



California Independent
System Operator Corporation

March 31, 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**

**Tariff Amendment to Implement Phase 2 of Resource
Sufficiency Evaluation Enhancements**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) submits this tariff amendment to implement market rule changes developed through phase 2 of its resource sufficiency evaluation (RSE) enhancements stakeholder initiative and related clarifications to the treatment of real-time export schedules (Phase 2 Enhancements).¹ The RSE is a key element of the western energy imbalance market (WEIM or EIM) that ensures each entity can adequately balance its own supply and demand prior to participating in the real-time market.

As explained further herein, in the course of the Phase 2 Enhancements initiative, stakeholders identified three market rule changes that are ripe for implementation beginning in summer of 2023.² First, stakeholders have worked

¹ The CAISO submits this filing pursuant to Section 205 of the Federal Power Act (FPA), 16 U.S.C. § 824d. 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 and appendices are references to sections and appendices of the CAISO tariff unless otherwise indicated. For the sake of clarity, this transmittal letter distinguishes between existing tariff provisions (*i.e.*, provisions in the current CAISO tariff), and new tariff provisions (*i.e.*, new provisions that the CAISO proposes to add in this filing).

² The CAISO's Phase 2 Enhancements initiative webpage is accessible at:
<https://stakeholdercenter.caiso.com/StakeholderInitiatives/EIM-resource-sufficiency-evaluation->

to develop a change to provide an option to allow members of the WEIM to access assistance energy transfers at a fixed surcharge upon failure of the RSE. Second, recognizing that the interactions between WEIM energy transfers and CAISO real-time exports can cause the CAISO to fail the RSE, stakeholders have developed a proposal to exclude the effect of real-time lower priority (LPT) exports from the CAISO's RSE obligations.³ Finally, the CAISO proposes changes to its tariff to provide visibility into the scheduling priorities of LPT exports and, when necessary, facilitate manual operator curtailment of these exports consistent with their market scheduling priority in the market. Approval of these changes will enable WEIM Balancing Authority Areas (BAAs) that are short of supply to leverage the WEIM's efficient dispatch; strengthen the RSE by more appropriately accounting for LPT exports from the CAISO; and clarify the scheduling priority and curtailment rules of LPT exports.⁴

The CAISO respectfully requests that the Commission issue an order accepting the Phase 2 Enhancements on or before May 31, 2023.⁵ Prompt approval of the Phase 2 Enhancements within this timeframe will support the CAISO's effort to implement the modifications during summer 2023.

I. Executive Summary

The RSE is a collection of four tests and associated procedures the CAISO administers in the real-time market. The RSE assesses whether BAAs in

[enhancements](#). In addition, the CAISO notified stakeholders of its intent to revise the tariff to address an implementation issue related to Flexible Ramping Product in the course of RSE Phase 2.

³ These exports, known as "lower price takers," or more simply, "LPTs," traditionally have been included in the CAISO's RSE even though such exports are curtailed when there is insufficient supply or binding transmission constraints. The specific real time LPTs excludable from the CAISO's RSE obligations are specified in proposed new tariff Section 34.12.4

⁴ From a substantive perspective, the categories of proposed enhancements listed above are separate and discrete from each other. They are separate elements of a multi-part filing severable from the tariff revisions in other categories. They are not interrelated, interdependent, or affected by Commission action on tariff revisions in any other category. Accordingly, the Commission should evaluate the justness and reasonableness of each category of proposed tariff revisions on its individual merits. Rejection of one proposed set of tariff revisions should not per se require rejection of any other set of tariff revisions (though it might require modification of the other set of tariff revisions to reflect the rejection). Further, if the Commission believes it needs more information to assess one category of tariff changes, the Commission should either reject only the tariff revisions in that category or issue a deficiency letter only for that specific category, while issuing an order by accepting the remainder of the tariff revisions.

⁵ The CAISO respectfully requests authorization to inform the Commission of the actual effective date of the tariff changes pursuant to a subsequent filing within five business days following implementation. See section IV of this transmittal letter.

the WEIM area have sufficient capacity and flexibility to meet forecasted demand and ensures that WEIM base schedules are feasible and balanced. The RSE functions to help ensure that supply cleared in the real-time market results from economic displacement and restricts BAAs from inappropriately relying on WEIM to meet needs that should be fulfilled through the forward procurement of capacity. Under the existing CAISO tariff, BAAs that fail the RSE are ineligible to receive incremental energy transfers from other BAAs in the fifteen-minute market, even when such supply is available.

The proposed enhancements will: (1) allow BAAs participating in the WEIM that do not satisfy the capacity and flexibility tests to elect to receive assistance energy transfers from other participating BAAs while retaining financial incentives for sufficient forward procurement; (2) reflect the benefit of excluding the real-time LPT export obligation from the CAISO's RSE calculations; and (3) establish specific tagging requirements and make clarifications to align the CAISO tariff provisions relating to resource scheduling priorities and tagging protocols. Additionally, the enhancements clarify how the WEIM uses RSE results in the flexible ramping procurement process.

First, the CAISO proposes to establish a new set of rules to allow a BAA that does not meet the RSE to elect to receive assistance energy transfers through the WEIM. A BAA that chooses to take part in this assistance energy transfer program will not have transfers restricted and will pay an additional surcharge in addition to the applicable price cleared in the market for assistance energy transfers. Supply offers voluntarily made into the WEIM will back the assistance energy transfers to the receiving BAA. Revenues from this surcharge will be allocated to all of the other BAAs in the WEIM area that have net exports and passed the upward capacity and flexibility tests in the RSE. The CAISO proposes that this assistance energy transfer program sunset on December 31, 2025. The CAISO intends to work with its stakeholders through additional phases of this initiative or in the course of the Extended Day-Ahead Market (EDAM), with the goal of developing an in-market solution.

Second, the CAISO proposes to update the computations of the CAISO's upward capacity and flexibility tests under the RSE to reflect the benefit of the exclusion of real-time LPT exports from the CAISO's obligations. At present, the obligation associated with these LPT exports is included as part of the CAISO BAA's RSE obligation even though these real-time LPT exports are curtailable. Today, WEIM energy transfers into the CAISO BAA are not counted as available supply in the RSE. Excluding the obligations associated with curtailable real-time LPT exports from the CAISO BAA's RSE obligations results in the application of the RSE to the CAISO in a more equitable manner.

Third, the CAISO proposes clarifications to the scheduling priority rules and E-tag requirements for LPT exports. The CAISO manages schedules on its

grid through its markets and applies scheduling priorities defined in its existing tariff to curtail self-schedules (*i.e.*, price-taker bids) in those markets. If there is insufficient supply or binding transmission constraints, the CAISO markets will clear by curtailing self-schedules.⁶ The CAISO proposes to clarify how it applies the tariff provisions regarding the scheduling priorities to meet increasing supply needs in the real-time market and ensure the CAISO can manually curtail lower-priority exports within the operating hour if the CAISO is unable to maintain its own load-serving obligations as a BAA. These clarifications are consistent with the existing scheduling priorities and compliance with E-Tag protocols. They will enhance transparency and aid neighboring BAAs, and the CAISO, in identifying LPT exports subject to manual operator curtailment if emergency conditions materialize.

II. Background

A. The Resource Sufficiency Evaluation

The CAISO market processes include both day-ahead and real-time wholesale electricity markets.⁷ The day-ahead and real-time markets operate inside the CAISO BAA, while the WEIM provides other BAAs in the Western Interconnection with the opportunity to participate in the real-time market.⁸

The WEIM design includes the RSE, which determines whether BAAs in the WEIM area have sufficient capacity and flexibility to meet forecasted demand and that WEIM base schedules are feasible and balanced. This market feature is intended to ensure that supply cleared in the real-time market results from

⁶ See, *e.g.*, Existing tariff section 34.12.

⁷ Existing tariff sections 31, *et seq.* and 34, *et seq.*; tariff appendix A, existing definition of “CAISO Markets Process.” The day-ahead market includes the market power mitigation process, the integrated forward market (IFM), and the residual unit commitment. Existing tariff section 31. The real-time market includes the hour-ahead scheduling process (HASP), the real-time unit commitment (RTUC), the short-term unit commitment, the fifteen-minute market (FMM), and the real-time dispatch (RTD). Existing tariff section 34. As relevant to this filing, the HASP is a special run of the RTUC through which the CAISO, among other things, accepts or rejects the following bids submitted by scheduling coordinators at scheduling points: self-schedule hourly blocks for energy and ancillary services; variable energy resource self-schedules for energy; economic hourly block bids for energy and ancillary services; and economic hourly block bids with an intra-hour option for energy and providing an hourly schedule that can be changed at most once in the trading hour. Existing tariff section 34.2.1.

⁸ The WEIM was formerly called the energy imbalance market (EIM). That former name is still used in some WEIM-related provisions and defined terms in the existing tariff and in some other documents. Many of the tariff provisions regarding the WEIM are contained in tariff section 29, including provisions on settlements and billing for WEIM market participants (tariff section 29.11) and on operation of the real-time market within the WEIM area (tariff section 29.34).

economic displacement and not inappropriate reliance on transfers from other BAAs in lieu of forward procurement.

The RSE consists of four tests – the feasibility test, balancing test, capacity test, and flexibility test – and associated procedures the CAISO administers in the real-time market.⁹ This filing pertains to the capacity test and the flexibility test.¹⁰ The capacity test assesses whether a WEIM entity has provided incremental bid-in capacity to meet the imbalance between load, intertie, and generation base schedules (or market schedules in the case of the CAISO).¹¹ The flexibility test assesses whether a WEIM entity has sufficient ramping capability from the start of an hour to meet the demand forecast and uncertainty in each of the four 15-minute intervals in that hour.¹² In addition to indicating the sufficiency of resources, the results of the capacity and flexibility tests also inform the procurement of the Flexible Ramping Product by WEIM entities.¹³ WEIM entities that satisfy the RSE are placed into a pool of entities for purposes of procuring flexible ramping capability while WEIM entities that do not satisfy the RSE are evaluated individually. Both tests have a directional component; they separately evaluate sufficiency in the upward direction and the downward direction. A WEIM entity can fail the capacity or flexibility test in one direction and pass the test in the other direction. These tests are intended to encourage all WEIM entities to remain resource-sufficient under a variety of stressed and non-stressed system conditions.¹⁴

The WEIM has included the RSE from the beginning of the market in November 2014. Since that time, the CAISO has worked with stakeholders to

⁹ See existing tariff sections 29.34(j)-(n).

¹⁰ The filing does not propose any changes to the feasibility test or the balancing test.

¹¹ Existing tariff section 29.34(l)

¹² Existing tariff section 29.34(m).

¹³ See existing tariff sections 29.34(n).

¹⁴ The capacity and flexibility tests do not determine if a BAA is able to meet its individual reliability requirements. Instead, they are real-time tests that serve as prerequisites for participation with other BAAs in the WEIM. See existing tariff section 29.34(n); existing tariff appendix B.17, *pro forma* EIM Entity Agreement, sections 2.1 and 3.2.2 (making clear that responsibility for reliability remains with the balancing authorities). Ensuring each BAA meets its reliability requirements is separately addressed by requirements determined by each BAA's applicable regulatory authority and North American Electric Reliability Corporation (NERC) reliability standards, not the WEIM. See *Cal. Indep. Sys. Operator Corp.*, 147 FERC ¶ 61,231, at P 122 (2014).

refine and, as necessary, modify the RSE,¹⁵ including modifications relating to phase 1 of the RSE Enhancements initiative in 2022.¹⁶

B. CAISO Market Scheduling Priorities

Scheduling coordinators can submit economic bids and self-schedules of energy and ancillary services in the CAISO markets, including self-schedules of load, exports, and wheeling through transactions.¹⁷ The CAISO does not use transmission reservations like those used under the Commission's *pro forma* open access transmission tariff (OATT) to manage the priority of schedules to address system constraints. Instead, the CAISO manages schedules on its grid through the day-ahead and real-time markets, and it applies scheduling run priorities defined in its tariff to curtail self-schedules (*i.e.*, price-taker bids) in its markets.¹⁸

The CAISO markets honor self-schedules if there is sufficient generation and transmission capacity to support them. If there is insufficient supply or binding transmission constraints, the CAISO markets will clear by curtailing self-schedules. The market software determines the priority order in which the various self-schedules are curtailed using market parameters known as penalty prices.¹⁹ The CAISO sets these penalty prices to specific values to determine the conditions under which the market may relax a constraint and/or curtail a self-schedule, and establish the market prices when these events happen.²⁰ The

¹⁵ See *Cal. Indep. Sys. Operator Corp.*, 153 FERC ¶ 61,087 (2015); *Cal. Indep. Sys. Operator Corp.*, 156 FERC ¶ 61,226 (2016); *Cal. Indep. Sys. Operator Corp.*, 175 FERC ¶ 61,160 (2021); *Cal. Indep. Sys. Operator Corp.*, 175 FERC ¶ 61,096 (2021); *Cal. Indep. Sys. Operator Corp.*, 181 FERC ¶ 61,034 (2022).

¹⁶ *Cal. Indep. Sys. Operator Corp.*, 179 FERC ¶ 61,151, *order on reh'g*, 180 FERC ¶ 61,101.

¹⁷ Existing tariff section 30, *et seq.* A self-schedule is a market bid a scheduling coordinator submits to the CAISO 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.

¹⁸ The market optimization schedules resources in two successive runs: the scheduling run, which produces resource schedules, followed by the pricing run, which produces locational marginal prices (LMPs). Existing tariff sections 31.3 and 34.4. The day-ahead market scheduling priorities are specified in existing tariff section 31.4, and the real-time market scheduling priorities are specified in tariff section existing 34.12.

¹⁹ Although self-schedules with the same scheduling priority may have the same penalty prices, they may or may not be curtailed equally due to congestion, loss factors, or other reasons.

²⁰ See existing tariff section 27.4.3 *et seq.*; see also business practice manual for market operations, section 6.6.5.

market 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, and 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.²¹

C. Phase 1 of the RSE Enhancements

The CAISO formally commenced the prior phase, Phase 1 of the RSE Enhancements initiative, in June 2021.²² From the summer of 2021 until the spring of 2022, the CAISO and stakeholders developed various refinements to the RSE, which the CAISO submitted to the Commission for approval. The Commission accepted these tariff revisions in 2022.²³

D. Phase 2 of the RSE Enhancements

Phase 2 of the RSE Enhancements initiative identified additional market rule enhancements. Following effectiveness of the Phase 1 enhancements, the CAISO published the first phase 2 straw proposal on July 1, 2022 and held the first stakeholder meeting on July 11, 2022. After reviewing written stakeholder comments on the straw proposal, the CAISO issued a draft final proposal on August 25, 2022, and held another meeting with stakeholders on September 2, 2022. To respond to stakeholder feedback and present compromise positions, the CAISO revised the draft final proposal and published subsequent iterations to reflect the incremental advancements of consensus positions on September 7, 2022; October 3, 2022; November 7, 2022; and December 6, 2022, respectively.²⁴

²¹ See existing tariff sections 27.4.3.2 and 27.4.3.3. The \$1,000/MWh soft energy bid cap represents 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. The \$2,000/MWh hard energy bid cap represents the maximum energy bid price the CAISO will use for purposes of clearing the CAISO market processes with cost verification. See existing tariff sections 30.5.8, 30.7.12, 30.11, 39.6.1.1; tariff appendix A, existing definitions of “Soft Energy Bid Cap” and “Hard Energy Bid Cap.”

²² The record of the entire RSE Enhancements initiative, including all documents posted by the CAISO and submitted by stakeholders, is available at <https://stakeholdercenter.caiso.com/StakeholderInitiatives/EIM-resource-sufficiency-evaluation-enhancements>.

²³ *Cal. Indep. Sys. Operator Corp.*, 179 FERC ¶ 61,151, *order on reh'g*, 180 FERC ¶ 61,101.

²⁴ The Final Proposal, designated as the “Second Revised Final Proposal,” is included as

On September 2, 2022, the CAISO issued draft tariff revisions to implement the Phase 2 Enhancements. The CAISO held a meeting with stakeholders to discuss the tariff revisions on September 15, 2022 and solicited written stakeholder comments. The CAISO issued updated draft tariff revisions on December 12, 2022; solicited written stakeholder comments and met with stakeholders on January 11, 2023; and published the revised tariff language on March 7, 2023 to resolve the issues identified by stakeholders at the January 11, 2023 meeting. The CAISO published a final draft of its tariff language on March 21, 2023.

In addition to feedback from stakeholders, the CAISO received feedback from the Market Surveillance Committee (MSC) on the proposed Phase 2 Enhancements. The MSC discussed these Phase 2 Enhancements at meetings held on September 19 and November 21, 2022.²⁵ On December 6, 2022, the MSC issued its final opinion.²⁶ The MSC supports the Phase 2 Enhancements and has encouraged the CAISO to continue working with stakeholders to address additional RSE-related issues in future initiatives.²⁷ The CAISO Department of Market Monitoring (DMM) also supports the CAISO in completing the Phase 2 Enhancements, subject to certain implementation details.²⁸ The

Attachment D and available on the CAISO website at:

<http://www.caiso.com/InitiativeDocuments/SecondRevisedFinalProposal-WEIMResourceSufficiencyEvaluationEnhancementsPhase2.pdf>.

²⁵ Materials from the MSC meetings are available at <http://www.caiso.com/informed/Pages/BoardCommittees/MarketSurveillanceCommittee/Default.aspx>. The draft opinion of the MSC was published on October 24, 2022 and is available at <http://www.caiso.com/Documents/MSCDraftOpiniononWEIMResourceSufficiencyEvaluationEnhancements-Phase2.pdf> (“Draft MSC Opinion”).

²⁶ The final opinion of the MSC was published on December 11, 2022 and is available at <http://www.caiso.com/Documents/MSCDraftOpiniononResourceSufficiencyEvaluationEnhancementsPhase2.pdf> (“Final MSC Opinion”).

²⁷ See Final MSC Opinion at 17 (“We support the changes being put forward in this proposal.”).

²⁸ The Department of Market Monitoring publishes the comments and reports it provides to the CAISO via its individual website, available at <http://www.caiso.com/market/Pages/MarketMonitoring/MarketMonitoringReportsPresentations/Default.aspx>. As the November 16, 2022 comments provided by the Department of Market Monitoring explain, the Department of Market Monitoring “supports the proposal to exclude low priority exports from the CAISO balancing area from the CAISO area’s test requirements” and believes the assistance energy transfer product is “a reasonable compromise.” See Department of Market Monitoring Comments on WEIM Resource Sufficiency Evaluation Enhancements Phase 2 Revised Final Proposal at p.1, available at: <http://www.caiso.com/Documents/DMM-Comments-WEIM-Resource-Sufficiency-Evaluation-Enhancements-Phase2-Revised-Final-Proposal-2022-11-16.pdf> (“DMM Nov. 16 Comments”).

CAISO Board of Governors and WEIM Governing Body have authorized the CAISO to file tariff revisions to implement the enhancements developed in phase 2 of the RSE Enhancements initiative.²⁹

III. Proposed Tariff Revisions

The CAISO proposes the tariff revisions discussed below to implement Phase 2 of the RSE Enhancements initiative. These enhancements will better enable the CAISO's real-time market to deliver benefits to customers and WEIM participants across the western United States.

A. Allowing Assistance Energy Transfers Through the WEIM if a BAA Fails the Capacity or Flexibility Test Under the RSE

As noted above, under the existing tariff a BAA's failure to ensure sufficient capacity or flexibility is available to meet its needs results in the BAA failing the RSE and being ineligible to receive incremental energy transfers from other BAAs through the WEIM.³⁰ Stakeholders have encouraged the CAISO to explore pathways to allow WEIM members to access additional supply in tight system conditions. In February 2022, the CAISO Board of Governors and WEIM Governing Body provided guidance supporting the consideration of such a mechanism. The new assistance energy tariff provisions have the two main components discussed below: (1) provisions addressing how assistance energy transfers will take place,³¹ and (2) provisions addressing the treatment of assistance energy transfer revenues and charges.³² The assistance energy transfer tariff provisions proposed in this filing will sunset on December 31,

²⁹ Materials related to these approvals by the CAISO Board of Governors and WEIM Governing Body are available at <http://www.caiso.com/informed/Pages/BoardCommittees/Default.aspx>. These materials include a memorandum to the CAISO Board of Governors and WEIM Governing Body dated December 7, 2022 from Anna McKenna, Vice President of Market Policy and Performance (Memorandum); and a PowerPoint presentation to the CAISO Board of Governors and WEIM Governing Body dated December 14, 2022 from Danny Johnson, Market Design Sector Manager, Market Infrastructure Policy (Presentation); both of which are also provided in attachment C to this filing. As explained at page 2 of the Memorandum and slide 2 of the Presentation, approval by the CAISO Board of Governors and WEIM Governing Body was required for the proposed changes described below in sections III.A and III.B of this transmittal letter. Approval of only the CAISO Board of Governors, with advice from the WEIM Governing Body, was required for the proposed changes described below in section III.C of this transmittal letter.

³⁰ See existing tariff section 29.34(l)-(m).

³¹ New tariff section 29.34(n)(3).

³² New tariff section 29.11(t).

2025.³³ The sunset date allows stakeholders to derive immediate value from the interim assistance energy transfer product proposed here while simultaneously working collaboratively through further phase of RSE enhancements or through the EDAM construct to further improve and refine the product.

1. Assistance Energy Transfers through the WEIM

To accommodate situations where a BAA that is otherwise resource sufficient experiences supply constraints, the CAISO proposes to establish a new set of rules to allow a BAA that fails the RSE to elect to receive assistance energy transfers through the WEIM for an additional cost called the EIM Assistance Energy Transfer Surcharge. As opposed to the manual provision of emergency assistance upon the request of a non-CAISO BAA, the assistance energy transfer product leverages a key benefit of the WEIM: the CAISO real-time market's ability to optimally dispatch all of the supply available and provide access to supply that may not otherwise be available in the bilateral market outside of the WEIM.

