



California ISO

Policy Initiatives Catalog

Prepared by
Market and Infrastructure Policy

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1 Introduction

This *Policy Initiatives Catalog* documents current, potential, planned and ongoing policy initiatives to develop enhancements to the California ISO (CAISO) markets or to related requirements or policy. These are enhancements requiring a stakeholder process and typically resulting in CAISO tariff changes. This catalog does not list potential process improvements or administrative changes.¹

This catalog is organized into the following sections:

- Stakeholder Policy Initiatives Catalog
- Submissions
 - Submissions Incorporated
 - Submissions Precluded
- Initiatives Completed Since Previous Catalog
- Initiatives Currently Underway and Planned
- Discretionary Initiatives
 - Energy and Ancillary Services Markets
 - Congestion Revenue Rights (CRRs)
 - Resource Adequacy
 - Interconnection
- Proposed Deletions

The CAISO updates this catalog twice a year in February and August.² Stakeholders may submit new initiative requests through the policy initiatives submission template posted on the *Annual Policy Initiatives* website.³ Submissions will be collected and considered for its respective catalog update until the first Tuesday of January and July.⁴ Following the deadline of submissions, the process for updating the catalog is as follows:

1. Stakeholder submissions are posted
2. ISO publishes draft policy initiatives catalog
3. Stakeholders submit comments on draft policy initiatives catalog
4. ISO publishes final policy initiatives catalog

¹ Such requests should be made through an ISO customer service representative or account manager.

² This new process will follow the above listed dates beginning in August 2018.

³ <http://www.caiso.com/informed/Pages/StakeholderProcesses/AnnualPolicyInitiativesRoadmapProcess.aspx>

⁴ See footnote 2.

5. Stakeholders submit comments on final policy initiatives catalog

Stakeholder's new initiative requests received for this version of the catalog are summarized in Section 3, below.

The *Policy Initiatives Catalog* is a separate document used in the development process for the *Annual Policy Initiatives Roadmap*.

2 Initiative Categorization

This catalog sorts initiatives into various categories using letter codes. These codes are found next to the initiative's title. An initiative's categorization determines priority for its inclusion in the roadmap.

The codes below are listed in priority of the CAISO:

- I – In-progress initiatives;
- F – FERC-mandated initiatives;
- C – ISO Committed initiatives; and
- D – Discretionary initiatives

FERC mandated initiatives are initiatives the CAISO must complete to comply with FERC orders. CAISO committed initiatives, which the CAISO tries to use sparingly, are initiatives that address very significant reliability or market efficiency issues. They also are initiatives the CAISO previously committed to during a regulatory proceeding or has already stated that it would undertake them to stakeholders, the CAISO Board of Governors, EIM Governing Body, or FERC. Discretionary initiatives are the remainder of initiatives suggested by either the CAISO or stakeholders for consideration in the roadmap. Discretionary initiatives are prioritized by the CAISO with stakeholder input during the development of the *Annual Policy Initiatives Roadmap*.

The *in progress* code may be combined with any of the other three codes. This indicates that a policy initiative has begun and a webpage likely exists on the CAISO website.⁵

In addition to the above codes, this document also includes codes for policy initiatives that may affect the Energy Imbalance Market (EIM). These codes describe the role of the EIM Governing Body in approving the policy resulting from the initiative.⁶

The EIM Governing Body codes include the following:

- E1 – EIM Governing Body's primary authority
- E2 – EIM Governing Body's advisory role
- E3 – EIM Governing Body's hybrid- primary authority

⁵ <http://www.caiso.com/informed/Pages/StakeholderProcesses/Default.aspx>

⁶ <http://www.caiso.com/Documents/CharterforEnergyImbalanceMarketGovernance.pdf>

E4 – EIM Governing Body’s hybrid- advisory role

An E1 classification is any policy initiatives that involve market rules changes that fall entirely within the EIM governing body’s primary authority.⁷ An E2 classification is any policy initiative proposing changes to generally applicable real-time market rules or rules that apply to all CAISO markets.⁸ An E3 classification is when the primary driver for the initiative is EIM and the policy initiative is a hybrid in that it has both a component that would fall within the EIM Governing Body’s primary authority and a component that does not.⁹ An E4 classification is when the primary driver for the initiative is not EIM and the policy initiative is a hybrid in that it has both a component that falls within the EIM Governing Body’s primary authority and a component that does not.¹⁰

Stakeholders should consider the EIM classification codes listed in this document as preliminary. Classifications can be changed anytime during the stakeholder process of an initiative. An EIM classification generally becomes final after the policy paper titled, draft final proposal is published. More information regarding this process is located in the *Guidance for Handling Policy Initiatives within the Decisional Authority or Advisory Role of the EIM Governing Body*.¹¹

3 Stakeholder Policy Initiatives Catalog Submissions

This section lists stakeholder’s submissions during the October 2017 policy initiative catalog submission period.

3.1 Submissions Incorporated

The following stakeholder initiative requests have been placed in this catalog:

- **EIM Default Energy Bid Option** (D, E1) was requested by Powerex, Idaho Power, and Seattle City Light. This initiative is located in Section 6.1 Energy and Ancillary Services Markets.
- **Hourly EIM Resource Sufficiency Evaluation** (D, E1) was requested by Powerex, Puget Sound Energy, NV Energy, Idaho Power, Arizona Public Service Company, Portland General Electric, and Seattle City Light. This initiative is located in Section 6.1 Energy and Ancillary Services Markets.
- **Market Commitment Process Constraints** (D) was requested by NV Energy and is located in Section 6.1 Energy and Ancillary Services Markets.
- **Over/Under Scheduling Load Enhancements** (D, E1) was requested by Puget Sound Energy, NV Energy, Idaho Power, Arizona Public Service Company, and Portland General Electric. This initiative was originally requested by NV Energy in 2017 and can be found in Section 6.1 Energy and Ancillary Services Markets.

⁷ Ibid.

⁸ Ibid.

⁹ Ibid.

¹⁰ Ibid

¹¹ <https://www.westerneim.com/Documents/GuidanceforHandlingPolicyInitiatives-EIMGoverningBody.pdf>

- **Limiting EIM Energy Transmission Scheduled Resources Transfers (D, E1)** was requested by Idaho Power Company and can be found in in Section 6.1 Energy and Ancillary Services Markets.
- **Generator Modeling Enhancements (D, E2)** was requested by PacifiCorp and can be found in in Section 6.1 Energy and Ancillary Services Markets.
- **Transmission constraint transparency** was requested by DC Energy. The potential scope items were added to **6.2.2 Congestion Revenue Rights Revenue Sufficiency (D)**.

3.2 Submissions Precluded

The following stakeholder initiative requests have not been placed in this catalog:

- **Enhancements to the Congestion Revenue Rights Model to Mitigate Diminution of Long-Term CRRs.** This initiative was requested by the City of Azusa and would explore revisions to the current congestion revenue rights (CRR) model for long-term CRR right. The City of Azusa states that revisions to the CRR model have resulted in Azusa losing long-term CRR rights.

The CAISO has not included this proposed initiative in this catalog because it would not be feasible to modify the CRR model so that long-term CRRs always remain feasible. Long-term CRRs become infeasible as changes are made to the transmission system. LSE's will have to revisit their nominations at certain locations as the transmission system evolves. For example, the CAISO made the revisions to the CRR model that resulted in Azusa losing long-term CRR rights to address shortfalls in the CRR balancing account and to address the implementation of EIM.

- **Shortening EIM Timelines for Binding Schedules.** This initiative was requested by Bonneville Power Administration and would explore shortening EIM timelines for submitting binding base schedules. This proposed initiative was not included in this catalog because adding this new initiative with this proposed scope item would be redundant. During the stakeholder process of the *Consolidated EIM Initiatives* the CAISO determined that changes to EIM entities' OATT would be the more appropriate vehicle to address imbalance energy settlement resulting from schedule changes. For example, OATT changes could be made to not expose transmission right owners to these imbalance charges. Changes that would result from the *Real-Time Market Enhancements* initiative would result in shortening EIM timelines.
- **Flexible Capacity Enhancements.** This initiative was requested by Public Generating Pool and Seattle City Light. This initiative would explore short-time and long-term flexible resource adequacy. It would explore 1) adding metrics to assess the flexibility needs of the system in the day-ahead, hour-ahead and real-time timeframes, 2) market structure and financial incentives for flexible capacity to be set-aside in the day-ahead and longer-term time frames to meet real-time uncertainty, and 3) adding market rules that allow for all qualifying loads and resources to be eligible as a day-head capacity product.

