM. Reliability capacity awards would be modeled as energy flows and the market would evaluate whether binding transmission constraints are uncompetitive using a dynamic competitive path assessment (DCPA). Resources that could provide counter-flow to uncompetitive constraints would have their reliability capacity up bids mitigated. Reliability capacity down bids would not be mitigated. The market would also not mitigate the reliability capacity up bids of non-EDAM intertie resources certified to provide reliability capacity, consistent with procedures for energy bid mitigation.

This proposal would mitigate reliability capacity offers to the higher of a default availability bid or the competitive locational marginal price for reliability capacity up. The latter would be derived as the

[26] California ISO. Market Enhancements for 2021 Summer Readiness stakeholder initiative. https://stakeholdercenter.caiso.com/StakeholderInitiatives/Market-enhancements-for-summer-2021-readiness.
[27] RUC availability is nodally procured today, but market power is not a concern because RA capacity must participate in RUC at $0 price, so there is no ability for RA resources to physically or economically withhold.

marginal price of reliability capacity up minus the non-competitive congestion components from binding constraints in RUC at the location of the mitigated resource. This proposal would also include a Negotiated Rate Option, under which the CAISO would use information provided by the Scheduling Coordinator to determine the negotiated default availability bid. The Negotiated Rate Option would be available to Scheduling Coordinators once the CAISO has sufficient operational knowledge of and experience with reliability capacity bids, ideally after one year of operational experience. Further details on the Negotiated Rate Option would be communicated in the CAISO's Business Practice Manuals.

The RUC default availability bid would be a static system-wide default availability bid for reliability capacity mitigation when DAME is first implemented. This default availability bid would be the same price for all resources and across all market intervals. It would provide a mitigation "floor" to balance the need to protect consumers against market power but also protect producers against excessive mitigation by forcing offers above a resource's costs. The reliability capacity up default availability bid would be set conservatively using a high percentile value of historical non-RA RUC availability offers. After the CAISO and market participants gain operational experience with biddable reliability capacity, and more information is available on the costs of offering reliability capacity under competitive conditions, the CAISO could re-engage with stakeholders to develop a more rigorous default availability bid methodology.

Similar to imbalance reserves, this proposal considers a default bid for reliability capacity mitigation of $55/MWh.

The competitive locational marginal price for reliability capacity is the marginal price of reliability capacity minus the non-competitive congestion components at the location of the mitigated resource.

Market Performance and Solve Time

The RUC market power mitigation pass should have a minimal impact on market performance and solve time because RUC is much less computationally complex than IFM. For example:

- **There is no co-optimization in RUC.** RUC only clears reliability capacity up and reliability capacity down.
- **There are no upward and down deployment scenarios in RUC.** There is only a base scenario in RUC.
- **IFM schedule, ancillary services, and imbalance reserve awards are fixed in RUC.** RUC is only procuring incremental or decremental supply to meet the BAA's demand forecast using the residual supply that is left over from IFM.
- **RUC has fewer binary variables.** Most of the resources are already committed in IFM.
- **RUC has fewer bids to consider.** For example, there are no load bids, no virtual bids; bids can only have a single capacity segment, etc.

Furthermore, to aid in the performance and solution time of the overall day-ahead market, the CAISO proposes to limit the RUC market power mitigation pass to a 24-hour horizon, rather than RUC's optimization horizon that may extend past the trading day.

3.5 Residual Unit Commitment Changes

Today, the residual unit commitment process runs after the integrated forward market produces energy schedules and ancillary service awards. The residual unit commitment process procures incremental capacity based on CAISO's demand forecast. The need for incremental capacity is based on the difference between the amount of physical supply that clears the integrated forward market and the amount of physical supply needed to meet the demand forecast. Resources participate in the residual unit commitment process by providing RUC availability bids.

This proposal considers several enhancements to the residual unit commitment process. First, physical capacity would be procured in the residual unit commitment process through a new day-ahead market product called reliability capacity. Reliability capacity could be procured in the upward or downward direction. Second, the residual unit commitment would be able to transition multi-stage generating resources in the downward direction (but not turn them off completely) and would establish their binding configuration. These enhancements are described in detail in the following sections.

Reliability Capacity (RCU/RCD)

The proposed reliability capacity product would improve the existing residual unit commitment process as the mechanism to ensure the day-ahead market schedules sufficient supply to meet a BAA's demand forecast. Unlike the existing residual unit commitment process, reliability capacity would provide both upward and downward dispatch capability. If a BAA's demand forecast is greater than the physical supply that clears the integrated forward market, the residual unit commitment process would procure reliability capacity up to provide upward dispatch capability and/or commit additional units. If the BAA's demand forecast is less than the physical supply that clears the integrated forward market, the residual unit commitment process would procure reliability capacity down to provide downward dispatch capability (but would not de-commit units).

Similar to the existing residual unit commitment process, the RUC optimization would consider transmission constraints when scheduling reliability capacity. Energy schedules, imbalance reserve awards, and ancillary services awards would be held fixed in RUC at their integrated forward market schedules.

A reliability capacity award would result in an obligation to provide economic energy bids to the real-time market. Resources awarded reliability capacity would have their reliability capacity schedule settled at a reliability capacity locational marginal price. The market would recover the costs of reliability capacity through a cost allocation (described in more detail in a later section).

Reliability capacity awards would be limited to a resource's 60-minute ramp capability. A resource can receive reliability capacity awards only in one direction (i.e., either reliability capacity up or reliability capacity down, not both).

Multi-Stage Generating Resource Configuration in the Residual Unit Commitment

Currently, multi-stage generating resource configurations are committed in the integrated forward market. These commitments are passed to the residual unit commitment as an input. The residual unit commitment is able to commit multi-stage generating resources or transition them to a higher configuration. System operators report seeing congestion or oversupply in the residual unit commitment where multi-stage generating resources should be allowed to transition downward but the current residual unit commitment does not have that functionality. This causes system operators to exceptionally dispatch the units down manually.

This proposal would enhance the residual unit commitment to transition multi-stage generating resources in the downward direction but not turn them off completely (i.e., transition down to their lowest configuration range but not shut down). This would help manage congestion in the residual unit commitment and avoid out-of-market actions by system operators.

This new functionality interacts with the process to validate high-priority (PT) exports. For example, assume an MSG resource is designated as a non-RA supporting resource for a PT export. Assume the exporter bids 80MW as a PT export. Assume the designated MSG resource bids 80MW into IFM, receives an 80MW IFM schedule, and is transitioned down to 60MW in RUC. The day-ahead market would validate support for an 80MW PT export schedule because the designated resource bid at least 80MW of energy into the day-ahead market. The day-ahead market does not require that a supporting resource actually clear IFM or RUC to support a PT export. Note that scenarios where RUC would de-commit an MSG to a lower configuration would tend to occur when CAISO is in an over-generation situation or otherwise low price conditions, which are not associated with tight system conditions.

Market Operator Adjustments to RUC Demand Forecast

One of the driving factors of this initiative is the increased frequency and magnitude of market operator adjustments to the RUC demand forecast. The cause and effect of these RUC adjustments are described in Section 2. As described in the Day-Ahead Market Enhancement Analysis Report[28], market operators reference an "upper confidence" demand forecast that assesses the maximum demand expected under current weather conditions. When the day-ahead forecasted load exceeds a certain level, market operators consider this upper confidence forecast to determine the size of the RUC adjustments.

The implementation of imbalance reserves into the day-ahead market should greatly reduce the amount of RUC adjustments going forward. However, market operators would still have the authority to use RUC adjustments as needed. Although net load uncertainty is the main reason market operators use RUC adjustments, RUC adjustments can be used to cover other operational risks as well, such as wildfire

[28] California ISO. Day-Ahead Market Enhancements Analysis. Alderete, Guillermo Bautista and Zhao, Kun. January 24, 2022. http://www.caiso.com/InitiativeDocuments/Day-AheadMarketEnhancementsAnalysisReport-Jan24-2022.pdf.

risks. Therefore, market participants should not expect the use of operator RUC adjustments to completely disappear.

The CAISO publishes the RUC load adjustment (MW) and RUC load adjustment reason in OASIS to provide transparency. The CAISO would continue to do so after DAME is implemented.[29]

Reliability Capacity and Intertie Resources

Hourly intertie resources are eligible to provide reliability capacity up and down if they are certified to do so. To be certified to provide reliability capacity, intertie resources would have to be registered with a resource ID defined in the Master File. This is so the market can certify the resource's ramp capability and capacity constraints to ensure the market awards are accurate. The market would not allow intertie resources to bid for reliability capacity with only a transaction ID.

The corresponding intertie schedule must be tagged after RUC with a transmission profile equal to the sum of the day-ahead energy schedule, plus the reliability capacity award, if any. Hourly exports to non-EDAM BAAs can also provide reliability capacity up at ISO interties, with the obligation to provide a decremental energy bid to dispatch down the export schedule in the FMM if needed.

Updates to the RUC market formulation in DAME require changes to the process for indicating exports at risk of curtailment in real-time. To indicate that economic exports and lower priority (LPT) exports that clear the IFM are at risk of curtailment in the RTM, if these exports do not explicitly bid for RCU, they will be considered in the RUC scheduling run with RCU bids at penalty prices that maintain the merit order of their energy bids in the IFM. Consequently, if there is no available physical supply capacity in the RUC above energy schedules to meet both the demand forecast and the economic and LPT exports that cleared the IFM, the latter will receive a curtailment indication for the RTM in the form of RCU awards. Note that these are only proxy RCU awards and, as such, they will not be paid at the relevant marginal RCU price. The scheduling coordinator for these exports will be obligated to submit energy bids for the RCU capacity, similar to the must-offer obligation for RCU awards. If an economic export submits an RCU bid (LPT exports may not submit RCU bids since an energy bid is required for them) and is awarded RCU, that RCU award will be paid at the relevant marginal RCU price.

Reliability Capacity Bidding Rules

The CAISO proposes the following bidding rules for products procured in the residual unit commitment process:

- Market participants would submit separate bids for RCU and RCD.
- Reliability capacity bids could have different hourly price/quantity pairs but only a single price/quantity pair in each hour.
- Reliability capacity up and down bid MW quantity must be greater than zero and would be capped by the associated resource's 60-minute ramp rate over the product horizon.
- Reliability capacity up and down bid prices will be capped at $250/MWh.

[29] California ISO OASIS. See System Demand > Load Adjustments. http://oasis.caiso.com/mrioasis/logon.do.

- Reliability capacity up bid MW quantity must be greater than or equal to the sum of the resource's energy bid quantity.
- CAISO resource adequacy resources would be able to bid non-zero prices for reliability capacity.
- CAISO resource adequacy resources with a day-ahead must-offer obligation in RUC will be subject to bid insertion for reliability capacity up. If the required amount of resource adequacy capacity is not offered as reliability capacity into the day-ahead market, the CAISO will
    - Extend the bid quantity to the required amount using the submitted bid price if the resource provided a partial reliability capacity up bid
    - Insert reliability capacity bids at $0 bid price for the required amount if the resource did not submit a reliability capacity up bid
- All resources with reliability capacity awards would be subject to energy bid insertion in the real-time market. This means that resources that do not submit the energy bids that are required based on their reliability capacity award would have energy bids inserted for them at their Default Energy Bid price in the real-time market.

Reliability Capacity Payments

The CAISO proposes the following day-ahead payments for resources that are awarded reliability capacity awards:

- All resources (including CAISO resource adequacy resources) that receive a reliability capacity up or down award will be paid the locational marginal price for reliability capacity in the upward or downward direction, respectively.

Reliability Capacity Cost Allocation

It is appropriate to design a cost allocation for reliability capacity payments that builds off the existing cost allocation for the residual unit commitment and accounts for the drivers of reliability capacity needs (load bids, virtual bids). The uplift cost for reliability capacity would be allocated as follows:

Reliability Capacity Up

- RCU Tier 1 cost would be allocated to net virtual supply and under-scheduled load.
    - The net virtual supply allocation quantity would be a maximum of (a) zero or (b) scheduling coordinator net virtual supply awards. Thus, net virtual demand would not net against the load allocation base for RCU. This assumes a balancing authority area procures net virtual supply.
    - Under-scheduled load would be defined using net negative metered demand. The net negative metered demand would exclude net negative demand associated with balanced ETC/TOR rights, negative deviation for Participating Load resulting from a market dispatch, and metered sub-systems that have elected not to participate in reliability capacity.
- RCU Tier 2 cost would be allocated to metered demand.

RCU Tier 1 costs would be limited by the minimum of the RCU capacity price and the RCU Tier 1 price.[30] In other words, if the RCU obligation were higher than the RCU awards, all of the cost would be allocated to RCU Tier 1. If RCU awards were greater than the RCU obligation, then costs would be split between Tier 1 and Tier 2.

Reliability Capacity Down

- RCD Tier 1 cost would allocated to net virtual demand and over-scheduled load.
    - The net virtual demand allocation quantity would be a maximum of (a) zero or (b) scheduling coordinator net virtual demand awards. Thus, net virtual demand would not net against the other allocation bases for RCD. This assumes a balancing authority area procures net virtual demand.
    - Over-scheduled load would be defined using net positive metered demand. The net positive metered demand would exclude net positive demand associated with balanced ETC/TOR rights, positive deviation for Participating Load resulting from a market dispatch, and metered sub-systems that have elected not to participate in reliability capacity.
- RCD Tier 2 cost would be allocated to metered demand.

RCD Tier 1 costs would be limited by the minimum of the RCD capacity price and the RCD Tier 1 price. In other words, if the RCD obligation were higher than the RCD awards, all of the cost would be allocated to RCD Tier 1. If RCD awards were greater than the RCD obligation, then costs would be split between Tier 1 and Tier 2.

Reliability Capacity Unavailability No Pay

This proposal considers the following unavailability penalties for reliability capacity:

Reliability capacity up: Resources with an upper economic limit that does not support their day-ahead energy + RCU award would be charged the RCU price.

Reliability capacity down: Resources with a lower economic limit that does not support their day-ahead energy - RCD award would be charged the RCD price.

Resources that receive both a reliability capacity and imbalance reserve award and are not available or only bid a portion of their combined award will have the unavailability charge applied first to reliability capacity and then to imbalance reserves.

Bid Cost Recovery

Currently, bid cost recovery is calculated separately for the day-ahead and real-time market. This would not change under this proposal. However, all resources committed in the residual unit commitment

[30] RCU Tier 1 price is the minimum of the RCU allocation price and the RCU capacity price. The RCU allocation price is the RCU cost divided by the total RCU Tier 1 allocation quantity. RCD Tier 1 price is calculated similarly.

process are eligible to receive real-time bid cost recovery.[31] The revenue and bid costs from reliability capacity awards would be included in the calculation of real-time bid cost recovery.[32] Resources committed after the close of the day-ahead market through a real-time market schedule or an exceptional dispatch would also continue to be eligible for real-time bid cost recovery.

Any surplus revenues from the residual unit commitment process would continue to be netted against revenue shortfalls in the real-time market. A revenue surplus would occur in the residual unit commitment when the marginal price of reliability capacity exceeds a resource's reliability capacity bid cost. Conversely, any surplus revenues from the real-time market would be netted against revenue shortfalls in the residual unit commitment process. Bid cost recovery payments from the integrated forward market and the residual unit commitment/real-time market would continue to be kept separate because they have different cost allocations. RUC bid cost recovery costs would be allocated to net virtual supply and under-scheduled load in alignment with reliability capacity up cost allocation.

Application of Grid Management Charge to Reliability Capacity

The market services charge of the grid management charge covers the cost of bidding and clearing the market. Currently, the market services charge is applied to ancillary services awards in the day-ahead market and real-time market. Suppliers include this cost in the bid price for ancillary services. The market services charge is not applied to the flexible ramping product and corrective capacity because suppliers are not allowed to submit bids for those products. Since bids can be submitted for reliability capacity, the market services charge would be applied for reliability capacity awards. Suppliers would include this cost in their bids.

4. Additional Day-Ahead Market Enhancement Design Considerations

4.1 Measures to Accommodate Long-Term Contracts

No matter how the day-ahead market settles the payments for the new day-ahead market products, RA contracts ultimately dictate how the revenue generated from the new market products is settled between counterparties. CAISO is concerned about getting into the middle of procurement contracts; however, it recognizes that entities may need additional information to settle revenues from the new market products in accordance with their contractual provisions.

During the implementation of DAME, CAISO will work with parties to understand and provide to the greatest extent possible the information needed to facilitate contractual settlement provisions and develop a process for providing this information to the relevant parties in a regularly issued settlement

[31] Units committed in RUC are included in the real-time market BCR (as opposed to day-ahead market BCR) because 1) many commitments made in RUC are non-binding so the real-time market makes the binding commitment decision and 2) long-start and extra-long-start resources that do receive binding commitments in RUC are only committed to their PMin so they can participate in the real-time market.
[32] Reliability capacity payments and bids would not be considered in the RUC/RT BCR calculation for RA resources.

report. In particular, the CAISO will provide a breakdown of the imbalance reserve marginal price by capacity versus opportunity cost, which several stakeholders have indicated is important.

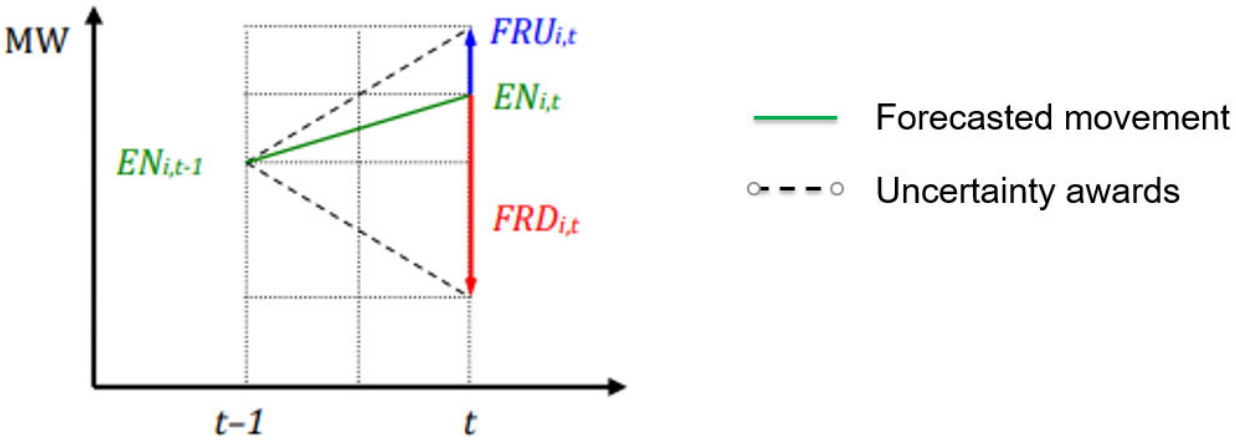
The CAISO also proposes to introduce a three-year "opt-in" transitional resource adequacy true-up mechanism whereby entities can choose to have the CAISO settlement system true-up specific imbalance reserve and reliability capacity payments that overlap with RA capacity. The transitional RA true-up mechanism allows load serving entities (LSEs) in agreement with the RA supply resource to have RA capacity shown on the LSE monthly RA plan and procured through the day-ahead market for imbalance reserve and/or reliability capacity to settle with both the LSE and the generator.

First, the CAISO will calculate an RA resources' overlapping RA capacity by comparing the resource's shown RA capacity against the resource's stacked awards for energy, ancillary service, imbalance reserve, and reliability capacity. Any portion of RA capacity that overlaps with either the imbalance reserve awards or reliability capacity awards will considered overlapping RA capacity potentially subject to the RA true-up mechanism. If a resource has multiple RA contracts that are shown on multiple LSE's monthly RA plans, the CAISO will determine the portion of overlapping RA capacity associated with LSE that "opt-in" to the RA true-up mechanism versus the LSEs that 'opt-out" of the RA true-up mechanism by distributing the overlapping RA capacity to the contracted LSE in proration to the LSE's RA showing as compared to the resource's total RA showings. In all cases, the CAISO will compensate the LSE for "opt-in" RA capacity at the respective imbalance reserve capacity price and/or reliability capacity price while also compensating the RA resource for the same overlapping RA capacity at the respective imbalance reserve opportunity cost. Furthermore, the CAISO will compensate the RA resource for any overlapping RA capacity that has not elected to "opt-in" to the RA true-up mechanism, as well as non-RA capacity procured for imbalance reserve or reliability capacity at the respective marginal imbalance reserve price or marginal reliability capacity price

4.2 Real-Time Market Ramp Deviation Settlement

The deviation settlement of ramp would involve two components: (1) forecasted movement and (2) uncertainty awards (see Figure 9). Forecasted movement is the change in energy schedules between market intervals. Uncertainty awards reserve additional ramping capability that is needed to meet net load forecast uncertainty in the next market run. The marginal value of providing ramp capability is the same for both forecasted movement and uncertainty awards.

Figure 9: Forecasted movement and uncertainty awards



Imbalance reserves in the day-ahead market and flexible ramping product in the real-time market both provide additional capacity for ramping. Market payments for the provision of ramping services should net in each market. However, there are differences in the configuration, eligibility, and pricing of these products that would make a direct deviation settlement infeasible. Table 3 describes these differences.

Table 3: Differences between Imbalance Reserves and Flexible Ramping Product

Imbalance Reserves	**Flexible Ramping Product**
Single settlement (uncertainty awards)	Dual settlement (uncertainty awards and forecasted movement)
Awards based on resource's 30-min ramp capability	Awards based on resource's 5-min ramp capability
Marginal clearing price based on bids and opportunity cost	Marginal clearing price based only on opportunity cost

This proposal considers a deviation settlement for ramp services. This approach is necessary to avoid the following issues:

- **Double payment of opportunity costs.** Resources that receive an imbalance reserve award in the day-ahead market are paid the locational marginal price of imbalance reserves for the corresponding interval. The locational marginal price of imbalance reserves is based on two factors: imbalance reserve bids and any opportunity costs. Opportunity costs for imbalance reserves occur when a resource is held out of merit for energy or ancillary services to preserve its ramp capability to provide upward capacity to meet the uncertainty requirements in a given interval. Similarly, opportunity costs for energy can occur when a resource is held out of merit for energy in order to preserve its downward capability to provide sufficient ramping to meet the load in a subsequent interval. However, the marginal clearing price of flexible ramping product is based only on opportunity costs; there are no bids associated with this product. A resource awarded both imbalance reserves and flexible ramping product could thus be paid opportunity costs from both products, even if its energy and ancillary service schedules did not change. This represents a double payment. However, the resource should retain its imbalance

reserve bid costs, which reflect the resource's marginal cost of being available for dispatch in the real-time market.

- **Double payment of forecasted movement.** In the day-ahead market, all hourly schedules are financially binding across the 24-hour horizon. That is, there are no unsettled advisory intervals in the day-ahead market. As a result, there is no need to settle forecasted movement in the day-ahead market because the energy prices already reflect the opportunity cost of resources scheduled out-of-merit in previous hourly intervals. However, in the real-time market, only one market interval is financially binding over the optimization horizon. The market produces unsettled "advisory" prices for the remaining market intervals. If a resource is dispatched for energy in the binding interval to provide ramp capability to meet the energy dispatch of an advisory interval, the resource can incur an opportunity cost if the binding interval price is less than its energy bid. If in this market run the resource incurs an opportunity cost, the advisory interval energy price will increase to reflect this tradeoff. However, the advisory interval energy price is not settled, and when it becomes binding in the next market run, the out-of-merit dispatch is unknown and the opportunity cost is not embedded in the binding energy price. In order to compensate the resource, it receives a separate payment for forecasted movement at the marginal price of ramp capability.[33] This incentivizes the resource to follow its energy dispatch because the resource is indifferent to receiving an incremental energy schedule or a forecasted movement payment because it earns the same profit under both scenarios. However, a resource may receive compensation for forecasted movement both in the day-ahead market (embedded in the energy prices) and in the real-time market (as a side payment). This represents a double payment.
- **Unavailable ramp drives up real-time prices.** Capacity that is not available in real-time reduces the available supply of ramp and drives up its price. Therefore, resources that do not provide the ramp they are obligated to should settle those deviations at prices reflecting real-time conditions.

The proposed settlement for imbalance reserves has several components:

- **The 5-minute ramp-capable portion of an imbalance reserve award will be subject to a deviation settlement with a flexible ramping product award in FMM.** Imbalance reserve is 30-minute ramp capability reserved for use in FMM to address the granularity difference between IFM and FMM, and uncertainty that may materialize between IFM and FMM. The uncertainty that may materialize between FMM and RTD is addressed by the flexible ramping product, which is 5-minute ramp capability reserved in FMM and RTD. Therefore, the 5-minute ramp-capable portion of imbalance reserve can be procured as flexible ramping product in FMM.
- **The portion of an imbalance reserve award in excess of the 5-minute ramp-capable portion will not be subject to a deviation settlement but will be subject to no pay provisions.** This portion of the imbalance reserve award can be scheduled as energy in FMM to address the uncertainty that may materialize in FMM or the granularity difference between IFM and FMM.

[33] See Section 7.1.3.1.4 of the Market Operations BPM for numerical examples.

This portion of the imbalance reserve award would not be subject to a deviation settlement. However, if any of this portion were unavailable due to outages, it would be subject to no pay provisions at the higher of the IFM marginal price for imbalance reserves, the FMM marginal price for flexible ramping product, or the RTD marginal price for flexible ramping product (see Section 3.3).

- **Forecasted movement in the FMM will be subject to a deviation settlement with forecasted movement in the IFM.** Forecasted movement in the FMM is paid the flexible ramp up price and charged the flexible ramp down price. Therefore, an upward deviation in forecasted movement is paid the flexible ramp up price and charged the flexible ramp down price, and a downward deviation in forecasted movement is paid the flexible ramp down price and charged the flexible ramp up price. This aligns with the deviation settlement between FMM forecasted movement and RTD forecasted movement.

The ramp capability of a resource may manifest as forecasted movement between energy schedules or it may be awarded as uncertainty awards, or any combination in between. That is why it is important the overall settlement of these complementary products have the following property:

> If the 5-minute ramp capability that is awarded in IFM (as either energy movement or an imbalance reserve award) is available and awarded in FMM (as either forecasted movement or a flexible ramping product award), there should be no net deviation settlement in FMM. Furthermore, if the 5-minute ramp capability that is awarded in FMM is available and awarded in RTD (as either forecasted movement or a flexible ramping product award), there should be no net deviation settlement in RTD.

The CAISO has published an Excel spreadsheet model[34] that illustrates that if the 5-minute ramp capability of a resource is awarded between forecasted movement and uncertainty awards the same across markets, from IFM to FMM to RTD, there are no net payments or charges due to deviations in the real-time market. The only exceptions are when a resource reaches their PMin or PMax at a different time than in the preceding market, there is a ramp rate de-rate, or the resource's ramp capability is not fully used.

Impacts to WEIM from Ramp Settlement

The Western Energy Imbalance Market also procures flexible ramping product to commit and position resources to meet future load and supply variability and uncertainty. Therefore, WEIM participants would also be subject to a forecasted movement deviation settlement in FMM. The baseline forecasted movement for each resource would be based on WEIM base schedules. For WEIM participants, forecasted movement from base schedules is equivalent to forecasted movement in the integrated forward market. If resources are already scheduled to ramp in WEIM base schedules, then paying an additional forecasted movement payment in FMM for the same ramp constitutes a double payment.

[34] FMM and RTD Settlement Example - Day-Ahead Market Enhancements.
http://www.caiso.com/InitiativeDocuments/FMM-RTDSettlementExample-Day-AheadMarketEnhancements.xlsx

Impact to Convergence Bidding from Ramp Settlement

Convergence bids, also known as virtual bids, are settled at the day-ahead price and liquidated in the FMM. Virtual supply is paid the IFM price and charged the FMM price. Virtual demand is charged the IFM price and paid the FMM price. Since the IFM energy price includes the settlement of forecasted movement, virtual supply and demand would have a forecasted movement deviation settlement at the FMM FRP prices.

4.3 Congestion Revenue from Deployment Scenarios

Participants in EDAM will have different mechanisms for collecting and allocating congestion revenues.

The CAISO BAA uses Congestion Revenue Rights (CRRs) as forward market products to hedge integrated forward market congestion costs. Today, CRR holders receive congestion revenues collected in the integrated forward market due to each binding transmission constraint between the CRR source and sink. The CRR settles at the difference between the marginal congestion components of the energy LMP at the sink and source of the CRR.

For EDAM BAAs, the process of collecting and allocating congestion revenue is determined through the Open Access Transmission Tariff (OATT) and may vary by entity.

This proposal would settle the cost of imbalance reserves through a cost allocation rather than a direct settlement with load and VERs using the locational marginal price of imbalance reserves. In this way, the CAISO would not collect congestion revenues to cover the marginal cost of congestion in the imbalance reserve deployment scenarios. Whenever a constraint is binding in the deployment scenarios, there could be a shortfall of congestion revenue collected on that constraint, since the CAISO would not otherwise collect congestion revenue on the imbalance reserve flow. In other words, the imbalance reserve deployment scenario flow can "displace" energy flows over constrained transmission paths.

The trade-off between using transmission for energy or imbalance reserve flows depends on the relative difference between the marginal energy and imbalance reserve offers inside and outside the constrained area. The CAISO expects that the differences between imbalance reserve bid prices for the constrained vs. unconstrained areas generally will be much lower than the differences in energy bid prices for the constrained vs. unconstrained areas. This expectation is based on the lower cost of providing imbalance reserves compared to providing energy. As a result, CAISO expects the constrained transmission to be mostly used for energy. Thus, CAISO does not expect this to be a major issue.

However, stakeholders pointed out that without a mechanism to collect congestion rent on imbalance reserve flows, the CAISO would be shifting costs away from entities who are entitled to congestion revenues and not considering the full cost of using the transmission system. The CAISO agrees with this notion and proposes the following mechanism to address the problem.

The CAISO would determine the "displaced" congestion revenue from imbalance reserve up flows by calculating and summing (Imbalance Reserve Up Flow) * (Shift Factor) * (Shadow Price of Transmission

Constraint) for all binding constraints in the upward deployment scenario. Similarly, the CAISO would determine the "displaced" congestion revenue from imbalance reserve down flows by calculating and summing (Imbalance Reserve Down Flow) * (Shift Factor) * (Shadow Price of Transmission Constraint) for all binding constraints in the downward deployment scenario.

The CAISO would collect this revenue through the existing imbalance reserve cost allocation. Congestion contributions to transmission constraints in an EDAM BAA from resources in other EDAM BAAs contribute to the congestion offset of the EDAM BAA where the congestion occurs. For the CAISO BAA, the congestion offset distribution is through the CRR Balancing Account.

For the CAISO BAA, the CAISO would redefine the notional value of CRRs to incorporate marginal cost of congestion differences between source and sink for imbalance reserve deployment scenarios. The CAISO would also redefine the congestion revenue collection to fund the CRR notional value to include imbalance reserve deployment scenarios.[35]

For non-CAISO BAAs, the CAISO would return the revenues to the BAA for distribution to its participants according to their OATT processes.

4.4 Variable Energy Resources Eligibility to Provide New Products

This proposal maintains that variable energy resources (VERs) would be eligible to provide imbalance reserves and reliability capacity in both directions. This proposal no longer considers distinguishing VER resources in the Master File to determine their eligibility to provide imbalance reserve up. All VERs would be eligible for imbalance reserve up awards. However, the ISO continues to be concerned about awarding upward reserves on VERs above their day-ahead forecast. To prevent this, the IFM would apply a capacity constraint to VERs such that their energy, upward ancillary services, and imbalance reserve up awards could not exceed their VER forecast.

A similar capacity constraint would apply in RUC where the sum of IFM awards and reliability capacity up awards could not exceed the VER forecast. This proposal would also require VERs to bid reliability capacity up quantity equal to their VER forecasted output. This is consistent with an EDAM proposal where all resource capacity shown in the EDAM resource sufficiency evaluation must be bid into RUC as reliability capacity up. Since VERs would be considered in the EDAM resource sufficiency evaluation at their forecast, they must bid reliability capacity up into RUC at their forecast MW. Independent of EDAM, this rule would be necessary to ensure that RUC can consider all physical supply, including the supply forecasted for VERs that is not bid into the IFM. If VERs do not bid reliability capacity up to their VER forecast, the ISO will generate bids at a bid price of $0. As part of these changes, this proposal would no longer consider VERs in the RCU/RCD cost allocation, because they no longer contribute to the reliability capacity requirement (see Section 3.4). In addition, this proposal updates the RCU no pay rule such that resources would only have to pay back the RCU price, instead of the higher of the RCU price or

35 This proposal would not change the existing CRR nomination and auction processes to account for imbalance reserves. Transmission capacity would not be withheld in the CRR model for the CRR nomination and auction processes.

RTPD FRU price, if the resource capacity is unavailable. This is so VERs that are awarded reliability capacity up but cannot produce to their day-ahead forecast in real-time only have their RCU awards rescinded and do not face any further financial penalty. This is also consistent with the current no pay RUC settlement (charge code 6824). Finally, VERs would be exempt from a current rule enforced in SIBR that capacity bid in RUC must first bid in IFM, which would force VERs to bid energy up to their forecast.

4.5 Changes to Storage Resources

This proposal includes a requirement that storage resources participate in the residual unit commitment process. Today, all schedules for storage resources from the integrated forward market are directly copied into the residual unit commitment. This policy includes a proposal to require that all storage resources shown for resource adequacy participate in the residual unit commitment process, but allows resources to bid freely in the process. This proposal also allows the ability for all storage resources that are not shown for resource adequacy to also participate in the residual unit commitment process, should they choose to do so.

This policy includes changes to the ancillary service state of charge equations to include imbalance reserves and reliability capacity. These equations ensure that storage resources have state of charge when awarded ancillary services.

Finally, the policy proposes new requirements that govern the amount of state of charge that a storage resource must hold to support imbalance reserve awards in the day-ahead market via anticipating upper and lower values (or an envelope) for state of charge. This change will help ensure that storage resources will be able to deliver imbalance reserve awards if called upon in the real-time market. This is extremely important because if the storage resources are not able to deliver, it could result in negative reliability implications. These equations provide additional guardrails than those developed in the energy storage enhancements policy for modeling expected impacts to state of charge from regulation awards. These guardrails may not be necessary for ancillary service awards because these awards may be smaller in magnitude and more granular than hourly energy awards. This proposal does not include updates to the state of charge equation to include expected impacts from imbalance reserve awards. Imbalance reserve awards could potentially introduce inconsistencies in modeled state of charge compared to state of charge that materializes in real-time. As more experience is gained with this issue, this equation may be revisited in future enhancements.

Many stakeholders requested that more time be spent thinking about the introduction of the new envelope equations and continuing to think about how these equations interact with existing constraints that are already imposed on storage resources. This policy commits to continuing this evaluation of the efficacy of the envelope equations, their impact on existing constraints, best methodologies to set multipliers, and what these initial multipliers will be set to. This policy understands that new constraints imply new complexities in operating storage resources, and that these new constraints could be challenging for storage resources operating in the day-ahead markets. This commitment will include discussions of these topics prior to policy implementation and formal inclusion of these values in the ISO business practice manuals.

These changes are summarized as follows:

- RA storage resources will be required to participate in the residual unit commitment process
  - All storage will be allowed to specify capacity bids in this process
  - Resources adequacy storage that do not provide bids will have bids inserted at $0/MW
- The ancillary service state of charge constraint will be extended to include imbalance reserves
- The day-ahead market will generate an upper and lower bound, or envelope, for state of charge
  - The envelope could constrain operation for storage resources
  - The initial upper and lower bounds will be set to the initial day-ahead state of charge
  - The initial multiplier attached to the imbalance reserves in the envelope equation will continue to be discussed, but may be set initially to .85

Residual Unit Commitment

Today storage resources do not formally participate in the residual unit commitment process. The market software uses results from the integrated forward market pass of the day-ahead market and includes those schedules directly in the residual unit commitment pass. Because storage resources are inherently use limited, schedules from the day-ahead market tend to reflect optimal schedules for the resources. These schedules include charging when prices are lowest and discharging when prices are highest and fully utilizing the storage resources.

However, there can be scenarios when storage resources are not fully utilized in the integrated forward market pass of the day-ahead market. This could occur because of economics, specifically if the bid spread for the resource does not materialize for the full duration of the resource. For example, if a 1-hour duration storage resource is bidding to charge when prices are less than $10/MWh, and to discharge if prices are greater, in other words submitting a $50/MWh price spread. But, if the difference between the highest priced hour and the lowest priced hour in the integrated forward market does not exceed $40/MWh, the storage resource will not be scheduled in the market.

If the discharge energy from storage resources could prevent commitment of other resources, this example can result in inefficiencies in the residual unit commitment process. Specifically, inefficiencies occur if the shortfall between the actual price spread and bid spread is less than the commitment costs for the resource. These inefficiencies are relieved if storage resources participate in the residual unit commitment process. Participation would allow the market optimization to make the economic tradeoff between committing the storage resource for an energy schedule or committing the other resource.

This proposal includes a requirement that storage resources shown for resource adequacy be required to participate in the residual unit commitment pass in the day-ahead market. This proposal will also allow storage resources that are not shown for resource adequacy to participate in the residual unit commitment process. Storage resources will be allowed to bid charging and discharging capability into the residual unit commitment process at any price. If bids are not provided, bids of $0/MWh will be inserted for storage resources shown for resource adequacy for the entire bid curve.

Ancillary Service State of Charge

Today the day-ahead market ensures that ancillary services awarded to storage resources will have sufficient state of charge to deliver those awards. The market accomplishes this by enforcing the ancillary service state of charge constraint, shown in Equation Set 1. These equations state that a storage resource must have sufficient state of charge to ensure that they provide awarded capacity for ancillary services for at least one hour. For example, if a storage resource receives an award for 10 MW of regulation up in the day-ahead market, it is required to have a state of charge of 10 MWh (10 MW multiplied by 1 hour) above the minimum state of charge. This ensures the resource's ability to deliver regulation for the entire 60-minute period of the award. Similarly, these constraints ensure sufficient state of charge headroom for resources providing regulation down.

$$\begin{aligned} SOC_{i,t-1} - RU_{i,t} - SR_{i,t} - NR_{i,t} &\geq \underline{SOC}_{i,t} \\ SOC_{i,t-1} + \eta_i \, RD_{i,t} &\leq \overline{SOC}_{i,t} \end{aligned} \quad (1)$$

Where:

$RU_{i,t}$ *Regulation up award for resource i at time t*

$SR_{i,t}$ *Spinning reserve award for resource i at time t*

$NR_{i,t}$ *Non-spinning reserve award for resource i at time t*

$\underline{SOC}_{i,t}$ *Minimum state of charge for resource i at time t*

$RD_{i,t}$ *Regulation down award for resource i at time t*

$\overline{SOC}_{i,t}$ *Maximum state of charge for resource i at time t*

This policy proposes enhancements to the day-ahead state of charge requirements for storage resources providing imbalance reserves. The current requirements ensure that storage resources have sufficient state of charge to provide all four ancillary services including regulation up, regulation down, spinning reserve and non-spinning reserve. This policy proposes expanding these requirements to require sufficient state of charge to provide imbalance reserve up and imbalance reserve down in addition to the other ancillary services. These proposed changes are outlined in Equation Set 2. These changes help ensure that storage resources have sufficient state of charge to provide awarded products.

$$\begin{aligned} SOC_{i,t-1} - RU_{i,t} - SR_{i,t} - NR_{i,t} - IRU_{i,t} &\geq \underline{SOC}_{i,t} \\ SOC_{i,t-1} + \eta_i \left(RD_{i,t} + IRD_{i,t}\right) &\leq \overline{SOC}_{i,t} \end{aligned} \quad (2)$$

Where:

$IRU_{i,t}$ *Imbalance reserve up award for resource i at time t*

$IRD_{i,t}$ *Imbalance reserve down award for resource i at time t*

Furthermore, these constraints would be expanded into the residual unit commitment process to require sufficient state of charge to provide reliability capacity up and reliability capacity down in

addition to the other terms included in the constraint enforced in the day-ahead market. This change is included in Equation Set 3.

$$\begin{aligned} SOC_{i,t} - RU_{i,t} - SR_{i,t} - NR_{i,t} - IRU_{i,t} - RCU_{i,t} \geq \underline{SOC}_{i,t} \\ SOC_{i,t} + \eta_i \left(RD_{i,t} + IRD_{i,t} + RCD_{i,t}\right) \leq \overline{SOC}_{i,t} \end{aligned} \quad (3)$$

Where:

$RCU_{i,t}$ *Reliability capacity up award for resource i at time t*

$RCD_{i,t}$ *Reliability capacity down award for resource i at time t*

Accounting for State of Charge

The final proposal for the day-ahead market enhancements policy included an update to the equation that governs state of charge for storage resources. One concern about this approach continues to be the nature of how imbalance reserves will be deployed – and thus impact state of charge – for storage resources in the real-time market. Many times imbalance reserves may not be a critical part of real-time market operations, but during some periods, imbalance reserves may be critical for reliable grid operation. During these periods, it is critical that storage resources have sufficient state of charge to provide these services. Also, there may be occasions when all, or nearly all, of the imbalance reserves awarded in one direction are converted to energy in the real-time market – even if imbalance reserves were procured in both directions. It is important to ensure that these kinds of scenarios do not lead to situations where storage resources have no state of charge to provide these services in future hours.

To ensure that storage resources have sufficient state of charge to provide imbalance reserves, this proposal introduces new constraints outlined in Equation Set 4. These equations include an estimate of a hypothetical upper bound for storage resources and a hypothetical lower bound for storage resources, and tracks these values over time. These values create an envelope, or boundary, for state of charge. Once the hypothetical state of charge reaches the lower/upper limit of the resource, then the market will schedule the resource to charge prior to scheduling any additional imbalance reserves that could potentially cause the hypothetical value to exceed the limit.[36]

$$\begin{aligned} SOC^{(u)}_{i,t} = SOC^{(u)}_{i,t-1} - EN^{(+)}_{i,t} - \eta_i \, EN^{(-)}_{i,t} + \eta_i \, AIRD_t \, IRD_{i,t} \leq \overline{SOC}_{i,t} \\ SOC^{(l)}_{i,t} = SOC^{(l)}_{i,t-1} - EN^{(+)}_{i,t} - \eta_i \, EN^{(-)}_{i,t} - AIRU_t \, IRU_{i,t} \geq \underline{SOC}_{i,t} \end{aligned} \quad (4)$$

Where:

$SOC^{(u)}_{i,t}$ *Upper envelope for state of charge for resource i at time t*

$AIRD_t$ *Adjustable multiplier applied to downward imbalance reserves to calculate the upper envelope for state of charge at time t*

$SOC^{(l)}_{i,t}$ *Lower envelope for state of charge for resource i at time t*

36 The initial values for both the upper and lower state of charge would be the actual initial state of charge in the day-ahead market.

$AIRU_t$ *Adjustable multiplier applied to upward imbalance reserves to calculate the lower envelope for state of charge at time t*

The envelope equations ensure that the upper envelope is always at or above the modeled state of charge and that the lower envelope is always at or below the modeled state of charge. This implies that if the state of charge is at a resource's maximum, then the upper envelope will also be at the maximum. The same is true for the lower limit and the minimum. When the values for the upper and lower envelopes are both at limits, this effectively implies that the state of charge of the resource is uncertain and will prevent further use of the resource.

This policy also notes that no explicit changes are being proposed to the state of charge formulation.

Example 1

Suppose a storage resource has a +/- 100 MW operating range and can hold a state of charge between 0 MWh and 400 MWh. Also, suppose that the model assumes that the resource will have 200 MWh of energy going into hour ending 1, and that the resource has no losses between charging and discharging. Further, assume the multipliers for both imbalance reserve up and down are set to 1. In this scenario, all of the following outcomes are feasible in the day-ahead market for hour ending 1:

- *0 MW of energy and 100 MW of imbalance reserve up*

This award does not impact the state of charge, which remains at 200 MWh. It does reduce the lower envelope to 100 MWh, but leaves the upper envelope and the state of charge at 200 MWh. The resource has sufficient state of charge to meet the ancillary service state of charge constraints.

Hour	En	IRU	IRD	SOC_U	SOC	SOC_L
0				200	200	200
1	0	100	0	200	200	100

- *100 MW of charging energy and 100 MW of imbalance reserve up*

The award increases the state of charge to 300 MWh. It also increases the upper envelope to 300 MWh, but the lower envelope remains unchanged at 200 MWh. The resource has sufficient state of charge to meet the ancillary service state of charge constraints.

Hour	En	IRU	IRD	SOC_U	SOC	SOC_L
0				200	200	200
1	-100	100	0	300	300	200

- *100 MW of discharging energy and 100 MW of imbalance reserve down*

The award decreases the state of charge to 100 MWh. It does not change the upper envelope from 200 MWh, but decreases the lower envelope to 100 MWh. The resource has sufficient state of charge to meet the ancillary service state of charge constraints.

Hour	En	IRU	IRD	SOC_U	SOC	SOC_L
0				200	200	200
1	100	0	100	200	100	100

- *100 MW of imbalance reserve up and 100 MW of imbalance reserve down*

The award does not impact state of charge, which remains at 200 MWh. It increases the upper envelope to 300 MWh, and decreases the lower envelope to 100 MWh. The resource has sufficient state of charge to meet the ancillary service state of charge constraints.

Hour	En	IRU	IRD	SOC_U	SOC	SOC_L
0				200	200	200
1	0	100	100	300	200	100

Example 1, Continued

Now suppose the same resource receives an award for 100 MW of imbalance reserve up and 100 MW of imbalance reserve down during hour ending 1. The following are feasible awards for hour ending 2:

- *0 MW of energy and 100 MW of imbalance reserve up*

This award does not impact the state of charge, which remains at 200 MWh. It does reduce the lower envelope to 0 MWh, but leaves the upper envelope and the state of charge at 300 MWh. The resource has sufficient state of charge to meet the ancillary service state of charge constraints.

Hour	En	IRU	IRD	SOC_U	SOC	SOC_L
0				200	200	200
1	0	100	100	300	200	100
2	0	100	0	300	200	0

- *100 MW of charging energy and 100 MW of imbalance reserve up*

The award increases the state of charge to 300 MWh. It also increases the upper envelope to 400 MWh, but the lower envelope remains unchanged at 100 MWh. The resource has sufficient state of charge to meet the ancillary service state of charge constraints.

Hour	En	IRU	IRD	SOC_U	SOC	SOC_L
0				200	200	200

1	0	100	100	300	200	100
2	-100	100	0	400	300	100

- *100 MW of discharging energy and 100 MW of imbalance reserve down*

The award decreases the state of charge to 100 MWh. It does not change the upper envelope from 300 MWh, but decreases the lower envelope to 0 MWh. The resource has sufficient state of charge to meet the ancillary service state of charge constraints.

Hour	En	IRU	IRD	SOC_U	SOC	SOC_L
0				200	200	200
1	0	100	100	300	200	100
2	100	0	100	300	100	0

- *100 MW of imbalance reserve up and 100 MW of imbalance reserve down*

The award does not impact state of charge, which remains at 200 MWh. It increases the upper envelope to 400 MWh, and decreases the lower envelope to 0 MWh. The resource has sufficient state of charge to meet the ancillary service state of charge constraints.

Hour	En	IRU	IRD	SOC_U	SOC	SOC_L
0				200	200	200
1	0	100	100	300	200	100
2	0	100	100	400	200	0

Example 1, Continued

Now suppose the same resource receives an award for 100 MW of imbalance reserve up and 100 MW during hour ending 1 and 100 MW of imbalance reserve up and 100 MW of imbalance reserve down during hour ending 2. The following are examples of infeasible for hour ending 3:

- *0 MW of energy and 100 MW of imbalance reserve up*

This award would not impact the state of charge, which would remain at 200 MWh. It reduces the lower envelope to -100 MWh, which is infeasible. The resource would have sufficient state of charge to meet the ancillary service state of charge constraints.

Hour	En	IRU	IRD	SOC_U	SOC	SOC_L
0				200	200	200
1	0	100	100	300	200	100
2	0	100	100	400	200	0
3	0	100	0	400	200	-100

- *100 MW of discharging energy and 100 MW of imbalance reserve down*

This award would decrease the state of charge to 100 MWh. It would not change the upper envelope from 400 MWh, but it would decrease the lower envelope to -100 MWh, which is infeasible. The resource would have a sufficient state of charge to meet the ancillary service state of charge constraints.

Hour	En	IRU	IRD	SOC_U	SOC	SOC_L
0				200	200	200
1	0	100	100	300	200	100
2	0	100	100	400	200	0
3	100	0	100	400	100	-100

Example 2

Suppose a storage resource has a +/- 100 MW operating range and can hold a state of charge between 0 MWh and 400 MWh. Also, suppose that the model assumes that the resource will have 100 MWh of energy going into hour ending 1, and that the resource has no losses between charging and discharging. Further, assume the multipliers for both imbalance reserve up and down are set to 0.2. This shows a potential scenario for multiple hours of awards, and includes comments on the awards.

Hour	En	IRU	IRD	SOC_U	SOC	SOC_L
0				100	100	100
1	20	50	0	80	80	70
2	0	80	100	100	80	54
3	-100	0	100	220	180	154
4	0	100	100	240	180	134
5	0	100	100	260	180	114

- *The resource starts the begins the day (is anticipated to end the previous day) at close to zero state of charge*
- *During hour ending 1 the resource has a discharge award, that moves the state of charge closer to 0 MWh*
- *Imbalance reserve up awards in hour ending 2 are limited to 80 MW because of the low state of charge*
- *The market schedules the resource to charge in hour ending 3, accompanied by awards for regulation up and regulation down*

These constraints will also be included in the residual unit commitment market run. The equations governing this relationship are outlined in Equation Set 5.

$$SOC_{i,t}^{(u)} = SOC_{i,t-1}^{(u)} - EN_{i,t}^{(+)} - \eta_i \, EN_{i,t}^{(-)} + \eta_i \, AIRD_t \, IRD_{i,t} + \eta_i \, ARCD_t \, RCD_{i,t} \leq \overline{SOC}_{i,t}$$
$$SOC_{i,t}^{(l)} = SOC_{i,t-1}^{(l)} - EN_{i,t}^{(+)} - \eta_i \, EN_{i,t}^{(-)} - AIRU_t \, IRU_{i,t} - ARCU_t \, RCU_{i,t} \geq \underline{SOC}_{i,t} \quad (5)$$

Where:

$ARCD_t$ *Adjustable multiplier applied to downward reliability capacity at time t*

$ARCU_t$ *Adjustable multiplier applied to upward reliability capacity at time t*

Setting the Multipliers

Because storage operation and market outcomes are dependent on how the parameters for these constraints are set, care will need to be taken when setting up a methodology to set the multipliers applicable for these constraints. Setting the multipliers too high could result in restricted outcomes for storage resources and setting the multipliers too low could result in ineffective constraints that do not ensure resource availability. Further, because these products are new, there is no actual operational experience for how awards for these products typically impact storage resources or how storage may be relied on during stressed system conditions to provide these products.

This policy proposes that the multipliers for all hours begin by being set to 0.85. This value will continue to be discussed with stakeholders prior to implementation of this constraint.

The constraints, the current hourly values for the multipliers, and the methodology for developing those multipliers will be described in the business practice manuals.

4.6 Treatment of Metered Subsystems, Existing Transmission Contracts, and Transmission Ownerships Rights

Metered Subsystems

Currently, metered subsystem operators must make an election on four issues that govern the manner in which the metered subsystem participates in the markets. The metered subsystem operator must choose either:

i. Net settlements or gross settlements.
ii. To load follow or not to load follow with its generating resources.
iii. To have its load participate in residual unit commitment procurement or not have its load participate in residual unit commitment procurement.
iv. To charge or not to charge the CAISO for their emissions costs.

With the day-ahead market enhancements, metered subsystem operators must make an election on three issues that will govern the manner in which the metered subsystem participates in the markets. The metered subsystem operator must choose either:

i. Net settlements or gross settlements.
ii. To load follow or not load follow with its designated generating resources.

iii. To charge or not to charge the CAISO for their emissions costs.

A metered subsystem operator may:

i. Bid to supply energy to or purchase energy from the markets.
ii. Bid to provide available capacity for imbalance reserves up/down to meet uncertainty requirements.
iii. Bid to provide available capacity for reliability capacity up/down to meet net load forecast
iv. Bid or self-provide an ancillary service from a system unit or from individual generating units, participating loads or proxy demand response resources within the metered subsystem. A metered subsystem operator also may purchase ancillary services from CAISO or third parties to meet its ancillary service obligations under the CAISO tariff.

The CAISO proposes to maintain the current settlement of metered subsystem operator day-ahead energy schedules who have elected gross settlement or net settlement. The CAISO proposes to settle metered subsystem resources that have received imbalance reserves or reliability capacity awards in a similar manner as non-metered subsystem resources, regardless of the metered subsystem operator's selection of net or gross settlement. Imbalance reserve up/down awards will settle at the relevant locational marginal price for imbalance reserves. Reliability capacity up/down awards will settle at the relevant locational marginal price for reliability capacity. For both reliability capacity tier 1 and reliability capacity tier 2 cost allocations, metered subsystem operators will settle in a similar manner as non-metered subsystem resources, regardless of their net versus gross selection. A metered subsystem operator that has elected to load follow to manage its own load variability shall not receive a reliability capacity tier 1 or a reliability capacity tier 2 cost allocation. For both imbalance reserve tier 1 and imbalance reserve tier 2 cost allocations, metered subsystem operators will settle in a similar manner as non-metered subsystem resources, regardless of their net versus gross selection. A metered subsystem operator that has elected to load follow to manage its own load variability shall receive imbalance reserve tier 1 and imbalance reserve tier 2 cost allocations based on the metered subsystem operator's net portfolio uninstructed deviations.

Existing Transmission Contracts and Transmission Ownership Rights

The CAISO proposes to maintain the current energy settlement for existing transmission contract rights (ETCs) and transmission ownership rights (TORs). Day-ahead energy schedules associated with an ETC or TOR self-schedule will settle at the relevant integrated forward market locational marginal price. In addition, the CAISO proposes to maintain the settlement of integrated forward market congestion credit for the valid and balanced portion of ETC or TOR self-schedules and relative eligible point of receipt of delivery.

Reliability capacity will ensure sufficient physical resources are committed to meet the net load forecast with adjustments for known differences between what cleared the integrated forward market including under-scheduled variable energy resources. As long as the ETC/TOR self-schedules supply to meet their demand, the market does not need to procure reliability capacity to meet the valid and balanced portion of ETC or TOR self-schedule. As such, the CAISO proposes to exclude the ETC and TOR self-

schedules from reliability capacity tier 1 and reliability capacity tier 2 allocations up to the valid and balanced portion of ETC and TOR self-schedules. In contrast, the ETC and TOR self-schedules are subject to reliability capacity tier 1 and reliability capacity tier 2 allocations for quantities above the valid and balanced portion of the ETC or TOR self-schedules.

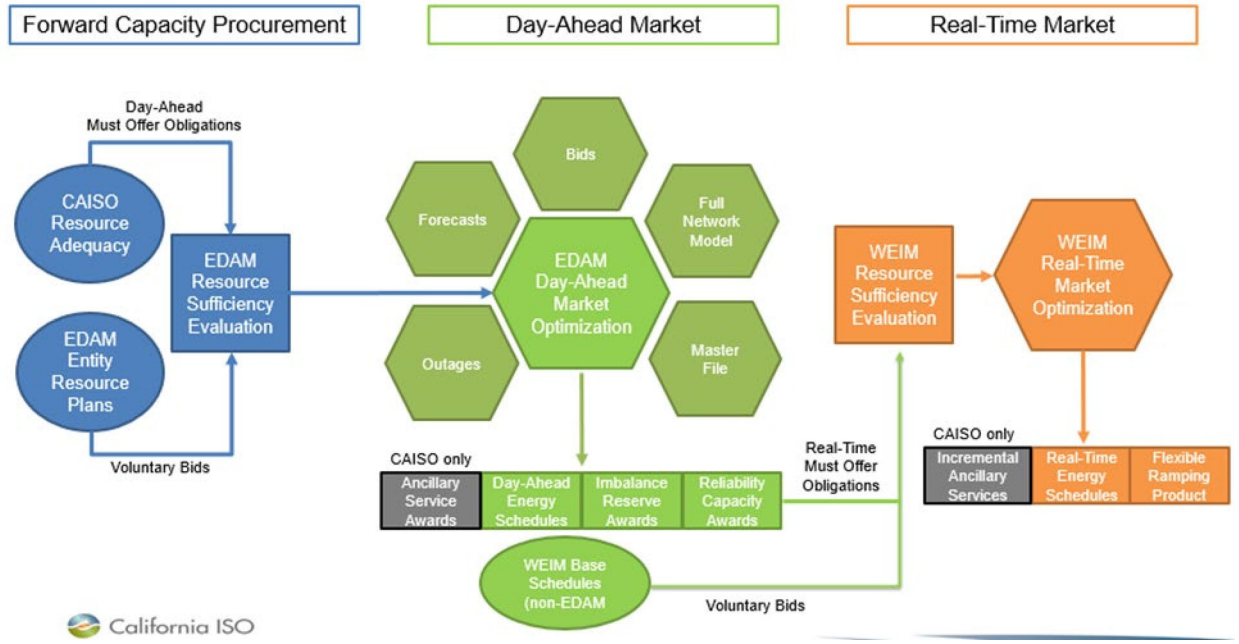
Imbalance reserves will ensure the day-ahead market schedules sufficient real-time dispatch capability to meet net load imbalances between the day-ahead and real-time markets. As long as the ETC and TOR self-schedules supply to meet their demand, the CAISO does not need to procure additional imbalance reserves. As such, the CAISO is proposing to exclude the ETC and TOR self-schedules from imbalance reserve tier 1 and imbalance reserve tier 2 allocations up to the valid and balanced portion of ETC and TOR self-schedules. In contrast, the ETC and TOR self-schedules are subject to imbalance reserve tier 1 and imbalance reserve tier 2 allocations for quantities above the valid and balanced portion of the ETC or TOR self-schedules.

5. Alignment between Resource Adequacy, DAME, and EDAM

The CAISO is coordinating the stakeholder initiatives for the Resource Adequacy Enhancements, Day-Ahead Market Enhancements, and Extended Day-Ahead Market to ensure alignment and consistency in determining forward capacity procurement requirements, bidding obligations, and market solutions. The goal of this effort is to ensure an efficient and robust market design that bridges the various election/bidding and program/market timelines.

Figure 8 is a flowchart depicting the correlation between resource adequacy, DAME, and EDAM.

Figure 8: Relationship between DAME, EDAM and Resource Adequacy



The flowchart can be summarized as follows:

1. The CAISO resource adequacy program and non-CAISO EDAM participants' integrated resource plan are the forward procurement processes that ensure the balancing authority areas have forwarded-contracted with adequate supply to meet their anticipated system needs. To participate in the day-ahead market and benefit from EDAM transfers, each EDAM participant must pass the EDAM resource sufficiency evaluation. The EDAM resource sufficiency evaluation ensures all EDAM participants have sufficient bids from participating resources to individually meet their demand forecast, ancillary service requirements, and uncertainty requirements for each hour of the operating day. This prevents EDAM participants from leaning on the capacity of others in the day-ahead timeframe. For the CAISO, the resource adequacy program requires resource adequacy capacity to bid in the day-ahead market through must-offer obligation rules. Non-CAISO EDAM participants provide voluntary bids to the day-ahead market that must be sufficient for the participant to meet its day-ahead resource sufficiency requirements.

2. EDAM participants will have their energy and imbalance reserves co-optimized to meet daily load and uncertainty requirements.[37] In addition, the residual unit commitment will procure reliability capacity in each EDAM balancing authority area across the EDAM footprint to meet difference in cleared physical supply and the BAA's demand forecast. The day-ahead market will result in must-offer obligations and bids into the real-time market. For EDAM participants, these real-time market bids are inputs into the WEIM resource sufficiency evaluation. EDAM participants will benefit in the WEIM RSE with assurance their day-ahead schedules are balanced. Entities participating in the WEIM but not in the EDAM will continue to provide WEIM base schedules. In order to benefit from transfers in the real-time market, WEIM participants must pass the WEIM real-time resource sufficiency evaluation.

3. The real-time market will co-optimize energy and real-time flexible ramping product across the entire WEIM footprint, and incremental ancillary services for the CAISO BAA.[38]

6. WEIM Governing Body Role

Under Currently Applicable Rules

Under the currently effective *Charter for EIM Governance*, this initiative would fall mostly outside the authority of the WEIM Governing Body because it focuses on the day-ahead market. As explained below, three elements do include proposed changes to real-time market rules, which would give the Governing Body a limited decisional role, as follows:

1. Financial settlement of flexible ramping product, to remove the double payment of forecasted movement (§ 4.2) – Joint authority

[37] The EDAM proposal would not co-optimize ancillary services at the onset of EDAM.
[38] The Western Energy Imbalance Market currently does not procure incremental ancillary services outside of the CAISO balancing authority area.

2. Other changes to the financial settlement of flexible ramping product (§4.2) – Advisory role

3. Bidding obligations for resources that have day-ahead schedules for imbalance reserve or reliability capacity (§ 3.1) – Advisory role.

The Governing Body would not have any role with respect to the remainder of this initiative.

More specifically, the changes to the settlement of flexible ramping product to remove the double payment of forecasted movement (proposal 1) would be "applicable to EIM Entity balancing authority areas, EIM Entities, or other market participants within EIM Entity balancing authority areas, in their capacity as participants in EIM,"[39] and therefore would fall within the scope of joint authority under the currently effective rules.

On the other hand, proposals 2 and 3, to the extent they change rules of the real-time market, would not be applicable to WEIM Entities in their capacity as participants in WEIM. To be clear, they may apply to some market participants within a WEIM Entity balancing authority area, but only as importers into or exporters from the ISO balancing authority, which are transactions that occur outside of the WEIM. Accordingly, these proposed tariff changes fall outside the scope of joint authority. They do, however, fall within the scope of the WEIM Governing Body's advisory role, because the WEIM Governing Body "may provide advisory input over proposals to change or establish tariff rules that would apply to the real-time market but are not within the scope of joint authority." Id.

Proposed Adjustment

CAISO management has stated that, notwithstanding this classification based on the current rules, it would be appropriate to consider an adjustment of this classification, subject to Board approval. Stakeholder comments on earlier papers indicated broad support for requiring joint approval of both the Board and the WEIM Governing Body for all aspects of this initiative. Such a classification could be appropriate given the unique nature of this initiative in the sense that it is foundational for EDAM because the imbalance reserve product developed in this initiative drives a significant portion of the potential benefits of EDAM.

The Chair of the Board of Governors during the December 14, 2022 joint meeting agreed that joint authority would be appropriate over all aspects of the proposal that are not specific to the CAISO's balancing authority area or operation of the CAISO controlled grid, such as California resource adequacy provisions. Therefore, in alignment with the Board's direction, management proposes that the entire proposal fall under the joint authority of the WEIM Governing Body and the ISO Board of Governors,

[39] The Board and the WEIM Governing Body have joint authority over any proposal to change or establish any CAISO tariff rule(s) applicable to the EIM Entity balancing authority areas, EIM Entities, or other market participants within the EIM Entity balancing authority areas, in their capacity as participants in EIM. This scope excludes from joint authority, without limitation, any proposals to change or establish tariff rule(s) applicable only to the CAISO balancing authority area or to the CAISO-controlled grid. Charter for EIM Governance § 2.2.1.
While it has been decided that this scope will be expanded after EDAM has been approved to include day-ahead market rules, this has not yet occurred.

subject to one exception. One of the obligations proposed in Section 3.1 is a bidding obligation for California RA resources – specifically, must-offer obligation in the day-ahead market for RA capacity that is eligible to provide imbalance reserves (i.e., 15 minute dispatchable). Those resources must offer imbalance reserves for the portion of their energy bid that is not self-scheduled (i.e., economically bid). Under the Board's direction, there would be no adjustment to the classification of this element, which thus would fall within the authority of the Board only, with no role for the WEIM Governing Body, because it proposes a rule of the day-ahead market as opposed to the real-time market.

There have been no objections to joint authority applying generally to this initiative overall except for the April 5, 2023 comments of the California Public Utilities Commission on the February and March workshops. They stated:

> ED staff is concerned about this recommendation because this initiative will affect penalty parameters, which affect reliability for California customers (e.g., what penalty parameter does IR get compared to low priority exports). Further, if EDAM does not materialize, these provisions will apply only to CAISO customers.

CAISO staff notes that a premise of this position is incorrect; if EDAM does not move forward, CAISO would not move forward with this version of DAME. In that case, a different version of DAME would be developed based on participation by CAISO only, and there would be an opportunity to revisit these proposed rules. Accordingly, CAISO staff maintains its recommendation that this matter should be adjusted to joint authority generally, as explained above, because this version of the proposal is foundational to EDAM.

