



California Independent
System Operator Corporation

March 11, 2022

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. ER22- ____-000**

**Tariff Amendment to Implement Resource Sufficiency Evaluation
Enhancements**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) submits this tariff amendment to implement resource sufficiency evaluation (RSE) enhancements prior to summer 2022 that improve performance and address several concerns expressed by stakeholders.¹ The RSE is a key element of the western energy imbalance market (WEIM) that ensures each WEIM entity can adequately balance its own supply and demand prior to participating in the real-time market. The proposed enhancements will allow the RSE to assess more accurately whether a balancing authority area in the WEIM is scheduling or bidding sufficient supply in the upcoming hour to meet its demand. The proposed enhancements will also produce a more appropriate allocation of revenues resulting from RSE penalties.

The proposed tariff enhancements build upon understandings learned from root cause analyses of the heat wave events in August 2020 and on July 9, 2021, and the CAISO's discussions with stakeholders through the Summer 2021 Readiness stakeholder initiative.² They reflect market rule changes and other enhancements

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 are references to sections of the CAISO tariff unless otherwise specified.

² See *Cal. Indep. Sys. Operator Corp.*, 175 FERC ¶ 61,160 (2021) (accepting, *inter alia*, changes to the RSE provisions of the CAISO tariff).

feasible for the CAISO to implement by summer 2022. These enhancements will better enable the CAISO's real-time market to deliver benefits to customers and WEIM participants across the western United States.

The CAISO respectfully requests the Commission issue an order by May 27, 2022, accepting the proposed tariff revisions to be effective on or after June 1, 2022.³ This will provide sufficient advance notice and time for market participants and the CAISO to prepare for implementing these changes. Consistent with Commission precedent recognizing the actual implementation date of some market rule changes can depend on variables that cannot be fully predicted in advance and additional time may be needed to implement some market rule changes, the CAISO further requests authorization to inform the Commission of the actual effective date of the tariff changes through a subsequent filing within five business days following the implementation.⁴

I. Executive Summary

The RSE is a collection of four tests – the balancing test, capacity test, flexibility test, and feasibility test – and associated procedures the CAISO administers in the real-time market. The RSE determines whether balancing authority areas (BAAs) in the WEIM area have sufficient capacity and flexibility to meet forecasted demand and that WEIM base schedules are feasible and balanced. This ensures that all transferred supply cleared in the real-time market results from economic displacement, rather than BAAs relying on the WEIM to clear real-time energy shortfalls. A BAA's failure to ensure sufficient capacity or flexibility is available results in the BAA being ineligible to receive incremental energy transfers from other BAAs. Passing the RSE entitles a BAA to share incremental transfers and diversity benefits with other BAAs in the real-time market, including allocation of over- and under-scheduling charges paid by others that are out of balance. The balance requirement provides financial disincentives against strategic under-scheduling or over-scheduling base schedules in the WEIM area.

The CAISO proposes the following tariff revisions to improve the accuracy of the RSE for summer 2022 and beyond.⁵ The CAISO proposes to revise the balancing test component of the RSE to exclude entities not subject to the balancing test from potential revenue allocation. The CAISO proposes the following revisions to the

³ The CAISO tentatively plans on implementing the proposed enhancements on June 1, 2022, but desires flexibility regarding the implementation date if there is some delay.

⁴ 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.

⁵ Attachment D reflects these same proposed changes to the balancing test, the capacity test, and the flexibility test in a tabular format. The CAISO proposes no changes to the feasibility test.

capacity test and/or flexibility test components of the RSE: (1) enhancing the accounting of supply that affects resource availability in the capacity test and, in some cases, the flexibility test; (2) adjusting the upward ramping capability requirement in the flexibility test to account for power balance constraint relaxation; (3) considering the state of charge for storage resources in the capacity and flexibility test; (4) allowing a WEIM entity to adjust its demand forecast referenced in the capacity and flexibility tests to account for demand response not currently represented in the real-time market; and (5) discounting CAISO interchange without a tagged transmission profile equal to the hour-ahead scheduling process (HASP) award from the capacity and flexibility tests for the CAISO BAA. Finally, the CAISO proposes to remove the incremental capacity test requirement determined using a historical intertie uncertainty calculation.⁶

Collectively, these proposed tariff revisions improve the RSE and are implementable by summer 2022. They will increase the accuracy of supply accounting in the RSE, build on lessons learned over the past few years, and address concerns raised in phase 1 of the WEIM Resource Sufficiency Evaluation Enhancements (RSE Enhancements) stakeholder initiative.⁷ These enhancements and associated clarifications can serve as a baseline for possible future enhancements market participants and the CAISO are considering in subsequent phases of this ongoing stakeholder initiative. As explained below, the CAISO is continuing to consider several enhancements that are not feasible for implementation by summer 2022 or are otherwise beyond the scope of this filing. In addition to the proposed tariff revisions, the CAISO has taken steps to improve the transparency of the performance of the RSE that do not require amendments to the CAISO tariff.