This proposed initiative was not included in this catalog because the proposed scope items are being addressed in other initiatives. The *Flexible RA Capacity Must Offer Obligation (FRACMOO) Phase 2* initiative is evaluating flexibility needs of the system in day-ahead, hour-ahead and real-time timeframes. FRACMOO 2 is also exploring using imports as additional flexible resource adequacy capacity. Market structure and financial incentives for flexible capacity in the day-ahead market is within scope of the *Day-ahead Reserve Product* initiative found in this catalog.

4 Initiatives Completed Since Previous Catalog

This section lists the initiatives where the policy development has completed since the CAISO published the Policy Initiatives Catalog. For the purpose of this catalog, policy development is considered completed when the stakeholder process is finished and the proposal has been approved by the CAISO Board of Governors. Initiatives placed in this section may still be currently underway, but are anticipated to be approved by the CAISO Board of Governors by the end of the year.

For additional information on initiatives underway, please refer to the initiative's web page.¹²

4.1 Generator Interconnection Driven Network Upgrade Cost Recovery (C)

The CAISO tariff requires participating transmission owners to reimburse generator interconnection customers for certain network upgrades. These network upgrade costs are included in their customer rate bases through transmission access charges. Customers of participating transmission owners with relatively small rate bases could experience significant rate increases from generator driven low voltage network upgrades. The stakeholder process explored potential changes to the current network upgrade cost recovery mechanism. The CAISO's proposal specifies guiding principles that the CAISO would apply on a case-by-case basis to alleviate unintended adverse impacts for each unique participating transmission owner.

This initiative was approved by the Board of Governors at its March 2017 meeting.

4.2 Bid Cost Recovery Enhancements (F, E2)

This initiative initially explored three elements of bid cost recovery: (1) basing real-time market bid cost recovery uplift allocation on deviations, (2) eliminating the exemption for load from being allocated bid cost recovery uplift costs to the extent that it self-schedules generation in the integrated forward market, and (3) dividing resource start-up costs over the total run time of the resource for resources operating over multiple days in the integrated forward market.

Of the three elements initially explored, the CAISO proposed to retain its current methodology for start-up costs in the bid cost recovery payment calculation. The CAISO suspended activities on the bid cost recovery allocation and integrated forward market self-schedules exemption elements

¹² <http://www.aiso.com/informed/Pages/StakeholderProcesses/Default.aspx>

of this initiative. This was because FERC issued a Notice of Proposed Rulemaking regarding real-time uplift and their final order may impact the approach for these elements of this initiative.

4.3 Stepped Constraint Parameters (F, E3)

This initiative considered revisions to the penalty prices used to relax transmission constraints used by the CAISO market. The review of penalty prices used in the CAISO market needed to comply with Federal Energy Regulatory Commission Order 831 is addressed in *Commitment Cost and Default Energy Bid Enhancements*.

After discussion with stakeholders and further review, the CAISO decided to close the Stepped Constraint Parameters initiative in March 2017. The CAISO may consider if graduated penalty prices are appropriate when there are insufficient energy bids as part of future efforts that consider co-optimizing ancillary services and energy in the real-time market.

4.4 Black Start and System Restoration (C)

The CAISO identified requirements for the immediate procurement of additional black start resources beyond those already procured by the transmission operators. In order to secure additional black start capability, the CAISO proposed to change its previous practice regarding procurement and compensation for black start services. This initiative developed a process to procure this capability and allocate costs of that procurement.

This initiative was approved by the Board of Governors at its May 2017 meeting.

4.5 Energy Storage and Distributed Energy Resources - Phase 2 (D, E2)

The CAISO's energy storage and distributed energy resources initiative is a multi-phase initiative designed to lower barriers and enhance the ability of transmission grid-connected energy storage and distribution-connected resources to participate in the CAISO market. This second phase of the initiative resulted in enhancements addressing alternative baselines for measuring demand response performance, distinguishing between a storage device's charging energy and station power, and an update to the net benefits test for demand response resources that participate in the EIM.

This initiative was approved by the EIM Governing Body and by the Board of Governors at their July 2017 meeting.

4.6 Aliso Canyon Phase 3 (C, E2)

This initiative proposed to further temporarily extend some of the measures originally put in place under the *Aliso Canyon Gas-Electric Coordination Measures* initiative and proposed to make permanent other of these measures. These were designed to mitigate the risk posed by the limited operability of the Aliso Canyon natural gas storage facility. In addition, this initiative proposed to make the CAISO market's natural gas constraint available for use throughout the CAISO and the EIM.

This initiative was approved by the EIM Governing Body and by the Board of Governors at their July 2017 meetings.

4.7 Generator Contingency Modeling/Remedial Action Scheme Modeling (C, E2)

This initiative proposed CAISO market design changes to model the potential loss of generation, a reliability issue that could require market to dispatch generation in certain locations so that transmission is not overloaded if a generator is unexpectedly lost. The same functionality would be used to also model generation loss due to remedial action scheme operation, which would more efficiently dispatch generation connected to a remedial action scheme.

This initiative was approved by the EIM Governing Body and by the Board of Governors at their September 2017 meetings.

4.8 Temporary Shutdown of Resource Operations (C)

This initiative was originally named Economic and Maintenance Outages in the *2017 Policy Initiatives Catalog*. Its name was later changed to Temporary Suspension of Resource Operations.

Under the current tariff, a resource owner is not allowed to take a resource out of service for an extended period of time when the owner believes the economic conditions cannot support the continued operation of the resource, i.e. take an outage for economic non-physical reasons. This initiative explored potential tariff changes to allow resources to temporarily shut down operation of the resource and the compensation, if any, the CAISO would pay a resource if the CAISO denies a request for a temporary shutdown.

The CAISO closed this initiative after it determined that stakeholder support for the initiative was not achievable given intractable differences in stakeholder positions.

4.9 Capacity Procurement Mechanism Risk-of-Retirement Process Enhancements (I, D)

This initiative explored modifying the CPM risk of retirement process to allow for conditional designations earlier in the year. The CAISO has authority to procure resources that are needed for reliability, but are at risk of retirement. These retirements are often due to a resource's failure to earn sufficient revenues if it is not procured by a load serving entity for resource adequacy. The CAISO's existing capacity procurement process notified resource owner at the end of the current year whether the CAISO intends to procure their capacity for the upcoming year.

The current process provided insufficient time for resources owners to make important business decisions regarding whether or not to retire their resource earlier in the year. Resource owners advocated for a longer "runway" to make these decisions. This initiative changed the notification to resource owners for conditional designations from the end of the year to earlier in the year. The new notification would occur through the resource adequacy process or under a CPM risk-of-retirement designation.

This initiative was approved by the CAISO Board of Governors at their November 2017 meeting.

4.10 Consolidated EIM Initiatives (I, D, E1)

This initiative combined EIM initiatives from the *2017 Policy Initiative Roadmap: Management of Bilateral Schedule Changes, Third Party Transmission Contribution, and Net Wheeling Charge*. Additionally, it included various EIM enhancements that will automate manually processes and improve market efficiency. These enhancement include: (1) automated matching of import/export schedule changes with an EIM non-participating resource, (2) automated updating of mirror system resources at CAISO intertie scheduling points, (3) imbalance settlement of base EIM transfer system resources, (4) submission of base generation distribution factors for aggregated EIM non-participating resources. Finally, this initiative modified certain market rules related to the CAISO's core non-generator resource model functionality. The core non-generator resource model is a market model applicable to the CAISO market in general.

Based on stakeholder feedback, the CAISO removed *Management of Bilateral Schedule Changes, Third Party Transmission Contribution, and Net Wheeling Charge* (aka equitable sharing of wheeling benefits) from the scope of this initiative. *Third Party Transmission Contribution* and *Equitable Sharing of Wheeling Benefits* will remain in the catalog as individual initiatives.

The CAISO plans to seek approval for this initiative from the EIM Governing Body at their November 2017 meeting and from the Board of Governors at their December 2017 meeting.

4.11 Contingency Modeling Enhancements (I, C)

This initiative developed a market mechanism to prepare the CAISO balancing authority area for system contingencies on major transmission lines for which the CAISO must restore flows to within operating limits within 30 minutes. This market mechanism will reduce exceptional dispatches and replace most minimum online constraints. It will also include a separate payment to resources that provide "corrective capacity". Also the market changes will include provisions related to congestion revenue rights settlement as it relates to the contingency modeling enhancements.