7. Stakeholder Engagement, Implementation Plan & Next Steps

Table 4 outlines the proposed schedule for completing the policy and implementation of the Day-Ahead Market Enhancements (DAME) initiative. CAISO has shifted the implementation of DAME to fall 2024 to coincide with the EDAM. Some stakeholders have requested that both the DAME and EDAM initiatives occur within the same stakeholder forum. Although the day-ahead market enhancements lay the foundation for EDAM, and CAISO is committed to aligning the objectives and functionalities of these initiatives, they were conducted as separate but parallel stakeholder processes. For this reason, it is crucial to keep the initiatives, board decisions, FERC filings, and implementation efforts aligned with EDAM. If there is a change in the EDAM schedule and CAISO were to consider implementing the day-ahead market changes without EDAM, it would reinstate a stakeholder process to ensure the design is appropriate for the CAISO balancing authority area alone.

Table 3: Stakeholder engagement and implementation development plan

Date	Milestone
Revised Final Proposal	May 1, 2023
Stakeholder Workshop	May 2, 2023
Joint ISO Board of Governors and WEIM Governing Body meeting (decision)	May 17, 2023

Draft Tariff Publication and Stakeholder Process	May 2023 – June 2023
Business Requirement Specification (BRS) Development	May 2023 – June 2023
Implementation	Fall 2024

Appendices

Appendix A: Eligibility Table

	EN	RCU	RCD	IRU	IRD
Non-Participating Load	Yes	Not Eligible	Not Eligible	Not Eligible	Not Eligible
Virtual Supply	Yes	Not Eligible	Not Eligible	Not Eligible	Not Eligible
Virtual Demand	Yes	Not Eligible	Not Eligible	Not Eligible	Not Eligible
Hourly Block Import	Yes	Eligible	Eligible	Not Eligible	Not Eligible
Hourly Block Export	Yes	Eligible	Eligible	Not Eligible	Not Eligible
15-Min Import	Yes	Eligible	Eligible	Eligible	Eligible
15-Min Export	Yes	Eligible	Eligible	Eligible	Eligible
Dynamic Import	Yes	Eligible	Eligible	Eligible	Eligible
Long-Start Generator	Yes	Eligible	Eligible	Eligible	Eligible
Short-Start Generator	Yes	Eligible	Eligible	Eligible	Eligible
Participating Load w/ 15-Min dispatch capability	Yes	Eligible	Eligible	Eligible	Eligible
Participating Load w/ Hourly dispatch capability	Yes	Eligible	Eligible	Not Eligible	Not Eligible
Variable Energy Resources (Wind/Solar)	Yes	Eligible	Eligible	Eligible	Eligible
Non-Generator Resources (Storage)	Yes	Eligible	Eligible	Eligible	Eligible
Hybrid Resource	Yes	Eligible	Eligible	Eligible	Eligible
Energy Storage Resource	Yes	Eligible	Eligible	Eligible	Eligible
60-Minute Proxy Demand Resource	Yes	Eligible	Eligible	Not Eligible	Not Eligible
15-Minute Proxy Demand Resource	Yes	Eligible	Eligible	Eligible	Eligible
5-Minute Proxy Demand Resource	Yes	Eligible	Eligible	Eligible	Eligible
Reliability Demand Response Resource	Yes	Not Eligible	Not Eligible	Not Eligible	Not Eligible

Attachment D – DAME CAISO Board of Governors and WEIM Governing Body

Memo and Vote

Day-Ahead Market Enhancements and Extended Day-Ahead Market

California Independent System Operator Corporation

August 22, 2023

Memorandum

To: ISO Board of Governors and Western Energy Imbalance Market Governing Body

From: Anna McKenna, Vice President of Market Policy and Performance

Date: May 10, 2023 (May 15, 2023 Addendum)

Re: **Decision on day-ahead market enhancements**

This memorandum requires ISO Board of Governors and WEIM Governing Body action.

EXECUTIVE SUMMARY

Management proposes to enhance the day-ahead market to better account for net load forecast uncertainty between the day-ahead and real-time markets, meet real-time ramping needs not addressed by hourly schedules or committed capacity in the day-ahead market, reduce the need for manual operator out-of-market actions, and improve supply commitment in the day-ahead market residual commitment process when cleared physical supply is either greater than or less than the balancing authority area's (BAA) load forecast. The increasing prevalence of variable energy resources, critical to meeting renewable energy and greenhouse gas emissions reduction goals, has introduced additional uncertainty and variability. The unpredictability of these energy imbalances creates challenging system conditions which drive out-of-market actions to manage them. Finally, these proposed enhancements are important elements of the extended day-ahead market (EDAM) because they enable supply and demand diversity benefits in the day-ahead market optimization across the expanded footprint.

Management's proposal is the product of extensive stakeholder engagement and addresses detailed design elements and concerns raised by stakeholders and industry experts in the development of an imbalance reserve product to enhance the day-ahead market. After four years of stakeholder discussion and consideration, in February, in response to stakeholder requests, Management delayed presenting a proposal for a decision to the ISO Board of Governors and WEIM Governing Body to allow additional time to address stakeholder concerns, particularly regarding the nodal design of imbalance reserve procurement. Management also extended the stakeholder process to further consider stakeholder feedback, alternative designs of the imbalance reserve product, and address remaining concerns. Management's proposal benefited greatly from the productive dialogue with stakeholders during the extended stakeholder process. In particular, the proposal incorporates additional modeling and procurement

flexibility that addresses stakeholder concerns about the computational performance and market impact of the nodal procurement of imbalance reserves, congestion arising from deployment scenarios, and uncertainty in the volume of protected exports in real-time.

Management proposes an imbalance reserve product in the integrated forward market (IFM) in the day-ahead market to reduce the need for out-of-market actions and produce a market solution that accurately reflects costs and system conditions. In addition to the incorporation of the imbalance reserve product in the IFM, Management also proposes to modify the residual unit commitment (RUC) process of the day-ahead market to create distinct reliability capacity and to allow for decremental reliability capacity in addition to incremental capacity relative to the IFM schedules.

Joint ISO Board of Governors and WEIM Governing Body motion:

> ***Moved, that the ISO Board of Governors and WEIM Governing Body approve the day-ahead market enhancements as described in the memorandum dated May 10, 2023 and the Addendum dated May 15, 2023, with the exception of the day-ahead must-offer obligation for resource adequacy capacity eligible to provide imbalance reserves, which remains under the sole authority of the ISO Board of Governors; and***
>
> ***Moved, that the ISO Board of Governors and the WEIM Governing Body authorize Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the change proposed in this memorandum, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.***

ISO Board of Governors motion:

> ***Moved, that the ISO Board of approve the day-ahead must-offer obligation for resource adequacy capacity eligible to provide imbalance reserves element of the day-ahead market enhancements proposal, as described in the memorandum dated May 10, 2023 and the Addendum dated May 15, 2023; and***
>
> ***Moved, that the ISO Board of Governors and the WEIM Governing Body authorize Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the change proposed in this memorandum, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.***

BACKGROUND

In September 2019, the ISO conducted an analysis of price formation in the day-ahead and real-time markets and produced a report titled *Price Performance Analysis*. The report identified factors that contribute to price differences between the day-ahead and real-time markets and proposed solutions to mitigate potential inefficiencies. The report also identified large price imbalances between the day-ahead and 15-minute markets, finding that day-ahead prices were persistently higher than real-time prices. The report attributed these price differences in part to out-of-market actions taken by system operators to procure additional capacity after the IFM to meet potential real-time supply and load imbalances.

ISO system operators increasingly have had to rely on out-of-market actions because the day-ahead market does not procure flexible reserves to cover net load uncertainty. Over the last several years, they have had to manually increase the forecast used in RUC in an attempt to procure capacity beyond the supply scheduled in the IFM to address the high net load uncertainty and ensure system reliability. Meeting net load uncertainty by procuring flexible imbalance reserves reduces the need to rely on out-of-market actions.

In addition to enabling ISO system operators to better manage unpredictable conditions, using an imbalance reserve product, rather than out-of-market actions, to procure flexible reserves to meet net load uncertainty provides several market efficiency benefits. The proposed day-ahead market enhancements provide the following benefits compared to the existing framework:

- **Maximizes the value of imbalance reserve through co-optimization**. Co-optimizing imbalance reserves with energy and ancillary services helps maximize their value to the market because the day-ahead market will make more effective unit commitment decisions and better allocate system ramping capability. In addition, the marginal price of imbalance reserves will consider the opportunity costs associated with providing imbalance reserves instead of other co-optimized products. The resulting prices will make suppliers indifferent to whether they receive an incremental energy schedule or an imbalance reserve award.
- **More efficiently compensates resources for flexible reserves through transparent market prices.** Currently, the market does not compensate resource adequacy resources for participating in the real-time market without day-ahead schedules. Instead, they must recover their costs through resource adequacy contract payments. Procuring flexible reserves using bids and compensating resources for those flexible reserves through direct market payments will create more efficient market outcomes by allowing the market optimization to consider costs when scheduling and committing units. It also will

make the value of flexible reserves known to market participants through a transparent market price, which should incentivize resources to provide more flexibility to the market.

- **Sufficient ramping capability**. Under the status quo, there is no assurance the supply committed or scheduled in the RUC process is sufficient to meet real-time market ramping needs. Imbalance reserves are 15-minute dispatchable, making them more flexible than supply procured in the RUC process.
- **Improved deliverability**. Confidence in deliverability of the imbalance reserve product will be improved through the proposed deployment modeling in the IFM process relative to how the RUC process attempts to ensure deliverability of committed capacity using adjustments to forecast demand. Unlike the use of RUC adjustments, deploying imbalance reserves in the integrated forward market will better ensure flexible reserves are deliverable to locations on the system where there are expected uncertainty needs.
- **Improves feasibility of day-ahead export schedules**. Relying on the RUC forecast adjustments to procure additional reserves can cause export schedules that cleared the IFM to no longer be feasible in the RUC process. Management expects imbalance reserves will significantly reduce the use of RUC forecast adjustments, so there is less chance export schedules clearing the IFM will be infeasible in the RUC process. In addition, by requiring imbalance reserve product procurement in the IFM, the market will not clear day-ahead export schedules that cannot be supported after considering the CAISO balancing authority area's flexible reserve needs.
- **More 15-minute non-EDAM import schedules**. The opportunity to sell imbalance reserves into the ISO market should encourage non-EDAM importers to set up their system resources as 15-minute dispatchable, giving the ISO real-time market additional flexibility.
- **Aligns with extended day-ahead market**. Imbalance reserves will optimize the scheduling of flexible resources across the EDAM footprint and maximize the diversity benefit of a large market footprint. By pooling the uncertainty risk over a wider geographic footprint, imbalance reserves reduce each EDAM BAA's individual net load uncertainty requirement and capacity procurement via the EDAM diversity benefit.

PROPOSAL

Management's proposal comprises two primary sets of changes to the day-ahead market: the introduction of an imbalance reserve product and modifications to the RUC process.

Imbalance Reserves

Imbalance Reserve Product

The day-ahead market currently does not have a product that provides flexible reserves to address day-ahead to real-time uncertainty. The declining predictability of energy

imbalances between the net load forecasted in the day-ahead market and the net load forecasted in the real-time market is requiring system operators to take out-of-market actions to secure additional supply. The proposed imbalance reserve product will ensure the day-ahead market schedules have sufficient flexible reserves to meet net load imbalances and ramping needs that materialize between the day-ahead and real-time markets, reducing the need for manual adjustments and creating a more efficient market outcome.

Management proposes to introduce an imbalance reserve product in the IFM. The IFM will procure imbalance reserves in the upward and downward direction, with the quantity of procured imbalance reserves based on the historical uncertainty in the day-ahead load, solar, and wind forecasts. Only resources dispatchable in the fifteen-minute market would be eligible to provide imbalance reserves, and the market would cap awards at the resource's 30-minute ramping capability. The market would consider transmission constraints to ensure imbalance reserves are deliverable in the day-ahead timeframe to locations where uncertainty is anticipated to materialize. Resources awarded imbalance reserves would receive a day-ahead payment at the product's locational marginal price.

Imbalance Reserve Product in the Integrated Forward Market

Imbalance reserves ensure the real-time market has sufficient dispatch capability to meet net load imbalances between the day-ahead and real-time markets. The IFM will procure and compensate flexible reserves. Under the proposed design, the IFM will continue to co-optimize energy and ancillary services, and it would include imbalance reserves in the co-optimization. The IFM will procure imbalance reserves in both the upward and downward direction. The imbalance reserve up and the imbalance reserve down are incremental and decremental reserves procured to meet the hourly upward and downward imbalance reserve requirement based on historical net load imbalance between the day-ahead and real-time markets.

Although the day-ahead market will schedule imbalance reserves in hourly intervals, the market will base the maximum award on a resource's 30-minute ramp capability, and eligible resources must be dispatchable in the 15-minute market. An imbalance reserve schedule results in an obligation to provide economic energy bids in the real-time market. This proposal includes an unavailability penalty for imbalance reserves to ensure resources follow through on this obligation.

Under Management's proposal, the market considers transmission constraints when awarding imbalance reserves in the IFM to ensure they are deliverable. The market accomplishes this by using upward and downward deployment scenarios. The IFM would solve the base scenario and deployment scenarios simultaneously, resulting in the procurement of imbalance reserves that ensure scheduled day-ahead physical supply can meet the uncertainty requirements if deployed without violating transmission constraints. Some stakeholders expressed concern that procurement of imbalance reserves using the deployment scenarios to evaluate deliverability could add

unnecessary complexity and delay DAME implementation. Management evaluated these comments and concluded that procuring an imbalance reserve product deemed deliverable in the day-ahead has several benefits over a procurement approach that ignores deliverability, which is generally characteristic of zonal approaches:

- Deliverable imbalance reserves procurement supports an operationally feasible and reliable day-ahead market by enabling the market to ensure the reserves are deliverable to where the uncertainty is expected to materialize without violating transmission constraints
- Assures the market would not award and pay for reserves from resources that are behind constraints and undeliverable in the day-ahead timeframe. Ignoring deliverability in the procurement of imbalance reserves could lead to awarding and paying for reserves on resources that are knowingly behind constraints
- More accurate prices for imbalance reserve awards because prices represent a locational value of flexible resources
- Improves confidence in EDAM transfers because there is more assurance that energy and imbalance reserve schedules are deliverable

Some stakeholders[1] urged the ISO to adopt an approach to imbalance reserves that models deliverability similar to the way the ISO procures ancillary services. They argued that such an approach would simplify market design and reduce the need for additional design elements like local market power mitigation. Management's proposal responds to this stakeholder feedback, by including the following:

- *Allow for the flexible activation/deactivation of individual transmission constraints in deployment scenarios.* This will enable the ISO to enforce fewer transmission constraints in the deployment scenarios if necessary due to lower computational performance or market performance. This will also enable the ISO to collaborate with EDAM balancing authorities to identify the most critical transmission constraints to enforce.
- *Implement a tunable parameter to define the proportion of imbalance reserve awards that are deployed with resulting flows in the deployment scenarios*. This addresses stakeholder concerns about excess congestion costs resulting from the deployment scenarios.

Local Market Power Mitigation of Imbalance Reserve Bids and Imbalance Reserve Demand Curve

Currently, day-ahead market energy bids are subject to local market power mitigation in the IFM. The market power mitigation tests for resources located in uncompetitive supply locations and mitigates those resources' energy bids to the higher of their cost-based default energy bids or the competitive locational marginal price. The competitive

[1]Bonneville Power Administration (BPA), California Energy Storage Alliance (CESA), NV Energy, Puget Sound Energy (PSE), San Diego Gas & Electric (SDG&E), Vistra, Western Power Trading Forum (WPTF)

locational marginal price is the marginal price of energy excluding the non-competitive congestion components of the locational marginal price. The IFM then uses the mitigated bids. Management proposes to incorporate the same approach for mitigating imbalance reserve-up offers. Imbalance reserve mitigation is necessary because local transmission constraints can lead to uncompetitive imbalance reserve supply conditions. In locations with uncompetitive supply conditions, suppliers could utilize their position on the grid to exercise local market power through their imbalance reserve offers.

Management proposes to mitigate imbalance reserve offers to the higher of a default availability bid or the competitive locational marginal price. In contrast to the default energy bid that the ISO uses to estimate a specific resource's marginal energy cost, Management proposes to use a common system-wide default availability bid for imbalance reserve mitigation. This default availability bid would be the same price for all resources across all market intervals. Management proposes to set the default availability bid price at $55/MWh. The default availability bid price was established by analyzing historical spinning reserve bids, which are representative of the costs of making a resource available for dispatch in the real-time market. The default bid level is based on the 80th percentile of the historical spinning reserve offers. This provides a conservative way of approximating the competitive cost to provide reserves until more data becomes available and it provides strong assurances that resources will not be mitigated below their costs.

The proposal also includes a demand curve to limit the amount of imbalance reserves the market procures as prices increase. Management considered several different approaches to establishing the demand curve values, and in response to significant stakeholder feedback, it proposes an initial demand curve that would cap imbalance reserve procurement at $55/MWh for the capacity. Given this new demand curve, the market power mitigation proposal can be simplified to a $55/MWh bid cap because both the default availability bid and the demand curve cap are set at the same $55/MWh price. Although the demand curve functionality eliminates the immediate need for market power mitigation features, Management still intends to develop these features even though they will not be active upon the market's launch. This will allow the ISO to use such features in the future if operational experience shows that further mitigation or a different demand curve structure is warranted.

Day-ahead imbalance reserves must-offer obligations for resource adequacy resources

Management proposes to extend the must-offer obligations of resource adequacy resources to include an offer obligation to imbalance reserves. Resource adequacy resources are required to submit bids for energy and all services they are eligible to provide. Therefore, with the introduction of the imbalance reserve product, resource adequacy capacity eligible to provide imbalance reserves (*i.e.*, capacity that can be dispatched in the 15-minute market intervals) will have a must-offer obligation for imbalance reserves for the portion of their energy bid that is not self-scheduled. This

requirement will ensure all resource adequacy capacity capable of providing imbalance reserves is available to provide the service. This will increase the competitiveness of the product, improve congestion management, and reduce concerns about physical withholding. In addition, in the context of the EDAM, this will better ensure that the ISO balancing authority area passes the day-ahead resource sufficiency evaluation.

Certain stakeholders[2] raised concerns that paying for imbalance reserves could result in double payments to ISO resource adequacy resources because resource adequacy contracts already compensate resources for their availability to the market. Some stakeholders supported[3] an automatic transfer of revenues from suppliers to load serving entities and to characterize the product such that suppliers would be required to transfer any revenue associated with imbalance reserves to load serving entities. Management determined that if the ISO provides certain information to the parties, the parties to these contracts can address these issues between themselves. This approach is preferable given these parties are most familiar with their contracts. For example, certain stakeholders[4] have indicated they can reconcile any double payment concerns if the ISO provides a breakdown of the imbalance reserve marginal price by capacity versus opportunity cost. Management proposes to provide this information and work with stakeholders to determine what information they require to reconcile their contractual issues.

Some stakeholders indicated that they are unable to reconcile these concerns on their own. In particular, the California Public Utility Commission (CPUC) noted that if parties under resource adequacy contracts cannot resolve potential double payment issues, ratepayers will be exposed to potential double payments. In response, Management proposes a three-year transitional period where the ISO will offer a resource adequacy "true-up" mechanism to facilitate these bilateral arrangements in the ISO settlement system. This mechanism would be available only to parties that mutually agree to opt-in to this settlement treatment. Management commits to work with the CPUC and the contracting parties to provide specific solutions to existing contracts the parties to such contracts cannot reconcile. For example, if the contract parties determine it is ambiguous whether their contract already compensated the resource for imbalance reserve product, the ISO can fashion a settlement adjustment that splits the resource's imbalance reserve earnings in half.

RUC Changes

The RUC process bridges the gap between a BAA's demand forecast and the physical energy cleared in the IFM by procuring incremental supply that was not scheduled or committed in the IFM to ensure sufficient physical supply to meet the BAA's day-ahead demand forecast. The addition of the imbalance reserve product in the IFM allows for

[2] California Community Choice Association (CalCCA), CPUC Public Advocates Office, Middle River Power, Vistra, WPTF
[3] CalCCA, Six Cities
[4] Pacific Gas and Electric (PG&E), Southern California Edison (SCE), SDG&E

more clearly defined distinct reliability capacity procured through RUC to meet the balancing authority's load. Management proposes to modify RUC to allow the definition of incremental as well as decremental reliability capacity relative to the IFM schedules. This change also will enable RUC to produce downward capacity, which it is not capable of doing today.

A reliability capacity award would result in an obligation for a resource to provide economic energy bids to the real-time market, limited to a resource's 60-minute ramp capability. Resources awarded reliability capacity would have their reliability capacity awards settled at a reliability capacity locational marginal price. This product addresses scenarios where the cleared physical supply differs from the BAA's demand forecast. This can occur when bid-in load clears the IFM less than or greater than the BAA load forecast or when the market clears net virtual supply or demand.

Finally, multi-stage generating resource configurations are currently committed in the IFM and passed to RUC as an input. System operators must exceptionally dispatch the units down manually to manage congestion or oversupply. This proposal would enhance RUC to transition multi-stage generating resources in the downward direction without shutting them down completely. This will help manage congestion in RUC and avoid out-of-market actions by system operators.

Market Power Mitigation Pass for RUC

Management proposes to include a new market power mitigation pass after the IFM and before RUC to assess the competitiveness of reliability capacity offers for RUC. This proposal would mitigate reliability capacity offers to the higher of a default availability bid or the competitive locational marginal price. The RUC default availability bid would be a static system-wide default availability bid for reliability capacity mitigation, and it would be the same price for all resources across all market intervals.

Although RUC currently procures supply nodally, market power is not a concern because RA capacity must participate in RUC at a price of $0, so RA resources are unable to withhold either physically or economically. Market power mitigation in RUC is necessary in DAME because all resources, including RA resources, can offer non-zero prices for reliability capacity up and down. RA resources must be able to bid non-zero prices in RUC so reliability capacity is competitively procured across the EDAM.

Real-time bidding obligations based on day-ahead awards

Resources that receive reliability capacity awards or imbalance reserve awards in the day-ahead market must provide economic energy bids for the full range of their awards in the real-time market. Real-time must-offer obligations will apply in the hours that a resource has an award. This will ensure resources awarded these products will bid in the real-time market for optimal utilization during awarded hours.

Day-ahead must-offer obligations for resource adequacy resources

Resources providing resource adequacy capacity that currently must submit RUC availability bids will also be required to bid their resource adequacy capacity into RUC for reliability capacity up. Resource adequacy capacity can bid into RUC at any price between the bid floor and the bid cap. As noted above, allowing RA resources to bid non-zero prices in RUC is necessary to procure reliability capacity competitively across the EDAM.

Real-time must-offer obligations for resource adequacy resources

Management's proposal maintains the ISO balancing area resource adequacy real-time must-offer obligation.

Lower priority exports

Updating the RUC market formulation in this proposal requires changes to the process for identifying exports at risk of curtailment in real-time. Economic exports and lower priority (LPT) exports that clear the IFM are at risk of curtailment in the real-time market. If these exports do not explicitly bid for reliability capacity up (RCU), they will be considered in the RUC scheduling run with RCU bids at penalty prices that maintain the merit order of their energy bids in the IFM. Consequently, if there is no available physical supply capacity in the RUC above energy schedules to meet both the demand forecast and the economic and LPT exports that cleared the IFM, the latter will receive a curtailment indication in the RTM in the form of RCU awards. The scheduling coordinator for these exports will be obligated to submit energy bids for the RCU capacity.

STAKEHOLDER ENGAGEMENT

After four years of stakeholder discussion, workshops and draft proposals, the ISO initially published the DAME final proposal on January 11, 2023, intending to bring it to the ISO Board of Governors and WEIM Governing Body for a decision in February. In response to stakeholder concerns, Management extended the DAME stakeholder process to facilitate additional discussion regarding key design elements, particularly the design of imbalance reserve procurement. Stakeholders expressed concerns about the cost of the imbalance reserve product and whether the proposed nodal design was the best path forward.[5] These stakeholders argued that the proposal was too complex and thus introduced significant market risk. They requested that the ISO instead begin with a zonal approach for procuring imbalance reserves, which they viewed as simpler.

[5] BPA, CalCCA, California Energy Storage Alliance (CESA), CPUC Public Advocates Office, NV Energy, Puget Sound Energy (PSE), San Diego Gas & Electric (SDG&E), Vistra, Western Power Trading Forum (WPTF)

They argued that a zonal approach would simplify the market design by reducing the need for complicated proposal elements, such as deployment scenarios and market power mitigation.

Between February and May, the ISO held six public meetings during which both the ISO and stakeholders presented their views on the proposed imbalance reserve product and alternative designs. After soliciting stakeholder presentations, the ISO held its first public meeting of the extended stakeholder process on February 27, 2023, with the Western Power Trading Forum, Vistra, and ISO staff presenting on their views of the imbalance reserve product. The ISO held a second public meeting on March 7, 2023, during which ISO staff, Vistra, and Southern California Edison presented their views on alternative designs. At the third public meeting on March 7, 2023, ISO staff and the Western Power Trading Forum again presented on their views of the proposal and design alternatives. On April 8, 2023, ISO staff held a fourth public meeting to review the draft revised final proposal published on April 6, 2023. ISO staff held a fifth public meeting on April 17, 2023, during which California Energy Storage Alliance and the ISO presented on the role of storage resources in the new market products. A final informational public meeting was held on May 2, 2023 to provide stakeholders with additional information on design considerations and implementation details for the imbalance reserve demand curve and procedures for assessing and establishing and tunable parameters. In addition, the Market Surveillance Committee considered the DAME proposal at its March 10, 2023 and May 4, 2023 general session meetings, with presentations by ISO staff and MSC members. The MSC's final opinion is attached for reference.

On March 20, 2023, the ISO published a comparison matrix highlighting the differences and tradeoffs between the design options discussed in the workshops. The matrix addressed three general design options:

- Nodal approach: procuring imbalance reserves within the IFM (co-optimized with energy and ancillary services) and using deployment scenarios to ensure the awards are transmission feasible if deployed as energy.
- Zonal approach: procuring imbalance reserves within the IFM (co-optimized with energy and ancillary services) similar to the procurement of ancillary services in designated zones established to manage congestion on major transmission interfaces within a BAA.
- SCE approach: procuring imbalance reserves within the RUC (co-optimized with reliability capacity) using nodal procurement to respect transmission constraints, with a fallback option of keeping imbalance reserves in the IFM but modeling less than full deployment of the imbalance reserves in the deployment scenarios.

Stakeholders submitted comments on March 30, 2023 based on the discussions from the first three stakeholder workshops. Feedback was mixed, with stakeholders

continuing to disagree on whether a nodal[6] or zonal[7] approach was preferable and whether downward imbalance reserves were necessary.[8] Some stakeholders suggested procuring imbalance reserves in the RUC process,[9] while other stakeholders disagreed with that proposal.[10] Several stakeholders expressed concern about the 15-minute ramping requirement of the imbalance reserve product,[11] and the potential cost associated with congestion induced in the deployment scenarios.[12] Other stakeholders commented on the imbalance reserve demand curve, the flexible application of constraints, local market power mitigation, and the nodal distribution of uncertainty demand. A summary of stakeholder positions and Management's responses thereto is included in the attached stakeholder matrix. Based on stakeholder feedback from comments and workshop discussions, the ISO published the draft revised final proposal on April 6, 2023.

As a result of the additional stakeholder process, several model and procurement flexibility enhancements and clarifications are included in Management's proposal directly responding to stakeholder feedback. These included:

- **Implement flexibility to define which transmission constraints to enforce in the deployment scenarios.** This will give the ISO flexibility to adjust the transmission constraints enforced in the deployment scenarios in response to optimization performance, market performance, or operational experience. This will also enable the ISO to work with EDAM BAA operators to define the critical constraints that will be enforced in the deployment scenarios in their balancing authority area. This modification addresses stakeholder concerns regarding the computational performance and market impact of the nodal approach to procurement of imbalance reserves.
- **Implement a tunable parameter to control the proportion of imbalance reserve awards deployed with resulting flows in the deployment scenarios.** The ability to model only a subset of imbalance reserve flows will mitigate concerns about excess congestion costs.
- **Expand the imbalance reserve product to include the 30-minute ramp-capable portion of the resource.** This is less restrictive than the previous 15-minute ramping restriction and is less costly because it requires fewer resources to provide imbalance reserves.

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[6] BANC, California Department of Water Resources (CDWR), DMM, Middle River Power, PacifiCorp, Public Generating Pool, Sacramento Municipal Utility District (SMUD), SCE, Seattle City Light, Tacoma Power
[7] BPA, CESA, Puget Sound Energy, Vistra, WPTF
[8] Puget Sound Energy, CESA, Six Cities, Vistra
[9] SCE, Six Cities
[10] BANC, BPA
[11] BANC, CPUC, DMM, Los Angeles Department of Water and Power (LADWP), NV Energy, PacifiCorp, PG&E, Seattle City Light
[12] PG&E, SCE

- **Include a mechanism to collect congestion revenue rent on imbalance reserve flows and redistribute it to entities entitled to the congestion revenue.** This mechanism will calculate displaced congestion revenue from imbalance reserve flows and redistribute it according to existing processes.
- **Commitment to evaluating the need to add a layer of regional uncertainty to the nodal uncertainty approach.** This evaluation will address stakeholder concerns that the approach to distributing uncertainty in the deployment scenarios is flawed because it does not account for differences in uncertainty across locations.
- **Include a three year "opt-in" transitional resource adequacy true-up mechanism.** This mechanism will allow entities to choose to have specific imbalance reserve and reliability capacity payments that overlap with RA capacity settled by the ISO.

During the extended stakeholder process, the ISO also provided additional documentation of previous challenges with flexible ramping product deliverability as reflected in prior ISO published reports. These issues drove the need to consider the same flexible ramping product nodal procurement approach for the proposed imbalance reserves product. This information supported the need to address the deliverability and price formation issues previously identified. The ISO also clarified that a negotiated bid option for imbalance reserves and reliability capacity will be available after the ISO gains operational experience with the associated bids/costs.

After thorough consideration of stakeholder feedback, Management concluded that the benefits of a nodal approach (as described above) warrant the increased complexity. Under a zonal approach, resources known to be undeliverable due to transmission constraints could be awarded imbalance reserves. This would significantly reduce the value of the product and require balancing authority areas to take out-of-market actions to ensure sufficient resources are available to meet uncertainty needs.

Following publication of the Draft Revised Final Proposal on April 6, 2023 and accompanying addendum published on April 24, 2023, the ISO held a stakeholder workshop focused on storage resources April 17, 2023. A final set of stakeholder comments was due on April 24, 2023. Although some stakeholders broadly supported the changes included in the draft revised final proposal,[13] other stakeholders identified remaining concerns. In particular, stakeholders requested the ISO provide additional justification for capping the imbalance reserve demand curve at $55/MWh and further clarity regarding the implementation of the imbalance reserve demand curve and the tunable parameters. In addition, stakeholders requested additional analytical support and metrics related to enforcing constraints in deployment scenarios and the process for changing the tunable parameters. Finally, stakeholders expressed concerns about the complexity of the new energy storage state of charge constraints and how they would align with existing constraints.[14] In response to these remaining stakeholder

[13] CDWR, DMM, LADWP, Pacific Generating Pool, PacifiCorp, Public Power Council, SCE,
[14] AES, Cal CCA, CESA, Middle River Power, REV Renewables, SCE, WPTF

concerns, the ISO held an additional stakeholder meeting on May 2, 2023 to provide further context and justification for the key changes incorporated into the revised final proposal – particularly the imbalance reserve demand curve and procedures for assessing and establishing tunable parameters. Although some stakeholders continue to request that the ISO delay bringing the proposal to the ISO Board of Governors and WEIM Governing Body for a decision,[15] Management has determined that given interdependencies between the DAME and EDAM initiatives and EDAM tariff filing deadlines, further delaying the DAME initiative risks delaying the planned Fall 2024 implementation of EDAM. The ISO remains committed to working with stakeholders to refine implementation details and provide additional clarity on recently-added elements in the proposal.

The ISO published the revised final proposal on May 1, 2023. The additional stakeholder engagement described above led to the following changes to Management's proposal focused on the imbalance reserve demand curve, market power mitigation, and storage resources:

- **Implement an imbalance reserve demand curve for all EDAM balancing areas including the ISO balancing area, and cap the imbalance reserve up and down demand curve values at $55/MWh.** Further evaluation and discussion of the prior demand curve approach revealed the prior proposal could lead to high prices solely for the ISO balancing authority area for providing flexibility throughout the EDAM footprint. By capping the demand curve values at the default bid price for imbalance reserve mitigation, market participants can gradually gain experience and adapt to the new market design. This approach is more consistent with the approach taken by the Mid-Continent Independent System Operator with a similar product. This approach allows for a smoother transition, reducing the likelihood for unforeseen issues or price spikes.
- **Revise local market power mitigation and the imbalance reserve bid cap in connection with the imbalance reserve demand curve.** The newly proposed demand curve (described above) negates the effect of local market power mitigation for imbalance reserves because the mitigated bid has the same value as the cap of the demand curve. However, Management still proposes to implement local market power mitigation procedures should the need arise where the parameters for the demand curve or the mitigated bids change in a way that makes the mitigation binding. The newly proposed demand curve also reduces the imbalance reserve offer cap from $247/MWh to $55/MWh.
- **Storage resource participation.** Provides non-RA storage resources the option to participate in the RUC process and require RA storage resources to participate in the RUC process. Storage resources must also anticipate and hold upper and lower values for state of charge to support imbalance reserve awards in the day-ahead market and ensure that they can deliver imbalance reserve awards in the real-time market.

[15] BPA, Middle River Power, Powerex, Six Cities, The Energy Authority, WPTF

- **Clarify an exception to the joint authority classification of this initiative.** Section 3.1 proposes a bidding obligation for California RA resources.[16] This element will remain under the sole authority of the ISO Board of Governors, with no role for the WEIM Governing Body.

Prior to the extended stakeholder engagement process, some stakeholders opposed applying market power mitigation measures to the new market products, arguing that energy mitigation is sufficient.[17] However, Management provided examples of how imbalance reserve bids could result in the exercise of market power, even when local market power mitigation was applied to energy bids. Therefore, Management believes it is appropriate to apply local market power mitigation measures to imbalance reserves and reliability capacity.

A detailed discussion of stakeholder positions on critical aspects of the proposal is included as an attachment to this memorandum.

CONCLUSION

Management requests the ISO Board of Governors and the WEIM Governing Body approve Management's day-ahead market enhancements proposal described in this memorandum. These enhancements will improve the ISO's day-ahead market, better account for variability and uncertainty, and maximize the benefits of West-wide diversity in the day-ahead market's optimization.

[16] Day-Ahead Market Enhancements Revised Final Proposal, page 28
[17] BPA, CESA, Middle River Power, PG&E, Public Generating Pool, REV Renewables, Vistra, WPTF

California ISO | WESTERN EIM

California Independent System Operator Corporation

Western Energy Imbalance Market

ISO Board of Governors and WEIM Governing Body Joint General Session **May 17, 2023** **Decision on day-ahead market enhancements**

Motion

Moved, that the ISO Board of Governors and WEIM Governing Body approve the day-ahead market enhancements as described in the memorandum dated May 10, 2023 and the Addendum dated May 15, 2023, with the exception of the day-ahead must-offer obligation for resource adequacy capacity eligible to provide imbalance reserves, which remains under the sole authority of the ISO Board of Governors; and

Moved, that the ISO Board of Governors and the WEIM Governing Body authorize Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the change proposed in this memorandum, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.

WEIM Govering Body vote: 5-0 **ISO Board of Governors vote: 5-0**			**Action: Passed**					
Name	**Position**	**Body**	**Move/ Second**	**Yes BoG**	**No BoG**	**Yes GB**	**No GB**	**Other**
Borenstein	Governor	Board		Y				
Campbell	Member	GB				Y		
Decker	Member	GB	Seconded			Y		
Eto	Governor	Board		Y				
Galiteva	Governor	Board		Y				
Gardner	Vice Chair	GB				Y		
Kondziolka	Chair	GB				Y		
Leslie	Chair	Board	Moved	Y				
Prescott	Member	GB				Y		
Schori	Vice Chair	Board		Y				
Vote Count	**10-0**							

Attachment E – EDAM Final Proposal

Day-Ahead Market Enhancements and Extended Day-Ahead Market

California Independent System Operator Corporation

August 22, 2023

California ISO

EDAM
EXTENDED DAY-AHEAD MARKET

FINAL PROPOSAL

December 7, 2022

EDAM

Table of Contents

I. Introduction & Executive Summary

A. Introduction

This final proposal for the Extended Day-Ahead Market (EDAM) initiative reflects significant stakeholder input and design changes across the initial April 28, 2022 straw proposal, the August 16, 2022 revised straw proposal, and the October 31, 2022 draft final proposal. The proposed EDAM is a voluntary day-ahead electricity market with the potential to deliver significant economic, environmental, and reliability benefits to participants across the West. EDAM will more efficiently and effectively integrate renewable resources and address significant operational challenges presented by a rapidly changing resource mix, emerging technologies, and the impacts of climate change. EDAM builds upon the proven ability of the Western Energy Imbalance Market (WEIM) to increase regional coordination, support state policy goals, and meet demand cost-effectively.

Since its inception in 2014, the WEIM has grown to 19 participating entities and has produced more than $2.9 billion in benefits to its participants.[1] In 2023, the number of participants will grow to 22 entities, representing approximately 79 percent of the load across the Western Interconnection. By leveraging the significant resource diversity and transmission connectivity that exists between the major supply and demand regions of the West, the WEIM has clearly demonstrated the value of strong collaboration across a broad regional footprint. EDAM will provide significant additional benefits through optimal commitment and scheduling of supply in the more extensive day-ahead timeframe. The EDAM design will apply equitably to all EDAM entities, including the ISO, ensuring a level playing field for market participants, inside and outside California.

The EDAM design will also support the rapidly evolving Western resource adequacy landscape. Recognizing there are differences in how the various programs ensure resource adequacy within their jurisdictions, EDAM is designed to provide a market platform that complements, coordinates, operationalizes, and maximizes the value of these programs through the use of the ISO's sophisticated security constrained economic dispatch and commitment capability. This will ensure participants can account for the capacity and optimize use of resources they have procured to support reliability within their footprint.

The final proposal is a result of continued extensive, open and collaborative stakeholder engagement, including more than 500 pages of stakeholder comments on each of the proposal iterations and stakeholder discussions during the numerous stakeholders meetings this year. The EDAM design, represented in this final proposal, will be presented to the ISO Board of Governors and the WEIM Governing Body for decision during the joint session meeting on February 1st, 2022. The ISO will continue to actively engage stakeholders during the tariff development process, which is the next stage of the stakeholder process in preparation for a filing of the EDAM design with the Federal Energy Regulatory Commission (FERC).

B. Design Changes from the Draft Final Proposal

In this final proposal, the ISO has endeavored to synthesize the valuable significant stakeholder input and build upon the initial EDAM design reflected in the prior iterations of the proposal by providing incremental enhancements and additional details, descriptions, and examples regarding the various EDAM design elements. Several design changes from the October 31, 2022 draft final proposal are summarized as follows:

[1] *Western Energy Imbalance Market Benefits Report Third Quarter 2022*, October 31, 2022. Link

- ***EDAM Participation Model –*** The final proposal clarifies, in response to stakeholder comments, the transmission requirement for resource participation in the market. In particular, the final proposal clarifies that a resource must be a designated network resource under the terms of the Open Access Transmission Tariff (OATT), have reserved firm point-to-point transmission (of any duration), or have a legacy transmission contract. If transmission has not been reserved, the resource would nevertheless be able to participate in the market and the EDAM entity transmission provider would assess a charge for using transmission based on the rate for the lowest duration of firm point to point transmission service established by the OATT.

- ***Transmission Availability in EDAM –*** The final proposal introduces two enhancement to the transmission availability design. First, it enables eligibility for historical revenue recovery associated with historical sales of monthly firm and non-firm point, in addition to the already eligible weekly, daily and hourly transmission products. Second, it clarifies the treatment of, and the ability to exercise, transmission rights between an EDAM balancing area and a non-EDAM balancing area to support continued service to load and meeting obligations under existing or emerging programs around the West.

- ***EDAM Resource Sufficiency Evaluation (RSE) –*** The final proposal provides enhancements and clarifications to select elements of the design. The proposal clarifies the provisions regarding demand response participation to ensure demand response participation is accurately captured and tracked. The proposal provides additional detail on how generation–only balancing areas will be treated in the EDAM resource sufficiency evaluation. The proposal also retains the consequence design for failing the resource sufficiency evaluation, but provides clarifications in response to stakeholder comments on the surcharge application the proposed cost and revenue allocations associated with the accrual and distribution of the surcharges for failing the resource sufficiency evaluation.

- ***Convergence Bidding –*** The final proposal modifies the design by allowing an EDAM entity to elect whether to enable convergence bidding within their balancing area at the onset of participation without a mandatory transition to convergence bidding after one year of participation. The ISO will further evaluate and derive a more permanent EDAM convergence bidding policy leading up to the two year anniversary of EDAM operation. The stakeholder process will permit for consideration of EDAM operational experience and EDAM entity readiness in deriving the convergence bidding policy design.

- ***Greenhouse Gas (GHG) Accounting and Reporting –*** The final proposal includes three changes from the draft final proposal. First, it clarifies and updates the counterfactual that would roll over from EDAM to the WEIM as the difference between the day-ahead energy award and the day-ahead GHG award to align with the approach taken in the WEIM. Second, the final proposal clarifies three aspects of the GHG net export constraint which was developed to limit secondary dispatch: the proposal retains the optionality to have the constraint as a static or dynamic constraint and to the extent implementation requires a static constraint, it will be based on the optimal net transfer of the previous market run; the constraint will be turned off for all non-GHG regulation area BAAs for any hours a BAA that overlaps with a GHG regulation area fails the RSE; and it

identifies exceptions for resource adequacy capacity. Third, the final proposal explains that the GHG settlement value will be represented as a positive value. This last clarification is necessary when there are multiple GHG regulation areas, but it does not change the settlement payment to resources that receive an attribution to serve demand in a GHG regulation area.

C. Executive Summary

A day-ahead market can deliver significant economic, reliability, and environmental benefits to balancing authority areas in the West. The EDAM design described in this draft final proposal provides for efficient integration and optimized commitment of diverse resources and transmission capability to serve load reliably and economically across a wide Western footprint.

The day-ahead market will optimally commit diverse supply and enable energy transfers between EDAM balancing areas to serve load throughout the EDAM footprint, producing reliability and economic benefits for the participating entities and their customers. The day-ahead market will also efficiently procure supply – imbalance reserves – to meet the uncertainty requirements for the broad footprint associated with changes in conditions between day ahead and real time. In the real-time market, the day ahead resource commitment and energy transfers are re-optimized, if necessary, to reflect the expected conditions on the grid. In stressed system conditions, the real-time market will seek to resolve these conditions through re-dispatch of the broad pool of supply and deployment of imbalance reserves, along with other mechanisms, to help maintain grid reliability in an individual EDAM balancing area and the broader footprint.

Underlying the EDAM design is a voluntary participation framework, with ease of entry and exit whereby WEIM entities can extend their market participation to the EDAM. Further, the EDAM structure maintains an equitable rate design framework for EDAM onboarding and participation fees, resulting in fair and reasonable rates for market participants.

The EDAM design leverages existing features of the ISO day-ahead market design which are common in other day-ahead markets across the country. The design also considers enhancements proposed in complementary stakeholder initiatives that will harness flexibility across the larger footprint by incorporating an imbalance reserve product and improved price formation.

This final proposal is divided into three substantive parts to facilitate review: (1) pre-market activities, (2) day-ahead market processes and features, and (3) post-market processes and outputs.

1. Pre-Market Activities and Inputs

Leading up to the day-ahead market at 10:00 a.m., an EDAM entity will identify the amount of transmission available to the market and organize its supply portfolio to meet its expected system needs.

Transmission Availability: Transmission availability to the EDAM is essential to support energy transfers across interties between participating balancing areas and to realize the full benefits of the market. The EDAM transmission availability design seeks to maximize the amount of transmission available, supporting robust transfers between participating balancing areas while respecting existing transmission rights and providing different pathways for making transmission available to EDAM. The design also provides the opportunity for transmission customers to exercise and indicate a later expected use of these transmission rights to support

wheeling through or exporting from an EDAM balancing area to a non-EDAM balancing area to meet their obligations. First, transmission customers and transmission providers will make available to the market high-quality transmission - firm and conditional firm point to point and network integration transmission service - to enable transfers of optimally committed supply between participating balancing areas. Transmission rights associated with delivering supply to meet the resource sufficiency evaluation across interties between participating balancing areas, *i.e.*, bucket one transmission, are made available to the market and may accrue transfer revenue that is allocated to the EDAM entity. Second, transmission rights held by transmission customers that are not used to support delivery of supply meeting the resource sufficiency evaluation can also be made available to the EDAM *i.e.*, bucket two transmission. This approach is comparable to a transmission customer's use of transmission customer held rights under the OATT. Transmission customers have the option to (1) utilize their transmission rights ahead of the day-ahead market (10:00 a.m. day ahead), (2) voluntarily release the transmission rights to the EDAM to optimize transfers, and in return receive a direct settlement from the ISO for any accrued transfer revenues associated with the released transmission, or (3) leave their transmission rights unscheduled by 10:00 a.m., in which case the market will utilize them to optimize transfers and transmission customers can seek to exercise them after the scheduling deadline consistent with their ability to do so under the OATT. Third, transmission providers also make available to the market unsold firm transmission capacity to support transfers, *i.e.*, bucket three transmission. Finally, the proposal provides a framework to enable transmission providers to recover historical transmission revenues to account for, in part, potential reduced sales of certain transmission products. Transmission revenues recoverable through the EDAM would include (1) historical revenues associated with sales of non-firm and short-term firm point-to-point transmission services (wheeling access charge revenues for the ISO), (2) revenues attributable to similar transmission services on new-build transmission facilities that increase transfer capability between EDAM balancing areas, and (3) revenues associated with transfers wheeling through an EDAM entity's transmission system in excess of its EDAM imports and exports.

Day-Ahead Resource Sufficiency Evaluation (RSE): Leading up to the day-ahead market, each EDAM entity, including the ISO, must have sufficient supply and reserves to meet forecasted demand and uncertainty that may materialize between the day ahead and real time. Supply procured under different resource adequacy and resource planning programs will be tested under a common day ahead sufficiency evaluation, ensuring equitable participation in the optimized resource commitment. The resource sufficiency evaluation design allows EDAM balancing areas to test resource sufficiency on an advisory basis before the day-ahead market run and to cure any deficiencies before the day-ahead market run at 10:00 a.m. Furthermore, the design allows delivered firm energy contracts, which are prevalent across the West and have been historically reliable, to count toward meeting the resource sufficiency evaluation. Entities failing to meet the evaluation requirements are subject to a consequence framework that incentivizes forward procurement to meet the daily resource sufficiency evaluation. The final proposal modifies the resource sufficiency evaluation failure consequence framework to provide for a tiered consequence structure. Smaller failures within the first tolerance band do not constitute a resource sufficiency evaluation failure, but failures above the tolerance band are subject to scaled financial administrative surcharges for two additional bands. The proposed administrative surcharge is based on a 16-hour energy block product and accounts for both the severity of resource insufficiency and the potential for repeated failures of a participating balancing area to enter into the EDAM sufficiently resourced. Balancing areas that pass the EDAM resource sufficiency evaluation will be tested for the WEIM resource sufficiency

evaluation together as a pool, rather than individually, which enables the diversity benefit of imbalance reserve procurement and decreases the overall WEIM resource sufficiency obligation for the pooled entities.

2. Day-Ahead Market Processes and Features

The day-ahead market processes and inputs enable the efficient commitment of resources across the EDAM footprint, identifying energy transfers that are supported by high-quality transmission made available to the market.

Integrated Forward Market (IFM) and Residual Unit Commitment (RUC): The IFM and RUC are the two primary processes of the day-ahead market. The IFM balances supply and demand, resulting in optimized supply commitment schedules and market transfers. The RUC process runs after the IFM and procures incremental or decremental capacity, as a backstop to the IFM, to ensure there is sufficient physical capacity to meet demand in real time. These are integral processes commonly reflected in day-ahead market designs, and the proposal retains them as part of the EDAM market design. The proposal continues to require all energy offered into the day-ahead market, including energy offered in excess of resource sufficiency evaluation needs, be offered as reliability capacity to ensure an optimal market solution across the footprint. Capacity awarded through these processes must be offered into the real-time market to ensure it is available and re-optimized based on real-time conditions.

Market Power Mitigation: Market power mitigation tools ensure that when supply is limited, suppliers cannot exercise market power to unduly influence prices. The proposal continues to extend the WEIM market power mitigation methodology to the EDAM. WEIM entities are already familiar with this design, which has functioned well. The ISO and stakeholders will continue to evaluate potential enhancements to this market power mitigation framework in the *Price Formation Enhancements*[2] initiative, which the ISO is conducting in parallel with development of the EDAM. Enhancements adopted in that initiative will also inform the evolution of the EDAM market power mitigation structure.

Convergence Bidding: Convergence bidding (commonly known as virtual bidding) allows market participants to submit financial bids in the day-ahead market that do not represent physical supply or demand. Convergence bidding is a common feature of forward electricity markets and improves price convergence between the day-ahead and real-time markets. The proposal has evolved to provide each EDAM entity with the option, at the onset of their participation in EDAM, to elect whether to implement convergence bidding within their balancing area. To the extent an EDAM entity elects not to implement convergence bidding, there is not an explicit transition period that would require convergence bidding implementation by a particular date. Providing the EDAM entities with the option to elect whether or not implement convergence bidding allows entities to gain market experience before introducing convergence bidding. However, leading up to the two-year anniversary of EDAM operations, the ISO will launch an initiative to more holistically evaluate the convergence bidding policy design in the EDAM informed by the market experience, readiness of entities to introduce convergence bidding and other factors identified through the process. Convergence bidding will continue to be supported in the ISO balancing area. The ISO will monitor the market's performance and evaluate any unintended adverse consequences, and it will stand ready to engage with stakeholders to adjust this framework as necessary.

[2] *Price Formation Enhancements Initiative* web page - Link.

External Resource Participation: Resources located outside of the EDAM footprint may desire to participate in the day-ahead market with supply offers at EDAM boundary interties; *i.e.*, interties between participating and non-participating balancing areas. This final proposal continues to extend the WEIM model of external resource participation to the EDAM. Under this model, source-specific supply associated with pseudo-tied and dynamically scheduled resources can economically bid and self-schedule at the EDAM footprint boundary interties. Non-source specific supply (non-pseudo, non-dynamic) located outside of the EDAM footprint that is contracted with an EDAM entity (or a load serving entity located within the balancing area) can continue to be self-scheduled at the EDAM footprint boundary interties. The final proposal permits off-system network resources designated under an EDAM entity's OATT to economically bid at the EDAM entity's interties. The designation of a source specific network resource under the OATT, that is modeled in the ISO master file, ensures deliverability. The framework does not permit non-specific source supply to submit economic intertie bids. The proposal continues to provide for full intertie bidding – from both source-specific and non-source specific supply – at the interties between the ISO balancing area and other balancing areas not participating in EDAM. This reflects the current practice in the WEIM. Intertie bidding, through the submission of economic bids, has been a longstanding feature of the ISO market design, and the ISO has mechanisms in place that mitigate the risks posed by these types of arrangements. As EDAM entities gain experience with and confidence in the market, the ISO and stakeholders can consider expansion of the external resource participation design.

Greenhouse Gas (GHG) Accounting and Reporting: The EDAM design will account for the costs and reporting requirements arising from state GHG accounting and regulation policies. The final proposal extends the WEIM GHG accounting framework – the resource specific approach – to the EDAM with enhancements that seek to balance market efficiency, with the goal of limiting secondary dispatch. This design uses resource-specific GHG bid adders that reflect both the cost of compliance and the willingness of resources to be dispatched and serve demand in a GHG regulation area. This is a reasonable, known, and currently functioning GHG accounting framework that can support an initial GHG accounting design for the launch of EDAM. The final proposal also provides additional details and analysis on various components of the GHG design, including updating the approach for the counterfactual from EDAM to the WEIM to align with the WEIM, clarifying aspects of the net export constraint, and explaining that the settlement value for GHG will be a positive value. The ISO commits to evaluate GHG design after the first year of EDAM implementation and work collaboratively with regulatory agencies to align market design with applicable regulations. If necessary, the ISO will work with stakeholders and regulatory agencies to consider design improvements and regulatory changes, including considering different design approaches identified and considered in the EDAM stakeholder process.

3. Post-Day-Ahead Market Outputs

The day-ahead market produces resource commitments and EDAM energy transfers that ultimately are settled, and it provides information that supports compliance with regulatory requirements.

Transfer Revenue and Congestion Revenue Allocation: As transmission is made available to the EDAM to support energy transfers across interties between EDAM balancing areas, transfer revenue may accrue to the extent the transmission scheduling limit is reached at the intertie between EDAM balancing areas, *i.e.,* binds in the market. Transfer revenue represents the separation in the marginal energy costs between two participating balancing areas when the scheduling limit is reached. The proposed design continues to reflect 50:50

sharing of transfer revenues accruing at the interfaces between participating balancing areas, including the ISO. Congestion revenue accrues when internal transmission path constraints or limits are reached, creating a separation in the marginal congestion component of the locational marginal price (LMP). Internal transmission constraints are modeled in the market and vary across the system; with some constraints becoming binding based on import flows across different interties. The proposal continues to allocate congestion revenue that accrues when internal transmission system constraints bind, including modeled intertie constraints, solely to the participating balancing areas where the constraint originated. This balancing area is ultimately responsible for responding to and resolving the constraint and should be allocated the associated revenue to offset the associated costs. In WEIM there is limited modeling of constraints in the market because entities seek to resolve them outside of the market. However, in the EDAM entities will want to ensure all constraints are visible to and respected by the market because all load and resources are participating in the market, and accrued congestion revenues will be allocated fully to the EDAM entity where the constraint binds.

Settlements: The ISO calculates settlement charges and payments based on market and transmission outcomes. The day-ahead market commits supply across the wider footprint and settles based on the market results. The EDAM will extend the existing day-ahead market settlement practices and timelines and develop some new settlement practices for participating balancing areas and market participants. This final proposal describes the settlement implications of various EDAM design components including the resource sufficiency evaluation failure consequences, settlement of EDAM transmission congestion revenues, and transfer revenue distribution details.

D. EDAM Benefits

The economic benefits of a day-ahead market across the Western Interconnection are estimated to range between $119 million and $1.2 billion annually, in addition to those seen in the WEIM.[3] An EDAM will provide additional opportunities to build upon the financial, environmental, and reliability benefits of the WEIM through increased coordination and collaboration across the footprint.

Through the optimized commitment of diverse supply through the day-ahead market, along with the associated optimization of transmission across balancing areas, the EDAM will position the footprint to meet its demand needs more cost-effectively. The EDAM will also enhance reliability across the footprint, and confidence in the market results through a robust and transparent resource sufficiency evaluation and an imbalance reserve product that accounts for a level of uncertainty that may materialize between the day-ahead and real-time, allowing the market to effectively respond in stressed system conditions. The EDAM also provides environmental benefits by better optimizing and reducing curtailment of renewable generation. Working in unison, these features afford market flexibility to re-optimize the resource fleet to respond to changes in system conditions and limit the instances of stressed conditions elevating to emergency status.

[3] *Extended Day-Ahead Market: Feasibility Assessment Update from EIM Entities* (2019), Link; *The State-Led Market Study,* Energy Strategies, July 30, 2021. Link; *Economic Benefits of an Extended Day-Ahead Market (2021),* conducted by Energy Strategies LLC. Link; *CAISO EDAM Benefits Study: Estimating Savings for California and the West Under EDAM Market Scenarios (2022)*, conducted by Energy Strategies LLC. Link; This most recent Energy Strategies LLC study quantified capacity savings of $652 million annually in addition to operational savings of $543 million. The EIM Entities study (2019) quantified operational savings but did not attempt to quantify capacity savings.

E. EDAM Interdependency with Existing Initiatives

Due to the breadth of the EDAM design, there are interdependencies between the EDAM initiative and other on-going initiatives. As the designs in these initiatives and the EDAM initiative evolve, it is important to consider the interplay between them to ensure a holistic and consistent market design.

Day-Ahead Market Enhancements (DAME) Initiative:[4] The DAME initiative evaluates the design of an imbalance reserve product that will address ramping needs between intervals and the uncertainty that can occur between the day-ahead and real-time markets. The imbalance reserve product is an important element of the overall EDAM design because the ISO will procure it to meet any uncertainty that materializes across the EDAM footprint, leveraging the diversity benefit and reducing each EDAM entity's overall daily sufficiency requirement. The imbalance reserve product will play a critical role in supporting EDAM transfers when uncertainty materializes between day ahead and real time, increasing the degree of confidence that these transfers can serve load reliably.

Transmission Service and Market Scheduling Priorities Initiative:[5] This initiative evaluates the design for a process to establish wheeling through scheduling priorities across the ISO transmission system. In particular, the initiative introduces a framework for calculating Available Transfer Capability (ATC) across the ISO interties and allowing wheeling through customers to access and reserve the ATC in advance. This will allow the wheeling through customer to establish a scheduling priority equal to load. EDAM entities seeking to utilize supply that wheels through the ISO system to support their RSE demonstrations would acquire high wheeling-through scheduling priority across the ISO system to bring bucket one transmission to the EDAM in most instances. Establishing a wheeling-through scheduling priority may not be required in all instances, particularly if it is associated with a delivered firm energy product where title to the energy is taken at the sink EDAM BAA intertie.

WEIM Resource Sufficiency Evaluation Enhancements:[6] This initiative evaluates enhancements to improve the accuracy of the WEIM resource sufficiency evaluation. The EDAM design must consider the interplay between the pooled WEIM RSE and the allocation of the uncertainty diversity benefit and to ensure proper incentives remain across the day-ahead and real-time markets to ensure EDAM entities provide sufficient resources. This initiative considers modifications to the consequences for failing the WEIM RSE, including financial consequences to cure undersupply conditions. The different EDAM and WEIM design elements should complement each other to send the appropriate signals and incentives.

Price Formation Enhancements:[7] This initiative evaluates several topics related to price formation, including scarcity pricing enhancements, fast-start pricing, and potential market power mitigation enhancements. The design emerging from this initiative will affect the day-ahead market and consequently the EDAM. The EDAM straw proposal moved consideration of market power mitigation enhancements to the *Price Formation Initiative* and, changes made in that initiative would thus affect the day-ahead market, including the EDAM. The initiative also considers scarcity pricing enhancements and fast-start pricing policies that, if adopted, could apply in the day-ahead market across the EDAM footprint.

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[4] *Day-Ahead Market Enhancement (DAME) Initiative*, web page - Link.
[5] *Transmission Service and Market Scheduling Priorities Phase 2 Initiative,* web page - Link.
[6] *WEIM Resource Sufficiency Evaluation Enhancements,* web page - Link.
[7] *Price Formation Enhancements Initiative,* web page - Link.

F. Interoperability between EDAM and Western Resource Adequacy Program (WRAP)

Interoperability between the EDAM and the WRAP and the need for continued coordination between the two programs is important given that entities may participate in both programs. The WRAP implements (1) a forward resource adequacy showing framework where entities demonstrate their ability to meet seasonal reliability metrics on a monthly basis, and (2) an operational program where participants with surplus capacity can be obligated to assist participants that may be deficient in the operational timeframe. WRAP's value proposition relies on participants having access to their demonstrated (forward contracted and owned) resources and confidence in the sharing of resources within the WRAP footprint to safely lower the regional planning reserve margin. The EDAM provides a market platform for optimizing commitment and dispatch of resources across the EDAM footprint to serve load efficiently and economically. As WEIM has demonstrated, resource adequacy and resource planning programs can integrate with organized markets to provide robust benefits.

Entities that participate in both the WRAP and the EDAM will ultimately be responsible for managing their participation in each; however, harmonizing both designs on an ongoing basis to ensure the success of both programs in providing the intended value proposition is important. Based on preliminary review of program timelines and technical implementation, there appear to be pathways to ensuring interoperability. The WRAP requires that entities procure or build adequate firm resources and transmission from a long-term resource planning and adequacy perspective to meet their expected needs during the summer and the winter months. In the day ahead timeframe, prior to 10:00 a.m., WRAP participants will know whether they have a "hold back" obligation as a surplus entity or whether they are deficit relative to the assumptions in the forward procurement window and can access firm supply from other WRAP members. The EDAM's resource sufficiency evaluation ensures that entities in different RA programs (or no centralized RA program) all bring adequate resources in the market such that they can rely on the day ahead energy transfers. A participating WRAP member, who is also an EDAM participant, can offer the same supply it relied on to meet its WRAP showing obligations to demonstrate its day-ahead resource sufficiency, including any supply it may have secured through the operational program.

As both EDAM and WRAP evolve, continued coordination is necessary to ensure the two programs complement each other and are interoperable when implemented. This will maximize the value the programs provide for their participants. The ISO is committed to continued engagement with EDAM participants and WRAP representatives to test aspects of the design, conduct scenario analyses, and identify and implement any potential design enhancements that are necessary to ensure continued interoperability. The EDAM will strive to ensure interoperability between the programs through both its initial design and future evolution.

II. EDAM Market Structure

A. Threshold Issues

1. Voluntary Participation Model

Defining a comprehensive participation model is an important element of the EDAM design. The draft final proposal described a voluntary participation framework for a WEIM entity considering participation in the EDAM: voluntary entry and voluntary exit with a six-month notice period and

no exit fees. This participation model design is consistent with the WEIM and allows for coordinated participation in and exit from both markets. The draft final proposal also introduced several transitional measures, largely consistent with the transitional measures present in the WEIM and the ISO tariff that would be extended under the EDAM. These transitional protection measures limit and mitigate adverse reliability and market outcomes resulting from EDAM participation, particularly during initial stages of market implementation and the onboarding of individual EDAM entities.

Stakeholders continued to express broad support for a voluntary participation framework that provides for ease of entry and exit at an EDAM entity level, *i.e.,* at a BAA level, because it allows an entity to evaluate benefits without a lengthy commitment. Stakeholders also appreciated the additional clarifications in the draft final proposal regarding roles and responsibilities of the market operator and EDAM entity regarding the transitional measures. The final proposal retains the voluntary participation design and the proposed transitional measures.

a) Voluntary Participation Model and Transitional Measures

Stakeholders continued to broadly support the concept of voluntary participation in the EDAM, namely, that a WEIM entity can elect to participate in the EDAM or continue to participate only in the WEIM. Stakeholders also continued to express support for ease of exit through a six-month notice period to cease participation in the EDAM with no exit fees.

The final proposal retains the proposed framework from prior proposals to extend the WEIM voluntary participation and responsibility model to the EDAM. In the EDAM, as in the WEIM, each participating entity would continue to retain key roles and functions that the ISO would not take on as the market operator, including: (1) resource planning, (2) transmission planning, (3) BAA operations and reliability, and (4) compliance with the associated standards. Retaining these important functions empowers participating entities to continue their long-term and short-term reliability planning and operations as they do today, while at the same time supporting their participation in the EDAM and enhancing regional coordination and reliability among participants.

WEIM entities are not required to participate in the EDAM. A WEIM entity can elect to participate only in the WEIM and not participate in the EDAM. However, WEIM participation is a pre-requisite for participation in the EDAM. In other words, a BAA cannot only participate in the EDAM; it must be a participating WEIM entity to participate in the EDAM. Also, it is possible an entity not currently in the WEIM can join the WEIM and EDAM simultaneously. Day-ahead market participation requires real-time market participation because it would be inequitable to make payments to, or charge, a participant for day-ahead market schedules without corresponding real-time market payments or charges for deviations from day-ahead market schedules based on actual production or usage.

The timeline for onboarding new EDAM entities will be similar to the timeline for onboarding WEIM entities.[8] The onboarding process will include steps similar to the WEIM onboarding activities; although, there may be some elements that are not required for EDAM onboarding

[8] ISO Tariff, section 29.2(b)(3). Note this timing applies to WEIM entities that have joined since start-up of the WEIM, and the timing for EDAM entity participation at start-up may vary.

because they are already in place given an entity's WEIM participation.[9] Section II.E describes the onboarding commitment and the associated fee.

The final proposal continues to include a voluntary exit framework from the EDAM with no exit fees and a six month notice period to exit from EDAM. This framework is consistent with the WEIM exit provisions: no exit fees and a six month (180-day) notice period.[10] Ease of entry and exit are key design concepts that allow an EDAM entity to evaluate the impacts and benefits of participation and enable the entity to cease participation if those impacts and benefits do not meet expectations. An entity exiting EDAM can still continue to participate in the WEIM. Exiting the EDAM does not affect WEIM participation.[11]

b) Transitional Protective Measures

The draft final proposal described transitional measures intended to protect EDAM entities from adverse reliability or market outcomes. Stakeholders commenting on the transitional measures continued to generally expressed support for extending the WEIM transitional measures to the EDAM particularly for existing WEIM entities that currently benefit from these measures.

Below, the final proposal describes both the WEIM transitional measures that apply during the onboarding period and more WEIM permanent measures that provide safeguards to market participation. These measures will similarly protect individual EDAM entities, including the ISO, to the extent there are adverse reliability or market outcomes in a particular BAA or in the broader EDAM footprint.