The CAISO proposes to establish a new set of rules to allow a WEIM BAA that fails the RSE to elect to receive assistance energy transfers through the WEIM, for which the WEIM BAA will pay an additional cost called the EIM Assistance Energy Transfer Surcharge. The EIM Assistance Energy Transfer Surcharge will be in addition to the applicable LMP cleared in the market for assistance energy transfers used to resolve the shortfall. As provided in the newly-proposed Section 29.34(n)(3), a BAA in the EIM area may obtain assistance energy transfers if its scheduling coordinator has submitted to the Master File a designation to accept incremental EIM transfer³⁴ imports and to pay the EIM Assistance Energy Transfer Surcharge following a failure of the capacity test or the flexibility test, in accordance with the timelines and procedures included in the WEIM BPM.³⁵ The CAISO will provide a Market Notice upon its

³³ New tariff section 29.34(n)(3)(C). The CAISO will also complete final settlement and billing of assistance energy transfers. New tariff section 29.11(t)(3).

³⁴ Under the existing tariff, an EIM transfer means the transfer of energy in Real-Time between an EIM entity balancing authority area and the CAISO balancing authority area, or between EIM entity balancing authority areas, using transmission capacity made available to the real-time market through the Energy Imbalance Market. An EIM transfer is not a real-time interchange export schedule or a real-time interchange import schedule. Tariff appendix A, existing definition of "EIM Transfer."

³⁵ New tariff section 29.34(n)(3)(A). In order to ensure the reliability of BAAs that are the source of WEIM transfer energy, the existing WEIM implementation enforces a constraint that does not allow a WEIM BAA to make a net export transfer above its base net transfer at the same time it is subject to system energy-balance constraint relaxation or a dispatch of Available Balancing Capacity. This existing constraint will ensure BAAs cannot provide assistance energy

election into, or out of, assistance energy transfers.³⁶ This opt-in process gives each WEIM BAA the option to cure any resource insufficiencies through relaxing of the binding constraint and allowing access to incremental assistance energy through the WEIM.³⁷ BAAs can also reverse their election through the Master File change process. Upon such election, access to the assistance energy transfer product will enable an otherwise resource sufficient BAA that is temporarily supply constrained to rely on the WEIM's efficient dispatch and resolve its shortfall. Utilizing the WEIM's assistance energy transfer product does not, in any way, prevent or preclude an entity from requesting and receiving emergency assistance from other balancing authorities to address emergency conditions.

Assistance energy transfers to the BAA will be sourced from supply offers voluntarily made into the WEIM. Entities that have opted-in to receive assistance energy transfers following a failure of the upward capacity test or the upward flexibility test will not have their transfers restricted upon such a failure, as they are today, and instead will pay the EIM Assistance Energy Transfer Surcharge for all assistance energy transfers received, as described below. The EIM Assistance Energy Transfer Surcharge will be paid as an incremental cost that is in addition to the applicable LMP cleared in the market for assistance energy transfers. This rate will help ensure BAAs continue to use their best efforts to ensure forward procurement of sufficient supply to meet their load obligations.

The assistance energy transfer product will be available until December 31, 2025, at which time it will expire.³⁸

2. Assistance Energy Transfer Revenue and Surcharges

The EIM Assistance Energy Transfer Surcharge is designed to provide an alternative incentive for WEIM BAAs to meet their resource sufficiency obligations during tight supply conditions while making additional supply available to other BAAs in the WEIM. Given the high costs of shedding load, providing a financial option in lieu of physically restricting WEIM transfers is a broadly-

at the risk of their own reliability.

³⁶ New tariff section 29.34(n)(3)(A).

³⁷ During the stakeholder process, the CAISO evaluated more granular functionalities that could enable entities to opt-in, and opt-out, without providing the advance notice required by the Master File and corollary Market Notice processes. It was determined that a more granular ability to access this functionality could result in strategic decisions to fail the WEIM RSE based on economic arbitrage of the failure consequences. Dynamically toggling a BAA's willingness to increase their reliability through accessing assistance energy transfers is not consistent with the intent of this reliability-based functionality.

³⁸ New tariff section 29.34(n)(C).

supported solution. The CAISO has balanced this solution with the core purpose of the RSE to ensure that WEIM BAAs maintain their individual responsibilities to ensure resource sufficiency. The EIM Assistance Energy Transfer Surcharge provides a signal to encourage BAAs to take all other reasonable measures to ensure their BAA is resource sufficient before utilizing the assistance energy transfer product.

Under the new tariff provisions, a participating BAA in the EIM area that receives assistance energy will pay the EIM Assistance Energy Transfer Surcharge, an after-the-fact charge (*i.e.*, a charge applied after the applicable CAISO market process), of \$1,000/MWh when the market parameters related to the soft energy bid cap are in effect or of \$2,000/MWh when the market parameters related to the hard energy bid cap are in effect.³⁹ This two-level pricing mechanism will allow the EIM Assistance Energy Transfer Surcharge to mirror the level of the soft energy bid cap or the hard energy bid cap, depending on the prevailing system conditions.⁴⁰ Stakeholders agreed the market cap is the appropriate level for the EIM Assistance Energy Transfer Surcharge because it is high enough to encourage EIM Entities to ensure resource sufficiency without assistance energy transfers.

The EIM Assistance Energy Transfer Surcharge (which is expressed in dollars per megawatt-hour) will be multiplied by a megawatt-hour quantity to determine the dollar amount the participating BAA must pay. That megawatt-hour quantity will equal the lower of the following values:

- (i) the quantity of the upward capacity test or the upward flexibility test insufficiency for the EIM Entity BAA, whichever is higher; or
- (ii) the quantity of net EIM transfers into an EIM Entity BAA excluding base transfers identified on all after-the-fact E-tags.⁴¹

The market clearing process will not consider the EIM Assistance Energy Transfer Surcharge. Instead, the market will allow WEIM transfers to occur through the economic displacement the WEIM is designed to facilitate. The EIM

³⁹ Tariff appendix A, new definition of “EIM Assistance Energy Transfer Surcharge.”

⁴⁰ See, e.g., *Cal. Indep. Sys. Operator Corp.*, 175 FERC ¶ 61,076 (2021) (recognizing the CAISO’s approach as tailored to the unique characteristics of the Western Interconnection and a reasonable balance between prices and resource adequacy).

⁴¹ New tariff section 29.11(t)(1)(A). If the lower value is the quantity of net EIM transfers into an EIM Entity BAA, then the quantity will be reduced by the applicable credit. See new tariff section 29.11(t)(1)(A)(ii)(a)-(b). The Upward Available Balancing Capacity will serve as a credit for EIM Entities and the corollary Regulation Up credit for the CAISO. *Id.*

Assistance Energy Transfer Surcharge will apply after-the-fact. The CAISO proposes to use the lower of the two megawatt-hour quantities in the equation described above to apply the EIM Assistance Energy Transfer Surcharge only when necessary.⁴² Doing so will limit a BAA's exposure to the additional cost of assistance energy transfers if such transfers were not needed to resolve a resource insufficiency.

For example, consider a BAA that did not pass the RSE by 100 MW when the evaluation occurred but ultimately in real-time needed only 50 MW of assistance energy transfers to resolve its insufficiency. In this case, the EIM Assistance Energy Transfer Surcharge would be calculated based on the transfers received less any amount of Upward Available Balancing Capacity that was not dispatched.⁴³ For example, if the entity had retained 20 MW of unused Upward Available Balancing Capacity that was not dispatched, then the EIM Assistance Energy Transfer Surcharge would be applied to a 30 MW quantity of transfers. The rationale for reducing the amount of transfers exposed to the EIM Assistance Energy Transfer Surcharge is that the real-time market would likely dispatch the capacity before transfers if the additional costs of assistance energy transfers had been modeled in the market. The CAISO recognizes that BAAs could potentially have incentives to lower their exposure to the EIM Assistance Energy Transfer Surcharge by strategically increasing the quantity of supply designated as Available Balancing Capacity as a means to reduce the EIM Assistance Energy Transfer Surcharge. The CAISO will monitor use of the assistance energy transfer product, as well as the Available Balancing Capacity amounts used to reduce exposure to the EIM Assistance Energy Transfer Surcharge, to ensure that the Available Balancing Capacity is not being used to inappropriately limit exposure to EIM Assistance Energy Transfer Surcharges.

Revenue from the EIM Assistance Energy Transfer Surcharge will be allocated to the entities that passed the RSE and are supplying the assistance energy. The allocation methodology assumes that net exports from BAAs that passed the RSE are the source of the assistance energy transfers such that the revenue from the EIM Assistance Energy Transfer Surcharge will be allocated *pro rata* to all of the other BAAs in the EIM area with net EIM transfers, excluding base transfers, in the export direction if those BAAs passed the upward capacity test and the flexibility test in the RSE.⁴⁴ Allocating the assistance energy transfer

⁴² New tariff section 29.11(t)(1)(A).

⁴³ Available Balancing Capacity is not a concept used for the CAISO BAA. The equivalent corollary will be used to calculate the CAISO BAA credit. See New tariff section 29.11(t)(1)(A)(ii)(b) (providing for the CAISO BAA credit to be calculated based on Regulation Up).

⁴⁴ New tariff section 29.11(t)(1)(B).

revenue to net exporters that have passed the RSE creates an incentive for BAAs to make additional capacity, competitively bid into the market at marginal cost, available to the WEIM.

The revenue from the EIM Assistance Energy Transfer Surcharge will be allocated to net exporters that passed the RSE and distributed to the EIM entity scheduling coordinators for sub-allocation in accordance with the EIM entity's OATT. Assistance energy transfer revenue allocated to the CAISO BAA will be distributed to scheduling coordinators in the CAISO that provide incremental energy.⁴⁵

The EIM Assistance Energy Transfer Surcharge allocated to entities that opted-in to receive assistance energy transfers and failed the RSE will be distributed to the applicable EIM entity scheduling coordinators for sub-allocation in accordance with the applicable OATT.⁴⁶ Any assistance energy transfer surcharges allocated to the CAISO BAA will be sub-allocated within the CAISO based on measured demand, excluding certain categories of demand.⁴⁷ The CAISO's allocation of the surcharge amount to measured demand is consistent with existing provisions for allocating the costs of emergency supply procured outside the WEIM.⁴⁸

⁴⁵ New tariff section 29.11(t)(1)(C). To ensure the revenue is distributed to those scheduling coordinators that are actually providing incremental energy, a scheduling coordinator must have provided incremental energy after netting net of imbalance energy (FMM instructed imbalance energy, RTD instructed imbalance energy, and uninstructed imbalance energy) and excluding non-Participating Load. The existing tariff defines Participating Load as an entity providing curtailable demand, which has undertaken in writing by execution of a Participating Load Agreement to comply with all applicable provisions of the tariff. Tariff appendix A, existing definition of "Participating Load."

⁴⁶ New tariff section 29.11(t)(1)(C).

⁴⁷ New tariff section 29.11(t)(2). Specifically, the excluded demand consists of demand associated with existing transmission contract (ETC) or transmission ownership right (TOR) self-schedules for which a real-time market congestion credit was provided as specified in the tariff, and excluding demand associated with ETC, TOR, or converted right self-schedules for which an IFM congestion credit was provided as specified in the tariff. Regardless of whether a metered subsystem (MSS) operator has elected gross or net settlement, scheduling coordinators for MSS operators will receive their allocation based on the MSS aggregation net non-ETC/TOR measured demand. *Id.*

⁴⁸ See existing tariff sections 11.5.6.2.5.2 (allocation of costs for exceptional dispatches used for emergency conditions and to avoid market disruption and system emergencies) and 11.5.8.1.1 (allocation of costs for emergency assistance, other than exceptional dispatch energy, provided to or by the CAISO).

3. Assistance Energy Transfers are a Voluntary Product

The availability of assistance energy transfers supports real-time reliability, while at the same time incentivizing the BAA to use best efforts to ensure forward procurement of sufficient supply to meet its load obligations. Assistance energy transfers to the receiving BAA will be sourced from supply offers voluntarily made into the WEIM.⁴⁹ Receipt of assistance energy transfers is likewise voluntary. As explained above, WEIM BAAs wishing to receive assistance energy transfers will follow the established practices and procedures to indicate such election through the Master File input process. Likewise, the CAISO will issue a Market Notice to provide transparency when it elects into, and out of, assistance energy transfers.⁵⁰

Each WEIM BAA will determine when it is appropriate for the individual BAA to opt-in, or opt-out, of the assistance energy transfer product. The CAISO will initiate a stakeholder process to revise its existing Energy Imbalance Market Business Practice Manual to specify implementation details for the CAISO BAA, including but not limited to, the boundaries to guide the CAISO BAA's opt-in and opt-out processes. The CAISO will work with its stakeholders to identify the situations where assistance energy transfers from the WEIM will enhance reliability of the CAISO BAA. The Business Practice Manual stakeholder process provides a forum for the CAISO to work with its impacted stakeholders to provide accurate and easily accessible information to support the development of data-driven criteria and aid in achieving a consensus solution that will guide the CAISO's opt-in and opt-out of the assistance energy transfer product. The final published Business Practice Manual will set forth the criteria to guide any decision made by the CAISO to opt-in to the assistance energy transfer product through a Market Notice as specified in the proposed tariff.⁵¹

B. Excluding Obligations of Real-Time Lower-Priority Exports When Performing the CAISO Balancing Authority Area's WEIM Resource Sufficiency Evaluation

To enable the CAISO to provide, and receive, assistance energy transfers that enhance reliability the CAISO proposes an additional change to the RSE

⁴⁹ The Second Revised Final Proposal contains a series of simplified examples showing how the EIM Assistance Energy Transfer Surcharge will be applied. See Attachment D, 23-25.

⁵⁰ New tariff section 29.34(n)(3)(A).

⁵¹ New tariff section 29.34(n)(3)(B). All entities, including the CAISO, will be defaulted to an "opt-out" selection that will remain until the EIM Entity elects to opt-in pursuant to the process and procedures set forth in the Business Practice Manual.

calculations for the CAISO BAA. The CAISO proposes to revise one aspect of the RSE capacity and flexibility tests set forth in the existing tariff to exclude from the calculation the effect of the obligation associated with real-time LPT exports that are otherwise available to meet CAISO's load obligations in real-time.⁵²

Under this revision, when calculating the upward capacity and flexibility components of the CAISO BAA's resource sufficiency obligation, the RSE will no longer include in its tests the obligations associated with curtailable real-time LPT exports. Including the obligation associated with LPT exports has caused the CAISO not to meet the RSE when it otherwise would have done so, and reflecting the benefit of the exclusion of curtailable real-time LPT exports in the CAISO's RSE calculations increases the accuracy of the evaluation.

Under the existing WEIM RSE design, obligations associated with LPT exports that have cleared HASP are added to the CAISO BAA's WEIM RSE obligation even though such supply is available to meet the CAISO's needs in real-time. This asymmetry can cause the CAISO to not meet its RSE obligations even when it has sufficient supply because the RSE does not account for the WEIM energy transfers into the CAISO as available supply but does account for the demand obligations of the real-time curtailable LPT exports. To resolve this asymmetry, the CAISO is proposing to exclude the obligation associated with curtailable real-time LPT exports from the CAISO's RSE and reflect the benefit of that exclusion in the CAISO's BAA upward capacity and flexibility tests. The asymmetry of treatment related to real-time curtailable LPT exports impacts only the CAISO's obligations. The reason for this difference is WEIM BAAs have the ability to schedule exports they know can be supported by their own resources, but exports from the CAISO BAA are scheduled through a market clearing process.

As the MSC explained, "the CAISO should not fail the RSE as a result of lower priority exports supported by EIM transfers."⁵³ For example, assume the CAISO BAA should pass the RSE because it has 42,000 MW of supply to meet 42,000 MW of forecast demand, and further assume the real-time market clears 1,000 MW of lower-priority exports based on 1,000 MW of WEIM transfers into the CAISO. Under the existing tariff, the CAISO BAA would fail the RSE because the RSE would calculate the CAISO BAA as having only 42,000 MW of supply to meet 43,000 MW of demand, which includes the 1,000 MW of lower-priority exports represented as a demand obligation the CAISO supply must meet. With the implementation of the tariff change proposed in this filing, the

⁵² The priority order of LPT exports is discussed *infra* Section III.C.

⁵³ MSC Final Opinion at 6; see *also id.* at 8-11 (explaining that the existing tariff creates the potential for the CAISO to fail the resource sufficiency evaluation because HASP exports are counted as load while the expected EIM transfer imports are not counted as supply and evaluating potential solutions to the identified problem).

RSE would correctly show the CAISO BAA as having 42,000 MW of supply to meet 42,000 MW of demand. This asymmetry issue does not exist for the other BAAs because the real-time market does not schedule non-WEIM exports from those other BAAs. Instead, each BAA determines whether it has sufficient internal capacity to support exports before it schedules the exports.

To mitigate the identified risk that can cause CAISO to fail the RSE even though it has sufficient supply, the CAISO worked with its stakeholders to resolve the asymmetry. Through the Phase 2 Initiative, the CAISO explored a variety of options, but stakeholders and the MSC generally agreed that the most effective means to address the asymmetry is a tariff change to exclude the obligations associated with curtailable real-time LPT exports when performing the RSE calculations for the CAISO BAA. The tariff revisions proposed through this filing leave in place the current rule that LPT exports to receiving WEIM BAAs count as supply towards meeting their RSE obligations. This is appropriate because such LPT exports will be available unless manual operator curtailment is initiated. Stakeholders generally support the tariff change the CAISO proposes to address this issue.⁵⁴

C. Clarifying Scheduling Priorities and Tagging Obligations for LPT Exports

The CAISO manages schedules on its grid through its markets by applying the scheduling priorities defined in its tariff to curtail self-schedules (*i.e.*, price-taker bids) in those markets.⁵⁵ When there is insufficient transmission capacity to support all transactions, the CAISO's market software determines the priority order in which schedules will be curtailed and provides the CAISO with the means to preserve its access to resource adequacy capacity on its system during stressed system conditions. To protect the CAISO's native load when the system is constrained, the tariff establishes a tiered priority structure to manage exports from the CAISO system. This structure grants priority exports (PT exports) the same priority as the CAISO's own native load and places lower-priority exports (LPT exports) at a lower priority than the CAISO's own native load.⁵⁶ LPT exports deemed feasible and cleared through the Hour-Ahead

⁵⁴ The MSC supports the proposed change because it clearly constitutes an improvement to the RSE relative to current practice, but the MSC believes more attention should be given to the ability for sink BAAs to continue to count non-firm supply for meeting their RSE obligations, as well as to the use of load conformance by CAISO operations personnel. The CAISO commits to discuss these issues in the subsequent RSE stakeholder processes.

⁵⁵ Existing tariff sections 31.4 (scheduling priorities for the day-ahead market) and 34.12 (scheduling priorities for the real-time market).

⁵⁶ See, *e.g.*, *Cal. Indep. Sys. Operator Corp.* 175 FERC ¶ 61,245 (2021) (accepting tariff

Scheduling Process (HASP) receive a higher priority than LPT exports submitted into the real-time market.⁵⁷

To support the effective implementation of the existing priority order, the CAISO proposes amendments to Section 34.12.4 to clarify the scheduling and tagging protocols for these exports. Hourly block schedules that clear the HASP are not re-optimized by the FMM or five-minute dispatch processes in the real-time market. This means that adjustments must be made manually, but the CAISO does not currently have effective and efficient tools to effectuate such adjustments. Proposed subsection 34.12.4 is designed to provide visibility and clarity into how the CAISO will manually curtail LPT exports following completion of the HASP should stressed system conditions required such action. The proposed revisions would effectuate curtailment of LPT and PT exports in the following order:

1. First, Real-Time economic hourly block schedules;
2. Second, Real-Time Self-Schedule hourly block export schedules not backed by Generation from non-Resource Adequacy Capacity, and
3. Last, Day-Ahead hourly block export schedules not backed by Generation from non-Resource Adequacy Capacity.

This subsection is consistent with the CAISO's existing authority to apply the scheduling priorities through its market optimization and simply clarifies how manual curtailment will be applied to such exports. As explained above, cleared HASP hourly block schedules cannot be adjusted in subsequent runs of the real-time market. Because such schedules are only optimized in HASP, adjustments to PT or LPT schedules must be made manually by the operators.

CAISO operators will continue to exercise judgment to maintain reliable grid operations and fulfill the CAISO's obligations to neighboring BAAs in accordance with NERC reliability requirements.⁵⁸ The CAISO is merely

revisions that balance the reliability of serving native load with the reliability of export and wheeling through transactions, while providing open access to the CAISO system).

⁵⁷ *Id.*

⁵⁸ See existing tariff section 34.12.2 (stating that "dispatch priorities as defined in the RTM [real-time market] optimization may be superseded by operator actions and procedures as necessary to ensure reliable operations"). See also *Cal. Indep. Sys. Operator Corp.*, 166 FERC ¶ 61,138, at P 24 (2019) ("We find that operators in the CAISO and EIM entity balancing authority areas should have the ability to manually adjust load forecasts in the real-time market when necessary to maintain system reliability and keep the system in balance.").

proposing to clarify that operator adjustments made after HASP will be made consistent with existing market scheduling priority order. To facilitate such action, proposed Section 34.12.4 requires compliance with the E-tag protocols set forth in the Business Practice Manuals. Use of a standard E-tagging protocol will (1) give visibility to CAISO operators and other BAAs regarding the lower priority of these exports (compared to higher priority exports that are supported by designated non-resource adequacy resources serving external load) and their greater risk of curtailment and (2) facilitate operators' ability to curtail LPT exports manually, if necessary. Absent this identification requirement, operators are not able to distinguish easily the LPT and PT exports. For practical purposes, lack of a standard identification for such exports has prevented CAISO operators from curtailing LPT exports manually after HASP even though the CAISO has the authority. The clarifying amendments proposed in Section 34.12.4 were included within the Phase 2 Enhancements as a means to facilitate effective implementation of the existing priority order and remove confusion regarding the scheduling and tagging protocols for these exports.