The CAISO plans to seek approval from the Board of Governors at their December 2017 meeting.

5 Initiatives Currently Underway and Planned

This section summarizes policy initiatives that are currently in a stakeholder process but will not be completed by the end of 2017. It also summarizes initiatives the CAISO plans to begin by the end of 2017.

5.1 Commitment Costs and DEB Enhancements (I, F, E2)

This initiative has been examining: (1) changes to commitment cost reference levels and default energy bids to allow resources to more accurately reflect cost expectations, and (2) changes to allow market-based bidding commitment costs and implementing an associated dynamic market

power mitigation methodology for these costs. This initiative is also examining hourly commitment cost offers.

5.2 Flexible Resource Adequacy Criteria and Must Offer Obligation Phase 2 (I, C)

This initiative addresses further enhancements needed to the flexible resource adequacy capacity construct and ensuring there is sufficient flexible resource adequacy capacity procured and made available to the CAISO to meet the operational needs of the transforming grid.

5.3 Review Transmission Access Charge Structure (C)

This initiative considers possible changes to the structure of the transmission access charge. The CAISO currently applies the transmission access charge to each MWh of metered internal end-use load and exports to recover participating transmission owners' costs of owning, operating, and maintaining transmission facilities under CAISO operational control. Included in the initiative scope are questions such as: (1) whether today's purely volumetric structure should be retained, or should be changed to include other factors such as peak demand; and (2) whether the billing determinant for internal load should be modified to account for the load that is offset by the energy output of distributed energy resources.

5.4 EIM Greenhouse Gas Enhancements (I, D, E1)

This initiative addresses the accuracy of greenhouse gas attribution to EIM participating resources for EIM transfers into the CAISO. It has been observed that the current dispatch algorithm may not fully account for the atmospheric effect of serving CAISO load through an EIM transfers because there may be instances where a secondary dispatch has occurred. This initiative is exploring a proposed enhancement to have two passes for the real-time market optimization to calculate greenhouse gas emissions.

Under this enhancement, in the first pass, the market will be optimized without allowing EIM transfers to sink into the CAISO. The dispatch level of EIM participating resources in the first pass will establish a reference level from which to measure the remaining upward dispatch capability of EIM participating resources. In the second pass, EIM transfers will be allowed into the CAISO and the greenhouse gas bid quantity of EIM participating resources will be reduced based on the available upward dispatch capability that remained after the first pass solution.

5.5 Energy Storage and Distributed Energy Resources Phase 3 (I, D, E2)

The CAISO's energy storage and distributed energy resources initiative is a multi-phase initiative designed to lower barriers and enhance the ability of transmission grid-connected energy storage and distribution-connected resources to participate in the CAISO market. Phase 3 of this initiative will continue to address enhancements to demand response, non-generator resources, and further exploration of multiple-use applications.

5.6 Frequency Response Phase 2 (I, F)

This initiative will complete the second phase of the CAISO's frequency response initiative. In this second phase of the stakeholder initiative, the CAISO seeks to examine a market structure that encourages frequency response capabilities of all participating resources, enables the diverse mix of resources to provide services, and ensures CAISO meets applicable reliability criteria. Without a market mechanism for frequency response capability or provision, CAISO's support of bulk electric system security will become more difficult in the long-term as the generation mix changes to accommodate a renewable portfolio standard of 50% renewables by 2030. In this initiative, the CAISO is evaluating the merits of enhancing its frequency response capability and provision through its primary or secondary frequency control mechanisms.

The CAISO has suspended this initiative until it has more clarity on the direction FERC will take on its November 2016 notice of proposed rulemaking regarding provision of primary frequency response.

5.7 Congestion Revenue Rights Auction Efficiency (D)

The congestion revenue rights (CRR) auction revenues collected by the CAISO are persistently less than the payments that the CAISO pays to auctioned CRR holders, indicating an issue with the efficiency of the CRR auction. An efficient CRR auction should lead to auction revenues that approach the auction payments. As discussed in the Department of Market Monitoring's 2015 Annual Report, since 2012 congestion revenue rights auction revenues that are allocated to load serving entities were on average \$130 million less than the congestion payments received by entities purchasing these congestion revenue rights. Most of these congestion payments are paid to financial entities that purchase congestion revenue rights but are not engaged in serving any load or managing any generation in the CAISO market. Department of Market Monitoring recommended reassessing the component of standard electricity market design under which CAISOs auction off excess transmission capacity remaining after allocating congestion revenue rights to load serving entities.

Department of Market Monitoring's Q1 2016 quarterly report outlines a potential approach for addressing this issue by modifying the congestion rights *auction* into a *market* for congestion revenue rights based on bids submitted by entities willing to buy or sell congestion revenue rights. They believe that with this approach, generators could still seek to purchase hedges for locational price differences. Financial entities or other participants could participate and submit bids reflecting a willingness to sell a hedge for locational price differences to other auction participants. Bids to buy congestion revenue rights would only be cleared if there were sufficient bids from entities willing to sell transmission revenue rights (i.e. to assume the obligation to pay congestion charges to entities purchasing these rights).

The CAISO held stakeholder workshops last spring to scope and design a study to assess the cause of the auction revenue shortfall. The CAISO plans to complete this study in November and launch a stakeholder process to consider the results and potential CRR market modifications.

5.8 Imbalance Conformance Enhancements – (I, D, E2)

This initiative would clarify the CAISO’s authority to conform for imbalance in both Day Ahead and Real Time as well as enhance the conformance limiter. The purpose of conforming is to maintain reliability of the electric grid. The purpose of the limiter is to ensure market results and pricing are aligned with current grid conditions without setting artificial price spikes.

Imbalance conforming is completed by grid operators in the CAISO and the EIM to update market inputs when system conditions vary from forecasts and/or un-predictable grid events happen. Often, these circumstances occur quickly without opportunity for necessary changes to be individually and manually input into the market. The imbalance conformance (aka *Load Conformance*) tool allows operators the ability to input the conformance directly into the market in a timely and efficient manner to maintain system reliability.

The limiter ensures that an artificial market infeasibility resulting from a mismatch between the actual system ramp capability and the operator input does not trigger invalid price spikes. This initiative would analyze the current requirements for the limiter and propose new parameters to ensure the limiter functions accurately.

5.9 Intertie Deviation Settlement (D)

The current “decline charge” for undelivered imports or exports was put into place to provide an incentive to deliver imports and exports when dispatched by the real-time market. The decline charge penalizes undelivered imports or exports to the extent they exceed a threshold amount over each month. Because of recent operational and market concerns with undelivered imports and exports, this initiative will examine if the current structure of the decline charge should be changed. The goal of this initiative is to ensure operational reliability by incentivizing intertie resources to deliver energy that has been awarded.

5.10 Review RMR and CPM Revisions (C)

This initiative would review of the Reliability Must-Run contract tariff and process. It would also seek to clarify and align the use of RMR versus backstop procurement under the CAISO’s current Capacity Procurement Mechanism tariff.

6 Discretionary Initiatives

This section describes the discretionary policy initiatives that were suggested by either the CAISO or stakeholders.

6.1 Energy and Ancillary Services Markets

This category includes potential market design enhancements that impact the day-ahead and/or real-time markets. This section also includes topics such as price formation, outage management, and resource modeling.

As background, the CAISO’s day-ahead market consists of the market power mitigation process, the integrated forward market and the residual unit commitment process. The structure and rules

for the day-ahead market are presented in the business practice manuals for market operations and market instruments.¹³

The real-time market includes three market runs: the 15-minute granularity short-term unit commitment process, the 15-minute granularity real-time unit commitment process, and the 5-minute granularity real-time dispatch. The short-term unit commitment process and real-time unit commitment process both commit resources. The second interval of the short-term unit commitment process is used for the 15-minute market, which includes financially binding 15-minute energy and ancillary service schedules and prices. The 5-minute granularity real-time dispatch also produces financially binding 5-minute energy dispatches. For more details regarding the real-time market, refer to the business practice manuals for market operations and market instruments.¹⁴

The energy imbalance market (EIM) extends the real-time market to other balancing authority areas in the West. The CAISO's market minimizes overall dispatch costs across the combined footprint of all EIM entity balancing authority areas and the CAISO balancing authority area. The EIM improves reliability by increasing the operational awareness and responsiveness to changing grid conditions across its large footprint. Further, the EIM allows for more efficient integration of renewable resources by capturing the diversity benefits across a geographical dispersed footprint.