Implementation Date Change: Prior to implementation, each entity joining the EDAM can request a change in its implementation date if it determines it cannot proceed on that date.[12] Over the years, WEIM entities have exercised their right to change their implementation date during WEIM implementation due to lack of readiness or other factors. This measure recognizes the importance of readiness to participate in the market. The proposal is to extend this WEIM transitional protective measure to the EDAM so entities joining the EDAM can change their implementation date due to readiness concerns. Changing the EDAM implementation date would simply require the ISO to post an updated implementation timeline, including an update to any readiness notifications to inform FERC of the delay, the reasons for the delay, a new implementation date if it can be determined, and an explanation of whether the entity will need to reissue a portion or all of the readiness certification.[13]

Temporary Suspension of EDAM Participation: Recognizing the importance of the onboarding process and readiness to participate in the market, under the WEIM the ISO may, within 60-days following the implementation date, temporarily suspend participation of the WEIM entity for a period not to exceed 60-days.[14] Although the ISO, as market operator, institutes the suspension, the ISO will coordinate the temporary suspension with the WEIM entity and grant deference to the WEIM entity. Typically this would occur in response to an unexpected market

[9] ISO Tariff, section 29.2(b)(3). An example would include the network model related tasks.
[10] ISO Tariff, section 29.4(b)(4).
[11] An entity choosing to exit the EDAM would independently have to exercise its decision to exit the WEIM. Having the same notice period for WEIM and EDAM will facilitate concurrent withdrawal if that is the EDAM entity's decision.
[12] ISO Tariff section 29.2(b)(6)(B).
[13] The formal requirements are based on the current WEIM readiness process, and the ISO has requested comment on the appropriate formalities associated with EDAM readiness determinations.
[14] ISO Tariff section 29.1(d); BPM for the Western Energy Imbalance Market, sections 11.4 and 11.5.

or system operational issue arising at the onset of the WEIM entity's participation. This transitional protective measure will be critical during the early EDAM onboarding period to ensure that from a market, systems, and operational perspective the onboarding does not cause unexpected issues or impacts. Although this protective measure can be invoked only during the first 60-day period, if it is invoked, the period can be extended if the matter is not resolved during the 60-day resolution period.

Transitional pricing measures: Transition period pricing is another important transitional measure in place today in the WEIM. For a period of six-months following the implementation date, the ISO will not apply certain transmission constraints and will relax certain transmission and/or power balance constraints.[15] In these circumstances, the ISO determines prices consistent with other provisions of its tariff, effectively substituting the last economic bid for what would otherwise be a parameter price. This transitional pricing period can be extended beyond six-months, but an extension requires FERC approval.

Another important WEIM transitional measure will also apply that extends the ISO's day-ahead price correction authority from five business days to 10 business days for a three-month period following implementation.[16] The ISO corrects prices when it determines that prices were not calculated accurately, consistent with the provisions of the ISO tariff. Extending the window for the ISO to assess and implement EDAM price corrections will help facilitate resolution of implementation-related issues associated with a new EDAM entity's participation. This protective measure has been a valuable tool in the WEIM, and extending to EDAM should provide similar value to the ISO and protection for EDAM entities.

Based on stakeholder requests in prior iterations of the proposal, the ISO will also extend the timeline for price correction timeline, based on the last economic bid, from three to six months to mitigate unintended consequences from merging the flow based and market scheduling paradigms. This proposal also protects against unintended consequences and potential modeling inaccuracies when an entity joins the EDAM.

EDAM disruption and interruption of participation in the market: The transitional measures discussed above would apply only during a limited period associated with an EDAM Entity's initial participation. There is another measure that applies beyond a WEIM entity's initial participation that the proposal seeks to apply to EDAM. Specifically, the ISO may interrupt a WEIM entity's participation in the real-time market when, in the ISO's judgment, operational circumstances have caused or are likely to cause abnormal system conditions that require immediate action to maintain system reliability or there is a communication failure that prevents access to ISO systems.[17] In these instances, although the ISO makes the ultimate decision, the ISO will coordinate closely with the WEIM entity regarding the need for interrupting WEIM entity participation in the real-time market and will grant deference to the WEIM entity. For example, in limited circumstances the ISO has interrupted WEIM entity participation due to transmission outages that electrically separated two participating WEIM BAAs. In these instances, based upon coordination with the entities, interruption was necessary to ensure reliable operation of the grid. These WEIM provisions are similar to provisions the ISO can implement within its own BAA to address short-term disruptions that require a brief interruption of the market.

[15] ISO Tariff, section 29.27.
[16] ISO Tariff, section 29.35.
[17] ISO Tariff, section 29.7(j).

In the example above, if due to a particular transmission outage there is complete electrical separation between EDAM BAAs, it may be necessary to suspend participation of an EDAM entity temporarily to ensure reliable operation of its system. The ISO would not exercise this transitional measure in isolation. Rather, the ISO would closely coordinate with the EDAM entity as it does in the WEIM today. The ISO could also exercise this measure to interrupt its own participation in the EDAM by isolating its BAA from the rest of the EDAM footprint and running the day-ahead market within its own BAA separate from the rest of the EDAM footprint. This transitional measure is an important measure in limited circumstances to allow separation from the market to maintain system reliability.

Commitment to Expedited Changes Where Necessary: Participation in the day-ahead market is new to WEIM entities electing to participate in the EDAM. As the EDAM implementation progresses with its inherent system and technology complexities, the ISO will monitor potential impacts of both technology and market design. The ISO commits to expediting technology fixes and market design changes to promptly resolve issues that may arise. If the EDAM is not yielding the expected benefits or there are unexpected reliability or other significant impacts resulting from the implementation of the EDAM, the ISO would convene EDAM entities and stakeholders immediately to discuss appropriate actions to address the situation. With the voluntary entry and exit framework and the transitional measures described above, the ISO believes the overall participation framework provides sufficient measures to address and mitigate promptly any unexpected consequences that may arise through EDAM participation.

c) Resource Participation Model

The draft final proposal continued to describe the resource participation model in the EDAM and compared it to the resource participation model in the WEIM. The proposal explained that in the EDAM all resources within the EDAM BAA, including pseudo-tied resources, are expected to participate in the market and be settled through the market. More specifically, if resources plan on being operational, they must submit a self-schedule or an economic bid into the market to provide visibility of all grid injections across the footprint. The revised and draft final proposals also described how entities can manage their market participation through self-scheduling and exercising their transmission rights in a manner that allows them to transact service similar to base scheduling in the WEIM (while being subject to full settlement through the market).

Additionally, the draft final proposal introduced a requirement that resources within an EDAM balancing area be associated with a transmission reservation, whether transmission is reserved by the load serving entity when designating the generation as a network resource under the OATT, or the transmission the resource reserves as point to point transmission service on the host balancing area's system. This addition was introduced in response to stakeholder comments and concerns that resources, particularly newly interconnected resources, potentially could avoid paying the costs of the transmission system if they participate in the market without a transmission reservation. Participation without a reservation would shift costs to other transmission customers paying for the transmission system and cause transmission planning and other challenges.

Stakeholders commenting on this aspect of the proposal generally appreciated the clarification regarding the treatment of resources participating in the market, although some sought clarification regarding existing contractual relationships to minimize the need to potentially modify the arrangements in support of market participation. The final proposal clarifies why contractual modifications may not be necessary. Separately, stakeholders largely supported introducing a transmission requirement, although many sought clarification of, or changes, to

the requirement recognizing the limited availability of firm transmission. They suggested lowering the barriers to resource participation by finding ways of ensuring there is contribution to the cost of the system and allowing shorter term transmission to support the requirement. These stakeholders suggested allowing the transmission provider to impose a charge for transmission if the resource has otherwise not reserved transmission service. During the November 14th EDAM stakeholder meeting, the ISO introduced modifications to this transmission requirement design, and stakeholder comments supported the overall direction of that design.

The final proposal discusses below the design clarifications and enhancements in response to stakeholder comments.

(1) Resource Participation Structure

In the WEIM, resources within the BAA can elect to be participating or non-participating.[18] A WEIM participating resource executes a participating resource agreement, which ensures it can meet certain requirements described in section 29 of the ISO tariff for participation in the real-time market. The resource participates through a WEIM participating resource scheduling coordinator who represents it in the market. The resource's operating characteristics are known because they are registered and modeled in the market, and the optimization can thus ensure the market respects these characteristics. A participating resource's economic bids and imbalance energy are cleared and settled in the market.

In contrast, a non-participating WEIM resource within the BAA has elected not to participate in the market. Such a resource does not execute an agreement with the ISO and is not registered as available to the real-time market. The WEIM entity represents non-participating resources and, working in coordination with the appropriate parties, submits a base schedule[19] for the non-participating resource so the real-time market can account for the resource in various aspects of WEIM operation, including the market optimization and dispatch and consideration of the resource's supply in the RSE. These base schedules for non-participating resources, similar to participating resources, are not directly settled through the market – only imbalances from base schedules are settled. A WEIM entity that does not join the EDAM will continue to be subject to the current WEIM rules regarding resource participation, including the concept of base scheduling and the differentiation between participating and non-participating resources.

In the EDAM, all resources within the associated BAA will participate in the market – both day-ahead and real-time – by submitting either economic bids or self-schedules. The EDAM will not support base scheduling of resources as occurs in the WEIM today, and all resources will be settled through the market. This means non-participating resources currently represented by a WEIM entity scheduling coordinator can either establish a direct scheduling coordinator relationship with the ISO under EDAM or be represented by the EDAM entity scheduling coordinator. The ISO's relationship with scheduling coordinators will support either approach under EDAM, so long as the resources in an EDAM BAA are represented by a scheduling coordinator and are identified in a participating resource agreement. Beyond this requirement for scheduling coordinator representation and contract identification, the EDAM entity and its

[18] See ISO Tariff, Appendix A – Master Definition Supplement for definition of EIM Participating Resource.
[19] An "EIM Base Schedule" is defined as "an hourly forward Energy Schedule that does not take into account Dispatches from real-time market and is submitted by an EIM Entity Scheduling Coordinator, EIM Sub-Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator for use in the real-time market." See ISO Tariff, Appendix A – Master Definition Supplement.

customers can determine whether third party resources in the BAA would be represented and identified separately or by the EDAM entity.

(2) Concept of "Base Scheduling" and the EDAM

Base schedules are needed for the WEIM real-time market because the WEIM is only an imbalance market with imbalance settlement, *i.e.,* the settlement is for deviations from base schedules, or from ISO day-ahead market schedules for the ISO BAA. Base schedules represent the WEIM entity's planned operation of its system for which the costs have already been covered. In the WEIM, base schedules are treated equal to ISO day-ahead market schedules.

Base schedules are inappropriate in the day-ahead market, however, because they can cause undue cost-shifting to other market participants. In addition, they are unnecessary because self-scheduling and the exercise of existing transmission rights can achieve a similar result to base scheduling.

The WEIM real-time market roughly accounts for congestion costs caused by real-time base schedules by allocating congestion costs to the BAA in which they are incurred. Thus, congestion costs are allocated to the WEIM entity responsible for the base schedules. These costs do not necessarily reflect all of the congestion base schedules cause because base schedules can cause congestion and result in re-dispatch costs above and beyond the congestion costs. Supporting base schedules in the EDAM would shift significant costs to other EDAM participants because they would not be included in the day-ahead market settlement and, consequently, would not be charged for congestion and losses. This would inappropriately cause other market participants to incur these costs through uplift charges. This cost shifting has been accepted in the WEIM because the overall real-time re-dispatch is relatively small compared to the overall energy production. This cost shifting, however, would be significant in the EDAM because the day-ahead market is not an incremental market, it is based on the full amount of supply and demand scheduled for the next day.

Similarly, day-ahead market base schedules would interfere with the day-ahead market's settlement of losses, again shifting costs. Losses for WEIM real-time market base schedules are accounted for by the WEIM RSE's balancing test that accounts for losses in determining whether a BAA's supply and demand schedules are balanced. The loss rate applied is the loss rate for the BAA's own settlement, outside of the ISO market, representing the arrangements for their planned operation as reflected in their base schedules. This loss rate is presumably based on average loss, *i.e.*, based on overall losses, not marginal losses. The WEIM's settlement is only incremental to these base schedules. However, the day-ahead market is based on the full amount of supply and demand scheduled for the next day, and the price for losses is based on the marginal loss rate. Thus, significant cost shifting could incur if losses for base schedules are not settled in the day-ahead market.

The EDAM will permit an end result similar to base scheduling through self-scheduling of supply and the exercise of existing transmission rights, but the resources will be directly settled through the market with the ISO. A self-schedule in the market indicates the resource does not have an economic offer expressing a willingness for the market to optimize and commit it. Self-scheduled resources are price-takers that want their output to flow irrespective of market prices. As discussed below, transmission customers can also utilize their transmission rights and pair their transmission rights with a self-schedule. This reflects that the participant submitting a generation self-schedule wants the resource's output to flow and that it has existing

transmission rights – whether under the OATT or legacy arrangements – to deliver that generation. This pairing of existing transmission rights and a self-schedule ensures through settlements that the participant exercising these rights is not charged for transmission and is held harmless for the congestion component between source and sink.

If a load serving entity wants to continue paying the same contract price for supply it paid prior to EDAM and not be subject to fluctuations in price driven by market efficiency, the market provides avenues to do that without the need for contractual modifications. If the entity holding the supply contract is the scheduling coordinator and the entity serving its load with the resource, the ISO will settle with the scheduling coordinator any energy payments emerging from the market. The scheduling coordinator can then manage redistribution of those payments in accordance with the terms of its contract to ensure the contract price is covered. This treatment can continue to support PURPA resources subject to regulatory must take requirements, or with special contractual provisions regulated by state commissions without the need for contractual changes. This treatment can also apply more broadly to other power purchase agreements where the scheduling coordinator bidding in the resource in the market is also the contract holder for the supply. Thus, this mechanism should apply in the vast majority of instances because the scheduling coordinator will likely be the same entity holding the contract for supply. However, to the extent that is not the case, parties can consider a "contract for differences" which allows supply and load to agree on an energy price and then make side payments outside of the centralized market to keep each other whole on the agreed to price. If the market price is above the agreed price, the supplier pays the load serving entity the difference, and if the market price is below the agreed price, the load serving entity pays the supplier the shortfall. Thus, a combination of self-scheduling of supply and the exercise of existing transmission rights, along with a contract for differences, can achieve a result similar base scheduling, with the understanding that full settlement will occur through the market to avoid the inefficient and adverse market impacts noted above.[20]

Finally, it is unnecessary for EDAM participants to submit base schedules to the real-time WEIM because EDAM participants will have day-ahead market schedules. Also, they could create adverse market incentives. The day-ahead and real-time markets work together and proper functioning of the markets relies on balanced incentives between the markets. For example, exposure to potentially high real-time market prices provides a valuable incentive to schedule demand close to forecast in the day-ahead market. Allowing day-ahead market participants to avoid exposure to real-time market prices by submitting real-time market base schedules would undermine this incentive. If an EDAM entity requires documentation demonstrating its ability to serve or deliver energy akin to base scheduling, the design can include processes for creating that documentation, including tracking of e-tags or schedules in the market.

(3) Transmission Requirement

In comments to the revised straw proposal, numerous stakeholder comments requested that the EDAM design consider requiring resources in an EDAM BAA operating under the OATT to secure transmission from the EDAM entity in order to participate in the market. These stakeholders argued that not requiring a supplier to hold a transmission reservation on the

[20] We recognize that there may be unique circumstances requiring a demonstration that absent the market the entity was ready and capable of serving load and meeting its obligations; *e.g.*, statutory or regulatory requirements. Nonetheless we believe that a self-schedule of generation, paired with exercise of existing transmission rights, can provide a demonstration that particular generating resources are operational and deliverable to meet load needs.

system supporting their EDAM participation potentially could shift transmission costs to load serving EDAM participants or transmission providers within the EDAM BAA, particularly those associated with newly interconnected resources that may not have reserved transmission service at the time of their interconnection. Other stakeholders argued that lack of a transmission requirement could encourage free-riding on the transmission system of the EDAM entity or other transmission providers within the EDAM entity area.

In response to the concerns expressed by these stakeholders, subsequently the draft final proposal introduced the requirement that generation have transmission service associated with their supply in order to participate in the EDAM, whether that transmission is reserved by the resource owner or the load serving entity seeking to utilize the supply to serve its load. The proposal provided that this transmission requirement could be satisfied through one of the following mechanisms:

- The resource must be a designated network resource under the terms of the EDAM entity OATT; or
- The resource must reserve firm point to point transmission service of at least one month in duration to the EDAM entity border under the terms of the EDAM entity OATT, or must otherwise hold a legacy (pre-OATT) transmission contract.

Numerous stakeholders argued in their comments on the draft final proposal that requiring the resource to reserve firm point to point transmission of at least a monthly duration (long-term or monthly firm point to point), to the border of the balancing area, is overly restrictive. They noted that such a requirement would limit a resources' ability to participate in the market if they do not meet the transmission requirements because firm service of any duration is scarce and may not be available, long-term or monthly firm point to point transmission service is difficult to secure under the OATT. Moreover, stakeholders noted that even weekly or daily firm point to point service, while more prevalent, may not always be readily available. Stakeholders acknowledged the intent behind the transmission requirement, and they expressed openness to considering alternative ways for ensuring generators continue to contribute to the costs of the transmission system if they cannot reserve transmission service, *e.g.*, by paying for transmission to the extent resources are committed or dispatched to reflect their use of the host EDAM entity transmission system.

Based on this stakeholder feedback, this final proposal modifies the transmission requirement to reflect the discussions regarding this issue during the November 14th stakeholder meeting by introducing a new mechanism to compensate the transmission provider if a resource cannot reserve transmission service. With this change, the transmission requirement for a generator can now be satisfied through one of the following mechanisms:

- The resource is a designated network resource under the terms of the EDAM entity OATT;
- The resource has reserved firm point to point transmission service of any duration, long-term or short-term, under the terms of the EDAM entity OATT, or otherwise holds a legacy (pre-OATT) transmission contract; or
- If neither of the requirements above are met, the EDAM entity transmission service provider will assess a transmission charge based on the transmission rate for the lowest duration of firm transmission service offered under its OATT, recognizing that some transmission providers may offer daily firm service and others may offer hourly firm

service. If the transmission provider offers daily firm point to point transmission service as the lowest granularity firm service, the transmission charge would be evaluated based on the single highest hour real-time dispatch of the resource across the day for the amount in excess of reserved transmission service. If the transmission provider offers hourly firm point to point transmission service as the lowest granularity of firm service, the transmission charge would be evaluated based on each individual hourly real-time dispatch of the resource for the day. If the real-time dispatch, for any hour across the daily horizon, is above the reserved transmission, the transmission provider will assess the hourly transmission charge as described above. The transmission service provider is in the best position to evaluate and validate whether transmission has been reserved and can assess the aforementioned transmission charge.

The proposed design recognizes that designation of a generator as a network resource by the load serving entity provides for transmission service and contributes to the costs of the transmission system because the load is paying for transmission. Similarly, a resources' reservation of firm point to point service of any duration contributes to the costs of the transmission system. Thus, requiring a transmission reservations to the border of the balancing area is unnecessary.

If a resource does not reserve transmission service in advance, the design provides another avenue for the transmission provider to recover transmission costs from the resource. The transmission provider thus recovers the costs associated with the use of its system, and resources have an incentive to reserve transmission in advance for longer duration because, under most rate structures, it is more economic to reserve long-term or monthly transmission service than to pay for transmission at the daily or hourly firm point to point transmission rate for the same period of time.

Many factors support the proposal. Under the EDAM design, participating EDAM entities retain key functions and responsibilities – resource planning, transmission planning, and reliability. Each EDAM entity remains responsible for managing its resource planning programs. Furthermore, each EDAM entity retains its transmission planning responsibility to plan the reliability of its system, which is informed in part by requests for transmission service under the OATT. The EDAM entity also retains its reliability function, namely the responsibility to operate its grid reliably and comply with applicable FERC, NERC, and WECC standards. The EDAM entity will carry out these responsibilities and obligations through administration of its OATT, which will remain in effect in the EDAM. The transmission provider function of each EDAM entity will continue to sell transmission service under the terms and conditions of the OATT. The ISO, as the operator of the day-ahead market, does not assume those obligations in the EDAM.

The EDAM design seeks to harmonize the bilateral and OATT process for accessing the grid with the organized market structure for how the market utilizes transmission, recognizing that each EDAM entity will continue to administer and provide transmission service under the terms of its OATT. Absent a requirement that generators in the EDAM entity BAA reserve transmission or be a designated network resource, a generator interconnecting to the grid potentially could avoid paying for transmission, shifting the costs of the transmission system to load, while deriving the benefits of market participation. A new generator interconnection does not convey transmission rights or deliverability of a generator's output across the grid. Under the OATT, an interconnecting generator must reserve transmission service to deliver energy across the grid. The transmission provider evaluates requests for service to determine the availability of transmission to support the request.

A transmission requirement for suppliers that are not designated resources under the OATT enables the EDAM entity transmission provider and other transmission providers within the EDAM entity footprint to plan and expand the transmission system more effectively to meet reliability and changing needs of its transmission customers. Absent a requirement to reserve transmission service, a supplier in an EDAM BAA that is not a designated network resource may free ride on the system, shifting costs to load and significantly affecting the transmission provider's ability to meet its transmission planning responsibilities under the OATT. In EDAM BAAs with OATTs, transmission service reservations, particularly long term reservations, drive transmission system upgrades and overall expansion to accommodate the changing needs of a transmission provider's customers. The lack of a requirement to reserve transmission service, while maintaining the OATT, could stifle transmission system planning and expansion putting system reliability at risk.

In approving the WEIM design and subsequent enhancements, FERC did not require a transmission reservation for generators to participate in the WEIM.[21] The EDAM, however, will involve a significantly larger volume of transactions compared to the WEIM because the entire load of an EDAM BAA will be represented in the market and all operational resources will be offering their supply into the market, whether economically bid or self-scheduled. The WEIM represents a low volume of all real-time transaction because it is primarily designed to cover only the hour to hour imbalance needs of its participants. Thus, the risk of cost shifts and free riding occurring in WEIM BAAs with an OATT is limited, and the prospect of foregone transmission revenue low. In EDAM if a supplier in an OATT BAA is not required to reserve transmission service or be a designated network resource, there could be a sizable cost shift risk and free riding concerns, which can significantly affect the transmission provider and its customers.

Requiring transmission service reservations or network designations will provide the EDAM participating transmission provider with revenues to avoid or limit undue cost shifts, support continued transmission planning, avoid free riding, and allow for generation to participate in the market.[22] It is important to recognize the vast majority of generators if not all of them, with the exception of interconnecting or newly interconnected generation, meet the requirement today as they have reserved transmission service under the OATT. Also, the ISO's discussions with some other market operators indicate they require transmission service or network designations to participate in the market. This proposed design supports the EDAM entity's administration of its OATT under EDAM.

d) Demand Participation in EDAM

The day-ahead market, through its integrated forward market (IFM) function, clears supply and demand bids. In the EDAM, participating entities will be able to self-schedule or economically bid their demand in the day-ahead market. As a starting point, the EDAM entity will be responsible for bidding and self-scheduling the demand within its BAA into the day-ahead market. Having the EDAM entity be the scheduling coordinator for all load serving entities in its

[21] *See PacifiCorp*, 147 FERC ¶ 61,227 (2014) at pp. 144-149 (rejecting PacifiCorp's proposal to charge incremental network and point-to-point transmission customers for WEIM transmission service when the dispatch operating point exceeds the transmission customer's reserved capacity).
[22] Transmission providers under the OATT may also continue to impose unreserved use charges on entities utilize the transmission system without a reservation.

BAA supports the coordination required for forecasting and the reliable and efficient submission of demand bids into the day-ahead market.

The ISO can also enable individual load serving entities within the EDAM BAA to represent their demand in the market separately from the rest of the BAA's load. The individual load serving entity would need to work with the EDAM entity and the ISO through the implementation process to model its load separately. Separating individual load serving entities within an EDAM BAA will require separate metering that satisfies the standards of the EDAM entity and the ISO. Additionally, the load serving entities would need a scheduling coordinator to represent its demand in the market and submit additional information, including meter data, to enable settlements. As each EDAM entity moves through the implementation process, the ISO will coordinate with the EDAM entity and interested load serving entities to enable individual load bidding in the day-ahead market.[23]

2. Confidence in Market Transfers

Establishing confidence in market transfers is a critical design component of the overall EDAM framework. Load serving entities and BAAs rely on bilateral procurement of supply and transmission to deliver supply reliably to serve load. In the EDAM, these same load serving entities and BAAs will make resources and transmission available to the market, which will derive an optimal solution for serving load across the EDAM footprint by optimally scheduling energy transfers between EDAM BAAs. The EDAM design should build collective confidence in transfers emerging out of the market and enhance the capability of the EDAM entity and the market to respond to stressed system conditions.

The draft final proposal continued to carry forward and describe different components of the EDAM design that contribute to the confidence in transfers. Transfers are scheduled optimally in the market after self-schedules, which are price-takers. A transfer can only be scheduled if there is sufficient available supply in the source EDAM BAA and the economics and scheduling limits allow it. If the sink EDAM BAA has passed the EDAM RSE, meaning it has sufficient supply capacity bids in the market to meet all of its requirements, energy transfer imports will economically displace supply capacity that can then be used to support export transfers of imbalance reserve in the IFM or reliability capacity in the RUC. The availability of imbalance reserves across the footprint and introduction of a power balance constraint to limit the propagation of the shortfalls across other BAAs contributes to the confidence in transfers and reliability benefits of the EDAM. This results in the most efficient solution where economic resources are scheduled for energy, and more expensive resources are scheduled for capacity services. At the same time, the resource sufficiency evaluation accounts for diverse sources of supply and accommodates different resource adequacy regimes.

In stressed system conditions where the market utilizes all available resources to optimally respond to the circumstances, each EDAM entity will rely on its operational tools to manage grid conditions within its BAA. If the stressed conditions persist and there is a risk of load shedding, all EDAM entities would afford market transfers sourcing from its BAA equal priority to its load, to be curtailed on a pro-rata basis, subject to operational discretion and coordination. Establishing this equal priority is central to overall confidence in transfers.

[23] In WEIM, the scheduling coordinator of the load resource is responsible for submitting the load meter vales and any uninstructed imbalance energy settlement calculated when comparing the load meter to day ahead load schedule.

Stakeholder comments generally continued to support the overall concept described in prior iterations of the proposal, including the draft final proposal, *i.e.*, that confidence in transfers is a critical component of the EDAM design and contributes to maintaining reliability in the BAA. Furthermore, stakeholders continued to support affording equal priority to market transfers and load during edge case stressed system conditions and the clarifications regarding the roles of the EDAM entity effectuating the priority and the market operator in edge case scenarios.

The final proposal retains the confidence in transfers design, *i.e.,* it provides for equal priority between market transfers and load in edge case stressed system conditions. Also, the final proposal continues to further describes the different design components that instill confidence in market outcomes and the resulting transfers supporting reliability across the footprint.

a) EDAM Design and Market Elements Building Confidence in Transfers

The proposed design for equitably establishing confidence in transfers for all EDAM participants has evolved in response to stakeholder comments and additional workshops. The initial straw proposal introduced the concept of equal priority between transfers and load in more stressed conditions, and the revised straw and draft final proposals built on stakeholder feedback and described in greater detail how key components of the overall design help mitigate stressed conditions through the market (and through BAA operations if the market cannot resolve the conditions). This section describes more comprehensively how the EDAM design supports reliability across the EDAM footprint, promotes responsive and efficient resolution of stressed system conditions, and ultimately provides a high degree of confidence in market transfers, all while continuing to recognize that the EDAM entity ultimately is responsible for the reliability function within its BAA.

As a starting point, the EDAM introduces a resource sufficiency evaluation that evaluates each BAA and determines whether it has sufficient supply to meet its forecasted demand, uncertainty requirement, and ancillary services requirements. This supply is then made available to the market and optimally committed day ahead, resulting in transfers between EDAM BAAs. If conditions change between day-ahead and real time, the day ahead schedules and any additional supply made available to the real-time market will be utilized and optimally re-dispatched to respond to changing grid conditions. This treatment will honor day-ahead schedules while recognizing updated forecast, topology, and supply availably to derive an optimal real-time solution.

Incenting EDAM entities to pass the RSE is critical. Absent a fair, equitable, robust, and stable RSE structure that creates effective consequences for failing the RSE, participating EDAM entities may not have the confidence necessary to offer surplus supply into the market, instead choosing to retain their surplus supply for managing reliability conditions. They may be concerned that if they offer surplus supply into the market, such supply simply will be committed to support transfers to deficient BAAs, creating a disincentive for such BAAs to become resource sufficient in favor of leaning on the surplus supply of others in the market.

The draft final and this final proposal refine the policy design regarding the consequences for failing the EDAM RSE to strengthen the incentive for EDAM entities consistently to enter the market sufficient through practices that support forward procurement sufficient to pass the RSE. The design introduces tiered financial consequences for RSE failure. Another related, but non-financial, consequence is that an EDAM entity that fails the RSE when the market is unable to cure the insufficiency will be evaluated individually for the WEIM RSE rather than being

evaluated jointly, as part of the pool, along with the passing EDAM BAAs. The proposed consequence structure will incentivize individual EDAM entities to undertake forward procurement of supply so they pass the RSE and enter the day-ahead market resource sufficient, rather than depending on the market to cure an insufficiency.

The diverse supply utilized to evaluate and pass the EDAM RSE is available to the day-ahead market. Energy transfer schedules emerging from the day-ahead market are feasible according to conditions at that time and considered firm. The schedules are feasible because the day-ahead market optimization ensures that forecasted demand and the uncertainty for the each BAA can be met, while also supporting EDAM transfers between EDAM BAA's. In other words, the market will only schedule EDAM transfers out of an EDAM BAA if the scheduled load and uncertainty within the BAA can be met with scheduled supply and imbalance reserve awards. This provides confidence that the scheduled transfers, which are accounted for through e-tags, are feasible and the load in the BAA can be served.

The day-ahead market will seek to commit and procure imbalance reserves efficiently across the entire EDAM footprint to cover uncertainty that may materialize in real time. All imbalance reserve and reliability capacity awards in the EDAM have a must offer obligation in the WEIM. Thus, all of these capacity awards are available for optimization in the WEIM, including the potential for providing counter flow on day-ahead energy transfers to address real time needs such as materialized uncertainty. If conditions change between day ahead and real time, the imbalance reserve capacity can be dispatched by the market to resolve the contingency, particular condition, or uncertainty that materialized, thus enabling transfers even in stressed conditions.

The design recognizes that EDAM entities can reserve supply in excess of their RSE obligation to manage and respond to reliability conditions within their BAA because each EDAM entity retains its reliability function and obligations. The design further introduces a *net EDAM export transfer constraint* that permits the EDAM entity to manage the amount of internal supply that can support EDAM export transfers out of the BAA. This is an additional tool available to the BAA to manage grid reliability. As EDAM entities gain experience with and confidence in the market, the need for the constraint may steadily phase out.

Shifting from day-ahead to real time, as conditions across the grid evolve, the WEIM will seek to re-optimize and re-dispatch the supply pool to respond to changing grid conditions. The scheduled transfers from the day-ahead market remain firm and fixed, but dynamic transfers are scheduled optimally, potentially in the counter flow direction of day-ahead transfers, as resources are re-dispatched to accommodate changing grid conditions. The WEIM's ability to re-optimize and dispatch supply in response to changing grid conditions across the entire footprint further mitigates the impact of stressed system conditions, instilling confidence in both the market design and the firm day-ahead energy transfers.

The design recognizes a constraint in the WEIM that prevents simultaneous relaxation of the power balance constraint and a net export transfer above the base net transfer. This constraint will be modified to consider EDAM energy and capacity schedules as part of the base transfer. When the constraint triggers, the net export transfer will be reduced to the net base transfer before the power balance constraint is relaxed. Triggering the constraint prevents propagation of a BAA's shortfall and consequential reliability challenges to other EDAM BAAs. This constraint is discussed in more detail in section the subsection below.

In more stressed system conditions, where the market has exhausted all of its tools but the reliability conditions cannot be fully resolved, the EDAM entity may need to rely on its operational tools to manage grid reliability and respond to the reliability event. Each EDAM entity retains its BAA reliability function. In these conditions, the BAA can rely on its individual operational tools to resolve the reliability event. If exercising such reliability tools does not resolve the reliability event and the risk of load shed remains, the EDAM BAA would afford market transfers and load equal priority subject to operational discretion and coordination, consistent with good utility practice. This means that load and transfers will be curtailed on a pro-rata basis. Operationalization of this priority will be discussed further below.

The aforementioned design elements contribute to the collective confidence in market transfers; *i.e.,* that in stressed system conditions the market will be able to respond effectively by leveraging these design elements along within a robust supply pool and imbalance reserve product to avoid stressed system conditions becoming emergency conditions. After the market has exhausted all available options, *i.e.,* exhausted available supply to resolve stressed system conditions in one or more BAAs, each EDAM BAA can rely on its own operational tools at its disposal to manage grid conditions to maintain reliability and avoid load shed within its BAA.

This proposed design continues to afford EDAM transfers a priority equal to load throughout stressed, "edge" or "corner" case conditions, *i.e.,* conditions where neither the market nor operational tools have adequately resolved the reliability conditions, and the EDAM BAA faces the prospect of load shed. This priority would remain subject to operational coordination with neighboring BAAs and operational discretion, which are integral features of responding to reliability events and meeting each BAA's reliability obligations

b) Effectuating Confidence in Transfers through the Market

If a BAA has insufficient supply capacity to meet its demand in the WEIM, import energy transfers will be scheduled optimally from other BAAs to serve the supply shortfall. If import transfers are restricted by scheduling limits or the available supply capacity in other WEIM BAAs is exhausted, and there is still unserved demand, the power balance constraint in the BAA that is short will be relaxed at a penalty price. However, the insufficiency will be restricted to short BAAs; *i.e.*, the power balance constraint will not be relaxed in other BAAs. This occurs because the ISO has implemented a special constraint in the WEIM that does not allow simultaneous relaxation of the power balance constraint and a net export transfer above the base net transfer.[24] As a result, the net export transfer will be reduced to the net base transfer before the power balance constraint is relaxed.

The final proposal continues to implement a similar constraint in the EDAM, not only for energy transfers, but also for capacity transfers. The constraint for energy in the IFM will not allow simultaneous relaxation of the power balance constraint and a net export transfer above what can be exported on bucket 1 energy transfers.[25] The constraint for imbalance reserves in the IFM will not allow the simultaneous relaxation of the imbalance reserve procurement constraint in the imbalance reserve deployment scenarios or a net imbalance reserve export transfer above what can be exported on bucket 1 imbalance reserve transfers. The constraint for reliability capacity in the RUC will not allow the simultaneous relaxation of the reliability capacity

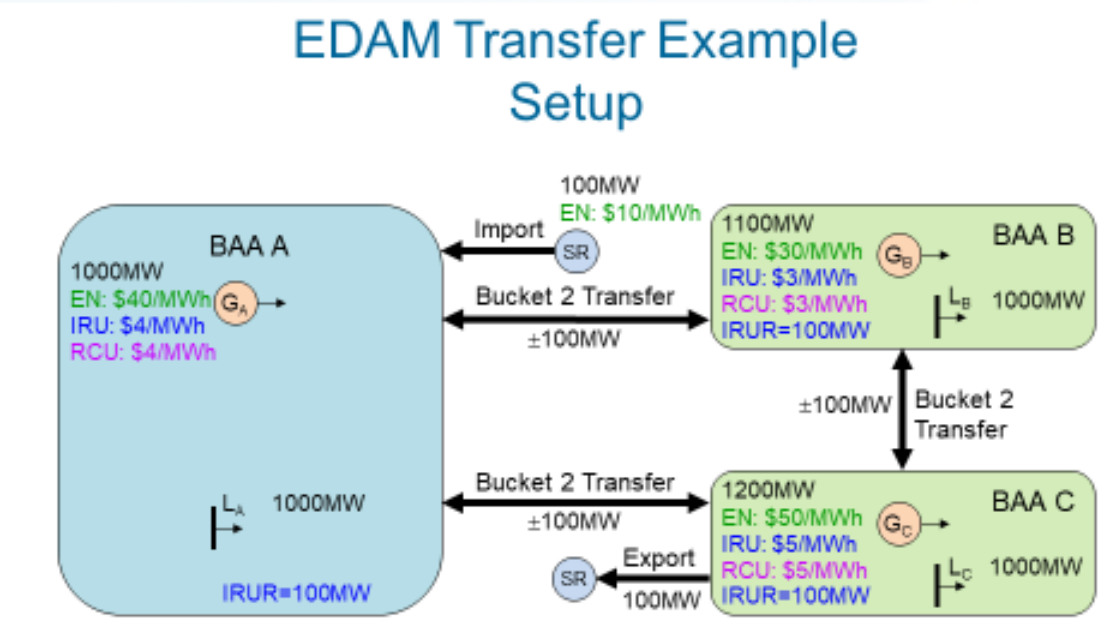
[24] The formulation of the constraint is illustrated in Appendix 3 of the document.
[25] Bucket 1 transmission consists of transmission rights held by transmission customers of the EDAM entity transmission service provider or other transmission service providers within the EDAM BAA that supports transfers used for RSE accounting purposes in the day-ahead timeframe.

procurement constraint and a net reliability capacity export transfer. These constraints will collectively ensure a BAA will first meets its own requirements before it exports energy or capacity to other BAAs.

In stressed system conditions, after the WEIM has exhausted available supply, the WEIM will signal infeasibility by relaxing the power balance constraint in the BAA with insufficient supply. Under these circumstances, day-ahead and base transfers will be afforded a priority equal to load, subject to operational coordination and good utility practice.

The following examples illustrate the use of transfers in the EDAM and continuing in the WEIM under various scenarios, including scarcity conditions as an "edge" case. These examples illustrate how the market relies upon the different design components, including the power balance constraint relaxation, to manage stressed system conditions and afford equal priority to transfers and load within the market.

The examples are based on the following setup of three EDAM BAAs:

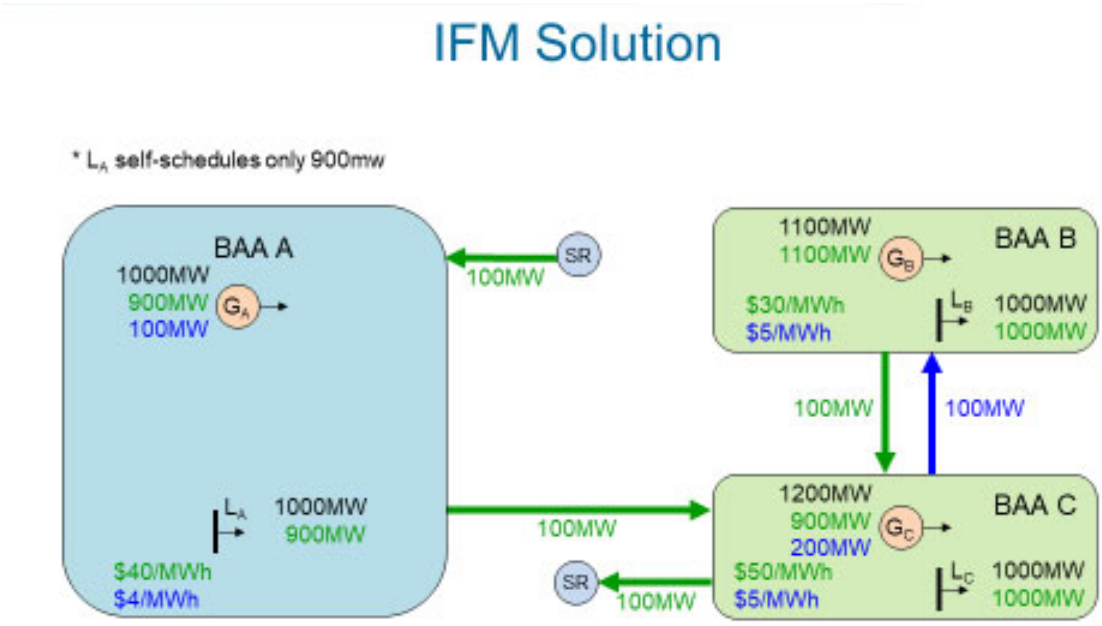


There are 100MW bi-directional bucket 2 transfers between each BAA pair. Transmission losses, ancillary services, imbalance reserve down, and reliability capacity down are ignored for simplicity. Each BAA has a 1000MW demand forecast, and a 100MW imbalance reserve up requirement (IRUR).

- BAA A has a generating resource (G_A) with a 1000MW bid for energy (EN) at $40/MWh, imbalance reserve up (IRU) at $4/MWh, and reliability capacity up (RCU) at $4/MWh. There is also an import bid (SR) from a non-EDAM BAA for 100MW at $10/MWh.
- BAA B has a generating resource G_B with an 1100MW bid for energy at $30/MWh, imbalance reserve up at $3/MWh, and reliability capacity up at $3/MWh.
- BAA C has a generating resource (G_C) with a 1200MW bid for energy at $50/MWh, imbalance reserve up at $5/MWh, and reliability capacity up at $5/MWh. There is also an export self-schedule (SR) to a non-EDAM BAA for 100MW.

All three BAAs pass the RSE because they have sufficient supply in the market to meet their demand forecast and imbalance reserve up requirement.

The optimal solution in the IFM is as follows:



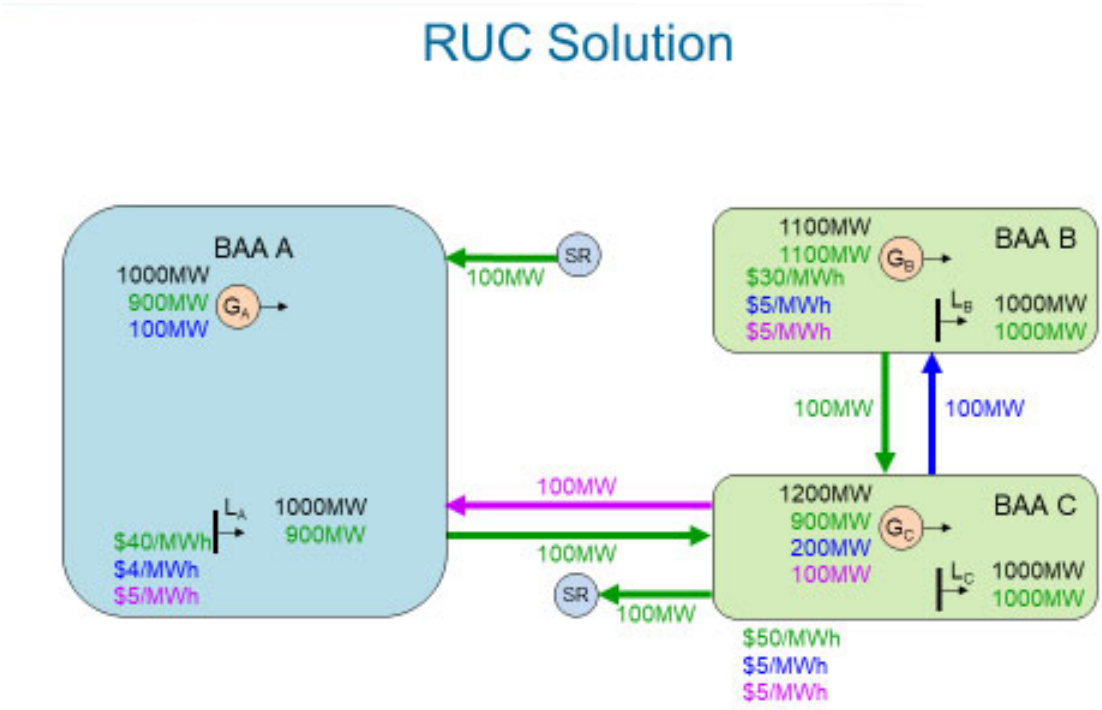
The load in BAA A submits a self-schedule at 900MW, *i.e.*, 100MW below the demand forecast, whereas the loads in BAAs B and C are self-scheduled at 1000MW, which is the demand forecast in these BAAs. The supply cost is lowest in BAA B and highest in BAA C; therefore, the optimal solution is to maximize the energy transfers (green) from BAA A to BAA C, and from BAA B to BAA C, scheduled at their scheduling limit of 100MW. In BAA A, the import is fully scheduled and the generating resource G_A is marginal at 900MW setting the LMP at $40/MWh. In BAA B, the generating resource G_B sets the LMP at $30/MWh (assuming the availability of marginal additional supply). Finally, in BAA C, the export is fully scheduled and the generating resource G_C is marginal at 900MW setting the LMP at $50/MWh. There is energy price separation among the three BAAs because the energy transfers between them are scheduled at their scheduling limit.

In the IRU deployment scenario, the generating resource G_A in BAA A is awarded 100MW imbalance reserve up satisfying the imbalance reserve up requirement and setting the imbalance reserve up price at $4/MWh. In BAA B, there is no available generating capacity; hence, the imbalance reserve up requirement is met by the generating resource G_C in BAA C via an imbalance reserve up transfer (blue) of 100MW. The generating resource G_C is awarded 200MW imbalance reserve meeting the imbalance reserve requirements of both BAAs B and C, setting the imbalance reserve up price in these BAAs to $5/MWh. There is no price separation for imbalance reserve up between BAAs B and C because in the deployment scenario the net transfer between them is zero because the 100MW deployed imbalance reserve up transfer from BAA C to BAA B fully counters the energy transfer from BAA B to BAA C.

Note that when BAA B exports 100MW of energy to BAA C, it becomes short in meeting its own imbalance reserve up requirement. However, that 100MW import transfer into BAA C displaces 100MW of more expensive generating capacity from G_C, which is then used to serve the imbalance reserve up requirement in BAA B via an imbalance reserve up transfer countering the

energy transfer import. This is the most efficient solution where energy and imbalance reserve are co-optimized.

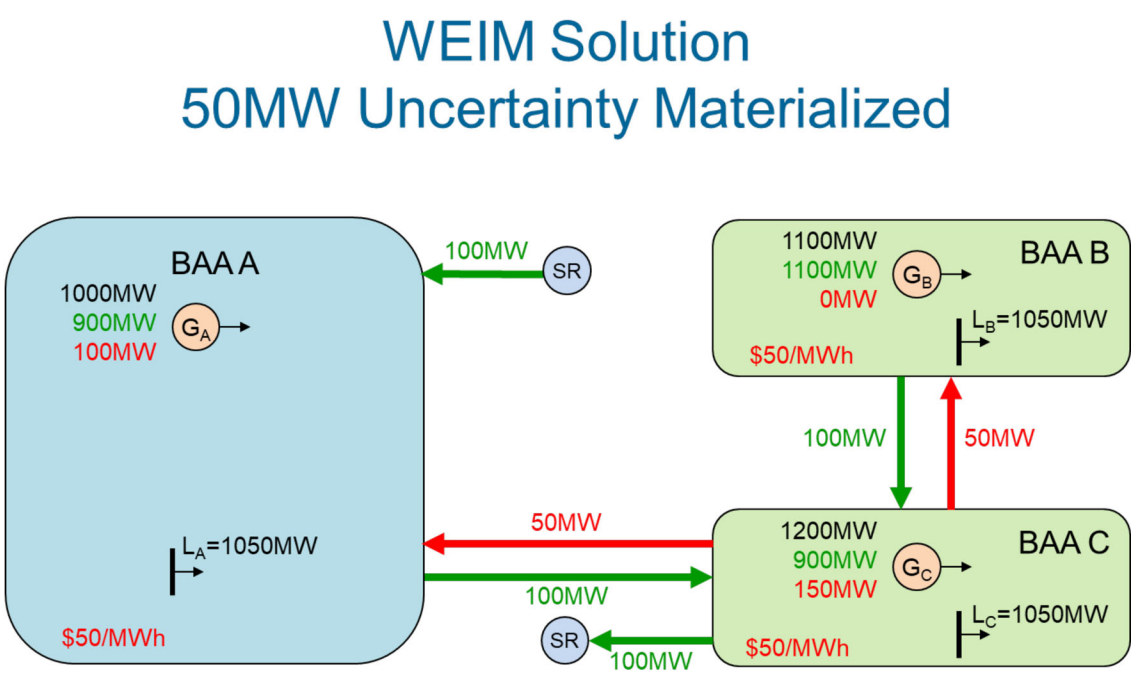
The optimal solution in the RUC is as follows:



Because the scheduled load equals the demand forecast in BAAs B and C, there are no reliability capacity requirements in these BAAs. However, in BAA A, there is a 100MW reliability capacity up requirement to substitute for the 100MW load under-scheduling below the demand forecast. There is no available supply in BAA A. When BAA A exports 100MW of energy to BAA C, it becomes short in meeting its own reliability capacity up requirement. Nevertheless, that 100MW import transfer into BAA C displaces 100MW of more expensive generating capacity from G_C, which is then used to serve the reliability capacity up requirement in BAA A via a reliability capacity up transfer (purple) countering the energy transfer import. The generating resource G_C in BAA C is awarded 100MW reliability capacity up setting the reliability capacity price for all BAAs at $5/MWh. There is no price separation for reliability capacity up between BAAs A and C because in the RUC the net transfer between them is zero as the 100MW deployed reliability capacity up transfer from BAA C to BAA A counters the energy transfer from BAA A to BAA C.

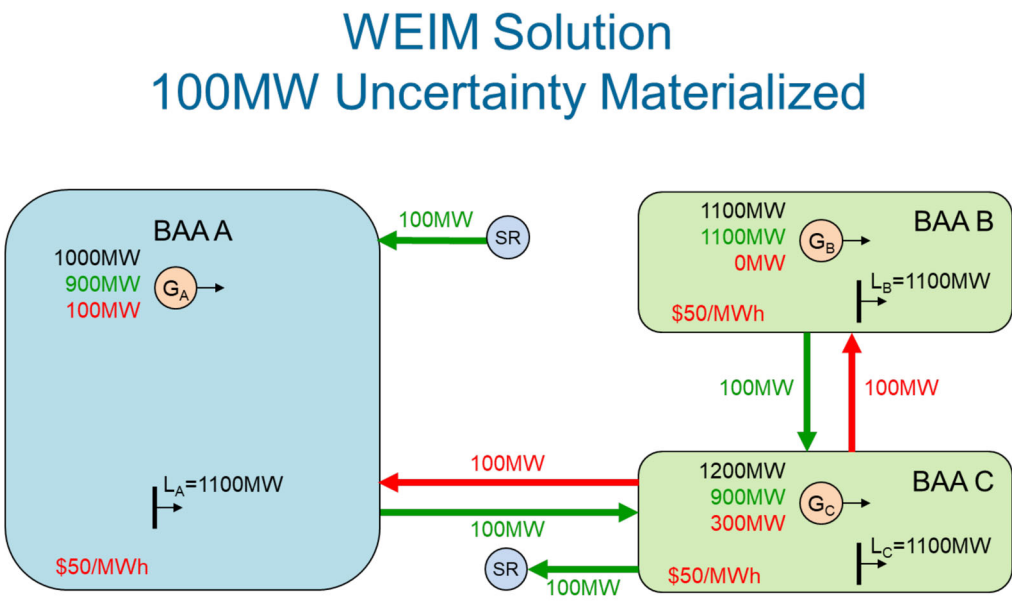
The next three scenarios consider three different levels of uncertainty that materialize in the WIEM. All imbalance reserve and reliability capacity awards from the EDAM have a must offer obligation, thus they are available for dispatch in the WEIM, assuming at the same energy bids as in the EDAM. The 100MW bi-directional transfer capacity between the three BAAs is also available in the WEIM, but the day-ahead energy transfers are fixed.

In the first scenario, 50MW of upward uncertainty materializes in each BAA:



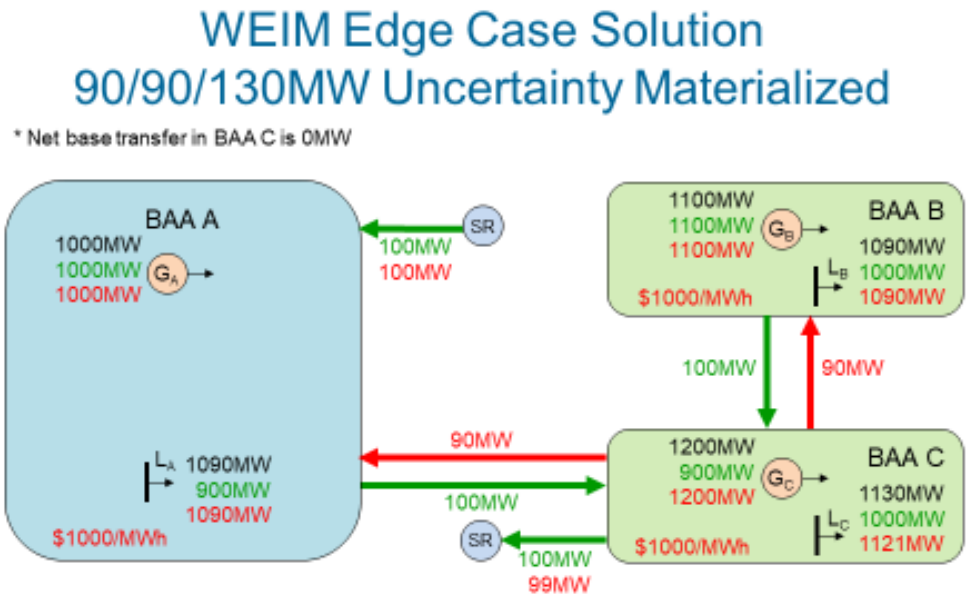
The demand forecast in each BAA is now 1050MW. The optimal solution for imbalance energy (red) is shown as a positive deviation on the EDAM solution (green). In BAA A, the generating resource G_A is dispatched up 100MW to its full capacity, yet BAA A is short by 50MW, considering its 100MW day-ahead export transfer commitment to BAA C. The generating resource G_B in BAA B is at full capacity; thus, BAA B is also short 50MW considering its 100MW day-ahead export transfer commitment to BAA C. However, the generating resource G_C in BAA C has 300MW of available capacity; therefore, it is dispatched up 150MW to meet the uncertainty in its own BAA C and also in BAAs A and B via dynamic export transfers of 50MW that counter flow on the day-ahead transfer imports. G_C sets the real time LMP at $50/MWh in all BAAs.

In the next scenario, all of the 100MW of upward uncertainty that was the EDAM requirement materializes in each BAA:



The demand forecast in each BAA is now 1100MW. The generating resource G_C in BAA C is now dispatched up 300MW to its full capacity to meet the uncertainty in its own BAA C and also in BAAs A and B via dynamic export transfers of 100MW that fully reverse the day-ahead transfer imports. G_C sets the real time LMP at $50/MWh in all BAAs.

The third and last scenario, examine an edge case where a total of 310MW of upward uncertainty materializes in the WEIM, *i.e.*, 10MW more than the imbalance reserve requirement in EDAM. Assume that the distribution of the materialized uncertainty is 130MW in BAA C and 90MW in each of the BAAs A and B. The optimal solution in the WEIM is as follows:



The demand forecast is now 1130MW in BAA C and 1090MW in BAAs A and B. The generating resource G_C in BAA C is dispatched again up 300MW to its full capacity because of the 310MW uncertainty that materialized in BAAs A, B, and C. BAA C has committed in the EDAM to provide 100MW of imbalance reserve up to BAA B and 100MW of reliability capacity up to BAA A. Therefore, the materialized uncertainty in BAAs A and B is met via 90MW dynamic export transfers from BAAC to each of these BAAs that partially reverse the day-ahead energy transfer imports. However, the materialized uncertainty in BAA C is 130MW; thus, BAA C is short by a 10MW supply. Consequently, the WEIM will relax the power balance constraint in BAA C by 10MW to resolve the infeasibility. The real time LMP is $1000/MWh in all BAAs, set by the power balance constraint relaxation penalty price. In the example, the BAA C operator resolves the infeasibility by applying a pro rata curtailment between the load and the firm export (the export schedule must be an integer).

Note that affording priority to day-ahead energy schedules results in the WEIM making full use of all available supply and transmission capacity to resolve the infeasibility before resorting to a power balance constraint relaxation. Note further that the power balance constraint in BAA C will not be relaxed while BAA C has a net export transfer above its day-ahead reference (net base transfer), which is 0MW, considering all day-ahead energy and capacity transfers. In the solution, BAA C has a net transfer of –20MW; thus, its power balance constraint is relaxed. If additional uncertainty materializes in BAAs A and B, the power balance constraint in BAA C may be further relaxed by another 20MW, after which the power balance constraint in another BAA will be relaxed. Also, it is important to note that if there is at least 10MW of available balancing capacity up in BAA C, the WEIM will dispatch that to avoid the power balance constraint relaxation.

Some stakeholders expressed concern that using convergence bidding in an EDAM BAA may adversely affect other EDAM BAAs that are not allowing convergence bidding because virtual supply could offset physical supply called upon by market, thus reducing the amount of physical supply available. Although virtual bids can economically displace physical bids in the IFM, virtual bids are not used in the RSE or in RUC. Therefore, a BAA with virtual bids is still required to meet its RSE requirements with available physical capacity. If a portion of that physical capacity is economically displaced in the IFM by virtual bids, that capacity is available to receive reliability capacity awards in the RUC, which essentially replaces virtual schedules in the WEIM. Any export transfers scheduled in the IFM and sourced from virtual supply remain firm in the WEIM because the virtual supply is replaced by reliability capacity awards. Consequently, there is no adverse reliability risk from convergence bidding.

c) Effectuating Confidence in Transfers in the Operational Timeframe – Equal Priority between Transfers and Load

It is important to acknowledge that the EDAM does not establish a unified single BAA as an ISO/RTO would. Rather, each EDAM entity continues to be responsible for managing operational reliability within its own BAA. Similarly, the ISO, as market operator, is not responsible for directing transmission operations, balancing supply and demand in individual EDAM BAAs, or directing specific curtailments and potential load shed. These functions remain the responsibility of each individual BAA. As illustrated in the examples above, in stressed system conditions the market will utilize the tools available at its disposal to resolve the reliability event whether driven by a higher level of uncertainty materializing, or loss of transmission and/or generation. In certain edge cases, the market may be unable to resolve the reliability

event, and the EDAM BAA may need to fall back on its operational tool set to manage reliability much as it does today.

In those edge cases where uncertainty materializes higher than what the market dispatched or committed as available supply and imbalance reserves, the EDAM BAA will revert to its operational tools to maintain and manage grid reliability. If, for example, the market infeasibility is isolated within the EDAM BAA that is facing a shortfall, the BAA would revert to manual action to manage insufficiency. The operational tools available to each BAA may vary, but generally include:

- Excess supply that may have been retained in the BAA to call upon in emergency conditions;
- Emergency assistance from neighboring BAAs;
- Reserve sharing groups;
- Curtailment of lower priority transactions/schedules on the system;
- Emergency supply programs such as demand response and other generation; or
- Deployment of operating reserves and arming firm load.

In an imminent load shed situation, EDAM BAA operators will coordinate with neighboring BAAs pursuant to good utility practice prior to curtailing transfers out of the BAA to another EDAM BAA and shedding load. The BAA facing the reliability event could coordinate with the EDAM BAA depending upon the transfer to determine whether curtailment of the transfer would place that BAA into a reliability event. If curtailing a transfer schedule to the receiving EDAM BAA would not place that BAA into an emergency condition, the EDAM BAAs could coordinate so the BAA facing the emergency condition might curtail the transfer schedule ahead of load to avoid load shed. The proposal is that in footprint-wide stressed conditions, where curtailing transfers likely would place the receiving BAA in an emergency condition, equal priority will be honored. In those situations, transfers would be curtailed by the EDAM entity proportional to its load shed. This approach promotes confidence in transfers through the concept of equal priority between market transfers and load, while providing flexibility for operational coordination and discretion to ensure reliable operation in each BAA and the grid as a whole. In exercising its operational discretion under these corner infeasible solutions, the EDAM entity transmission service provider retains discretion how it administers resolution of the infeasibility relative to its load and other transactional obligations not associated with EDAM transfers.

In prior comments, stakeholders sought clarification regarding (1) the role of the market operator and the EDAM BAA in effectuating the priority and curtailment of transfers relative to load, and (2) whether the BAA retains the ability to take reliability actions on e-tags. The EDAM BAA retains its role and function of managing reliability within its BAA and complying with relevant NERC and WECC standards, *i.e.,* the market operator does not take on those obligations for each BAA in the EDAM footprint. Consequently, each EDAM BAA is responsible for curtailing transfers by communicating with the market operator, and it remains solely responsible for managing and directing load shed. The ISO, as market operator, does not identify, manage, or direct load shed in an EDAM BAA. Similarly, an EDAM BAA, consistent with its reliability function and practices in the WEIM today, retains the authority to approve and take reliability actions on e-tags that affect its BAA.

d) Priority of Transfers to an EDAM BAA that Fails the RSE

Earlier iterations of the proposal explored the priority of transfers to an EDAM BAA that failed to meet its day ahead resource sufficiency evaluation. Informed by stakeholder feedback, the draft final proposal proposed that a lower priority for transfers to an EDAM BAA for failing the RSE should not be a consequence, at least at the onset of the EDAM. Further, the draft final proposal recognized that the overall RSE failure consequence design provides meaningful consequences and these would be monitored for effectiveness, and additional or different more physical consequences could be considered in the future as the EDAM evolves. Stakeholder comments generally supported excluding a lower priority framework design due to the practical difficulty of implementing such a design in stressed conditions and differentiating between different priority transfers. The final proposal does not alter the approach from the draft final proposal and does not introduce the concept of lower priority transfers if there is a RSE failure.

Introducing the added complexity of different transfer priorities in the operational horizon in stressed system conditions, when load is at risk, outweighs the benefits at this initial stage of EDAM. In these stressed conditions with dynamic operational conditions, a BAA's ability to differentiate between high and lower priority transfers is limited, particularly if only a small MW amount is associated with lower priority transfers.

The RSE failure consequences discussed in section II.B.2(g) have evolved since the initial straw proposal. The proposal introduces consequences that impose sizable financial administrative surcharges with increasing consequences for repeated failures. Moreover, by failing the day ahead RSE or failing to tag an import (or resupply by identified timeframes), an EDAM entity will be tested for the WEIM RSE individually and not jointly, as part of a pool, with the EDAM entities that passed the day ahead RSE. Thus, it will lose the diversity benefit of the imbalance reserve requirement to meet its uncertainty obligation. Adding a further consequence, *i.e.*, imposing a lower priority on transfers to an EDAM BAA that failed the RSE, could have a reliability impact for the failing BAA, particularly in emergency conditions if day ahead energy transfers are at higher risk of curtailment.

Under this design, all market transfers between EDAM BAAs are afforded equal priority to load, instilling collective confidence that the energy will be provided under stressed conditions subject to operational discretion and coordination. An EDAM BAA that fails the day ahead RSE and incurs the financial and diversity benefit consequences can continue to rely on cleared transfers sinking in its BAA having equal priority to the source BAA's load. Likewise, the failing BAA would afford transfers to other EDAM BAAs equal priority to its load under stressed conditions. This framework at the onset of EDAM is preferable to raising a potential reliability risk, particularly given the changed consequences for failing the RSE.

B. Pre-Market Processes

Leading up to the day-ahead market start at 10:00 a.m. the day prior to the operating day, the ISO and EDAM entities will continue to perform the same critical tasks they do today – organizing their supply portfolio to meet the expected needs on their system and ensuring there is sufficient transmission to meet these needs. These activities, which are an essential part of each BAA's existing processes, will support the evaluation of each EDAM entity's resource sufficiency in the day-ahead market. This section discusses the processes associated with the resource sufficiency evaluation and the steps of making transmission available in the EDAM to support transfers among participating BAAs.

1. Transmission Availability in EDAM

Transmission availability in the EDAM is foundational to achieving a well-functioning, efficient, and reliable day-ahead market. This includes transmission both internal to a participating BAA and on interties between participating BAAs. As the day-ahead market optimally commits resources, availability of transmission to the market is critical for efficient transfers of supply across the EDAM footprint to serve load and maintain grid reliability.

In the EDAM, transmission service providers will continue to maintain their OATTs and administer sales of transmission service under them. The proposed transmission availability within the EDAM design seeks to maximize the amount of transmission capability made available to the market under different transmission service arrangements while accommodating both the ISO's organized market transmission design and the OATT framework. Maximizing the availability of high quality transmission to the EDAM increases the benefits participating EDAM entities and their customers will derive from the day-ahead market.

The draft final proposal described the concept of transmission "buckets" and discussed how transmission customers with transmission rights at interfaces between EDAM BAAs make such rights available to the market and how transmission providers make unsold transmission available. The proposal also described three different pathways a transmission customer with transmission rights under the OATT can take to utilize its transmission rights or make them available to the EDAM. In particular, the proposal clarified the treatment of unscheduled transmission rights (pathway 3) and the ability of the rights holder to exercise previously unscheduled transmission rights after the day-ahead market run and not be assessed costs as the market re-dispatches supply to respond to changing grid conditions. The draft final proposal also described a detailed design for historical transmission revenue recovery for EDAM entity transmission providers recognizing they might face reduced sales of short-term transmission as a result of EDAM.[26] The intent of the revenue recovery mechanism is to mitigate the EDAM entity's potential under-recovery of transmission revenues following EDAM participation.