D. Synchronizing the Flexible Ramping Product and the RSE

In September 2016, the Commission accepted the CAISO's tariff revisions to deploy the Flexible Ramping Product in all of its real-time market processes, including the WEIM.⁵⁹ Recently, the Commission approved enhancements to the Flexible Ramping Product and the CAISO deployed these enhancements on February 1, 2023.⁶⁰ Under this revised structure, WEIM entities that pass the RSE are pooled together into Flexible Ramp Up (FRU) and Flexible Ramp Down (FRD) groups to determine their Uncertainty Requirements. WEIM entities that do not pass the RSE are evaluated individually.

The CAISO models flexible ramping requirements through the existing Real-Time Unit Commitment (RTUC) processes, with RTUC performing its final optimization for the first fifteen-minute interval of the operating hour 37.5 minutes before the operating hour begins. RSE evaluations are performed for WEIM BAAs at 75 minutes, 55 minutes, and 40 minutes before the operating hour.⁶¹ To allow the RTUC to optimize procurement of flexible ramping capability during the first fifteen-minute interval of the operating hour the RTUC utilizes the RSE results published 55 minutes before the operating hour. RTUC will utilize the RSE results published 40 minutes before the operating hour to optimize

⁵⁹ *Cal. Indep. Sys. Operator Corp.*, 156 FERC ¶ 61,226 (2016).

⁶⁰ *Letter Order*, Docket No. ER22-2261 (Oct. 18, 2022); *see also* CAISO Notification of Effective Date, Docket No. ER22-2261 (Feb. 2, 2023).

⁶¹ *See* existing tariff section 29.34(f)(1)(a)-(c).

procurement of flexible ramping capability in the remaining three intervals of the hour.

The proposed revisions to Section 29.34(n)(1) and (2) clarify the inputs used to determine whether to pool WEIM entities in the first interval of each hour or consider them individually for purposes of flexible ramping requirements. The revised tariff specifies that during the first interval of each hour (e.g. 11:00-11:15), the CAISO will utilize the RSE results published 55 minutes before the operating hour to establish the WEIM BAAs' Uncertainty Requirements. In the remaining intervals (e.g. 11:15-11:59), the CAISO will continue to provide the fifteen-minute cure period and will utilize the RSE results published 40 minutes before the operating hour when establishing the WEIM BAAs' Uncertainty Requirements.

E. Stakeholder Engagement

Stakeholders had requested that the CAISO develop a mechanism for providing assistance energy to WEIM BAAs that do not pass the RSE as an alternative to the current regime where such entities' transfers are limited. In February 2022, the CAISO Board of Governors and WEIM Governing Body provided guidance supporting the consideration of such a mechanism. In the ensuing months, the CAISO developed an initial straw proposal in furtherance of such direction and began receiving stakeholder feedback in July 2022. Since that time, CAISO has published iterative proposals that incorporate stakeholder feedback and revisions and has worked to achieve acceptable compromise positions where stakeholders were not in uniform agreement.

Most stakeholders support revising the tariff to allow the provision of WEIM assistance energy to a BAA that fails the RSE. While some stakeholders disagree about the need for an assistance energy transfer arrangement, other stakeholders strongly supported implementing rule changes for WEIM assistance energy by summer 2023. All stakeholders agree that further work is needed to continue consensus building in order to achieve an assistance energy transfer priced through the market as opposed to an administrative price. Stakeholders recognize that the proposed design is an interim measure that increases reliability, with the sunset date will serve to drive parties to work towards developing an in-market solution to procure assistance energy transfers before December 31, 2025.

Some stakeholders oppose the assistance energy tariff provisions being applied after-the-fact, rather than being applied to real-time imbalance energy prices. The CAISO believes that the assistance energy tariff provisions as proposed in this filing will provide substantial benefits to WEIM BAAs and ultimately to consumers. While improvements and refinements will be explored through the course of subsequent enhancements, the initial product is an approach the CAISO can implement more readily to address the identified

challenges of not accessing incremental WEIM transfers during periods of tight supply.

Most stakeholders support, or do not oppose, excluding the obligations associated with real-time LPT exports from the CAISO RSE calculations. The CAISO is discussing with a small subset of stakeholders that have concerns that the CAISO's E-tagging protocol to identify the LPT exports may be challenging if the receiving BAA has unique protocols whereby it will only accept E-tags associated with certain types of transactions. WECC expressly acknowledges and accommodates the use of additional types of transactions (*e.g.*, Firm Provisional Energy), and the CAISO intends to work with its stakeholders through the BPM process to develop tagging protocol that minimizes impact in the event a Balancing Authority Area has not yet established its practices to accept all WECC transactions. The CAISO also notes that it requested stakeholders to identify alternative frameworks the CAISO could use to identify real-time LPT exports, and stakeholders generally agreed that the use of E-tags was the most viable solution subject to developing protocols to minimize impact on receiving BAAs. The CAISO recognizes that some BAAs may need to adopt practices and procedures to accept schedules that use certain e-tag designations for firm provisional energy. The CAISO will work with impacted BAAs and their associated technology providers to ensure all BAAs continue to accept schedules from the CAISO even if such schedules include a designation to reflect their LPT status.

IV. Effective Date

The CAISO respectfully requests the Commission issue an order by May 31, 2023 that accepts the proposed tariff revisions in this filing on or about June 1, 2023. The CAISO is targeting implementation of the proposed revisions by June 1, 2023, but due to enterprise resource demands in implementation of numerous projects, final implementation of all Phase 2 enhancements may not occur by June 1, 2023. For this reason, the CAISO further requests authorization to inform the Commission of the actual effective date of the tariff changes pursuant to a subsequent filing within five business days following implementation if the implementation is delayed beyond June 1, 2023. This is consistent with Commission precedent recognizing that the actual

implementation date of some market rule changes can depend on many variables that cannot be fully predicted in advance.⁶²

V. Communications

Correspondence and other communications regarding this filing should be directed to:

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VI. Service

The CAISO has served copies of this filing on the California Public Utilities Commission, 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.

VII. Contents of filing

In addition to this transmittal letter, this filing includes the following attachments:

Attachment A	Clean CAISO tariff sheets incorporating this tariff amendment
Attachment B	Red-lined document showing the revisions in this tariff amendment

⁶² 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.

- Attachment C Memorandum to the CAISO Board of Governors and the WEIM Governing Body, and PowerPoint Presentation to the CAISO Board of Governors and the WEIM Governing Body
- Attachment D Final Proposal for WEIM Resource Sufficiency Evaluation Enhancements Phase 2

VIII. Conclusion

For the reasons set forth in this filing, the CAISO respectfully requests the Commission issue an order on or before May 31, 2023 accepting the proposed tariff revisions on or about June 1, 2023.

Respectfully submitted,

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Attachment A – Clean Tariff

Tariff Amendment – Resource Sufficiency Evaluation – Phase 2

California Independent System Operator Corporation

March 31, 2023

29.11 Settlements and Billing for EIM Market Participants.

* * * * *

(t) **Revenue and Surcharges for the Assistance Energy Transfer Product.**

The revenue from assistance Energy transfers paid by a participating Balancing Authority Area in the EIM Area that has elected to receive assistance Energy in accordance with Section 29.34(n)(3), *i.e.*, the EIM Assistance Energy Transfer Surcharge, will be calculated, allocated and distributed as follows—

(1) **Assistance Energy Transfer Surcharge.**

(A) **Calculation.** If a Balancing Authority Area in the EIM Area receives an assistance Energy transfer, then the EIM Assistance Energy Transfer Surcharge will apply to the lower of the quantities specified in Section 29.11(t)(1)(A)(i) or (ii):

(i) the higher of the quantity of the failure of the upward capacity test in Section 29.34(l) or the upward flexibility test in Section 29.34(m), or

(ii) the quantity of net EIM Transfers excluding base scheduled transfers as identified on all after-the-fact E-Tags associated with EIM Transfers into the participating Balancing Authority Area.

(a) If the EIM Assistance Energy Transfer Surcharge is applied to the assistance Energy transfers received by an EIM Entity pursuant to Section 29.11(t)(1)(A)(ii), then the quantity of EIM Transfers subject to the EIM Assistance Energy Transfer Surcharge will be adjusted to reflect the EIM Upward Available Balancing Capacity as a credit.

(b) If the EIM Assistance Energy Transfer Surcharge is applied to the assistance Energy transfers received by

the CAISO pursuant to Section 29.11(t)(1)(A)(ii), then the quantity of EIM Transfers subject to the EIM Assistance Energy Transfer Surcharge will be adjusted to reflect the sum of all Regulation Up (adjusted for Regulation non-compliance quantities) within the CAISO Balancing Authority Area as a credit.

- (B) **Allocation.** The revenue collected through the EIM Assistance Energy Transfer Surcharge from participating Balancing Authority Areas in the EIM Area that fail the upward capacity test in Section 29.34(l) or the upward flexibility test in Section 29.34(m) will be allocated, pro rata, to all other Balancing Authority Areas in the EIM Area with net EIM Transfers, excluding base scheduled transfers, in the export direction if such Balancing Authority Areas passed the upward capacity test in Section 29.34(l) and the upward flexibility test in Section 29.34(m). A Balancing Authority Area is eligible for a revenue allocation even if it has not elected to receive assistance Energy transfers.
- (C) **Distribution.** The revenue collected through the EIM Assistance Energy Transfer Surcharge will be allocated to the net exporting Balancing Authority Areas in the EIM Area that pass the upward capacity test in Section 29.34(l) and the upward flexibility test in Section 29.34(m) in accordance with Section 29.11(t)(2) will be distributed as follows:
- (1) to the EIM Entity Scheduling Coordinators for sub-allocation according to its OATT, or
 - (2) to the CAISO for sub-allocation to Scheduling Coordinators that provide incremental Energy net of

FMM Instructed Imbalance Energy, RTD Instructed Imbalance Energy, and Uninstructed Imbalance Energy excluding non-Participating Load.

(2) Assistance Energy Transfer Surcharges.

(A) Any assistance Energy transfer surcharges allocated to the net importing Balancing Authority Areas in the EIM Area that fail the upward capacity test in Section 29.34(l) or the upward flexibility test in Section 29.34(m) will be allocated to the EIM Entity Scheduling Coordinator for sub-allocation according to its OATT. Any assistance Energy transfer charges allocated to the CAISO Balancing Authority Area will be sub-allocated based on Measured Demand, excluding Demand associated with ETC or TOR Self-Schedules for which a RTM Congestion Credit was provided as specified in Section 11.5.7, and excluding Demand associated with ETC, Converted Right, or TOR Self-Schedules for which an IFM Congestion Credit was provided as specified in Section 11.2.1.5; regardless of whether an MSS Operator has elected gross or net Settlement, Scheduling Coordinators for MSS Operators will receive their allocation based on the MSS Aggregation Net Non-ETC/TOR Measured Demand.

(3) Applicable Period for Assistance Energy Transfer Surcharges and Distribution of Collected Amounts. Upon termination of the assistance Energy transfer product as provided in Section 29.34(n)(3)(C), and final Settlement and Billing for the assistance Energy transfer product, this Section 29.11(t) will terminate.

* * * * *

29.34 EIM Operations

* * * * *

(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.

(2) **Supply and Demand Forecast.** Conditions and actions in the Real-Time Market will affect what Supply will be counted and what Demand Forecast will be referenced in the capacity test performed in accordance with this Section 29.34(l) and, in some cases as noted below, both this capacity test and the flexibility test performed in accordance with Section 29.34(m).

(A) For purposes of this Section 29.34(l) and also for purposes of Section 29.34(m) with respect to Sections 29.34(l)(2)(A)(iii) and 29.34(l)(2)(A)(iv), Supply counted in the capacity test will also include—

(i) a Short Start Unit with a Bid in the RTM through the upcoming hour that is offline in the last fifteen minute interval before the hour under evaluation provided the Short Start Unit has remaining Start-Ups in the day including the hour under evaluation;

(ii) a Multi-Stage Generating Resource configuration that can reach another configuration within the timeframe for it to be counted as available in accordance with Section 29.34(l)(1)(A)(i), provided the resource has remaining in-state transitions to that MSG Configuration in the day including the hour under evaluation;

(iii) a Multi-Stage Generating Resource transitioning between MSG

Configurations or a Short Start Unit moving through a Forbidden Operating Region in the hour under evaluation, in both the capacity test and the flexibility test performed in accordance with Section 29.34(m); or

- (iv) a Non-Generator Resource or storage device maximum and minimum output in the hour under evaluation based upon its State of Charge as monitored by the CAISO in the last fifteen minute interval before the hour under evaluation, and its Bids to charge or discharge Energy in the hour under evaluation, in both the capacity test and the flexibility test performed in accordance with Section 29.34(m).

(B) For purposes of this Section 29.34(l) and also for purposes of Section 29.34(m) with respect to Section 29.34(l)(2)(B)(iii), Supply counted in the capacity test will not include—

- (i) a Short Start Unit with a Bid in the RTM which received a Start-Up Instruction before the hour under evaluation and has failed to initiate Start-Up;
- (ii) a Short Start Unit that is on Outage during the hour under evaluation or has returned from an Outage but is unable to Start-Up within the hour under evaluation; or
- (iii) an Import Bid or Export Bid for delivery to or export from the CAISO Balancing Authority Area without a transmission profile in a submitted E-Tag that supports its Interchange Schedule by T-40, in both the capacity test and the flexibility test for the CAISO Balancing Authority Area performed in accordance with Section 29.34(m).

(C) Supply from a resource counted in accordance with Section 29.34(l)(2)(A)(i) may be adjusted by the CAISO in accordance with the

timelines and procedures provided in the Business Practice Manual for the Energy Imbalance Market to address significant overcounting of Supply available to the Real-Time Market, provided that the overcounting has been identified, supported with analysis and documented by the CAISO.

(D) Demand response under a demand response program administered in an EIM Entity Balancing Authority Area that does not otherwise qualify as an EIM Resource, *i.e.*, count as Supply, may be accounted for through a corresponding EIM Entity adjustment to their Demand Forecast, which will then be referenced in the capacity test performed in accordance with this Section 29.34(l), the flexibility test performed in accordance with Section 29.34(m), and the balancing test performed in accordance with Section 29.34(k), provided the EIM Entity submits an attestation to the CAISO in accordance with the procedures and timelines in the Business Practice Manual for the Energy Imbalance Market that certifies adjustments made to its Demand Forecast will correspond to expected increases or reductions in demand provided by the demand response.

(3) **Insufficient Supply.** An EIM Resource Plan or the CAISO equivalent, as applicable and as detailed in Business Practice Manuals, shall be deemed to have insufficient Supply to pass the capacity test if—

(A) the sum of EIM Base Schedules of Supply and the sum of the incremental or decremental offers in the Energy Bid range from EIM Participating Resources above or below their EIM Base Schedules, including Interchange with other Balancing Authority Areas, is not sufficient to meet the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority, and

(B) the sum of Supply and the sum of the incremental or decremental offers

in the Energy Bid range above or below the RUC Schedules, the HASP Advisory Schedules and HASP Intertie Block Schedules or the FMM Schedules is not sufficient to meet the total Demand Forecast for the CAISO Balancing Authority Area, 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.

(m) **EIM Resource Sufficiency Evaluation – Flexibility Test.**

(1) **Review.**

(A) **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).

(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), provided that the benefit of the exclusion of

export schedules which may be curtailed in accordance with Section 34.12.4(a) or 34.12.4(b) will be reflected in the results of the upward flexibility test for the CAISO Balancing Authority Area.

(C) **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 Benefit.** The CAISO will calculate separately the upward and downward EIM diversity benefit 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.

(3) **Effects of EIM Diversity Benefit.** For each Balancing Authority Area in the EIM 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) **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.

- (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.**

- (1) **Insufficient Capacity.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules as provided in Section 29.34(f)(1)(c), the EIM Resource Plan or the CAISO equivalent has insufficient Supply as determined according to Section 29.34(l) -

(A) the CAISO will not include the EIM Entity Balancing Authority Area or the CAISO Balancing Authority Area in the Uncertainty Requirement of the EIM Area; and

(B) the CAISO will hold the EIM Transfer limit into or from the EIM Entity Balancing Authority Area or the CAISO Balancing Authority Area, as specified in Section 29.34(n)(2), at the less restrictive of the value for the last 15-minute interval with sufficient Supply or the hourly Real-Time EIM Base Schedule corresponding to the 15-minute interval with insufficient Supply.

(C) To facilitate procurement of the Flexible Ramping Product within the existing RTUC processes and along the time intervals for RTUC runs set forth in Section 34.3.1 and further explained in the Business Practice Manual for Market Operations, and solely for the purpose of this subsection 29.34(n)(1), the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules to allow for procurement of the Flexible Ramping Product for the first fifteen-minute interval of each hour

will be that provided in Section 29.34(f)(1)(B) and the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules to allow for procurement of the Flexible Ramping Product for the remaining intervals of each hour will be that provided in Section 29.34(f)(1)(C).

- (2) **Insufficient Flexible Ramping Capacity.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules or the CAISO equivalent as provided in Section 29.34(f)(1)(c), the CAISO determines -
- (A) that an EIM Entity Balancing Authority Area or the CAISO Balancing Authority Area has insufficient upward Ramping capacity according to Section 29.34(m), the CAISO will take the actions described in Section 29.34(n)(1)(A) and (B) in the upward and into the EIM Entity BAA or CAISO BAA direction; and
 - (B) that an EIM Entity Balancing Authority Area or the CAISO Balancing Authority Area has insufficient downward Ramping capacity according to Section 29.34(m), the CAISO will take the actions described in Section 29.34(n)(1)(A) and (B) in the downward and from the EIM Entity BAA or CAISO BAA direction.
 - (C) To facilitate procurement of the Flexible Ramping Product within the existing RTUC processes and along the time intervals for RTUC runs set forth in Section 34.3.1 and further explained in the Business Practice Manual for Market Operations, and solely for the purpose of this subsection 29.34(n)(2), the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules to allow for procurement of the Flexible Ramping Product for the first fifteen-minute interval of each hour will be that provided in Section 29.34(f)(1)(B) and the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules to allow for procurement of the Flexible Ramping Product for the remaining intervals of each hour will be that provided in Section 29.34(f)(1)(C).

(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) **Sunset Period.** This tariff Section 29.34(n), together with Section 29.11(t), will terminate on December 31, 2025.

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34.12 CAISO Market Adjustment To Non-Priced Quantities In The RTM

All Self-Schedules are respected by the SCED and SCUC to the maximum extent possible and are protected from curtailment in the Congestion Management process to the extent that there are effective Economic Bids that can relieve Congestion. If all Effective Economic Bids for the RTM are exhausted, all Self-Schedules between the Minimum Load and the lowest Energy level of the first Energy Bid point will be subject to uneconomic adjustments based on assigned scheduling priorities. This functionality of the optimization software is implemented through the setting of scheduling parameters as described in Section 27.4.3 and specified in Section 27.4.3.1 and the BPMs. Through this process, imports and exports may be reduced to zero, Demand may be reduced to zero, and Generation may be reduced to a lower operating limit (or Regulation Limit) (or to a lower Regulation Limit plus any qualified Regulation Down Award or Self-Provided Ancillary Services, if applicable). Any Self-Schedules below the Minimum Load level are treated as fixed Self-Schedules and are not subject to uneconomic adjustments for Congestion Management but may be subject to decommitment via an Exceptional Dispatch if necessary as a last resort to relieve Congestion that could not otherwise be managed.

34.12.1 Increasing Supply

The scheduling priorities as defined in the RTM optimization to meet the need for increasing Supply as reflected from higher to lower priority are as follows:

Scheduling Run Priority	Scheduling Parameters Under Soft Energy Bid Cap (27.4.3.2)	Scheduling Parameters Under Hard Energy Bid Cap (27.4.3.3)
CAISO Forecast of CAISO Demand; the export Self-Schedule of a Priority Wheeling Through; exports explicitly identified in a Resource Adequacy Plan backed by Resource Adequacy Capacity explicitly identified and linked in a Supply Plan to the exports; or Self-Schedules for exports at Scheduling Points backed by Generation from non-Resource Adequacy Capacity or from non-	\$1450	\$2900

RUC Capacity		
RUC Schedules that are Self-Schedules of exports at Scheduling Points not backed by Generation from non-Resource Adequacy Capacity, or the RUC Schedules that are the export Self-Schedules of non-Priority Wheeling Throughs	\$1250	\$2500
Real-Time Market Self-Schedules of exports at Scheduling Points not backed by Generation from non-Resource Adequacy Capacity or non-RUC capacity, or the Real-Time Market Self-Schedules that are the export Self-Schedules of a non-Priority Wheeling Through	\$1150	\$2300
Contingency Only Operating Reserve if activated by Operator to provide Energy (as indicated by the Contingency Flag and the Contingency condition)	\$1000	\$2000

34.12.2 Decreasing Supply

The scheduling priorities as defined in the RTM optimization to meet the need for decreasing Supply as reflected from higher to lower priority are as follows:

Scheduling Run Priority	<u>Scheduling Parameters Under Soft Energy Bid Cap (27.4.3.2)</u>	<u>Scheduling Parameters Under Hard Energy Bid Cap (27.4.3.3)</u>
Non-Participating Load increase	Not Applicable	Not Applicable
Reliability Must Run (RMR) Schedule (Day-Ahead manual pre-dispatch or Manual RMR Dispatches or Dispatches that are flagged as RMR Dispatches following the MPM, for Legacy RMR Units and Exceptional Dispatch for RMR Resources process)	-\$6000	-\$12000
Transmission Ownership Right (TOR) Self-Schedule	-\$5900	-\$11800
Existing Rights (ETC) Self-Schedule	-\$5100 to -\$5900	-\$10200 to -\$11800
Regulatory Must-Run and Regulatory Must-Take (RMT) Self-Schedule;	-\$1400	-\$2800
Participating Load increase	Not Applicable	Not Applicable
Day-Ahead Supply Schedule	-\$1200	-\$2400

Self-Schedule Hourly Block	-\$1100	-\$2200
Import Self-Schedule of a non-Priority Wheeling Through	\$0	\$0

These dispatch priorities as defined in the RTM optimization may be superseded by operator actions and procedures as necessary to ensure reliable operations.