Convergence (or virtual) bidding is a mechanism whereby market participants can make self-liquidating sales (or purchases) of non-physical energy in the day-ahead market, with the explicit requirement to buy back (or sell back) that energy in the real-time market. Virtual bids improve the efficiency of the markets because they tend to make day-ahead and real-time market prices converge.

Currently, the CAISO procures four types of ancillary services products in the day-ahead and real-time markets: regulation up, regulation down, spinning reserve, and non-spinning reserve. Section 4 of market operations business practice manual describes these ancillary services.¹⁵ The CAISO introduced the flexible ramping product in fall 2016 and plans to implement no market functionality and pricing modifications resulting from the *Contingency Modeling Enhancements* and *Generator Contingency and Remedial Action Scheme* monitoring initiatives in fall 2018.

6.1.1 EIM Default Energy Bid Option (D, E1)

Powerex, Idaho Power, and Seattle City Light suggested in the 2017 policy initiative catalog process that this initiative be added to the catalog. This initiative will explore creating a fourth option to the CAISO's current default energy bid (DEB) options. The CAISO's existing DEB options consist of a Variable Cost Option, which does not incorporate any opportunity costs; an LMP Option, which is based on a 90-day lagging metric of prices, and cannot represent same-hour or future-hour opportunity costs; and a Negotiated Rate Option based on negotiations with CAISO's Department of Market Monitoring (DMM). The Negotiated Rate Option provides a framework for a customized estimate of marginal costs. However, the market participants requesting this initiative contend it does not eliminate hour-to-hour inaccuracies of any formulaic

¹³ <http://www.caiso.com/rules/Pages/BusinessPracticeManuals/Default.aspx>

¹⁴ Ibid.

¹⁵ <https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Market%20Operations>

approach that attempts to estimate EIM resources' marginal costs, including opportunity costs. This initiative would evaluate a default energy bid option that would address these inaccuracies for EIM participants.

6.1.2 Hourly EIM Resource Sufficiency Evaluation (D, E1)

Powerex, Puget Sound Energy, NV Energy, Idaho Power, Arizona Public Service Company, Portland General Electric, and Seattle City Light suggested in the 2017 policy initiative catalog process that this initiative be added to the catalog. The hourly resource sufficiency evaluation ensure that each EIM Entity and the CAISO have sufficient participating resources to individually meet their forecasted imbalance needs for the upcoming hour. This policy was developed to ensure that EIM balancing areas do not lean on other balancing areas to avoid incurring costs for capacity, flexibility, or transmission in the bilateral market. The evaluation tests for capacity, supply/demand balance, and ramping. In the event that a balancing area in the EIM fails a test, the balancing area is not allowed to have incremental transfers from the previous hour's last FMM transfer. EIM entities have expressed the need to consider potential enhancements to the resource sufficiency evaluations. They contend the enhancements to the test should include: (1) Correct overstatement of the flexible ramp sufficiency requirement; (2) address under-valuing EIM Entity resources; (3) correct improper consequences for failing the flexible ramp sufficiency test; (4) performing flexible ramp sufficiency at T-40 with 5 minute granularity; (5) potentially make uncertainty histogram enhancements; and (6) enabling participating resource scheduling coordinators visibility into the test obligations. If the CAISO adds this initiative to the roadmap, the CAISO anticipates that this initiative would first begin with a stakeholder workshop to fully identify areas to address in the initiative.

6.1.3 Market Commitment Process Constraints (D)

NV Energy suggested in the 2017 policy initiative catalog process that this initiative be added to the catalog. This initiative would explore enhancing the day-ahead and real-time unit commitment processes. This enhancement would limit commitments of resources with must-offer obligations to hours where market participants supplied a minimum load bid. NV Energy contends resources without a must-offer obligation should not be committed for any hours in which a resource was not willing to offer.

6.1.4 Over/Under Scheduling Load Enhancements (D, E1)

Puget Sound Energy, NV Energy, Idaho Power, Arizona Public Service Company, and Portland General Electric suggested in the 2017 policy initiative catalog process that this initiative be added to the catalog. This initiative was originally requested by NV Energy in 2016.

This initiative would examine possible improvements and enhancements to load forecasting transparency and accuracy. Items that could be discussed include changes to the existing penalty bands for EIM entities deviating from the forecast, the 1% exemption rule when an EIM entity uses the CAISO load forecast, additional situations that exempt an EIM entity when using the CAISO load forecast and actual load is off by the penalty bands. This initiative may also look at changes to the distribution of penalty revenues to balancing areas in the EIM that did not incur a penalty over the operational day. For example, allocating revenues on an hourly basis to EIM balancing areas that did not incur a penalty for that hour.

6.1.5 Limiting EIM Energy Transmission Scheduled Resources Transfers (D, E1)

Idaho Power Company suggested in the 2017 policy initiative catalog process that this initiative be added to the catalog. This initiative would explore limiting the magnitude of inter-interval changes to transfers of power dispatched by the EIM between EIM balancing areas. Idaho Power Company states that that large transfer changes between intervals has the potential to cause reliability issues.

6.1.6 Generator Modeling Enhancements (D, E2)

PacifiCorp suggested in the 2017 policy initiative catalog process that this initiative be added to the catalog. This initiative would examine the variety of different resource models within the CAISO market and potentially update them. PacifiCorp contends this would improve modeling of generating units (such as combined cycle, hydro, and coal units) and curtailable metered load, and improve the flexibility that could be offered into the market if those products were able to be modeled to better fit with the unique attributes of each type of generator.

6.1.7 Combined IFM and RUC (D)

This initiative was added to the catalog by the CAISO in October 2017 and was based on the *Combined IFM/RUC with Multi-Day Unit Commitment* initiative listed in last year's catalog. This initiative would consist of combining the integrated forward market and the residual unit commitment process to co-optimize energy, ancillary services, and backstop capacity in the day-ahead market. Combining the integrated forward market and residual unit commitment process allows the market optimization to consider the CAISO's demand forecast in the market's clearing of bid-in demand. This increases the efficiency of the integrated forward market and residual unit commitment process solutions because they are co-optimized. In addition, this initiative would consider allowing the residual unit commitment process to de-commit resources to better manage the potential for over-generation because of increased amounts of variable energy resources.

6.1.8 15-Minute Day-Ahead Scheduling Granularity (D, E2)

This initiative was added to the catalog by the CAISO in October 2017. This initiative would assess how the day-ahead market could better account for ramping needs by moving from the current hourly scheduling construct to 15-minute scheduling and settlement intervals. This would provide significant benefits by enabling day-ahead market schedules to more closely follow the expected net load ramps. For example, the morning solar ramp could be more accurately scheduled using 15-minute granularity versus the average forecasted output over the hour used today. Using 15-minute granularity in day-ahead reduces the imbalance that must be resolved in real-time. This is because only forecast errors between 15-minute intervals must be resolved, unlike today where both granularity differences and forecast errors are left to the real-time market. In addition to ensuring that resources with sufficient ramping capability are scheduled optimally in the day-ahead timeframe, imports and exports that can respond on a 15-minute basis could be scheduled to help meet day-ahead net-load forecasts. The day-ahead market would still support hourly block (and longer) scheduling; however, flexible resources that are able to be scheduled economically on a 15-minute basis will be able to capture the value of their flexibility. This initiative may also assess whether EIM base schedules should similarly be at 15-minute granularity.

6.1.9 Multi-Day Unit Commitment (D)

This initiative was added to the catalog by the CAISO in October 2017 and was based on the *Combined IFM/RUC with Multi-Day Unit Commitment* initiative listed in last year's catalog. This

initiative would evaluate if the day-ahead market should include a multi-day unit commitment. Having the day-ahead market look out two to three days would create more efficient commitment decisions that better reflect whether resources are expected to run for a single or multiple days.