Some stakeholders expressed concern that the availability of transmission under EDAM may not align with a specific limitation providing that FERC has no authority under the Federal Power Act to require an electric utility or person in the Pacific Northwest to convert involuntarily firm transmission rights that existed in 2005 through contract or transmission ownership to tradable or financial rights. The ISO understands this concern and the importance of ensuring the proposal falls outside of this limitation and maximizes the future potential of EDAM. Although neither FERC nor the courts have interpreted this statutory protection of Pacific Northwest transmission rights since it was enacted in 2005, the ISO has carefully considered this statutory provision and believes its current proposal will ensure that FERC acceptance of EDAM would not be contrary to this limitation. First, the EDAM proposal does not require the conversion of firm physical transmission rights to tradeable or financial rights such as CRRs. As such, the EDAM proposal will not ask FERC to require such a conversion. In addition, the ISO believes the voluntary nature of participation in EDAM fundamentally ensures the opportunity for interested entities to work with their transmission customers and the ISO to mitigate any concerns related to the continued right to exercise firm transmission rights that may linger beyond the final proposal. The ISO also clarified in the draft final proposal that the transmission rights, whether legacy rights or firm OATT rights, remain eligible for scheduling after the close of

[26] Besides recognition of reduced sales of short-term firm and non-firm transmission, the design provides for cost recovery of a percentage of new builds and transmission costs associated with supporting wheel through transfers in excess of import/export transfer levels.

the day-ahead market just as they would be today under the *pro forma* OATT, thereby preserving the physical right through the real-time market where WEIM scheduling practices would apply. The use of unscheduled capacity in EDAM after 10:00 a.m. does not change this outcome; rather, the physical rights would be accommodated through re-dispatch as required. Further, the rights holders in coordination with their transmission provider may register their rights with the ISO and receive a contract reference number for scheduling purposes, which as explained elsewhere results in accrued congestion costs associated with use of the transmission rights netting out in settlements. This ensures the transmission customer may continue to use its rights without direct financial consequence. There will similarly not be any direct assignment of re-dispatch costs to the transmission customer by the ISO. The EDAM entity will have the opportunity to work with its transmission customers and load serving entities to determine an equitable allocation of any shortfall or excess from the pool of congestion revenues and re-dispatch costs. This overall approach represents a reasonable starting point for EDAM and does not constitute involuntary conversion of firm transmission rights to tradable or financial rights.

The final proposal retains the design from the draft final proposal, with smaller clarifications in response to stakeholder comments. The following sub-sections describe in more detail the proposed design and associated rationale and offer a more detailed view into the associated stakeholder comments.

a) Internal Transmission Availability in EDAM

The availability of transmission internal to participating BAAs is an important aspect of facilitating optimized unit commitment by the market throughout the EDAM footprint. In the WEIM, internal transmission supports optimized dispatch based upon the flow capability of the transmission network in real time. Through its full network model, the ISO models the internal transmission system of each WEIM entity and utilizes flow based congestion management that respects intra-BAA physical transmission constraints, BAA specific power balance constraints, and intertie constraints between BAAs (both physical limits and scheduling limits). This enables the WEIM to function in a multi-BAA environment compatible with and complementary to OATT-regulated transmission and a bilateral energy market that co-exists with the WEIM, while still respecting the transmission rights of third parties and scheduled transactions in the bilateral market.

Similar to the WEIM, the EDAM will model internal transmission flow capability within each participating BAA, and it will support optimized commitment of supply in the day-ahead market. Through the full network model, the day-ahead market will have visibility into transmission system topology, outages, and overall flow capability. In identifying resource commitment and transfers between EDAM BAAs, the market will co-optimize the entire internal transmission network while respecting the use of internal firm transmission rights to the extent transmission customers seek to exercise those by submitting energy self-schedules. To the extent derates arise on the internal transmission network, the market will know these conditions in the day-ahead timeframe.

Transmission customers with internal EDAM BAA transmission rights can economically bid or self-schedule supply to serve internal load, whether the supporting resources are internal to the EDAM BAA or located in another BAA. Transmission customers with internal EDAM BAA firm transmission rights, whether point-to-point service (PTP) or network integration transmission service (NITS), can exercise their firm transmission rights by submitting balanced supply and demand self-schedules associated with existing firm transmission rights. A self-schedule is a

price-taking bid scheduled in the market; for generating resources, a self-schedule also indicates self-commitment. Self-schedules associated with transmission rights may also have a higher scheduling priority compared to other self-schedules not associated with transmission rights. Self-schedules supported by transmission rights may be afforded a hedge against marginal congestion differences between the network locations of their sources (supply) and their sinks (demand), which would mitigate potential exposure to congestion price differences, either positive or negative, between the source and the sink. Through this framework, the EDAM will optimize resource commitment in the day-ahead market while respecting the exercise of transmission rights.

In addition to legacy (pre-OATT) contract rights and third party transmission ownership rights, firm OATT transmission rights held by customers within an EDAM BAA that do not support transfers between EDAM BAAs[27] will be afforded scheduling and settlement similar to firm transmission rights between EDAM BAAs and that the accrued internal congestion revenues will be settled with the EDAM entity. To receive this treatment, which the ISO has referred to as "ETC/TOR treatment," internal firm OATT transmission service customers must follow the same scheduling timelines associated with pathway 1, described further below, *i.e.,* they should schedule these transmission rights in the day-ahead market by 10:00 a.m. or ultimately exercising them at a later time. Legacy (pre-OATT) contract rights and third party transmission ownership rights would retain the scheduling rights and priorities provided under their contract or ownership arrangements, which EDAM would honor. The mechanism for how these transmission rights will be made known to the market and subsequently afforded the associated settlement treatment is further discussed in section II.B.1(e) below.

EDAM entities will continue to provide transmission service under the OATT, selling firm and non-firm transmission across the internal transmission network. Under the OATT, transmission providers sell non-firm transmission on an as-available basis, and it has a lower curtailment priority than firm transmission. In the EDAM, transmission customers holding non-firm transmission on the internal network to deliver generation from source to sink can submit economic bids or self-schedules into the market. The market will not establish different levels of priorities of market schedules based on different types of non-firm transmission rights, but the EDAM entity transmission provider will continue to be the arbiter of these transmission rights, and it will retain the authority to curtail internal schedules supported by non-firm transmission as it does today, consistent with its OATT. Consistent with the practices in the WEIM, the transmission service provider administers those curtailments, and in the WEIM the market may need to re-dispatch around those curtailments of non-firm transmission associated with the source of the generation.

b) Transmission Availability at Interties between EDAM Areas

Transmission capability at and across interties between EDAM BAAs supports optimized energy transfers identified through the day-ahead market. These EDAM transfers are important to provide benefits across the EDAM footprint. Prior to the day-ahead market run, each EDAM entity will identify the transmission capacity it can make available to the day-ahead market at the interfaces between EDAM BAAs to support transfers. Building on the revised straw proposal, the draft final proposal continued to described how transmission customers with firm and

[27] EDAM BAA internal transmission rights include firm rights from (a) a source to sink within an EDAM BAA, (b) a source to an intertie location with a non-EDAM BAA, (c) an intertie location with a non-EDAM BAA to an sink, and (d) a wheel through an EDAM BAA from an intertie location with a non-EDAM BAA to another intertie location with a non-EDAM BAA.

conditional firm transmission rights could make their transmission available and how the transmission provider would make unsold firm transmission available to the market to support transfers; *i.e.*, the "transmission buckets" framework. The draft final proposal further described the pathways for how transmission customers holding firm and conditional firm transmission rights under the OATT could exercise them or otherwise make them available to the EDAM for optimization, including how unscheduled transmission rights are utilized by the EDAM and how the transmission customer can exercise these rights after the day-ahead market run. This final proposal retains the same design, with smaller clarifications in response to stakeholder comments.

(1) Transmission "Buckets" Framework for Transmission Customer and Transmission Provider Transmission Availability in EDAM

The final proposal retains (1) the "transmission buckets" framework to represent how transmission is made available to the market by transmission customers and the transmission provider, and (2) the associated accrual of transfer revenues from the availability of that transmission. This framework was originally introduced by WEIM entities and was further discussed in various working groups and workshops. An important element of the design is that high quality transmission is made available to support transfers between EDAM BAAs, and this transmission is eligible for accrual of transfer revenues. Figure 1 below illustrates the qualities of each one of the three transmission buckets.

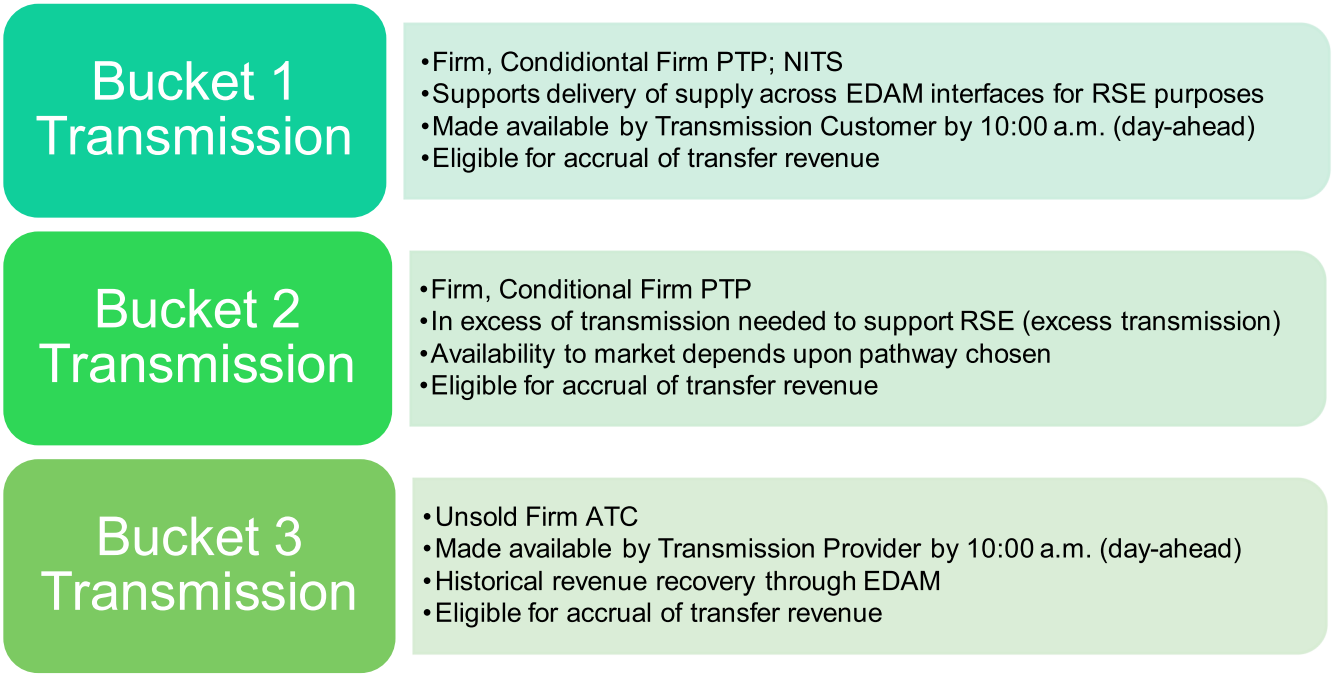


Figure 1: Description of the transmission buckets framework.

Although these transmission buckets largely merge from an operational standpoint, the labels are helpful to differentiate who is making the transmission available, the type of transmission being made available, and the disposition of transfer revenues that may accrue.

(a) Bucket 1: Transmission to Support Resource Sufficiency

This final proposal retains the bucket 1 transmission framework whereby each EDAM BAA must make bucket 1 transmission available to the market to support resource sufficiency plans across an intertie with an adjoining EDAM BAA. As such, bucket 1 consists of transmission rights held by transmission customers of the EDAM entity transmission service provider or other transmission service providers within the EDAM BAA associated with contractual agreements for delivery of energy at interties between EDAM BAAs used for meeting the RSE in the day-ahead timeframe. In other words, if EDAM entity A relies on a resource located in the adjacent EDAM entity B area, EDAM entity A would need to make available bucket 1 transmission to deliver that resource across the interface between the two BAAs.

Bucket 1 transmission must be firm or conditional firm point to point transmission or network integration transmission service associated with a designated network resource. Firm and conditional firm point to point transmission service is highly reliable transmission that is made available across an interface between two EDAM BAAs, reserved under the terms of the OATT of each transmission provider. This is necessary to have transmission to and across the interface between the BAAs to support the transfers.

Network integration transmission service associated with delivering designated network resources can also qualify as bucket 1 transmission if the designated network resource is utilized to meet the EDAM entity's RSE obligation. If the EDAM entity relies on an off-system designated network resource to meet the RSE obligation and schedules the energy from the resource location to the intertie, it will have secured firm point-to-point transmission service across one system to an interface, and there will be NITS across the interface on the sink BAA system. The transmission across the interface between the BAAs is made available to support EDAM transfers as bucket 1 transmission.

In comments to prior proposals, some stakeholders sought clarification on the transmission expectations associated with delivered firm energy contracts, such as WSPP Schedule C arrangements where neither the source of the generation nor the transmission are generally known before the 10:00 a.m. day-ahead market run. As discussed further in the RSE section, firm energy contracts are delivered to the interface with the sink BAA where the purchaser (a load serving entity) takes title to the power at that interface. These products and similar contractual arrangements have been prevalent across the Western interconnection, and they have proven to be highly reliable. These arrangements qualify today as designated network resources under the OATT and support resource adequacy in California and other states. The transmission associated with the delivery of these arrangements will not be optimized by the market because it is unknown by the time of the day-ahead market run, but the contractual arrangement for firm energy will be able to support the day ahead RSE.

It is important to clarify that to the extent an EDAM entity relies on import supply delivered across an intertie with a non-EDAM BAA, the transmission is not considered bucket 1 transmission and is thus unavailable to the market to optimize transfers. Transmission made available under the buckets, including bucket 1, is intended only to support optimized energy transfers between two EDAM BAAs; transmission at an interface between an EDAM and a non-EDAM BAA will not be available to the market for optimization. Import supply delivered across an intertie with a non-EDAM BAA would be included in a WEIM base schedule as it is today.

Bucket 1 transmission should be identified and made available at the time of bid submission into the day-ahead market. As discussed in the RSE section, the RSE will include advisory runs, including a more comprehensive advisory run at 9:00 a.m., to help inform each BAA of its sufficiency going into the day-ahead market at 10:00 a.m. when the market runs. The accuracy of the 9:00 a.m. advisory RSE run output is only as good as the bids and bucket 1 transmission made available by that time and, thus, entities are encouraged to submit bids and bucket 1 transmission by 9:00 a.m. However, entities ultimately have until 10:00 a.m. to become resource sufficient, and some may need to submit additional bids, including bucket 1 transmission, after the 9:00 a.m. RSE advisory run to cure potential deficiencies ahead of the binding RSE run.

Because the transmission service provider is already compensated for the transmission capacity through transmission reservations and contracts, or transmission access charges as is the case for the ISO, no additional transmission recovery provisions are required for bucket 1 transmission. The ISO will allocate transfer revenues, when they accrue, to the EDAM entity to distribute under the terms of its OATT, as discussed further in this proposal. This is consistent with how the ISO allocates transfer and congestion revenues in the WEIM today - the settlement is directly with the WEIM entity to utilize as described under the terms of its OATT.

(b) Bucket 2: Transmission Rights Held by Transmission Customers Not Needed as Bucket 1 Transmission

Bucket 2 transmission consists of firm and conditional firm point to point transmission rights held by transmission customers that are not utilized as part of bucket 1 transmission to satisfy the resource sufficiency of an EDAM BAA. These can be transmission rights beyond what is needed to support the RSE demonstration or transmission rights that are not utilized by the time of the day-ahead market run. For example, a transmission customer with 100 MW of firm point to point transmission rights across an interface between two EDAM BAAs that bids 75 MW of import supply for the sink BAA RSE supported by 75 MW of its transmission rights as bucket 1 transmission, could make available the remaining 25 MW to the market as bucket 2 transmission

The draft final proposal continued putting forward a framework under which transmission customers with firm or conditional firm transmission rights could make excess transmission, not utilized to support the RSE as bucket 1 transmission, available to the EDAM as bucket 2 transmission. The design recognized the ability of transmission customers to (1) schedule use of their rights by 10:00 am, or (2) release the transmission to the market and receive transfer revenue as a result of making that transmission available to the market (like congestion revenue rights holders in the ISO). Alternatively, unscheduled transmission would be made available to the market, and the transmission customer could seek to exercise those rights after the day-ahead market run. These options are detailed below.

In comments on the draft final proposal, stakeholders largely continued to support or not oppose the bucket 2 transmission design where firm and conditional firm point to point transmission rights (whether affirmatively released to the market or unscheduled by the scheduling deadline) are included in the day-ahead market optimization. They stated this approach would maximize transmission availability, maximizing the benefits of EDAM participation. Some stakeholders continued to express concern with the design because it does not provide a pathway for transmission customers to withhold transmission from the market or otherwise be compensated for the market use of the transmission rights at a hurdle rate or something more definitive than transfer revenue.

The final proposal retains the design described in the draft final proposal. A purely voluntary framework for transmission customers to make transmission available to the market at a hurdle rate would stifle the efficiency of the market solution because beneficial transfers would be limited as they would have to overcome a hurdle rate in the market to be scheduled. Throughout the initiative, stakeholders largely supported the objective of avoiding transmission hurdle rates and the resulting rate pancaking that stifles market efficiency. Such a proposal can also create artificial and inappropriate congestion. A framework where transmission customers can voluntarily release transmission to the market in return for transfer revenue settlement from the ISO is preferable. Making unscheduled, un-utilized, transmission by the time of the day-ahead market available to the market improves transfer optimization, increases transmission availability to support transfers, and maximizes benefits for the footprint as a whole. As the benefits of the WEIM have demonstrated, overall benefits increase as connectivity across the WEIM footprint increases and additional transmission is made available to support transfers.[28] A similar result would be expected in the EDAM as more transmission is made available to support robust transfers.

The bucket 2 transmission made available to the market is limited to firm and conditional firm point to point transmission service; it does not include network integration transmission service because transmission capacity reserved as network integration transmission service and associated with a designated network resource is generally released for sale under the OATT un-designation terms to the extent the designated network resource will not be utilized to serve load during a particular hour or day. If the EDAM entity does not bid the designated network resource into the market (by submitting an economic bid or self-schedule) and thus it is not utilized for RSE purposes, the transmission capacity is released through the un-designation process and made available to the market. Additionally, network integration transmission service cannot be resold or assigned because it is only used for load service. In contrast, a firm point-to-point transmission customer can come back after 10:00 a.m. and seek to exercise its transmission rights.

The final proposal discusses further below the timing and availability of bucket 2 transmission to the market in the context of the three bucket 2 pathways or options for how transmission customers can utilize their transmission rights in EDAM or make them available to the market.

(i) Pathways for Transmission Rights Availability in EDAM

Bucket 2 consists of transmission customer firm and conditional firm point to point transmission rights that are otherwise not made available to support resource sufficiency (bucket 1). Effectively bucket 2 consists of excess transmission rights at interfaces between EDAM BAAs that may not be utilized by the time of the day-ahead market run (10:00 a.m.).

This proposal continues to introduce three different “pathways,” or options, for how transmission customers could exercise their transmission rights or otherwise make their rights available to support EDAM transfers.

1. ***Pathway 1*** – Transmission customer schedules explicit use of the transmission rights in the day-ahead market by submitting a self-schedule associated with existing transmission rights. The ISO would allocate accrued transfer revenue to the EDAM entity for re-allocation under the terms of its OATT.

[28] *Western Energy Imbalance Market Benefits Report Third Quarter 2022,* October 31, 2022. Link

2. **Pathway 2** – Transmission customer releases the transmission rights to the EDAM before the day-ahead market processes, by 9:00 a.m. of the day-ahead. The transmission customer is eligible for an allocation of transfer revenue directly from the ISO. The transmission customer cannot self-schedule use of the transmission rights in real time for the amount released to the market, but it can continue to submit a self-schedule or economically bid into the market as any other user of the system.

3. **Pathway 3** – Transmission customer did not exercise transmission rights in day ahead under pathways 1 or 2, but it retains the ability to exercise these transmission rights after the day-ahead market run. If the transmission customer does not schedule use of the transmission rights by the start of the day-ahead market processes at 10:00 a.m., the unscheduled transmission capacity would be made available to the market to support optimized transfers. If a transfer constraint binds, transfer revenue associated with the unscheduled transmission would accrue and be allocated to the EDAM entity for re-allocation under the terms of its OATT. The transmission customer may exercise its previously unscheduled transmission rights between day ahead and real time, and the market would seek to re-dispatch the system to accommodate the use of the transmission rights. The transmission customer will be held harmless from direct re-dispatch costs by the transmission provider as a result of it exercising previously unscheduled transmission rights, as described further below.

The final proposal retains these three options described above, which were introduced in prior iterations of the proposal. The proposal describes below the different attributes and characteristics of the pathways to how a transmission customer can utilize its transmission rights or make them available to the day-ahead market.

(a) Pathway 1 – Exercising Transmission Rights Through the Day-Ahead Market

Transmission customers with firm and conditional firm point to point or network integration transmission (NITS) rights at interfaces between EDAM BAAs can continue to exercise their transmission rights through the EDAM to the extent they choose to not economically bid in the supply associated with those transmission rights. Pathway 1 describes the implications if a transmission customer with transmission rights across an interface between two EDAM BAAs chooses to exercise those transmission rights in the market.

If the transmission customer elects not to economically bid its supply into the market and make associated transmission capacity available to the market to optimize as bucket 1 transmission, the transmission customer can seek to exercise its transmission rights by submitting a self-schedule in the market and associate that self-schedule with existing transmission rights secured under the OATT.[29] The transmission customer must exercise its transmission rights by 10:00 a.m. (*i.e.*, by the time of the day-ahead market and the firm scheduling deadline in the OATT). The transmission rights the customer exercises in the market would be its firm or

[29] The process for registering transmission rights with the market in order to exercise these is further described in section II.B.1(e).

conditional firm point to point transmission rights, or the associated self-schedule with the delivery of a designated network resource on network integration transmission service.

A transmission customer holding a legacy transmission contract*, i.e.*, a contract executed prior to adoption of the OATT or otherwise not governed by the terms of the OATT, can exercise its transmission rights by submitting a self-schedule in the market associated with those legacy transmission rights under pathway 1. These transmission rights would need to be registered in advance and known to the market to enable the proper exercise and accounting of these rights.

(b) Pathway 2 – Releasing Transmission Rights to EDAM in Advance

A transmission customer also has the option to release transmission rights voluntarily to the EDAM to support transfers between EDAM BAAs under pathway two. The transmission rights would be eligible for accrual of transfer revenues which the ISO would settle directly with the transmission customer. Releasing transmission rights to the market ensures that the transmission rights will be available to support transfers and not be utilized by the transmission customer after the day-ahead market has optimized its use. This pathway provides a direct settlement with the transmission customer.

The transmission rights eligible to be released to the market initially are long-term (one year and longer) and monthly firm and conditional firm point to point transmission rights. These transmission rights are of longer duration and reasonably can be registered with the ISO to facilitate their release to the market without adding significant complexity and other challenges.[30] The transmission customer could determine, on a daily basis, whether to make the full amount or only a portion of its registered transmission rights available to the EDAM for the day or a longer timeframe. The transmission customer would receive transfer revenue accrued directly from the ISO for the duration of the capacity's release to the market. NITS transmission rights would be ineligible for pathway 2 because under the OATT these rights are tied to a designated network resource, and if the resource is not scheduled to serve load it does not have transmission rights that can be released to the market.

The transmission rights released to the market cannot be reclaimed or scheduled for the duration and trade date for which they have been released. Nevertheless, releasing transmission rights to the market does not preclude the transmission customer from economically bidding generation or submitting a regular self-schedule in the day ahead and real time markets for the associated generation. To enable release of transmission to the EDAM would require modification of the EDAM entity OATTs to recognize the ISO and the EDAM as an "eligible customer."[31]

Transmission rights held under legacy contracts may contain unique terms and conditions not governed by the OATT. The transmission service provider and the transmission customer holding legacy transmission contracts should review the terms and conditions of transmission

[30] Due to their longer duration, long term firm and monthly firm point to point transmission rights reasonably and effectively can be registered in master file with the ISO and provide a stable set of rights that can be utilized and/or released under pathway 2. It would be a significant technological and settlements challenge to accommodate shorter duration transmission rights, such as daily firm point to point service. The ISO can consider the potential for making shorter term transmission rights eligible for release to the market under pathway 2 in the future.

[31] The OATT definition of "eligible customer" does not explicitly acknowledge the ISO or the organized market to which transmission rights could be released to optimize transfers.

service to determine whether they can be released to the market under pathway 2. If the terms of the contract support releasing legacy transmission rights consistent with pathway 2, these rights can be made available to the EDAM.

(c) Pathway 3 – Unscheduled Transmission Rights Availability in EDAM

Transmission rights that are not made available as bucket 1 transmission to support the RSE, are otherwise not scheduled under pathway 1 or released under pathway 2, remain unscheduled, *i.e.*, unused, by the time of the day-ahead market run. Under Pathway 3, firm and conditional firm point to point transmission rights that are not scheduled by the day-ahead market run (10:00 a.m.) become available to the EDAM to support optimized transfers. In other words, pathway 3 enables these unscheduled transmission rights to be made available to the market, at 10:00 a.m., to optimize EDAM transfers. Under pathway 3, transmission customers retain the ability to exercise their unscheduled transmission rights after the day-ahead market and into real time as they do under the OATT. If they schedule these transmission rights after the day-ahead market run, the market will seek to accommodate the exercise of those rights if practicable, by re-dispatch if necessary. The transmission customer would not be assigned direct costs of re-dispatch as a result of its use of previously unscheduled transmission rights, as described further below.

Stakeholder comments largely supported the pathway 3 design, particularly with the clarification that transmission customers exercising previously unscheduled transmission rights would not be directly assigned costs of re-dispatch. Some stakeholders continued to suggest that these unscheduled transmission rights should be "carved out" of and not be made available to the market. Stakeholders supporting the pathway 3 approach generally acknowledged the significant benefits provided to the market by making unscheduled, unutilized, transmission available to support transfers, and they indicated that pathway 3 is comparable to the treatment of unscheduled firm transmission rights under the OATT.

The overall EDAM design seeks to harmonize the transmission rights afforded under the OATT with the practical operations of the organized market and the resulting resource commitments and energy transfers emerging from the market optimization. Under Section 13.8 of the pro-forma OATT, schedules for the exercise of firm point to point transmission service must be submitted no later than 10:00 a.m. of the day prior to start of service, and schedules submitted after 10:00 a.m. will be accommodated if practicable. Thus, the OATT establishes a clear scheduling deadline. To the extent firm transmission rights are not scheduled in the day-ahead timeframe, the transmission provider may release them as non-firm transmission. The transmission customer with the firm point to point transmission rights can later seek to exercise these rights by submitting a schedule up until the real time scheduling deadline. However, the transmission customer is not guaranteed the ability to utilize its firm transmission rights not scheduled by the 10:00 a.m. deadline. If the transmission provider can - and does - accommodate the later schedule for firm point to point transmission service, the transmission customer is subject to the cost of the firm transmission reservation under the transmission provider's OATT. However, Section 13.8 of the OATT does not expressly obligate the transmission provider to utilize re-dispatch to accommodate a customer's late scheduled transmission service request, and point-to-point transmission customers generally have no right to rely on re-dispatch to meet their transmission service requests unless they have agreed to compensate the transmission provider for such re-dispatch under the OATT.

The design of pathway 3 for using transmission rights in the EDAM is comparable to transmission customers' ability to utilize these rights under the OATT today. Under pathway 3, firm and conditional firm transmission rights held by a transmission customer unscheduled by 10:00 a.m., would be made available to the EDAM to support optimized commitment of generation across the EDAM footprint and energy transfers in lieu of being released as non-firm transmission for sale by the transmission provider as is done under the OATT. If the transmission customer elects later (after 10:00 am) to exercise its previously unscheduled transmission rights, under pathway 3 it can submit a self-schedule into the market to indicate it wants to use its rights. This is comparable to how it can submit a late firm schedule request under the OATT today. If necessary, the market will seek to re-dispatch generation to accommodate the late self-schedule. In the vast majority of instances, there will be a feasible solution, involving re-dispatch or otherwise, to accommodate the late exercise of these transmission rights, just as a transmission provider today may accommodate such late schedules under the OATT if practicable (*e.g.*, by curtailing non-firm service). There may be instances, based on physical conditions on the grid, where the market may be unable to solve (infeasibility) due to generation outages, limitations in the available generation to support a feasible re-dispatch solution, or transmission outages or constraints. These factors may make it infeasible and not practicable, to accommodate fully or partly the late exercise of transmission rights.

As noted above, the market's ability to accommodate the exercise of unscheduled transmission rights after the scheduling deadline is based largely upon re-dispatch, which may cause certain uplifts in the market that will be allocated to the EDAM entity through settlements. Market re-dispatch is a frequent and common occurrence, driven primarily by changes in conditions between day ahead and real time and within real time as well. As load fluctuates across the footprint, generation and transmission outages materialize, and other physical changes or limitations occur on the grid, the market seeks to re-dispatch generation to meet the changing conditions. As such, the exercise of unscheduled transmission rights after the scheduling deadline is one additional variable that can contribute to the need for market re-dispatch. Because of the frequency of re-dispatch in the market and the interplay of the many factors causing it, the ISO as the market operator cannot specifically distinguish re-dispatch caused by the exercise of previously unscheduled transmission rights from other re-dispatch causes.

The proposal is for the EDAM transmission provider to hold all firm point to point and NTIS customers, including the firm point to point customers that exercise their firm transmission rights after 10:00 a.m. day ahead, harmless from EDAM transfer and congestion costs to the extent feasible by offsetting such potential costs with EDAM transfer and congestion revenues. This element should be a standardized requirement across the participating EDAM balancing areas under their OATTs. However, disposition of shortfalls or excesses of these offsets do not have to be standardized across EDAM balancing areas, and each EDAM entity will identify under the terms of its OATT how these offsets will be allocated further, whether to measured demand or to a different segment similar to how the EDAM entity allocates the surpluses or shortfalls in the WEIM today.[32] This is consistent with the treatment of late schedule submissions under the OATT where the transmission customer is not subject to additional charges for exercising its firm transmission rights to the extent the transmission provider can accommodate the schedule. However, as indicated above, the transmission provider is not obligated to undertake re-

[32] The ISO and EDAM entities will monitor the effectiveness of pooling the transfer and congestion revenues to offset congestion costs and potentially other uplifts that may arise in this context.

dispatch to accommodate a late point-to-point schedule under the OATT.[33] The EDAM, however, will use re-dispatch to accommodate late schedules. The ISO will settle transfer revenues that accrue as a result of transmission being made available to the market under pathway 3 with the EDAM entity.

Pathway 3 maximizes the transmission available to the EDAM to optimize robust transfers and produce significant benefits for the footprint. Although some stakeholders prefer a design that allows transmission customers to "carve out" their firm or conditional firm point to point rights from use by the market and use them at will after the scheduling deadline, such an approach could result in underutilization of the grid and will adversely affect market efficiency and has significant congestion implications. This would greatly reduce the benefits a day-ahead market provides. The proposed pathway 3 design mitigates the risks to the transmission customer of making unscheduled transmission available to the market, and the transmission customer is able to use its transmission rights in a manner similar to its ability under the OATT today. Indeed, the transmission customer arguably is being accorded a better opportunity because the market will seek to utilize re-dispatch to accommodate the customer's late schedule, a right that generally does not exist under the OATT unless it is a condition of the customer's service. In short, the transmission customer continues to be able to exercise it unscheduled transmission rights after the day-ahead market run, and the market will seek to re-dispatch the system to accommodate the use of such rights after the schedule deadline.

Below is a summary of the attributes of pathway 3:

- *Ability to exercise transmission rights after the day-ahead market* – under pathway 3, unscheduled transmission rights (firm and conditional firm point to point) are released to the market to support EDAM transfers, but the transmission customer retains the ability to exercise these rights after the day-ahead market run at 10:00 a.m. The customer exercises these rights by submitting a self-schedule associated with its transmission rights, which will have been registered in the masterfile, or through a different mechanism yet to be determined.
- *Re-dispatch* – as noted above, once the transmission customer exercises its previously unscheduled transmission rights after the scheduling deadline, the market will seek to re-dispatch (if necessary) to accommodate that use. In the vast majority of cases, the market is expected to find a feasible solution to accommodate as the market frequently re-dispatches the system in response to changing conditions and uses of the grid the late-submitted schedules. If the market cannot feasibly accommodate the late schedule, (whether due to derates or other market infeasibility), the market will not disturb the cleared day ahead schedules, or schedules of entities that self-scheduled or otherwise exercised their transmission rights (bucket 1) in a timely manner in the day-ahead market. However, the market will accommodate these late scheduled transmission rights before accommodating newly submitted real time self-schedules.

[33] An exception under the pro forma OATT may be if re-dispatch is a condition of providing point to point transmission service associated with studied transmission upgrades through a system impact study. In those instances, either as an alternative to the transmission upgrade or while awaiting completion of a transmission upgrade, a re-dispatch option may be in place depending on the results of the system impact study and subsequent terms and conditions between the transmission customer and transmission provider enabling re-dispatch. In those instances, section 27 of the OATT makes the transmission customer responsible for the cost of re-dispatch.

- *Transfer revenue allocation to the EDAM entity* – similar to bucket 1 and pathway 1, the ISO will allocate accrued transfer revenues to the EDAM entity. This is a consistent with how the ISO allocates and settles congestion revenues[34] in the WEIM, *i.e.*, with the WEIM entity rather than the individual transmission customer. The EDAM transmission provider would hold all its transmission customers – firm point to point and NITS customers, including the firm point to point customer exercising their firm transmission rights after 10:00 a.m. day ahead, harmless from EDAM transfer and congestion costs to the extent feasible by offsetting such potential costs by accrued transfer and congestion revenues. The EDAM entity would identify under its OATT how to equitably allocate shortfalls or excesses, whether to measured demand or another method which may be consistent with the entity's practice in the WEIM.

Pathway 3 does not apply to legacy transmission contracts, *i.e.,* those contracts executed prior to adoption of the OATT and which are not subject to the terms and conditions of the OATT. These legacy transmission contracts are governed by their own bilateral agreement terms and conditions. If there remains unscheduled transmission capacity associated with a legacy contract, such unscheduled transmission would not be made available to EDAM under pathway 3 recognizing the unique terms of the conditions of those arrangements.

(c) Bucket 3: Transmission Provider Unsold Firm Available Transfer Capability (ATC)

This final proposal retains the bucket 3 design described originally in the revised straw proposal, and retained in the draft final proposal. By excluding transmission hurdles from the day-ahead market design, the optimization can produce more efficient unit commitment and energy transfers that will provide greater benefits for all EDAM entities in the footprint. Moreover, the transmission revenue recovery design will allow EDAM entity transmission providers to recover revenues associated with historical sales of short-term firm ATC, making bucket 3 uses of transmission by the market fair and equitable.

The proposal requires EDAM entity transmission providers to make unsold firm ATC available to the market at the interfaces between EDAM BAAs at 10:00 a.m. to ensure the market can rely on this transmission capacity when identifying transfers. As noted in the context of the other transmission buckets, unsold firm ATC is only made available to the market at the interfaces between two EDAM BAAs and not between the EDAM BAA and a non-EDAM BAA. Moreover, as the unsold ATC is made available to the market at 10:00 a.m., the EDAM entity transmission provider function would need to stop sales of firm ATC at the interfaces between EDAM BAAs until 1:00 p.m. when the day-ahead market results are published. At that point, after the market results are published, the ISO will share a report with each EDAM entity identifying the amount of bucket 3 transmission (unsold firm ATC) used in day-ahead market, at which point the EDAM entity transmission provider can resume sales of unused firm ATC. Bucket 3 transmission, similar to the other buckets, is eligible for accrual of transfer revenues that would be allocated and settled with the EDAM entity.

[34] In the WEIM today, the term congestion revenue encompasses both revenues that accrue as a result of conditions on the transfer points and on the internal transmission system. As discussed in later sections, under EDAM transfer revenue is separated from congestion revenue to distinguish transfer revenue (that accrues on the interties as a result of scheduling limits being reached) and congestion revenue (that accrues on the internal transmission system as a result of binding constraints on the system).

The proposal further supports the EDAM entity's participation in reserve sharing programs and provides that the EDAM entity can specify under its OATT how it will deduct from the amount of firm ATC released to the market any necessary ATC associated with its participation in these programs. More broadly, the methodology for calculating ATC may differ among western transmission providers, and there may be unique circumstances that limit the amount of bucket 3 transmission that is made available. Any unique conditions or circumstances should be considered on a case by case basis and reflected in the EDAM entity's OATT to allow the ISO to account for it in EDAM.

c) Exercising Transmission Rights at Interties with Non-EDAM Areas

This final proposal recognizes there will be transmission customers with firm OATT transmission rights across the interties between an EDAM BAA and a BAA outside of the EDAM footprint. These transmission rights may support delivery of energy schedules wheeling through an EDAM BAA or exporting from an EDAM BAA to a BAA outside the EDAM footprint to support resource adequacy obligations or otherwise meet reliability or operational needs. The EDAM design supports the exercise of these firm OATT transmission rights. Similar to the exercise of transmission rights internal to an EDAM BAA (as described in section II.B.1(a)), the EDAM will accommodate use of these transmission rights. Transmission customers holding firm OATT rights will have pathways similar to those using transmission rights between EDAM balancing areas (as discussed in section II.B.1(b)), with differences that account for the nature of these transmission rights.

Transmission customers holding firm OATT transmission rights across interfaces between an EDAM and a non-EDAM BAA will be able to self-schedule their firm transmission rights through the day-ahead market, whether to wheel through or export from the EDAM footprint. This exercise of transmission rights is effectuated through the submission of a self-schedule in the market in association with existing and registered OATT firm transmission rights.

The transmission customer should indicate before the day-ahead market run, by 9:00 a.m., its intent to schedule energy supported by the exercise of its firm OATT transmission rights in real-time to support load service, meet operational or reliability needs, or otherwise exercise their transmission rights. This indication before the day-ahead market run, will provide the market operator and EDAM entity transmission provider with information on the expected utilization of these transmission rights. When a self-schedule associated with firm transmission rights is submitted into the real-time market, the market may re-dispatch if necessary to accommodate the exercise of those transmission rights. If the market cannot feasibly accommodate the real-time schedule, the market will afford these real-time self-schedules equal priority to cleared day-ahead schedules. In other words, if re-dispatch cannot accommodate the exercise of the transmission rights (previously indicated to be exercised) the market will afford equal priority in real-time to cleared day-ahead schedules. This is appropriate because the transmission customer will have indicated to the market before the day-ahead timeframe that it intends to schedule energy supported by its existing firm transmission rights in real-time. If the transmission rights a customer previously indicated it would use in real-time, are not ultimately exercised, they would be released to the WEIM and would support flows in real-time.

Firm OATT transmission rights that are left unscheduled in the day-ahead market, *i.e.*, without a day ahead indication of intent to utilize the rights later through a transmission reservation, will be available to the market to support optimized flows across the balancing area and between EDAM BAAs. If the transmission customer later seeks to exercise these unscheduled firm OATT transmission rights, the market will seek to re-dispatch to accommodate this later use. If the

real-time market cannot feasibly accommodate the late schedules, the market will not disturb cleared day-ahead schedules. However, the market will accommodate these real-time scheduled transmission rights before accommodating newly submitted real-time self-schedules.

The ISO will monitor the scope and magnitude of the late exercise of these firm OATT transmission rights, including the frequency with which these rights are exercised across different systems and the extent to which notice of intent of utilization is provided before the day-ahead market run. The ISO will be ready to engage with stakeholders to respond to any unintended consequences in the design if necessary.

If the exercise of these firm OATT transmission rights across interfaces with non-EDAM BAAs becomes burdensome across particular paths, interties, or flowgates, or otherwise creates unintended impacts on the market or affects grid reliability, the ISO will consider potential adjustments such as carve-outs of highly impacted transmission from the market. Further, if these rights are used for support of resource adequacy or resource planning programs, the ISO will engage with affected entities to consider further arrangements that may be required to facilitate the exercise of transmission rights across balancing areas.

d) ISO Transmission Availability in the EDAM

Prior sections describe how EDAM entities make transmission available under the OATT framework for the different transmission buckets. This section describes how ISO transmission is made available across interfaces with other EDAM entities and how EDAM entities relying on wheels through or exports from the ISO for purposes of the RSE would meet the transmission bucket 1 requirements.

Bucket 1 transmission for the ISO is transmission supporting the resource sufficiency showings of the ISO load serving entities that is imported and delivered into the ISO across interfaces with other EDAM BAAs. Entities depending upon resources that are wheeled through the ISO or exported from the ISO to meet the EDAM RSE would have the following pathways to do so:

- Wheeling through the ISO system – entities would demonstrate establishment of a wheeling through priority (equal to load) across the ISO system and bring Bucket 1 transmission to the EDAM across the interface, based upon the process in place for establishing scheduling priority.[35]
- Exports from the ISO system – entities would demonstrate establishment of high priority export status to export supply (non-resource adequacy supply) from the ISO and meet Bucket 1 transmission requirements. The WAC charges would be assessed for the period that the high priority export is being shown for the RSE.[36]

Bucket 2 transmission on the ISO system is primarily associated with legacy contracts ("ETCs/TORs") which could be made available to the market based upon the terms of the agreement the appropriate pathways. Under pathway 1, the rights holder could schedule use of those rights, but unscheduled transmission would not be made available to the market because the rights holder can exercise rights generally into real time. This is consistent with the rights legacy transmission rights holders across the ISO system have today and how they exercise

[35] The ISO is currently undertaking the *Transmission Service and Market Scheduling Priorities* initiative to develop a new, and durable, process for establishing wheeling through priorities.
[36] Payment of the wheeling access charge (WAC) is consistent with the payment of transmission charges today for a high priority exports that are self-scheduled.

them. Pathway 2 allows the legacy transmission rights holder to make those rights available to the market in the day ahead timeframe and collect transfer revenue/congestion revenues.

The remaining transmission on the ISO system is effectively Bucket 3 transmission, unreserved and unsold transmission, available to the day-ahead market to optimize and support transfers across interfaces with EDAM entities. The historical EDAM revenue recovery proposal described above would allow for the recovery of the revenue shortfall associated with historical WAC revenues.

e) Providing for Historical Transmission Revenue Recovery through EDAM

EDAM entity transmission providers may face the potential risk of foregone transmission revenues based upon decreased sales of short-term transmission because they have made transmission available to the EDAM. The ISO too may potentially experience reduced wheeling access revenues under the EDAM. Providing a mechanism in EDAM for transmission providers, including the ISO, to recover potentially foregone revenues is an important element of the overall design. This section describes the proposed design to enable a transmission provider to recover historical and associated transmission revenues through EDAM.

The draft final proposal continued to propose a design to allow for the recovery of EDAM recoverable transmission revenues that consist of:

- Revenues associated with the short-term firm and non-firm point-to-point products, and for the ISO, foregone reduction in wheeling access charge (WAC) revenues;
- Revenues attributed to short-term firm and non-firm point to point transmission service on approved[37] new transmission builds that increase transfer capability between EDAM BAAs; and
- Revenues for wheeling-through volumes for EDAM BAAs that exceed the total imports/exports from the EDAM entity BAA.

Each EDAM entity would forecast its EDAM recoverable transmission revenues based on these three components on an annual basis, with the exception of the wheeling through component, which would be included only for months where specified conditions trigger. The EDAM recoverable transmission revenue amounts would then be allocated to gross load across the EDAM footprint, with the understanding that each EDAM entity would not be allocated its own EDAM recoverable transmission revenues. There would be an annual true-up to support actual revenue recovery of shortfalls by individual EDAM entities.

Stakeholder comments continue to generally support the overall concept and framework for the transmission revenue recovery design, although some stakeholders sought further clarifications regarding the various design components. Stakeholders generally recognized the importance of a transmission revenue recovery mechanism to mitigate the risk of reduced revenues the transmission provider is expected to collect at the outset of EDAM. Other stakeholders suggested additional oversight and transparency measures regarding the data inputs and monitoring for unintended consequences.

[37] For new transmission upgrades to be incorporated into the EDAM recoverable transmission revenues, the upgrades must have been approved through an applicable regulatory process.

The final proposal retains the design framework described in the draft final proposal with clarifications and enhancements in response to stakeholder comments. The ISO provides further clarification and details regarding the proposal below.

(1) Determining the Revenues Recoverable Through EDAM

The EDAM recoverable transmission revenues are comprised of three components that represent the recoverable revenues through the EDAM. The intent is to ensure each EDAM entity transmission provider, or other transmission provider within the EDAM BAA, recovers its historical transmission revenues associated with certain transmission products that may experience reduced use as a result of EDAM.

(a) Component 1: Short-Term Firm and Non-Firm Point to Point Transmission & Wheeling Access Charge (WAC) Revenues

An EDAM entity operating under the OATT framework may face potential reduced transmission revenues, associated with certain transmission products due to its participation in EDAM. These may be non-firm point to point revenues arising from the proposed bucket 2 transmission design where unscheduled firm and conditional firm transmission is made available to the EDAM. Today, unscheduled firm point to point transmission is automatically released as non-firm transmission for sale by the transmission provider. As the unscheduled firm or conditional firm point to point transmission is made available to the EDAM, the transmission provider may experience reduced non-firm transmission sales because some unscheduled firm transmission will be made available for supporting EDAM transfers.

The draft final proposal continued to recommend that the EDAM recoverable transmission revenues consist of only those associated with historical transmission sales to third parties, not sales to the EDAM entity's merchant function. It further proposed that the following non-firm point to point transmission products, which may have lower sales volumes, would also be eligible for inclusion in the EDAM recoverable transmission revenues:[38]

- Hourly non-firm point to point
- Daily non-firm point to point
- Weekly non-firm

Similarly, the EDAM entity would make bucket 3 transmission (unsold firm ATC) available to the EDAM to support transfers. Because the proposal is that such transmission be made available to the EDAM hurdle free, outside of the optimization, the transmission that is made available to the EDAM would be represented as foregone revenue along with other short-term firm products that may see reduced sales. It further proposed the following short-term firm point to point transmission products would also be eligible for historical revenue recovery and be included in the EDAM recoverable transmission revenues.

- Hourly firm point to point (if product is offered by the transmission provider)
- Daily firm point to point

[38] Revenues from monthly non-firm point to point service would not be included at the onset because this is a longer duration product that may not be directly affected by the EDAM. However, EDAM entities should monitor the impacts on these revenues, and they may be considered for inclusion at a later date if warranted.

- Weekly firm point to point

The ISO may also face foregone revenues associated with the WAC paid by non-participating transmission owners. These are revenues associated with third parties wheeling through, or exports from the ISO BAA. The revised straw proposal recommended that foregone WAC revenues associated with third-party wheels through or exports from the ISO be eligible for recovery and be included in the EDAM recoverable transmission revenues.

The draft finial proposal also continued to recommend that the EDAM recoverable revenues be only those associated with historical transmission sales to third parties, not sales to the EDAM entity's merchant function. It is not appropriate to include historical foregone revenues associated with sales of short-term and non-firm transmission to the merchant function of the EDAM entity. Such an approach would allocate or shift costs to the footprint associated with transmission sales to a different branch of the same company. Under most instances today, a vertically integrated utility has different accounting mechanisms for sales of transmission to a branch of itself, through offsetting accounts not an actual exchange of physical payments. It would be inappropriate to recover costs of transmission accounted for as inter-company offsetting accounts through the EDAM by shifting the costs to the rest of the footprint.

Some stakeholders continued to request that component 1 allow for recovery of historical revenues associated with monthly firm and non-firm transmission sales, in addition to weekly, daily, and hourly transmission sales. These stakeholders noted that there is a level of uncertainty associated with the impact of the EDAM on short-term transmission sales, which includes the monthly products, and thus these should be considered as part of the historical revenue recovery. The final proposal extends component 1 to include historical revenue recovery associated with monthly firm and non-firm transmission products. Including monthly transmission products in component 1 recognizes that monthly transmission products are short-term products and ensures the entire, spectrum of short-term transmission products ranging from monthly to hourly are eligible for historical revenue recovery. Short-term products generally are more at risk of reduced sales than long-term transmission service. Further, monthly transmission products typically make up a smaller portion of the overall short term sales; daily and hourly transmission sales are more prevalent. By including the requirement that generation must be associated with transmission reservations, or otherwise the transmission provider would assess a transmission charge, entities have a continued incentive to reserve transmission including longer duration transmission. As discussed later, continued sales of transmission under the OATT would reduce the revenue shortfall that would need to be recovered through the EDAM to ensure that the transmission provider is recovering their historical revenues associated with the eligible products.

The final proposal, with the inclusion of the monthly transmission product, provides that the EDAM recoverable transmission revenues consist of the historical revenues associated with the following short-term firm and non-firm transmission products:

- Short Term Firm Products:
    - Hourly Firm Point to Point (if product is offered by the transmission provider)
    - Daily Firm Point to Point
    - Weekly Firm Point to Point
    - Monthly Firm Point to Point
- Non-Firm Products:
    - Hourly Non-Firm Point to Point

- Daily Non-Firm Point to Point
- Weekly Non-Firm Point to Point
- Monthly Non-Firm Point to Point

The historical revenues recoverable through the EDAM based on the products noted above are associated with historical sales to third parties and not sales to the EDAM entity merchant function.

(i) Calculating the EDAM Recoverable Transmission Revenues and the Shortfall Recoverable Through EDAM

The EDAM recoverable transmission revenues are represented by the total historical revenue at risk associated with certain transmission products that are eligible for recovery through the EDAM. For EDAM entities operating under the OATT, the EDAM recoverable transmission revenue would be the historical transmission revenue requirement for short-term firm point to point (hourly, daily, weekly) and non-firm point to point transmission (hourly, daily, weekly) associated with sales to third parties (non-merchant function). Generally, non-firm and short term point to point transmission sales to third parties represent less than 10% of the total historical revenue requirement of the transmission provider, but it may vary among providers. For the ISO, the EDAM recoverable transmission revenues are the total historical Wheeling Access Charge (WAC) revenues associated with exports and wheels through the ISO system by third parties. For the ISO, WAC revenues associated with third parties represent 2-3% of the total transmission revenue requirement. The table below is a simple example of the EDAM recoverable transmission revenues design.

	Total Revenue Requirement	**Non-Firm sales (3rd party)[39]**	**Short-term Firm sales (3rd parties)[40]**	**EDAM Recoverable transmission revenues**	**Ratio (EDAM recoverable revenues / Total revenue requirement)**
EDAM Entity (OATT)	$100 Million	$3 million	$4 million	$7 million	7%

Table 1: Identification of the EDAM recoverable transmission revenues and ratio of recoverable revenues to total revenue requirement.

There are two key questions regarding calculation of the EDAM recoverable transmission revenues: (a) across what time period is the historical at risk EDAM recoverable transmission revenue derived; and (b) how often is the historical at risk EDAM recoverable transmission revenue amount updated.

- *Timeframe for deriving the at risk EDAM recoverable transmission revenue:* The proposal is for each EDAM BAA transmission provider to calculate its BAA's EDAM recoverable transmission revenues based on its average FERC-approved (or applicable regulatory authority-approved) historical transmission revenues for non-firm and short-term firm point to point transmission services for the most recent three years. In addition, the proposal is to calculate the ISO BAA's total EDAM recoverable transmission revenues as the sum of ISO participating transmission operators (PTO) EDAM recoverable transmission revenues amount. The ISO PTO EDAM recoverable

[39] Based on historical sales of non-firm transmission to third parties.
[40] Based on historical sales of short-term firm transmission to third parties.

transmission revenue amount shall be equal to the average FERC-approved transmission revenue balance account adjustment from wheeling third party transactions over the most recent three years. Considering only the most recent year's data may be too small of a sample and not reflect the EDAM recoverable transmission revenues going forward. A longer duration sample size is appropriate. Three years represents a reasonable time period that should provide a more stable and reasonable representation of revenue requirement associated with the transmission products eligible for recovery through the EDAM. Stakeholder comments generally supported the three-year lookback horizon for measuring historical EDAM recoverable transmission revenues. The EDAM entity would be required to provide supporting information for the calculation, and the final submission of the historical EDAM recoverable transmission revenues should be signed and attested to by an appropriate senior executive of the organization or ratified by the board or other overseeing authority of the organization. The data would be made available publicly in the interest of transparency.

- *Updating the EDAM recoverable transmission revenue amount:* The proposal continues to be that the EDAM recoverable transmission revenues be reviewed and updated after two-years of participation in the EDAM. Although some stakeholders suggested a longer time horizon to provide stability, a two-year horizon is important to provide an opportunity to update these values relatively soon after participation commences to evaluate patterns in transmission usage change and update the values to reflect those patterns. Locking in the period of the EDAM recoverable transmission revenues for a longer period may be overly restrictive and could lock the values for too long without providing an opportunity to account for changed conditions.

The EDAM recoverable transmission revenues represent the upper bound of transmission revenue recovery associated with the transmission products identified. However, the amount subject to recovery through the EDAM is expected to be much smaller because it will be offset by ongoing transmission sales throughout the year under the OATT or the terms of the ISO tariff, whichever applies. EDAM entities and the ISO will continue to administer their respective tariffs and continue to sell the transmission products noted above and, for the ISO, continue to collect WAC revenues. Those sales would reduce the amount needed to be recovered through the EDAM – the historical transmission revenue shortfall to support historical revenue recovery.[41]

The total recoverable revenues through the EDAM consist of the difference between the historical EDAM recoverable transmission revenues (upper bound) and the actual transmission revenues collected through transmission sales of the products eligible for recovery under the terms of the respective tariffs, deriving the recoverable shortfall.

$$Recoverable\ Shortfall = EDAM\ Recoverable\ revenues\ (historical) - Actual\ transmission\ revenues$$

[41] For the ISO, WAC revenues would continue to accrue for exports to non-EDAM BAAs, wheels through the ISO, and exports to EDAM BAAs that would pay the WAC.

Table 2 below illustrates further the example of the recoverable shortfall recoverable through the EDAM.

	EDAM Recoverable shortfall	NF PTP Actual Sales	STF PTP Actual Sales	Total Shortfall
EDAM Entity	$7 million	$2 million	$3 million	$2 million

Table 2: Deriving the EDAM recoverable shortfall.

As indicated in the table above, although the EDAM recoverable transmission revenues associated with non-firm and short-term firm point to point is $7 million, the EDAM entity continued to make sales through its OATT that derived $5 million in revenues. Thus, the total shortfall recoverable through the EDAM would be only $2 million. The EDAM entity will be responsible for providing supporting information regarding actual sales of the applicable transmission products that contribute to the identification of the total shortfall recoverable through the EDAM.

(ii) Limits to the EDAM Recoverable Transmission Revenues

In response to the revised straw proposal, stakeholders that commented on this element of the design largely supported establishing a bound to limit the transmission revenues recoverable through the EDAM as described in the proposal. Stakeholders believed the bound was a reasonable initial safeguard to avoid disproportionate cost shifts. Some stakeholders suggested that the design should remain flexible to evolve to a different or otherwise superior design over time as the EDAM evolves and there is actual experience with proposed overall design.

In response to stakeholder feedback, consistent with the draft final proposal, this final proposal continues to provide for a bound, or limit, to the EDAM recoverable transmission revenue amount based upon the EDAM transfer flows compared to the total EDAM and non-EDAM exports of a BAA. Such a bound would avoid shifting of costs to the EDAM disproportionately compared to using the EDAM entity system to support EDAM transfers. The EDAM recoverable transmission revenues upper bound seeks to apply a limit by comparing EDAM transfer exports (energy transferred) out of the EDAM BAA and total exports (energy exported to EDAM and non-EDAM BAAs). The formula is identified below.

$$Revenue\ Recovery\ \ Bound = \frac{EDAM\ Transfer\ Use\ (MWh)}{Total\ Exports\ (MWh)} \times EDAM\ Recoverable\ Transmisison\ Revenues$$

The ISO must consider the limit on a monthly basis based on the prior month's transfer use and exports to derive a recoverable limit. After gathering longer-term data, the limit would be applied on a longer term basis, across a full year of data to derive the ratio of EDAM transfer use to total exports. After EDAM launches and the ISO and other EDAM entities gain experience with implementing and applying these methodologies, we will consider changes and improvements to ensure it is applied appropriately and ultimately serves its function of avoiding cost shifts to the EDAM.

(b) Component 2: Percentage of New Transmission Builds

The second component eligible for transmission revenue recovery through the EDAM is associated with new transmission construction approved via applicable regulatory processes.[42] New transmission facility upgrades that increase the transfer capability between EDAM BAAs creating the potential for additional transfers. There could be foregone transmission revenues associated with non-firm and short-term firm transmission sales on new builds. This foregone revenue risk also should be considered. The amount of new transmission upgrade revenue requirement that would be recoverable through the EDAM is limited to the ratio of the non-firm and short-term firm point to point historical EDAM recoverable transmission revenues associated with third-party sales, associated with the transmission products described in component 1 above[43], on the new upgrade to the total EDAM entity transmission provider revenue requirement.

Table 1 above can be used to illustrate this. In that prior example showing derivation of the EDAM recoverable transmission revenues, the non-firm and short term firm point to point revenue requirement makes up $7 million of a total $100 million, *i.e.*, it is 7% of the total EDAM entity transmission revenue requirement. This percentage would be applied to the revenue requirement of the new transmission upgrade that increases transfer capability between EDAM BAAs. If the upgrade adds $50 million to the total revenue requirement, then the amount recoverable through the EDAM would be 7% of that amount, a total of $3.5 million.

A new transmission project is eligible for partial recovery through EDAM if it increases the transfer capability between two EDAM BAAs to support additional transfers and benefits for its participants, which is effectuated through and reflected in EDAM Transfer System Resource(s), (ETSR), between EDAM BAAs.

In comments to prior iterations of the proposal, some stakeholders requested that the component 2 mechanism also account for potential reduced short-term firm and non-firm transmission revenues associated with expiring legacy (non-OATT) transmission contracts, and the draft final proposal introduced this for consideration. Stakeholders commenting on this topic supported including this in component 2, recognizing it may not be a frequent occurrence and, to the extent the created ATC is sold through OATT process, it should reduce the recovery through this component. This is consistent with the general principle of allowing for recovery of costs associated with new transmission to account for a small portion of potentially reduced sales. Although transmission providers make transmission service available for sale under the terms and conditions of the OATT, there are still remaining legacy transmission contracts – executed prior to the adoption of the OATT – with unique terms and conditions. Over time, these transmission contracts may migrate to OATT service or otherwise expire. If a legacy transmission contract expires and is not converted to an OATT contract with that transmission customer, the transmission becomes available for sale through the OATT, and some of that

[42] The EDAM entity will need to provide supporting information to demonstrate approval of projects and relevant financial information to support the derivation of the amount to be recovered through the EDAM. The document should be signed by a senior executive of the organization or approved by the Board or other overseeing body.

[43] Component 1 is based on historical revenues associated with the following transmission products: monthly firm and non-firm transmission, weekly firm and non-firm transmission, daily firm and non-firm transmission, and hourly firm and non-firm transmission.

released transmission might support short-term firm and non-firm sales. In the context of the EDAM, the transmission provider may also see reduced revenues from sales of non-firm and short-term firm transmission associated with the release of transmission capacity resulting from the expiration of a legacy transmission contract. These reduced revenues would be approximated based on the same methodology applied to new transmission builds by applying the ratio of the short-term firm and non-firm historical revenues to the overall transmission revenue requirement. This ratio would be multiplied by the value of the firm transmission released to the market.[44] Because component 1 considers reduced transmission sales of short-term firm and non-firm transmission across the system as a whole, this design element would not need to be limited to transmission capacity that is created at the interties between two EDAM BAAs.

(c) Component 3: Recovery of Transmission Costs Associated with EDAM Wheeling through Volumes Net of Imports/Exports

The third component of revenues eligible for transmission revenue recovery through the EDAM is associated with wheels through an EDAM entity's transmission system in excess of the total net imports/exports transfers of the EDAM entity. Some WEIM entities have experienced this situation during certain periods across the year. In those situations, the WEIM entity's transmission system supported robust wheels through its system benefitting other WEIM participants, and this scenario could occur in the EDAM as well.

The proposal continues to be that in those limited periods where this net difference occurs, the EDAM entity would be compensated for the excess transmission use supporting net wheel through transfers across its system. The wheels through the EDAM entity system create benefits for other EDAM BAAs but not for that entity. In those instances, the excess wheels through the system should be considered foregone revenue for the EDAM entity. The volume of net wheels through the EDAM entity's transmission system, net of EDAM transfer imports/exports, would be compensated at the EDAM entity's filed and approved non-firm hourly point to point transmission rate.[45]

Stakeholders that commented on this particular element of the proposal largely supported or did not oppose the design. However, in comments to prior iterations of the proposal some commenters requested clarification that transmission costs for supporting wheeling through transfers above the import/export transfers should only recover these costs if there is insufficient alternate revenues to cover the uses of their system. This proposal clarifies that the EDAM recoverable transmission revenues, across the three components, are viewed together, and to the extent that the actual revenues through OATT sales exceed the historical EDAM recoverable transmission revenues, those revenues in excess of component 1 would be utilized to offset recoverable revenues through components 2 or 3 described above.

In comments to the draft final proposal, one stakeholder commented that compensation under this component 3 for net wheeling through transfer volumes in excess of import/export transfers

[44] To the extent there are unique conditions where the historical short-term sales cannot be derived, there may need to be consideration of an appropriate proxy to these on a case by case basis and discussed more broadly with the EDAM and stakeholder community.
[45] The EDAM entity will be required to submit supporting information for the derivation of the amount recoverable through component 3 signed off by a senior executive of the organization or otherwise approve by the organization's Board or other appropriate overseeing authority.

would allow for double recovery of transmission costs because component 1 already allows for recovery of historical transmission revenues associated with short-term transmission products. It is important to recognize that component 3 reflects compensation beyond component 1 and covers different uses of the transmission system than may be present today. Recovery under component 1 reflects recovery of historical transmission revenues associated with specified short-term transmission products, while compensation under component 3 provides for compensation associated with higher transmission use of the transmission system to support transfers, to support and derive benefits for the rest of the EDAM footprint, which are uses of the system not necessarily present today nor compensated. Moreover, historical transmission revenue volumes do not account for or reflect these new potential uses, associated with EDAM wheel through transfers across the EDAM entity's transmission system that may, in certain periods of the year and conditions, support more wheel through EDAM transfers across their system than import/export transfers.

(2) Allocating Revenue Shortfalls in the EDAM

The previous sections focused primarily on the inputs into the EDAM recoverable transmission revenues to recovery through the EDAM. This section describes a design to ensure each EDAM entity can recover the necessary revenues to cover its actual revenue shortfall based on the recoverable revenue elements and provides a true-up opportunity at the end of the year. The intent of the design is to cover actual revenue shortfalls as much as possible.

The proposal is that each EDAM entity estimate its expected annual revenue shortfall (associated with earlier components), which will form the basis for the amount it needs to recover over the year. This amount can also be converted from an annual amount to a monthly amount for each entity across the year. Once the estimated shortfall is identified by the EDAM entity, a rate that allows for recovery of the estimated shortfall across the footprint would be derived.

Prior iterations of the proposal recommended to apply this derived rate as an uplift rate that would be assessed either to gross load across the footprint or to demand plus supply across the footprint. In allocating this uplift charge, the proposal was to not allocate an EDAM entity its own revenue shortfall so its load does not have to pay for its own cost recovery.

Stakeholders that commented on the appropriateness of the allocation methodology generally supported allocating the uplift rate to gross load as opposed to gross load and supply. This is in large part predicated on the assumption that generation in the EDAM BAA is either a designated network resource dedicated to serving load or generators have purchased transmission service across the EDAM BAA transmission system. Stakeholders generally supported the proposal that the EDAM entity should not pay for its own revenue shortfall recoverable through the EDAM.

In light of the stakeholder comments, as well as the new requirement in this draft final proposal that generators within an EDAM BAA must be a designated network resource or otherwise have reserved transmission service under the OATT as described in section II.A.1(c)(3), the proposal continues to allocate the EDAM revenue shortfall to gross load[46] across the EDAM footprint. Load ultimately benefits from the optimized transfers, and because supply must be associated

[46] Gross Load: metered demand measured through meter data from end-use meters excluding excess behind the meter values or metered demand calculated without end-use meters.

with a transmission reservation on the system, supply will contribute to the costs of the system. However, each EDAM entity will not be allocated its own revenue shortfall.

The ISO would derive an annual EDAM entity-specific rate (which excludes its own recoverable shortfall amount), that would be applied against the gross load (MWh) in the EDAM footprint. This rate would be derived by (1) allocating each BAA's revenue shortfall to the other BAAs in proportion to that BAA's gross load divided by the total EDAM gross load less gross load of the BAA whose revenue shortfall is being distributed, (2) calculating the total BAA revenue shortfall allocation, and then (3) dividing the total BAA revenue shortfall allocation by the BAA gross load. The tables below illustrates the resulting rate for individual BAAs based upon this methodology.