34.12.3

In the event an Intertie is constrained in the import direction by a scheduling limit or Path 26 is constrained in the north-south direction, when HASP cannot meet CAISO Forecast of CAISO Demand or fully accommodate a Priority Wheeling Through transaction, the CAISO will perform a post-HASP process to pro rata allocate available transmission capacity between Load and CAISO Balancing Authority Area and Priority Wheel Through transactions, as described in the Business Practice Manual. The pro rata share of Load within the CAISO Balancing Authority Area will be based on the lower of each applicable Resource Adequacy Resource's Real-Time Energy Bid quantity or its shown Resource Adequacy Capacity. The Priority Wheeling Through pro rata share for each Self-Schedule will be based on the lowest of (1) 110 percent of the submitted Day-Ahead Market Self-Schedule of the Priority Wheeling Through transaction, (2) the submitted Real-Time Market Self-Schedule of the Priority Wheeling Through transaction, or (3) the Priority Wheeling Through quantity requested 45-days in advance of the month. The available transmission capacity the CAISO awards to Priority Wheeling Through transactions in the post-HASP process cannot exceed the Priority Wheeling Through quantity the CAISO calculates in this pro rata allocation. Energy scheduled via the post-HASP process will be settled as Exceptional Dispatch Energy pursuant to Section 11.5.6.1, as applicable.

34.12.4

At its sole discretion, the CAISO may, after HASP, apply the market scheduling run priorities in Section 34.12.1 through manual operator intervention to curtail lower priority HASP hourly block export schedules even before the CAISO Balancing Authority Area is in an energy emergency alert. When the CAISO is in an emergency alert level 3 (EEA 3), subject to operator judgement and consistent with good utility practice, it will curtail in accordance with the priority specified below to prevent the need to arm Load, or reduce the amount of Load that is armed, and meet its operating reserve obligations. For purposes of

this section, the CAISO would curtail lower priority exports in the following order:

- (a) Real-Time economic hourly block export schedules that cleared HASP,
- (b) Real-Time Self-Schedule hourly block export schedules not backed by Generation from non-Resource Adequacy Capacity and cleared HASP, then
- (c) Day-Ahead hourly block export schedules not backed by Generation from non-Resource Adequacy Capacity that also cleared HASP.

To accommodate curtailment of lower priority exports in the order set forth above, the CAISO will consider any schedule to export energy, other than an export backed by Generation from non-Resource Adequacy Capacity, as firm provisional energy. A Scheduling Coordinator's failure to comply with the tagging requirements specified in the Business Practice Manual for any export schedule other than an export backed by Generation from non-Resource Adequacy Capacity will result in a default to the priority specified in (a) above (e.g., will be curtailed in the same tranche as the Real-Time economic hourly block export schedules that cleared HASP).

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APPENDIX A

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- EIM Assistance Energy Transfer Surcharge

An after-the-fact charge of \$1,000/MWh when the Soft Energy Bid Cap is in effect that will increase to \$2,000/MWh when the Hard Energy Bid Cap is in effect and is paid by a participating Balancing Authority Area in the EIM Area pursuant to Section 29.11(t)(1)(A).

Attachment B – Marked Tariff

Tariff Amendment – Resource Sufficiency Evaluation – Phase 2

California Independent System Operator Corporation

March 31, 2023

29.11 Settlements and Billing for EIM Market Participants.

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(t) Revenue and Surcharges for the Assistance Energy Transfer Product.

The revenue from assistance Energy transfers paid by a participating Balancing Authority Area in the EIM Area that has elected to receive assistance Energy in accordance with Section 29.34(n)(3), i.e., the EIM Assistance Energy Transfer Surcharge, will be calculated, allocated and distributed as follows—

(1) Assistance Energy Transfer Surcharge.

(A) Calculation. If a Balancing Authority Area in the EIM Area receives an assistance Energy transfer, then the EIM Assistance Energy Transfer Surcharge will apply to the lower of the quantities specified in Section 29.11(t)(1)(A)(i) or (ii):

(i) the higher of the quantity of the failure of the upward capacity test in Section 29.34(l) or the upward flexibility test in Section 29.34(m), or

(ii) the quantity of net EIM Transfers excluding base scheduled transfers as identified on all after-the-fact E-Tags associated with EIM Transfers into the participating Balancing Authority Area.

(a) If the EIM Assistance Energy Transfer Surcharge is applied to the assistance Energy transfers received by an EIM Entity pursuant to Section 29.11(t)(1)(A)(ii), then the quantity of EIM Transfers subject to the EIM Assistance Energy Transfer Surcharge will be adjusted to reflect the EIM Upward Available Balancing Capacity as a credit.

(b) If the EIM Assistance Energy Transfer Surcharge is applied to the assistance Energy transfers received by

the CAISO pursuant to Section 29.11(t)(1)(A)(ii), then the quantity of EIM Transfers subject to the EIM Assistance Energy Transfer Surcharge will be adjusted to reflect the sum of all Regulation Up (adjusted for Regulation non-compliance quantities) within the CAISO Balancing Authority Area as a credit.

(B) **Allocation.** The revenue collected through the EIM Assistance Energy Transfer Surcharge from participating Balancing Authority Areas in the EIM Area that fail the upward capacity test in Section 29.34(l) or the upward flexibility test in Section 29.34(m) will be allocated, pro rata, to all other Balancing Authority Areas in the EIM Area with net EIM Transfers, excluding base scheduled transfers, in the export direction if such Balancing Authority Areas passed the upward capacity test in Section 29.34(l) and the upward flexibility test in Section 29.34(m). A Balancing Authority Area is eligible for a revenue allocation even if it has not elected to receive assistance Energy transfers.

(C) **Distribution.** The revenue collected through the EIM Assistance Energy Transfer Surcharge will be allocated to the net exporting Balancing Authority Areas in the EIM Area that pass the upward capacity test in Section 29.34(l) and the upward flexibility test in Section 29.34(m) in accordance with Section 29.11(t)(2) will be distributed as follows:

- (1) to the EIM Entity Scheduling Coordinators for sub-allocation according to its OATT, or
- (2) to the CAISO for sub-allocation to Scheduling Coordinators that provide incremental Energy net of

FMM Instructed Imbalance Energy, RTD Instructed Imbalance Energy, and Uninstructed Imbalance Energy excluding non-Participating Load.

(2) Assistance Energy Transfer Surcharges.

(A) Any assistance Energy transfer surcharges allocated to the net importing Balancing Authority Areas in the EIM Area that fail the upward capacity test in Section 29.34(l) or the upward flexibility test in Section 29.34(m) will be allocated to the EIM Entity Scheduling Coordinator for sub-allocation according to its OATT. Any assistance Energy transfer charges allocated to the CAISO Balancing Authority Area will be sub-allocated based on Measured Demand, excluding Demand associated with ETC or TOR Self-Schedules for which a RTM Congestion Credit was provided as specified in Section 11.5.7, and excluding Demand associated with ETC, Converted Right, or TOR Self-Schedules for which an IFM Congestion Credit was provided as specified in Section 11.2.1.5; regardless of whether an MSS Operator has elected gross or net Settlement, Scheduling Coordinators for MSS Operators will receive their allocation based on the MSS Aggregation Net Non-ETC/TOR Measured Demand.

(3) Applicable Period for Assistance Energy Transfer Surcharges and Distribution of Collected Amounts. Upon termination of the assistance Energy transfer product as provided in Section 29.34(n)(3)(C), and final Settlement and Billing for the assistance Energy transfer product, this Section 29.11(t) will terminate.

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29.34 EIM Operations

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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.
- (2) **Supply and Demand Forecast.** Conditions and actions in the Real-Time Market will affect what Supply will be counted and what Demand Forecast will be referenced in the capacity test performed in accordance with this Section 29.34(l) and, in some cases as noted below, both this capacity test and the flexibility test performed in accordance with Section 29.34(m).
- (A) For purposes of this Section 29.34(l) and also for purposes of Section 29.34(m) with respect to Sections 29.34(l)(2)(A)(iii) and 29.34(l)(2)(A)(iv), Supply counted in the capacity test will also include—
- (i) a Short Start Unit with a Bid in the RTM through the upcoming hour that is offline in the last fifteen minute interval before the hour under evaluation provided the Short Start Unit has remaining Start-Ups in the day including the hour under evaluation;
 - (ii) a Multi-Stage Generating Resource configuration that can reach another configuration within the timeframe for it to be counted as available in accordance with Section 29.34(l)(1)(A)(i), provided the resource has remaining in-state transitions to that MSG Configuration in the day including the hour under evaluation;
 - (iii) a Multi-Stage Generating Resource transitioning between MSG

Configurations or a Short Start Unit moving through a Forbidden Operating Region in the hour under evaluation, in both the capacity test and the flexibility test performed in accordance with Section 29.34(m); or

- (iv) a Non-Generator Resource or storage device maximum and minimum output in the hour under evaluation based upon its State of Charge as monitored by the CAISO in the last fifteen minute interval before the hour under evaluation, and its Bids to charge or discharge Energy in the hour under evaluation, in both the capacity test and the flexibility test performed in accordance with Section 29.34(m).

(B) For purposes of this Section 29.34(l) and also for purposes of Section 29.34(m) with respect to Section 29.34(l)(2)(B)(iii), Supply counted in the capacity test will not include—

- (i) a Short Start Unit with a Bid in the RTM which received a Start-Up Instruction before the hour under evaluation and has failed to initiate Start-Up;
- (ii) a Short Start Unit that is on Outage during the hour under evaluation or has returned from an Outage but is unable to Start-Up within the hour under evaluation; or
- (iii) an Import Bid or Export Bid for delivery to or export from the CAISO Balancing Authority Area without a transmission profile in a submitted E-Tag that supports its Interchange Schedule by T-40, in both the capacity test and the flexibility test for the CAISO Balancing Authority Area performed in accordance with Section 29.34(m).

(C) Supply from a resource counted in accordance with Section 29.34(l)(2)(A)(i) may be adjusted by the CAISO in accordance with the

timelines and procedures provided in the Business Practice Manual for the Energy Imbalance Market to address significant overcounting of Supply available to the Real-Time Market, provided that the overcounting has been identified, supported with analysis and documented by the CAISO.

(D) Demand response under a demand response program administered in an EIM Entity Balancing Authority Area that does not otherwise qualify as an EIM Resource, *i.e.*, count as Supply, may be accounted for through a corresponding EIM Entity adjustment to their Demand Forecast, which will then be referenced in the capacity test performed in accordance with this Section 29.34(l), the flexibility test performed in accordance with Section 29.34(m), and the balancing test performed in accordance with Section 29.34(k), provided the EIM Entity submits an attestation to the CAISO in accordance with the procedures and timelines in the Business Practice Manual for the Energy Imbalance Market that certifies adjustments made to its Demand Forecast will correspond to expected increases or reductions in demand provided by the demand response.

(3) **Insufficient Supply.** An EIM Resource Plan or the CAISO equivalent, as applicable and as detailed in Business Practice Manuals, shall be deemed to have insufficient Supply to pass the capacity test if—

(A) the sum of EIM Base Schedules of Supply and the sum of the incremental or decremental offers in the Energy Bid range from EIM Participating Resources above or below their EIM Base Schedules, including Interchange with other Balancing Authority Areas, is not sufficient to meet the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority, and

(B) the sum of Supply and the sum of the incremental or decremental offers

in the Energy Bid range above or below the RUC Schedules, the HASP Advisory Schedules and HASP Intertie Block Schedules or the FMM Schedules is not sufficient to meet the total Demand Forecast for the CAISO Balancing Authority Area, 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.

(m) **EIM Resource Sufficiency Evaluation – Flexibility Test.**

(1) **Review.**

(A) **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).

(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), provided that the benefit of the exclusion of

export schedules which may be curtailed in accordance with Section 34.12.4(a) or 34.12.4(b) will be reflected in the results of the upward flexibility test for the CAISO Balancing Authority Area.

(C) **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 Benefit.** The CAISO will calculate separately the upward and downward EIM diversity benefit 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.

(3) **Effects of EIM Diversity Benefit.** For each Balancing Authority Area in the EIM 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) **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.

- (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.**

- (1) **Insufficient Capacity.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules as provided in Section 29.34(f)(1)(c), the EIM Resource Plan or the CAISO equivalent has insufficient Supply as determined according to Section 29.34(l) -

(A) the CAISO will not include the EIM Entity Balancing Authority Area or the CAISO Balancing Authority Area in the Uncertainty Requirement of the EIM Area; and

(B) the CAISO will hold the EIM Transfer limit into or from the EIM Entity Balancing Authority Area or the CAISO Balancing Authority Area, as specified in Section 29.34(n)(2), at the less restrictive of the value for the last 15-minute interval with sufficient Supply or the hourly Real-Time EIM Base Schedule corresponding to the 15-minute interval with insufficient Supply.

(C) To facilitate procurement of the Flexible Ramping Product within the existing RTUC processes and along the time intervals for RTUC runs set forth in Section 34.3.1 and further explained in the Business Practice Manual for Market Operations, and solely for the purpose of this subsection 29.34(n)(1), the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules to allow for procurement of the Flexible Ramping Product for the first fifteen-minute interval of each hour

will be that provided in Section 29.34(f)(1)(B) and the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules to allow for procurement of the Flexible Ramping Product for the remaining intervals of each hour will be that provided in Section 29.34(f)(1)(C).

(2) **Insufficient Flexible Ramping Capacity.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules or the CAISO equivalent as provided in Section 29.34(f)(1)(c), the CAISO determines -

(A) that an EIM Entity Balancing Authority Area or the CAISO Balancing Authority Area has insufficient upward Ramping capacity according to Section 29.34(m), the CAISO will take the actions described in Section 29.34(n)(1)(A) and (B) in the upward and into the EIM Entity BAA or CAISO BAA direction; and

(B) that an EIM Entity Balancing Authority Area or the CAISO Balancing Authority Area has insufficient downward Ramping capacity according to Section 29.34(m), the CAISO will take the actions described in Section 29.34(n)(1)(A) and (B) in the downward and from the EIM Entity BAA or CAISO BAA direction.

(C) To facilitate procurement of the Flexible Ramping Product within the existing RTUC processes and along the time intervals for RTUC runs set forth in Section 34.3.1 and further explained in the Business Practice Manual for Market Operations, and solely for the purpose of this subsection 29.34(n)(2), the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules to allow for procurement of the Flexible Ramping Product for the first fifteen-minute interval of each hour will be that provided in Section 29.34(f)(1)(B) and the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules to allow for procurement of the Flexible Ramping Product for the remaining intervals of each hour will be that provided in Section 29.34(f)(1)(C).

(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) Sunset Period. This tariff Section 29.34(n), together with Section 29.11(t), will terminate on December 31, 2025.

* * * * *

34.12 CAISO Market Adjustment To Non-Priced Quantities In The RTM

All Self-Schedules are respected by the SCED and SCUC to the maximum extent possible and are protected from curtailment in the Congestion Management process to the extent that there are effective Economic Bids that can relieve Congestion. If all Effective Economic Bids for the RTM are exhausted, all Self-Schedules between the Minimum Load and the lowest Energy level of the first Energy Bid point will be subject to uneconomic adjustments based on assigned scheduling priorities. This functionality of the optimization software is implemented through the setting of scheduling parameters as described in Section 27.4.3 and specified in Section 27.4.3.1 and the BPMs. Through this process, imports and exports may be reduced to zero, Demand may be reduced to zero, and Generation may be reduced to a lower operating limit (or Regulation Limit) (or to a lower Regulation Limit plus any qualified Regulation Down Award or Self-Provided Ancillary Services, if applicable). Any Self-Schedules below the Minimum Load level are treated as fixed Self-Schedules and are not subject to uneconomic adjustments for Congestion Management but may be subject to decommitment via an Exceptional Dispatch if necessary as a last resort to relieve Congestion that could not otherwise be managed.

34.12.1 Increasing Supply

The scheduling priorities as defined in the RTM optimization to meet the need for increasing Supply as reflected from higher to lower priority are as follows:

Scheduling Run Priority	Scheduling Parameters Under Soft Energy Bid Cap (27.4.3.2)	Scheduling Parameters Under Hard Energy Bid Cap (27.4.3.3)
CAISO Forecast of CAISO Demand; the export Self-Schedule of a Priority Wheeling Through; exports explicitly identified in a Resource Adequacy Plan backed by Resource Adequacy Capacity explicitly identified and linked in a Supply Plan to the exports; or Self-Schedules for exports at Scheduling Points backed by Generation from non-Resource Adequacy Capacity or from non-	\$1450	\$2900

RUC Capacity		
RUC Schedules that are Self-Schedules of exports at Scheduling Points not backed by Generation from non-Resource Adequacy Capacity, or the RUC Schedules that are the export Self-Schedules of non-Priority Wheeling Throughs	\$1250	\$2500
Real-Time Market Self-Schedules of exports at Scheduling Points not backed by Generation from non-Resource Adequacy Capacity or non-RUC capacity, or the Real-Time Market Self-Schedules that are the export Self-Schedules of a non-Priority Wheeling Through	\$1150	\$2300
Contingency Only Operating Reserve if activated by Operator to provide Energy (as indicated by the Contingency Flag and the Contingency condition)	\$1000	\$2000

34.12.2 Decreasing Supply

The scheduling priorities as defined in the RTM optimization to meet the need for decreasing Supply as reflected from higher to lower priority are as follows:

Scheduling Run Priority	<u>Scheduling Parameters Under Soft Energy Bid Cap (27.4.3.2)</u>	<u>Scheduling Parameters Under Hard Energy Bid Cap (27.4.3.3)</u>
Non-Participating Load increase	Not Applicable	Not Applicable
Reliability Must Run (RMR) Schedule (Day-Ahead manual pre-dispatch or Manual RMR Dispatches or Dispatches that are flagged as RMR Dispatches following the MPM, for Legacy RMR Units and Exceptional Dispatch for RMR Resources process)	-\$6000	-\$12000
Transmission Ownership Right (TOR) Self-Schedule	-\$5900	-\$11800
Existing Rights (ETC) Self-Schedule	-\$5100 to -\$5900	-\$10200 to -\$11800
Regulatory Must-Run and Regulatory Must-Take (RMT) Self-Schedule;	-\$1400	-\$2800
Participating Load increase	Not Applicable	Not Applicable
Day-Ahead Supply Schedule	-\$1200	-\$2400

Self-Schedule Hourly Block	-\$1100	-\$2200
Import Self-Schedule of a non-Priority Wheeling Through	\$0	\$0

These dispatch priorities as defined in the RTM optimization may be superseded by operator actions and procedures as necessary to ensure reliable operations.

34.12.3

In the event an Intertie is constrained in the import direction by a scheduling limit or Path 26 is constrained in the north-south direction, when HASP cannot meet CAISO Forecast of CAISO Demand or fully accommodate a Priority Wheeling Through transaction, the CAISO will perform a post-HASP process to pro rata allocate available transmission capacity between Load and CAISO Balancing Authority Area and Priority Wheel Through transactions, as described in the Business Practice Manual. The pro rata share of Load within the CAISO Balancing Authority Area will be based on the lower of each applicable Resource Adequacy Resource's Real-Time Energy Bid quantity or its shown Resource Adequacy Capacity. The Priority Wheeling Through pro rata share for each Self-Schedule will be based on the lowest of (1) 110 percent of the submitted Day-Ahead Market Self-Schedule of the Priority Wheeling Through transaction, (2) the submitted Real-Time Market Self-Schedule of the Priority Wheeling Through transaction, or (3) the Priority Wheeling Through quantity requested 45-days in advance of the month. The available transmission capacity the CAISO awards to Priority Wheeling Through transactions in the post-HASP process cannot exceed the Priority Wheeling Through quantity the CAISO calculates in this pro rata allocation. Energy scheduled via the post-HASP process will be settled as Exceptional Dispatch Energy pursuant to Section 11.5.6.1, as applicable.

34.12.4

At its sole discretion, the CAISO may, after HASP, apply the market scheduling run priorities in Section 34.12.1 through manual operator intervention to curtail lower priority HASP hourly block export schedules even before the CAISO Balancing Authority Area is in an energy emergency alert. When the CAISO is in an emergency alert level 3 (EEA 3), subject to operator judgement and consistent with good utility practice, it will curtail in accordance with the priority specified below to prevent the need to arm Load, or reduce the amount of Load that is armed, and meet its operating reserve obligations. For purposes of

this section, the CAISO would curtail lower priority exports in the following order:

- (a) Real-Time economic hourly block export schedules that cleared HASP,
- (b) Real-Time Self-Schedule hourly block export schedules not backed by Generation from non-Resource Adequacy Capacity and cleared HASP, then
- (c) Day-Ahead hourly block export schedules not backed by Generation from non-Resource Adequacy Capacity that also cleared HASP.