6.1.1 Day-Ahead Flexible Reserve Product (D)

This initiative was added to the catalog by the CAISO in October 2017. In addition to residual unit commitment awards for differences between the CAISO's load forecast and cleared bid-in demand, the day-ahead market could be enhanced to procure additional capacity to meet uncertainty needs from internal and external resources that can respond to 15-minute schedule changes and 5-minute dispatch needs in real-time. The requirement could be based on a statistical determination of uncertainty needs between the cleared day-ahead market schedules and the 15-minute market/5-minute real-time dispatch. The uncertainty requirements would likely vary by time of day and season. Scheduling coordinators would submit economic capacity bids to provide the flexible reserve product. The upward and downward capacity awards would be paid a market clearing price in the day-ahead market similar to how the CAISO currently prices ancillary services. Resources awarded upward and/or downward capacity would be obligated to submit economic bids into the real-time 15-minute market. In the event a resource does not meet its real-time bidding obligation, the CAISO would rescind the day-ahead market capacity payment.

6.1.2 Full Network Model Expansion – Phase 2 (N, E2)

This initiative would be the second phase of the Full Network Mode Expansion initiative implemented in fall 2014. That initiative provided reliability and market efficiency benefits by enhancing the CAISO's modeling capabilities to account for unscheduled flows and enforce intertie power flow constraints in the day-ahead market. As part of this, the full network model topology was expanded to include information on resources, load, and interchange schedules in other balancing authority areas.

Phase 2 will explore modeling imports and exports into the CAISO balancing at their actual source and sink to improve the CAISO market's modeling of actual electrical flow. Although the CAISO market currently uses an approximation of this for imports and exports to and from EIM areas, it currently models imports and exports to and from the CAISO balancing areas as point injections and withdrawals at the intertie scheduling point. Consistent modeling across the CAISO and EIM balancing areas would improve the market's accuracy. The initiative would likely consider the potential use of "scheduling hubs" as representations of import and export sources and sinks, e-tagging or settlement rule refinements, and remapping congestion revenue rights to scheduling hubs.

6.1.3 Regional Integration (D)

The California legislature and other stakeholders continue to consider a framework for extending the CAISO balancing area and day-ahead market to multiple states. This initiative would consider modifications to the CAISO markets and associated rules to accomplish a regionally integrated market that address resource adequacy, transmission cost recovery, grid management charges, and a governance structure.

6.1.4 Storage as a Transmission Facility (D)

This initiative was added to the catalog by the CAISO in October 2017. This initiative would consider using electric storage to provide grid services as a transmission facility, with all or a portion of costs recovered through the transmission access charge. This initiative would further explore issues around electric storage resources seeking to receive cost-based rate recovery for certain services (transmission, grid support services, or other needs identified by an RTO/ISO). It would also explore storage resources receiving market-based revenues for providing separate market-based rate services.

6.1.5 Ancillary Services Verification, Compliance Testing, and Auditing (D)

This initiative was added to the catalog by the CAISO in October 2017. This initiative would consider revisions to the CAISO's program for ancillary services performance audits and compliance tests. Under section 8.9 and 8.10 of its tariff, the CAISO conducts both performance audits of how resources with spinning reserve and non-spinning reserve awards respond to contingency dispatches as well as unannounced compliance tests conducted by operations. Pursuant to the CAISO's operating procedures, a resource must reach 90 percent of its awarded capacity within 10 minutes to pass a performance audit or compliance test. This initiative would consider changes to the payment rescission rules associated with this program as well as eliminating the issuance of notices to regulatory authorities when resource adequacy resources do not pass an ancillary services performance audit or compliance test.

6.1.6 Bid Floor (N, E2)

This initiative would examine lowering the CAISO's bid floor. On December 19, 2013 FERC accepted the CAISO's proposal to lower the bid floor from - \$30/MWh to -\$150/MWh under the notion of facilitating increased real-time economic bidding by variable energy resources. By lowering the bid floor, the opportunity costs of not producing for many variable energy resources could be reflected in the resource's economic bid. It also provides an incentive for resources with positive marginal costs to economically bid instead of self-schedule. Those resources can avoid negative prices in both day-ahead and real-time, for schedules above day-ahead, and generate more revenues in real-time for decremental dispatches below day-ahead. During the 2013 stakeholder initiative, it was contemplated that a further reduction to -\$300/MWh would occur at some later date.

Currently, the bid floor (-\$150/MWh) and bid cap (+\$1000/MWh) are not symmetrical. This results in under-scheduled load in the day-ahead market being potentially subject to real-time prices at the \$1,000/MWh bid cap, and for overscheduled load in the day-ahead market potentially incurring a cost of \$150 per MWh. Thus the incentive for not under-scheduling load in the day-ahead market is not equivalent to the incentive for not over-scheduling load in the day-ahead market. Furthermore, as the supply fleet evolves towards a 50 percent renewable portfolio standard, there may be increased instances of over-supply conditions. A deeper pool of economic bids could enable the market to more efficiently manage over-supply conditions, but may require a bid floor such that resources are able to fully reflect the cost of not producing. The current bid floor of -\$150/MWh may not be sufficiently low enough to incent the procurement of downward flexible resources that will be needed as we move toward a 50 percent renewable performance standard and may not provide accurate price signals during periods of high downward flexibility needs.

The CAISO discussed a lower bid floor with stakeholders in 2016 as part of the Bid Cost Recovery Enhancements initiative. The CAISO decided not to lower the bid floor after weighing both the benefits of a lower bid floor and the potential adverse effects of a lower bid floor, such as increased overall market costs. The CAISO decided the benefits would be limited because the market relatively infrequently curtails self-scheduled generation, indicating it relatively runs out of economic bids under the current bid floor. CAISO will continue to monitor levels of self-schedule curtailments and other market results to determine whether a lower bid floor is appropriate.

6.1.7 Fast Frequency Response (D)

This initiative would explore a potential separate market product for resources to provide automatic, autonomous fast frequency response. This would entail providing frequency response within a much shorter timeframe (i.e. within 60 cycles) than within the primary control horizon, generally within seconds provided by automatic generator response, load response (typically from motors), and other devices that provide an immediate response based on local (device-level) control systems. This service is also referred to as synthetic inertia. CAISO procurement of this service may be needed in the future to assist in arresting frequency decay once the system has even higher levels of renewables and the system's inherent inertia is insufficient to arrest frequency decay in a timely manner.

6.1.8 Real-Time Market Enhancements (D, E2)

This initiative will examine market design changes needed to enable the 5-minute real time dispatch to perform many of the functions that are now performed by the 15-minute real time unit commitment. These functions may include real-time unit commitment, ancillary services procurement, local market power mitigation, and the EIM hourly resource sufficiency evaluation. The 15-minute market would continue to schedule interties and internal resources at 15-minute granularity but would run with a shorter lead time. Along with these changes, the CAISO may consider extending the horizon of short-term unit commitment process to allow for a longer look-ahead period, enabling it to commit resources that have a start-up time longer than five hours and to more optimally commit all resources, particularly those with limited starts.

6.1.9 Regulation Pay-for-Performance Enhancements (D)

ARES suggested in the 2017 policy initiative catalog process that this initiative be added to the catalog. The CAISO implemented a market design for a regulation market in response to FERC's directive under Order 755. In this design, the CAISO compensates resources for their performance through a mileage payment. This initiative would review and analyze the current method of compensating resources in the regulation market, potentially explore enhancements to the pay-for-performance payments, and/or explore enhancements to the CAISO's minimum performance criteria and regulation certification process.

6.1.10 Regulation Service RT Energy Make Whole Settlement (D)

This initiative would examine whether rule changes are appropriate for the settlement of real-time imbalance energy when resources are providing regulation. The regulation up and regulation down products allow the CAISO to move a resource up or down, respectively, in real-time within a defined capacity range using automatic generator control. The resulting imbalance energy is settled as real-time instructed imbalance energy at the real-time price. NCPA noted the price of this imbalance energy can result in a significant net loss to a resource despite the resource performing as dispatched by the CAISO. For example, the CAISO market can schedule a

resource for downward regulation and then move the unit down in real-time. If the energy price is high, this can result in the resource “buying-back” its energy schedule at a loss.

6.1.11 Fractional Megawatt Regulation Awards (D)

SDG&E proposed in a previous policy initiative catalog process that this initiative be added to the stakeholder initiatives catalog. This initiative would explore the CAISO establishing minimum thresholds for regulation awards. SDG&E has observed that certain of its automatic generation capacity capable (AGC-capable) units receive regulation awards of as little as 0.01 MW, which is not only infeasible but also removes otherwise available capacity above the regulation range from the market. An effective solution may be to enable market participants to specify a minimum regulation award quantity.