BAA	Shortfall ($ in Millions)	Gross Load (MWh in Millions)
BAA1	$6	211
BAA 2	$2	18
BAA 3	$3	39
BAA 4	$4	70
Total	$15	338

BAA	Revenue shortfall Allocation ($ in Millions)					BAA Specific Rate[47]
	BAA1	BAA 2	BAA3	BAA 4	Total	
BAA 1	$0.0	$1.3	$2.1	$3.1	$6.6	$0.03 per MWh
BAA 2	$0.9	$0.0	$0.2	$0.3	$1.3	$0.07 per MWh
BAA 3	$1.8	$0.2	$0.0	$0.6	$2.7	$0.07 per MWh
BAA 4	$3.3	$0.4	$0.7	$0.0	$4.4	$0.06 per MWh
Total	$6.0	$2.0	$3.0	$4.0	$15.0	

Table 3: deriving a BAA-specific rate based on a gross load allocation.

The EDAM revenue shortfall amounts would be settled monthly. In the example above, BAA 1 would be assessed $0.03 per MW across its gross load for the month that would go toward ensuring the recovery of the forecasted EDAM revenue shortfall for BAAs 2, 3 and 4. These values are realistic as a starting point for EDAM revenue shortfall recovery because entities will continue to make OATT sales and the ISO will continue to collect the WAC. The numbers presented in the table 3 represent approximations of real gross load values of market participants and the resulting rates are representative of the rate range to the extent there were four EDAM participants. Appendix 2 provides additional illustrations of the resulting rate, with different EDAM revenue shortfall levels to provide a range of possible BAA specific rates.

[47] The BAA specific rate is calculated as the sum of BAA EDAM revenue shortfall allocations from other BAAs EDAM revenue shortfalls divided by the gross load of BAA in which the revenue shortfalls were allocated. For example, in calculating the BAA specific rate for BAA 1, consideration is only given to the costs of BAAs 2, 3, and 4 divided by the proportion of BAA 1's gross load to the gross load of those three BAAs.

(3) Truing Up the Forecasted Revenue Shortfall with the Actual Shortfall

Throughout the year, each EDAM entity will collect revenues towards its forecasted revenue shortfall. At the end of the year, each EDAM entity will also know its actual revenue shortfall based on the OATT sales conducted throughout the year, which would go towards reducing the revenue shortfall recoverable through EDAM. Based on the actual revenue shortfall and the amount of revenue collected by each EDAM entity (based on one of the rate methods above), there may be a recovery surplus or a shortfall at the end of the year.

The revised straw proposal offered two options for addressing any surplus or shortfall (1) a year end true-up where the surpluses and shortfalls are settled; or (2) year-end true-up carrying over the shortfalls or surpluses into the following year's calculation of the forecasted historical recoverable transmission revenues, which would affect the BAA-specific rate calculated. Under the first approach, shortfalls not recovered by an EDAM entity would be allocated based either upon the gross load ratio share (excluding the short entity). Under approach 2, any shortfalls or surpluses are carried forward into next year's forecasted revenue shortfall assessment (and either increase or decrease that value).

In comments to the draft proposal, stakeholder commented in support of option 2 – a year-end true-up that allows carrying shortfalls or surpluses of the forecasted historical recoverable transmission revenues into the following year's calculation. They recognized this may affect the calculated BAA-specific rate. This final proposal retains the framework of a year-end true-up as previously proposed. The ISO will monitor the process closely and work with stakeholders to adjust these processes if additional enhancements or clarifications are needed.

(4) Establishing Transparency and Miscellaneous Items

Throughout the initiative stakeholders noted the importance of ongoing oversight and monitoring of the historical EDAM recoverable transmission revenue process for any unintended consequences and to inform possible adjustment to the methodology as necessary. These stakeholders acknowledged a role for both the ISO and the EDAM entity to ensure unintended consequences can be identified and rectified promptly. Other stakeholders emphasized the need for transparency in this area to ensure that information forming the basis for recoverable revenues is made available publicly and is easily accessible and verifiable, instilling confidence in the resulting revenues that are recovered through the EDAM.

This proposal recognizes that transparency and oversight through robust monitoring are important aspects of the design for historical transmission revenue recovery through the EDAM. Monitoring and transparency by the ISO and EDAM entities will instill confidence in the overall design and allow for prompt identification and rectification of unintended consequences. Throughout the different sub-sections of the revenue recovery design, the proposal identifies transparency and data requirements. Additional suggestions to improve the transparency of the process can be considered and accommodated in the future.

Separately, throughout the initiative some stakeholders suggested that accrued transfer revenues associated with bucket 3 transmission – unsold firm ATC made available by the transmission provider – should be credited toward offsetting the EDAM recoverable transmission revenues. They note that the EDAM entity would realize value from the unsold transmission in exchange for making bucket 3 transmission available.

In this context, it is important to recognize the distinction between the EDAM recoverable transmission revenues and the accrual of transfer revenues to determine if these should effectively be commingled and transfer revenues used to offset the EDAM revenue shortfall. Transfer revenue represents a separation in the marginal energy costs between EDAM BAAs, and, along with congestion costs, they are new day ahead cost exposures to customers that are currently hedged in the bilateral world. Those transfer revenues can be utilized to hold transmission customer harmless because in some periods costs may be incurred, but in other periods, surplus revenues can offset those costs to mitigate customers' exposure. This may not potentially be seen as a new source of revenue but as a mechanism to hedge cost exposure for customers, along with congestion revenues. On the other hand, the design for the EDAM historical transmission revenue recovery seeks to ensure the transmission provider continues to recover its historical revenues paying for the embedded costs of the transmission system.

Another important element to recognize is that all transmission buckets realize and accrue transfer revenue, even bucket 1 and bucket 2 where the transmission reservation costs have been recovered by the transmission provider. Similarly, transfer revenue does not represent all of the uses of the transmission system, particularly given the conditions and limited frequency with which transfer revenue accrues. Bucket 3 transmission can be utilized every hour of every day to support EDAM transfers, and the revenue recovery framework is intended ensure historical revenue recovery associated with short term firm transmission reservations, which, in part, are represented by bucket 3 transmission. Although there is value realized through the accrual of transfer revenue associated with bucket 3 transmission, in instances when the transfer limit binds, these revenues do not necessarily represent the quantity and frequency of bucket 3 transmission use to support EDAM transfers. As such, this proposal does not require that bucket 3 transfer revenues offset the EDAM revenue shortfall for EDAM participants.

f) Registering and Exercising Transmission Rights

An important design component of the transmission framework is to allow transmission customers to exercise their transmission rights, whether under the OATT or as legacy (pre-OATT) transmission arrangements. In the ISO market today, the market recognizes the exercise of legacy contracts through functionality known as the exercise of "ETCs/TORs."[48] An entity holding a legacy transmission contract or a transmission ownership right exercises these rights by submitting a self-schedule that is paired with the ETC/TOR. This indicates to the market the exercise of transmission rights that is not subject to a transmission charge, receives a congestion hedge between the source and the sink, and has a high scheduling priority. The permissible parameters of ETC/TOR rights are defined by instructions provided to the ISO by the transmission owner - the ISO does not interpret existing contracts or define ownership rights.

Throughout the discussion of the transmission commitment design, the proposal has alluded to the exercise of ETC/TOR functionality to enable the transmission customer to exercise its OATT (or legacy) transmission rights and also obtain the hedge on the congestion. The congestion hedge not only precludes the accrual of congestion costs, it also precludes the accrual of congestion revenues. Functionality and procedures are necessary to support the exercise of existing transmission rights, including registration of the transmission rights so they are known

[48] ETC/TOR functionality refers to the mechanism for exercising existing transmission contracts and transmission ownership rights. It is used in this context to reference the functionality, not the rights.

to the ISO and the market.[49] These procedures and the associated functionality ensures that when these rights are exercised they are visible to and respected by the market, as well as settled.

Transmission rights in EDAM afforded ETC/TOR like treatment must be registered in the ISO master file following coordination between the transmission customer or transmission owner who holds the transmission rights and the EDAM entity (*i.e.,* the transmission owner or transmission service provider) that will validate the transmission rights. The entities would then coordinate with the ISO regarding the submission of transmission rights and transmission curtailment (TRTC) instructions that define the nature and scope of transmission rights. Once the TRTC instructions are finalized and registration in the master file is established, the transmission rights will be assigned a contract reference number (CRN) that identifies them. This unique number, which could correspond to the numerology used by the transmission owner if it is compatible with the ISO's systems, must be utilized when self-scheduling the use of such eligible transmission. The CRN also provides an indication to settlements not to assess transmission charges with the exercise of these rights, and the assigned scheduling priority in the market.[50] One stakeholder commented that the registration process for transmission contracts may be overly burdensome, especially with sizable volumes of transmission contracts that may be prevalent across transmission providers and balancing area. The ISO recognizes these concerns and is open to working with individual EDAM entities to find ways to ease this burden, including the potential aggregation of transmission rights that may not require registration of individual transmission contracts.

Because the EDAM entity transmission provider will continue to sell short term firm transmission under its OATT, it will also be necessary to design a system or mechanism where monthly, weekly and daily firm transmission reservations in particular can be exercised, released, or otherwise made available to the market. The transmission customer would register, in coordination with the EDAM entity not only transmission rights across interfaces between EDAM BAAs, but also point-to-point transmission rights that are internal to the system that they plan to exercise.

2. Day-Ahead Resource Sufficiency Evaluation

The EDAM resource sufficiency evaluation (EDAM RSE) is intended to ensure that each EDAM entity, including the ISO, is able to meet its BAA obligations (forecasted demand, uncertainty, ancillary service requirements) prior to engaging in transfers with other participating BAAs through the day-ahead market. Because balancing authority areas across the West are not subject to a common resource adequacy or resource planning program, the EDAM RSE is intended to serve as a common mechanism to ensure day-ahead supply sufficiency and avoid leaning on the pool of supply by any one EDAM participant. Although participating EDAM entities comply with their own individual resource adequacy or resource planning programs, in stressed system conditions the EDAM RSE design incents entities to come to the market with sufficient forward procured supply to prevent entities with insufficient resources leaning on others.

[49] *See* ISO Tariff sections 16 and 17 (explaining the procedures by which the ISO honors existing rights on the ISO controlled grid and transmission ownership rights in the ISO balancing authority area.
[50] Failure to reference the CRN properly and establish a balanced source and sink consistent with the TRTC instructions and master file registration may result in assessment of congestion and other charges.

Additionally, the day-ahead RSE protects the diversity benefits created from participation in the EDAM through the procurement of imbalance reserves to meet any uncertainty or variability that materializes between day ahead and real time. Traditionally each BAA is responsible to meet its forecasted load and variability in net load between day ahead and real time to ensure reliable operations. The EDAM reduces the procurement requirement of each participating BAA to meet uncertainty over a large geographic footprint by sharing the collective risk that the uncertainty will materialize across the diverse footprint. The EDAM RSE design helps preserve this diversity benefit of a lower collective uncertainty requirement procurement target into real time.

The EDAM RSE tests whether each participating BAA has sufficient capacity and flexibility ahead of participating in the day-ahead market at 10:00 a.m. and imposes consequences for a BAA that fails the evaluation. Passing the EDAM RSE ensures that all resulting EDAM transfers facilitate beneficial economic displacement, meaning that the EDAM transfer allows a participating BAA to access more economic energy than it would have without access to the EDAM. The process also presents an opportunity to procure additional supply through the market or backfill a deficiency and thereby retain the pooling benefit of passing into real time.

a) Conducting the EDAM RSE

The proposal is to conduct a binding EDAM RSE at 10:00 a.m., prior to running the day-ahead market. This proposal also includes the ability to conduct advisory EDAM RSE runs at 6:00 a.m. and 9:00 a.m., with the results available on demand to each EDAM entity. In response to extensive stakeholder feedback in the EDAM RSE technical workshops held in the spring of 2022, the proposal is to offer an on-demand application to conduct advisory RSE runs.

The demand forecast and variable energy supply forecast used in advisory runs will be taken from the last valid forecast either (a) created by the ISO's forecasting system, or (b) submitted to the ISO by the EDAM entity. The proposal is to lock all forecasts used in the EDAM RSE at 9:00 a.m. on the day before the trading day. This will provide EDAM BAAs a fixed obligation towards which they can schedule prior to the final binding EDAM RSE.

The proposal is to calculate each EDAM BAA's imbalance reserve requirements[51] at 6:00 a.m. and 9:00 a.m. The results obtained in the 6:00 a.m. advisory run can be used in all on-demand advisory runs by an EDAM entity prior to 9:00 a.m. The results of the day-ahead market uncertainty calculated at 9:00 a.m. will provide an updated uncertainty requirement that the ISO will use in the 9:00 a.m. advisory run and the final binding EDAM RSE run shortly after the day-ahead market submission process closes at 10:00 a.m., shortly prior to running the day-ahead market. Nevertheless, EDAM entities will have access to the tool so they can test their sufficiency on an advisory basis outside of the 6:00 a.m. and 9:00 a.m. advisory runs.

b) Optimization Tool

The EDAM RSE application will optimally determine if an EDAM BAA can achieve a feasible operating schedule given its obligations using submitted bids. As currently formulated, the application will not reflect a full security constrained economic dispatch because it does not include transmission constraints or calculate resultant power flows.[52] The application will model all of an EDAM BAA's load and supply on a single bus; then it will perform a unit commitment optimization using all of the existing ISO resource models. The proposal is to set the optimal

[51] This proposal is being considered in the Day-Ahead Market Enhancements (DAME) initiative.
[52] The optimal solution will be subject to all constraints defined in Appendix 1.

function of the application to minimize the total cost, as a means to determine the most efficient use of the varying resources types and capabilities made available to the EDAM. The results will be reflected as the quantity of insufficiency across the day-ahead horizon. The application will be set to minimize the requirement shortfall across the entire 24-hour optimization horizon. The EDAM RSE application accomplishes this by minimizing the total cost utilizing the EDAM BAA's available resources across the day, irrespective of that BAA's ability to pass the EDAM RSE in any particular interval. Effectively minimizing cost in this manner likely will spread the requirement shortfall across multiple intervals. The results of this optimization will inform an EDAM BAA's ability to cure the shortfall through the EDAM RSE as described in section II.B.2.(g).

c) Resource Deliverability in the EDAM RSE

Certain stakeholder comments have raised concerns that resources shown in the EDAM RSE ultimately may be unavailable for dispatch within the market application because transmission constraints existing in the market optimization may not be considered within the RSE. Underlying this concern is the potential that a BAA could pass the EDAM RSE yet still have insufficient resources available to clear the day-ahead market. Stakeholder comments also broadly recognized that although modeling the, transmission constraints in the EDAM RSE was desirable, it would not increase the accuracy of the test sufficiently to justify the significant effort and complexity of implementing such modeling at this time. For reasons discussed below, the draft final proposal does not propose modeling transmission elements and constraints within the EDAM RSE. The proposal includes adopting stakeholder recommendations that the ISO consider monitoring and evaluation of the RSE for a period of time to ensure that it performs as expected without the modeling of transmission constraints.

Including transmission elements in the EDAM RSE would require using the ISO's full network model (FNM), which in turn would require integration with additional market applications.[53] Functionally, the application would become a proxy run of the ISO's existing day-ahead market. Given the computational time required to run the application in this configuration, the on-demand functionality could not reasonably be supported, and thus there would be trade-offs between the number and frequency of advisory runs prior to the final binding EDAM RSE and the accuracy of the application itself. Further, all solutions from this configuration of the application necessarily must be determined using direct current (DC) power flow, which by default eliminates consideration of marginal loss factors in the test. In addition, if the design were to include transmission elements in the EDAM RSE, we would need to resolve several important questions:

- Do the shift factor matrices need to reflect the topology at the time of every advisory run; what is the acceptable level of accuracy of EDAM RSE with the full network model and transmission constraints?
- What volume of transmission constraints would be tested for in the market run?
- How would remedial action schemes (RASs) or nomograms be considered?
- What consideration should be given to intertie bids at the ISO's BAA border?

[53] Additional integration would be necessary with the ISO's webOMS, Enterprise Model Management System (EMMS) and potentially with applications that are utilized to determine available transmission capacity (ATC) across scheduling paths.

Beyond these accuracy trade-offs and the functionality challenges, there would need to be consideration of networked transmission effects to determine actual deliverability. This includes the power flow results of the optimal unit commitment in neighboring EDAM BAAs, assumed dispatch in non-EDAM BAAs, and the potential for market constraints in those BAA's to effect networked power flow. If an insufficiency is identified, the policy would need to include a methodology to somehow attribute the cause of this insufficiency accurately.[54] For example, should a BAA's capacity be disqualified because the market optimally dispatched resources in neighboring BAAs that resulted in some shown generation being unavailable due to congestion?

Given the additional complications created by including transmission elements in the EDAM RSE, the proposal is not to include transmission constraints within the RSE at the onset of EDAM and instead to monitor the results of the EDAM RSE to assess whether capacity that is regularly shown undeliverable and to what extent. The ISO will do this by comparing the EDAM RSE showing with IFM and RUC awards during instances when the RUC process is infeasible. This will allow the ISO to assess the level of supply shown for purposes of passing the EDAM RSE that is undeliverable because the supply would have neither an IFM nor a RUC award. The results of this monitoring during parallel operations and the first year of EDAM participation will help inform market design evolution.

d) EDAM RSE Requirements

The EDAM RSE ensures that each participating BAA is separately able to meet its obligation prior to participating in the EDAM. The EDAM RSE will test an EDAM entity's ability to meet its BAA requirements, including demand and ancillary service obligations, in each of the 24 hours of the day-ahead market run, as well as the flexibility to ramp between the requirements in each hour. The following summarizes the elements of the EDAM RSE:

(1) **Forecasted Demand:** Each EDAM BAA's ability to meet its forecasted demand requirement ensures sufficient supply is available to meet forecasted energy usage and prevent leaning on the capacity or flexibility of other participating EDAM BAAs. The ISO will offer a demand forecast for each EDAM BAA. If an EDAM entity chooses not to utilize the ISO forecast, it can submit its own forecast with the understanding that referencing the most accurate forecast is the objective. The proposal is that the forecast contain the average loss factors as defined by each EDAM entity in its OATT; EDAM generation-only BAA's will have an average loss factor applied based on their forecast or bid in resource output. This will ensure the most accurate forecast is used for the EDAM RSE and RUC process; metrics will be maintained to ensure the most accurate forecast is being used.

(2) **Imbalance Reserves:** The proposal is that each EDAM BAA possess sufficient supply and flexibility necessary to meet its imbalance reserve obligations. Procuring sufficient imbalance reserves will increase the reliability of EDAM transfers, thus maximizing the chances each EDAM BAA will have sufficient reserves to cover its upward and downward uncertainty requirements.[55] Potential generation-only EDAM BAA's may

[54] Outages are submitted to the market operator through the outage coordination process, but outage coordination remains the responsibility of each EDAM balancing area, making this difficult.

[55] The confidence level created by the imbalance reserve product will be predicated on allocation of the diversity benefit discussed in section II.B.2(h), while the imbalance reserve product is discussed in section II.C.2(c).

receive imbalance reserve obligations if they operate variable energy resources that drive the intraday uncertainty imbalance reserves are designed to address.[56]

(3) **Flexibility Requirement:** The EDAM will create an optimal schedule across 24 hours. An EDAM BAA's ability to meet forecasted ramping requirements across the 24-hour period is an integral component of being resource sufficient. The EDAM RSE application indirectly will assess this ramping capability by testing whether an EDAM BAA has a feasible schedule, ramping between hourly requirements across this same time period.

(4) **Ancillary Service Requirements:** Each EDAM BAA will define its ancillary service requirements consistent with its reliability requirements. These requirements will be provided to the market operator prior to running the EDAM RSE, and the EDAM entity can update them until 9:00 a.m. when all test inputs are fixed. The EDAM RSE will then test and validate whether an EDAM BAA has self-provided sufficient capacity to meet its requirements that does not overlap with supply made available to the EDAM. The EDAM will accommodate ancillary service requirements that are satisfied through participation in a reserve sharing group. If multiple EDAM BAAs participate in a reserve sharing group, the proposal is to require them to identify the transmission that will be utilized to ensure delivery of the shown reserve capacity, consistent with existing practices the entities have in place today for delivery of the reserves. This transmission capacity will be withheld from the market optimization to ensure the deliverability of the reserve sharing obligations in real time.

(5) **Reliability Capacity Bidding:** The proposal is that all entities participating in EDAM that submit a day-ahead energy bid into the Integrated Forward Market (IFM) also submit a bid for a matching quantity of reliability capacity in the RUC process of the day-ahead market. Availability bids for any portion of the forecasted supply of variable energy resources will be inserted for any forecasted quantity that does not have a bid. This will ensure RUC has sufficient capacity and accurately considers the impact of variably energy resources when clearing against the forecasted obligation.[57]

e) EDAM RSE Inputs

The EDAM RSE application will utilize energy bids and self-schedules to determine feasible operating schedules. The test will assume all owned and contracted resources are available for the next day. The EDAM RSE will count third party resources[58] located within the ISO BAA that are bidding into the EDAM but are not otherwise forward contracted.[59] EDAM will include functionality for the EDAM entity to validate the contractual status of all resource bids and self-schedules within its BAA, without pricing information. This functionality will allow the EDAM entity to ensure third party resources not under a forward contract with a load serving entity either internal to or external to its BAA are not counted within its RSE (or are counted if the resource is contracted elsewhere and the transaction is being considered as a bucket 1 transfer to another EDAM BAA).

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[56] Variable energy resources operated by a generation-only BAA will be eligible to fulfill this requirement.
[57] RUC is further discussed in section II.C.3.
[58] Resources participating within the ISO BAA operate under a participating generator agreement (PGA), which references performance obligations in the ISO tariff.
[59] Additional discussion regarding the counting of intertie bids made at the ISO border with a non-EDAM BAA are discussed in section II.B.2(e).

(1) Resource Specific Energy Bids – Gas Optimization

Gas nominations for the following day typically occur prior to 11:30 a.m., but the results of the day-ahead market post around 1:00 p.m. This can result in market participants having to make decisions regarding day-ahead gas nominations without the benefit of resource schedules for the next day. Further, it could require them to engage in additional intra-day gas trading. Notwithstanding this complication, an entity is expected to perform in real time consistent with its day-ahead market awards. Entities currently participating in the ISO's day-ahead market have successfully navigated similar challenges caused by these different timelines through internal procedural adjustments. In addition, the ISO allows entities to reflect changes in fuel cost through the reference level change request process.[60] This helps mitigate risk.

To aid entities participating in EDAM in their gas procurement planning, the proposal is to share advisory D+2 market results. The information provided in these advisory D+2 results is an estimation based on the robustness of the bids available at the time, and the resulting dispatch can inform gas procurement decisions prior to the D+1 market run. The proposal is to provide access to the advisory D+2 market results to the scheduling coordinators representing gas resources. They can request the information for their specific gas generators no later than 5:00 a.m. of the day-ahead market run; *i.e.*, 5:00 a.m. on D+1. Limited results would also be shared with the EDAM entity, transfer schedules that can support reliability studies and outage coordination.

Stakeholders also suggested additional enhancements such as the ability of the market to apply constraints or grouping constraints that capture pipeline restrictions in an EDAM footprint and ability to aggregate use limited modeling of gas resources in particular gas regions. The proposal is to consider further enhancements later as these are specific to pipelines to which multiple EDAM BAA's may interconnect. Any potential use of such a constraint will require careful coordination with potential EDAM BAAs. Some stakeholders also indicated that consideration should be given to extending the advisory day ahead results to D+3 to help inform gas procurement over the weekend period. The proposal is to make these advisory D+3 day-ahead results available; however, it should be noted that the accuracy of these results is only as good as the bids and available VER and demand forecasts, which in the D+3 timeframe may not be sufficiently accurate for this purpose. The ISO remains open to additional enhancements as necessary to support effective resource participation based upon unique limitations or considerations associated with gas pipeline delivery systems supporting EDAM entities.

(2) Resource Specific Energy Bids – Hydro Operation

Hydro resources often face limits on their production due to constraints imposed by water delivery requirements, environmental requirements, and other factors that can affect the energy available from the resource. The proposal is to allow EDAM BAAs to manage their hydro resources through daily energy limits, which set a limitation on the total discharge of individual resources, and hourly energy bids, which inform minimum discharge obligations and availability to discharge. Participants can use these constraints in combination to meet a hydro project's underlying requirements and efficiently schedule their resource through the day-ahead market process. In addition, the proposal is that the ISO will facilitate hydro resource modeling that

[60] ISO BPM – Market Instruments (see Attachment O)

allows multiple related resources comprising an aggregated resource to function as a single resource in the market.[61]

(3) Variable Energy Resource (VER) Supply Bids

In developing its day-ahead supply plan, an EDAM BAA may rely on the forecasted output of VERs. The financial nature of a day-ahead market does not always incentivize VER scheduling coordinators to bid up to the full quantity of the VER forecast due to the inherent uncertainty in that day-ahead forecast. This decision generally is made because the uncertainty inherent in day-ahead forecast decreases confidence in the upper and lower bounds of the forecast. The ISO has observed that the difference between forecast and bid in VER supply typically is backfilled by convergence supply bids, which allows the existing day-ahead market to clear; adjustments are then made in the RUC run to account for the difference in forecast and bid in supply. To ensure VER supply is appropriately reflected in the EDAM RSE the proposal is to create default supply bids for the difference between the bid in and forecast quantity for use in the EDAM RSE only. The day-ahead market will then utilize the bid in supply and convergence bids, as applicable, within its optimal clearing process. For EDAM BAAs that do not allow convergence bidding, bidding limitations will exist in the IFM to ensure demand cannot be scheduled above the supply brought by the BAA. These load bidding rules will be based on the difference between the bid-in VER supply and the forecast VER output; however, the market operator will work with each BAA to adjust this quantity for forecast supply forecast that may not be deliverable because of system conditions. These bidding rules will ensure that the day-ahead market is not exposed to artificial scarcity and its potential to increase prices artificially, due to BAAs participating without sufficient bid-in resources to clear against their own demand obligations. It remains the responsibility of each EDAM BAA to develop rules for how they or load serving entities embedded within their footprint account for the reduced ability to bid in load. Further, to ensure there are sufficient bids to clear RUC, the proposal is to require the scheduling coordinator for each VER to submit RUC availability bids up to the resource's variable energy forecast;[62] otherwise the ISO will insert a zero dollar availability bid for that VER into the RUC. These rules will reasonably ensure the supply clearing in the day-ahead can reliably meet forecasted real time conditions.

(4) Non-Resource Specific Resources

EDAM BAA day-ahead supply plans consist of resource or load modification programs that cannot explicitly be modeled in in the EDAM. This circumstance generally arises when the source or transmission is unknown in the day-ahead timeframe or the load modification program does not conform to existing demand response models developed by the ISO. The proposal is to account for these resources in the EDAM RSE as described below.

[61] Under this paradigm, the EDAM entity must demonstrate the reasonableness of the proposed aggregation and preserve the security of the underlying transmission by its operation of the hydro aggregation.
[62] DAME proposes to create an additional market power mitigation run within the RUC to test for market power with the reliability capacity product. Accurately representing forecasted VER production is necessary to ensure the accuracy and effectiveness of that market run.

(5) Delivered Firm Energy Contracts

Delivered firm energy contracts, commonly but not exclusively executed through WSPP Schedule C arrangements, are an important component of the supply portfolios of Western load serving entities and have been historically reliable and dependable sources of supply. These types of supply contracts generally include liquidated damages provisions or other performance incentives designed to ensure dependability. Moreover, these are delivered contracts where the supplier makes the necessary transmission arrangements to deliver the energy to a the border of the BAA where the contracting load is located and the point at which the contracting load serving entity takes title to the generation. For these types of firm energy contracts, while the delivery point to BAA is known, the source and transmission path may not be known in time for the day-ahead market close (10:00 a.m.) when bids are submitted into the market. WEIM entities depend upon these arrangements to varying degrees in their resource portfolios, and this dependence may also vary seasonally. Similarly, California load serving entities rely on delivered firm energy contract arrangements to secure imports as part of meeting their resource adequacy program obligations. Stakeholder comments emphasized the dependence on these arrangements across the west, their historical reliability in performance, and the need for these arrangements to count toward the RSE.

Given the potential lack of resource and transmission specificity by the time of day-ahead market run at 10:00 a.m., stakeholders have expressed concerns regarding challenges that these arrangements raise, including the risk of the supporting resource potentially being double counted in how they are offered into the market and potential congestion price implications. To the extent WSPP-C contracts between EDAM BAA's are modeled in the market and included in congestion management, the contracts will implicitly receive equal priority to other transfers using potentially limited transmission between EDAM BAAs in the day-ahead market.

The proposal is to count delivered firm energy contracts in the EDAM RSE, including WSPP-C, and similar forward contracted supply for the participating EDAM BAAs. If forward contracted supply is offered to the ISO through an intertie bid, the ISO will provide functionality to associate that intertie bid with a forward contract for purposes of counting in the EDAM RSE.[63] All source-specific forward contracted supply will count towards the EDAM RSE and, if possible, will be modeled in the EDAM.

When the resource supplying the contract cannot be identified, assumptions must be made regarding the source of the supply. These assumptions will affect the power flow of the day-ahead market and, ultimately, the pricing of the day-ahead market. To minimize the inaccuracy in day-ahead market price formation results inherent to non-source specific supply contracts, the proposal is that all forward supply contracts considered in the EDAM RSE, at a minimum, identify the source BAA prior to running the day-ahead market. Stakeholders have noted that at times they can identify specifically the source of the generation, but if not they can identify the source BAA with reasonable frequency. The participating BAA where the supply from these contracts will sink is expected to make every effort to coordinate both with the supplier/marketer fulfilling these contracts and the source BAA, to ensure these contracts are modeled as a bucket 1 transfers for purposes of EDAM RSE counting as well as IFM market clearing. Functionality will be available to allow the source BAA to incorporate additional resource bids in its EDAM RSE supply to offset the bucket 1 transfer. This will lead to better price formation outcomes in the IFM and, to the extent these non-resource specific supply contracts are modeled in this manner, reduce the potential double counting of resources.

[63] Additional discussion regarding the external resource participation can be found in section II.C.6.

Modeling non-resource specific supply contracts sourced from somewhere within the EDAM footprint as price taking self-scheduled injections into the sink BAA will serve as a secondary option, however, its use is discouraged due to its potential negative impacts on price formation and potential for double counting of supply. Non-resource specific supply contracts sourced from external to the EDAM footprint will be modeled as price taking self-scheduled injections into the sink BAA. Counting non-resource specific supply that is modeled as a self-scheduled injection will be limited by the transfer capacity of the intertie on which the supply is modeled.

Given how the modeling of these contracts in the market can affect day-ahead price formation, the ISO will monitor this issue. If the ISO observes that self-scheduled injections create persistent deviations in results between the day-ahead and real-time markets, causing congestion pricing differences, or producing other adverse outcomes, the ISO will consider developing mitigation measures such as volumetric limitations on the extent to which these contracts can be used.

In summary, the proposal is to count delivered firm energy contracts within the EDAM RSE with the following considerations:

- Strongly encourage identification of the source or source BAA, particularly if it is located in EDAM footprint.
- If source BAA is not known, the arrangement will be modeled as a self-scheduled injection at the intertie of the sink BAA.
- Tagging requirements discussed below that instill confidence in performance of these arrangements.
- Provision for continued monitoring of the impacts of these arrangements on congestion pricing, delivery and performance rate, and ultimate source of the generation.

Separately, the proposal is to require energy scheduled by the EDAM from non-source specific forward supply contracts be tagged within three hours of the ISO publishing day-ahead market results.[64] This will increase confidence that this non-source specific forward supply will be delivered in real time because submitting a tag requires resource and transmission identification. The ISO will publish an EDAM BAA's quantity of import supply that does not have a day-ahead e-tag for situational awareness of BAAs that participate in the EDAM.

For the remaining schedules that lack a valid day-ahead e-tag within the timeframe described above, the EDAM entity will have until the start of the short term unit commitment horizon (STUC),[65] *i.e.*, the final four intervals which correspond to the trade hour, either to submit e-tags and/or replace the capacity with other firm schedules or physical resources. If the EDAM BAA does not tag the outstanding schedules prior to the start of the STUC run, the proposal is to remove the BAA from the pooled WEIM RSE approach.[66]

Some stakeholders submitted comments seeking to establish a *de minimis* dead-band that would recognize how small failures to timely tag should not remove the EDAM entity from continuing within the WEIM RSE pool. If cleared imports are not tagged by the timelines noted above, the proposal allows the EDAM entity to cure these failures through resupply of the

[64] The day-ahead market results are published at 1pm. If publication is delayed, the tagging requirement is within three hours following publication of the results.
[65] The short term unit commitment run is part of the ISO's real-time market. It runs hours for the upcoming 18 15-minute intervals resulting in binding unit commitments for resources who otherwise are unable to be started by the real time unit commitment process.
[66] The proposed consequences for not passing the EDAM RSE are discussed in section II.B.2(f)

capacity by the STUC horizon, through additional real-time bids, to replace the supply previously not tagged. In the ISO, for example, additional supply bid in under a real-time must offer obligation or other internal resources can cure the tagging deficiency and keep the entity within the pooled WEIM RSE. Similarly, an EDAM entity can offer in additional supply to the market (whether economically bid or self-scheduled) to cure the deficiency and remain in the pool.

The EDAM BAA that fails to cure its untagged supply will not be a party to the shared uncertainty requirement procured for the EDAM footprint as a whole. The excluded EDAM BAA will instead receive schedules that were optimally procured from elsewhere in the footprint for purposes of passing the WEIM RSE; this is due to the energy and capacity transfers awarded by the day-ahead market meeting the excluded EDAM BAA's day-ahead obligations. Under this proposal, the STUC run assumes transfers into the EDAM BAA that did not pass the RSE are limited for the final four intervals. This allows the market to start additional resources that will be available to the excluded EDAM BAA, increasing its chances of resolving the shortfall in the real-time market.

If supply without a supporting valid e-tag causes the EDAM BAA to fail the WEIM RSE, the EDAM import/export energy and capacity transfers to/from the failed BAA would nonetheless be supported through the market optimization. Per stakeholder feedback, at this time the proposal is to not consider differentiating transfer priority between the real time and day-ahead market; more discussion on this topic can be found in section II.A.2(d).

The proposal is that the Department of Market Monitoring report monthly on the volume of day-ahead non-resource specific schedules that fail to submit valid e-tags prior to conclusion of the WEIM RSE. This monthly reporting could build on the existing reporting the Department of Market Monitoring already conducts for the WEIM.

(6) Day-Ahead Intertie Bids for EDAM BAA's

Stakeholder feedback supports the draft final proposal's direction regarding how non-resource specific intertie bids submitted at the ISO BAA border are counted in the EDAM RSE. Specifically, the proposal is to count economic supply offers in the EDAM RSE at ISO interties with non-EDAM BAAs (*i.e.*, "intertie bidding"), if those supply offers are associated with a forward contract[67] with a load serving entity within the ISO BAA or otherwise have a reasonable expectation of delivery. Accordingly, the proposal is to count:

- Intertie bids associated with a resource adequacy contract whether shown as part of a resource adequacy supply plan on not.
- Intertie bids originating from resources that are pseudo tied with the ISO BAA – these resources have their output telemetered into the ISO and are deemed produced in the ISO BAA under the terms of a contract with the ISO under the tariff.[68]
- Intertie bids originating from dynamically scheduled resources into the ISO BAA – these resources provide telemetered readings of their intertie schedules and have an

[67] The ISO will provide a means for load serving entities to link intertie bids with a forward contract
[68] ISO Tariff, *Pseudo-Tie Participating Generator Agreement,* Appendix B.16.

agreement with the ISO (with scheduling coordinator and host balancing authority area) under the tariff that sets out operating requirements.[69]

- Intertie bids originating from a *non-dynamic resource –specific system resource* – these are source specific external resources that have an executed agreement with the ISO that sets out performance and operating requirements.[70] In practice, these resources have a contractual relationship with ISO load serving entities so they can be considered as contracted supply.

Each of these transaction types indicates a supplier's intent to sell energy to the ISO BAA in the day-ahead market. This, combined with the observed performance of intertie supply, demonstrates confidence that these supply offers will deliver in real time, satisfying their obligations under the ISO tariff. The ISO tariff includes an under/over delivery charge that assesses penalties for intertie resource deviations from their market schedules.[71] These obligations should be sufficient to count ISO intertie bids as proposed herein; nevertheless, the ISO will continue to monitor deliveries from these supply resources and evaluate enhancements to address any identified concerns.

(7) Load Modification/Demand Response Programs

EDAM BAAs may have emergency supply or load modification programs that inform its next-day operating plan. The EDAM design will account for these programs and ensure their potential use does not preclude a BAA from realizing the benefits of day-ahead market participation. To facilitate this approach, the ISO's two demand response models that allow load modification programs to participate in the market as load curtailment will be available in EDAM. These models allow supply side demand response to offer supply bids into the market as either price responsive or reliability triggered load curtailment, and they include metering and telemetry requirements. However, EDAM entities may have their own demand response programs that may not align with these existing market models.

The proposal would allow EDAM BAAs to represent load modification programs, or supply types that can only be utilized during real time emergencies, through a demand forecast adjustment similar to that used in the WEIM; these modifications will be utilized in both the EDAM RSE and the RUC process.[72] The demand forecast adjustment represents an expectation and a commitment the EDAM BAA will utilize these programs in real time if forecasted conditions materialize; effectively these programs becomes a part of the an EDAM BAA's day-ahead plan. The market operator will review load modifications made to the EDAM RSE requirement against demand response utilization in the real-time to ensure this functionality is not being used to pass the EDAM RSE erroneously. If this functionality is being misused, the market operator will consider limitations to this functionality and potential load bidding rules in the IFM. The objective of this is to prevent an entity from manipulating the EDAM RSE requirements for purposes of

[69] ISO Tariff, *Dynamic Scheduling Host Balancing Authority Operating Agreement,* Appendix B.9; *Dynamic Scheduling Agreement for Scheduling Coordinators,* B.5.
[70] ISO Tariff, *Resource-Specific System Resource Agreement,* Appendix B.13.
[71] In addition, as part of the *Price Formation Enhancements* the ISO is actively considering adopting different energy market bid caps between the day-ahead and real-time markets. This could discourage speculative intertie supply bids in its day-ahead process by potentially increasing the financial exposure of the scheduling coordinator moving into the real-time market.
[72] *See* ISO tariff section 29.34(l)(2)(D).

passing the test and avoiding the potential surcharge, while procuring excess supply in the EDAM to avoid using the demand response programs.

The existing rules regarding use of the ISO's reliability demand response resource (RDRR) limits these resources' ability to participate in the day-ahead market. If advisory EDAM RSE results indicate a potential inability for the ISO BAA to meet its next day obligations, the ISO could modify its forecast in the extended day-ahead market and the RUC. This will result in the market not procuring energy, imbalance reserves, or reliability capacity up to its full, un-modified, day-ahead forecast, but it would allow the ISO BAA to pass the EDAM RSE and fully participate in the day-ahead market. The ISO BAA would then have RDRR bids enabled into the real-time market for the same intervals ensuring the supply is available for the real-time market's optimal use.

f) RSE Obligation Trading Platform

The proposal is that RSE requirements can be traded between EDAM BAA's through a platform provided by the ISO, *i.e.*, functionally that serves as an ISO-hosted board to facilitate hourly transactions between EDAM participants. On an hourly granularity, EDAM BAAs can make residual supply and bucket 1 transmission available for usage by any neighboring EDAM BAA for a preset price. These trades will be effectuated by offsetting BAA obligations in the EDAM RSE.

	BAA 1	BAA 2	BAA 3
BAA IRU Up Requirement	1000	150	400
BAA1 – BAA 2 Trade	-50	50	-
BAA1 – BAA 3 Trade	-200	-	200
BAA2 – BAA 3 Trade	-	-	-
Final IRU Requirements	750	200	600

Table 4: Illustration of bid range trading.

The proposed on-demand EDAM RSE combined with this platform will allow the EDAM BAAs to work together to cure deficiencies for a duration shorter than currently possible through existing bilateral market products. The capacity offsets would be at prices agreed upon by both parties, while still leveraging the market for settlement. Curing potential EDAM deficiency through this process allows the seller to retain all of the revenue generated from the transaction unlike the administrative surcharge to cure deficiencies through the market clearing process as proposed below.

g) Failure to Pass the EDAM RSE

The proposal aims to present a balanced approach to cure deficiencies through the EDAM during all periods with a surcharge commensurate with the magnitude of failure. The surcharge would be based on the maximum hourly deficiency as determined by the EDAM RSE application. The quantity of the RSE failure in any interval is determined as the summation of the under-supply power balance constraint, imbalance reserves in the upward direction, regulation, spinning reserve, and non-spinning reserve relaxation. The EDAM RSE will minimize the capacity deficiency across the 24-hour horizon resulting in optimally calculated schedules that may contain a supply deficiency in any of the 24 hours. The maximum hourly value for failure will serve as an input to the failure surcharge calculation.

(1) Consequences of Failure

(a) On-Peak Upward Insufficiency Failure

The proposal is that deficiencies identified in the EDAM RSE be cured, if possible, by the EDAM market through a surcharge. The deficiency would be cured through surplus supply offers that have been willingly bid into the EDAM. The surcharge will vary depending upon the size of the EDAM RSE deficiency. The proposal is to have three tiers of varying consequence for upward insufficiencies for each EDAM BAA, which are described below:

Tier 1: *A de minimis RSE failure up to the higher of 10MW or the forecast error associated with the EDAM entity's upward imbalance reserve requirement.*

- This tier recognizes that a de minimis, failure of the RSE should not be subject to a consequence *i.e.*, an administrative surcharge. Failures within Tier 1 should not cause insufficient supply to clear the market.

Tier 2: *A RSE failure of a magnitude less than 50% of the EDAM entity's upward imbalance reserve requirement, but higher than a Tier 1 failure.*

- This tier recognizes that failures above a de minimis threshold can have more consequential impacts and thus will be subject to an administrative surcharge. Under this tier, although the EDAM balancing area can meet most of its obligations, it cannot meet 50% of its imbalance reserve requirement.
- Tier 2 RSE failures are subject to the administrative surcharge with a 1.25 multiplier. This tier creates a forward procurement incentive to ensure sufficiency ahead of the day-ahead market. A Tier 2 magnitude failure is subject to the administrative surcharge for the full amount of the failure.

Tier 3: *A RSE failure of a magnitude greater than 50% of the EDAM entity's upward imbalance reserve requirement.* A RSE failure within this tier is significant and sizable, indicating that the EDAM balancing area does not have sufficient supply to meet more than half its imbalance reserve requirement and potentially may not have sufficient supply to meet its load. This can create reliability conditions or potentially higher marginal prices for the rest of the footprint. Accordingly, Tier 3 RSE failures are subject to an administrative surcharge with a 2.0 multiplier, creating an incentive to avoid failures of this magnitude and cure insufficiencies through forward procurement before the day-ahead market. A Tier 3 magnitude failure is subject to the administrative surcharge for the full amount of the failure.

If sufficient excess supply is offered into the day-ahead market, the IFM will seek to cure the insufficiency. If the market cannot cure all resource insufficiencies, the power balance constraint will be relaxed optimally. This ensures the supply and transmission in the EDAM is used to meet the maximum quantity of bid in demand while minimizing losses and total cost for the EDAM footprint.

If the market can cure the full insufficiency, the EDAM entity will only be subject to the administrative surcharge based on the tier of the original RSE , and it will remain in the pool along with other EDAM entities that passed the day ahead RSE for pooled or joint evaluation of

the WEIM RSE. The sizing for all tiers and multipliers proposed for tiers 2 and 3 will be evaluated as the market evolves to ensure they properly incent entities to enter the EDAM resource sufficient.

However, depending on EDAM footprint conditions and the magnitude of failure, the market may not have sufficient excess supply to cure fully the insufficiency of an EDAM entity that has not met the RSE. If the market cannot cure the full insufficiency, the EDAM entity will remain subject to the administrative surcharge based on the tier of the original RSE failure, and it will be removed from the pool of EDAM entities being evaluated together for the WEIM RSE. The EDAM entity whose insufficiency was not cured by the market will be evaluated by itself for the WEIM RSE, and it will forego the diversity benefit of the day ahead uncertainty requirement.

Some stakeholders requested capping the amount of a resource sufficiency failure that can be cured by the market to, in part, avoid converting the decision to pass the evaluation into a purely financial decision. For example, they suggested a cap if the entity fails the EDAM RSE by a magnitude sufficiently significant to prevent meeting any portion of their imbalance reserve requirement, *i.e.*, some level whereby the market would not even consider a cure for the deficiency. Introducing a cap that would limit the market from curing an insufficiency even if there was excess supply in the market would preclude identifying efficient transfers and limit market efficiency. Such a limitation would likely need to be implemented through limitations on transfers, which throughout discussions stakeholders have not preferred as an initial design. Large magnitude RSE failures remain a valid concern because these can deplete excess supply, particularly in stressed conditions. The ISO is committed to monitoring the magnitude and frequency of failures and, as necessary, evolving the design to consider limitation of how much insufficiency the market should cure based actual experience and better understanding of the circumstances under which large magnitude sufficiency failures occur.

The administrative surcharge will be applied to the maximum hourly supply deficiency.[73] The surcharge will use the maximum of the Mid-C or Palo Verde day-ahead hub price for a 16-hour on-peak block of energy, for the entire multi-hour block, for each MW the BAA has been identified as being short. A credit will be applied in all hours that pass for the difference between a load weighted average[74] of LMP's within the BAA and the bilateral hourly price that the surcharge is based upon for each hour. The credit accounts for the value of the on-peak block of energy during non-failure hours. The credit will be structured to ensure it does not result in revenue generation, to the extent it exceeds the price of the surcharge. This crediting approach is similar to the bilateral contract construct in that during the hours the energy is not needed to meet a BAA's own obligation, it can be re-marketed or used to displace resources internal to that BAA.

Some stakeholders suggested that the administrative surcharge should not be based on bilateral market hub prices because those hub prices may not be sufficiently liquid to provide an

[73] By indexing the surcharge to the major bilateral hub prices, the surcharge will automatically scale with varying system conditions. Although concerns have been raised regarding the ongoing liquidity of the bilateral hubs following implementation of EDAM, the ISO does not determine their liquidity. If a hub does not remain sufficiently liquid, it may not be no longer be appropriate to use it as a reference point and the proposed reference will be reevaluated.

[74] Utilizing a load weighted approach allows us to account for GHG costs to the extent a BAA operates in multiple states both with and without GHG programs.

appropriate measure of financial consequences for failing the RSE, and they may have further decreased liquidity following implementation of the EDAM. These are valid concerns to consider and warrant continued monitoring of the liquidity at these hubs as a reference informing the size of the administrative surcharge. Nonetheless, as a starting EDAM design, the pricing at the different hubs represents, in part, the cost individual entities would bear if they must cure the insufficiencies without an EDAM and, by extension, when the EDAM is initially implemented. An entity that does not have sufficient supply to meet the RSE would seek out additional supply to cure that insufficiency, in part, by purchasing energy at these same hubs. The ISO views the use of the existing hubs as a preferable starting point for referencing the surcharge as compared to making the surcharge endogenous to potentially more liquid markets, such as the EDAM. The ISO will monitor the liquidity of the hubs and the effectiveness of the administrative surcharge so there are proper incentives to ensure day ahead sufficiency. The ISO remains open to evolving to other designs based on that experience and monitoring, including alternative methods of measuring the administrative surcharge.

The surcharge will be applied hourly, and it will prevent a BAA from profiting from the difference between the price for the on-peak surcharge and its hourly marginal energy cost. Hourly application ensures the hourly generation dispatch for a net-EDAM exporting BAA that cures the deficient BAA is compensated for its supply. More information regarding the revenue allocation can be found in section II.D.2(a).

To account for what otherwise would be the value of the on-peak block procurement during non-failed hours, the market operator will administer a credit as described above. Table 5 below provides a numeric example. Although the surcharge is based on the value of a 16-hour block of energy the credit represents the potential savings or additional uses of that energy during non-failed intervals.

Hour	Shortfall (MW)	Mid-C Price ($/MWh)	PV Price ($/MWh)	BAA Weighted LMP ($)	Hourly surcharge/credit ($)
1	0	100	80	40	1.25[max(0,(20*100)-(20*40))]
2	0	100	80	50	1.25[max(0,(20*100)-(20*50))]
3	20 (Tier 2)	100	80	90	1.25[(20*100)]
4	0	100	80	70	1.25[max(0,(20*100)-(20*70))]
Administrative Surcharge =					**$6000**

Table 5: Example of Administrative surcharge to cure supply deficiency through the EDAM.

Stakeholders expressed support for escalating consequences when there are repeated and systemic failures. In response, the proposal is to index the Tier 2 and Tier 3 multiplier prospectively for every daily failure during the retroactive 30-day period. For every additional failure over a rolling 30-day window, 1% will be added to the surcharge starting with the second failure. For example, if an EDAM BAA experiences a Tier 2 failure and it is the 7th failure over the rolling 30-day period, its surcharge multiple would be 1.31. The proposal contemplates these parameters can be adjusted in the future as necessary, based on EDAM experience to discourage repeated and systemic failures.

(b) Off-Peak Upward Insufficiency Failure

The surcharge is an alternative to procuring an on-peak block of energy. Although, failures can occur during off-peak periods[75], the proposal views this as unlikely. Depending on the magnitude of failure that occurs during this window, a penalty of 1.25 or 2.0 will be applied exclusively to the load weighted average[76] of LMP's within the deficient BAA asymmetric from on-peak failure, this asymmetry recognizes the likely surplus supply within the EDAM footprint and the reduced reliability risk and impact to market prices during this period. The ISO will monitor the frequency and magnitude of RSE failures during off-peak periods and, if failures are frequent, it may re-evaluate the design.

(c) Downward Insufficiency Failure

BAAs can also fail the EDAM RSE in the downward direction if they have a limited quantity of downward dispatchable or downward flexible supply. Failure in the downward direction does not create similar pricing or reliability impacts for the EDAM footprint as would failures in the upward direction. Although an individual EDAM BAA may experience downward flexibility challenges due to large amounts of low or zero dollar cost VER production in localized areas, downward flexibility is not expected to present a challenge across a more geographically diverse EDAM footprint. A geographically diverse EDAM footprint dramatically reduces the likelihood the market would have insufficient VERs to support de-committing a resources in another location to provide downward flexibility. For these reasons, the consequence of failure will be an hourly surcharge that precludes the failed EDAM BAA from profiting on the energy for which the EDAM market is providing an off-taker. For example, consider an EDAM BAA's failure of 10 MW in the downward direction with a resulting marginal energy price in the failed BAA of $25 MW. To ensure the failed EDAM BAA does not profit, a $250 surcharge will apply for the 10MW of oversupply for which the EDAM market provided an off-taker. This effectively claws back the energy revenue that would have been derived from the optimal solution.

If the IFM can fully resolve the deficiency and cure the EDAM BAA through the market optimization, the EDAM BAA would be treated as a member of the pool of passing BAAs as the EDAM results are used in the WEIM RSE. The proposal is that if the market is unable to resolve the entire deficiency, the EDAM BAA would retain its ability to participate in the pool of passing BAAs if, by the STUC horizon ending in the hour of their shortage, the BAA can backfill the deficiency with supply. This allows the EDAM BAA to participate in a pooled WEIM RSE, while also benefitting the passing group if the failed EDAM BAA cannot cure given its imbalance reserve requirement was calculated assuming the participation of the deficient EDAM BAA.

(2) Allocating Surcharge Revenue

The proposal is to allocate to EDAM BAAs the revenues associated with the surcharge to cure undersupply conditions that result in an EDAM BAA's failure to pass the EDAM RSE in the upwards direction on an hourly basis. An EDAM BAA will become ineligible for allocation of any upward surcharge revenue if it fails the EDAM RSE in the upward direction during any hourly interval across the day. This allocation of hourly upward surcharge revenues collected from EDAM BAAs failing the RSE will be based on the volume of net EDAM export transfers from an

[75] The off-peak period is defined as 10:00 p.m. – 6:00 a.m. Monday through Saturday, all day Sunday and Holidays.
[76] Utilizing a load weighted average can account for GHG costs to the extent a BAA operates in multiple states both with and without GHG programs.

EDAM BAA, including the EDAM BAAs transfers of energy and imbalance reserves. The upwards surcharge revenues will be allocated on a pro-rata basis among the passing EDAM BAAs based on this volume of net export transfers. This allocation methodology of hourly upward surcharge revenues applies to both for RSE failures that occur during on-peak and off-peak hours. Because these products overlap, the proposal is to consider the optimal procurement of imbalance reserves beyond an EDAM BAA's pro-rata obligation because the market may limit energy exports in lieu of procuring imbalance reserves for the footprint from within that EDAM BAA. Allocating the revenues to net-EDAM exporters and entities that procure imbalance reserves beyond their obligation appropriately rewards BAAs whose supply and flexibility is used for economic displacement and, in this case, ultimately curing the supply deficiency.

In summary, the proposal is to allocate revenues associated with the surcharge to cure an oversupply condition pro-rata to all net importing EDAM BAA's that have passed the EDAM RSE. Similarly, eligibility for downward failure revenue allocation will be predicated on the BAA not experiencing any EDAM RSE failures in the downwards direction during any interval across the day. The proposal also creates a backstop allocation to account for the possibility that no EDAM BAA avoids an upwards or downwards failure of the EDAM RSE across the 24-hour horizon. In this circumstance, the allocation will revert to hourly whereby only the hourly results, rather than the daily EDAM RSE results, will be utilized in determining eligibility for the allocation.

(3) Allocation of Assessed Failure Surcharges

The proposal is that in the event of a RSE failure within one of the tiers described earlier, the ISO will assess an administrative surcharge corresponding to the failure tier to the failing EDAM entity. The payment of surcharges by the entity that failed the RSE represents the revenue that is allocated as described in the prior section. Each EDAM BAA will be individually responsible for any surcharge assessment it receives. The proposal is that each EDAM entity will remain responsible for allocating any accrued surcharges to customers within its service area and it is expected that the allocation mechanism would be further described in the EDAM entity OATT.

(4) Monitoring and Additional Administrative Penalties

Certain stakeholders expressed concern that EDAM entities may rely on the aforementioned failure consequences in lieu of forward procurement. The proposed financial consequences are a reasonable proxy for the prices an EDAM BAA would face if it sought to cure any deficiency through the existing day-ahead bilateral market. As long as the day-ahead bilateral market exists as a mechanism to cure next day supply deficiencies, curing such deficiencies in the EDAM market in the same timeframe is a reasonable alternative. The proposal is to monitor EDAM entity use of EDAM to cure deficiencies so the ISO has information necessary to ensure that the financial consequences are correctly set and do not incent EDAM entities to avoid sufficient forward procurement.

(5) ISO BAA Participation Rules

Because the ISO BAA is comprised of many load serving entities operating under various forward procurement rules, additional coordination may be required regarding both funding the RSE surcharge and curing a deficiency. To cure EDAM RSE deficiencies within the ISO BAA, based on exiting tariff rules, the ISO relies largely on the RA program for meeting the RSE, as well as additional tools such as exceptional dispatch, its capacity procurement mechanism

(CPM), and its reliability must run (RMR) authority to resolve supply shortfalls. Load serving entities also may have additional supply under contract that can be made available if necessary, following requests from the ISO. The ISO will consider what additional mechanisms may be necessary to ensure the ISO BAA can cure deficiencies in the advisory period as well as how any surcharges are to be allocated to its own load serving entities.

A related element that will be need to considered for the ISO balancing area is the allocation of EDAM RSE failure surcharges. The ISO would seek to allocate accrued failure surcharges based on cost causation principles through a two tiered approach by first seeking to allocate the surcharge to entities that caused or otherwise contributed to the RSE failure to the extent this can be discerned, and then the remainder distributed more broadly on a load-ratio share or different method. The ultimate design for the ISO will need to consider the interplay with other inactive mechanisms and policies that may be in place to ensure compatibility. Similarly, the design will need to consider allocation within the ISO balancing authority area of revenues associated with the distribution of failure surcharges allocated to the ISO due to RSE failures by other EDAM balancing areas. These revenues can contribute to offsetting accrued surcharges or costs.

The ISO will undertake an initiative that more narrowly considers potential enhancements to the ISO tariff and processes to enable curing of EDAM RSE advisory failures in a timely manner and avoid application of administrative surcharges. Relatedly, the initiative will consider the allocation of revenues or surcharges within the ISO arising out of EDAM RSE failures. Similarly, other EDAM entities will need to consider similar issues that are unique to their balancing areas regarding allocation of revenues or surcharges arising from EDAM RSE failures across the footprint or the individual entity.

h) EDAM Entities Pooled WEIM RSE

The proposal is that all parties that pass the EDAM RSE would be tested as a pool in the WEIM RSE. This pooling approach creates an opportunity both to allocate a diversity benefit on the uncertainty that may arise between the day-ahead and real time and potentially enhance the reliability of the EDAM footprint in the real-time market.

(1) Diversity Benefit and Linkages to WEIM RSE

Calculating a pro-rata diversity benefit[77] for the imbalance reserve requirements can reduce each participating EDAM BAA's forward showing obligation because the uncertainty in the overall EDAM footprint will be less than the sum of individual BAA's uncertainty. This lower requirement, however, effectively reduces the confidence level to which imbalance reserves are procured on an EDAM BAA by EDAM BAA basis. Absent a pooled test, the diversity benefit would effectively reduce imbalance reserves within each EDAM BAA, which in turn would increase the potential failure of WEIM RSE to the extent higher levels of uncertainty materialize. The diversity benefit for each BAA will be limited by the BAA's import and export capability based on transmission made available to the EDAM.

[77] Calculating a diversity benefit for all EDAM participants can be considered as part of the EDAM design. The ISO would calculate the imbalance reserves requirements for both each BAA independently and for the EDAM footprint as a whole. The ISO would then distribute the diversity benefits pro-rata based on the reduction between the summed individual BAA requirement and the EDAM footprint requirement.

The proposal is to test the EDAM footprint for WEIM resource sufficiency considering all day-ahead awards, imbalance reserves, and reliability capacity. Each participating BAA is expected to address any intra-day outages that render any of the capacity used to back EDAM schedules prior to the running of the WEIM RSE. Testing in a pooled manner is a straightforward way to ensure the energy, imbalance reserves, and reliability capacity awards from the EDAM are able to be leveraged to provide high levels of confidence against uncertainty materializing in the WEIM.[78]

(2) Hybrid Diversity Benefit and Pooled WEIM RSE

The proposal is to test the EDAM footprint in the WEIM using a hybrid pooled methodology. Under this methodology, a portion of the diversity benefit will not be allocated; instead, it will be reflected as additional global procurement of imbalance reserves for the footprint to use as a whole. The proposal is the market operator can configure this quantity to provide the EDAM BAAs a collective mechanism to adjust imbalance reserve requirements dynamically.[79] This additional quantity of imbalance reserves can be utilized to provide additional confidence and reliability above the stated 97.5 upward procurement threshold or, if extreme levels of uncertainty do not materialize, to cover for intra-day changing system conditions. Although this will reduce economic benefits due to increased EDAM RSE showing requirements, it will provide additional reserves for the EDAM while the EDAM BAA's familiarize themselves with a centrally cleared, multiple BAA, day-ahead market.

(3) Failure of the EDAM Footprint Using a Pooled Approach

Procuring imbalance reserves to a high confidence level, combined with the additional procurement of a pre-set quantity of imbalance reserves, should limit occurrences in which EDAM schedules are insufficient to pass the WEIM RSE.

The pooled EDAM footprint as a whole remains responsible for curing any shortfall in the WEIM RSE. Testing each EDAM BAA separately following the failure of the pool is inappropriate because effectively each BAA would have fewer imbalance reserves to address uncertainty within their BAA than otherwise could have been covered if imbalance reserves were procured for on a BAA-specific basis. Under this scenario, a single BAA could cause the pool to fail but, due high levels of materialized uncertainty, multiple BAAs could in turn fail the WEIM RSE. The market operator will provide information that allows for coordination between EDAM BAAs in curing real-time WEIM deficiencies; the specific information necessary to facilitate this coordination will be determine both through the onboarding process and the continued evolution of the EDAM.

In the future, intertie bids made at the ISO border or the border of an EDAM BAA that allows intertie bidding will be credited towards meeting the needs of the EDAM footprint as a whole. If that curing does not occur, the footprint would be exposed to the existing consequences for failing the WEIM RSE. If coordinated efforts between the EDAM BAAs to resolve the supply insufficiency do not resolve the infeasibility, the real-time market would isolate the power

[78] The EDAM technical workshops held on July 15th, 2022[78] provide detailed examples of how the pooled WEIM RSE approach would work considering the diversity benefit, some of which are included in the confidence in transfers discussion in section II.A.2(b).
[79] The process and considerations for configuring this quantity will be identified in the business practice manual as this is a configurable amount and discussed with stakeholders.

balance infeasibility in the BAA that caused the shortfall, and manual operator actions to mitigate the supply deficiency would follow.

i) Managing Supply in Excess of RSE Requirements

During stakeholder meetings, the ISO discussed an EDAM entity's ability to retain an amount of excess supply above what is needed to pass the RSE. This retained capacity could then be used by the balancing authority for reliability management purposes. Although there are financial incentives to make all excess supply available to the market, some stakeholders have argued that it may be beneficial for a BAA to retain excess capacity from the market for operation during stressed conditions to protect against un-anticipated reliability needs that may not be covered by the day-ahead market.

In prior comments and meetings, ISO load serving entities expressed the need to consider how resource adequacy capacity, procured by load serving entities to serve their load reliably, can remain available to ensure grid reliability if intra-day contingencies arise during stressed system conditions that are not covered by operating reserves, imbalance reserves, or reliability capacity. Under the current ISO BAA resource adequacy program, resource adequacy supply has a must offer obligation into the day-ahead and real-time markets. As such, all supply is offered into the market even if it exceeds the ISO's RSE obligation. In the EDAM, the excess resource adequacy supply may be committed economically to support transfers without remaining available to help respond to potential reliability events between day-ahead and real-time. Other EDAM entities may have their own resource adequacy or resource planning regulatory programs, and they can retain supply above their RSE obligations in anticipation of stressed conditions and not offer it into the EDAM or to offer such excess supply to derive further benefits.

Based on stakeholder feedback, the draft final proposal introduced a net EDAM export transfer constraint into the market that permits all supply to be offered into the market while allowing the market to manage the amount of net export transfers supported by supply in the EDAM BAA. The net EDAM export transfer constraint would help remedy the asymmetry in the ISO BAA arising from the resource adequacy must offer obligation. The constraint would be made available, on a voluntary basis, to all EDAM BAAs that find it beneficial. The constraint would enable BAAs to offer supply in excess of their RSE obligation into the market and, through the constraint, manage how much internal supply is available to support export transfers out of the BAA on a net basis.

In comments to the draft final proposal, stakeholders supported introducing the net EDAM export transfer constraint, including making application of this constraint optional or voluntary for each EDAM BAA. Stakeholders noted a net export constraint's reliability benefit to a balancing area and its potential to allow an area to manage contractual capacity obligations, unique conditions and or stressed conditions more effectively by managing the level of export transfers from the balancing area. This final proposal retains the formulation of the net EDAM export transfer constraint, with minor clarifications. The design and formulation of the net EDAM export transfer constraint is discussed further below.

(1) Designing the Net EDAM Export Transfer Constraint

The net EDAM export transfer constraint is a mechanism that can limit net export transfer out of an EDAM BAA, particularly in stressed system conditions, to retain available supply within the BAA to respond to adverse grid reliability conditions that materialize in real time. The constraint would apply in the base scenario of the IFM for the net energy transfer - on an hourly basis - to

ensure that market adheres to the constraint when optimally scheduling EDAM import and export energy transfers.

The net EDAM export transfer constraint is based on the difference between bid in supply and the RSE obligation and provides the option for additional adjustment as described below:

$$(RSE\ Eligible\ Supply + Non\ RSE\ Eligible\ Supply\ x\ Confidence\ Factor) - RSE\ Obligatoin - Additional\ Margin$$

Where:

- *RSE eligible supply* = supply that counts toward the EDAM entity RSE.
- *Non RSE eligible supply* = supply that is ineligible to count toward the EDAM entity's RSE. For the ISO, intertie bids from supply not under contract are ineligible RSE supply.[80]
- *Confidence Factor* = an optional factor that accounts for confidence in delivery associated with a portion of the non-RSE eligible supply. For example, in the ISO BAA the confidence factor could be used to adjust for the risk of untagged intertie day-ahead schedules.
- *RSE Obligation* = the day ahead RSE obligation for the EDAM entity based upon forecasted load, positive uncertainty requirement, and upward ancillary services requirements. It includes high priority exports (PT exports to non-EDAM BAAs) since they are considered in the RSE.
- *Additional Margin* = represents an additional amount of capacity established by the EDAM BAA to reduce the limit on the BAA net export transfer, if necessary, to account for reliability risk and the ability to replace reserves particularly during tight supply system conditions.