To accommodate curtailment of lower priority exports in the order set forth above, the CAISO will consider any schedule to export energy, other than an export backed by Generation from non-Resource Adequacy Capacity, as firm provisional energy. A Scheduling Coordinator's failure to comply with the tagging requirements specified in the Business Practice Manual for any export schedule other than an export backed by Generation from non-Resource Adequacy Capacity will result in a default to the priority specified in (a) above (e.g., will be curtailed in the same tranche as the Real-Time economic hourly block export schedules that cleared HASP).

* * * * *

APPENDIX A

* * * * *

- EIM Assistance Energy Transfer Surcharge

An after-the-fact charge of \$1,000/MWh when the Soft Energy Bid Cap is in effect that will increase to \$2,000/MWh when the Hard Energy Bid Cap is in effect and is paid by a participating Balancing Authority Area in the EIM Area pursuant to Section 29.11(t)(1)(A).

Attachment C – Board Memoranda & Presentation
Tariff Amendment – Resource Sufficiency Evaluation – Phase 2
California Independent System Operator Corporation
March 31, 2023



California ISO

WESTERN EIM

Decision on resource sufficiency evaluation enhancements phase 2

Danny Johnson

Market Design Sector Manager, Market Infrastructure Policy

ISO Board of Governors and WEIM Governing Body Joint Meeting

General Session

December 14, 2022

Management proposes several enhancements that increase the reliability of WEIM balancing authority areas

- Proposals that fall under joint authority of the WEIM Governing Body and ISO Board of Governors:
 - Provide for assistance energy transfers for WEIM areas that fail the resource sufficiency evaluation
 - Ensure the resource sufficiency evaluation only considers each balancing authority's demand and firm export obligations
- Proposal that falls under WEIM Governing Body's advisory role:
 - Align tagging rules with the quality of different market products

Management proposes a new assistance energy transfers service for WEIM areas that fail the resource sufficiency evaluation

- Allows the WEIM to provide reliability benefits to capacity or flexibility deficient balancing authorities
- Assistance energy transfers are subject to an after-the-fact surcharge based on WEIM transfers
 - Revenue from assistance energy transfers allocated pro-rata to net WEIM exporting balancing authorities
 - Available balancing capacity, or its equivalent will be credited against the transfer amount surcharge
- Allows each balancing area to elect whether to receive assistance energy transfers or remain under the status quo
 - Cost sub-allocation at discretion of each WEIM balancing authority; would be allocated to demand and exports for the ISO area

Management proposes an enhancement to ensure the resource sufficiency evaluation only considers each balancing authority's demand and firm export obligations

- Analysis shows ISO low priority exports are often the result of WEIM supply offers in the real-time market
- Including low priority exports in ISO's sufficiency obligation has led to inappropriate ISO failures
- No changes are proposed to the current rules that allow other WEIM areas to count ISO low priority exports as supply in their resource sufficiency evaluation

Management proposes a change to align the tagging rules with the quality of different market products

- Provides clarity to receiving area of the quality of the interchange product
- Firm provisional designation will apply to ISO low priority exports, indicating:
 - Energy will not be curtailed for economic reasons
 - Receives lesser priority to ISO load
- Clarification is consistent with existing tariff provisions that prioritize ISO load over lower priority exports

Stakeholders broadly support the proposed ability to receive assistance energy transfers as an improvement to reliable operations, however the following concerns were raised

- Select stakeholders expressed concern that the after-the-fact surcharge does not send the correct price signal to resource deficient WEIM balancing areas
 - Management plans on future initiatives to consider this concern as part of a more comprehensive solution
- Some stakeholders internal to the ISO balancing area prefer a more granular cost allocation
 - The proposed cost allocation is consistent with emergency assistance and emergency dispatch instructions

Stakeholders broadly support changes to low priority export counting and tagging rules

- Most stakeholders agree with changes to not count lower priority exports in the ISO balancing area's resource sufficiency evaluation obligations
 - Some stakeholders raised concerns with allowing WEIM balancing area's to count ISO's lower priority exports as supply
- Stakeholders recognize the benefits of aligning the tagging rules associated with lower priority exports
 - Some stakeholders are concerned how this impacts their existing operational practices

Management recommends the Board of Governors and WEIM Governing Body approve the proposed enhancements

- Management recommends the WEIM Governing Body and ISO Board of Governors approve the joint approval elements:
 - Proposal for assistance energy that leverages the WEIM to increase reliability for balancing authorities experiencing energy or flexibility deficiencies
 - Proposal to exclude low priority exports from the ISO's resource sufficiency evaluation ISO's obligation
- Management recommends the WEIM Governing Body support and the ISO Governing Board approve the proposed tagging rule enhancements to reflect the attributes of lower priority ISO exports



Memorandum

To: ISO Board of Governors and Western Energy Imbalance Market Governing Body

From: Anna McKenna, Vice President of Market Policy and Performance

Date: December 7, 2022

Re: **Decision on WEIM Resource Sufficiency Evaluation Enhancements – Phase 2 and Rules Related to Low Priority Exports**

This memorandum requires ISO Board of Governors and WEIM Governing Body action.

EXECUTIVE SUMMARY

Management has worked extensively with stakeholders to propose two changes to the Western Energy Imbalance Market's (WEIM) Resource Sufficiency Evaluation (RSE). Management has also worked with stakeholders to propose an e-tag rule for low-priority exports from the ISO balancing authority area (BAA).

The first RSE change provides an option for WEIM energy transfers at an additional cost into a BAA that has failed the RSE, instead of restricting the transfers. These optional transfers, termed "WEIM assistance energy," will enable BAAs that are short supply to access the WEIM's efficient dispatch while still providing incentives for BAAs to participate in the WEIM with sufficient resource to meet their own load.

The second RSE change is to no longer count certain low-priority exports from the ISO BAA in its RSE obligations. This change accounts for interactions between WEIM energy transfers and ISO exports that can occur in the real-time markets and can result in the ISO BAA erroneously failing the RSE when it has sufficient internal supply resources to meet its load obligations. WEIM BAAs receiving these exports would still be permitted to count the supported supply towards meeting their RSE obligations.

Management proposes an additional change unrelated to the RSE, but related to ISO operations during emergencies discussed in the stakeholder process. Management proposes that market participants must submit e-tags for low-priority exports from the ISO BAA with the designation that the energy is "Firm Provisional" to facilitate market

and manual operator curtailments of these low-priority exports and provide visibility as to their scheduling priority.

The two changes to the RSE proposed in this memorandum fall under the ISO Board of Governors' and WEIM Governing Body's joint approval authority. The third change proposed in this memorandum associated with e-tag rules for low-priority exports falls under the WEIM Governing Body's advisory role to the ISO Board of Governors. All three changes are proposed to be severable from each other should they not be approved in total:

WEIM Governing Body and Board of Governors joint decision on RSE changes

Moved, that the ISO Board of Governors and WEIM Governing Body approve the two changes to the resource sufficiency evaluation proposal as described in the memorandum dated December 7 , 2022; 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 these changes, 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 Governing Body decision on advisory role on e-tag rules for low priority exports

Moved, that the WEIM Governing Body advises the ISO Board of Governors, as discussed in the December 14, 2022 joint general session meeting, that it supports / does not support Management's proposal pertaining to e-tag rules for low-priority exports as described in the memorandum dated December 7, 2022.

Board of Governors decision on e-tag rules for low priority exports

Moved, that the ISO Board of Governors approve the e-tag rules for low-priority exports as described in the memorandum dated December 7, 2022; and;

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement these changes, 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

Background

The proposed changes in this memorandum are the product of a robust and collaborative stakeholder process conducted throughout 2022 to further refine the resource sufficiency evaluation, the *WEIM Resource Sufficiency Evaluation Enhancements – Phase 2* initiative. This initiative followed an initial set of RSE enhancements developed in 2021 that the ISO Board of Governors and WEIM Governing Body jointly approved at their February 2022 meeting. This initiative began with a workshop focusing on the WEIM assistance energy concept and a series of workshops examining analyses regarding various aspects of the RSE's performance.

The RSE tests each hour that individual BAAs in the WEIM have scheduled or bid sufficient supply in the ISO real-time market to meet forecasted demand. Today, the WEIM ensures participants offer sufficient resources to meet their load obligations in the WEIM by restricting a BAA's energy transfers in the corresponding real-time market interval if it fails either the RSE "capacity test" or "flexible ramping" test. Depending on the nature of the failure, WEIM import or export transfers are limited to the preceding interval's schedules.

In addition to the enhancements proposed in this memorandum, stakeholders also considered whether the RSE should consider BAA operator adjustments to the BAA's load forecast. Also, stakeholders considered whether a net load uncertainty adder should be reinstated in the RSE's capacity test and whether an adder to account for potential undelivered imports should be reinstated in the RSE. Based on stakeholder feedback, Management does not plan to incorporate operator adjustments in RSE requirements at this time and will further consider the RSE adders, along with other topics, in a future RSE enhancements initiative phase.

Proposal

WEIM Assistance Energy

WEIM assistance energy provides an important RSE enhancement. At their February 2022 meeting, the guidance the Board of Governors and WEIM Governing Body gave was to find an economic solution for providing assistance energy instead of limiting transfers. In response, Management proposes changes to market and financial settlement rules that will provide for WEIM assistance energy. WEIM assistance energy consists of energy transfers at an additional cost into a BAA that has failed the RSE and has elected to be eligible to receive WEIM assistance energy. WEIM assistance energy will enable a BAA that is short of supply to leverage the WEIM's efficient dispatch, while still providing incentives to ensure forward procurement of sufficient supply to meet its load obligations.

The current RSE rules limit additional WEIM energy transfers into a BAA in a market interval in which the BAA is short of supply and has failed the RSE. Management proposes that this provision would no longer apply to BAAs that elect to receive WEIM assistance energy to fill in any supply shortfall. For these BAAs, the real-time market would dispatch energy transfers into a BAA without limitation, subject to available supply elsewhere in the WEIM, during real-time market intervals for which it failed the RSE. These transfers will then have an additional cost applied after-the-fact through the ISO's settlement system, *i.e.*, not considered during the market clearing process. The assistance energy will receive an additional surcharge at the energy bid cap in effect for that interval, typically \$1000/MWh. or \$2,000/MWh under tight system conditions, in addition to the applicable market price cleared in the market for transfers necessary to resolve a shortfall.

This additional revenue received for WEIM assistance energy will be used to compensate BAAs who brought the additional supply to the WEIM and was used to cure a BAA's supply shortfall. The proposal for assistance energy will allow a BAA to leverage the WEIM's efficient dispatch and resolve its supply shortfall when the BAA is deficient despite its best efforts to procure supply in advance of the real-time market. This leverages a key benefit of the WEIM which is the ISO real-time market's ability to optimally dispatch all of the supply available and provide access to supply that may not otherwise be available in the bilateral market outside of the WEIM. The additional cost of the assistance energy at the bid cap provides additional compensation to those BAAs that are the source of the additional supply.

Because this surcharge price will not be considered in the market clearing process, WEIM transfers may occur through the economic displacement the WEIM is designed to facilitate; *i.e.*, those transfers that the BAA may not have needed to meet forecasted demand can potentially be exposed to this after the fact charge. To minimize the impact of this occurrence, the proposal will limit the after-the-fact surcharge to the minimum of (1) the MWh quantity by which the BAA failed the RSE, or (2) the amount of WEIM transfers into the deficient BAA. This limits a BAA's exposure to the assistance energy's additional cost that may not be needed to resolve a deficiency.

Available balancing capacity is a WEIM feature that dispatches resource capacity a BAA has not bid into the WEIM, but has indicated to the ISO that it wants to be dispatched in the event the BAA could otherwise not meet its load. If the amount of WEIM transfers into the deficient BAA is the minimum amount that would determine the assistance energy additional cost, *i.e.* item (2) described above, the transfer amount subject to the additional cost will be reduced by the BAA's unused available balancing capacity or its equivalent for balancing authority areas with full resource participation.

For example, consider a balancing authority that received 50 MW of assistance energy transfers to resolve shortfall but retained 20 MW of unused available balancing capacity that was not dispatched. In this case, the after the fact charge would be calculated based on 30 MW of assistance energy transfers. The rationale for reducing the amount

of transfers exposed to the after-the-fact surcharge cost based on this unused capacity is that the real-time market would likely dispatch this capacity before transfers if the assistance energy additional cost would have been modeled in the market.

However, BAAs could potentially have adverse incentives to lower exposure to the after the fact surcharge by strategically increasing the quantity of supply designated as available balancing capacity. Consequently, the ISO will monitor available balancing capacity amounts, as compared to historical designation, to ensure it is not being misused as a mechanism to inappropriately limit exposure to assistance energy charges.

Next, Management proposes that to allocate the WEIM assistance energy revenue to BAAs in the WEIM that were the source of the assistance energy and did not fail the RSE. Management proposes to allocate the revenue to each BAA that has passed the RSE in the applicable market interval in proportion to its net export energy transfers in the corresponding market interval. Revenue and cost sub-allocations within each balancing authority will be made at the discretion of each balancing authority; the CAISO balancing authority will allocate the revenue to real-time imbalance energy and the cost to measured demand.

Finally, Management proposes that a BAA's election to utilize WEIM assistance energy will be made in the ISO Master File and any changes to that election will occur through the existing Master File change management process, which represents a 5 to 11 day lead time. Today's tariff based existing RSE failure consequences limiting WEIM transfers to the amount in the previous market interval would be maintained for BAA's that opt out of WEIM energy assistance. Management will develop a process for the CAISO BAA to determine whether to elect to participate in assistance energy in a subsequent process.

Accounting for Low-Priority Export's in the ISO's RSE Obligations

The second RSE change Management proposes would no longer include low-priority exports in the ISO's upward capacity RSE that are only scheduled in the real-time market (*i.e.*, low-priority exports not scheduled in the day-ahead market). "Low-priority exports" in this context refers to ISO export self-schedules not explicitly backed by designated non-resource adequacy resources and exports resulting from economic bids. These are exports scheduled at the ISO interties primarily on an hourly basis and are separate from energy transfers between BAAs that result from the WEIM's dispatch of resources across the WEIM.

This proposed change addresses differences between the way exports are scheduled in the ISO's real-time market and the way other WEIM BAAs schedule exports. Exports are scheduled from the ISO BAA based on the results of its market clearing process, while WEIM BAAs have the ability to schedule exports that they know can be supported by their own resources. For the ISO, low-priority exports can clear the real-time market

based on supply from scheduling WEIM energy transfers into the ISO. This can cause the ISO to fail the RSE even if it has sufficient supply to meet its RSE obligations. This occurs because the RSE does not count WEIM energy transfers into a BAA as available supply, but does count a BAA's RSE obligation for non-WEIM exports.

For example, assume the ISO should pass the RSE because it has 42,000 MW of supply to meet 42,000 MW of forecast demand, and further assume the real-time market clears 1,000 MW of low-priority exports based on 1,000 MW of WEIM transfers into the ISO. Under the current rules, the ISO BAA would fail the RSE because the RSE would calculate the ISO BAA as having only 42,000 MW of supply to meet 43,000 MW of demand because the 1,000 MW of low priority exports represent a supply obligation.

The example shows how the ISO BAA can fail the RSE despite having sufficient internal supply to meet its demand, simply because the real-time market scheduled the low-priority exports based on the supply provided by the market also scheduling WEIM transfers. This is not an issue for other BAAs in the WEIM because the real-time market does not schedule non-WEIM exports from those BAAs. The BAA determines whether it has sufficient internal capacity to support exports before it schedules the exports.

The analysis of RSE performance discussed with stakeholders showed that that this interaction between low-priority exports clearing the real-time market based on WEIM transfers contributes to the ISO BAA failing the RSE. For example, as much as 1,500 MW of low-priority exports cleared based on WEIM transfers shown in data gathered from July 9, 2021 and discussed with stakeholders.

Therefore, Management proposes to no longer include low-priority exports in the RSE upward obligation for the ISO BAA that are only scheduled in the real-time market. Management proposes to continue to count in the ISO's RSE obligations low-priority exports scheduled in the day-ahead market that the real-time market has been determined as supportable because there are no WEIM transfers in the day-ahead market that they can clear against as in the real-time market example above.

Despite this change, Management is not proposing to change the current rule that WEIM BAAs receiving low-priority exports that clear the real-time market's hour ahead scheduling process count as supply towards meeting their RSE obligations. The stakeholder process explored a more complicated methodology that would determine hourly which ISO exports were not supported by WEIM transfers, but stakeholders pointed out that in practice this approach would not be feasible. In addition, these exports should be reliable because the ISO real-time market has determined them to be feasible.

Low-Priority Export E-Tags

The third change Management proposes requires low-priority exports¹ to be e-tagged as Firm Provisional Energy, with a designation of the associated ISO real-time market priority. This will identify these exports as having a priority lower than ISO load so that they can be curtailed according to existing tariff rules. This change will help ensure that low-priority exports have a lower priority than ISO load within the operating hour. These proposed tariff revisions are not related to the RSE; rather, they address issues that arose during the stakeholder process in connection with discussions regarding low-priority exports.

The proposed procedure will explicitly apply the existing scheduling priorities used in the day-ahead and real-time markets to manual actions operators may take outside of the market. Such actions occur within the operating hour after the real-time market's hour ahead scheduling process schedules exports. This will continue to enable operators to exercise judgement to maintain reliable grid operations and fulfilling obligations to neighboring BAAs under NERC requirements. This will ensure the ISO can manually curtail low priority exports within the operating hour if the ISO is unable to maintain its own load serving obligations as a BAA.

The requirement to e-tag low-priority exports as Firm Provisional Energy will also increase visibility to market participants and the BAA receiving these exports as to their lower scheduling priority and increased risk of curtailment.

POSITIONS OF THE PARTIES

The majority of stakeholders strongly support providing for WEIM assistance energy for a BAA that fails the RSE, noting that it will increase reliability by allowing WEIM participants to leverage the market and make up for supply shortfalls. These stakeholders recognize that the proposed design, while not meeting all RSE stated design objectives, will adequately serve as an interim measure that increases reliability. Management plans a subsequent stakeholder process to explore a more robust assistance energy solution that is priced through the market.

A minority of stakeholders oppose the proposed assistance energy product being applied after-the-fact, rather than being applied to real-time imbalance energy prices. They maintain that the proposed design lessens the financial consequences a balancing authority area may be exposed to resulting from being resource insufficient.

Management agrees with this sentiment, however, Management does not believe additional design changes can be implemented prior to the summer of 2023 in a manner that would ensure equal and equitable application of an assistance energy product is

¹ Under tariff section 34.12.1, low-priority exports are (1) RUC schedules that are self-schedules of exports at scheduling points not back by generation from non-Resource Adequacy Capacity, or (2) real-time market self-schedules of exports at scheduling points not backed by generation from non-Resource Adequacy Capacity or non-RUC capacity.

incorporated into the real-time imbalance energy price. As stated above, Management intends to explore a more robust assistance energy solution that is priced through the market in a subsequent stakeholder process. The assistance energy product proposed in this memorandum is proposed to sunset no later than December 31, 2025, at which time the more robust design should be completed and ready for implementation.

Stakeholders generally support not counting low-priority exports that are only scheduled in the real-time market and not the day-ahead market in the ISO's RSE upward obligations.

Stakeholders within the ISO BAA generally support the e-tagging rule change for lower priority exports and associated tariff clarifications. Some of these stakeholders maintain they should be curtailed before an EEA 3, while others outside the ISO BAA do not support this rule change, stating that this will greatly diminish the value of ISO exports or negatively impact their existing business or operational practice.

As a clarification, the ISO may curtail low-priority exports regardless of being in an EEA 3 if it determines the exports may not be supportable without putting ISO load at risk. Management believes the proposed tariff changes merely clarify that low-priority export's existing scheduling priority extends to within the operating hour and supports accurate curtailment. The requirement to e-tag these exports as Firm Provisional Energy reflects and makes transparent this priority.

Some stakeholders within the ISO BAA object to allocating assistance energy costs to demand, rather than to individual entity's shortfalls. Management notes that the allocation to demand is consistent with existing provisions for allocating the costs of emergency supply procured outside the WEIM. Nevertheless, Management plans additional consideration of this element in the planned initiative to examine the terms of the ISO BAA's EDAM participation.

The ISO Market Surveillance Committee developed a formal written opinion on Management's proposal, included as Attachment A. In this opinion, they recognize the proposed changes to the treatment of low-priority exports in the RSE corrects a underlying flaw in the design, however the proposed ability for sink balancing authorities to continue to count this non-firm supply for meeting their RSE obligation, as well as the ISO system operators persistent use of load conformance warrants further attention. In addition the MSC recognizes the proposed design of the assistance energy product may serve to increase reliability, but at the cost of undesirable and inefficient pricing due to the out of market surcharge applied to these transfers. In response, the ISO commits to continue stakeholder discussions in a subsequent RSE focused initiative to improve on this design.

The ISO Department of Market Monitoring supports Management's proposals, and acknowledges stakeholder views that the proposed approach for energy assistance is an important option to have available by next summer. In addition to supporting the

proposed changes to how low-priority exports are treated, DMM views the proposed design for assistance energy transfers as a reasonable compromise that could encourage a large portion of BAAs in the WEIM to participate in this option.

CONCLUSION

Management recommends that the ISO Board of Governors and the WEIM Governing Body approve the changes described in this memorandum. They will enable BAAs that are short supply to leverage the WEIM's efficient dispatch, more appropriately account for ISO BAA low-priority exports in the RSE, and align ISO e-tag rules to transparently reflect the scheduling priority of ISO low-priority exports.