6.1.12 Multi-Stage Generator Regulation Refinements (D)

This initiative was added to the catalog by the CAISO in September 2015. When there is low hydro availability, CAISO operations is more dependent on the thermal units on automatic generation control which requires more realistic regulation modeling for the thermal units. One advantage of the multi-stage generator model is if a plant could provide regulation at different configurations, every configuration could have its own regulation bid price and regulation ramp rate.

6.1.13 Flexible Ramping Product Enhancements (D, E2)

The Department of Market Monitoring suggested in the 2017 policy initiative catalog process that this initiative be added to the catalog. This initiative would explore enhancements to the design of the flexible ramping product. The flexible ramping product design that was implemented in fall 2016, procures and prices the appropriate amount of ramping capability to account for the uncertainty in only five minute net load forecasts. Flexible ramping product design enhancements in this initiative include locational procurement and pricing of flexible ramping capability, and appropriately including the impacts of dispatchable-resource uninstructed deviations into the flexible ramping product demand curve and cost allocation.

6.1.14 Allowing Convergence Bidding at CRR Sub-Load Aggregation Points (D)

WPTF suggested during a previous policy initiative catalog process that this initiative be added to the catalog. Currently convergence bidding does not allow virtual bids at congestion revenue right sub-load aggregation points. WPTF would like the CAISO to consider adding congestion revenue right sub-LAPs to the available locations for convergence bidding.

6.1.15 Implement Point-to-Point Convergence Bids (D)

DC Energy suggested during a previous policy initiative catalog process that this initiative be added to the catalog. This initiative would examine market rules to allow market participants to bid point-to-point – a source and a sink combined with specified up to congestion price. Point-to-point up-to-congestion bids would clear as long as the specified congestion spread bid is greater than the congestion spread in the day-ahead market. Congestion spread is the difference between the sink and source’s locational marginal price in the day-ahead market. A point-to-point up-to-congestion bid will pay the difference of locational marginal price at the sink minus locational marginal price at the source in the day-ahead market and will be paid that difference in the real-time market. These price differences may be positive or negative, determining whether the market participant is paid or has to pay in either market.

6.1.16 Review of Convergence Bidding Uplift Allocation (D)

This initiative would explore a settlement rule to allocate real-time congestion offset costs to convergence bids to the extent convergence bids contribute to these costs. These offset costs can occur when the CAISO needs to adjust constraint limits downward in the 15-minute market below levels incorporated in the day-ahead market model. For instance, this occurs due to transmission de-rates or modeling inaccuracies that cause actual flows to exceed the available transmission. This can cause significant real-time imbalance offset costs currently allocated primarily to load-serving entities.

6.1.17 Enhancing Participation of External Resources (D, E1)

This initiative would investigate potential EIM enhancements to allow participation of resources in balancing authority areas that have not joined the energy imbalance market. The proposed changes will ensure that external participation is complementary and compatible with bilateral trades. In addition, the external resources will need to meet similar requirements of EIM participating resources. Such as locational bidding of a physical resource, modeling of resource characteristics, telemetry, and metering to enable accurate modeling of physical flows, congestion management, and ensure feasible dispatches. Also, these external resources will need to be subject to market power mitigation procedures and make transmission available to exclusively accommodate its maximum bid range. Lastly, rules will need to be developed to address potential leaning by extending the resource sufficiency evaluation to external participation.

6.1.18 Potential EIM-wide Transmission Rate (D, E1)

This initiative would develop and design evaluation criteria to assess the merits of alternative transmission service rates for transmission compensation in the EIM. The CAISO would likely consider the following alternatives that were outlined in the EIM draft final proposal:

- Reciprocity in Use of Transmission Made Available by Rights-Holders
- Transmission Access Charge
- Transfer Charge as a Minimum Shadow Price
- Transmission Access Charge Applicable to Load and Wheeling¹⁶

6.1.19 Flow Entitlements for Base / Day-ahead Schedules (D, E1)

This initiative would evaluate adding this functionality if there is a material impact on the constraints within a balancing authority area in the EIM footprint from other EIM balancing authority areas or the CAISO. Currently, the real-time congestion offset is allocated based solely upon where the constraint is located. This design change would allocate a portion of a balancing authority area's real-time congestion offset to other balancing authority areas in the EIM in the event that base schedule flows exceed agreed to flow entitlement.

6.1.20 Equitable Sharing of Wheeling Benefits (D, E1)

This initiative would evaluate wheel-through transactions occurring throughout the EIM area. A wheel through is a transaction in which an EIM Entity facilitates a transfer without sourcing or sinking energy. When a wheel through occurs, the entity "in the middle" receives no direct financial

¹⁶ The Energy Imbalance Market Draft Final Proposal can be found at:
<https://www.westerneim.com/Documents/EnergyImbalanceMarket-DraftFinalProposal092313.pdf>

benefit even though they facilitated the transfer. This initiative will also investigate the need for compensation when net wheeling occurs.

This initiative was originally considered in 2017 but it was determined at the time that all EIM Entities currently benefit more than they facilitate wheels. Therefore, because all entities receive direct financial benefit from the EIM (in comparison to net wheeling), an ex-post settlement or hurdle rate to compensate for wheels was not favorable. This item will remain in the catalog and can be revisited if it is prioritized and deemed necessary. Wheeling data will be published quarterly in the EIM Quarterly Benefits Report.

6.1.21 Third Party Transmission Contribution (D, E1)

The initiative would explore allowing third parties to contribute transmission capacity located between two EIM BAAs for use in the EIM. This would increase energy transfer throughout the EIM area and enable the third party to receive congestion rents. This initiative was originally considered in 2017, but it was determined at that time the implementation costs may outweigh use and benefits. The CAISO agreed to keep this item in the catalog so it can be prioritized at a later date if deemed necessary.

The CAISO believes implementation of the third party transmission contribution may address concerns regarding transmission compensation for net wheeling. For example, if an EIM entity releases available transmission capacity to the EIM, this may exceed the EIM transfer in and EIM transfers out of that BAA needed to meet its own imbalance energy needs. The EIM entity may be concerned that other market participants are not submitting hourly base schedules for wheel transactions, but rather waiting for the EIM because the market participant knows there would be unused transmission made available such that the wheel transaction had a very high probability of flowing in the EIM and avoiding the transmission charges. The EIM entity could modify its open access transmission tariff such that only transmission necessary to meet its own imbalance is release to the EIM. This now removes the high level of certainty that the wheel transaction will flow in the EIM. The market participant now has an incentive to procure transmission and if the market participant did not want base schedule the wheel, the market participant could contribute the transmission to the EIM which would enable the wheel to flow if economic in the EIM.

6.1.22 Bidding Rules on External EIM Interties (D, E1)

Currently, the EIM design allows full discretion to the EIM entity as to whether real-time economic bidding is allowed on intertie scheduling points with balancing authority areas outside the EIM footprint. This initiative would determine the calculation of a default energy bid for intertie transactions and other issues to resolve should an EIM entity decide to allow economic bidding at its interties. *Full Network Model Expansion – Phase 2* would be a necessary precursor to this initiative so that the CAISO would model economic bids consistently between CAISO and EIM areas.

6.1.23 Over/Under Scheduling Load Enhancements (D, E1)

NV Energy suggested during the 2017 policy initiative catalog process this initiative be added to the stakeholder catalog. This initiative would examine possible improvements and enhancements to load forecasting transparency and accuracy. Items that could be discussed include changes to the existing penalty bands for EIM entities deviating from the forecast, the 1% exemption rule when an EIM entity uses the CAISO load forecast, additional situations that exempt an EIM entity

when using the CAISO load forecast and actual load is off by the penalty bands. This initiative may also look at changes to the distribution of penalty revenues to balancing areas in the EIM that did not incur a penalty over the operational day. For example, allocating revenues on an hourly basis to EIM balancing areas that did not incur a penalty for that hour.

6.1.24 Hourly Bid Cost Recovery Reform (D, E2)

The CAISO implemented market changes in 2014 that separated bid cost recovery calculations and payments between the day-ahead and real-time markets. This initiative would break the bid cost recovery review horizon further in real-time which is in line with the Market Surveillance Committee's opinion on the bid cost recovery rule changes wherein it suggests that "separable decisions" should receive separate bid cost recovery. One possibility is to afford separate bid cost recovery to separate commitments of short-start units in the real-time market.