⁶ The CAISO will also remove the net-load uncertainty language from the RSE tariff provisions as part of this filing because the CAISO disabled this feature of the capacity test following a market notice and informational filing in accordance with current authority under CAISO Tariff Section 29.34(l)(5). See CAISO Filing of Informational Report, Docket No. ER21-1536-000 (Feb. 25, 2022) (reporting the findings that supported removal of the net-load uncertainty requirements from the capacity test portion of the RSE as of February 15, 2022) (Informational Report Filing). For ease of reference, this filing distinguishes between current CAISO tariff sections (*i.e.*, tariff sections that are currently in effect), revised CAISO tariff sections (*i.e.*, current tariff sections the CAISO proposes to revise in this filing), and proposed CAISO tariff sections (*i.e.*, new tariff sections the CAISO proposes to add in this filing).

⁷ 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. 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.

II. Background

The WEIM has included the RSE from the beginning of the market in November 2014. Since that time, the CAISO has made several modifications to the RSE.⁸ The RSE is comprised of four tests: (1) feasibility, (2) balancing, (3) capacity, and (4) flexibility.⁹ The RSE runs at seventy-five (T-75), fifty-five (T-55), and forty (T-40) minutes prior to the upcoming hour.¹⁰ The first two passes produce advisory results that allow a WEIM entity BAA to update its base schedule so it may pass the final, financially binding test at forty minutes prior to the upcoming hour.

The feasibility test is a power flow evaluation to allow WEIM entities to resolve congestion prior to the real-time market. The balancing test imposes financial charges applied to WEIM entities for inaccurate schedules compared with forecast or measured demand, thus incentivizing WEIM entities to submit accurate base schedules. The capacity and flexibility tests ensure balancing authorities are resource-sufficient and not “leaning” on others, *i.e.*, they have sufficient supply to meet their demand forecast. Failing either the capacity or flexibility test will result in a BAA’s transfers being limited to the transfer amount in the most recently passed interval.¹¹

The capacity and flexibility tests are intended to prevent a BAA from leaning on the capacity, flexibility, and transmission of other BAAs in the WEIM area. Leaning has been defined as a BAA participating in the WEIM without sufficient capacity and ramping capability to cover its demand, including uncertainty. The voluntary nature of participation by separate BAAs individually responsible for reliability within the WEIM is a major reason why the RSE was not intended to set reliability requirements or a minimum amount of capacity a BAA must offer into the real-time market.¹² The capacity and flexibility tests do not determine if a BAA is able to meet its individual reliability requirements: rather, it is a real-time test that serves as a prerequisite for participation

⁸ 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.

⁹ See current CAISO Tariff Sections 29.34 (j)-(n).

¹⁰ The CAISO has proposed to change the final test to T-30 in the fall of 2022 approved by the Commission in Docket No ER21-955-000. See *Cal. Indep. Sys. Operator Corp.*, 175 FERC ¶ 61,096 (2021).

¹¹ The CAISO has revised the RSE to limit transfers to the most recently passed interval, rather than the most recent hour. This change was presented for stakeholder review in 2018 through the EIM Offer Rules Workshops available at http://www.aiso.com/Documents/Presentation-EnergyImbalanceMarketResourceSufficiencyTest-Sep26_2018.pdf. See Section 11.3.2 of the Business Practice Manual for the Energy Imbalance Market, as updated to reflect April 2019 software changes.

¹² See current CAISO 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 while allowing for termination of WEIM with six months’ advance notice).

with other BAAs in the real-time market administered by the CAISO.¹³ Ensuring each BAA meets its reliability requirements is separately addressed by individual resource adequacy requirements determined by each BAA's applicable regulatory authority and NERC reliability standards, not the WEIM.¹⁴ Thus, the capacity and flexibility tests are not intended to ensure, and do not necessarily ensure, a BAA is resource adequate. Rather, these tests address concerns with leaning by limiting energy transfers to a BAA when it fails either of these tests.