In the context of applying the net EDAM export transfer constraint to the ISO BAA, the constraint would consist of all supply bid into the ISO counting toward the RSE plus economic intertie import bids that represent non-contracted supply offered at the ISO interties from non-EDAM BAAs. The ISO is uniquely positioned compared to other EDAM entities because it offers full economic intertie bidding. Although non-contracted intertie import bids do not count toward meeting the ISO RSE obligation, they can bid into the day-ahead market and may clear the market if they are economic. Once these intertie import bids clear the market, they may support energy export transfers in the EDAM.

If there is observed and empirical evidence of a non-deliverability risk of these intertie schedules or risk of non-performance by supply overall, the BAA may introduce a confidence factor less than 100%. In the case of the ISO, if there is evidence to support a non-delivery risk with cleared economic intertie bids, the bid in supply amount can be reduced by a confidence factor representing the risk of non-delivery. For example, if one percent of cleared intertie bids do not tag by the appropriate deadlines or do not perform, the bid in supply would be multiplied by 99% to reflect the non-delivery risk representative of the confidence factor.

Once the upper bound limit of the net EDAM export transfer constraint is derived, the BAA can further reduce the limit by an additional margin - that reflects an amount of non-exportable capacity held back in anticipation of needing to respond to reliability conditions. A realistic example where a BAA may need the additional margin is when there is significant risk the BAA

[80] The ISO will provide functionality that will allow parties to distinguish whether the supply is RSE eligible or non-RSE eligible supply, such as whether the supply is under contract.

could not replace operating reserves if a contingency occurs during tight supply conditions. Under such operating conditions, the BAA may benefit from reserving sufficient capacity using the export constraint in an amount equal to its most severe single contingency (MSSC). The additional margin provided by the export constraint would provide the BAA sufficient available capacity to replace its operating reserves if the MSSC were to occur. The export constraint enhances reliability by providing operators with an efficient mechanism to manage critical conditions.

Table 6 below provides an illustrative example of the formula for deriving the constraint.

Hour	RSE Eligible Supply	Non RSE Eligible Supply	Confidence Factor	RSE Obligation	Additional Margin	Net Export Transfer Constraint
HE 12	35,000 MW RSE Eligible	5,000 MW	95% (applicable to non-RSE eligible supply)	35,000 MW	3000 MW	1,750 MW
HE 13	39,000 MW RSE eligible	5,000 MW	95% (applicable to non-RSE eligible supply)	38,500 MW	0 MW	5,250 MW

Table 6: illustrative example of net EDAM export transfer constraint derivation.

In the example above, for HE12, the bid in RSE countable supply is 35,000 MW, and non-countable RSE supply is 5,000 MW for a particular hour totaling 40,000 MW. The non RSE supply of 5,000 MW is discounted by a confidence factor of 95% to represent the risk of non-delivery resulting in 4,750 MW of non RSE supply, resulting in a total supply of 39,750 MW to derive the net EDAM export transfer constraint. This amount is further reduced by the RSE obligation of 35,000 MW and an additional 3000 MW margin for the hour due to the reliability conditions, resulting in a net EDAM export transfer constraint of 1,750 MW that the market will consider when identifying transfers. Because the constraint is evaluated hourly, the constraint could have a different limit for HE 13 as illustrated above.

The constraint limit cannot be reduced below the shown bucket 1 transfers out of the EDAM BAA. If an EDAM entity relies on exports to meet the RSE from the EDAM BAA imposing the net export transfer constraint, the EDAM BAA sourcing the supply cannot reduce the net export transfer below the export committed for RSE purposes. At a minimum, bucket 1 transfers must be supported and maintained. The net EDAM export constraint cannot be negative and a negative value in the calculation will be set to zero.

The constraint is dynamic, applicable in the day-ahead market on an hourly basis. In normal system conditions, the constraint is not expected to bind because the bid in supply should be much larger than the RSE obligation. However, in more stressed system conditions, the difference between the bid in supply and the RSE obligation could be narrow, thus the net export transfer constraint may be binding.

The proposal is that the net export transfer constraint is optional for each EDAM BAA that each can adopt in its OATT based on the design described above. It would be an additional tool to limit or mitigate reliability risk in anticipation of stressed system conditions. Moreover, the constraint enables all supply to be offered into the market for optimization, and the market will respect the constraint when making resource commitments and identifying energy transfers. A similar constraint would also be enforced in the IRU deployment scenario in the IFM to constrain the IRU net export transfer, and also in the RUC to constrain the RCU net export transfer. The mathematical formulation for the constraint is described in detail in Appendix 4.

Because the constraint is optional, an EDAM BAA that wants to use the net EDAM export transfer constraint within the market must (1) indicate its intent to use the constraint to the ISO

and (2) describe either in its OATT or business practice manuals (a) the formulation for deriving the confidence factor applicable to non-RSE eligible bid in supply and (b) factors/criteria for deriving the additional margin that further reduces the constraint limit. The ISO will include formulation of these components of the export constraint in an upcoming ISO BAA implementation initiative that will consider this element and other aspects of ISO BAA specific rules associated with participation in EDAM including, the ability of the ISO to cure RSE deficiencies and allocate administrative surcharges resulting from the ISO RSE failure.

C. Extended Day-Ahead Market Processes

This section describes how the EDAM will be orchestrated through the day-ahead and real-time market processes. The day-ahead market processes primarily include the integrated forward market (IFM), residual unit commitment (RUC), and market power mitigation (MPM) processes. The day-ahead market runs from 10:00 a.m. to 1:00 p.m. and optimizes resource commitments and schedules across the EDAM footprint. This section also covers convergence bidding, external resource participation, and other important day-ahead market considerations.

1. Day-Ahead Market Overview

The day-ahead market considers several inputs to produce feasible and efficient market results. For example:

- *Bids* – scheduling coordinators submit bids to let the market know how much energy or reserves they are willing to sell or purchase in the day-ahead market, and at what price.
- *Forecasts* – forecasts include demand forecasts and renewables forecasts to provide insight into the needs for the next day and the potential quantity of renewables that may be available.
- *Full Network Model* – a computer-based model that provides the market all of the options for flowing the supply to meet the demand, including any transmission limits.
- *Outages* – reductions in capacity (planned or forced) that impact the amount of supply that can flow from resources or across transmission lines.
- *Master File* – a database that contains the attributes of the resources in the market (*e.g.*, start-up times, ramp rates, maximum capacity, fuel type).

Each of these components helps the day-ahead market produce schedules to meet the demand at least cost while maintaining system reliability.

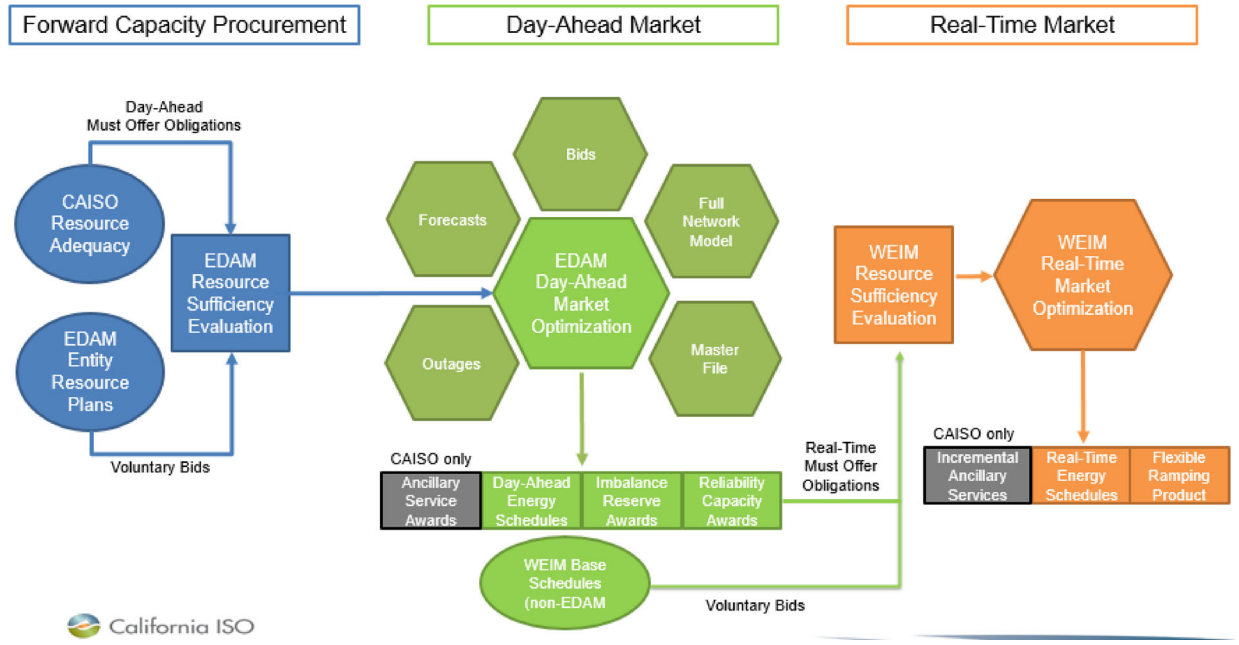

Figure 2: illustration of day-ahead market processes, inputs and outputs.

2. Integrated Forward Market (IFM)

The IFM balances supply and demand, produces hourly unit commitment and energy schedules, and procures hourly ancillary services for entities within the ISO BAA. It is an integral part of the EDAM design. Under EDAM, scheduling coordinators will participate in the IFM by submitting hourly bids (self-schedules or economic bids) for supply and demand resources and for imports and exports at interties between external BAAs and EDAM BAAs or the ISO. All participating resources within the EDAM footprint and at the ISO interties can submit energy bids. For the initial EDAM implementation, the proposal is that the IFM will not co-optimize ancillary services with energy across the EDAM footprint.[81] The proposal is, however, to procure imbalance reserves based on economic bids throughout all BAAs participating in EDAM.

In contrast to WEIM, EDAM BAAs will not have base schedules. An EDAM resource's entire day-ahead energy schedule will be settled in the day-ahead market, and it will serve as the reference for measuring and settling imbalance energy in the WEIM.

Throughout the initiative, stakeholders have supported extending the Integrated Forward Market to the EDAM. Stakeholder comments generally support the concept of imbalance reserves, its inclusion in the EDAM, and its relationship to the EDAM resource sufficiency evaluation. Many stakeholders believe imbalance reserves are a valuable addition to the day-ahead market to procure flexible capacity to address net load uncertainty between the day-ahead and real-time markets. The imbalance reserves design is being considered in a separate parallel initiative, *i.e.*, the Day-Ahead Market Initiative (DAME), which will be completed and considered for approval together with the EDAM proposal.

a) IFM Unit Commitment

As part of EDAM, generating resources may have startup and minimum load bids and registered unit commitment constraints such as minimum up/down times and maximum number

[81] ISO and stakeholders may consider this element as an enhancement to the EDAM in a later phase.

of daily startups. The IFM will calculate an hourly optimal unit commitment status (on/off) for these resources considering their initial commitment status before the start of the trading day, their startup and minimum load bids, and their inter-temporal unit commitment constraints. Additionally, the IFM will enforce all applicable resource constraints and limitations.

The EDAM will include functionality currently in the ISO day-ahead market to support optimal unit commitment and dispatch for various types of resources based on their particular operating characteristics. For example, the existing markets have special functionality for pumped-hydro resources and resources with multiple operating configurations, such as combined cycle generators. If revenues earned from providing energy and capacity do not cover costs associated with unit commitment, the resource is eligible for a "make whole" payment known as bid cost recovery (BCR).

b) Energy Schedules

In EDAM, the IFM will produce hourly day-ahead energy schedules for all resources with energy bids and self-schedules, including load resources, as well as virtual supply and demand. Generating resources not committed in the IFM will have 0 MW energy schedules in the relevant hour. The IFM uses energy bids screened by the EDAM market power mitigation (MPM) process. The ISO will settle energy schedules at the applicable locational marginal price (LMP).

Scheduling coordinators for physical resources with day-ahead energy schedules must bid the awarded MW quantity into the real-time market. If the scheduling coordinator does not submit an energy bid in the real-time market for these quantities, the ISO will insert a commensurate self-schedule. Scheduling coordinators may also submit economic energy bids in the real-time market with a range above and/or below the day-ahead energy schedule for the real-time market to re-optimize. The difference between the fifteen-minute market (FMM) dispatch and the day-ahead energy schedule constitutes an energy imbalance deviation that the ISO will settle at the applicable FMM LMP for energy.

Resources can also submit self-schedules for a given hour. The energy schedule will reflect the self-schedule or a higher range if the scheduling coordinator for the resource submits an economic energy bid above the self-schedule and the bid clears the IFM. Scheduling coordinators may not submit an energy bid in an operating range below a self-schedule.

c) Imbalance Reserves

Stakeholders and the ISO are developing an imbalance reserve product as part of the Day-Ahead Market Enhancements (DAME) initiative.[82] The proposal is to procure imbalance reserves across the EDAM footprint. Imbalance reserves will provide upward and downward ramp capacity in the day-ahead market to meet uncertainty in the net load forecast (load minus wind/solar) between the day-ahead and real-time markets. The market will procure imbalance reserves in the IFM co-optimized with energy and ancillary services. Imbalance reserves will be a biddable product in both the upward and downward direction. Resources can provide imbalance reserves if they are dispatchable on a 15-minute basis. An imbalance reserve award comes with a must-offer obligation to provide economic energy bids in the fifteen-minute market

[82] For more discussion regarding the imbalance reserve product see the Day-Ahead Market Enhancements (DAME) initiative (Link)

for the amount of the award. The ISO will procure imbalance reserves respecting transmission constraints to ensure the capacity is deliverable, resulting in imbalance reserve LMPs.

The ISO will procure imbalance reserves based on an hourly uncertainty requirement. The hourly uncertainty requirement will be based on historical forecast deviations between the day-ahead and real-time markets. The proposal is to reduce the uncertainty requirement (and thus the quantity of imbalance reserves procured) in each BAA by a pro rata allocation of an *EDAM diversity benefit*.[83] The ISO will calculate the diversity benefit as the positive difference between the sum of the uncertainty requirements of all individual BAAs in EDAM and the uncertainty requirement for the entire EDAM footprint. The ISO will allocate the EDAM diversity benefit based on each EDAM BAA's original unreduced uncertainty requirement.

This proposal takes advantage of the geographic diversity of the EDAM footprint and enables EDAM BAAs to save on day-ahead procurement by recognizing high levels of uncertainty are unlikely to materialize simultaneously in all EDAM BAAs. Thus, the diversity benefit that occurs from "pooling" multiple BAAs reduces the overall amount of capacity needed to meet net load across the EDAM footprint in real-time. Access to resources across the larger EDAM footprint will enable procurement of more efficient, lower cost capacity. Additionally, imbalance reserves will provide revenue opportunities to BAAs with more efficient and flexible resources.

d) IFM Transfers

EDAM transfers constitute energy or capacity exchanges between BAAs in the EDAM footprint. Transfers between BAAs are defined differently depending on their direction at a particular intertie (*i.e.*, transfers in or transfers out). There are also different transfers for different commodities (*i.e.*, energy, imbalance reserves, reliability capacity).

Optimizing the transfer of either energy or imbalance reserves in the IFM is the primary mechanism for producing EDAM benefits. Benefits are realized when higher energy or imbalance reserve bids in a BAA are economically displaced by lower energy or imbalance reserve bids from another BAA.

Transfers are classified by the type of underlying intertie transmission capacity released by EDAM BAAs and the ISO for use in the market. Transmission capacity released for transfers in EDAM must be highly reliable and remain available for re-optimization in the WEIM. The net transfer of a BAA in the EDAM footprint for a given commodity and the associated transmission bucket is the sum of export transfers minus import transfers over all interties of that BAA.

In EDAM, the IFM will support various transactions between participating BAAs, including transferring demand obligations, imbalance reserve up/down, and ancillary services requirements. The IFM will optimize energy associated with transmission made available to the market, and it will respect energy transfers associated with physical and/or financial rights. In the IFM, the market would enforce the scheduling limit for each transfer.

3. Residual Unit Commitment (RUC)

The residual unit commitment (RUC) process runs after the IFM produces energy schedules and ancillary service awards. The RUC process will procure incremental or decremental capacity (called reliability capacity up and reliability capacity down, respectively) based on the

[83] The uncertainty requirement and diversity benefit are discussed further in the EDAM RSE section II.B.2(h).

amount of physical energy that clears the IFM in relation to each EDAM BAA's load forecast.[84] RUC is a backstop to the IFM to ensure there is sufficient physical supply available to serve load in real-time. The proposal continues to require that the RUC process be part of the EDAM. Stakeholders generally agree that RUC is an integral component of the day-ahead market.

RUC transfers will facilitate the procurement of reliability capacity in the EDAM footprint at least cost. RUC will use transfer capacity that remains unscheduled after the IFM or counter-flow on energy transfers that clear the IFM.

Resources participate in the RUC process by providing reliability capacity bids. The final proposal continues to require that all resources offering energy bids in the IFM must submit bids for reliability capacity in the RUC at the same quantity as their energy bid plus ancillary service self-provision. This ensures all resources shown in the EDAM RSE are fully available for use in RUC, including excess supply that participants offered above their RSE requirements. Stakeholders generally support this proposal in their comments. However, some stakeholders noted the importance of EDAM BAAs holding back supply from the market to support their reliability obligations. This proposal would not infringe on EDAM entities' ability to hold back supply from the market. The requirement to bid in RUC only extends to capacity shown in the resource sufficiency evaluation (and by extension to the IFM) and not to all resources in the EDAM BAA.

Reliability capacity up or down bids that clear the market result in reliability capacity up or down awards. These awards obligate the resource to provide economic energy bids to the real-time market. This ensures the ISO can re-dispatch these resources in the real-time market if system conditions change.

The RUC optimization will consider transmission constraints when scheduling reliability capacity, resulting in locational marginal prices (LMP). The ISO will pay all resources receiving a reliability capacity up or down award the locational marginal price for reliability capacity up or down, respectively. A resource may receive a reliability capacity award for an hour in only one direction, up or down. The net of all reliability capacity awards in an EDAM BAA will be in the direction of the total RUC requirement. However, based on network constraints and different RUC requirements across the BAAs in EDAM, there can be both reliability capacity up and down awards within a participating BAA.

The RUC process awards reliability capacity up either as an incremental dispatch on a resource already committed in the day-ahead market or by committing additional resources. RUC issues binding start-up instructions for resources with a startup time longer than six hours and advisory start-up instructions for all other resources. In addition, RUC may adjust the commitment of multi-stage generators (MSG) by transitioning them to a different configuration, either higher or lower, than the configuration that cleared the IFM. Any commitment costs due to binding commitment decisions in RUC are eligible for BCR subject to certain eligibility requirements.

Another important feature of RUC is its ability to look out multiple days. The RUC optimization horizon is up to 72 hours. The 72-hour horizon allows RUC to calculate advisory energy schedules to meet the demand forecast beyond the trade date and to commit extra-long-start resources that have a startup time longer than 18 hours. In addition, RUC provides information for future days that is useful for reliability studies and outage coordination efforts.

[84] Today, RUC only clears incremental supply. The ability to procure decremental supply in RUC is being considered in the DAME initiative and would apply to the EDAM if DAME is implemented.

Imports from non-EDAM BAAs can provide reliability capacity up and down at ISO interties. These intertie resources would have to be registered with a resource ID defined in the master file; no reliability capacity bids would be accepted from imports with just a Transaction ID. The corresponding intertie schedule must be tagged after RUC with a transmission profile equal to the sum of the day-ahead energy schedule, plus the reliability capacity award, if any. Exports to non-EDAM BAAs can also provide reliability capacity up at ISO interties, with the obligation to provide a decremental energy bid to dispatch down the export schedule in the FMM if needed.

4. Market Power Mitigation

The draft final proposal continued to recommend extending the WEIM market power mitigation framework to EDAM. The proposal also noted that broader market power mitigation design enhancements, beyond extending the WEIM market power mitigation, are being considered within the *Price Formation Enhancements*[85] initiative conducted in parallel to this EDAM initiative. Stakeholder comments on the draft final proposal largely continued to support the idea that broader market power mitigation changes be considered in the *Price Formation Enhancements* initiative with the starting point for the EDAM being extension of the WEIM market power mitigation framework. In response, this final proposal continues to retain the extension of the WEIM market power mitigation practices in the WEIM to the EDAM and to discussing any necessary adjustments to those practices in the *Price Formation Enhancements* initiative.

Stakeholders that commented on this topic generally continued their support for extending the WEIM market power mitigation design to EDAM as a default starting point with an opportunity to evolve the design. The stakeholders recognized that the *Price Formation Enhancements* initiative is considering within its scope design enhancements to market power mitigation that will be informed by additional stakeholder input. Some of these stakeholders continued to express interest in further evolving the market power mitigation measures with enhancements being considered in the price formation initiative. The paragraphs that follow summarize the existing WEIM market power mitigation processes that would be extended to the EDAM and notes any further structural changes under consideration in parallel with the EDAM initiative through the *Price Formation Enhancements* initiative.

Market power mitigation is a standard element of energy market design. The ISO market has automated processes to mitigate the potential exercise of market power resulting from transmission constraints that create isolated load pockets. When only a few resources can serve load in those constrained areas, they can exercise market power and raise their market offers above a competitive level. The ISO's market power mitigation process addresses that concern by substituting suppliers' offers with cost-based bids when market conditions otherwise would allow resources to exercise local market power.

In the existing day-ahead market, the ISO performs a dynamic competitive path assessment (DCPA) to determine if resources can exercise market power. The DCPA tests if three or fewer generators can provide pivotal supply (counter flow) to a binding transmission constraint and arbitrarily affect prices. The binding constraint is considered uncompetitive if supply counter flow from the three largest pivotal suppliers is required to satisfy it. In this case, energy bids for resources that provide counter-flow are subject to mitigation. The ISO mitigates energy bids for these resources above the competitive LMP to the lower of their submitted bid or the respective

[85] Price Formation Enhancements initiative webpage - Link

ISO generated default energy bid (DEB).[86] In the day-ahead, the ISO runs two market passes. The first is the MPM pass that uses unadjusted bids, and the second is the IFM pass that uses mitigated bids.

In the context of the WEIM, the ISO performs a DCPA to test if the supply in an individual WEIM BAA can meet the demand competitively or provide counter-flow on congested transmission constraints within the BAA. Where the binding constraint is the BAA power balance constraint, then all supply resources provide supply counter-flow. The ISO only performs the test when there are binding transfer limits in the import direction to that BAA that restrict external resources from meeting internal demand. This method assumes that the ISO BAA is competitive. When this test fails, the energy bids of all supply resources in the respective WEIM BAA are mitigated.[87]

5. Convergence Bidding

The ISO day-ahead market enables participation by convergence bidding entities, which can submit financial bids that do not represent physical supply or demand. Instead, convergence bidding provides market participants with an opportunity to arbitrage price differences between the day-ahead market and the real-time market. The purpose of convergence bidding is to converge energy prices between the day-ahead market and the real-time market, improve market liquidity, and increase competition.[88] Convergence bids are referred to as *virtual supply* or *virtual demand.*[89] Cleared virtual supply in the day-ahead market is paid the day-ahead energy price and charged the FMM energy prices for the corresponding hour. Cleared virtual demand in the day-ahead market is charged the day-ahead energy price and paid the FMM energy prices for the corresponding hour.

The draft final proposal recommended a design under which EDAM entities could either start with convergence bidding or have a one-year transition period before enabling it. This design attempted to accommodate stakeholder requests for optionality to enable convergence bidding if ready at the onset of participation, but also allow entities not ready at the onset of their participation to gain experience with the market and develop the necessary readiness prior to implementing convergence bidding in their area after the expiration of the one-year transition period. Stakeholder comments generally supported this design and the balance it sought to strike. However, a number of stakeholders expressed concern with a mandatory transition to convergence bidding after one year and the imposition of convergence bidding in each EDAM balancing area without evaluating readiness. These stakeholders noted that one year may be insufficient for the EDAM entity to develop experience in the market and be ready to implement convergence bidding. They also suggested that one year may be insufficient for the market to develop and offer a more holistic opportunity to evaluate the impacts of convergence bidding. They instead suggested conducting a stakeholder process at the two-year mark of EDAM operation to identify a more permanent EDAM convergence bidding policy informed by market

[86] DEBs represent an approximation of the resource's nominal marginal cost, and they can include fuel costs, opportunity costs, and other costs. The competitive LMP is the LMP at the resource location as calculated in the MPM run, excluding marginal congestion contributions from uncompetitive constraints.
[87] The competitive LMP used in this mitigation is the power balance constraint shadow price of the ISO BAA.
[88] *See, e.g.,* Federal Energy Regulatory Commission, ENERGY PRIMER: A HANDBOOK FOR ENERGY MARKET BASICS at p. 68 (April 2020), *available at* Link.
[89] The term "convergence bidding" is unique to the ISO. "Virtual bidding" is the common industry term.

experience and the experience of those entities that implemented convergence bidding at the onset of their participation.

This final proposal allows EDAM entities to choose whether to enable convergence bidding in their balancing area at the onset of their EDAM participation. However, this proposal removes a mandatory transition to convergence bidding after a one year transition period if an entity does not elect to implement convergence bidding at the onset of their participation. Under the final proposal, in the lead-up to the two-year anniversary of EDAM operation – as a year-two enhancement – the ISO will conduct a stakeholder process to derive a more permanent EDAM convergence bidding policy informed by operational experience and stakeholder input. The proposed optionality enables interested EDAM entities to implement convergence bidding functionality in their balancing area at the onset of their participation in EDAM. It also allows entities that are not yet ready for enabling convergence bidding in their balancing area at the start of their EDAM participation to gain experience with the market and implement convergence bidding at a later time. The first two years of EDAM operation will allow the ISO and EDAM participants to develop valuable operational experience in the EDAM and evolve the design based on that experience. A future stakeholder process will evaluate a holistic implementation of convergence bidding, including a formal transition to convergence bidding for participating EDAM entities, the necessity for any interim bidding requirements, and design enhancements based on EDAM operational experience. The ISO will, in coordination with the Department of Market Monitoring (DMM), continue to monitor and evaluate the market's performance with or without convergence bidding in various parts of the footprint to help inform the evolution of the future design and address any unintended consequences of an optional convergence bidding design at the onset of EDAM. The ISO will continue supporting convergence bidding within its own balancing area.

Convergence bidding applied to EDAM BAAs would mimic the existing implementation and functionality of convergence bidding in the ISO. Convergence bidding would be allowed at eligible internal nodes, trading hubs, and load aggregation points in each EDAM BAA, but it would be prohibited at intertie locations between EDAM BAAs and between EDAM and non-EDAM BAAs.

Previous versions of the proposal stated that interim bidding requirements in EDAM BAAs without convergence bidding may be necessary during the transition period to prevent inefficient market outcomes. One interim bidding requirement that was considered was a measure to prevent load under-scheduling. The ISO implemented its nodal market in 2009 and phased in convergence bidding after the first year. In the absence of convergence bidding during this period, FERC required the ISO to include interim provisions to offset load-serving entities' incentive to under-schedule in the day-ahead market. In response, the ISO implemented "interim scheduling charges" with $/MWh penalties for persistent and excessive load under-scheduling.

This final proposal continues to not consider interim provisions to prevent load under-scheduling necessary for EDAM. The incentive to under-schedule load in the EDAM is not analogous to the ISO's previous convergence bidding transition period. In the latter, load-serving entities were divested from much of their generation and were large net buyers in the market. This is not the case with the WEIM entities that might join the EDAM. Although EDAM load-serving entities are not expected to face the same incentives to under-schedule load, the ISO will monitor whether entities engage in excessive or persistent load under-scheduling, and will be prepared to file implementation of under-scheduling penalties at FERC if the need arises.

Today, the ISO has the authority to suspend or limit convergence bidding if necessary for system reliability.[90] The ISO can exercise this authority at specific eligible nodes or at all eligible nodes. In comments to prior iterations of the proposal, some stakeholders questioned whether each EDAM entity would be able to suspend convergence bidding in their BAA if operational challenges arise. It is appropriate for the ISO, as the market operator, to maintain the authority to suspend or limit convergence bidding. However, it is equally necessary for EDAM participants to be able to communicate with ISO operators if they believe it is necessary to suspend convergence bidding in their BAA. The EDAM design will include a process similar to those outlined in the WEIM market disruption operating procedure,[91] to allow EDAM entities to recommend and justify suspending convergence bidding in their BAA. While the ISO, as market operator, would make the final decision, it would give deference to the EDAM entity in making the decision.

Some stakeholders continued to question the impact of having convergence bidding enabled in the ISO but not enabled in other EDAM BAAs during the transition period. For example, some stakeholders questioned whether the settlement process could prevent cost shifting with RUC costs and uplift allocations. These settlements are described in the Post Day-Ahead Market Process section. At this stage, there are no apparent reasons to believe convergence bidding applied in some EDAM areas and not in others will cause detrimental market impacts.[92]

6. External Resource Participation

External resource participation in EDAM refers to the opportunity for resources physically located outside of the EDAM footprint, *i.e.*, resources located in a non-EDAM BAA (including WEIM BAAs) to participate in the day-ahead market operating in the EDAM footprint. The interties between EDAM BAAs will be considered internal EDAM interties that function as transfer points between EDAM BAAs and support EDAM transfers. The interties between EDAM BAAs and non-EDAM BAAs will be considered external EDAM interties that do not function as EDAM interties and will not support EDAM transfers. If an EDAM external intertie is within a WEIM BAA, the intertie will continue to function as a transfer point in the WEIM and support WEIM transfers between the EDAM BAA and the WEIM BAA.

There are different methods by which external resources can participate in EDAM, including pseudo-ties, dynamic scheduling, self-scheduling, and economic bidding. The draft final proposal continued to extend the current WEIM external resource participation framework to the EDAM, which limits participation to pseudo-tied, dynamically scheduled, and self-scheduled contracted supply, while committing to continue evaluation of this framework as the EDAM evolves. The draft final proposal further introduced the ability for off-system designated network resources, under the terms of the EDAM entity OATT, to bid economically at the EDAM entity intertie where these are contracted to serve load.

Stakeholder comments largely supported the proposed design, including introduction of the ability for off-system designated network resources to economically bid at the EDAM entity

[90] See ISO Tariff section 7.9.
[91] See *Market Disruption – Western Energy Imbalance Market (WEIM)* operating procedure. (Link)
[92] The ISO's Department of Market Monitoring (DMM) conducts monitoring, as part of its function, of convergences bidding practices including in the EDAM. The ISO will also engage the Market Surveillance Committee on this issue, and it commits to assessing this matter closely during the market simulation phase of EDAM implementation.

interties if the relevant criteria is met. This final proposal retains the design introduced in the prior proposal as described further below, including the proposal to retain economic intertie bidding at the ISO external interties.[93]

a) External Resource Participation at EDAM Entity Interties

Stakeholders, particularly WEIM entities, largely continue to support extending the WEIM framework for external resource participation to the EDAM. More specifically, they support external resource participation at the EDAM entity interties by pseudo-tied, dynamically scheduled, and self-scheduled contracted supply. Stakeholders continued to express concern that allowing non-contracted, non-source-specific resources to submit economic bids at their interties in the day-ahead timeframe might adversely affect reliability, enable transmission cost avoidance, and limit the incentives to participate in EDAM.

This final proposal retains the proposal to extend the WEIM external resource participation model to the EDAM where pseudo-tied and dynamically scheduled supply can be economically bid at the EDAM entity interties; other contracted supply must be self-scheduled and cannot be economically bid. The reliability-based concerns discussed in the revised straw proposal[94] and reiterated by numerous WEIM entities in their comments warrant, at the onset of EDAM, extending the WEIM external resource participation model. It will be necessary to work with stakeholders to re-evaluate the merits of implementing more comprehensive intertie bidding design after EDAM entities gain experience with the market. The later re-evaluation of external resource participation will allow consideration of the matter in conjunction with possible co-optimization of energy and ancillary services in the EDAM, which mitigates some of the reliability concerns raised by WEIM entities. Also, supply structures across the West may evolve in a manner that further mitigates the reliability concerns expressed.

The proposal expands the EDAM external resource participation model to include source-specific off-system designated network resources, as introduced in the draft final proposal. An external resource located in a WEIM BAA outside of the EDAM footprint[95] can economically bid or be self-scheduled at the intertie of an EDAM BAA in which the resource is designated as a network resource to serve load under the terms of the EDAM entity's OATT. An off-system designated network resource under the terms of the EDAM entity's OATT (or the OATT of another transmission provider in the EDAM BAA) can be designated to serve load in the EDAM BAA. The OATT process requires (1) an attestation that the designation is supported by a contract for the supply, (2) the supply will be delivered on firm transmission to the BAA where

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[93] An ISO external intertie can coexist with an EDAM internal intertie when multiple BAAs interconnect at that location, similar to the WEIM. *See* ISO tariff section 29.17(f)(5).

[94] Stakeholders expressed concern that non-contracted, non-source specific resources economically bidding at the EDAM entity interties may adversely affect reliability by displacing internal generation that cannot be committed in real time if this unknown, bid-in external supply does not materialize. Moreover, they raised concerns about operational uncertainty associated with unknown supply that may or may not be deliverable to the EDAM entity at the interties. They believed this risk outweighs the benefit of the additional economic supply. They further noted that economic intertie bids from unknown supply may dis-incent participation in the EDAM by allowing external entities to derive benefits of the market without making the significant investment EDAM entities make to participate. Finally, they noted concerns regarding (1) suppliers avoiding transmission costs absent a transmission requirement if they bid at interties, and (2) the difficulty of planning for ancillary service procurement to address the risk posed by economic bids at the interties.

[95] This is a resource physically located in a WEIM BAA that is not yet participating in the EDAM.

the load is located, and (3) the resource is designated to serve that specific load.[96] If the resource is designated as a network resource under the terms of the OATT, it will be delivered on firm transmission to the intertie of the EDAM BAA where the load is served, and it will be delivered to load using the NITS service across the EDAM BAA where the load is located. This mitigates deliverability and free-riding concerns for transmission service. Specifically, the proposed EDAM requirements for an off-system designated network resource eligibility to bid economically at the EDAM BAA intertie where the load is located include:

- *The resource must be located in a WEIM BAA* – resources located in a WEIM BAA are already largely modeled in the ISO full network model, and the resource characteristics and abilities are already visible to the market operator.
- *The resource must be modeled as a specific resource in the ISO master file* – this provides visibility and confidence that the off-system resource is a specific resource visible to the market. This can include grouped resources or system resources that are modeled as a specific market resource.
- *Economic bidding at the EDAM BAA intertie where load is located* – the off-system designated network resource, if choosing to bid economically, must be bid at the intertie with the EDAM entity where the load associated with the designated resource is located. In other words, the resource should not economically bid at an EDAM BAA's intertie where it does not have a contractual relationship to serve load as an off-system designated network resource. The bid amount should not exceed the amount of the off-system network resource being designated.

Off-system designated network resources meeting these requirements either reserve and pay for transmission or are associated with NITS transmission and the source and transmission path are known. This mitigates the reliability risks stakeholders identified when the source and transmission is unknown. The proposal allows the generation that the load serving entity has procured and designated to serve its load, to bid economically into the market and allows the market to serve load cost effectively through optimization.

The table below describes the different types of external resources – resources located physically outside of the EDAM BAAs - and their ability to offer into the market at the ISO non-EDAM footprint interties; *i.e.*, external EDAM interties.

Type of External Resource	Market Offers
Source Specific: Pseudo Tied Resource	Economically bid and self-schedule into market
Source Specific: Dynamically Scheduled Resource	Economically bid and self-schedule into market
Off-System Designated Network Resource	Economically bid and self-scheduled into market
Other Contracted Supply[97]	Self-scheduled into market at EDAM footprint interties.
Non-Source Specific, Non-Contracted Supply	Cannot self-schedule or economically bid into the market at the EDAM footprint interties.

Table 7: Summary of external resource participation framework in WEIM and EDAM.

[96] Open Access Transmission Tariff (OATT), section 29.2(v), (viii).
[97] This can include other supply that is not a designated network resource but is under contract to serve load in the EDAM BAA.

Pseudo-tied and dynamically scheduled resources are source-specific supply located outside of an EDAM BAA that are treated and/or otherwise deemed to be located within that EDAM BAA through modeling and telemetry. This means that the EDAM BAA provides balancing authority services and takes on other obligations for the resource, particularly for pseudo-tied resources. These arrangements and obligations are captured in tariffs and under contractual provisions between the EDM BAA and the resource owner, and they establish obligations related to performance, delivery, and other operational requirements. As such, these resources can continue to self-schedule and submit economic bids at the EDAM external interties consistent with their ability to do so today in the WEIM. Similarly, source specific supply that is otherwise not pseudo-tied or dynamically scheduled, but is owned or under contract to serve load within the EDAM BAA, can be self-scheduled or economically bid at EDAM external interties because these resources have a contractual relationship with the EDAM entity or another load serving entity within the EDAM BAA.

If non-source specific import supply is under contract, such as firm energy contracts where the source of the generation is not known ahead of the 10:00 a.m. day-ahead market close (*e.g.*, WSPP Schedule C arrangements), it can be self-scheduled. These supply arrangements impose certain performance and delivery requirements that instill greater confidence regarding their performance and delivery. Moreover, the EDAM BAA can better account for these from a reliability perspective by considering them when defining the level of ancillary services procurement to the extent necessary. Accordingly, contracted non-source specific supply may participate in EDAM through self-schedules.

Non-source specific supply that is not under contract cannot participate at EDAM external interties *i.e.*, these supply sources cannot offer supply at EDAM entity external interties, either by self-scheduling or economic bidding. This exclusion is limited to non-specific supply resources at EDAM external interties with EDAM entity BAAs, *i.e.,* not the ISO external interties, and is premised upon the reliability implications noted by the WEIM entities.[98]

b) External Resource Participation at ISO Interties

Most stakeholders continued to support or not oppose continuing to allow economic bidding at the ISO external interties because this historically has provided an opportunity to derive value for excess supply that may be bid into the day-ahead market. As noted in prior comments, stakeholders recognize the value the ISO BAA derives from excess supply offered economically into the day-ahead market. Some stakeholders expressed equity concerns if economic intertie bidding is allowed at the ISO external interties but not allowed to the same extent at the external interties of other EDAM BAAs. This draft final proposal retains in EDAM the ISO's existing practice, which allows external resources to submit economic bids at the ISO external interties. This allows source specific and non-source specific resources to bid economically into the day-ahead market consistent with current practice where the ISO retains full intertie bidding capability at its external interties.

Within its BAA, the ISO co-optimizes energy and ancillary services procurement through the market and, as such, it can better manage potential risks associated with economic bidding at its external interties. Moreover, economic bidding at the ISO external interties has been a longstanding and beneficial feature of the ISO market, providing suppliers an opportunity to offer excess supply into the market, enabling the ISO to serve demand more economically. The ISO is committed to working closely with prospective EDAM entities and other market participants to

[98] This type of external resource supply is similarly not able to participate in the WEIM.

evaluate the external resource participation model and evolve the design as entities gain experience in the market.

Similarly, the draft final proposal continues to allow pseudo-tied and dynamically scheduled resources to self-schedule or economically bid into the market at its external interties between the ISO BAA and non-EDAM BAAs.

c) Exports from the EDAM Footprint

This draft final proposal continues to extend to EDAM the WEIM framework for supporting exports out of the EDAM footprint. Under the WEIM framework, the WEIM entity facilitates exports from its BAA through the submission of base schedules. This process ensures the export schedules secure and pay for the necessary transmission rights under the EDAM entity's OATT. Under the proposed framework, an export out of the EDAM footprint must secure transmission under the respective EDAM entity's OATT or utilize existing transmission rights to support the export. This approach will compensate the EDAM entity for the use of its system, and it will require the exporter to work with the appropriate EDAM entity to submit an export self-schedule out of the EDAM footprint. Extending the WEIM framework to the EDAM acknowledges EDAM entities (transmission provide function) will continue administering their OATTs and sell transmission. With respect to the ISO BAA, exports out of the EDAM footprint to non-EDAM BAAs will be similarly supported under the existing export design.

7. Greenhouse Gas (GHG) Accounting and Reporting

The EDAM design seeks to account for the costs and reporting requirements arising from state GHG accounting and reduction policies. This includes factoring in GHG emission costs incurred by parties for GHG regulatory compliance associated with power transactions, reflecting those costs in the ISO's security constrained least cost dispatch, and facilitating any required GHG reporting and verification processes.

The proposal is to start EDAM with the resource-specific approach on the basis that stakeholders are familiar with the design as an extension of the WEIM, it is the most defined option, and it requires the least amount of implementation changes. Moreover, it effectively models the emissions costs of participating resources offering their output to serve demand in a GHG regulation area. The ISO commits to continue working collaboratively with regulatory agencies to pursue alignment of market design with applicable regulations. If necessary, the ISO will work with stakeholders and regulatory agencies to consider design improvements based on actual market experience and regulatory changes, including considering different design approaches identified and considered in the EDAM stakeholder process.

In comments, stakeholders sought clarifications and provided recommendations and feedback on the resource-specific approach. Key areas of feedback included reactions to the net export constraint and the ISO's attempt to include measures to limit secondary dispatch while ensuring there are no reliability or severe pricing impacts, the design of the GHG counterfactual, recommendations on what resources should be fully attributable, interest in LADWP's approach in future years, and recommendations regarding state and entity level reporting metrics. This GHG section responds to these topics raised by stakeholders.

a) Background

(1) The Western EIM and GHG Today

Because California has the only currently active GHG accounting program among states participating in the WEIM, today's WEIM design focuses on reflecting the cost of compliance, point of regulation, and reporting requirements of the California Air Resource Board's (CARB) cap-and-trade program. When offering output to serve California demand, scheduling coordinators for resources located in BAAs outside of California submit bid adders consisting of a GHG bid capacity (MW) quantity and a GHG price ($/MWh) that reflect the scheduling coordinator's willingness to make output from the resource available to serve California demand and the participating resource's costs to comply with California's GHG regulations in alignment with the first jurisdictional deliverer approach.[99] When determining total imports to a GHG regulation area, the ISO's optimization utilizes both the GHG bid adder and energy bid to determine which resources to attribute as serving California demand in a least cost manner. If a resource does not submit a bid adder or the GHG bid capacity is zero MW, the ISO does not attribute the resource to serve California demand.

This design accounts for WEIM transfers serving California demand. In connection with these imports, the ISO, CARB, and stakeholders have recognized the phenomenon of secondary dispatch in which higher-emitting resources may backfill to serve demand outside of California when the optimization attributes lower emitting resources to serve California demand. The ISO has implemented market rules to reduce the potential for secondary dispatch in the WEIM and proposes additional enhancements in this final proposal.

The ISO does not identify emissions associated with secondary dispatch; rather, CARB accounts for them through its outstanding emissions calculation by calculating total California WEIM emissions at the unspecified source rate and then subtracting emissions of WEIM participating resources outside of California that the market optimization attributes as supporting California demand.[100] CARB then addresses WEIM outstanding emissions through the direct retirement of freely allocated allowances that CARB would otherwise allocate to electric distribution utilities within California. The outstanding emissions calculation is subject to CARB's jurisdiction.

(2) State Regulations

California has established a carbon price for electricity transactions, and Washington will do so starting in 2023.[101] To the extent practicable, the GHG market design allows scheduling coordinators to reflect the costs of complying with state GHG reporting and reduction programs in their economic bids. The ISO may then reflect the cost of carbon under these state programs in its optimization.

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[99] *See generally* ISO Tariff section 29.32. Resources internal to California include the cost of GHG compliance in their energy bid.

[100] Title 17 California Code of Regulations. Section. §95111(h)(1)(A).

[101] The ISO understands Washington's approach will continue to evolve. Under Washington statute, the Washington Department of Ecology, in consultation with the Washington Utilities and Transportation Commission and Washington Department of Commerce, must adopt by regulation a methodology in the cap-and-invest context for addressing imported electricity associated with a centralized energy market by October 1, 2026. If the point of compliance changes in the future in this regulation, potentially under a linked program with California, the resource-specific model will accommodate this change.

b) Resource Specific Approach

(1) Overview

The EDAM resource-specific approach is an extension of the WEIM design that uses resource-specific bid adders to optimize dispatch. It is important to note in the EDAM context all GHG compliance is ultimately based on real time dispatch and resulting emissions. However, the settlement of GHG attributions is based on the GHG attributions scheduled in the EDAM, and then on GHG attribution deviations dispatched in the WEIM. The approach includes four design areas that differ from the current WEIM design. First, to align with state GHG regulations, the final proposal models the GHG regulation areas and their GHG transfers instead of from the BAAs and their transfers as in the current WEIM design. Second, it supports GHG bid adders and GHG attributions for multiple GHG regulation areas. Third, it introduces a new GHG counterfactual approach based on an optimized solution rather than self-submitted base schedules. Fourth, it applies a GHG net export constraint to mitigate the potential for secondary dispatch by limiting aggregate GHG attribution.

The final proposal includes three changes from the draft final proposal. First, it clarifies and updates the counterfactual that would roll over from EDAM to the WEIM as the difference between the day-ahead energy award and the day-ahead GHG award to align with the approach taken in the WEIM. Second, the final proposal clarifies three aspects of the GHG net export constraint which was developed to limit secondary dispatch: the proposal retains the optionality to have the constraint as a static or dynamic constraint and to the extent implementation requires a static constraint, it will be based on the optimal net transfer of the previous market run; the constraint will be turned off for all non-GHG regulation area BAAs for any hours a BAA that overlaps with a GHG regulation area fails the RSE; and it identifies the exceptions for RA capacity. Third, the final proposal explains that the GHG settlement value will be represented as a positive value. This last clarification is necessary when there are multiple GHG regulation areas, but it does not change the settlement payment to resources that receive an attribution to serve demand in a GHG regulation area.

(2) Geographic Boundary

The proposal is that the ISO will update the geographic boundary used for GHG accounting purposes to reflect state boundaries. Today the ISO uses BAA boundaries to represent GHG regulation areas. The rationale for changing the geographic boundary from BAAs to GHG regulation areas (*i.e.*, state-level boundaries) is that state regulations do not align with BAA boundaries. This will allow the ISO to reflect the dispatch costs associated with GHG pricing program compliance for resources within a state or dispatched to serve demand within that state, but not reflect these costs in the dispatch of resources not subject to these programs.[102] This design change will also affect the GHG design in the WEIM.

In cases where an entity has special state provisions in which either generation or load is not associated with the state for GHG accounting purposes, the ISO can model these unique circumstances. In collaboration with these entities, the ISO will model these footprints to ensure

[102] From an implementation perspective, the ISO will reflect boundary areas in its Master File with a new GHG regulation area field (*e.g.*, CA, WA, non-GHG) and associated nodes (Pnodes, Apnodes, and interties) and resources. We are planning on forecasting load based on WEIM load aggregation points (ELAPs), at the BAA level, and then distributing the demand to custom load aggregation points (CLAPs) using load distribution factors to identify demand at the GHG regulation area. Under this approach, the ISO will continue to enforce a power balance constraint at the BAA level, but it will be able to identify within its market optimization the EDAM Entity demand in the GHG regulation area.

the optimization correctly accounts for the price of carbon and does not affect resources or loads not subject to a state's program.

(3) Bidding, Optimization, and Attribution

(a) Bidding Mechanics

The EDAM GHG design reflects costs of compliance submitted by scheduling coordinators for participating resources in their bids. Through the bids submitted by scheduling coordinators, the ISO's market optimization considers certain information based on where resources are located and what GHG regulation area they plan to serve demand. This information takes three forms (1) to serve energy outside a GHG regulation area the optimization only considers the resources' energy bids because they are not subject to any GHG regulation, (2) to serve energy inside a GHG regulation area (imported in the GHG regulation area) the optimization considers the resources' energy bids + GHG bid adders, and (3) to serve energy inside a GHG regulation area (from resources inside the GHG regulation area), the optimization considers only the resources' energy bids, which include the cost of GHG compliance.

Submitting a GHG bid adder is voluntary and reflects the willingness of an EDAM scheduling coordinator to serve demand in a GHG regulation area and be subject to the GHG compliance for imports into that area. Similar to the current WEIM rules, the ISO will calculate a maximum GHG bid adder price for each resource outside GHG regulation areas on a daily basis to cap the GHG bid adder that a scheduling coordinator may submit in the day-ahead market for each hour to serve demand in a GHG regulation area.[103] A GHG bid of zero MW will reflect the resource is unavailable for dispatch to serve load in a GHG regulation area.

Currently, the two states that will have carbon pricing at the start of the EDAM, Washington's cap-and-invest program and California's cap-and-trade program, are not linked.[104] The two states are unlikely to share a common GHG price at the outset of the EDAM. This poses a challenge in determining how to treat transfers between California and Washington because the two states will not recognize each other's compliance instruments. This will result in some entities facing GHG compliance costs from both states when in-state electricity generation has a compliance obligation in one state and serves the other GHG region. The ISO anticipates state regulators will address this issue, and the ISO will provide any necessary support to them.

Recognizing the two programs will not be linked at the start of the EDAM, resources in a GHG regulation area will include their GHG costs in their energy bid and have a bid adder to serve demand in another state with a GHG pricing policy in place (*i.e.*, a bid adder to serve the other GHG regulation area: California or Washington). This approach allows for resource-specific attribution of resources in a GHG regulation area for serving load in another GHG regulation area. For example, a resource in Washington could submit a GHG bid adder to serve demand in California. Likewise, a resource in California could submit a GHG bid adder to serve demand in Washington.[105]

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[103] For resources located within a GHG regulation area, the ISO will also include reference level updates based on prevailing allowance prices as is done today for GHG pricing regions.
[104] Information on CARB's linkage requirements are available at: (Link). Washington also has a series of requirements and analytical steps that would need to be met before linkage could be approved.
[105] *See, supra* footnote 97. The ISO will work with state regulators as the rules around point of compliance evolve.

(b) Attribution and Secondary Dispatch

Below the ISO outlines how attribution occurs as well as the difference between secondary dispatch and incremental dispatch:

1. **Bid adders:** Under the ISO's resource-specific approach, the ISO will not attribute a transfer to serve demand within a GHG regulation area unless the resource's scheduling coordinator submits a voluntary GHG bid adder, indicating their willingness to serve demand in a GHG regulation area. The market optimization determines the total economic GHG transfer, or net import, for a GHG regulation area based on these bid adders and the corresponding energy bids.

2. **Attribution is based on energy + GHG bids:** Based on the submitted bid adders, the optimization selects, or attributes, resources based on their composite energy and GHG bid, lowest to highest, until the total MW of GHG transfers is fully allocated. The shadow price of this GHG transfer allocation constraint is the marginal GHG price. Attributed resources are paid the product of the marginal GHG price and the quantity of their GHG attribution.

3. **Attribution in relation to the counterfactual:** Attribution of transfers to serve demand in a GHG regulation area can occur either above or below a resource's counterfactual operating level established by the GHG reference pass, further discussed below. For example, in the WEIM, a resource can receive a GHG attribution when its economic award is less than its base schedule due to a reduction in load or economic displacement by other resources.

4. **Attributing resources to a GHG regulation area may result in secondary dispatch:** Attributing resources to a GHG regulation area can result in higher-emitting resources backfilling this attribution to serve load in other BAAs not in a GHG compliance area (*i.e.,* secondary dispatch).[106] For example, a GHG attribution to resource capacity below its optimized counterfactual schedule may result in secondary dispatch.

5. **Incremental dispatch should not be conflated with secondary dispatch:** Incremental dispatch is all dispatch above the GHG counterfactual. Not all incremental dispatch that is not otherwise attributed is the result of secondary dispatch, and there is no MW to MW relationship between transfers and secondary dispatch. Incremental dispatch can occur for a variety of reasons, some of which include (1) economic displacement: surplus power in a non-GHG regulation area that otherwise would not have been scheduled can economically displace resources in the GHG regulation area, and (2) hourly ramping schedules for resources in the non-GHG regulation area. Even if the GHG counterfactual obtained by the GHG reference pass is an optimized solution, this economic displacement is still possible outside GHG regulation areas in the IFM because the unit commitment and congestion patterns are very different in the two problems.

[106] As a reference for market participants, the ISO publishes on a monthly basis in its Monthly Market Performance Reports total WEIM transfers by fuel type which is equivalent to GHG attributions by fuel type. (Link)

(c) Counterfactual

The purpose of a GHG counterfactual is to establish a baseline to determine what dispatch would have occurred in the non-GHG regulation area without offers to serve demand in GHG regulation areas. In the WEIM, the counterfactual is the self-submitted base schedule.[107]

Because there are no base schedules in EDAM, the proposal leverages a special market run in the day-ahead market processes before the actual market run, solely to calculate a GHG counterfactual ("GHG reference pass"). The ISO anticipates the largest area of secondary dispatch reductions will occur due to an improved GHG counterfactual. This is because a more optimal GHG counterfactual should result in lower deviations between the GHG counterfactual and the actual market run. The ISO outlines the various market passes below, which will generally will occur between 10:00 and 13:00 one day before the Trading Day, and indicates where and how GHG regulation costs are considered in each market pass:

1. **RSE pass:** Ensures the ISO and EDAM entities can meet their BAA obligations prior to participating in the EDAM through a test that determines whether each participating BAA has sufficient supply and reserves to meet forecasted demand, ancillary services requirements, and uncertainty requirements.
    - To ensure RA resources can be accounted for, RA capacity in EDAM BAAs must be shown as bucket 1 energy transfers into the ISO BAA. The ISO expects the GHG bid for these RA resources to match the resources' RA capacity.

2. **GHG reference pass**: Serves as the GHG counterfactual by finding an optimal solution where the demand in the non-GHG area is optimally served by resources in this area without GHG transfers into GHG regulation areas. This market run will be identical to the IFM with the following exceptions:
    - It will not allow net imports into a GHG regulation area, however, exports from a GHG regulation area will be allowed. This will approximate how BAAs outside GHG regulation areas will meet their own load with their internal generation, similar to the concept of base schedules. However, in the GHG reference pass, transfers between BAAs outside GHG regulation areas will be optimally scheduled. Therefore, the optimal schedule from the GHG reference pass will reflect how supply resources can optimally serve demand in the EDAM footprint without net imports into GHG regulation areas and the associated GHG regulation cost. In the WEIM, base schedules include day-ahead transactions with other BAAs. This modeling convention is an appropriate extension of that logic. In response to two stakeholder requests that the ISO only create a counterfactual at the BAA level and not for the total non-GHG regulation area, such an approach would not allow for economic transfers to occur and thus result

[107] In the IFM, the proposal will limit GHG attributions to the lower of (a) the GHG bid capacity, (b) the resource's optimized dispatch, and (c) the positive difference between the highest energy bid capacity and the resource's base schedule. This constraint reflects the logic that a base schedule supports demand obligations prior to the real-time market, which limits to some degree available capacity offered to serve demand in a GHG regulation area. This rule reduces the potential for secondary dispatch and also applies to the WEIM market passes

in a non-optimal counterfactual. The optimal counterfactual is for the broader non-GHG regulation area.
    - It will not schedule RA resources in EDAM BAAs outside the ISO BAA by ignoring the energy bids of these resources. Consequently, these RA resources will have a zero GHG counterfactual schedule, which means they can be fully attributed to the CA GHG regulation area in the IFM (and its MPM pass).

3. **MPM pass for the IFM**: Provides effective measures against the exercise of market power when there is an opportunity for suppliers to exercise market power in the day-ahead market. In this pass, GHG transfers are unlocked and the following GHG constraints are applied:
    - First, the GHG attribution to a resource outside a GHG regulation area with a GHG bid is limited to the lower of (1) the GHG bid capacity, (2) the positive difference between the upper economic limit on the energy bid and the GHG reference obtained from the GHG reference pass, and (3) the optimal energy schedule.
    - Second, the aggregate GHG attribution to resources in a BAA in the non-GHG area is limited by the net export constraint; it would not exceed either the BAA's export capability or optimal net export transfer in a given interval (with the exception of RA capacity), relative to the net export transfer in the GHG reference pass. The optimization will view RA resources as internal to the GHG regulation area when they are either pseudo-tied[108] or dynamically scheduled from non-EDAM BAAs as system resources or tie-generators at an ISO scheduling point.

4. **IFM:** Co-optimizes energy, ancillary service bids, and imbalance reserve bids to produce day-ahead schedules and awards to ensure bid-in supply meets bid-in demand and all ancillary services and uncertainty requirements. In this market pass, the ISO will optimize for each BAA and GHG regulation area to reflect the optimal dispatch in the EDAM footprint considering GHG bids. The GHG constraints described in the MPM-IFM pass also apply to the IFM at the BAA and GHG regulation area level.

5. **MPM pass for RUC:** Checks for and mitigates market power for reliability capacity bids. GHG considerations are not applicable.

6. **RUC**: Identifies capacity needs and commits additional resources to ensure grid reliability. GHG considerations are not applicable.

In the draft final proposal the ISO suggested that the day-ahead schedule produced in EDAM would carry over to the WEIM and serve as the real time counterfactual. In this final proposal, the ISO clarifies the counterfactual for use in real time will be the difference between the day-ahead market energy schedule and day-ahead market GHG award for two reasons. First, this

[108] Any pseudo-tie participating generator agreement with a BAA within a GHG regulation area will also require modeling the resource as a GHG pseudo-tie to the GHG regulation area. The proposal does not accept a GHG pseudo-tie arrangement without the resource having a pseudo-tie agreement with a BA within a GHG regulation area.

approach more closely aligns with the concept of a base schedule. If the day ahead energy award is the energy needed to serve the whole market and the day-ahead market GHG award is the energy needed to serve a GHG region, the difference between them is the energy needed to serve the non-GHG portion of the market. Although this is not a perfect match with the base schedule, the ISO believes this is a closer approximation than the day ahead energy schedule. Second, this approach aligns with the fact that the real-time market is performing its own optimization and determines the final attribution. This is how the WEIM works today, and it allows for resources with lower GHG bids that only participate in the WEIM to displace more expensive resources that participate in both the WEIM and EDAM. The examples below highlight both the draft final proposal approach (Example 1) as contrasted with the final proposal approach (Example 2, 3, and 4) to clarify the mechanics of the approach.

	DA	FMM	Settlement	Comments
Background	For all examples assume: - Pmax / UEL= 100 MW -GHG bid = 50 MW - Marginal cost of GHG = $30	The GHG attribution to a resource outside a GHG regulation area with a GHG bid is limited to the lower of: (1) the GHG bid capacity, (2) the positive difference between the upper economic limit on the energy bid and the GHG reference obtained from the GHG reference pass, and (3) the optimal energy schedule. - Assume that FMM award is equal for all 4 intervals	**Day Ahead Settlement** = IFM Award MW * IFM Marginal cost of GHG **FMM GHG settlement (assuming the FMM award is equal for all 4 intervals)**= (FMM Award MW – IFM Award MW) x FMM marginal cost of GHG **RTD GHG settlement (assuming the RTD award is equal for all 12 intervals)**= (RTD attribution MW – FMM Award MW) x RTD marginal cost of GHG	Attribution is not guaranteed but based on voluntary bids submitted. Once the total MW of GHG transfers are determined, resources are selected for attribution at least cost to satisfy total GHG transfers All settlement is a deviation from the day ahead (i.e., higher attribution in RT will settle above DA settlement, lower attribution in RT will settle below DA settlement)
Example 1: Challenges with the ISO's draft final proposal: DAM energy schedule as the reference	DAM Energy Award = 90 MW DA GHG Award = 50 MW	FMM Counterfactual = Energy Award = 90 MW Max FMM GHG Award = UEL-Counterfactual = 100 MW – 90 MW = 10 MW	DA GHG Settlement = 50 MW * $30 = $1,500 FMM GHG Settlement = (10 MW – 50 MW) x $30 = ($1,200) Total: $300	Only 10 MW of the resource could potentially be awarded in RT
Example 2: Final proposal: Resource Energy Award	DAM Energy Award = 90 MW DAM GHG Award = 50 MW	FMM Counterfactual = DAM Energy Award - DAM GHG Award = 90 MW - 50 MW= 40 MW	DA GHG Settlement = 50 MW * $30 = $1,500	The resource is attributed to the GHG area in DA and RT

Higher than GHG Award		FMM Eligible Attribution = UEL – Counterfactual = 100-40 = 60 MW	FMM GHG Settlement = (60 MW – 50 MW) x $30 = $300 Total: $1,800	
Example 3: Final proposal: Resource Energy and GHG Award are equal in DA	DAM Energy Award = 50 MW DAM GHG Award = 50 MW	FMM Counterfactual = DAM Energy Award - DAM GHG Award = 50 MW -50 MW = 0 FMM Eligible Attribution = GHG bid = 50 MW = 50 MW	DA GHG Settlement = 50 MW * $30 = $1,500 FMM GHG Settlement = (50 MW – 50 MW) x $30 = $0 Total: $1,500	The resource is attributed to the GHG area in DA and RT.
Example 4: Final proposal: Resource is not awarded GHG in DA	DAM energy award = 100 MW DA GHG Award = 0 MW	FMM baseline = DAM energy schedule - DAM GHG award = 100 MW – 0 MW = 100 MW FMM Eligible Attribution = UEL – Counterfactual = 100-100 = 0	DA GHG Settlement = 0 MW * $30 = $0 FMM GHG Settlement = (0 MW – 0 MW) x $30 = $0 Total: $0	The resource is not attributed; it is serving the non-GHG portion of the market

Table 8: Day ahead to real time counterfactual and attribution examples.

For entities that participate in the WEIM and not in the EDAM, the ISO will continue to use the self-submitted base schedule as the GHG counterfactual. Some stakeholders posed additional questions on how the EDAM counterfactual differs from the two-pass solution previously considered in the context of the WEIM and expressed concerns that entities may withhold supply from the first market pass in order to secure a GHG attribution in the second market pass. The ISO emphasizes that it would be difficult to do this based on the optimized GHG reference pass proposed for the EDAM. As background, in the WEIM, a resource in the non-GHG area may submit a low base schedule (even zero) to create headroom for a GHG attribution to serve demand in California and profit from the additional payment for that GHG attribution. As documented in the ISO's compliance filing to FERC, the ISO did not find there were changes to the submission of WEIM base schedules by market participants to maximize revenue from GHG payments as opposed to the optimal dispatch of the resource.[109]

Unlike the WEIM, the EDAM GHG reference pass does not use a self-submitted base schedule; rather, it calculates an optimized supply schedule to meet the demand in the non-GHG area without GHG transfer imports into GHG regulation areas. As a result, it should yield realistic schedules for EDAM entities to serve their native load prior to making additional supply

[109] See ISO's December 27, 2019 Informational Report on EIM Market Bid Adder Rules. ER18-2341. Link

available to serve demand in a GHG regulation area. Unlike the WEIM, in EDAM a scheduling coordinator that bids a high energy bid for a resource in the non-GHG area to result in a low GHG reference that would increase its GHG attribution, risks pricing the resource out of the IFM.

(d) Secondary Dispatch Constraints

To reduce the potential for secondary dispatch, the ISO has proposed constraints to limit attribution. None of the constraints eliminate secondary dispatch. This final proposal includes two key measures to mitigate the potential for secondary dispatch. First, in the IFM, mirroring the approach used in the WEIM, the proposal is to limit resource-specific attributions to the lower of: (a) the GHG bid capacity, (b) the positive difference between a resource's upper economic limit and its GHG reference pass, or (c) the optimal energy schedule. Second, based on stakeholder feedback regarding concerns that the ISO was attributing resources to a GHG regulation area in periods when the BAA was a net importer or in excess of net optimal transfer schedule, the proposal is to implement an hourly GHG net export constraint for BAAs outside of GHG regulation areas.

In EDAM, the GHG net export constraint is an hourly constraint that applies to every BAA that does not overlap with a GHG regulation area. When a BAA that overlaps with a GHG area (no export constraint is enforced for that BAA) fails the RSE, all net export constraints are deactivated for that hour so as to not restrict imports into that BAA potentially creating a reliability issue. The constraint treatment is the same in both EDAM and WEIM, except for the interval duration. In the WEIM, this constraint will be deactivated for every 15 minute interval when a BAA that overlaps with a GHG area fails the RSE, and apply to all non-GHG EDAM BAAs.

In response to the draft final proposal, the ISO received stakeholder feedback both in favor of and opposing turning off the constraint. The final proposal maintains it is prudent to turn off the constraint to ensure there are no reliability impacts resulting from an attempt to limit attribution and therefore secondary dispatch.

This final proposal maintains considerations for RA resources so that the constraint limits the aggregate GHG attribution to resources in a BAA in the non-GHG area to the higher of the optimal net transfer (positive for export and negative for import) or the aggregate available RA capacity in that BAA. Furthermore, the constraint limit would be set relative to the net transfer of the BAA in the GHG reference pass; therefore, GHG attributions will be allowed to resources in a BAA with a reduced net import transfer in the IFM compared to the net transfer in the GHG reference pass. The proposal maintains implementation flexibility on whether the constraint will be static (now defined not as the capability of the line, but rather, it is defined as the optimal net transfer from the previous market run) or dynamic (based on the optimal GHG net transfer capability in a given interval). This constraint has the effect of reducing the available choices for GHG attributions, thus it may indirectly result in a higher marginal GHG price. This measure will also apply to WEIM. Lastly, the proposal also clarifies that if a BAA fails the RSE, the ISO will turn off the GHG net export constraint for the hours of that day that the BAA fails the RSE.