6.1.25 Inter-Scheduling Coordinator Trade Adjustment Symmetry (D)

NRG suggested in a previous stakeholder initiative catalog process that this initiative be added to the catalog. Currently, market participants engage in an Inter-Scheduling Coordinator Trade (IST) based on a forecast for a variable energy resource (VER). The CAISO then updates the VER forecast, if the revised forecast is lower than the amount in the agreed upon IST, the IST is reduced and the SC for the VER is "forced" into a Converted Physical Trade (CPT) for the difference between the previous IST and the new IST. However, if the revised CAISO VER forecast is higher than the amount in the IST, the IST is not adjusted. This creates asymmetrical treatment in two ways: (1) by forcing the VER SC into a CPT only where the forecast is lower but never forcing the SC for the VER buyer into a CPT where the forecast is higher, and (2) creating a mechanism in which the amount of the IST can only be reduced, but never increased, by a more accurate forecast. If the CAISO VER forecast is unbiased, the IST should be allowed to go up – creating a CPT for the SC buyer – when the T-45 forecast is higher than the IST.

6.1.26 Exceptional Dispatch Decremental Settlement (D)

This initiative would address settlement rules for decremental exceptional dispatch energy including its shut-down energy (energy from minimum load to shutdown). First, decremental energy settles at the lower of the locational marginal price, default energy bid, or market bid. Second, the tariff does not specify a price for decremental exceptional dispatch energy when a resource is exceptionally dispatched to shut down from minimum load. Therefore the current practice has been not to charge any price at all. This initiative would explore settlement alternatives for decremental exceptional dispatches including shut-down energy.

6.1.27 Extending the submission deadline for Real-Time Inter-SC trades (D)

Boston Energy Trading and Marketing suggested in the 2017 policy initiative catalog process that this initiative be added to the catalog. This initiative would examine a mechanism to allow for inter-scheduling coordinator trades (IST) to reflect bilateral contracts transacted in the real-time. The real-time IST would allow CAISO to account for these bilateral contracts between two parties through the real-time market in its FMM and RTD settlements. This would reduce the SC need to perform additional transactions outside of CAISO Market while mitigating against potential double settlement both in the organized and bilateral markets. It would also examine extending the inter-SC physical trade submission deadline until some period after the hour is completed or allow VERs to update their inter-SC physical trade MW value some period after the hour is completed.

6.1.28 FMM Block Scheduling of Demand Response Resources (D, E2)

PG&E suggested during the 2017 policy initiative catalog process that this initiative be added to the catalog. This initiative would explore enhancements to Reliability Demand Response Resources through block scheduling to dispatch these resources in the real-time market only in the 15-minute market.

6.1.29 Marginal Loss Surplus Allocation Approaches (D)

Since the start of the CAISO's nodal market, the CAISO has allocated the marginal loss surplus based on measured demand. This methodology was accepted by FERC in its September 21, 2006 MRTU order. PG&E previously expressed concerns regarding the accepted methodology and suggested an alternative approach to allocate marginal loss surplus. The CAISO agreed to study alternatives and published analyses in April 2007 and October 2010 comparing its current methodology to other proposed alternatives. The April 2007 report found that allocation based on measured demand was within the bounds of alternative methodologies. Using data from the first year of operation after the start of the nodal market, the October 2010 report found that allocation based on measured demand did not lie within the bounds of alternative methodologies. Based on these results, the CAISO agreed to perform further analysis using "data covering the period after April 1, 2010, which will further inform the stakeholder process". To re-launch this stakeholder process, the CAISO would need to release an update to the October 2010 report.

6.1.30 Export Charges (D)

This initiative would address real-time intertie liquidity by increasing the quantity of export bids in the real-time market by exempting real-time exports from transmission access and measured demand uplift charges.

6.1.31 Multi-Stage Generator Bid Cost Recovery (D, E2)

In 2014, the CAISO implemented market design changes resulting from the completed "Renewable Integration Market and Product Review" and "Bid Cost Recovery Mitigation Measures" initiatives that separately calculates bid cost recovery for the day-ahead and real-time markets. For non-multi-stage generators, this is a straightforward calculation that clearly assigns costs to either market. However, multi-stage generators may be committed in different configurations between the day-ahead and real-time markets. This initiative would further refine the allocation of costs between the day-ahead and real-time markets for multi-stage generators committed in different configurations in the two markets.

6.1.32 Extended Pricing Mechanisms (D, E2)

This initiative would explore extended pricing mechanisms to either incorporate non-priced constraints into energy prices or to reduce uplifts. An example of an extended pricing mechanism is the Midwest ISO's "extended locational marginal pricing (LMP)." Extended LMP, or convex hull pricing, is a pricing methodology that incorporates the costs of resource commitment and dispatch in energy clearing prices. LMPs only capture generator dispatch costs based on incremental energy bids and do not directly account for unit start-up or transition costs, minimum load costs, and impact of discontinuous minimum and maximum generation physical parameters. These additional costs are typically incurred by fast start or fast response resources such as gas turbines and demand response. Extended LMPs aim to better reflect the full cost of satisfying demand.

6.1.33 Integrated Optimal Outage Coordination – Phase 2 (D)

This initiative would examine including economic criteria for approving or rejecting planned outage repair requests. In an effort to improve and expedite outage management studies and decisions on system-wide level, the CAISO is developing an analysis engine capable of solving the short-term integrated optimal outage coordination. The “Integrated Optimal Outage Coordination” application is intended to provide a comprehensive support for the operation engineers and outage coordination groups in their evaluation and approval process of both transmission and generation outages in an integrated system-wise and optimal manner.

Using the Integrated Optimal Outage Coordination application, the CAISO will have the ability to consider physical characteristics of resources, system and network constraints in addition to the constraints associated with independent and dependent repairs. The Integrated Optimal Outage Coordination application will provide an optimal outage schedule while ensuring reliable system operation. In the first phase, the resulting outage schedule will be optimal in the sense that it can minimize bid-in costs while taking into account physical constraints of generating and transmission assets and maintaining power system reliability requirements.

6.1.34 Rescheduled Outages (D)

Currently, section 9.3.7 of the CAISO tariff describes the process by which the CAISO may cancel or change an approved maintenance outage if it is “required to secure the efficient use and reliable operation of the CAISO-Controlled Grid.” Section 9.3.7.3 describes what compensation will be paid to a participating transmission owner or participating generator as the result of the cancellation of an approved maintenance outage. Stakeholders have indicated that they believe this may not adequately consider their situations and would like to re-examine these rules to ensure that they result in the most efficient operation of the grid and their resources and ensure fair compensation.

6.1.35 Regulation Aggregated Pumps and Pumped Storage (D)

This initiative would include enhancements to participating load that would improve participating load’s ability to participate more fully in the market. Since the implementation of the CAISO’s nodal market in 2009, participating load’s functionality has been limited to providing non-spinning reserves. State Water Project recommends that the CAISO conduct a study on what improvements could be made to participating load functionality that would provide system benefits and conforms to pumping load/pumping storage limitations. For instance, SWP believes that the ability for participating load to bid demand in the real-time market would greatly reduce the current barriers to participating load’s participation in wholesale demand response and possibly improve system reliability during over-generation periods. Also, by allowing participating load to change its demand bid in the real-time market, participating load could potentially better respond to ramping needs by shifting demand during critical ramping periods when water conditions permit.

6.2 Congestion Revenue Rights

This section describes potential enhancements to the CAISO’s rules and systems related to congestion revenue rights (CRRs), including both short-term (*i.e.*, one-year seasonal and monthly) CRRs, as well as long term CRRs. The CAISO allocates CRRs to load serving entities in the CAISO balancing area and makes them available to all market participants through auction. Further details are available in the business practice manual for CRRs.