Attachment D – Final Proposal
Tariff Amendment – Resource Sufficiency Evaluation – Phase 2
California Independent System Operator Corporation
March 31, 2023



California ISO

WEIM Resource Sufficiency Evaluation Enhancements Phase 2

Second Revised Final Proposal

December 6, 2022

Prepared by

Danny Johnson

Brad Cooper

California Independent System Operator

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1 Introduction

The purpose of this initiative is to continue to enhance the accuracy of the WEIM resource sufficiency evaluation (RSE) while also exploring the potential for the WEIM to be used for energy assistance.

This second phase of this initiative has been examining:

- Whether adjustments made to a balancing authority area's (BAA's) load forecast used by the real-time market should be included in a BAA's RSE obligations;
- The potential for WEIM advisory transfers in the hour-ahead scheduling process (HASP) to result in additional block hourly exports from the CAISO;
- Measures to assess uncertainty; and
- Consideration of appropriate failure consequences during over and under supply conditions and the potential to leverage the WEIM to facilitate energy assistance.

This initiative is addressing remaining items from the RSEE Phase 1 initiative as well as elements deferred from the Phase 1 policy development process. This scope is informed by analysis the CAISO performed on different aspects of the WEIM RSE that were not addressed under the RSEE Phase 1 policy development.

2 Stakeholder Comments and Changes from Revised Final Proposal

The CAISO appreciates the wide array of comments received from a large segment of market participants and stakeholders. It is a testament to the close engagement of the stakeholder community on this initiative, which is vital to its success. The CAISO has carefully considered all stakeholder input and in response is putting forth revisions to its final proposal. The CAISO has made every effort to balance the diverse viewpoints of its stakeholders while adhering to principles of sound market design and utility practice.

Table 1 summarizes the changes reflected in this revised final proposal:

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Table 1 – Stakeholder Comments and Changes from Final Proposal

Topic	Notes/Changes from Previous Proposals
Incorporation of load conformance in RSE	No change
Curtailment of LPT exports	No change
Exclusion of LPT exports from the CAISO's obligations in the WEIM RSE	No change
Change to the designation of LPT exports on e-tags and clarification to scheduling priorities after HASP	No change
LPT curtailment priority	Clarification that LPT exports can be curtailed subject to operator judgement and consistent with good utility practice
RSE capacity test uncertainty adders	No change
Curing supply insufficiencies through WEIM assistance energy transfers	No Change
Allocation of WEIM assistance energy revenue	No change
Monitoring for misuse of WEIM assistance energy	No change
WEIM decisional classification	No change

3 RSE Background

This section provides a high-level review of the purpose of each WEIM RSE test component as well as the principles that informed the existing WEIM RSE design.

3.1 Resource Sufficiency Evaluation Purpose and Principles

The purpose of the WEIM RSE is to ensure each WEIM BAA is able meet its demand and uncertainty with its own net supply prior to engaging in transfers with other BAAs in the real-time market. This is accomplished by meeting the following objectives: 1) ensuring that BAAs do not inappropriately lean on the real-time capacity, flexibility, and transmission of other BAAs in the WEIM footprint, and 2) providing an incentive for WEIM BAAs to submit base schedules that balance supply and demand while identifying and resolving potential transmission congestion.

The WEIM RSE's capacity and flexible ramping tests address the first objective of preventing inappropriate use of the capacity of other market participants; the balancing test also provides a level of protection against inappropriate use, however that is not its primary objective.

The WEIM RSE's capacity and flexible ramping tests do not determine if a BAA is able to meet its individual reliability requirements since, for example, ancillary services are not included in these tests. Rather, these are real-time tests that serve as prerequisites for WEIM participation. Ensuring each WEIM BAA meets its reliability requirements is addressed by individual WEIM entities' resource adequacy requirements determined by their regulatory authority, and by meeting NERC reliability standards.¹ The capacity and flexible ramping tests do not necessarily ensure a BAA is resource-adequate. Rather, they aim to ensure no inappropriate leaning occurs by limiting receiving and/or sending WEIM energy transfers from other BAAs when a BAA fails the tests.

The RSE's balancing test protects against strategic base schedule submissions that are intentionally designed to arbitrage imbalance energy prices between supply and load. The RSE's feasibility test enables WEIM participants to check whether their initial base schedules are feasible considering transmission congestion.

The proposal reiterates the voluntary nature of participation in the WEIM. The RSE is not intended to set reliability requirements. With that understanding, the RSE has been generally accepted as being consistent with the following principles:

- Inappropriate leaning is participation in the WEIM without sufficient capacity and ramping capability to meet expected load;
- WEIM RSE failures should not cause operational or reliability issues; and

¹ [Order Conditionally Accepting Proposed Tariff Revisions to Implement Energy Imbalance Market \(ER14-1386\)](#)

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- The WEIM RSE does not dictate resource adequacy or integrated resource plans in individual BAAs.

During this phase of the initiative, the CAISO is exploring leveraging the WEIM to provide energy assistance during under and over-supply conditions. The proposal recognizes that the WEIM platform could be leveraged to increase a BAA's reliability in the real-time market, but it should not be relied on in this way. It is the responsibility of each BAA to develop their own plans to reliably operate their control areas absent the WEIM. To this end, the proposal is for rule and compensation for when leaning within the WEIM is acceptable.

4 Phase 2 – Accuracy Enhancements

This section of the paper discusses additional accuracy enhancements to the WEIM RSE that the stakeholder process was unable to address in the first phase of the initiative. These include the consideration of load conformance, developing appropriate measures of uncertainty, and the interaction between advisory WEIM transfers and block hourly exports cleared in the HASP process.

4.1 Load Forecast Adjustments

BAA operators currently use load forecast adjustments or “load conformance” to meet a number of real-time operational needs that the market is either unable to account for, or does not model. These operational needs range from 1) increasing their resource fleet's flexibility to 2) accounting for forecast error, or 3) ensuring the availability of replacement reserves. The use of load conformance may cause the commitment of additional resources internal to the BAA, an increase in block hourly interchange supply, a decrease in block hourly exports, or an increase in WEIM transfers.

During the RSEE Phase 1 policy development, stakeholders raised concerns that the use of load conformance was inappropriately advantaging the CAISO BAA in passing the WEIM RSE. However, the existing design of the WEIM RSE does not count WEIM transfers as available supply in the bid-range capacity test. Intrinsic to its design, the use of load conformance cannot help any BAA pass the WEIM RSE capacity test. The flexible ramping sufficiency test uses the financially binding market results for the 15-minute interval immediately prior to the hour under evaluation as a reference point to determine the upward and downward ramping requirements in each 15-minute interval in the following hour. To the extent that load conformance drives WEIM transfers that unload

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resources internal to a BAA, the resulting lower operating level of those resources would be reflected as additional upward ramping capability in the flexible ramping sufficiency test. Limited analysis in Phase 1 showed that load conformance did result in an increase to WEIM transfers, however, this analysis did not show load conformance resulted in a 1-for-1 increase in WEIM transfers.² Given the complex interactions that drive market outcomes, the proposal deferred additional consideration of load conformance until Phase 2 to allow time for more robust analysis.

To better understand this relationship, the CAISO preformed additional analysis on the 16 highest load days in 2021, as well as 3 non-summer days in January of 2022. The results of that analysis were presented by the CAISO in preliminary form on March 30, 2022, and final form on June 21, 2022.³ The analysis confirms that the use of load conformance does not result in a one-to-one increase in WEIM import transfers. Rather it shows that there is no precise means to routinely estimate the impact of load conformance on incremental WEIM transfers. A regression performed on the change in HASP import transfers indicates that, even during high levels of conformance, it does not necessarily result in significant volumes of incremental WEIM transfers. This relationship can be seen in Figure 1.

² [CAISO Resource Sufficiency Evaluation Performance on July 9: Presented to the Market Surveillance Committee November 19, 2021](#)

³ [CAISO Report on WEIM Transfers, Hourly Interties and Load; June 21, 2022](#)

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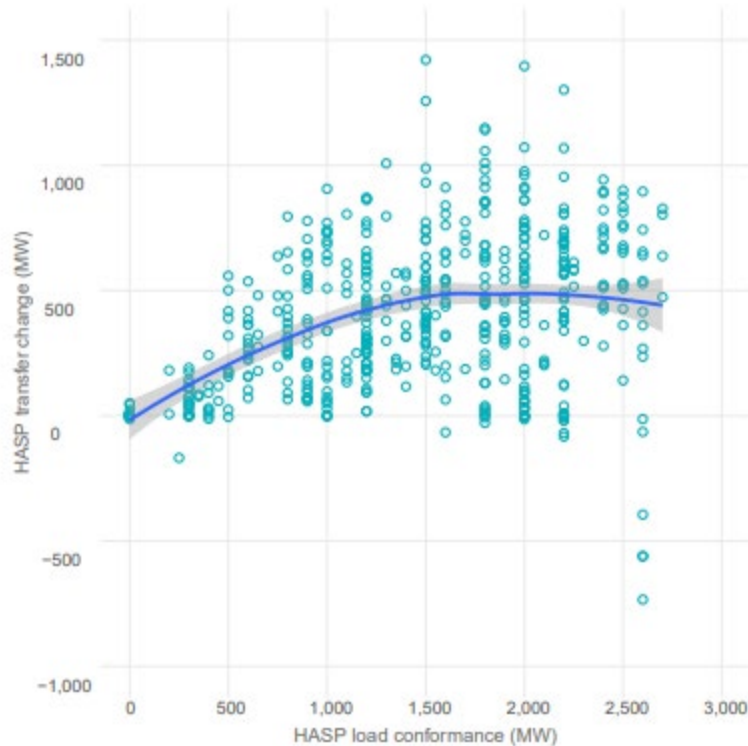


Figure 1: HASP Load Conformance vs WEIM Transfers

The other pertinent finding is that the use of load conformance routinely results in schedules to increase the output of resources internal to the CAISO BAA, resulting in less upward flexibility to be used in the flexible ramping sufficiency test. This phenomenon is illustrated in Figure 2. While the analysis clearly shows that load conformance does lead to an increase in WEIM transfers, it also shows that this transfer increase is often less than the increase in output levels of resources internal to the CAISO BAA, resulting in a net reduction of flexibility for the CAISO BAA. More detailed information about the result of load conformance and its impact on the market results in the CAISO BAA can be seen in the CAISO's published analysis.⁴

⁴ *Id.*, at 3

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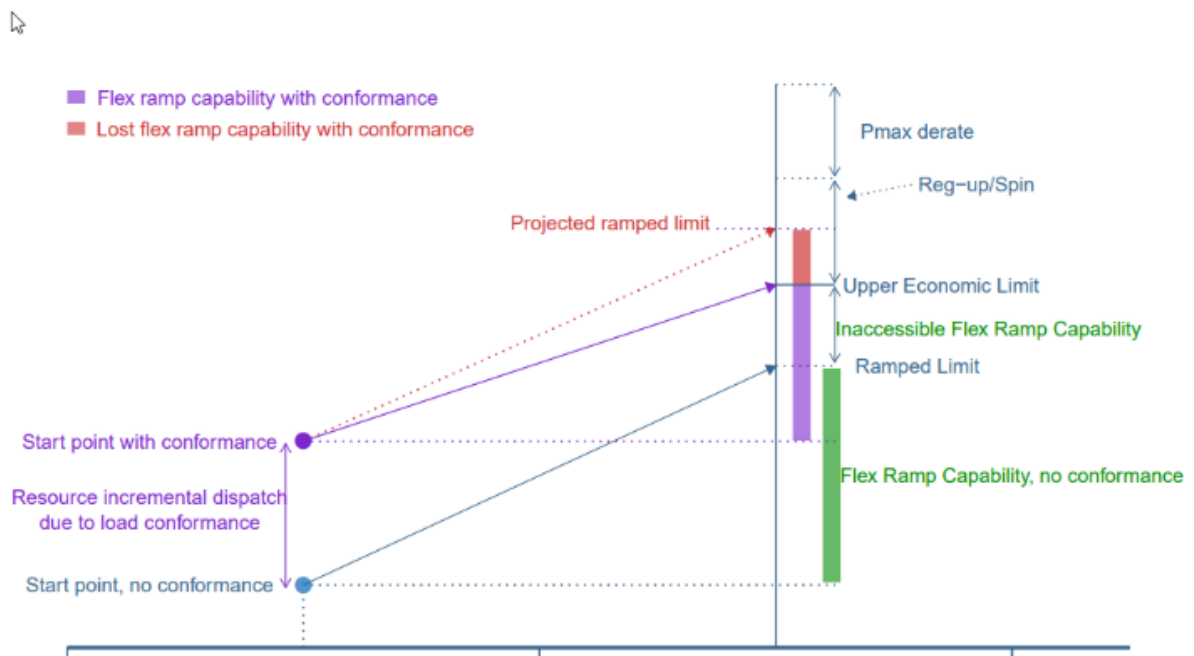


Figure 2: Illustration in reduction in resource flexibility due to load conformance

Given these findings, the proposal is to not make any changes in the WEIM RSE formulation to account for load conformance. The analysis concludes that the use of load conformance does not regularly benefit any BAA in passing the WEIM RSE. In addition, to the extent that it drives additional WEIM transfers, there is limited ability to accurately predict the result of load conformance. Rather, the proposal reiterates that the WEIM RSE should be applied in a narrow manner to test for a BAA’s ability to meet its forecasted demand and ramping requirements, rather than forecasted requirements plus out of market actions or otherwise undefined operating practices.

4.2 Interaction between Advisory WEIM Transfers and HASP

During Phase 1 of the RSEE initiative, preliminary analysis showed an interaction wherein advisory WEIM transfers enabled the HASP process to clear additional hourly exports from the CAISO BAA. Since not all HASP exports are cleared using supply internal to the CAISO BAA, this interaction creates the potential for the CAISO BAA to erroneously fail the WEIM RSE.

4.2.1 **Background**

The real-time market's unit commitment process performs a rolling multi-interval optimization to minimize costs in the upcoming four to seven 15-minute intervals;⁵ the cost minimization occurs across the entire market footprint. The first sequence in this process is the HASP run which optimizes the next seven 15-minute intervals, with the last four of the seven intervals being the upcoming hour. The HASP considers all offers including 1) bids from resources internal to the CAISO BAA, 2) bids on interties, and 3) bids from resources in the WEIM footprint outside the CAISO BAA. One result of this optimization is the award of hourly interchange schedules into (imports) and out of (exports) the CAISO BAA.⁶ Another result is the dispatch of resources across the WEIM that results in WEIM energy transfers between BAAs.

Under the existing WEIM RSE design, awarded HASP exports are added to the CAISO BAA's WEIM RSE obligation, yet WEIM transfers are not counted as available supply. As a result, the CAISO BAA can have sufficient supply to meet its own obligations over the upcoming hour, but fail the WEIM RSE due to insufficient capacity to support the block hourly export transfers cleared through access to WEIM transfers.

Analysis published by the CAISO on June 21, 2022 confirms that this dynamic occurs.⁷

In performing this analysis, production market cases were rerun with adjustments made to account for unrealized WEIM transfers in the real-time dispatch (RTD).⁸ The analysis shows that this interaction has the potential to result in hundreds, if not thousands of additional MW of obligation for the CAISO BAA. However, given the complex interaction that leads to this outcome, the analysis did not show a strong correlation between the volumes of WEIM import transfers and HASP exports. Results from July 9th can be seen below in Figure 3, and a simplified, graphic example of this interaction can be seen below in Figure 4.

⁵ [CAISO Business Practice Manual for Market Operations Section 7.5](#)

⁶ The hourly imports and exports over CAISO interties are based on import and export bids and schedules. These hourly imports and exports are separate from WEIM energy transfers.

⁷ *Supra*, note 2

⁸ RTD is a 5-minute security constrained economic dispatch application that re-optimizes the results of the unit commitment performed through the 15-minute granularity RTUC process.

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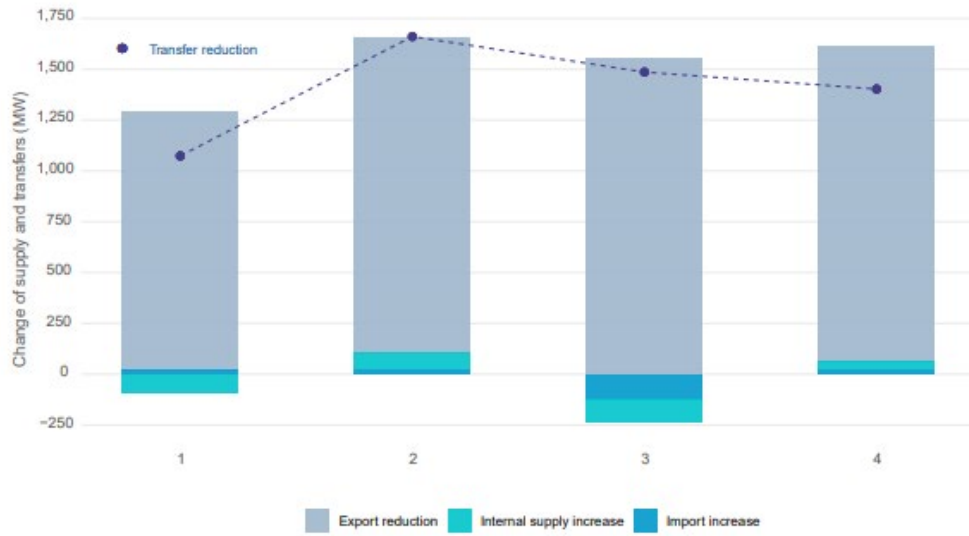


Figure 3: Changes of exports and supply relative to changes in WEIM transfer -July 9, 2021, HE19

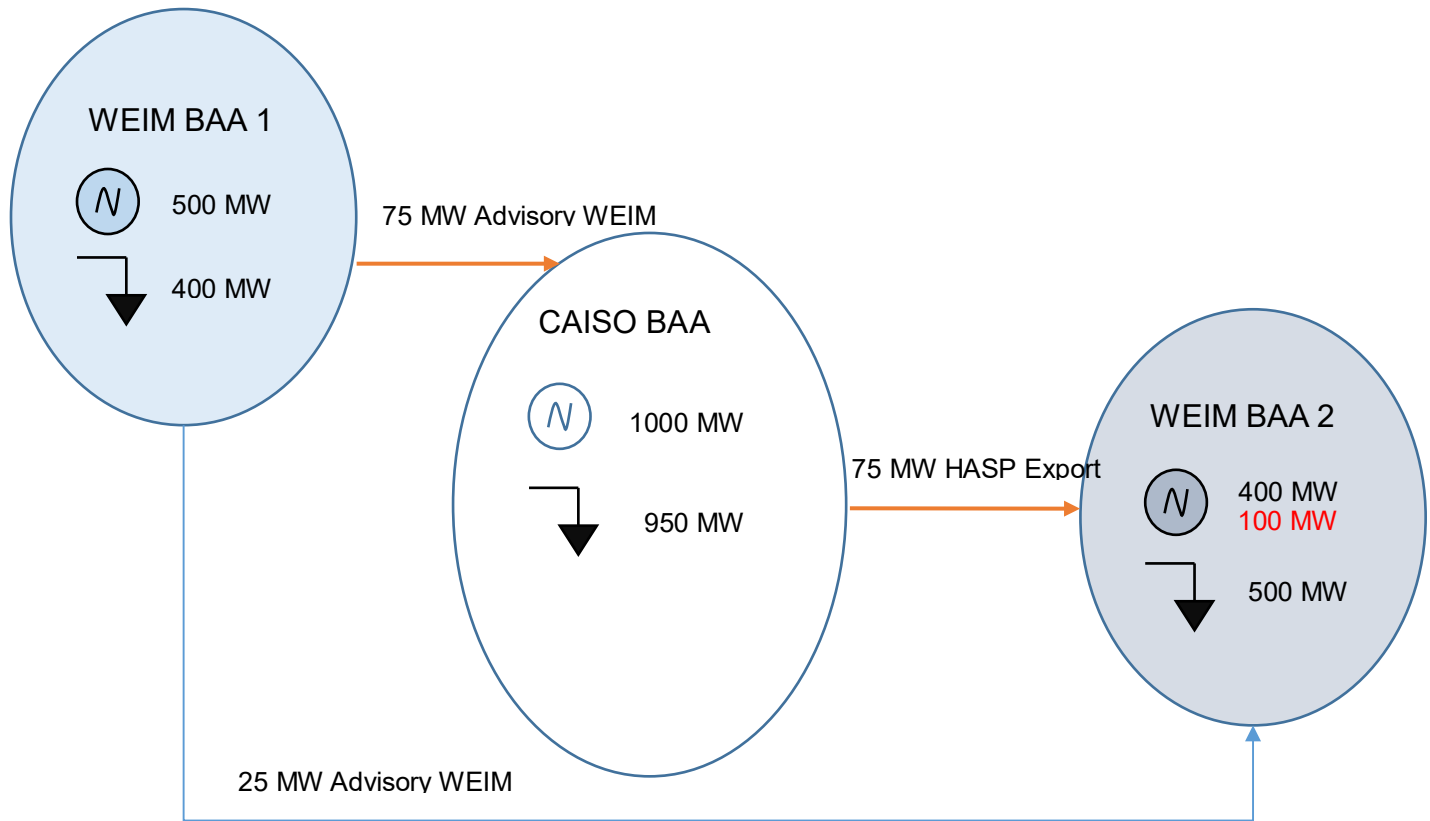


Figure 4: Graphic Example of HASP Export Advisory WEIM import interaction

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In the example shown in Figure 4 above, each balancing authority area would be resource sufficient based on the conditions that exist prior to HASP, however HASP scheduling a low-priority export at a CAISO BAA intertie based on WEIM transfers into the CAISO BAA subsequently results in the CAISO BAA failing the WEIM RSE:

- There is 2000 MW of supply for 1850 MW load across the three BAAs
- The optimal HASP solution clears a 75 MW advisory WEIM transfer into the CAISO BAA and reflects 25 MW of advisory transfers from BAA 1 to BAA2. This allows HASP to schedule a 75 MW hourly export at a CAISO BAA intertie to BAA2 because the export is supported by the 75 MW transfer.
- The CAISO BAA would then fail the final WEIM RSE conducted after the HASP as the CAISO BAA's demand obligation in the final RSE run is 1025 MW while it only has 1000 MW of supply. Its demand obligation in the RSE is based on its 950 MW internal load plus the 75 MW hourly export scheduled by HASP. However, the supply considered by the RSE is only the CAISO BAA's 1000 MW of internal supply as the RSE does not consider WEIM transfers as supply. Thus, the WEIM transfer into the CAISO BAA allowed HASP to schedule the export, resulting in the export causing the CAISO BAA to fail the RSE. HASP may do this because HASP does not consider the RSE as part of its optimization.