The final proposal clarifies how ISO RA resources[110] will be treated in the table below:

Viewed as internal to the GHG regulation area; not attributed	Viewed as external to the GHG area; can be fully attributed
Resources with both a pseudo-tie PGA to associate the resource with the BAA and a GHG pseudo tie (flagged in the master file) to associate the resource with the GHG regulation area will be viewed as internal to the GHG regulation area. In the case of a partial pseudo-tie, the resource would need to be registered as two separate resources, and one of them would be pseudo-tied. The logical[111] resources are bid, scheduled, and settled individually without any dependency with each other and the physical resource; the SC is responsible for dividing the physical resource capacity and technical characteristics between the logical resources. Similar to a full pseudo-tie, a partial pseudo-tie would need to have both a pseudo-tie PGA and a GHG pseudo-tie. A partial pseudo-tie is not a recommended approach and it can result in an infeasible dispatch.	RA resources from EDAM BAAs must be shown as bucket 1 energy transfers into the ISO BAA for RSE. They will have a zero GHG reference so that RA capacity can be fully attributed; their attribution will not be constrained by net export transfer constraints.
Dynamically scheduled resources from non-EDAM BAAs shown as system resources or tie-generators at an ISO scheduling point would be viewed as internal to the GHG regulation area.	Dynamically scheduled resources from non-EDAM BAAs shown as system resources or tie-generators at an EDAM BAA intertie can be viewed as external to the GHG regulation area if the EDAM BAA is not inside the GHG regulation area.

Table 9: RA treatment in the GHG counterfactual.

As follow up to questions from stakeholders and the November 21, 2022 Market Surveillance Committee (MSC) meeting regarding the extent to which the GHG net export constraint could limit transfers to a GHG regulation area and result in either reliability or pricing impacts, the ISO provided analysis in the draft final proposal which is also included in this final proposal. The ISO's analysis, using WEIM data for the most stressed months of July, August, and September, 2022 assessed the extent to which the GHG net export constraint would affect the availability of GHG bids. To do this, the ISO assessed what "currently eligible GHG bids" would be after determining it could not exceed the positive difference between the upper economic limit and the base schedule. From the "currently eligible GHG bids," the ISO then subtracted bids from BAAs that were net importers and bids in excess of the BAAs' transfer capabilities.

While the ISO did not find a reliability impact, it did find some pricing impacts. The preliminary analysis, summarized in the table and figures below, finds less than one percent of all Real-Time Pre-Dispatch (RTPD) intervals from July through September 2022 have exhausted the

[110] The proposal contemplates ISO RA resources. If there are other BAAs that participate in EDAM that have a resource adequacy construct that the ISO should allow to be fully attributable in the context of the GHG net export constraint, the resource-specific information of those resource adequacy resources will need to be provided to the ISO in the onboarding process to account for them.
[111] Logical means that it is not a physical resource, but a logical resource representation in the market.

submitted GHG bid capacity.[112] This refers to a situation where, after imposing both the current WEIM constraints on GHG awards and the proposed GHG net export constraints, no more GHG bids would be available to serve load within the GHG regulation area. The ISO does not anticipate a reliability impact arising from such a situation for two reasons (1) the RSE should ensure sufficient supply, and (2) the ISO has provisions in place to turn off the constraint as described above.

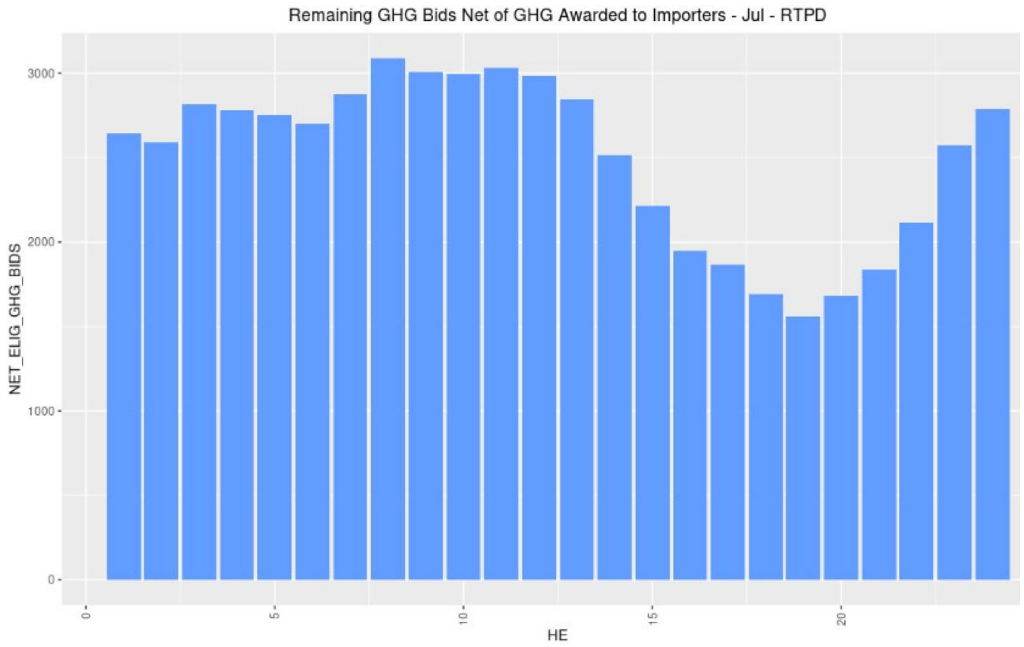
The ISO anticipates some pricing impacts because adding any new constraint to limit GHG attribution will likely affect prices as the constraint can affect which resource's bid sets the GHG marginal price. Thus, the marginal GHG bid will be higher up the bid stack. Conversely, the GHG net export constraint should limit the potential for secondary dispatch and therefore better reflect actual costs.

	Number of RTPD Intervals		
Month	Yes	No	Total[113]
July 2022	1	2,972	2,973
August 2022	25	2,940	2,965
September 2022	27	2,850	2,877

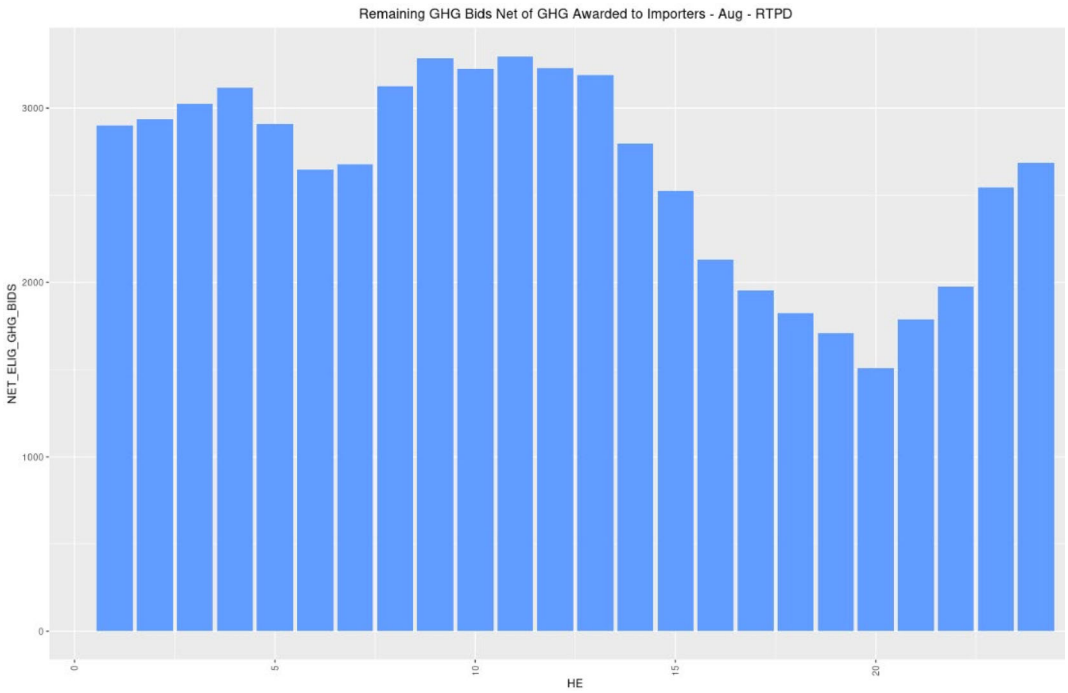
Table 10: Number of RTPD intervals in which GHG bid capacity might be exhausted.

The ISO has captured average hourly remaining GHG bids in the WEIM which are in excess of the constraint in the graphs below for July, August, and September 2022. These are remaining bids that have not been attributed after considering the constraint that the GHG bids cannot exceed the positive difference between the upper economic limit and base schedule, cannot come from a BAA that is a net importer, and cannot come from a BAA if attribution exceeds actual export capability.

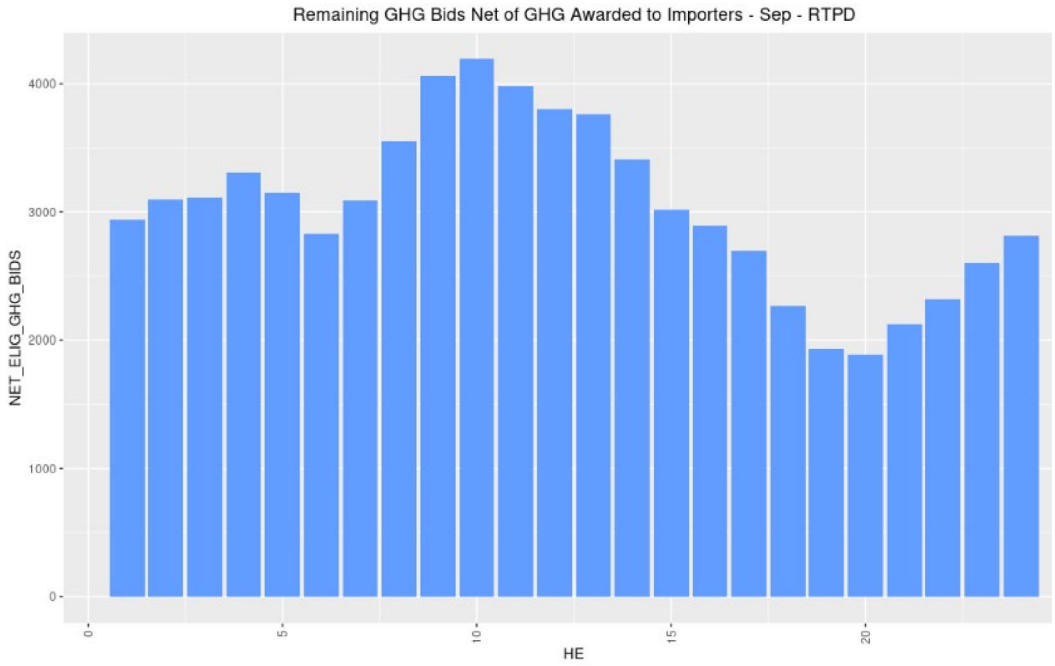
[112] Note: the results of the analysis shown herein reflect a slightly different export constraint than the one proposed in the revised straw proposal. Specifically, the analysis considered the net export constraint to be based on actual export capability rather than the constraint based on the optimal transfer. The ISO performed a similar analysis using the optimal transfer which yielded qualitatively similar results as the analysis shown here. As noted, the ISO is still evaluating if this constraint should be based on the optimal net transfer schedule or based on the transfer capability between BAAs.
[113] Note: an immaterial number of RTPD intervals were removed from the analysis due to various minor data integrity issues.



Graph 1: July 2022 average hourly remaining GHG bids in excess of the constraint.

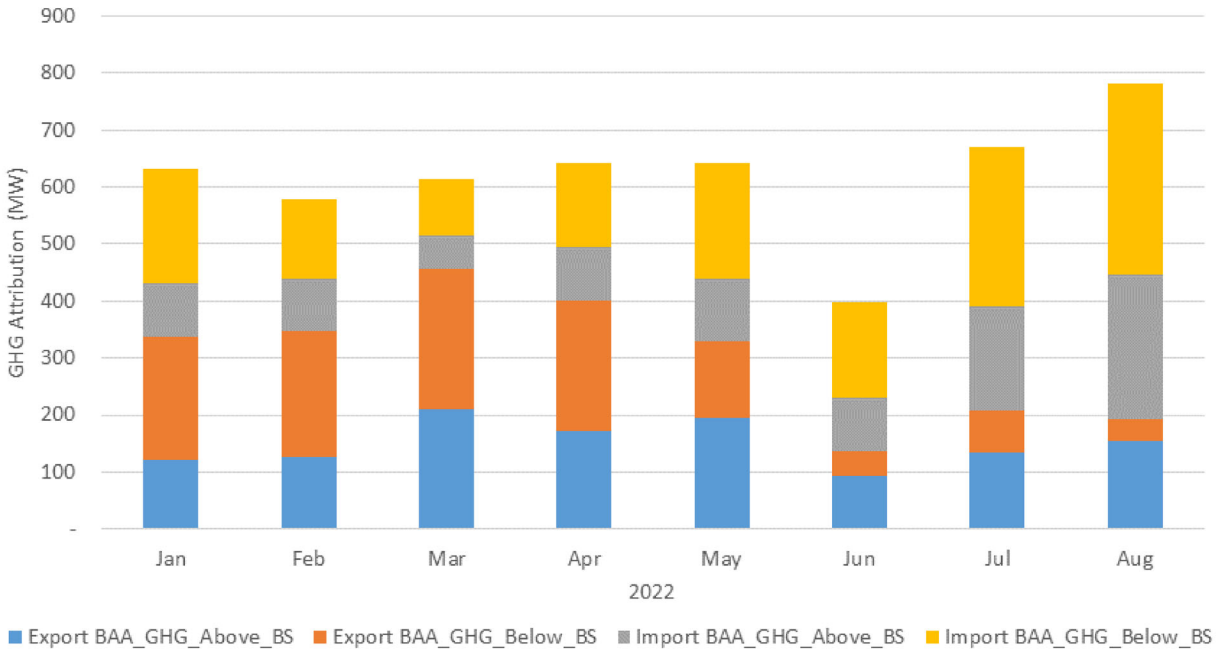


Graph 2: August 2022 average hourly remaining GHG bids in excess of the constraint.



Graph 3: September 2022 average hourly remaining GHG bids in excess of the constraint.

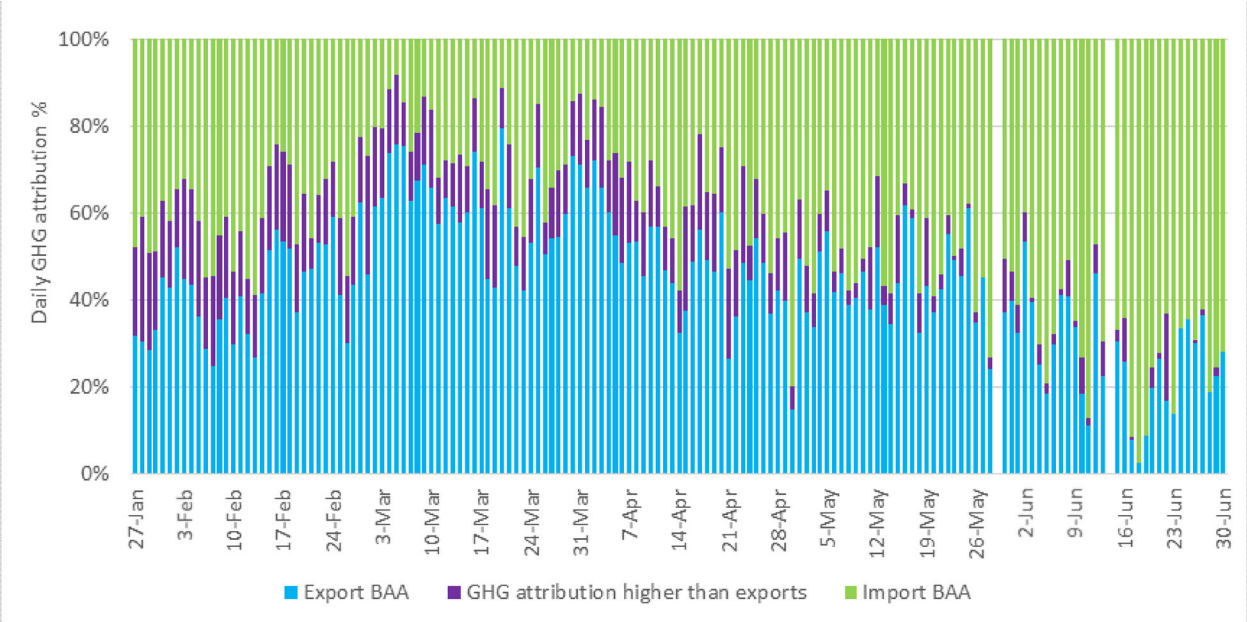
The MSC asked questions to understand where secondary dispatch came from in the GHG bid sufficiency analysis (the analysis above). They requested information on what attribution occurred above or below the base schedule. In response, the ISO produced the analysis below. The graph below provides the GHG attribution that are currently in an importing BAA or exporting BAA and the quantity that represent secondary dispatch. As a result of the net export constraint, the attributions in a currently importing BAA would no longer be available. The exporting BAA figures are not in excess of transfer limits, and resources located in those exporting BAAs could still receive an attribution based on bids to serve demand in a GHG regulation area. Both the importing and exporting BAA figures highlight what is above or below the base schedule, with the yellow and orange areas representing total secondary dispatch arising from attributions below resources' base schedules.



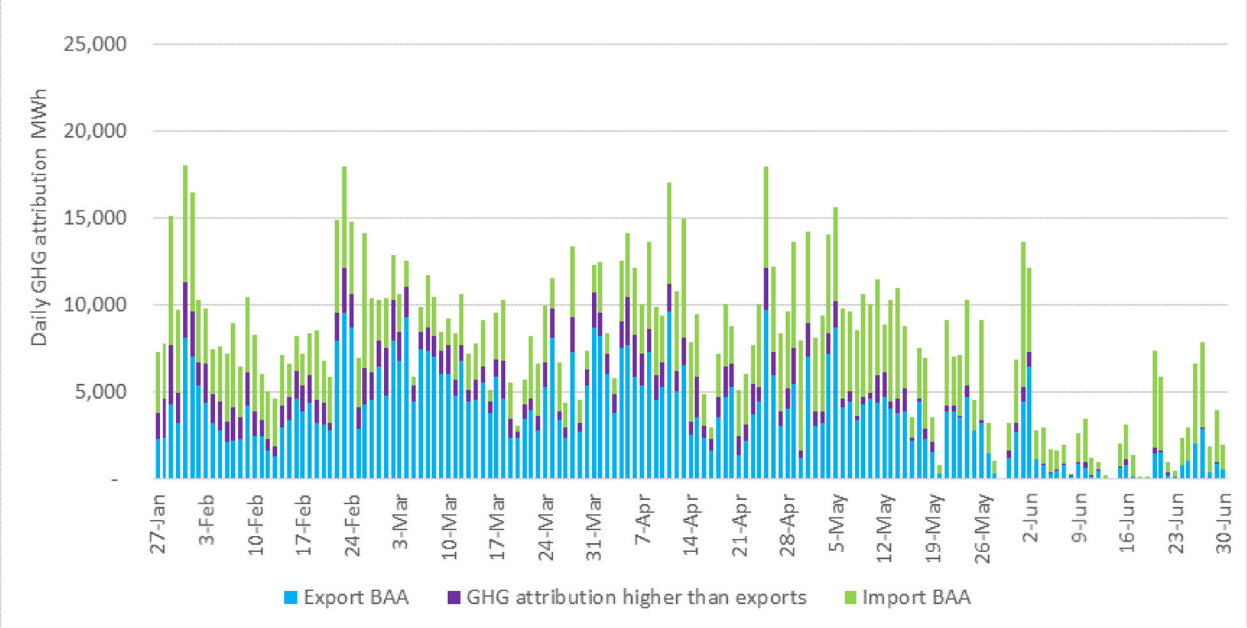
Graph 4: 2022 GHG attribution awards above and below the base schedule for importing and exporting BAAs.

There are some limitations to the analysis. First, unlike the proposal, the ISO did not adjust for monthly RA capacity from a BAA. Thus, this aspect of the analysis is more conservative than what would occur in EDAM. Second, the analysis considered the GHG net export constraint to be based on actual export capability rather than the constraint based on the optimal transfer. This aspect of the analysis is less conservative than what has been proposed. Lastly, although WEIM data can serve as a proxy, uncertainties remain regarding the extent the WEIM will mirror EDAM based on EDAM participation, bidding behavior, and the use of a different and optimal counterfactual.

Stakeholders also requested information on the amount of secondary dispatch in EDAM using the resource specific approach, and information regarding the extent to which the approach would minimize leakage compared to the WEIM approach. Without actual EDAM bids and awards, the ISO cannot forecast the amount of secondary dispatch. However, absent a live EDAM market to test the impact, the ISO has attempted to provide a proxy of the impact this enhancement might have by applying the constraints to the WEIM and measuring the reduction in attribution. This approach does not re-run the market; rather, it quantifies when attribution occurred above BAA transfer limits and when the BAA was a net importer as a means of quantifying the potential reduction in secondary dispatch.



Graph 5: EDAM secondary dispatch constraints applied to the WEIM on a percentage basis in 2022.



Graph 6: EDAM secondary dispatch constraints applied to the WEIM on a volumetric basis in 2022.

This dataset from January 27, 2022 through June 30, 2022 reveals that a net GHG export transfer constraint would have reduced total attributions to resources within BAAs that were net importers. Although this does not indicate the possible magnitude of GHG attributions we might see in the EDAM, it provides context to the possible impact of the constraints.

- **Import constraint:** The green bars reflect the percentage and volume of attribution that occurred when the BAA was a net importer. This dataset demonstrates that if the market optimization applied the import constraint, the reduction in GHG, attribution would have varied by day and ranged between 0-95% or 0-7,000 MWh.

- **Export constraint**: The purple bars reflect when attributions occurred notwithstanding the BAA exporting beyond its physical transfer limits. This dataset demonstrates that if market optimization applied the export constraint, the reduction in GHG attribution would have varied by day and ranged between 0-30% or 0-4,000 MWh per day.

Certain stakeholders requested the ISO introduce a constraint to limit GHG attributions to only dispatches above the counterfactual. Although this approach appears straightforward, testing and modeling examples indicate this constraint would create significant implementation concerns. First, it may not be implementable. The number of binary variables required to linearize the constraint impose a performance challenge. Introducing a binary variable for each resource with a GHG bid (*i.e.*, for hundreds of resources in each hour), would increase the performance effort in the IFM (and its MPM pass) because the complexity increases exponentially with the number of binary variables. No matter how much time the market has to solve, it may even be impossible to obtain a solution. This issue will be exacerbated if applied in the real-time market. Second, the constraint produces pricing which is inconsistent with resource costs, which is antithetical to market design principles. The constraint removes the convexity of the problem leading to solutions with inappropriate and inconsistent unit commitment, dispatch, production cost, and marginal prices. The constraint may increase the cost and marginal prices for load outside the GHG regulation area. Also, resources outside the GHG area can be uneconomically scheduled above the GHG reference to receive a GHG attribution, resulting in payment inadequacy (payment below bid cost). This goes against a key benefit of EDAM and the WEIM; namely that the markets support economic displacement. The reduction of the secondary dispatch is but a secondary objective because the first and main objective is to minimize the scheduling cost in the market footprint.

Stakeholders may question how far should the market go to reduce the secondary dispatch before severely compromising its primary objective. The ISO shared examples and modeling efforts in its November 14th stakeholder meeting that demonstrate these problems. Most stakeholders that commented on the constraint in response to the draft final proposal, approved of not moving forward with the constraint in light of the inconsistencies it creates between the resource's prices and costs. The ISO understands that many stakeholders would like to better understand the frequency with which these issues occur. These instances occur during periods of economic displacement, which is the objective of EDAM. However, the ISO cannot quantify the frequency these events would occur outside of a live EDAM market.

(4) Transparency

As described above, the optimization takes the total imports for a GHG regulation area and then attributes resources lowest to highest. The shadow price of the GHG transfer allocation to GHG attributions is the marginal GHG price. Only resources with GHG bids receive an attribution of a transfer serving demand in a GHG regulation area. The ISO publishes GHG attribution data in various forms:

- For scheduling coordinators, the proposal is to make GHG attribution data available on a resource-by-resource basis in the Customer Market Results Interface (CMRI) and through settlement statements. Scheduling coordinators could use data from the CMRI to report MWh imports, by source, to their respective GHG regulation programs. This information can also be reviewed by third-party verifiers to confirm reported values. The proposal is also to make resource specific data from the GHG reference pass solution available to the resource's scheduling coordinators.

- At the state level, today the ISO reports total and WEIM-entity level MWh GHG attributions to CARB pursuant to a subpoena. The ISO will continue to explore how best to provide total WEIM and EDAM transfers to states with GHG accounting and reduction programs.

(5) Settlement

Under a resource-specific approach, resources that receive a day-ahead GHG attribution to support demand in a GHG regulation area will receive a payment for their GHG attribution at the IFM marginal GHG price. In the real-time market, scheduling coordinators for resources will receive a deviation settlement from the resource's day-ahead attribution quantity. Deviation payments or charges will apply to the difference between the real-time and the day-ahead GHG attribution at the relevant real-time marginal GHG price.

As a clarification, in both EDAM and the WEIM the marginal greenhouse gas regulation cost (MGC) component of the LMP will be positive inside the GHG regulation area and zero outside the GHG regulation area. As a result, in settlements, the GHG component will be a positive payment to EDAM participating resources that receive a GHG attribution. This is a departure from today's approach in the WEIM in which the MGC is a negative value outside the GHG regulation area and zero inside California. The ISO is updating its approach in order to support multiple GHG areas. This does not change settlement outcomes.

(6) Compliance and Reporting

For regulatory purposes, the proposal is to for the ISO to provide total WEIM and EDAM transfers to states with GHG pricing programs. For voluntary clean energy programs, with market enhancements, the ISO could also provide emissions intensity information for in-state generation and the total MW of BAA-level transfers. This effort will depend on the data set needed by states to assess how dispatch of resources in a centralized market informs the GHG intensity of power serving its demand. The ISO is open and willing to begin longer term efforts to provide states with and without carbon pricing programs data on centralized market transactions. To support such reporting efforts, the ISO will work with state representatives to assess what type of data would best support their requirements and the frequency they would like it provided.

Regarding REC reporting and compliance, stakeholders raised concerns that some states may view market dispatch as a claim on the REC and suggested improved data reporting to ameliorate this issue. The ISO makes no claim to a resource's environmental attributes, either for itself or on behalf of its market participants, as a result of a dispatch in its markets. To assist with this issue, one stakeholder encouraged the ISO to work with The Western Electric Coordinating Council's (WECC) Western Renewable Energy Generation Information System (WREGIS) to develop a comprehensive tracking and reporting mechanism that covers all generating units operating in the Western Interconnection. This request extends beyond the scope of an initial EDAM design. The ISO is willing to explore data needs with entities in the Western Interconnection as efforts to implement EDAM continue.

Lastly, some states require deliverability to the service territory of the purchasing utility for a utility to claim the REC. This type of policy can prohibit market participation and, consequently, efforts to lower emissions in the west. The final proposal is to defer to states to address this issue.

D. Post-Day-Ahead Market Processes

Revenue allocation and settlement are essential post-day-ahead market processes. This section discusses these processes as they apply in the EDAM, along with the EDAM fees framework.

1. Transfer Revenue and Congestion Revenue Allocation

The draft final proposal retained the proposal for sharing of transfer revenue which accrues at the interfaces between EDAM BAAs.[114] Under this approach, there would be a 50:50 sharing arrangement between two EDAM BAAs that made available transmission at the interface between the BAAs to facilitate energy transfers, imbalance reserve transfers, and/or reliability capacity transfers. The draft final proposal also retained the proposal for distribution of congestion revenue,[115] which accrues on the internal transmission system when there are binding constraints, and includes intertie constraints (ITCs), would be retained by the EDAM BAA where the congestion occurs.

Stakeholders generally supported the proposed shared allocation of transfer revenue that accrues at the interfaces between two EDAM BAAs. However, a few stakeholders continue to raise concerns with the allocation of congestion revenues accrued as a result of transmission constraints binding on the internal transmission system of an EDAM BAA to that BAA. These stakeholders stated that if a constraint is binding because of limitations on the internal system driven by flows across the interties, known as an intertie transmission constraints (ITC), the revenue should be shared with the transmission owners of the intertie. Other stakeholders supported allocating congestion revenues accrued on the internal system of an EDAM BAA to that BAA on the grounds such BAA must resolve the congestion, which results in re-dispatch and other costs. Accordingly, they argued accrued congestion revenues should remain with that entity. As discussed further below, this final proposal retains the proposals to (1) share transfer revenue 50:50 accrued at the interties between the two EDAM BAAs, and (2) assign the congestion revenues accrued resulting from congestion and constraints on the internal transmission system to remain with the EDAM entity on whose transmission system the constraint materialized.

a) Background and WEIM Congestion Revenue Allocation Today

The ISO models internal transmission constraints, internal transmission limits, and transmission transfer limits in the WEIM and would continue to do so in the EDAM. If these internal transmission limitations or constraints are reached – the constraint or limit binds – the market will seek to re-dispatch around these constraints. When these limits or constraints bind, the marginal cost of congestion (MCC) component within the LMP accounts for differences between the incremental cost to serve demand and recovers these costs as congestion revenues.

Similarly, entities make transmission available at the interfaces/interties between EDAM BAAs to support energy transfers. The transmission across interfaces between WEIM BAAs may have

[114] Transfer revenue is the revenue collected at transfer locations when one EDAM BAA provides energy, imbalance reserve and/or reliability capacity to another EDAM BAA, and the transfer scheduling limit is binding at the optimal solution.
[115] Congestion revenue is produced by a binding transmission constraint or intertie scheduling limit (ITC/ISL) in the optimal solution such that the LMP, exclusive of Marginal Cost of Losses and Marginal GHG regulation cost, at different locations of the transmission system generally is not equal across an EDAM BAA.

limitations or other constraints, largely informed by the amount of transmission capacity made available to the market across the transfer interfaces that derives a scheduling limit. When this transfer scheduling limit is reached, *i.e.*, becomes binding, the market will seek to re-dispatch to meet the obligations across the footprint. For example, the market may award capacity from higher cost resources within the BAA to meet BAA load and other requirements. When the transfer limit binds in the EDAM, it will result in price separation of the marginal energy component (MEC) of the LMP for the binding BAA and the rest of the footprint, which represents the accrual of transfer revenue.[116]

In the WEIM, real-time congestion revenue accrues when either internal transmission constraints bind or transfer constraints bind, and both constraints are considered within the congestion component of the LMP. The WEIM entity is allocated congestion revenues accrued associated with binding internal transmission constraints within the BAA in which the constraint is modeled. The ISO allocates congestion revenue accrued as a result of binding transfer scheduling constraints among the BAAs associated with the transfer point. If the transfer point is between two WEIM BAAs, the congestion revenues are shared between the two BAAs 50:50, with the exception that across interfaces with the ISO BAA, the congestion revenue is allocated fully to the WEIM BAA supporting the transfer. In the WEIM, the WEIM congestion revenue – also known as congestion rent – is settled through one charge code on a net basis where the revenues accrued are offset by incurred congestion costs.

b) Transfer and Congestion Revenue Allocation in EDAM

Revenue associated with binding transfer limits or constraints at the interfaces between two EDAM BAAs, as well as congestion revenue associated with binding internal transmission limits, will accrue in EDAM similar to how they accrue in WEIM. However, rather than settling these revenues under the umbrella of "congestion revenue" (or congestion rent) under one settlement charge code, these components will be separated and settled independently with the EDAM entity – one settlement for accrued transfer revenue and a separate settlement for accrued congestion revenue.[117]

This final proposal retains the proposal that transfer revenue accruing at the interfaces between two EDAM BAAs is shared 50:50 between the two entities, including with the ISO. The transfer revenue accrues because two EDAM entities brought transmission to the interface to support mutual transfers, and they derive mutual benefits. Thus, sharing these transfer revenues is fair and equitable. The transmission brought to the EDAM encompasses bucket 1, bucket 2, and bucket 3 transmission that facilitates transfers and accrual of transfer revenues when net transfer limits – represented by ETSRs – bind (reach the limits). The exception to the sharing of transfer revenue 50:50 between two EDAM BAAs is when transmission across an interface is made available by a transmission customer under pathway 2, *i.e.*, where they release their transmission rights to the market in advance for optimization. In that instance, the transmission

[116] The ISO will calculate transfer revenue for energy, imbalance reserve, and/or reliability capacity for those hours in which a participating BAA's transfer scheduling constraint becomes binding.
[117] During the *Real Time Settlement Review Initiative*, the ISO identified an asymmetrical settlement for energy wheeling through the WEIM area when one WEIM BAA has a power balance constraint violation. This could lead to limited cost shifting within the WEIM area and between WEIM and non-WEIM BAAs. The initiative determined that the ISO would settle all ETSRs, which are associated with transfers between BAAs. Thus, there must be separation between the settlement of transfer and congestion revenues. *Real Time Settlement Review Initiative,* October 21, 2020. Link

customer will receive the full allocation of transfer revenue associated with its transmission rights released to the market. In unique instances where the sharing of transfer revenue 50:50 between two EDAM BAAs does not align with existing or future commercial arrangements between the two BAAs (*i.e.*, specific contracts between the entities), different transfer revenue sharing arrangements can be accommodated.

Similarly, this final proposal retains the proposal that congestion revenue accruing because of binding transmission constraints on the internal transmission network of the EDAM entity be fully allocated to the EDAM entity, including with the ISO.[118] This approach is consistent with the allocation of congestion revenues in the WEIM, where the full allocation is settled with the EDAM BAA. On the ISO system, congestion revenues accruing on the internal transmission system are allocated to fund congestion revenue rights, and sharing these revenues could lead to under collection and undermine the ISO's ability to fund these congestion revenue rights. More practically, if there is a binding internal transmission constraint, the market re-dispatches generation internal to the BAA to continue serving load and meeting the BAA's obligations. Sharing the accrued revenues with other entities would be inequitable in these circumstances. Stakeholders do not oppose this approach for allocating congestion revenue for purely internal constraints.

Some stakeholders continue to oppose fully allocating congestion revenues to the EDAM BAA where the constraint materializes accruing as a result of binding limits or constraints on internal paths due to import or transfer flows across interfaces between EDAM BAAs. These constraints on the internal transmission paths of a BAA arise, in part, due to import flows across one or multiple interfaces. A common example of an ITC is a constraint or limit on an internal path or physical facilities that may bind due to simultaneous flows across particular interties. These are common limits or constraints transmission providers may have on their internal transmission network today. When these constraints or limits are reached, it may lead to curtailment of transmission service or re-dispatch within the BAA to ensure those limits are respected and do not impede reliability. In the WEIM, although the ISO has many ITCs modeled in the market because its entire load is offered in the day ahead, only a few participating entities have elected to model ITCs in the market. They have opted instead to monitor and resolve them outside of the WEIM, in part, because of the limited scope of the WEIM in optimizing supply to meet imbalance needs. Also, it may be more practical to manage internal transmission system constraints outside of the market consistent with a BBAs' historical practice.

In the EDAM, where the scope of participation is broad, entities will be similarly situated to the ISO and will seek to model more if not all their internal transmission constraints in the market to ensure feasible commitment of supply in the day ahead and dispatch in real time. The ISO therefore expects ITCs will be more prominent in the EDAM across all participating EDAM BAAs, with congestion revenue accruing in every EDAM BAA as a result of a binding ITC on the internal transmission network. These revenues would be allocated to the EDAM BAA to compensate for re-dispatch of generation internal to the BAA to manage the constraint and ensure continued reliable service to load. This practice is consistent with actions outside of the

[118] To the extent there are multiple transmission owners within a BAA, they may also be eligible for allocation of accrued congestion revenue associated with their facilities availability in the EDAM and there may be a need for direct payment of congestion revenues to these transmission owners. The accrual and disposition of congestion revenues associated with multiple transmission owners within an EDAM BAA depends on the individual ownership rights, contractual arrangements and physical aspects of the transmission system and as such would be addressed and delineated during the implementation and onboarding process of an EDAM entity and the associated circumstances and arrangements.

EDAM by Western BAAs where the transmission provider resolves internal transmission constraints, whether caused by simultaneous import flows or other constraints materializing on the system. As such, it is fair and equitable that the congestion revenues accruing on all internal constraints be allocated fully to the EDAM entity where the internal transmission constraint is binding.

In order to align practices across the markets, the proposal is to extend this proposed transfer revenue and congestion revenue allocation design to the WEIM to ensure consistent treatment across markets. As explained above, the proposed EDAM design is largely consistent with the WEIM where congestion revenue accruing on binding internal transmission constraints is fully allocated to the EDAM entity on whose system the internal constraint binds. Similarly, in the WEIM the transfer revenue is largely being shared today (50:50), and the proposal is to make this the default allocation for all transfer revenues between EDAM BAAs, including with the ISO, except for transmission being released under pathway 2 where the transmission customer will be allocated a full share of transfer revenue associated with its transmission rights released to the market.

2. Settlements

The ISO calculates settlement charges and payments based on market and transmission activities. The EDAM will extend some existing settlement practices and develop new settlement practices for participating BAAs and other EDAM market participants.

The draft final proposal provided more details on the settlement of the integrated forward market and reliability unit commitment, as well as interactions with the real-time market. Although stakeholder comments support the majority of the settlement details, several stakeholders continue their encouragement to consider settling transfer revenue, congestion revenue, and uplift allocations, directly with the third party customers.

This final proposal retains most of the proposal elements described in the draft final proposal. However, the proposal includes some clarifications to reflect design changes made in prior sections as well as some clarifying revisions.

This section describes the proposed settlement principles and requirements that would apply to supply and demand resources that participate in EDAM by bidding into the Integrated Forward Market, Residual Unit Commitment process, and real time market.

a) IFM Resource Sufficiency Evaluation Settlement

As discussed above in Section II.B.2(g), EDAM BAAs that fail the RSE test(s) will be assessed an administrative charge based on the direction of the RSE failure (*i.e.*, upward or downward), the magnitude of the failure, and the hour(s) in which the failure occurs.

IFM Resource Sufficiency Failure Settlement:

The proposal is that for EDAM BAA(s) that fail the RSE in the upward direction in an off-peak hour, the ISO will calculate an RSE off-peak upward administrative penalty in that failed hour. For EDAM BAA(s) that fail the RSE in upward direction in at least one hour of 16 hour on-peak period, the ISO will calculate the RSE on-peak upward administrative penalty for each hour within the16-hour peak block period. In addition, for BAA(s) that fail the RSE in the downward direction, the ISO will calculate the IFM RSE downward penalty for each hour the BAA failed.

The ISO will calculate the RSE off-peak upward administrative penalty as the product of the hourly RSE deficiency quantity, the BAA load weighted average LMP, and the RSE failure

multiplier adjusted by any scaled persistent RSE failure factor. As described in section II.B.2(g), the RSE failure consequence multiplier will depend upon the amount of deficiencies cured by the market and will be 0, 1.25, or 2. The persistent RSE failure factor is calculated on a rolling prior 30 day window and is the product of the number of daily upward RSE tier two or above RSE failure consequences levels in that rolling 30 day period less RSE threshold and a configurable RSE scaling factor.

The ISO will apply the RSE on-peak upward administrative penalty each hour within the 16 hour block on-peak period. For each hour in the 16 hour block period in which the BAA failed the RSE upward test, the administrative penalty equals the product of the highest RSE deficiency quantity across the on-peak hours, the higher of the bilateral hub price of MID-C or bilateral hub price at Palo Verde, and the RSE failure multiplier adjusted by any scaled persistent RSE failure factor. For those hours within the 16 hour block period where the BAA passed the RSE upward test, the hourly administrative penalty will be adjusted by the RSE pass credit amount, which equals the product of the highest deficiency quantity and the BAA load weighted average LMP of the passed hour. In addition, if the RSE credit exceeds the RSE administrative charge in the hour for which the entity passed the RSE, the administrative charge will be capped at zero. RSE credits will not be netted across the 16-hour block period.

The ISO will calculate the IFM RSE downward administrative charge in each hour the BAA failed. The RSE downward administrative penalty equals the product of the hourly RSE deficiency quantity and the marginal energy cost for that BAA.

If an EDAM BAA is assessed IFM RSE Failure Penalty, the cost will be allocated directly to the EDAM Entity to re-allocate through the OATT. If the ISO BAA is assessed the IFM RSE Failure Penalty, the ISO will re-allocate the costs to participants through a two-tiered approach. The first-tier allocation is to the resource adequacy resources that contribute to the ISO deficiency up to the higher of the bilateral hub price at MID-C or the bi-lateral price at Palo Verde. Any unallocated RSE penalty costs will be allocated to ISO metered demand.

IFM Resource Sufficiency Penalty Revenue Distribution:

On an hourly basis, the ISO will sum the RSE off peak upward administrative penalty revenue of the BAAs that failed the RSE upward test and distribute the revenue to EDAM BAAs that passed the RSE upward test pro-rata based upon a BAA's total net export transfer to total net export transfer of all the BAAs that passed the RSE upward test. On an hourly basis, the ISO will the sum of the RSE on-peak upward administrative penalty revenue of the BAAs that failed the RSE upward test and distribute the revenue to EDAM BAAs that passed the all-peak hour RSE upward tests pro-rata based upon a BAA's total net export transfer to total net export transfer of the BAAs that passed the RSE upward test. In addition, because energy and imbalance reserve capacity is fungible, the total net export transfer equals the sum of the net energy transfer plus net imbalance reserve transfer. On an hourly basis, the RSE downward administrative penalty revenue will be distributed to those BAAs, in that hour, that passed the RSE downward test pro-rate based on their load forecast in relationship to total load forecast of those BAAs that passed the RSE downward test. Afterward distributing the RSE administrative penalty revenue to the BAAs, the ISO will distribute the total BAA RSE Penalty revenue to the EDAM Entity for sub-allocation per the OATT or if, the EDAM BAA is the ISO, the total RSE Penalty revenue will be allocated to participants within the ISO BAA as determined in an upcoming ISO BAA implementation initiative.

b) Integrated Forward Market (IFM)

The day-ahead market primarily comprises the IFM, RUC, and the market power mitigation processes. The IFM process co-optimizes energy bids, convergence bids, imbalance reserve bids, and ancillary services bids. The IFM co-optimization will commit resources to start-up or to minimum load and will produce hourly day-ahead energy schedules, convergence bid (virtual) schedules, ancillary service awards, and imbalance reserve awards. The IFM also produces hourly day ahead energy schedules. These day-ahead awards and schedules will have an explicit settlement, while IFM commitment costs will be considered in bid cost recovery calculations. The ISO will settle the results of the IFM and RUC processes as described in the following sub-sections.

c) Day-Ahead Energy Schedule and Convergence Bid Settlement

Once the IFM clears the market, it produces hourly day-ahead energy schedules for all resources with energy bids and/or energy self-schedules. These day-ahead energy schedules include generation, import, export, load, and virtual supply and demand. The IFM will also produce hourly transfer energy schedules at transfer locations between BAAs in the EDAM footprint.

Generation that clears the day-ahead market is paid the LMP at the relevant pricing node location. An import schedule is paid the LMP at the relevant scheduling point-intertie pricing location. Virtual supply is paid the LMP at the relevant pricing node, trading hub, or aggregated pricing node location in which the virtual supply cleared the day-ahead market.

In contrast, load that clears the day-ahead market will be charged the LMP at the relevant load aggregation point (LAP). An export schedule will be charged the LMP at the relevant scheduling point-intertie pricing location. Virtual demand is charged the LMP at the relevant pricing node, trading hub, or aggregated pricing location, including load aggregation points in which the virtual demand cleared the day-ahead market.

In addition, because energy transfer schedules identify energy that is passing between two BAAs in the EDAM footprint, the energy transfer will settle both as an export energy transfer and an import energy transfer. These import and export energy transfers will be paid and charged the LMP at their relevant scheduling point-intertie locations.

d) Day-Ahead Greenhouse Gas (GHG) Settlement

In the final proposal, resources in the non-GHG region can submit GHG specific bids to serve demand in a GHG region. The IFM optimizes and clears supply bids to meet demand. After taking the GHG counterfactuals under consideration, the IFM clearing will optimize bids in non-GHG region and GHG regions, and dispatch resources to meet demand. The IFM optimization can result with the scheduling of energy from a non-GHG supply resource to meet demand in a GHG region, otherwise referred to as a GHG transfer schedule. The GHG transfer schedules represent the net energy transfer from a non-GHG region to GHG region.

Resources that receive a day-ahead GHG attribution to serve demand in a GHG region will receive a GHG payment. The GHG payment is the product of the IFM GHG obligation and the IFM marginal GHG price. The GHG region load being served by non-GHG supply will have its GHG charge settlement embedded within the overall load energy schedule settlement.

e) ETC/TOR IFM Settlement

Scheduling Coordinators who self-schedule energy in the IFM using their ETC/TOR rights will settle at the LMP in a manner similar to all other day ahead schedules. However, the balanced portion of ETC/TOR schedules is eligible for mitigation against congestion. The ISO will facilitate this mitigation by reversing the marginal cost of congestion component of the LMP difference between the balanced source day ahead schedule and sink day ahead schedule. The ISO will include these congestion costs in the calculation of Day Ahead Congestion revenue. In addition, long-term contracts with special marginal losses provision will have a similar settlement mechanism apply to the marginal cost of losses component of LMP.

f) Day-Ahead Energy, Congestion, and Marginal Loss Offset Settlement

The ISO's settlement procedures will ensure that an EDAM BAA's energy settlement is revenue neutral. To ensure neutrality, the settlements system will need to consider the energy settlement of each component of the LMP: marginal energy cost, marginal cost of congestion, marginal cost of losses, and marginal cost of GHG. The following sub-sections describe how ISO settlements will maintain EDAM BAA neutrality.

g) Day-Ahead Marginal Loss Offset

The ISO will calculate an hourly day-ahead marginal loss offset amount for each BAA. The hourly day-ahead marginal loss offset amount will equal the sum of the product of day-ahead energy schedules, including virtual schedules and transfer energy schedules, and the marginal cost of losses at their relevant pricing location. The hourly day-ahead marginal losses offset amount will also include any ETC/TOR marginal losses reversal. The ISO will allocate the hourly day-ahead marginal loss offset amount to the EDAM entity, which will re-allocate the amount per its OATT. For the ISO BAA, the ISO will allocate the hourly day-ahead marginal loss offset to measured demand in same manner as today.

h) Day-Ahead Greenhouse Gas Offset

The ISO will calculate an hourly day-ahead marginal GHG offset amount for the EDAM footprint in relationship to GHG region(s) vs the non-GHG region. The hourly day-ahead marginal GHG offset amount will equal the sum of the product of day-ahead energy schedules, including virtual schedules, the energy transfer schedules, the GHG transfer schedule, and the marginal cost of GHG. The ISO will allocate the BAA hourly day-ahead marginal GHG offset amount to a GHG region's metered demand. If more than one GHG region exists with different GHG accounting rules, this determination will require the ISO to calculate a separate GHG marginal offset amount for each GHG region.

i) Day-Ahead Marginal Congestion Offset

The ISO will calculate an hourly day-ahead marginal congestion revenue amount for each EDAM BAA. The hourly day-ahead marginal congestion revenue amount will equal the sum of the product of day-ahead energy schedules, including virtual schedules and energy transfer schedules, and the marginal cost of congestion contribution for each EDAM BAA at its relevant pricing location and considering relevant intertie transmission constraints. The hourly day-ahead congestion revenue amount will also include any ETC/TOR marginal congestion reversal amounts. The ISO will allocate the hourly day-ahead marginal congestion revenue amount to

each EDAM BAA through day ahead marginal cost of congestion offset for distribution based upon its OATT, and the hourly day-ahead marginal congestion revenue amount allocated to the ISO BAA will be distributed first to CRRs and then to any surplus allocated to measured demand per the ISO tariff.[119]

j) Day-Ahead Marginal Energy Offset

The ISO will calculate an hourly day-ahead marginal energy offset amount for each EDAM BAA. The BAA hourly day-ahead marginal congestion offset amount will equal the remainder of the hourly day-ahead energy settlement less the offset amounts attributed to BAA day-ahead marginal cost of losses, BAA day-ahead marginal cost of greenhouse gas, and the BAA day-ahead marginal cost of congestion. The ISO will allocate the hourly day-ahead marginal energy offset amount to the EDAM entity for distribution per its OATT or to the ISO BAA for distribution to metered demand.

k) IFM Transfer Revenue

The proposal is to calculate transfer revenues for energy transfers, imbalance reserve transfers, and/or reliability capacity transfers for all participating BAAs when the transfer scheduling limit is binding.

Transfer revenue for energy occurs when the EDAM BAA net transfer scheduling limit binds as market clearing bid in supply against bid in demand. This binding constraint manifests as a separation of the marginal energy price of the binding EDAM BAA from the marginal energy price of neighboring EDAM BAAs. The proposal is to calculate an hourly transfer revenue for energy for each transfer point at which the transfer scheduling limits are binding. The transfer revenue equals the product of the transfer quantity and the difference between the transfer import marginal energy component (MEC) price and transfer export MEC price.

Transfer revenue for imbalance reserve up and imbalance reserve down (IRU/IRD) manifests when transfer scheduling limit binds while optimizing capacity to meet BAA uncertainty requirement. The binding constraint manifests as separation of imbalance reserve up price/imbalance reserve down price (IRUP/IRDP) in the binding EDAM BAA from the IRUP/IRDP. The proposal is to calculate an hourly transfer revenue for IRU/IRD for each transfer point at which the transfer scheduling limits is binding. The transfer revenue equals the product of the transfer quantity and the difference between the transfer import IRUP/IRDP price and transfer export IRUP/IRDP.

Transfer revenue for reliability capacity up and reliability capacity down (RCU/RCD) manifests when transfer scheduling limit binds in RUC. The binding constraint manifests as separation of reliability capacity up price/reliability capacity down price (RCUP/RCDP) in the binding EDAM BAA from the RCUP/RCDP. The proposal is to calculate an hourly transfer revenue for RCUP/RCDP for each transfer point at which the transfer scheduling limits is binding. The transfer revenue equals the product of the transfer quantity and the difference between the transfer import RCUP/RCDP and transfer export RCUP/RCDP.

The ISO will calculate the total transfer revenue per transfer location as the sum of energy transfer revenue, plus imbalance reserve transfer revenue, plus reliability capacity transfer revenue. Pathway 2 transmission will have designated transfer resources that will be optimized by the market and award energy, imbalance reserve, and/or reliability capacity. Scheduling

[119] ISO tariff section 11.2.4.

Coordinators associated with Pathway 2 transfer resources will receive a direct allocation of the appropriate energy, imbalance reserve, and/or reliability capacity transfer revenue. The total transfer revenue less Pathway 2 Transfer revenue distribution will be distributed to the BAAs associated with the transfer location on a 50:50 ratio. EDAM BAA transfer revenue will be assigned to the EDAM Entity for sub-allocation per its OATT. ISO BAA transfer revenue is further distributed to transmission rights holders, if applicable, or to scheduling coordinators in proportion to their measured demand compared to ISO total measured demand. Allocating ISO transfer revenue to measured demand compensates a participant in a manner similar to congestion revenue right surplus allocation and the real time congestion offset allocation.

l) Imbalance Reserve Settlement

Resources that receive an imbalance reserve upward (IRU) capacity award will be paid the applicable nodal imbalance reserve upward price (IRUP). These resources will have a must offer obligation to bid the IRU capacity into the real-time market (RTM). If the resource does not meet its must offer obligation, the ISO will assess a non-compliance rescission charge for the IRU capacity in excess of the resource 5-minute-ramp-capable portion not bid into the RTM. EDAM transfer resources that received an IRU capacity award will be charged the IRUP of the BAA out of which the capacity requirement is transferring and be paid the IRUP of the BAA into which the capacity requirement is transferring.

Resources that receive an IRD capacity award will be paid the applicable nodal IRDP. These resources will have a must offer obligation to bid the IRD capacity into the RTM. If the resource does not meet its must offer obligation, the ISO will assess a non-compliance rescission charge for the IRD capacity in excess of the resource 5-minute-ramp-capable portion not bid into the RTM. EDAM transfer resources that received an IRD capacity award will be charged the IRDP of the BAA out of which the capacity requirement is transferring and be paid the IRDP of the BAA into which the capacity requirement is transferring.

ISO settlements will separately allocate each EDAM BAA's IRU and IRD costs through a two-tier allocation methodology under development in the DAME initiative. The ISO will update stakeholders regarding the allocation methodology when the DAME initiative concludes.

m) Ancillary Service Settlement

At the start of EDAM, EDAM BAAs will self-provide their entire ancillary service requirements. The IFM will initially co-optimize energy and imbalance reserve for each EDAM BAA and energy, ancillary services, and imbalance reserves for the ISO BAA. During this time, the ISO will settle ISO ancillary service awards and self-provisions associated with EDAM in same manner it does today.

After the ISO implements functionality to accept bids for ancillary services from resources in EDAM BAAs, scheduling coordinators for resources that receive a day-ahead ancillary service award will be paid the relevant day-ahead ancillary service marginal price. These day-ahead ancillary service awards will be subject to non-compliance rescission provisions. The ISO will allocate the ancillary service cost less the payment rescission to scheduling coordinators based upon ancillary service obligations netted against ancillary service self-provision.

n) IFM Bid Cost Recovery

IFM bid cost recovery (BCR) is the process by which the ISO ensures eligible resources can recover their commitment costs (start-up costs, minimum load costs, and transition costs) and

bid costs (energy, ancillary service, and imbalance reserve), to the extent these costs are not sufficiently covered by IFM revenue from day-ahead energy settlement, day-ahead ancillary service award settlement, and imbalance reserve capacity settlement. The ISO will calculate bid cost recovery for each eligible resource. If the total day-ahead market revenues over a trading day do not exceed the resource's daily commitment and bid costs, the resource is eligible to recover its daily shortfall in the trade hours in which the resource was short in recovering its costs.

For each trading hour, the ISO will calculate the total IFM bid cost recovery amount (IFM BCR amount) for each EDAM BAA. For a BAA with net export transfer, which is the sum of BAA net energy transfer plus the BAA net imbalance reserve transfer is the export direction, the ISO will transfer a portion of the BAA's IFM BCR amount to BAAs receiving net import transfers, where sum of BAA net energy transfer plus the BAA net imbalance reserve transfer is the import direction. This IFM BAA BCR transfer adjustment amount will equal the product of the BAA hourly IFM BCR amount and the BAA net transfer export divided by the sum of the BAA net transfer export plus day-ahead load schedule and day-ahead export schedules. The IFM BAA BCR adjustment amount will be allocated to BAAs with net transfers in the import direction and added to the BAA IFM BCR amount. For EDAM BAAs, the adjusted BAA IFM BCR amounts will be allocated directly to the EDAM entity for reallocation in accordance with the BAA OATT. For the ISO BAA, the ISO will reallocate the adjusted IFM BCR amounts through the current two-tier IFM BCR allocation in the ISO tariff.

o) Residual Unit Commitment Settlement

As described earlier, the RUC process runs after the IFM. The RUC process procures incremental or decremental capacity (called reliability capacity up and reliability capacity down, respectively) to resolve differences between an EDAM BAA's IFM physical energy schedules and its load forecast. RUC is a backstop to the IFM to ensure there is sufficient physical supply available to serve load in real time. The ISO discuss below the settlement of specific transactions in RUC.

p) Reliability Capacity Settlement

Stakeholders and the ISO are currently developing a reliability capacity product as part of the DAME initiative. The proposal is to utilize the reliability capacity product throughout the EDAM footprint. The RUC process will procure reliability upward capacity and reliability downward capacity from resources that have submitted reliability capacity bids.

Resources that received a reliability capacity up (RCU) award will be paid the marginal reliability capacity up price. Resources that received a reliability capacity down (RCD) award will be paid the marginal reliability capacity down price. Like imbalance reserves, resources that receive a RCU award or RCD award have a real time must offer obligation. Resources that do not submit RCU/RCD quantities in accordance with their RTM must offer obligation will be subject to a non-compliance charge.

The ISO will calculate the total BAA net reliability capacity up amount as the sum of the EDAM BAA resource reliability capacity up settlement, BAA resource reliability capacity up non-compliance amount, and the BAA reliability capacity up transfer amount. The ISO will calculate the total BAA net reliability capacity down capacity amount as the sum of the EDAM BAA resource reliability capacity down settlement, BAA resource reliability capacity down non-compliance amount, and the BAA reliability capacity down transfer amount. The total BAA net

reliability capacity up capacity amount and the total BAA net reliability capacity down amount will be allocated according to the two-tier allocation being developed in the DAME initiative.

q) RUC Bid Cost Recovery

RUC bid cost recovery (BCR) is the process by which the ISO ensures eligible resources recover their commitment costs (start-up costs, minimum load costs, and transition costs) and reliability capacity bid costs to the extent these costs are not sufficiently covered by RUC revenue from reliability capacity settlement or excess real-time market revenue.

The ISO will calculate BCR for each eligible resource. The ISO will calculate the RUC shortfall and RUC surplus for each trading hour of trading day. In addition, the ISO will apply the BCR netting process between net RUC BCR shortfalls and RTM surpluses and net RUC surplus and RTM shortfalls. If the total net RUC surplus over a trading day does not exceed the resource's daily RUC shortfalls, the resource is eligible to recover the daily RUC shortfall in the trade hours in which the resource was short revenue.

For each Trading hour, the ISO will calculate the total BAA RUC bid cost recovery amount (RUC BCR net amount). The total BAA RUC BCR amount will be allocated to the appropriate BAA according the two-tier RUC allocation methodology being developed in DAME initiative.

r) Real-Time Market Settlement

The real-time market (RTM), including the WEIM, commits and dispatches resources to meet real time demand forecast needs, flexible ramp uncertainty requirements, and ancillary service requirements. The RTM is composed of the real time resource sufficiency evaluation (WEIM RSE), hour-ahead scheduling process (HASP), short-term unit commitment process (STUC), fifteen minute market (FMM), and real time dispatch process (RTD). The RTM co-optimizes energy bids, greenhouse gas bids, and ancillary service bids to meet demand forecast and uncertainty needs and real time ancillary service requirements. For WEIM BAAs that join EDAM, the RTM settlement is mainly an imbalance settlement of energy, ancillary services, and flexible ramp product from day-ahead schedules and awards because base schedules no longer serve as the reference point.

s) RTM Resource Sufficiency Evaluation Settlement

The ISO will perform resource sufficiency evaluation tests for each BAA or the pooled group of EDAM BAAs that participate in RTM/WEIM. WEIM-only BAAs must demonstrate: (i) the ability to balance EIM Demand and EIM Supply for the prospective EIM Entity's Balancing Authority Area; (ii) ability to pass the capacity test; and (iii) ability to pass the flexible ramping sufficiency test. EDAM BAAs must demonstrate ability to pass the capacity test and ability to pass the flexible ramping sufficiency test.

t) WEIM RSE Failure Surcharge

Stakeholders and the ISO are currently developing an update to the WEIM market design in Phase 2 of the Resource Sufficiency Evaluation Enhancement initiative (RSEE Phase 2). This initiative proposes changes to enhance the accuracy of the WEIM resource sufficiency evaluation (RSE), while also exploring the potential to leverage the WEIM and increase reliability by creating an assistance energy product. This initiative allows BAAs to cure insufficiencies through the WEIM. BAAs that voluntarily elect to participate in the assistance energy program will be subject to energy assistance surcharge for the portion of its RSE failure cured by the market above their available balancing capacity or equivalent product. The energy

assistance surcharge will be collected and distributed through ISO settlement system, *i.e.*, outside of the market.

u) Under-Scheduling and Over-Scheduling Charge

As previously discussed in the RSEE Phase 1 initiative, it would be inequitable to apply the balancing test to the real time demand forecast for BAAs that participate in the IFM. As such, WEIM BAAs that join EDAM will no longer be subject to the over-scheduling/under scheduling charge, nor will they be eligible to receive any funds collected via the over-scheduling/under-scheduling charge structure in place for the WEIM. This structure will incent balanced schedules in the WEIM, but it is unnecessary for the EDAM, which relies on the day-ahead market to produce balanced schedules through its own incentive mechanisms.

v) Transmission Recovery Settlement

The transmission commitment section of this draft final straw proposal describes a method for releasing bucket 3 transmission hurdle free. In exchange for releasing the bucket 3 transmission to the market hurdle free, the ISO is providing EDAM BAAs, including the ISO BAA, a mechanism to recover gross "at risk" EDAM recoverable transmission revenue, transmission revenue associated with certain transmission new-builds, and excess wheeling revenue.[120] This draft final straw proposes to collect each BAA's EDAM recoverable transmission revenue amount from the EDAM footprint gross load less the recovering EDAM BAA's gross load. The collected BAA revenue recovery amount will be paid to the EDAM entity or to the ISO's participating transmission owners (PTO) pro rata based on their PTO transmission recovery amount in proportion to the ISO total transmission revenue recovery amount.

w) Real-Time Market Energy Settlement

The ISO will settle imbalance energy for each resource within the WEIM/ISO BAA dispatched in real time. There are four categories of imbalance energy: FMM instructed imbalance energy, RTD instructed imbalance energy, uninstructed imbalance energy, and unaccounted for imbalance energy. In addition, the ISO will account for any non-zero neutrality amounts which materialize from imbalance energy settlement.

x) Fifteen Minute Market Settlement

The fifteen minute market process (FMM) co-optimizes energy bids and ancillary service bids to resolve demand forecast changes, FMM uncertainty requirements, and real-time market ancillary service needs. The FMM commits/schedules energy to meet the fifteen minute demand forecast. The committed/scheduled resources are then settled as the difference between the FMM schedule and the day-ahead schedule, *i.e.*, FMM instructed imbalance energy (FMM IIE), multiplied by the FMM LMP of the applicable pricing location. For WEIM BAAs that join EDAM, the FMM IIE settlement will resemble their current FMM IIE settlement, except the reference point for FMM IIE settlement will be the resource's day-ahead schedule, not its real time base schedule.

The EDAM proposal introduces some new RTM FMM settlement changes.

[120] Additional information about the EDAM recoverable transmission revenues proposal is discussed in the transmission commitment discussion in section II.B.1(d).

- Intertie schedules awarded an energy schedule in the day-ahead market that subsequently have an incremental/decremental FMM schedule change in the RTM and did not submit an energy profile tag prior to HASP, will be subject to the HASP reversal rule applied through settlements.
- FMM energy transfer schedules will settle as FMM IIE at the LMP for the applicable scheduling point-ties between EDAM BAAs.

Because convergence bidding is an IFM mechanism, the difference between zero and the day-ahead virtual awards will settle at the FMM LMP at the applicable pricing location.

y) Real Time Dispatch Settlement

The real time dispatch process (RTD) will optimize energy bids to resolve load forecast changes and uncertainty requirement changes from the FMM. RTD commits /schedules energy to meet the RTD demand forecast. The RTD IIE quantity will settle at the RTD LMP of applicable pricing location. For WEIM BAAs that join EDAM, the RTD IIE settlement will resemble their current RTD IIE settlement.

The EDAM proposal also introduces a new RTM RTD settlement charge. RTD energy transfer schedules will settle as RTD IIE at the LMP of applicable scheduling point-tie(s) between EDAM BAAs.

z) Uninstructed Imbalance Energy Settlement

The ISO calculate uninstructed imbalance energy settlement as the difference between the resource's submitted meter and the final reference point schedule or dispatch. For generation, import and export resources, including energy transfers, the reference point is the RTD dispatch. For load, the reference point is day-ahead energy schedule. For BAAs that join EDAM, the UIE will be the same as today. Resource specific UIE will settle at the RTD LMP, and load UIE will settle at the RTM hourly LAP LMP.

aa) ETC/TOR Real-Time Market Settlement

Scheduling Coordinators who self-schedule energy in the RTM using their ETC/TOR rights will settle any imbalance energy at the relevant LMP in a manner similar to all other imbalance energy settlement. Because the imbalance settlement reflects the imbalance energy between day ahead schedules and meter/tags, the ISO will derive the incremental/decremental imbalance ETC/TOR balanced quantity. These resource imbalance ETC/TOR quantities are eligible for mitigation against RTM congestion. The ISO will facilitate this mitigation by reversing the marginal cost of congestion component of the LMP difference between the balanced source imbalance energy quantity and sink imbalance energy quantity. The ISO will include these congestion costs in the calculation of real time congestion offset. In addition, long-term contracts with special marginal losses provision will have a similar settlement mechanism apply to RTM marginal cost of losses component of LMP.

bb) Unaccounted for Energy Settlement

Unaccounted for energy settlement (UFE) is the difference between the net energy of the BAA or utility service area adjusted for transmission losses. UFE will settle at the hourly RTM LAP LMP and will be allocated to relevant metered demand. Based upon stakeholder comments, the draft final proposal agrees to extend the WEIM Unaccounted for Energy election provision to EDAM BAAs.

cc) RTM Greenhouse Gas Settlement

Similar to energy, RTM greenhouse gas (GHG) settlement is considered an imbalance settlement from day-ahead GHG settlement. The RTM will optimize and clear energy bids against the demand forecast. If the RTM dispatches energy from a non-GHG region with GHG region, this energy will be attributed to resources based upon their GHG bids and the least cost solution.