6.2.1 Long Term Congestion Revenue Rights (D)

This initiative would explore potential long term CRR products, as well as refinements to the long term CRR products. These would include some or all of the following items:

- A multi-period optimization algorithm for long term CRRs. When the CAISO performed the initial release of long term CRRs for the period 2008-2017, the simultaneous feasibility test optimization treated the entire 10-year time horizon as a single time period (for each combination of season and time of use period) with respect to network model assumptions. A multi-period algorithm may result in a more optimal allocation of long term CRRs because it would reflect different assumptions for each year regarding the availability of grid capacity for CRRs, in particular the known expiration of previously released long term CRRs, existing transmission contracts, and converted rights.
- Flexible term lengths of long term CRRs. FERC's July 6, 2007 Order on CRRs encouraged the CAISO to consider future flexibility to allow: (1) long-term CRRs in excess of 10 years; (2) annual CRRs with guaranteed renewal rights up to year 10; or, (3) long term CRRs with terms ranging from 2 to 9 years. FERC notes that any subsequent change in the available term lengths would have to respect the rights of the holders of any outstanding 10-year CRRs. This initiative could modify the annual CRR process to allow market participants in subsequent auctions to submit bids/offers for any remaining months in the current year, as well as any block of months in the current year.
- A long term CRR auction. The CAISO's January 29, 2007 compliance filing on long term CRRs noted that several parties wanted the CAISO to implement an auction process for long term CRRs, which the CAISO agreed to consider for a future release. FERC's July 6, 2007 order on CRRs encouraged the CAISO to initiate a stakeholder process and file tariff language to implement an auction for residual long term CRRs in a future release of the new market. If the CAISO and the stakeholders decide to move forward with a long term CRR auction, then the ability to sell CRRs in the auctions would be included in the scope of that effort if it is not implemented sooner.

6.2.2 Congestion Revenue Rights Revenue Sufficiency (D)

This initiative would also evaluate various improvements to revenue sufficiency which would include some or all of the following items:

- CRR modifications. During 2014, the CAISO experienced significant revenue inadequacy of CRRs. The CAISO used existing tariff authority to model additional contingencies in both the annual and monthly CRRs release process starting in September 2014. In addition, the CAISO expanded the number of paths that are adjusted in the annual process using the breakeven methodology applied to internal constraints and intertie scheduling points. This initiative would address any additional changes that may be warranted to address revenue inadequacy.
- Revenue inadequacy. PG&E in a previous stakeholder catalog process requested this initiative be added to the catalog. Integrated Forward Market congestion revenues

collected by the CAISO are persistently less than the payments that the CAISO pays to all CRR holders, indicating variances between the CRR market modeling and the integrated forward market modeling. PG&E is concerned by the large sums of CRR revenue inadequacy that have occurred in the past. Revenue inadequacy totaled \$200 million in 2014 and approximately \$80 million through Q3 of 2015.

- **Improved Requirements for Transmission Outage Submission.** DC Energy proposed in a previous catalog process that this initiative be added to the catalog. According to the Outage Management Business Practice Manual, “requests for planned outages of Significant Facilities must be submitted to CAISO Outage Coordination at least 30 days prior to the start of the calendar month for which the outage is planned to begin”. The “30-day rule” is intended to improve the fidelity of the Monthly CRR network models, however the current construct does not include an incentive mechanism for adhering to the rule. That is, the rule is advisory only and there is no implication for schedules submitted inconsistent with the rule’s timeline. Adhering to the rule has numerous important benefits since outages on Significant Facilities significantly impact the amount of CRR network capacity offered and the resultant CRR revenue adequacy. In addition, it promotes the transparency of high impact outages, which can help rationalize CRR clearing prices and foster CRR price convergence.

DC Energy proposed a similar initiative in the 20117 catalog process, requesting the CAISO post information related to CRR modeling on its market participant portal and address advanced notification changes to congestion management, requiring entities to submit transmission outages so they can be included when submitting nomination in the CRR market model, and expanding the definition of significant entities to possibly include 100kv elements.

- **CRR Allocation.** CDWR requested this initiative in a previous catalog process that the CAISO introduce revise the Counter-flow CRR methodology used for allocating CRRs sourced at the trading hubs. CDWR believes that the current methodology contributes to revenue imbalance of the CRR balancing account and is counterproductive to the stated purpose for CRRs.

6.3 Resource Adequacy

The CAISO works closely with local regulatory authorities to develop and implement resource adequacy policies and rules that ensure sufficient capacity exists in the balancing area in the right places and with the right capabilities. While the CAISO does not take the lead role in establishing system resource adequacy requirements, the CAISO does have specific and essential responsibilities in most all resource adequacy related functions, including establishing local and flexible resource adequacy capacity needs.

6.3.1 Resource Adequacy Enhancements (D)

This initiative was added to the catalog by the CAISO in October 2017. The rapid transformation of the resource fleet to cleaner and more variable energy resources is exposing inadequacies in the current resource adequacy framework. In collaboration with the CPUC and stakeholders, the

CAISO will explore what reforms are needed to the CAISO's resource adequacy rules, requirements, and processes to ensure the future reliability and operability of the grid.

6.3.2 Multi-Year Resource Adequacy (D)

WPTF suggested in the 2017 policy initiative catalog process that this initiative be added to the catalog. This initiative would work in tandem with the California Public Utility Commission's Multi-Year RA proceeding with the intent on expanding any CPUC-jurisdictional program to all CAISO participants.

6.3.3 Multi-Year Risk-of-Retirement (D)

NRG suggested in the 2017 policy initiative catalog that this initiative be added to the catalog. The CAISO's current authority to issue a "risk-of-retirement" backstop procurement designation extends only a single year into the future. As a result, there is no mechanism to ensure that capacity that might otherwise retire would be kept in operation to maintain reliability for needs projected more than a single year out. Extending the CAISO's authority to issue a "risk-of-retirement" backstop designation, and provide appropriate compensation, to more than a year in advance would help address this current deficiency in procurement processes.

6.3.4 Examination of NQC Values for ELCC Methodology (D)

SDG&E requested in the 2017 policy initiative catalog process that this initiative be added to the catalog. This initiative would conduct an effective load carrying capability (ELCC) study to determine the capacity contribution of wind and solar resources (i.e. net qualified capacity, NQC). As part of this initiative the CAISO would work with stakeholders to determine the input assumptions and inputs for this study process.

6.3.5 Review of Maximum Import Capability (D)

This initiative would be in conjunction with the multi-year RA obligation framework being considered by the CPUC as part of track three of the RA proceeding (R.14-10-010). It would conduct a holistic review of the maximum import capability methodology to address state policies or objectives to minimizing the need for further system reinforcement or preferred locations for renewable generation. It would also review the methodology of allocation of maximum import capability for market participants.

6.4 Interconnection

This section includes policy initiatives related to interconnection and transmission planning.

6.4.1 Interconnection Process Enhancements (D)

LSA suggested this initiative as part of the 2017 policy initiative catalog process. This initiative would review potential enhancements to its generation interconnection process to reflect changes in the industry and to better accommodate the needs of interconnection customers. This initiative would consider the following topics for consideration: generator interconnection and deliverability allocation procedures ("parking" rules, transmission upgrade status, generator interconnection, behind-the-meter storage issues, participating transmission owner construction timing, shared stand-alone network upgrades, reassessment cost cap, affected system options, shared transformer clarifications, downsize before Phase 1 Study, local capacity requirement qualification, security impacts of withdrawal- phased third interconnection financial security postings, and process clarifications for invoicing and posting.

6.4.2 GIDAP and Industry Generation Procurement Solicitations Alignment Opportunities (D)

First Solar suggested this initiative as part of the 2017 policy initiative catalog process. This initiative would examine and explore opportunities to further align the current generator interconnection and deliverability allocation procedures with industry generation procurement solicitations. It will review the time frames projects need to compete in procurement solicitations and their need and ability to retain eligibility for transmission deliverability. It will also examine if the current ‘parking’ provisions that allow projects to compete for long-term utility contracts and other consumers’ solicitations are reasonable.

7 Proposed Deletions

This section includes the CAISO’s proposed deletions to this catalog:

7.1 Transitional Grid Management Charge for New PTOs (D)

Reason for deletion: This initiative’s scope would be subsumed in Regional Integration (D).

This initiative would explore the need to provide a transition mechanism for new participating transmission owners that may join the CAISO. Specifically, the CAISO will develop guiding principles that enable new entrants into the CAISO balancing authority area, ensure existing participants are not made worse off due to the transitional mechanisms, and that outline a process by which the new participating transmission owners would transition to comparable treatment with existing participating transmission owners.

7.2 FMM Settlements of Non-Participating Resources (D, E2)

Reason for deletion: The CAISO implemented system changes that addressed the issue below. PacifiCorp asked that this initiative request be removed from the catalog.

PacifiCorp suggested in the 2016 policy initiative catalog process that this initiative be added to the catalog. This initiative would review the EIM settlement rules and processes governing settlement of non-participating resources, this would include variable energy resources in the CAISO’s 15-minute market. After the review, it could determine if current settlement processes should be revised to ensure a certain level of FMM settlements, regardless of whether or not it is economic.