A similar interaction can occur if HASP schedules imports into the CAISO BAA to support exports. Although imports count as supply in the WEIM RSE, they do not count in the final WEIM RSE if the import supplier has not submitted an e-tag with the transmission path for the import before the final WEIM RSE after the HASP. Thus HASP can schedule exports from the CAISO BAA based on import supply but then fail the WEIM RSE if an import e-tag is not submitted.

While the example above highlights a snapshot showing the potential for WEIM import transfers to add to the CAISO BAA's obligation, the table below shows how this phenomenon can occur, and worsen the CAISO BAA's net position across an hour. Specifically how the CAISO BAA can fail the WEIM RSE mid-hour, and the resulting limitation of incremental WEIM import transfers can exacerbate the capacity shortfall. An example of this dynamic in practice would be the HASP awarding export transfers from the CAISO BAA during the net-load peak when its solar supply is reduced throughout the hour.

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Table 2: Numeric Example of WEIM Transfers Facilitating HASP Exports

Numeric Example of WEIM Transfers Facilitating HASP Exports				
HASP Results that are the input to the T-55 RSE	0:15	0:30	0:45	1:00
CAISO BAA Supply	40250	39500	38750	38250
CAISO BAA Demand	39000	38750	38250	38000
WEIM Import Transfers	500	500	750	1000
Optimal HASP Export	1250	1250	1250	1250
T-55 RSE results				
CAISO BAA supply	40250	39500	38750	38250
CAISO BAA RSE Obligation	40250	40000	39500	39250
CAISO BAA Deficiency	0	-500	-750	-1000
Pass / Fail	X	X	X	X
Net Supply Position				
Last 15min interval	500	0	-250	-500

Following a failure of the WEIM RSE, the current design is to limit incremental transfers in the direction of failure to the greater of either the base transfer or the transfer in the most recently passed 15-minute interval. Should the CAISO BAA fail the WEIM RSE due to this interaction, its incremental WEIM transfers are likely to be limited to the most recently passed 15-minute interval. Alternatively, the CAISO BAA would pay a penalty for incremental transfers under the change proposed later in this paper. Either of these results appear to be flawed as the CAISO BAA's failure results merely because of the interaction of exports with WEIM transfers and imports in the HASP optimization.

4.2.2 Resource Sufficiency Evaluation Treatment

As described above, the HASP optimization can result in the CAISO BAA failing the WEIM RSE even if the CAISO BAA is resource sufficient because the optimization may schedule low-priority (LPT) hourly exports at the CAISO BAA interties based on supply from WEIM energy transfers into the CAISO BAA. The CAISO BAA may fail the WEIM RSE because the LPT exports add on to the CAISO BAA's load obligation in the WEIM RSE while the transfers do not count as RSE supply. LPT exports offers that are not able to be cleared by the HASP process should not be represented on the base schedule of any WEIM BAA.

This issue is unique to the CAISO BAA because the HASP schedules hourly exports at the CAISO BAA intertie based on economic bids and self-schedules clearing in the market optimization process. The optimization can choose to meet this demand with either

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internal CAISO BAA resources, or with imports or WEIM transfers. As the HASP is scheduling for the subsequent hour about an hour ahead of time, it may be supplying exports with transfers scheduled in the advisory market intervals covering the next hour.

Because of this, the CAISO BAA cannot ensure it has sufficient internal supply and imports to support LPT exports as the supply for the exports is coming from WEIM transfers. As shown in the example in the previous section, this may result in the CAISO BAA failing the WEIM RSE merely because it is economic to dispatch WEIM supply up to provide transfers to the WEIM to use as the source of supply for LPT exports from the CAISO BAA. The CAISO BAA would fail the WEIM RSE because the RSE does not count WEIM transfer supply towards meeting a BAA's RSE obligation, while at the same time it, under the current rules, it counts the LPT exports as additional obligations in the RSE.

The HASP could potentially be modified to ensure that WEIM transfers into the CAISO BAA cannot be used as the source of export supply. However, such a measure would likely be very complex and/or greatly reduce WEIM benefits. For example, the WEIM transfer constraints for the CAISO BAA in the HASP run for the advisory market intervals in the next hour could conceivably be set to zero. However, this would entail transfers into the CAISO BAA not being available to the market optimization in future intervals, undermining the benefits of the multi-interval optimization. It would prevent transfers into the CAISO BAA from serving as the source for low-priority exports, but it would also prevent HASP from optimally using economic supply offers to avoid the more expensive commitment of a resource within the CAISO BAA. Again, this would be inefficient and reduce the WEIM benefits.

In addition, the scheduling priorities of LPT exports are appropriate to consider in the RSE's treatment of LPT exports as additional obligations. These scheduling priorities ensure LPT exports from the CAISO BAA are awarded with a lesser priority than serving CAISO BAA demand with the understanding they could be curtailed to serve CAISO BAA demand. Given that the WEIM RSE is designed to test that a BAA can meet its own obligations prior to participating in the real-time market, the CAISO BAA should not experience a failure of the WEIM RSE based on LPT schedules. While the CAISO BAA retains the ability to curtail all LPT exports, the existing sequencing of the market makes it unlikely DA LPT exports could result in a failure of the WEIM RSE, as the exports would have been cleared absent potential influence of WEIM advisory transfers, and would be required to re-bid into the real-time market to potentially address any changes to the supply that cleared the exports in the day-ahead process. Therefore the proposal is to count high priority block hourly export transfers, day-ahead cleared lower priority exports as well as its own demand in determining the CAISO BAA obligation in the WEIM RSE. This provides equivalent treatment to how interchange schedules are made and represented by WEIM entities through the base scheduling process. Bilaterally, only

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schedules the WEIM entity is confident it can support are sold as firm energy, reflected in the base schedules, and tested against in the RSE.

Based on these considerations, the proposal puts forth the following rules for the RSE test for the RSE calculations for the CAISO BAA.

4.2.2.1 Capacity Test

The proposal is to only to count demand, net-load uncertainty,⁹ exports that meet the high priority criteria, or lower priority exports that have cleared the ISO's day-ahead market process, in the WEIM RSE capacity test obligation for the CAISO BAA. As described above, no longer including real-time LPT exports is appropriate because HASP may schedule LPT exports at the CAISO BAA interties based on WEIM energy transfers. Including LPT exports that have cleared the day-ahead process is reasonable as the ISO has previously determined that they can be supported through the reliability unit commitment process; any changes to the resultant supply mix that resulted in these LPT exports clearing would already be accounted for as the exports would be required to re-bid into the real-time market, would not clear the subsequent HASP process, and thus would not be added to the CAISO BAA's RSE obligation.

4.2.2.2 Flexible Ramping Sufficiency Test

The proposal is to only count demand, net-load uncertainty,¹⁰ exports that meet the high priority criteria, or lower priority exports that have cleared the ISO's day-ahead market process in the derivation of its flexible ramping sufficiency upward requirements. This tests to ensure that the CAISO BAA is able to ramp from the binding market schedule in the previous hour, to expected obligations in the upcoming hour. As described above, no longer including real-time LPT exports is reasonable as the HASP may schedule LPT exports at the CAISO BAA interties based on WEIM energy transfers. Day-ahead LPT exports are reasonable to include in the CAISO BAA's RSE obligation for the reasoning provided in 4.2.2.1.

The proposal is to account for demand, net-load uncertainty and all LPT exports in the derivation of its flexible ramping sufficiency downward requirement. LPT exports signify a willing off-taker of supply made available to the market. Counting LPT exports in the CAISO BAA's obligation for the derivation of the flexible ramping down requirement in the WEIM RSE is reasonable. This is because the CAISO BAA, in practice, would deliver on these LPT exports prior to curtailing supply that results in the lack of downward flexibility.

⁹ The net-load uncertainty requirement in the capacity test is currently suspended.

¹⁰ The net-load uncertainty requirement in the capacity test is currently suspended.

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4.2.2.3 WEIM Entity Treatment of HASP Awards

In response to stakeholder feedback, the proposal is to no longer proposing any rules discounting LPT exports that are shown within the base schedule for WEIM BAAs. The proposal recognizes that allowing for these exports to count creates an asymmetry. However, allowing WEIM entities to count these may be rationale for the following reasons:

1. The CAISO BAA would be unable to offer advisory pro-rata curtailments to LPT exports until the second advisory WEIM RSE that is executed at T-55. Potential curtailments made at this time do not leave the sink WEIM BAA sufficient time to update their base schedules. This in turn results in the sink BAA either base scheduling in excess of its actual expected needs resulting in market inefficiency, or failing the WEIM RSE resulting in either potential reliability issues or the need to cure the deficiency through the assistance energy product discussed in section 5.1.
2. The HASP market optimally clears LPT exports. To the extent that these LPT exports do not cause the CAISO BAA to fail the WEIM RSE, it is reasonably expected that these transfers will flow. WEIM BAAs would only be able to count LPT exports that clear the HASP in the final RSE run, which occurs after HASP is complete.

The proposal recognizes that this may inadvertently allow WEIM BAAs to count in their base schedules WEIM transfer supply that is “firmed up” by the HASP process. However, per stakeholder feedback, this outcome is preferable to the significant inefficiencies that may result from real-time pro-rata derates, or the inability to count LPT exports as a portion of their base schedules.

To the extent this treatment results in the WEIM having insufficient capacity or flexibility, the WEIM BAAs whose LPT exports were curtailed would see the power balance constraint violation appear in their control areas. This result is appropriate as the shortfalls are limited to BAAs who claimed LPT exports, which are provisional-firm in nature, within their WEIM base schedules.

4.2.3 *HASP Export Firmness*

As part of this initiative, the proposal is to require LPT exports be e-tagged as “Firm Provisional Energy (G-FP).”¹¹ The purpose of this rule is to apply the existing market scheduling priorities affording LPT exports a lower priority than serving CAISO BAA load in the day-ahead and real-time market¹² post HASP so if the CAISO BAA is unable to maintain its own load serving obligations as a balancing authority it can manually curtail LPT exports that have cleared HASP within the hour. Requiring LPT exports to be tagged as Firm Provisional Energy also will provide better visibility to other BAAs regarding the firmness of these exports.

This rule will not apply to high-priority (PT) exports, which require a non-RA resource internal to the CAISO BAA be designated to back the export. HASP exports that meet that qualify as high priority exports will have equal priority to CAISO BAA load and can be tagged as firm-energy (G-F).

As a practice, the CAISO BAA would carry reserves for all exports from its BAA, and it would only look to curtail these exports if it is unable to replace its reserves within the NERC allotted timeframes or it cannot deploy its reserves to address a supply shortfall that risked its load. All LPT exports clearing the HASP would be made with this understanding regarding the potential for future curtailment, which will be reflected in the tariff.

In the manual curtailment process, the proposal is to provide a higher priority to LPT exports that cleared the day-ahead process over LPT exports that appear only in real-time only. This essentially extends the market curtailment priorities in tariff section 34.12.1 to manual curtailments. Because the proposal is limited to manual, operator driven curtailment of these LPT exports, this differentiation will be reflected as different tiers of LPT exports that are available for pro-rata curtailment by CASIO BAA system operators. This differentiation will provide additional certainty for market participants who scheduled their LPT exports from the market on a day-ahead basis.

The proposal is to continue to retain operator discretion regarding the curtailment of LPT export transfers out of the CAISO BAA. The advisory results produced by the real-time unit commitment (RTUC) process will return a list of potential lower priority export curtailments necessary to preserve CAISO BAA load. The CAISO systems, following affirmation of the system operator, will pro-rata curtail these exports for all BAAs.

¹¹ WECC Glossary of Terms G-FP: Firm Provisional Energy. This product may be interrupted only if the interruption is within the recall time and for conditions allowed by applicable provisions governing interruption of service, as mutually agreed to by the parties. A G-FP product cannot be interrupted for economic reasons

¹² CAISO tariff section 34.12

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The CAISO BAA system operators would curtail these exports within the hour when it does not have enough resources to meet its load and reserve obligations. Subject to operator judgement and consistent with good utility practice, this would happen even before the CAISO BAA is in an Energy Emergency Alert (EEA) 3. When the CAISO is in an EEA 3, subject to operator judgement and consistent with good utility practice, it will require LPT exports to be curtailed to prevent the need to arm load, or to reduce the amount of load that is armed, to meet its reserve obligations.

4.3 RSE Measures of Uncertainty

4.3.1 Background on Existing Measures of Uncertainty

During the RSEE Phase 1 policy development stakeholders raised concerns that the WEIM RSE's existing measures of net load uncertainty may not be sufficiently accurate. Specifically with respect to future demand uncertainty, these measures may not adequately increase the accuracy of the WEIM RSE.

Since November 1, 2016, the Flexible Ramping Product (FRP) has been in place for the 15-minute and 5-minute markets. These products provide additional upward and downward flexible ramping capability to account for uncertainty due to gross load, wind and solar forecasting errors. The FRP procurement requirement is based on forecast uncertainty as measured by net load (NL), where net load = load (L) – wind (W) – solar (S).

In each market, FRP needs to estimate both Flexible Ramping Up (FRU) and Flexible Ramping Down (FRD) procurement requirements. The current implemented approach to do this, commonly referred to as the histogram methodology, uses the upper 97.5 and lower 2.5 percentiles of observed net load uncertainty from the previous rolling 40 matching week days and 20 matching weekend days to set the FRP requirement. Within this methodology, two main limitations have been observed; 1) no incorporation of the future impact of weather conditions on the net load uncertainty, and 2) the historical sample set utilized.

Developed concurrent with the *FRP Refinements* policy initiative that was approved through the CAISO's governance in October 2020, the CAISO also developed enhancements to the net load uncertainty requirement used to determine the quantity of FRP the real-time market procures. This methodology will be defined in a CAISO Business Practice Manual and is colloquially referred to as the quantile regression methodology.¹³ This same uncertainty requirement is used as part of the calculation

¹³ [Flexible Ramping Product Requirements - Appendix C "Quantile Regression Approach"](#)

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BAA's RSE obligations. It is used as part of the both the RSE's capacity and flexible ramping test, although its used in the capacity test is currently suspended, as described further below.

Uncertainty requirements, such as the one for FRP, are important to reevaluate and enhance over time to ensure the market properly captures the uncertainty of net load. Within the analysis conducted prior to the RSE Phase 2 stakeholder process, the CAISO presented further information on the proposal to use quantile regression to incorporate weather information in estimating FRP. This included the construction of the net load formulation and mosaic quantile regression, the comparison of the current histogram approach to the newly formed mosaic quantile regression, the analysis of the overall benefit in the mosaic quantile regression, and lastly a sensitivity analysis of some additional considerations that will be monitored.

The RSE's capacity test also included a separate uncertainty requirement to account for undelivered imports, termed the intertie uncertainty adder. As an outcome of the phase 1 policy development, the intertie uncertainty adder¹⁴ was suspended from the RSE's capacity test. This adder set an hourly uncertainty requirement based on observed deviations from what was shown in the final WEIM RSE forty minute prior to the hour (T-40) and what was eventually tagged at twenty minute prior to the hour (T-20). The methodology calculates a highest relative deviation¹⁵ and a highest absolute deviation¹⁶. The uncertainty requirement is then determined by taking the minimum of the absolute deviation or the relative deviation multiplied by the scheduled net interchange. The requirement was set to a 95% confidence interval; resulting in only the upper and lower 2.5% of observations not being included in the derivation of the requirement. The small retroactive sample size used – that is, the previous 3 months – is largely due to the changing nature of system operations through the year. Using a longer more robust sample reduces accuracy of the intertie uncertainty adder as the system conditions to which the adder is being applied is more likely to lead to variation from the observed conditions. This results in a small sample which is then prone to increased error and accuracy of the calculated adder due to outlier events driving future requirements. Analysis published by the CAISO on April 26, 2022 further confirms the existing methodology is prone to inaccurate estimations of future uncertainty.¹⁷

¹⁴ FERC Order Accepting Tariff Revisions (ER22-1278)

¹⁵ $Relative\ deviation = \frac{\sum Base\ Schedules_{T-40} - \sum Tagged\ Schedules_{T-20}}{\sum Base\ Schedules_{T-40}}$

¹⁶ $Absolute\ deviation = \sum Base\ Schedules_{T-40} - \sum Tagged\ Schedules_{T-20}$

¹⁷ [CAISO Report on Intertie Deviation adder for the WEIM Resource Sufficiency Evaluation Enhancements](#)

4.3.2 *Revisions to Uncertainty in the WEIM RSE*

The proposal is to utilize the quantile regression methodology to calculate net-load uncertainty as part of implementing the changes resulting from the *FRP Refinements* initiative. The quantile regression methodology uses historic data as well as forecasted load and variable energy resource output to improve accuracy.

Based on concerns with the existing calculation of net load uncertainty that were causing spurious RSE failures, the CAISO proposed and FERC approved suspending net load uncertainty as a component of each BAA's RSE obligation.¹⁸ In the straw proposal, the proposal asked stakeholders if net load uncertainty should be reintroduced in WEIM RSE obligations. While many stakeholders are supportive of adding net load uncertainty to RSE obligations, they also are of the opinion that the quantile regression methodology's performance should be further assessed before doing so.

Consequently, the proposal was to defer this topic until after it has implemented the quantile regression methodology in conjunction with the *FRP Refinements* implementation and has had the opportunity to assess its performance. Its performance would then be assessed with respect to the following metrics: 1) coverage, 2) requirement, 3) closeness, and 4) exceedance as explained in CAISO's previous analysis of the quantile regression methodology.¹⁹

With regard to the inertia uncertainty adder, the proposal is to permanently remove it from the capacity test. Analysis performed by the CAISO shows that the existing methodology produces a requirement that does not serve as good predictor of future inertia uncertainty. The inertia uncertainty requirement is either greatly in excess of the observed uncertainty or fails to cover the larger materializations of uncertainty during the rare occasions it arises. The analysis also did not indicate external drivers that could be used to reasonably inform an increased risk of inertia uncertainty. Further, given the recent changes to require the use of an e-tag showing the transmission path for an import to the CAISO BAA to count in the WEIM RSE, all inertia transactions used to pass the WEIM RSE have similar expectations of delivery. Consequently, all parties will be equally situated regarding the potential for inertia uncertainty to arise.

¹⁸ *ibid* 13

¹⁹ [Flexible Ramping and Inertia Deviation Uncertainty in the Western Energy Imbalance Market; June 22, 2022](#)

5 Phase 2 – Energy Assistance through the WEIM

The proposal is to leverage the WEIM for energy assistance during under-supply conditions by optionally allowing incremental transfers following the failure of the WEIM RSE at preset financial consequence. The WEIM is not intended to cure deficiencies in forward planning; however, to the extent it can facilitate energy assistance in real-time without undermining the existing incentives for sufficient forward procurement, it will look to do so. The proposal is that each BAA retain discretion on whether it wants to be eligible to receive assistance energy as part of its participation in the WEIM. Transfers will be sourced from supply offers voluntarily made into the WEIM.

During the previous iteration of the proposal, stakeholders raised concerns with an “in-market” assistance energy transfer design. Specifically, that the design necessitated changes to scarcity pricing and would result in changes to penalty prices. Several stakeholders also pointed out that the CAISO BAA is differently situated than other WEIM BAAs in that its real-time imbalance energy is settled off of its day-ahead schedule rather than a base schedule that is submitted up to forty minutes prior to the hour. They contended that this asymmetry significantly increased the volume of real-time imbalance energy that is exposed to the assistance energy transfer cost. In response to these concerns the CAISO feels it is more appropriate to consider the WEIM RSE failure consequences for an assistance energy product that explicitly impacts price formation as part of a more holistic scarcity pricing design within the *Price Formation Enhancements* initiative.

Other stakeholders raised concerns regarding the optional nature of assistance energy. The proposal considered eliminating the voluntary nature of this functionality, however it does not propose mandatory participation as the inaccuracies inherent to the ex post surcharge design discussed below create a financial liability that each WEIM BAA should retain control over their exposure to. Instead, the proposal aims to address this asymmetry and put forward a design that encourages more WEIM BAA's to participate.

The CAISO will continue to look to refine the consequences for failing the WEIM RSE, such as limiting WEIM transfers in a way that does not exacerbate reliability issues for WEIM BAA's. The proposal is to sunset this assistance energy design no later than December 31, 2025. This will serve to provide an opportunity for an “in market” assistance energy design to be completed and implemented in future initiatives such as *Price Formation Enhancements* and *RSEE Phase 3*.