The FMM process will attribute GHG MWs to resources based upon the least cost solution and GHG bid. The GHG settlement for the resource will be an imbalance settlement from its day-ahead GHG attribution. The FMM GHG settlement will equal the product of the FMM GHG attribution less the day-ahead attribution and the FMM marginal cost of GHG. This can result in a payment or charge to the resource.

RTD GHG settlement is also an imbalance settlement, but the reference point is the FMM GHG attribution MWs. Similar to FMM GHG settlement, the RTD GHG settlement will equal the product of the RTD GHG attribution less FMM attribution and the RTD marginal cost of GHG.

dd) Real Time Offsets

For BAAs that join EDAM, the BAA real time marginal loss offset settlement and BAA real time congestion offset settlement will account for any ETC/TOR marginal losses reversal and ETC/TOR real time congestion reversal, if applicable. The ISO will calculate these offsets for each BAA based upon the nodal energy dispatch, the relevant FMM or RTD marginal cost of losses price, and the relevant FMM or RTD BAA marginal cost of congestion price. For EDAM BAAs, the ISO will allocate the BAA level offsets directly to the EDAM BAA for reallocation per its OATT and allocate RTM offsets for the ISO BAA to measured demand.

The BAA real time imbalance energy offset settlement includes two modifications from the EDAM straw proposal:

1. The ISO will remove the calculation for financial transfer amounts.
    a. Financial transfers represent a non-binding settlement amount calculated to reflect the cost of energy to transfer out of a WEIM BAA and into another WEIM BAA.
    b. The draft final proposal removes this non-binding financial settlement because FMM/RTD transfers will be explicitly settled in the EDAM.
2. The ISO will develop a RTM GHG offset charge code. This charge code will mimic the day-ahead greenhouse gas offset calculations, except the RTM GHG region(s) and RTM non-GHG region(s) will l incorporate the WEIM BAAs.

ee) Real Time Ancillary Service Settlement:

The RTM co-optimizes energy and ancillary service bids. At the outset of EDAM, EDAM BAAs will provide the RTM with total ancillary service self-provision. This RTM self-provision should equal the day-ahead self-provision or day-ahead self-provision plus any incremental real time self-provision if ancillary service requirements increase in the RTM. If EDAM BAAs are bidding ancillary services into the day-ahead market at some point in the future, the EDAM entity will be required to submit an RTM self-provision as either the day-ahead cleared ancillary service or

day-ahead cleared ancillary service amount, plus any incremental self-provision. The resource should also submit ancillary service economic bids.

Resources that receive a RTM ancillary service award will be paid the RTM ancillary service marginal price. These RTM ancillary service awards will be subject to the same noncompliance provision as the day-ahead ancillary service awards. The ISO will allocate the ancillary service cost less the payment rescission to scheduling coordinators based upon ancillary service obligations netted against ancillary service self-provision.

ff) Intertie Deviation Settlement

The intertie deviation penalty (IDS) is a charge applied to intertie resources that receive an award in HASP and submit an after-the-fact tag that deviates from that HASP schedule. However, if the deviation results from a reliability curtailment, the resource's reliability curtailment is excluded from the penalty. The ISO calculate the IDS penalty for each deviating intertie resource as the product the IDS deviation quantity, which is the difference between resource e-tag and HASP award, and the IDS price. The IDS price is 50% of the greater of the FMM LMP or RTD LMP for of that settlement interval. In addition, a 25% charge applies if the resource accepted the award but does not tag its accepted award. The IDS penalty is then allocated to the BAA measured demand. Because EDAM BAA OATTs have specific provisions addressing non-delivery of bi-lateral intertie schedules, the proposal is to not assess the IDS penalty at the start of EDAM for other BAAs, and continue to assess the charge only for the ISO BAA. Instead, the ISO would monitor the intertie scheduling and tagging practices for reliability concerns.

gg) Flexible Ramp Settlement

(1) Forecasted Movement

Resources that receive a FMM forecasted movement award will receive a settlement charge or payment equal to the difference of the FMM forecasted movement from the day-ahead market forecasted movement and the price differential between relevant FMM flexible ramping up and FMM flexible ramping down prices, respectively. In addition, resources receiving a RTD forecasted movement award will receive a settlement charge or payment equal to the difference of the RTD forecasted movement from the FMM forecasted movement and the price differential between relevant RTD flexible ramping up and RTD flexible ramping down prices. The sum of FMM and RTD forecasted movement settlement will be allocated to the relevant EDAM BAA(s) metered demand based upon the results of the flexible ramp resource sufficiency evaluation.

(2) Flexible Ramp Up/Down Uncertainty Settlement (FRU/FRD)

Because of the imbalance reserve product being developed as part of the DAME initiative, resources receiving a FMM FRU/FRD award will receive an imbalance settlement. The resource will settle the FRU/FRD award equal to the difference between the five minute ramp IRU/IRD award and the FMM FRU/FRD award multiplied by the FMM FRU/FRD LMP. The ISO will calculate the RTD FRU/FRD award settlement as the ISO does today. RTD FRU/FRD settlement will be the product of the difference between the RTD FRU/FRD award and FMM FRU/FRD award and the RTD FRU/FRD LMP.

The total flexible ramp up/down uncertainty award cost, which is the sum of FMM FRU/FRD settlement plus RTD FRU/FRD settlement, will be allocated to relevant BAA(s) and uncertainty

movement categories. The FRU/FRD category costs are further allocated to resources based upon decremental/incremental uninstructed imbalance energy, respectively, plus uncertainty movement or operational adjustment.

E. EDAM Fees Framework

The ISO is committed to fiscal responsibility, including fair and reasonable rates for its customers. For the EDAM, the ISO will develop EDAM fees using the rate design model and activity-based costing system used to determine existing rates for other cost-based services, including its grid management charge (GMC) rates, WEIM administrative fees, the reliability coordinator (RC) rate, and planning coordinator fees. The ISO model is based on six guiding ratemaking principles: cost causation, focus on the use of services, transparency, predictability and the ability to forecast, flexibility, and simplicity.

The ISO will manage EDAM fees within the GMC revenue requirement. Using the ISO's existing rate design to establish the EDAM fees will ensure EDAM customers and existing ISO customers benefit from the stability and disciplined growth of our annual GMC revenue requirement.

Stakeholder comments on the draft final proposal continued to express support for the proposed design, which remains unchanged in this final proposal.

1. Implementation Fees Framework

Implementation Agreement: A WEIM entity seeking to participate in the EDAM must enter into an agreement with the ISO requiring the prospective EDAM entity to compensate the ISO for the costs incurred to integrate the WEIM entity into the EDAM. The agreement will establish the implementation date for entity's participation in the day-ahead market and require the ISO to perform changes to its systems that allow the prospective EDAM entity to participate in the day-ahead market. These implementation activities include planning and project management, administrative management, full network modeling of resources, system integration and functional testing, metering and settlements, and operations readiness and training. The implementation process also includes system integration and functional testing, as well as training, market simulation and a period of parallel operations. The agreement will discuss how the deposits will be settled, including any refunds. One stakeholder asked whether the ISO could provide an updated estimate of the start-up costs at the time of the signing of the implementation agreement based on the associated complexity for implementation of the particular EDAM entity. The ISO commits to provide an updated estimate at that time.

Entity Implementation Fee: The ISO's actual costs incurred to onboard the WEIM entity into EDAM will be recovered through an implementation fee, based on the ISO's cost of service. For projection purposes, the ISO used an hourly rate of $200 for all onboarding activities. This fully burdened rate is calculated based on the most recently published triennial Grid Management Charge Update Cost of Service Study. For billing purposes, the ISO will determine hourly rates for onboarding activity on an annual basis based on current aggregated and burdened labor rates. The ISO does not project the hourly rates will exceed $200 per hour for any activity. The majority of the onboarding costs will be labor costs; however, it is reasonable to assume some onboarding-specific non-labor costs. Based on these factors, the average cost to onboard an EDAM entity is projected to be $1,200,000. The actual onboarding costs per EDAM entity will vary depending on the size and complexity of the onboarding. A $300,000 deposit will be collected from prospective EDAM entities to cover the actual start-up costs incurred. If the

deposit exceeds the actual cost incurred to provide onboarding services, the ISO will refund the excess amount including any interest accrued on the remaining deposit. If the actual cost of performing the service exceeds the deposit, additional deposits in $300,000 increments will be required, which the EDAM entity must pay within thirty (30) calendar days of invoice. Any invoice payment past due will accrue interest, per annum, calculated in accordance with 5 C.F.R. § 1315.10. If the EDAM entity fails to timely pay any undisputed costs, the ISO will not be obligated to continue performing onboarding activities unless and until the EDAM entity has paid all undisputed amounts.

After the entity has entered the EDAM, the ISO will provide a report that details deposit(s) received, actual costs incurred, and applicable interest earnings (on deposit balance) for the entity's onboarding project. The ISO will calculate the average interest earned on the deposit at the end of the onboarding project. The ISO will return any unused deposit remaining after onboarding, plus interest on the remaining deposit (based on the average interest rate earned), to the EDAM entity within ninety (90) calendar days after onboarding is completed and acknowledged by both the ISO and EDAM entity.

If a party terminates an implementation agreement after the prospective EDAM entity's onboarding has begun, the ISO will make every attempt to halt work and stop incurring costs on implementation as soon as practical. Any implementation-related costs the ISO incurs will be drawn against the deposit provided. The ISO will invoice the prospective EDAM entity for any amounts over the onboarding deposit. Invoices will be due no later than thirty (30) days after the date of receipt. Any invoice payment past due will accrue interest, per annum, calculated in accordance with 5 C.F.R. § 1315.10. The ISO will return any unused deposit to the EDAM entity within ninety (90) calendar days after the onboarding costs are reconciled.

This proposal is similar to the other existing tariff processes. Following this existing process allows the ISO to account for its costs in performing onboarding activities accurately and efficiently.

2. Administrative Fees Framework

The ISO recovers its GMC revenue requirement through unbundled grid management charges and other fees developed using the most recent triennial cost of service results.[121] The cost of service study analyzes cost and time data provided through activity based costing to determine how much time and effort staff uses to support activities in the various cost categories and supplemental services. Through this process, the ISO aligns costs with services rendered and develops rates, like the EDAM administrative fees, that follow cost causation and other relevant ratemaking principles.

The EDAM administrative fees will consist of the existing market services charge and a new EDAM system operations charge, both volumetric charges. The market services charge represents fees for the real-time market and the day-ahead market services that EDAM offers, and applies to awarded MWh of energy and MW of capacity. The EDAM systems operations charge will represent the fees for real time dispatch services that EDAM offers, and it applies to metered flows in MWh of supply and demand. This is a similar assessment to the system operations charge. Assessing the EDAM systems operations charge in this manner is fair and reasonable because it represents the ISO's efforts to manage the day-ahead and real time MWh. Once a WEIM entity begins participating in the EDAM, it will no longer pay WEIM

[121] *See* the most recent triennial cost of service study, available on the ISO website. Link

administrative fees, only EDAM administrative fees. As participation in EDAM grows, the increase in volumes will contribute to lower market services and system operations rates, all other factors held constant. This, in turn, will contribute to lower WEIM administrative fees. At this time the ISO does not expect that introducing the EDAM administrative fees will change the rate structure of the WEIM administrative fees.

The following steps provide interested parties a sense of what the pro-forma bundled EDAM administrative fees would be based:

- The annual GMC revenue requirement that assumes a certain number of eligible WEIM entities participate in the EDAM.
- A market services charge based on the following:
    - Calculate the market services portion of the annual GMC revenue requirement amount to collect based on the latest cost of service study results.
    - Divide the market services revenue requirement by the projected total day-ahead, 15-minute market, real time dispatch, and instructed imbalance energy MWh volumes. Total volumes include the ISO and the WEIM entities expected to participate in EDAM.
- An EDAM system operations charge based on the following:
    - Calculate the EDAM system operations portion of the annual GMC revenue requirement amount to collect based on the latest cost of service study results.
    - Divide the EDAM system operations charge by the projected total generation, import, load, and export (gross meter) MWh volumes. Total volumes include the ISO and the WEIM entities expected to participate in EDAM.

Under this approach, all customers, receiving market services (including existing ISO customers) will benefit from a lower market services rate when EDAM is operationally effective because the market service charge will be calculated using the incremental day-ahead MWh volumes from EDAM participants. Simply put, the more entities that participate in EDAM the lower the rates will be.

III. Stakeholder Process and Board Approval

A. Stakeholder Engagement

1. Process to Date

Prior to launching the EDAM initiative and stakeholder process, the ISO published *the EDAM Common Design Principles and Concept* document,[122] which the ISO developed in collaboration with a subset of WEIM entities and California transmission owners. The document represented general, initial, design principles regarding several key EDAM design elements. These principles formed the basis for initial discussions and vetting through the stakeholder process. In November 2021, the ISO launched the EDAM stakeholder process with a workshop to re-introduce the region to the concept of an extended day-ahead market through discussion of the design principles, and to describe the stakeholder working group process that would further leverage stakeholder input and perspectives on key items.

[122] *Extended Day-Ahead Market (EDAM) Common Design Principles and Concepts*, October 18, 2021. Link

On January 3, 2022 the ISO launched a rigorous stakeholder working group process focused on three key EDAM design areas: (1) supply commitment and resource sufficiency evaluation, (2) transmission commitment and congestion revenue allocation, and (3) GHG accounting and costs. Over an eleven week period, the three working groups met twice a week through an inclusive and transparent process to solicit stakeholder ideas and perspectives on the different design elements. For each working group, the ISO published a final summary report describing the different concepts, perspectives and ideas discussed.[123] The working group concepts and ideas helped inform and shape different elements of the straw proposal.

On April 28, the ISO published a comprehensive EDAM straw proposal describing a proposed market design framework, and provided an opportunity for stakeholders to submit written comments on the straw proposal. The ISO next held a series of collaborative workshops between July 11 and July 27 regarding various design elements described in the straw proposal, including the resource sufficiency evaluation, transmission availability in EDAM, confidence in transfers, and GHG accounting. Stakeholder comments and the workshops informed development of the revised straw proposal.

On August 16, the ISO published the EDAM revised straw proposal describing a more detailed, evolved, design informed by stakeholder discussions. The ISO held four stakeholder meetings, from August 29 to September 14 to discuss the different elements of the design. Additionally, on October 11 the ISO held workshop on EDAM settlements processes based on the most recent design. This draft final proposal is informed by written stakeholder comments received on September 26 and the prior stakeholder meetings.

On October 31, the ISO published the EDAM draft final proposal continuing to evolve various aspects of the design based on stakeholder discussions and comments. The ISO held a stakeholder meeting on November 14 to discuss and review the incremental design elements put forward in the draft final proposal, and received stakeholder comments on November 30.

2. Initiative Schedule

The following table describes the upcoming EDAM milestones and schedule.

Date	Milestone
Q4 2022	
October 31, 2022	Publication of draft final proposal
November 7, 2022	Publication of draft tariff framework
November 14, 2022	Stakeholder meeting (in-person and virtual)
November 22, 2022	Comments due on draft final proposal
December 7, 2022	Publication of final proposal
December 14, 2022	Joint ISO Board of Governors and WEIM Governing Body meeting (**briefing**)

[123] The final summary reports for each working group can be found on the EDAM initiative webpage by selecting the relevant working group. Link

February 2023	Joint ISO Board of Governors and WEIM Governing Body meeting (**decision**)
Q1 2023	Draft tariff publication and stakeholder process
Q2 2023	FERC filing
Q4 2023	Implementation
2024	EDAM go-live coordinated with interested entities

Table 9: EDAM milestones schedule.

B. Decisional Classification for WEIM Governing Body

This initiative proposes a day-ahead market that extends beyond the ISO footprint, and across participating WEIM BAAs. The current delegation of authority does not provide the WEIM Governing Body with a decisional role for proposed changes to the day-ahead market. This initiative also proposes certain changes to real-time market rules, which would fall within the WEIM Governing Body's joint authority or advisory role. These changes, however, are only a part of the overall EDAM initiative, and thus if the current rules were applied, the remaining changes would fall outside the WEIM Governing Body's decisional role.

The EDAM design involves the creation of a new unique market paradigm that the current decisional classification rules did not contemplate. The Board of Governors, during its May 11, 2022 meeting, proposed that the entire EDAM initiative fall under the joint authority of the WEIM Governing Body and the Board. The revised straw proposal explained this proposed classification and requested stakeholder comment. Stakeholders expressed support for this approach. Accordingly, ISO management expects that the entire initiative will be subject to joint authority, requiring the approval of both the Board and the WEIM Governing Body under that construct.

APPENDIX

IV. Appendix 1: EDAM RSE Application formulation

i	Resource index	*LEL/UEL*	Lower/Upper economic limit
t	Time period index (0 for initial condition)	*LOL/UOL*	Lower/Upper operating/regulating limit
EN	Energy schedule	*RRU/RRD*	60min ramp rate up/down capability
IRU/IRD	Imbalance Reserve Up/Down award	*E*	Daily energy limit
RU/RD	Regulation Up/Down award	*SOC*	State of charge
SR, NR	Spinning and Non-Spinning Reserve schedule	η	Charging efficiency
$\overline{\ }$, $\underline{\ }$	Denotes upper/lower limit	$^{(+)}$, $^{(-)}$	Denotes discharging/charging schedule
D	Demand forecast*	*v*, *w*	Penalized upward/downward capability shortfall
IRUR/IRDR	Imbalance reserve up/down requirement*	*u*	Discharge binary variable
RUR/RDR/SRP/NRR	Regulation up/down & spinning/non-spinning reserve requirement*	α, β, γ, δ	Shared ramp capability constraint coefficients
*adjusted for bucket-1 energy/imbalance reserve/regulation/contingency reserve transfers			

Table 10: Notation for EDAM RSE application

Power balance requirements:

$$\sum_i EN_{i,t} + v_t - w_t = D_t$$

Imbalance reserve requirements:

$$\sum_i IRU_{i,t} \geq IRUR_t, \quad \sum_i IRD_{i,t} \geq IRDR_t$$

Ancillary Services requirements (cascading for ISO BAA is not shown):

$$\sum_i RU_{i,t} \geq RUR_t, \quad \sum_i RD_{i,t} \geq RDR_t, \quad \sum_i SR_{i,t} \geq SRR_t, \quad \sum_i NR_{i,t} \geq NRR_t$$

Capacity Constraints:

$$EN_{i,t} + IRU_{i,t} \leq UEL_{i,t}$$
$$EN_{i,t} - IRD_{i,t} \geq LEL_{i,t}$$
$$EN_{i,t} + IRU_{i,t} + NR_{i,t} + SR_{i,t} + RU_{i,t} \leq UOL_{i,t}$$
$$EN_{i,t} - IRD_{i,t} - RD_{i,t} \geq LOL_{i,t}$$

Ramping Capability Constraints:

$$EN_{i,t} - EN_{i,t-1} \leq RRU_i(EN_{i,t-1}) - \alpha\, RU_{i,t} - \beta\, SR_{i,t} - \gamma\, NR_{i,t} - 4\,\delta\, IRU_{i,t}$$
$$EN_{i,t} - EN_{i,t-1} \geq -RRD_i(EN_{i,t-1}) + \alpha\, RD_{i,t} + 4\,\delta\, IRD_{i,t}$$

Energy Constraints:

$$\underline{E_i} \leq \sum_t EN_{i,t} \leq \overline{E}_i, \forall i$$

Energy Storage Model:

$$SOC_{i,t} = SOC_{i,t-1} - \left(EN_{i,t}^{(+)} + \eta_i\, EN_{i,t}^{(-)}\right)$$
$$EN_{i,t} = EN_{i,t}^{(+)} + EN_{i,t}^{(-)}$$
$$0 \leq EN_{i,t}^{(+)} \leq u_{i,t}\, UEL_{i,t}$$
$$(1 - u_{i,t})\, LEL_{i,t} \leq EN_{i,t}^{(-)} \leq 0$$

$$SOC_{i,t-1} - RU_{i,t} - SR_{i,t} - NR_{i,t} - IRU_{i,t} \geq \underline{SOC_i}_{,t}$$
$$SOC_{i,t-1} + \eta_i \left(RD_{i,t} + IRD_{i,t}\right) \leq \overline{SOC}_{i,t}$$

V. Appendix 2: EDAM Revenue Shortfall Allocation

This appendix shares additional illustrations of the BAA-specific rate for recovery of the forecasted EDAM revenue shortfall if allocated to gross load as discussed in section II.B.1(d). The BAA specific rate is derived by excluding both the forecasted EDAM revenue shortfall and the denominator.

Method 1 - Gross Load Allocation, BAA-specific scenarios

Medium-end forecasted EDAM revenue shortfall scenario

BAA	Shortfall ($ in Millions)	Gross Load (MWh in Millions)
BAA1	$12	211
BAA 2	$4	18
BAA 3	$6	39
BAA 4	$8	70
Total	$30	338

BAA	Revenue Shortfall Allocation ($ in Millions)					BAA Specific Rate[124]
	BAA1	BAA 2	BAA3	BAA 4	Total	
BAA 1	$0.0	$2.6	$4.2	$6.3	$13.2	$0.06 per MWh
BAA 2	$1.7	$0.0	$0.4	$0.5	$2.6	$0.14 per MWh
BAA 3	$3.7	$0.5	$0.0	$1.2	$5.3	$0.14 per MWh
BAA 4	$6.6	$0.9	$1.4	$0.0	$8.9	$0.13 per MWh
Total	$12.0	$4.0	$6.0	$8.0	$30.0	

Table 11: deriving a BAA-specific rate based on a gross load allocation.

High-end forecasted EDAM revenue shortfall scenario

BAA	Shortfall ($ in Millions)	Gross Load (MWh in Millions)
BAA1	$20	211
BAA 2	$10	18
BAA 3	$12	39
BAA 4	$16	70
Total	$58	338

[124] Calculated as sum of BAA revenue shortfall allocation from other BAAs revenue shortfalls divided by the gross load the individual entity when identifying the specific rate applicable to that BAA gross load. For example, in calculating the BAA specific rate for BAA 1, consideration is only given to the costs of BAAs 2, 3, and 4 divided by the proportion of BAA 1 gross load to the gross load of those three BAAs.

BAA	Revenue Shortfall Allocation ($ in Millions)					BAA Specific Rate[125]
	BAA1	BAA 2	BAA3	BAA 4	Total	
BAA 1	$0.0	$6.6	$8.5	$12.6	$27.7	$0.13 per MWh
BAA 2	$2.8	$0.0	$0.7	$1.1	$4.6	$0.26 per MWh
BAA 3	$6.1	$1.2	$0.0	$2.3	$9.7	$0.25 per MWh
BAA 4	$11.0	$2.2	$2.8	$0.0	$16.0	$0.23 per MWh
Total	$20.0	$10.0	$12.0	$16.0	$58.0	

Table 12: deriving a BAA-specific rate based on a gross load allocation.

[125] Calculated as sum of BAA revenue shortfall allocation from other BAAs revenue shortfalls divided by the gross load the individual entity when identifying the specific rate applicable to that BAA gross load. For example, in calculating the BAA specific rate for BAA 1, consideration is only given to the costs of BAAs 2, 3, and 4 divided by the proportion of BAA 1 gross load to the gross load of those three BAAs.

VI. Appendix 3: Mathematical Formulation of the WEIM Power Balance Constraint Relaxation (Confidence in Transfers)

Notation

i	Node/resource index
j	BAA index
t	Time index
BAA	Set of resources in a BAA
G	Supply resource (including virtual supply in EDAM)
D	Demand forecast
T	Algebraic net transfer (positive for export)
$\bar{T}$	Net transfer reference
$T^{(EN)}$	Day-Ahead or base net energy transfer
$T^{(IRU)}$	Day-Ahead net imbalance reserve up transfer
$T^{(IRD)}$	Day-Ahead net imbalance reserve down transfer
$T^{(RCU)}$	Day-Ahead net reliability capacity up transfer
$T^{(RCD)}$	Day-Ahead net reliability capacity down transfer
$s^{(+)}$	Supply shortfall
$s^{(-)}$	Supply surplus
$ABC^{(+)}$	Available balancing capacity up
$ABC^{(-)}$	Available balancing capacity down

For a given time interval, the BAA power balance constraint with penalized supply shortfall and surplus is as follows:

$$\sum_{i \epsilon BAA_j} G_{i,t} - D_{j,t} - T_{j,t} + s_{j,t}^{(+)} - s_{j,t}^{(-)} = 0$$

The power balance constraint relaxation when either the shortfall or the surplus take value is constrained as follows:

$$\left(s_{j,t}^{(+)} + \sum_{i \epsilon BAA_j} ABC_{i,t}^{(+)} \right) \left(T_{j,t} - \bar{T}_{j,t}^{(+)} \right) \leq 0$$

$$\left(s_{j,t}^{(-)} + \sum_{i \epsilon BAA_j} ABC_{i,t}^{(-)} \right) \left(T_{j,t} - \bar{T}_{j,t}^{(-)} \right) \geq 0$$

Where the net transfer references are determined as follows:

$$\bar{T}_{j,t}^{(+)} = T_{j,t}^{(EN)} + T_{j,t}^{(IRU)} + T_{j,t}^{(RCU)}$$

$$\bar{T}_{j,t}^{(-)} = T_{j,t}^{(EN)} - T_{j,t}^{(IRD)} - T_{j,t}^{(RCD)}$$

VII. Appendix 4: Mathematical Formulation of the Net EDAM Export Transfer Constraint

Notation

i	Node index
j	BAA index
k	Innermost ITC index
t	Time index
G	Generation schedule
I	Import schedule
E	PT Export schedule
T	Net transfer
$\bar{T}$	Net base transfer (net of bucket 1 transfers, positive for export)
UEL	Upper economic limit, reflecting derates
AS	Total upward ancillary service award (regulation up + spinning reserve + non-spinning reserve)
IRU	Imbalance reserve up award
RCU	Reliability capacity up award
ITC	Import scheduling limit
NEC	Non-exportable capacity margin
u	Unit commitment status (0/1)
a	Confidence factor for non-RSE eligible supply
BAA_j	Set of resources in BAA j
S_k	Set of intertie resources constrained by ITC k
S_{RSE}	Set of RSE-eligible resources
$\widetilde{\ }$	Denotes RSE optimal schedule meeting RSE requirements

Assuming for simplicity that the energy bid extends to the maximum resource capacity ($UEL = P\max$) and that there are no AS and IRU/RCU intertie bids, the net energy export constraint in the base scenario of IFM is as follows:

$$T_{j,t} \le \bar{T}_{j,t} + \max\Bigg(0, \sum_{i \epsilon BAA_j \cap S_{RSE}} u_{i,t}\left(UEL_{i,t} - \widetilde{AS}_{i,t} - \widetilde{IRU}_{i,t} - \tilde{G}_{i,t}\right) + a \sum_{i \epsilon BAA_j - S_{RSE}} u_{i,t}\left(UEL_{i,t} - \widetilde{AS}_{i,t} - \widetilde{IRU}_{i,t} - \tilde{G}_{i,t}\right) + \sum_k \min\Bigg(ITC_{k,t} - \sum_{i \in S_k}\left(\tilde{I}_{k,i,t} - \tilde{E}_{k,i,t}\right), \sum_{i \in S_k \cap S_{RSE}}\left(UEL_{k,i,t} - \tilde{I}_{k,i,t}\right) + a \sum_{i \in S_k - S_{RSE}}\left(UEL_{k,i,t} - \tilde{I}_{k,i,t}\right)\Bigg) - NEC_{j,t}\Bigg)$$

The net (energy + IRU) export constraint in the IRU deployment scenario of the IFM is as follows:

$$T_{j,t} + T_{j,t}^{(IRU)} \leq \bar{T}_{j,t} + \bar{T}_{j,t}^{(IRU)}$$
$$+ \max\Bigg(0, \sum_{i \epsilon BAA_j \cap S_{RSE}} u_{i,t}\left(UEL_{i,t} - \widetilde{AS}_{i,t} - \widetilde{IRU}_{i,t} - \tilde{G}_{i,t}\right)$$
$$+ a \sum_{i \epsilon BAA_j - S_{RSE}} u_{i,t}\left(UEL_{i,t} - \widetilde{AS}_{i,t} - \widetilde{IRU}_{i,t} - \tilde{G}_{i,t}\right)$$
$$+ \sum_{k} \min\Bigg(ITC_{k,t} - \sum_{i \in S_k}\left(\tilde{I}_{k,i,t} - \tilde{E}_{k,i,t}\right), \sum_{i \in S_k \cap S_{RSE}}\left(UEL_{k,i,t} - \tilde{I}_{k,i,t}\right)$$
$$+ a \sum_{i \in S_k - S_{RSE}}\left(UEL_{k,i,t} - \tilde{I}_{k,i,t}\right)\Bigg) - NEC_{j,t}\Bigg)$$

Finally, the net (energy + IRU + RCU) export constraint in the RUC is as follows:

$$T_{j,t} + T_{j,t}^{(IRU)} + T_{j,t}^{(RCU)}$$
$$\leq \bar{T}_{j,t} + \bar{T}_{j,t}^{(IRU)}$$
$$+ \max\Bigg(0, \sum_{i \epsilon BAA_j \cap S_{RSE}} u_{i,t}\left(UEL_{i,t} - \widetilde{AS}_{i,t} - \widetilde{IRU}_{i,t} - \tilde{G}_{i,t}\right)$$
$$+ a \sum_{i \epsilon BAA_j - S_{RSE}} u_{i,t}\left(UEL_{i,t} - \widetilde{AS}_{i,t} - \widetilde{IRU}_{i,t} - \tilde{G}_{i,t}\right)$$
$$+ \sum_{k} \min\Bigg(ITC_{k,t} - \sum_{i \in S_k}\left(\tilde{I}_{k,i,t} - \tilde{E}_{k,i,t}\right), \sum_{i \in S_k \cap S_{RSE}}\left(UEL_{k,i,t} - \tilde{I}_{k,i,t}\right)$$
$$+ a \sum_{i \in S_k - S_{RSE}}\left(UEL_{k,i,t} - \tilde{I}_{k,i,t}\right)\Bigg) - NEC_{j,t}\Bigg)$$

Note that there are no RCU bucket 1 transfers:

$$\bar{T}_{j,t}^{(RCU)} = 0$$

Attachment F – EDAM CAISO Board of Governors and WEIM Governing Body

Memo and Vote

Day-Ahead Market Enhancements and Extended Day-Ahead Market

California Independent System Operator Corporation

August 22, 2023

Memorandum

To: ISO Board of Governors and Western Energy Imbalance Market Governing Body

From: Anna McKenna, Vice President of Market Policy and Performance

Date: January 26, 2023

Re: **Decision on the extended day ahead market (EDAM)**

This memorandum requires ISO Board of Governors and WEIM Governing Body action.

EXECUTIVE SUMMARY

The diversity of resources and transmission connectivity in the West presents a unique opportunity to lead the nation and demonstrate that collaboration and innovative mechanisms can deliver substantial economic, reliability, and environmental benefits. An example of that is the Western Energy Imbalance market (WEIM), which since its inception in 2014 has grown to represent nearly 80% of the load in the West and has accrued over $3 billion in benefits for its participants. The WEIM, although limited as only a real-time based market, clearly demonstrates that strong collaboration across a broad regional footprint is key to unlocking the value that exists across the West. The addition of a day-ahead market across a broad Western footprint builds on the WEIM to deliver sizable incremental benefits. Recent studies[1] estimate these benefits to range from $543 million to $1.2 billion per year when considering the operational benefits in addition to potential capacity benefits. The proposed extended day-ahead market (EDAM) provides a significant next step in unlocking these incremental benefits and achieving these shared objectives for all participating entities.

Management proposes to extend the ISO's day-ahead market to WEIM entities. The proposed EDAM design allows for the optimized commitment of resources and use of transmission capability across a larger footprint to effectively and efficiently position resources to meet next-day demand. The proposal provides the opportunity for existing WEIM entities to voluntarily extend their participation to the EDAM, building upon the established relationship with the ISO, while continuing to retain their resource planning,

[1] http://www.caiso.com/Documents/Presentation-CAISO-Extended-Day-Ahead-Market-Benefits-Study.pdf

transmission service and planning, and reliability functions through their respective processes and Open Access Transmission Tariffs (OATTs).

A primary benefit of the EDAM is that it will provide access to a diverse pool of resources and increase visibility into the supply conditions across the market footprint in the day-ahead timeframe. The design further maximizes the optimal utilization of transmission capability within and between participating balancing areas to derive benefits of energy transfers across the footprint, while providing assurance that the transfer of energy may be relied on to serve load. This enables the market to optimize available supply and transmission through economic solutions to anticipated system conditions in the day ahead of the operating day, reducing the frequency of real-time emergency declarations under stressed system conditions. At the same time, the design supports greenhouse gas emissions accounting and reporting obligations associated with the transfer of energy across the region, thereby facilitating participants' compliance with regulations that may be implemented in different states across the region.

The proposed design is the result of extensive stakeholder engagement and diverse stakeholder input. Since the launch of the initiative, the ISO has held nearly 80 public meetings ranging from working groups, targeted workshops and meetings, to review the different iterations of the proposal. Moreover, the design is informed by over 1,500 pages of diverse stakeholder comments received across different proposal iterations, which are summarized in a separate document. The level of ISO engagement and stakeholder participation is an indication of the importance of this effort and the willingness of the West to build upon the collaboration and success of the WEIM, increase regional coordination, and support evolving state policy goals.

Management recommends the following motion:

> ***Moved, that the ISO Board of Governors and WEIM Governing Body approve the extended day-ahead market proposal as described in the memorandum dated January 26, 2023; and***
>
> ***Moved, that the ISO Board of Governors and the WEIM Governing Body authorize Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the change proposed in this memorandum, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.***

DISCUSSION AND ANALYSIS

The EDAM design offers a regional day-ahead market by leveraging the existing features of the ISO's day-ahead market with additional modifications that recognize the unique challenges and needs of Western utilities, generators, and balancing authorities. The proposed design considers the enhancements to the day-ahead market being

considered in a parallel initiative and supports the optimal commitment of a geographically diverse set of resources across the EDAM footprint utilizing available transmission capability, building upon the WEIM and providing incremental economic, reliability and environmental benefits. The proposed EDAM design, although rooted in fundamental energy market principals and operations, is innovative and unique. Management expects that the design will evolve over time with experience. Further, Management will monitor its performance closely and will provide regular public reports on its performance.

Management proposes to establish the EDAM on the same participation model that balancing authorities have voluntarily elected to participate in the WEIM. This means each balancing authority may decide to extend its participation into the day-ahead market – the EDAM – or remain as a participant only in the real-time market – the WEIM. Management also proposes to extend parallel transitional measures to the EDAM that are present in the WEIM today to insulate participants from adverse reliability or market outcomes during the onboarding process and throughout their participation.

Interested entities will commit to a project timeline for implementation into the EDAM by executing an agreement with the ISO. The implementation process may take anywhere from six to 24 months depending on the circumstances, and will cover a variety of integration and project management activities. The ISO will recover its implementation costs through a deposit and incremental charge/refund true up mechanism based on its cost of similar services. Additional agreements will therefore be executed as part of the onboarding process, setting up participation and operation of EDAM in the balancing authority area. Participants thereafter will pay an administrative fee based upon the ISO's cost of service and the services necessary to support EDAM participation.

Load serving entities, as well as resources in participating balancing areas, will have the ability to participate in the day-ahead market, and their day-ahead market transactions will be settled through the ISO's settlements systems based on day-ahead market outcomes and differences between the day-ahead and real-time markets. This means that resources and load in a participating balancing authority area will be expected to submit an economic bid or a self-schedule in the market based on their availability and operational circumstances. This differs from the resource participation model in the WEIM, where resources may not participate and instead are represented by a base schedule that reflects their planned operation. In the WEIM, only deviations from base schedules and dispatch instructions are settled through the real-time market. Participating entities will be able to self-schedule or economically bid their load in the day-ahead market, and the market will optimize the transmission and resources offered into the market to identify efficient commitments and energy transfers to meet the forecasted load across the footprint. This foundational element of EDAM will allow for full optimization of load and resources through the day-ahead market and full settlement of imbalances between day-ahead positions and the real-time market.

Although all resources and load in participating EDAM balancing areas will be participating in the market through the submission of self-schedules or economic bids,

transmission providers in EDAM balancing areas will continue to operate their transmission service under their OATT to deliver generation to load or otherwise meet contractual obligations. Therefore, transmission customers will have to continue to comply with each provider's transmission reservation requirements and contribute to the costs of the transmission system. This design ensures that resources are not able to avoid transmission reservations and thereby shift the costs of the transmission system to other transmission customers and load.

Management proposes that resources located in an EDAM balancing area reserve transmission associated with their supply or otherwise be assessed a transmission charge by the transmission service provider. In particular, a generator located in an EDAM balancing area can meet the transmission service requirement by one of the following methods:

- Be a designated network resource under the terms of the EDAM entity OATT, which means that the load serving entity has arranged the transmission necessary to deliver that resource to load; or
- Reserve firm point-to-point transmission service under the OATT of any duration or otherwise hold a legacy transmission contract (pre-OATT).

To the extent the generator has not met the requirements noted above, the EDAM transmission service provider in an EDAM participating area will assess a transmission charge based upon the shortest duration of firm transmission service it offers under its OATT. Such assessments of transmission charges for transmission service will ensure generation continues to contribute to the costs of the transmission system and will continue to facilitate the administration of the OATT by EDAM entity transmission providers.

There are three primary dimensions of the EDAM proposal—prior to the day-ahead market, within the day-ahead market, and after the day-ahead market. Each dimension includes specific design elements that support the associated timeframe in which the ISO or the market participant take various actions.

Prior to the day-ahead market is the resource sufficiency evaluation

Management proposes a day-ahead resource sufficiency evaluation (RSE) culminating at the start of the first run of the day-ahead market, i.e., the integrated forward market. The day-ahead RSE evaluates, across the next day 24-hour horizon, whether each balancing area's supply offered into the day-ahead market is sufficient to meet its next day forecasted load, imbalance reserve obligation, and self-provisioned ancillary service obligations. This includes functionality to allow each balancing authority to evaluate on an advisory basis its progress toward meeting the final RSE so they may take steps to cure any anticipated insufficiencies prior to the execution of the day-ahead market.

EDAM resource sufficiency evaluation structure

The day-ahead RSE will consider resource bids – self schedules and economic bids – of different resource types and technologies, including demand response, across the footprint that entities may have contracted under respective resource adequacy or resource planning programs. This includes the planned delivery of firm energy products where the source or transmission path may not be known by the time of the day-ahead market run, but the entity relying on this energy product takes title to the energy at its intertie border.

Management proposes that balancing areas that pass the day-ahead RSE will be evaluated together, as a pool, in the WEIM hourly sufficiency evaluation. This pooling approach benefits those balancing areas by ensuring the diversity benefit of procured imbalance reserves through the day-ahead market is realized in the WEIM resource sufficiency evaluation. The day-ahead market will in all circumstances seek to cure the insufficiency of one or more balancing areas that may not have brought sufficient supply to the market to meet their next day obligations. To the extent there is sufficient supply in the market to cure an insufficiency without degrading reliability, the balancing area will have cured that insufficiency through the market and will be treated as if it had passed the RSE, and consequently will be considered as part of the pool of entities passing the RSE for purposes of being evaluated jointly for the WEIM RSE. Otherwise, the EDAM entity will be subject to the administrative surcharge outlined below and will be evaluated on its own for the WEIM RSE.

Management proposes that the day-ahead RSE design include financial consequences for RSE failure in order to provide a strong incentive for procuring sufficient supply ahead of the day-ahead market. The design provides a tiered consequence structure depending upon the magnitude of the failure to meet the EDAM entity's resource sufficiency. The first tier – Tier 1 – is a *de minimis* RSE failure within the maximum of 10 MW or the forecast error associated with the balancing area's upward imbalance reserve requirement. An RSE failure of a magnitude less than 50% of the balancing area's imbalance reserve requirement is considered a Tier 2 failure and is subject to an administrative surcharge with a 1.25 multiplier (i.e., a 25% adder above Tier 1). Finally, an RSE failure of a magnitude greater than 50% of the balancing area's upward imbalance reserve requirement is considered a Tier 3 failure – a larger magnitude failure – and is subject to an administrative surcharge with a 2.0 multiplier (100% adder above Tier 1). The tiered structure is intended to acknowledge small, *de minimis* failures, but apply a sufficiently robust financial consequence to incent forward procurement of supply to help ensure sufficiency in advance of the day-ahead market. The design also provides for additional escalating surcharge multipliers to the extent that an EDAM entity is persistently failing to meet the day ahead RSE. This additional component of the surcharge applies a prospective additional adder for each day over a rolling retrospective period an EDAM entity experienced a failure for the EDAM RSE.

Net EDAM export transfer constraint

Management proposes to introduce a net EDAM transfer export constraint in the market that would allow balancing areas, including the ISO, to manage the amount of supply internal to their balancing area that can be exported to support transfers with other EDAM balancing areas. Without this protection, excess resource adequacy supply may be committed through the day-ahead market to support EDAM transfers, which in more stressed system conditions could pose a problem for the host balancing areas because the transfers would not be curtailable to manage the balancing area's system reliability conditions. In the ISO balancing area's case, this protects against exports from resource adequacy capacity similar to the ISO's ability to recall lower priority exports that are not contractually obligated to serve external load. Although other EDAM entities may not have a must offer obligation, this constraint will also give them the ability to manage their reliability or resource adequacy obligations while allowing their resources to be optimally managed through the market.

In sum, the day ahead RSE provides a common mechanism to evaluate how each balancing area is positioned and the ability of each balancing area to meet its next day obligations under the associated resource planning paradigms which may differ among entities. The RSE design, in conjunction with the net export constraint, instills confidence in the availability of supply to realize an optimized market solution and encourages entities to make available excess supply to the market beyond what is needed to meet the RSE.

Transmission availability to support the day-ahead market

The availability of transmission, both internal to the system and across interfaces between balancing areas in EDAM, is foundational to optimizing unit commitment in the day-ahead market and to identifying robust energy transfers across the EDAM footprint.

Management proposes that transmission capability internal to each balancing area be made available to the EDAM to support optimized unit commitment in the day-ahead market that strengthens the re-optimization of flow capability across the internal network in real time, as in the WEIM today. Through the use of a full network model, the ISO would model the internal transmission system network of each EDAM entity as it does today through the WEIM. Known transmission outages will be visible to the day-ahead market and will be considered when identifying feasible resource commitments and energy transfers across the footprint.

Transmission customers and transmission providers will also be able to make transmission available across interfaces between EDAM balancing areas to support energy transfers between areas in the footprint. The transmission made available at the interfaces between EDAM balancing areas is also optimized by the day-ahead market to support EDAM transfers. The transmission that is made available to the EDAM is high quality transmission – firm and conditional firm – under the OATT, while the ISO will make its full transmission capability available to support optimized transfers.

Transmission providers will make rights across interfaces between EDAM balancing areas associated with delivery of generation to meet an EDAM entity's resource sufficiency available to the EDAM to optimize in the day-ahead market. To the extent transmission rights held by transmission customers across EDAM balancing area interfaces are not being utilized to support delivery of generation for purposes of the resource sufficiency evaluation, there are different options through which the transmission customer can make transmission available to the EDAM or otherwise exercise their rights. The transmission customer can exercise their specific OATT rights in the day-ahead market by submitting a self-schedule in the day-ahead market associated with those existing transmission rights. In such cases, the market will not optimize those transmission rights, but the self-schedule will nevertheless count for the RSE for the sink EDAM balancing area. To the extent transfer revenue accrues, it will be settled with the EDAM entity. Alternatively, the transmission customer can elect to voluntarily release those transmission rights[2] to the EDAM. In such cases, to the extent transfer revenue accrues across the interface, the ISO will settle those transfer revenues directly with the transmission customer that released their transmission rights to the EDAM.

Transmission rights held by transmission customers that are not exercised in the day ahead market or released to the market, will remain unscheduled and will be optimized in the day-ahead market to support EDAM transfers. Transmission customers whose transmission rights remained unscheduled and were optimized by the market, can later exercise their transmission rights through the real-time market. The market will seek to re-dispatch the system to accommodate those transmission rights. If re-dispatch is not feasible, the market will not disturb day-ahead market cleared schedules. Instead, the market will seek to accommodate these later scheduled transmission rights before accommodating new submitted self-schedules.

The transmission provider in an EDAM area must also make unsold firm transmission capability available to the market to optimize transfers between EDAM balancing areas. The ISO will produce a report for the transmission providers identifying the amount of unsold transmission capability that was optimized in the day-ahead market, such that the transmission provider can resume sales for the transmission that was not utilized by the market.

Transmission customers holding OATT transmission rights across interfaces with non-EDAM balancing areas can continue to exercise these rights to support reliability, resource adequacy or other contractual obligations. Transmission customers holding firm transmission rights that wheel through an EDAM balancing area or otherwise export from the EDAM footprint will be able to self-schedule their transactions associated with their OATT transmission rights through the day-ahead market. The ISO, along with EDAM entity transmission providers, will monitor the frequency and magnitude of the exercise of these transmission rights across different systems and interfaces to understand the market impacts. If such exercise is frequent across discrete transmission paths, or if frequent use is anticipated across discrete transmission paths as determined during the EDAM entity

[2] The transmission rights eligible to be released to the EDAM at the onset are long-term firm or monthly firm, conditional firm, transmission rights.

onboarding process, Management would consider adjustments such as internal network transmission carve-outs, seams arrangements or other mechanisms to mitigate the potential impacts.

Providing for historical transmission revenue recovery through EDAM

Management proposes a design under which transmission providers in the EDAM footprint, including transmission owners in the ISO, can recover historical transmission revenues through the EDAM. The proposed process would allow for the following transmission through the EDAM as follows:

1. Historical transmission revenues from sales of short-term firm and non-firm transmission products under the OATT, and for historical Wheeling Access Charge revenues for the ISO;
2. A portion of new approved transmission builds that increase the transfer capability between EDAM balancing areas based on the proportional ratio of historical short term sales to the overall historical transmission revenues; and
3. Revenues for use of the transmission system when wheel through transfer volumes through an EDAM balancing area are greater than total import and export transfer volumes for the balancing area.

Participating EDAM entities, in their role as transmission providers, will continue to administer and sell transmission under their OATTs. As a result of EDAM participation, transmission service providers may experience reduced transmission sales particularly of shorter term transmission products – monthly, weekly, daily and hourly firm and non-firm transmission. In particular, current WEIM entity transmission providers considering participation in the EDAM expressed that it was important that the design ensure that they can recover their historical transmission revenues to avoid or mitigate transmission cost shifts between different customer classes to the extent there are reduced transmission sales once they join the EDAM. Management proposes three measures for ensuring transmission revenue recovery:

- Since EDAM entity transmission providers continue to make OATT sales, the EDAM recoverable transmission revenues are based on the difference between the historical transmission revenues from short-term firm and non-firm sales and the current OATT sales. As an entity continues to make OATT sales of short-term transmission it reduces the amount that may be recoverable through the EDAM. A portion or percentage of new transmission builds would also be recoverable through the EDAM to the extent a new approved transmission upgrade increases the transfer capability between two EDAM balancing areas, thus supporting increased transfers across the footprint. The portion of the new transmission build costs that would be recoverable through the EDAM is derived by determining the percentage that historical short-term firm and non-firm sales contribute to the overall transmission revenue requirement of the transmission provider.
- Revenues associated with the use of an EDAM entity's transmission system to support transfers wheeling through the system in excess of import and export transfers will also be eligible for cost recovery. In these instances, the EDAM entity

transmission system is supporting the derivation of benefits for the rest of the EDAM footprint in excess of the benefits the EDAM entity may be deriving for itself through transfers that may either source from or sink into its balancing area. When those net wheels through the EDAM entity system exceed the import and export transfers, the EDAM entity transmission provider would be compensated for this net wheel through use of its system at the approved non-firm hourly point-to-point transmission rate.

The EDAM recoverable revenues associated with the three components described above would be allocated to gross load across the EDAM footprint since load, ultimately, derives the primary benefits from the optimized transfers resulting from EDAM participation. Additionally, as part of the allocation of recoverable revenues, an individual EDAM entity will not be allocated its own recoverable revenue or shortfall that needs to be recovered.

Extension of the day-ahead market processes to other balancing areas

Management proposes the retention of the integrated forward market and residual unit commitment as integral components of the EDAM that produce efficient unit commitments and energy transfers between EDAM balancing areas, deriving the expected economic and reliability benefits. Extension of the day-ahead market necessitates retention of significant elements of the day-ahead market as described below.

Market power mitigation

For the start of the EDAM, Management proposes to extend to the EDAM the same market power mitigation design used in the WEIM today. Entities are familiar with this approach and the design can also effectively address market power concerns in the EDAM. Management will be evaluating overall broader market power mitigation design changes within the existing *price formation enhancements* initiative and to the extent design changes emerge, these would be extended to the EDAM.

Extension of convergence bidding

Convergence bidding (also known as virtual bidding) is an important element of two-day energy markets as it drives convergence between day-ahead and real-time market prices through day-ahead virtual supply and demand bids for expected real-time supply and demand that was not bid into the day-ahead market. Convergence bidding improves market liquidity and increases competition by allowing more parties to take day-ahead market positions that are then liquidated in the real-time market. Convergence bidding entities are subject to rigorous creditworthiness requirements and can submit convergence bids, which are financial bids that do not represent physical supply or demand.

Management proposes a convergence bidding design that allows EDAM entities to elect whether or not to enable convergence bidding within their balancing area at the onset of their participation in the EDAM. As the EDAM launches and becomes operational, in the lead up to the two-year anniversary of EDAM operations, the ISO will conduct a stakeholder process to evaluate and derive a permanent EDAM convergence bidding policy informed by operational experience and stakeholder input. This aspect was important for prospective

EDAM entities to provide them the ability to gain operational experience with the EDAM prior to introducing convergence bidding within their balancing area, to the extent they elect not to implement convergence bidding at the onset of their EDAM participation. Management does not propose to change convergence bidding in the ISO BAA. The ISO, along with the Department of Market Monitoring (DMM), will continue to monitor and evaluate market performance with convergence bidding enabled in some balancing areas in the footprint but not others, which will inform evolution of future design.

External resource participation

External resource participation refers to the ability of resources located outside of the EDAM footprint to participate in the market. In the WEIM today, pseudo-tied and dynamically scheduled resources can self-schedule or economically bid at the WEIM entity interties since these resources are source-specific and have contractual and other obligations described in the individual tariffs with transmission providers. Other supply that is under contract and is located outside of the WEIM footprint can only self-schedule at the WEIM entity interties but cannot economically bid. This restriction is due, in part, to reliability concerns that non-source specific supply that may not be deliverable can economically bid at the interties and displace physical internal generation. If the economically bid intertie supply does not perform, it can cause or exacerbate reliability conditions within the WEIM balancing area. For the ISO balancing authority area, parties can continue to submit both economic bids and self-schedules at ISO interties.

Management proposes to extend the WEIM framework for external resource participation to the EDAM so as to enable contracted source-specific supply and designated under the terms of the EDAM entity OATT to bid economically at the EDAM entity intertie. Through the stakeholder process, WEIM entities continued to express similar reliability concerns of permitting economic bidding at their interties. However, supply outside of the EDAM footprint that is designated under the terms of the EDAM entity OATT to serve load in the EDAM balancing area can bid economically at the EDAM entity intertie where the load is located. The supply needs to have sufficient specificity to be modeled in the ISO master file. The terms of the OATT for designating a network resource impose specific transmission requirements that provide confidence the supply that is designated is deliverable, and the added requirement that the resource be specific and modeled in the ISO master file provides further confidence that the supply is real and not speculative. In the EDAM, the ISO will continue to support full intertie bidding at its interties with non-EDAM balancing areas. As the EDAM becomes operational and participating entities gain further operational experience, this element of the design can be re-evaluated to consider whether to expand external resource participation.

Confidence in market transfers between balancing areas

In the EDAM, participating balancing areas will rely on optimized market transfers identified through the day-ahead and real-time markets to serve their load. As a result, it is important to ensure that participating entities can rely upon these transfers in normal and stressed system conditions and have the confidence that these transfers will be effectuated mutually across the footprint to ensure reliable service to loads. There are several elements of the

design, described earlier, that contribute to instilling confidence in EDAM transfers, including the resource sufficiency evaluation and net export constraint, as well as the day-ahead optimization of energy and imbalance reserves.

In stressed system conditions, the market will re-dispatch in response to changes in conditions. The broad supply pool offered into the market will provide an effective tool for responding to changes in conditions. When the market has done all it can to respond to changes in system conditions, the EDAM entity may need to rely on its own operational tools to manage conditions on its grid. These tools may include seeking emergency assistance from neighboring balancing areas, triggering emergency supply programs such as demand response or other emergency generation, or deployment of operating reserves and arming firm load.

Management proposes that in stressed conditions where the EDAM entity has exhausted its operational tools and load shed in the balancing area is imminent, EDAM transfers out of the balancing area be afforded equal priority to an EDAM participating entity's load subject to operational discretion and good utility practice. In these instances, similar to practices in place today, the EDAM entity facing the reliability event would coordinate with neighboring balancing areas including other EDAM balancing areas that are depending on transfers sourcing from the EDAM entity facing the reliability event. The operators in those instances would continue to maintain discretion and the ability to coordinate such that if curtailing the EDAM transfer ahead of load would not cause reliability problems for the receiving EDAM balancing area, they can curtail these to avoid or limit load shed. The proposed design of equal priority between EDAM transfers and load instills mutual confidence between EDAM entities that these transfers can be relied upon even in stressed system conditions and that entities will support reliable and dependable service to each other under those conditions.

Greenhouse gas (GHG) accounting

State carbon pricing policies increase the marginal cost of electricity to the extent generation subject to these policies produces greenhouse gas (GHG) emissions. Two states in the West, California and Washington, currently have carbon pricing policies covering electricity generation serving their demand.[3] An objective of the market design is to account equitably for GHG costs associated with EDAM transfers, consistent with current and emerging state policies within the EDAM footprint.

Under the WEIM GHG accounting design in place today, bid adders are used to identify which resources serve demand in the California balancing area using a resource-specific approach. When offering bids to serve demand in a state with carbon pricing policies, scheduling coordinators for resources located in balancing areas outside of California submit a two-part bid adder consisting of a GHG bid capacity (MW) quantity and a GHG price ($/MWh). The bid adder reflects the willingness of the resource to make its output available to serve demand within California and reflects the cost of compliance with California's

[3] The ISO is similarly committed to working with Oregon regulators to fulfill reporting and compliance with Oregon's Clean Energy Targets legislation. The program requires electricity suppliers to reduce greenhouse gas emissions associated with electricity sold in Oregon according to an emissions reduction schedule, for which the first reduction target is 2030.

carbon pricing policies. The market optimization considers the GHG bid cost adder in addition to the energy bid to determine efficient dispatch and identify which resources serve demand in California balancing areas. To the extent a resource does not submit a GHG bid adder, the market does not consider or attribute the resource to serve California demand.

Management proposes to extend the current WEIM GHG accounting framework and resource-specific approach to the EDAM with several enhancements.

While a number of different options were considered throughout the initiative,[4] the current resource-specific approach to GHG accounting in the WEIM provides a reasonable starting point for the EDAM since it provides a defined and tested approach that is familiar to prospective EDAM entities, requires the fewest implementation changes, and most closely aligns with current regulations. The bid adder design is also flexible enough to accommodate alternative approaches to GHG accounting should states want to evolve their programs.

The proposed resource-specific approach is an initial EDAM design and the ISO is committed to working collaboratively with stakeholders and regulatory agencies based on operational experience and regulatory policy changes to evolve the approach including consideration of alternate approaches.

Geographic boundary for GHG accounting purposes

Management proposes to update the geographic boundary used for GHG accounting purposes to reflect state boundaries rather balancing authority area boundaries. Today, in the WEIM, the market uses balancing area boundaries to represent GHG regulation areas. A state-level boundary more accurately represents the boundary of the GHG regulation area than balancing area boundaries, which generally do not align with state boundaries. This enhancement will allow the market to reflect the dispatch costs associated with GHG pricing program compliance for resources within a state or dispatched to serve demand within that state, but not reflect these costs in the dispatch of resources not subject to the GHG pricing program.

Supporting bidding and attribution for multiple GHG regulation areas

Management proposes a further enhancement to the GHG accounting framework to allow for submission of GHG bid adders associated with serving demand across multiple GHG regulation areas. As described earlier, under the resource specific approach to GHG accounting, resources located outside of the GHG regulation area can voluntarily elect to submit GHG bid adders that reflect the cost of compliance with state carbon emission pricing policies. The market will consider the bid adders in addition to energy bids in determining the most efficient dispatch for serving demand in a GHG regulation area. California is currently the only state with a carbon compliance cost, but the state of Washington is in the process

[4] Throughout the initiative, and different iterations of the proposal, the ISO and stakeholders considered different approaches which were discussed in various working groups and workshops but ultimately may not be compatible with existing regulatory policy structures and would require significant changes to state regulations to implement.

of developing rules for its cap-and-invest program which will establish a carbon price and separate compliance structure through an initial auction on February 28, 2023. Other states across the West may consider similar policies in the future.

Recognizing the need to facilitate compliance with multiple carbon pricing policies, the EDAM will support bid adders for multiple GHG regulation areas. Resources can indicate willingness to serve demand in different GHG regulation areas and reflect state-specific compliance costs through separate GHG bid adders. This framework will allow for resource-specific attribution of resources in one GHG regulation area to serve load in another GHG regulation area. For example, a resource in Washington could submit a GHG bid adder to serve demand in California and vice versa. Should regulators pursue program linkage, a single carbon price can be used to reflect the common compliance cost.

Establishing an attribution baseline through an updated GHG counterfactual

Attribution of resources to a GHG regulation area can result in secondary dispatch wherein resources backfill to serve demand outside of a GHG regulation area. In the WEIM today, a GHG counterfactual approach is used to limit attribution that may result in secondary dispatch. The purpose of a GHG counterfactual is to establish a baseline to determine what dispatch would have occurred in non-GHG regulation areas without offers to serve demand in a GHG regulation area(s). In the WEIM today, the counterfactual is based on self-submitted base schedules representing the expected resource operation.

Management proposes an enhancement to the GHG counterfactual applied in the EDAM by introducing a special market run – the GHG reference pass – in the day-ahead market process. Since there are no base schedules in the EDAM, the GHG reference pass uses energy bids to optimize dispatch that would serve the demand in the non-GHG regulation area without GHG transfers. The enhanced GHG counterfactual is expected to more closely align with the integrated forward market run, resulting in fewer deviations and a larger reduction of secondary dispatch. Because energy bids are used for dispatch in the integrated forward market, using bids instead of self-submitted base schedules should reduce the opportunity for resources to withhold supply from the first market pass to secure a GHG attribution.

Management proposes that the counterfactual for use in real time will be the difference between the day-ahead market energy schedule and day-ahead market GHG award. Because GHG compliance is ultimately based on dispatch and the resulting emissions in the real-time market which performs its own optimization and determines final attribution, this approach more closely aligns with the concept of base schedules than the day ahead energy schedule. Further, this allows for resources with lower GHG bids that only participate in WEIM to displace more expensive resources participating in the EDAM. The GHG counterfactual for entities that participate in the WEIM and not in the EDAM will continue to use self-submitted base schedules.

Introduction of a GHG net export constraint limiting secondary dispatch

Management also proposes the introduction of a GHG net export constraint to further limit attribution and reduce the potential for secondary dispatch. The GHG net export constraint is an hourly constraint, which limits attribution of resources to a GHG regulation area in periods when a balancing area is a net importer or limits attribution in excess of a net optimal transfer schedule. In the day-ahead market, the GHG net export constraint is an hourly constraint that applies to every EDAM balancing area that does not overlap with a GHG regulation area. When an EDAM balancing area that overlaps with a GHG regulation area fails the resource sufficiency evaluation, all net export constraints are deactivated for that hour so as to not restrict imports into that balancing area potentially creating a reliability risk. In the day-ahead market, the constraint is deactivated for the hour of the resource sufficiency failure, while in the real-time market (WEIM) the constraint is deactivated for every fifteen minute interval in which a WEIM balancing area that overlaps a GHG regulation area fails the resource sufficiency evaluation.

Furthermore, the proposed design accounts for supply to which load serving entities within a GHG regulation area have entitlements to serve their demand.[5] Contracted resources viewed as external to the GHG regulation area will have a zero value in the GHG reference pass so that the capacity can be fully attributed to serve demand in a GHG regulation area. In addition, attribution of this supply to serve demand in the GHG regulation area will not be constrained by the GHG net export constraint. Resources viewed as internal to the GHG regulation area, including pseudo-tie resources and dynamically scheduled resources from non-EDAM balancing areas shown as system resources at a scheduling point in the GHG regulation area, are not attributable.

Post-market settlement and transfer revenue and congestion revenue allocation

Settlement will be managed in accordance with the ISO tariff-based timelines and procedures associated with settlement of all market participant transactions. All day-ahead charges will be assessed and settled similarly, unless there is a unique dimension to the EDAM settlement that necessitates additional provision. This primarily arises in the context of transmission availability and the associated transfer and congestion revenues.

In the WEIM, the ISO models internal transmission constraints, internal transmission limits, and transmission transfer limits between balancing areas and will continue to do so in the EDAM. As noted earlier, transmission capability internal to an EDAM balancing area is made available to support optimized day ahead unit commitment. Congestion revenue accrues when transmission constraints or limits internal to an EDAM balancing area are reached on particular paths, which in turn causes the marginal cost of congestion component of the locational marginal price (LMP) to reflect the difference between the

[5] The ISO's final proposal identified that resource adequacy supply would receive this treatment, but the logic behind this proposed aspect of the GHG reference pass equally applies to non-resource adequacy resources under contract to serve load.

incremental costs to serve demand. These accrued incremental costs are accounted for as congestion revenues.

Management proposes that congestion revenues, accrued as a result of internal transmission limits or constraints being reached, be allocated fully to the EDAM entity where the internal limit is reached. This approach is consistent with the allocation of congestion revenues in the WEIM where these are fully allocated and settled with the EDAM entity where the internal transmission limit is reached creating the congestion revenue accrual. From a practical perspective, if an internal binding transmission limit is reached, the market will re-dispatch generation internal to that balancing area to continue serving load, and this is the case even outside of the EDAM where the balancing area where the internal limit is reached is ultimately responsible for resolving that constraint. As such, it is appropriate to fully allocate congestion revenues to the EDAM entity where the internal constraint originated and not share those congestion revenues with other EDAM entities.

Transmission capability is also made available at interfaces between EDAM balancing areas, which is then optimized to support energy transfers. Transfer revenue accrues when the transmission scheduling limit at the transfer points (interfaces) between EDAM balancing areas is reached, which is informed by the amount of transmission capacity that is made available across the interface. When this transfer limit is reached, it will result in price separation of the marginal energy component of the LMP, and this difference in the energy component of the LMP represents the accrual of transfer revenue.

Management proposes that transfer revenue accrued at an interface between two EDAM balancing areas be shared equally between the two EDAM entities that made the transmission available to facilitate energy transfers. This is an equitable approach, supported by stakeholder comments, that reflects entities coming together and releasing transmission to the day-ahead market to share in the benefits of optimized market transfers. Two EDAM balancing areas could mutually agree to a different allocation to reflect existing or future commercial arrangements. The exception to the equal sharing of transfer revenue is for the transmission made available at an interface when the transmission customer releases their transmission rights in advance in return for transfer revenue, where the transmission customer will receive the full allocation of transfer revenue associated with the transmission rights released to the market.

The Market Surveillance Committee published its opinion of the proposal on January 23, and formally adopted its draft Opinion on January 25. The final Opinion will be formally adopted on January 27, 2023.

CONCLUSION

Management requests the ISO Board of Governors and WEIM Governing Body approve Management's extended day-ahead market proposal described in this memorandum. This proposal will extend the ISO's day-ahead market to WEIM entities thus enabling optimized commitment of resources and use of transmission capability across a larger footprint to efficiently position resources to reliably meet next-day demand.

California ISO | WESTERN EIM

California Independent System Operator Corporation

Western Energy Imbalance Market

Board of Governors and WEIM Governing Body Joint General Session **February 1, 2023**
Joint decision on extended day-ahead market proposal

Motion

Moved, that the ISO Board of Governors and WEIM Governing Body approve the extended day-ahead market proposal as described in the memorandum dated January 26, 2023; and

Moved, that the ISO Board of Governors and the WEIM Governing Body authorize Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the change proposed in this memorandum, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.

WEIM Govering Body vote: **ISO Board of Governors vote:**			**Action: Passed 10-0**					
Name	**Position**	**Body**	**Move/ Second**	**Yes BoG**	**No BoG**	**Yes GB**	**No GB**	**Other**
Bhagwat	Governor	Board		Y				
Borenstein	Governor	Board		Y				
Campbell	Member	GB				Y		
Decker	Member	GB				Y		
Galiteva	Governor	Board	Second	Y				
Gardner	Vice Chair	GB				Y		
Kondziolka	Chair	GB				Y		
Leslie	Chair	Board		Y				
Prescott	Member	GB				Y		
Schori	Vice Chair	Board	Moved	Y				
Vote Count				**5**		**5**		