5.1 Curing Resource Undersupply Conditions

The CAISO proposes that BAAs be able to elect whether they want to utilize assistance energy as part of their participation in the WEIM. If a BAA does not elect to utilize energy assistance, the market would limit its WEIM energy transfers when it fails the RSE as under the current rules. These rules limit transfers to the amount in the market interval prior to the failed interval from the last passed run, or to the base scheduled transfer amount if greater. Continuing to provide the current rule set as an option ensures that a BAA's reliability is not further degraded through the WEIM following a failure of the WEIM RSE.

If a BAA has elected to utilize assistance energy and the BAA is short on supply or upward ramping capability resulting in a failure of the WEIM RSE in the upwards direction, the proposal is to allow the BAA to still receive WEIM energy transfers. The BAA would then pay an after-the-fact or "ex post" surcharge. This surcharge will serve as an hourly capacity payment to the WEIM in exchange for the ability to access energy from the remainder of the WEIM footprint.

The CAISO's settlement systems will apply an ex-post cost of either \$1,000/MWh or \$2,000/MWh depending on whether the market is accepting bids above the \$1,000/MWh soft bid cap.²⁰ This surcharge will be applied to all dynamic WEIM import transfers into a BAA that has failed the WEIM RSE. Varying the level of the ex post surcharge will serve as a proxy to scale the surcharge during stressed or abnormal system conditions. Lower ex post surcharge levels to provide gradation within normal system conditions were considered, however additional analysis and stakeholder feedback would be necessary to develop price thresholds and surcharge levels supported by a broad subset of stakeholders.

To limit inaccuracies inherent to an ex post settlement the proposal limits the surcharge to the lower of (a) the quantity of upward WEIM RSE failure of the capacity or flexible ramping sufficiency test, or (b) the dynamic WEIM transfers that are tagged. Using the minimum of these values attempts to limit non optimal settlements that can arise due to the ex post design not accounting for these costs explicitly in the market optimization. The surcharge will only be applied to net-import WEIM transfers, if conditions change such that the WEIM BAA who has failed the WEIM RSE is exporting no surcharge or payment will result.

²⁰ CAISO tariff section 27.4.3.3(a) defines when the CAISO is using either the \$1,000/MWh or \$2,000/MWh power balance constraint penalty price.

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The following series of examples are intended to show how the ex post surcharge will be applied; for simplicity sake no physical or schedule transfer limits are present. The examples show how applying the minimum quantity of the alternatives as explained above would be implemented. The examples also show more complex interactions where the market schedules dynamic WEIM transfers because it perceives those transfers as efficient compared to dispatching more expensive generation internal to the failed BAA.

The simple example in Figure 5 shows the market only clearing WEIM transfers needed to cure the deficiency. In this example BAA1 fails the WEIM RSE by 100 MW and receives 100 MW of transfers from BAA 2. The transfers are settled at market prices; BAA 1 is then assessed a surcharge of \$1000/MWh for the transfers it receives.

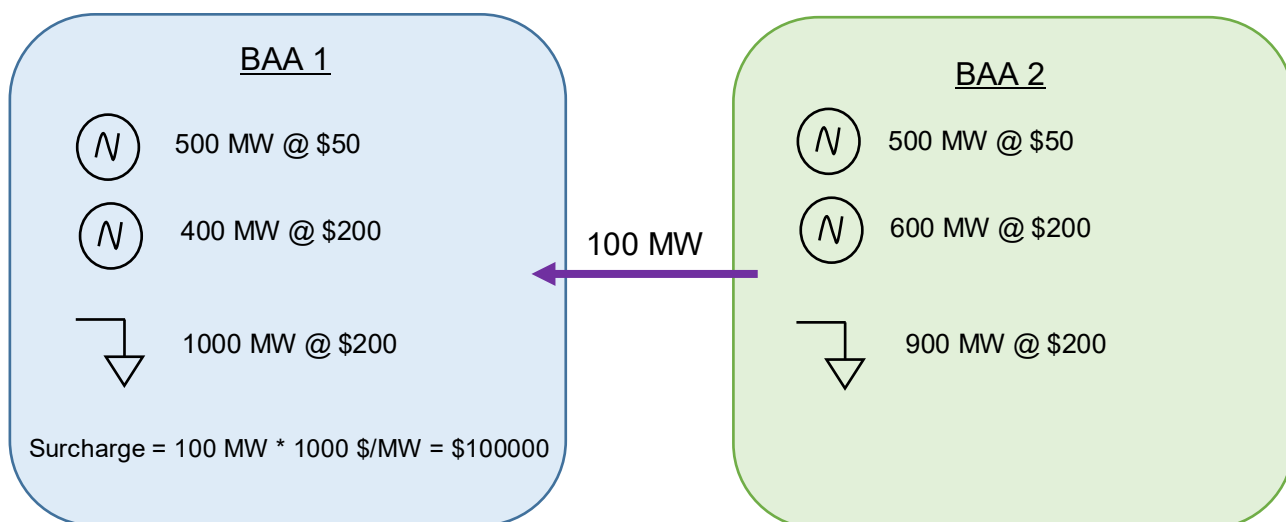


Figure 5: Simple Example of Ex Post surcharge

The next example described in Figure 6 shows how the surcharge amounts would be limited by the RSE failure quantity. In this example BAA 1 fails the WEIM RSE by 100 MW due to only having 900 MW of supply for its 1000 MW of obligation. However, due to the supply offers made available to the real-time market, 25 MW of supply offered within BAA 1 is displaced by 25 MW of economic transfer from BAA 2. These economic transfers occur in addition to the 100 MW of assistance energy transfers that are needed to resolve the deficiency in BAA 1. Basing the surcharge on the minimum of the failure amount or the tagged transfers ensures that BAA 1 does not have the 25 MW of transfers that result from economic displacement incorrectly exposed to the surcharge. This limitation does have the potential to cap the surcharge exposure for BAA 1 for any changes between when the final RSE is run at T-40 and the real-time conditions that necessitate additional transfers to cure the deficiency. This trade-off is made on the assumption that conditions deteriorating further from what was observed in the T-40 RSE are lesser in magnitude than economic displacement transfers resulting from the WEIM's optimal solution.

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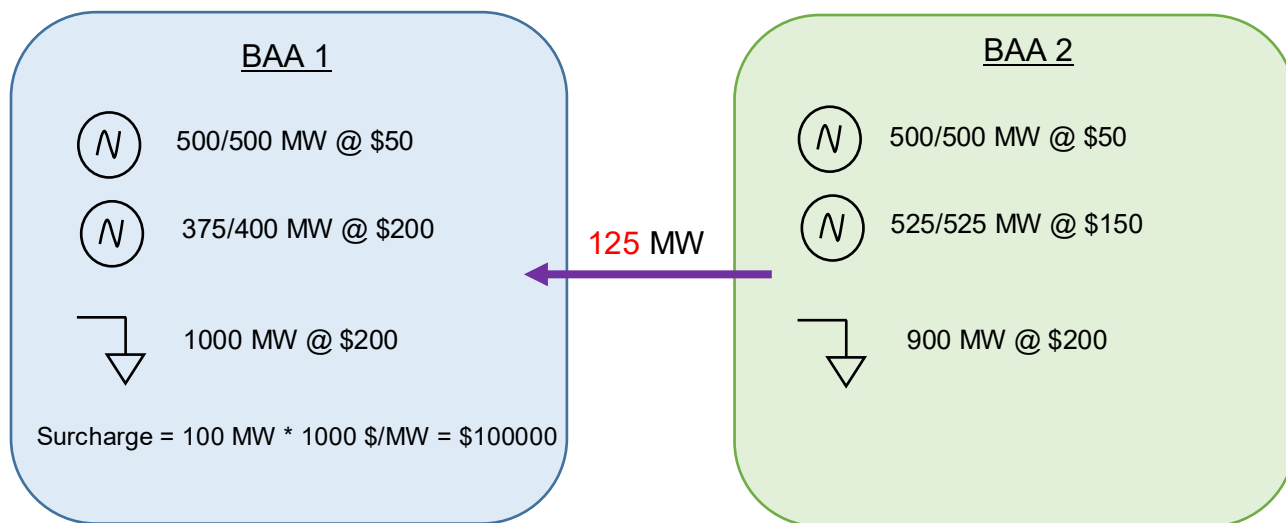


Figure 6: Surcharge based on minimization of RSE failure amount

The next example described in Figure 7 shows how the surcharge would be based on the tagged flows rather than the RSE failure amount. This allows for potential changes in generation availability or the actual materialization of forecast demand to be captured in the surcharge to some extent. To the extent that fewer transfers are scheduled compared to the RSE failure amount, the WEIM BAA who has failed the RSE would only have those transfers exposed to the surcharge. In this example BAA 1 fails the RSE by 100 MW, but the full 1000 MW of load does not materialize; rather 950 MW does. In this case only 50 MW of WEIM transfers are needed to cure BAA 1’s deficiency. Under the proposed design the surcharge for BAA 1 would be based on the minimum of their failure amount or materialized transfers. Thus the surcharge is based on the 50 MW of transfers.

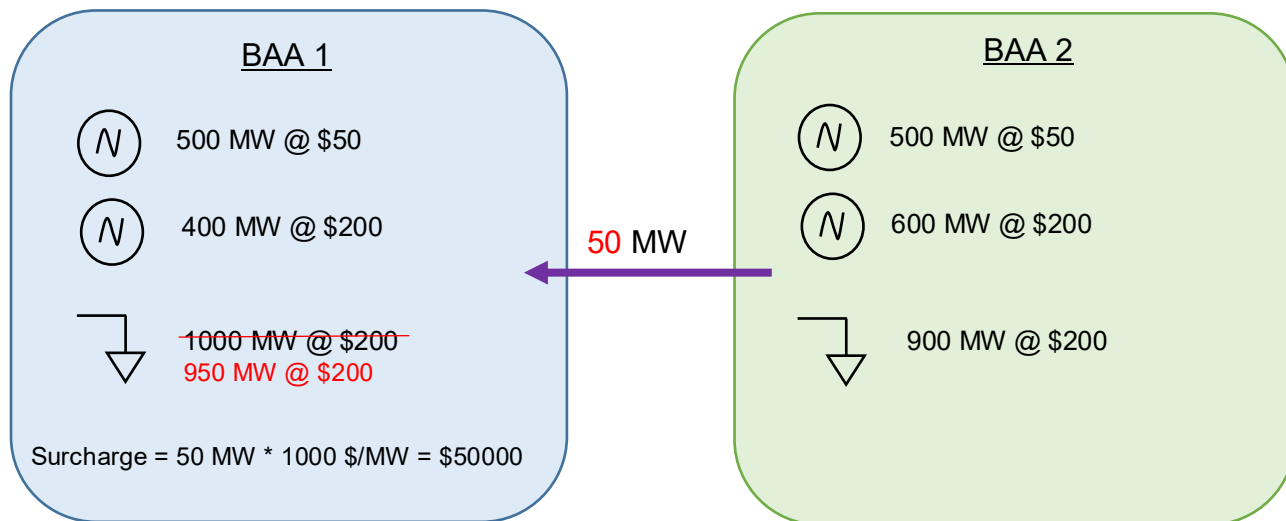


Figure 7: Surcharge based on minimization of failure quantity or materialized transfers

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There remains the potential that improved operational conditions would not result in lower WEIM import transfers due to the economic displacement that results from the real-time markets optimization. An example of this interaction can be seen in Figure 8. In this example, BAA 1 fails the RSE by 100 MW, but the full 1000 MW of load does not materialize; rather 950 MW does. Only 50 MW of WEIM transfers are needed to cure the insufficiency. However, due the supply offers made available to the real-time market, 25 MW of supply offered within BAA 1 is displaced by 25 MW of economic transfer from BAA 2. These economic transfers occur in addition to the 50 MW of assistance energy transfers that are need to resolve the deficiency in BAA 1. Since the optimization is not able to consider the ex post cost which would price the transfers at \$1150/MWh, the optimal result will include 25 MW of economic displacement which is then exposed to the \$1000/MWh surcharge. While the failure quantity of the WEIM RSE places an upper bound on the exposure to this result, each WEIM BAA will have to decide if this financial risk is an acceptable trade-off for the increased reliability that can be derived from accessing assistance energy transfers.

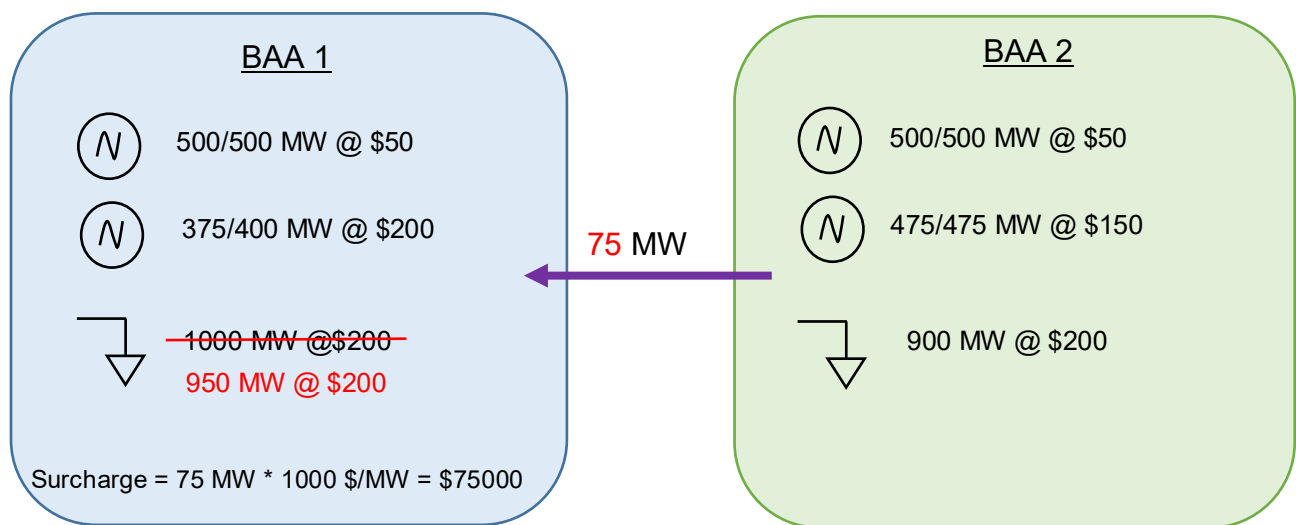


Figure 8: Example of potential for ex post settlement to be applied to WEIM transfers resulting from economic displacement

The proposal will also provide optionality if a WEIM BAA would like their available balancing capacity (ABC) to be considered as a credit to reduce the volume of WEIM transfers exposed to the surcharge. Optionality on this functionality is appropriate as the capacity that constitutes ABC may be designated as part of each WEIM BAA’s ancillary service requirements. By allowing ABC capacity to be netted on a 1 for 1 MW basis off the WEIM import transfer amount that is exposed to the ex post cost, each BAA retains some ability to mitigate their exposure to the ex post cost for spurious failures for the WEIM RSE during non-stressed system conditions.

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The proposal is for the election to utilize assistance energy to be made in the Master File and any changes to that election will occur through the existing Master File process²¹. This allows BAAs optionality in curing resource insufficiency, either including the ability to utilize WEIM, or to access emergency supply. However should a BAA elect to cure insufficiency, the intention of the assistance energy transfers are to offer a means to increase real-time reliability and as such offering more granular functionality may not be necessary.

Dynamically toggling a BAA's willingness to increase their reliability through accessing assistance energy transfers is not consistent with the intent of this reliability based functionality. A more granular ability to access this functionality could result in strategic decisions to fail the WEIM RSE and cure through a combination of bilateral emergency energy assistance WEIM transfers limited to the values in the last passed interval that include no surcharge, as an economic alternative to curing through assistance energy transfers. In addition, because of resource and timing constraints, the only option that can realistically implement by summer 2023 is to provide for elections through the Master File.

In order to ensure reliability of BAAs that are the source of WEIM transfer energy, the existing WEIM implementation enforces a constraint that does not allow a WEIM BAA to have simultaneously have a net export transfer above its base net transfer, and also have a power balance constraint relaxation or available balancing capacity dispatched. This constraint will ensure BAAs will not provide assistance energy at the risk to their own reliability.

5.1.1 Allocating Assistance Energy Revenue

The proposal is to allocate the assistance energy revenue pro-rata by net WEIM export transfer amount, excluding base transfers, to BAAs that have passed the WEIM RSE. This allocation methodology assumes that net exports from BAAs passing the RSE are the source of the assistance energy transfers. Allocating to net exporters has the advantage as it further incentivizes competitive energy bids to increase the likely that a BAA's resources are the ones dispatched to provide energy assistance. The potential for the allocation of assistance energy revenue in this manner may create additional incentive to BAAs to make additional capacity, bid in at marginal cost, available to the WEIM due to the premium that BAA may receive for being a net WEIM exporter

The previous proposals have offered a potential alternative allocation methodology, which was to allocate pro-rata to BAAs in proportion to the amount their offered supply exceeded their RSE obligation. This option has been ruled out this option as it would not be feasible to implement by summer 2023 because of resource and timing constraints. The settlement system already calculates the net export transfer quantity information.

²¹ [CAISO Business Process Manual for Managing Full Network Model](#)

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Information on bid amounts and RSE obligations would require additional system integration effort that would put summer 2023 implementation at risk.

The proposal is that WEIM BAAs sub-allocate any assistance energy revenue received as defined in their OATT. For the CAISO BAA, the proposal is to sub-allocate the assistance energy revenue to real-time imbalance energy from supply.

The proposal is that WEIM BAAs charge for any assistance energy revenue received as defined in their OATT. For the CAISO BAA, the proposal is to sub-allocate the assistance energy charge to measured demand.

5.1.2 Misuse of WEIM to cure real-time resource insufficiencies

The concern that the WEIM could be used as an alternative to avoid sufficient forward contracting has existed since the inception of the WEIM. This was one of the primary reasons that net incremental WEIM transfer is limited in the current implementation following a failure of the WEIM RSE. The proposal is to relax this limitation, additional consequences may be needed to ensure this practice does not take place. Any attempt to develop additional deterrents to prevent misuse of assistance energy transfers must recognize that currently under NERC guidelines²² and good utility practice emergency energy assistance between BAAs is supported if possible.

Administrative consequences for BAAs that misuse this functionality is a potential avenue for design; however, the comments did not indicate broad support for any specific means to prevent misuse. Based on this feedback the proposal is to monitor for misuse, and if necessary develop more stringent rules at a later date.

5.2 Curing resource oversupply conditions

In the straw proposal, the proposal put forward the concept of providing for oversupply energy assistance, to also allow a BAA that fails the RSE in the downward direction to have export transfers at a penalty price. Currently, when a BAA fails the flexible ramping sufficiency test or capacity test in the downward direction, its WEIM transfer exports are limited and potential manual curtailments or self-schedule cuts may be required to resolve the condition. Rather than continuing to limit transfer exports, the straw proposal proposed to allow exports from a BAA failing the RSE in the downward direction once pre-defined conditions have been met.

²² NERC TOP-001-5

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However, after further consideration of resource and timing constraints to implement the remainder of this proposal by summer 2023, particularly energy assistance for supply shortages, the CAISO proposes to defer this topic for future consideration.

6 WEIM Decisional Classification

This initiative proposes changes to the resource sufficiency test that is a part of WEIM. These changes include:

- (1) No longer include LPT exports when calculating the CAISO balancing authority area's WEIM resource sufficiency obligation (Section 4.2.3).
- (2) Changing the consequences for a balancing authority area that fails to meet the resource sufficiency test through a range of rules that fall within the new framework of "energy assistance through EIM" (Section 5).

In addition, the initiative proposes (3) a change to the rules for tagging exports from the CAISO balancing authority area. Exports that do not meet criteria to qualify for high priority will be tagged as firm-provisional rather than firm energy (Section 4.2.3.). Element (3) is severable from the remaining three elements in the sense that management would proceed to implement it even if the other sets of changes were not approved.²³

Note that the revised draft final proposal additionally included a change to permanently remove the intertie uncertainty adder from the resource sufficiency evaluation's capacity test. As that uncertainty adder is not currently specified in the CAISO tariff, this element of the proposal does not in fact require a change.

As explained below, CAISO staff believes that the WEIM Governing Body has joint authority with the Board of Governors over all of the proposed changes except for element (3), the proposed tagging change in Section 4.2.3, for which it would have an advisory role.

The role of the WEIM Governing Body with respect to policy initiatives changed on September 23, 2021, when the Board of Governors adopted revisions to the corporate bylaws and the Charter for EIM Governance to implement the Governance Review

²³ In addition, several of the proposed rule changes within each of these general categories may be severable from the other proposals. We do not detail every instance of severability, though, because the other instances are not relevant to the decisional classification.

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Committee's Part Two Proposal. Under the new rules, 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. The proposed tariff changes to implement elements (1) through (3) above would all 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.” They would not be applicable “only to the CAISO balancing authority area or to the CAISO-controlled grid.” Accordingly, these proposed changes to implement elements (1) through (3) would fall within the scope of joint authority.

Element (3), which would change the rules about how to tag exports from the CAISO balancing authority area, are not applicable to WEIM participants in their capacity as WEIM participants. Rather, these rules apply without regard to WEIM, to all exporters from the CAISO balancing authority area. Accordingly, they fall outside the scope of joint authority. The WEIM Governing Body may provide advisory input, however, because this tagging rules apply to the real-time market. The WEIM Governing Body's advisory role extends to any proposal to change or establish tariff rules that would apply to the real-time market but are not within the scope of joint authority.

Stakeholders are encouraged to submit a response in their written comments to the proposed classification of as described above, particularly if they have concerns or questions.

7 Stakeholder Engagement

Table 3 outlines the proposed schedule to complete the policy for the EIM resource efficiency evaluation enhancements:

Table 3

Date	Milestone
<i>December 14, 2022</i>	Decision at Joint Governance Meeting
<i>June 1, 2023</i>	Implementation