A. Feasibility Test

The feasibility test serves as an opportunity for WEIM entities, because they are not participants in the CAISO day-ahead market, to minimize re-dispatch and resulting imbalance charges that are necessary to resolve infeasible base schedules prior to the real-time market. The feasibility test performs a power flow evaluation on a WEIM BAA's submitted base schedules to determine if they would result in violations of transmission limits. Following the posting of results, the WEIM entity can adjust its base schedules to resolve advisory violations. The feasibility test is not explicitly applied to the CAISO BAA because the CAISO's existing market processes use a security constrained economic dispatch to resolve transmission violations automatically. Consequently, the CAISO does not need to make manual adjustments to market results to relieve transmission violations as this is accomplished through the market optimization. The CAISO BAA uses the market results from the day-ahead market, HASP and real-time pre-dispatch (RTPD) *in lieu* of base schedules.

B. Balancing Test

The balancing test compares a WEIM entity BAA's base schedules from generation and imports to the demand forecast to determine hourly imbalance. This test does not apply to the CAISO BAA. The day-ahead market, HASP, and RTPD processes are designed to commit supply equal to forecasted demand for the CAISO. The test provides a financial incentive for WEIM entity BAAs to provide/update base schedules near forecasted demand. The WEIM enables WEIM entities and WEIM participating resources within those BAAs to operate more efficiently. However, there is an opportunity for WEIM entities to under/over-schedule within their submitted base schedules as a means to control energy prices or shift costs. For example, a WEIM entity could try to avoid de-committing generation to avoid start-up costs by providing base schedules in excess of its forecasted demand. The excess supply would then be resolved through dispatch of resources within the WEIM based on real-time energy offers, irrespective of resource cycling decisions.

¹³ *Id.*; see also current CAISO Tariff Section 29.34(n) (restricting economic transfers with other BAAs in the event of a BAA failing either the capacity or the flexibility test).

¹⁴ See *Cal. Indep. Sys. Operator Corp.*, 147 FERC ¶ 61,231 at P 122 (2014).

Overscheduling can also present opportunities to shift costs via imbalance charges when there are systemic differences in prices due to congestion between a WEIM entity's supply resources and load. For this test, WEIM BAAs may choose to use the CAISO's demand forecast or their own forecasts. If the WEIM BAA elects to use the CAISO demand forecast, imbalances within 1% result in the BAA passing the test. If the imbalance is greater than 1%, the BAA fails the test. Following failure of the balancing test, the WEIM BAA is subject to over- or under-scheduling load penalties if its actual load is 5% more or less than its base schedule for an hour.¹⁵ If the WEIM BAA chooses to use its own demand forecast for the test, it is always subject to Level 1 over-or under-scheduling penalties when metered demand exceeds 5% more or less than its base schedule for an hour; *i.e.*, 125% of the locational marginal price (LMP) for under-scheduling and 75% of the LMP for over-scheduling.¹⁶ Level 2 over-or under-scheduling penalties apply when metered demand exceeds 10% more or less than the base schedule for an hour; *i.e.*, 200% of the LMP for under-scheduling and 50% of the LMP for over-scheduling.¹⁷

C. Capacity Test

The capacity test determines whether a BAA is participating in the real-time market with sufficient capacity and accompanying energy bids for both over- and under-capacity requirements based on the supply made available to meet its demand forecast. The capacity test requires an additional amount of resource capacity to account for net-load uncertainty and intertie uncertainty. If a BAA fails the capacity test for any interval in an hour, it automatically fails the respective up or down flexibility test for the corresponding hour's 15-minute interval. The CAISO calculates the capacity test by determining if the total bid range is greater than the total requirement, including adjustment based on historical intertie deviation. If the capacity and accompanying bid range is greater/less than the requirement, the BAA passes/fails the test. WEIM transfers (real-time imports or exports) and temporal constraints are not included in the capacity test.

D. Flexibility Test

The flexibility test ensures BAAs have sufficient ramping capabilities to meet demand forecast change and uncertainty inherent to both load and renewable resource performance. The test assesses whether a BAA has upward and downward flexible capacity available to be dispatched in the real-time market. The test evaluates four ramp intervals from the last 15-minute schedule from the proceeding hour to each 15-minute interval of the current hour. The flexibility test has six inputs: net demand

¹⁵ Current CAISO Tariff Section 29.11(d).

¹⁶ Current CAISO Tariff Sections 29.11(d)(A)(1) and -(B)(1).

¹⁷ Current CAISO Tariff Sections 29.11(d)(A)(2) and -(B)(2).

uncertainty, forecasted change in demand, diversity benefit factor, net import capability, net export capability, and flexible ramp credit. The net demand uncertainty is a fixed number for all tests and can increase the requirement. The forecasted change in demand can either increase or decrease the requirement. The diversity benefit, net import capability, net export capability, and flexible ramp credit can reduce the requirement.

III. Resource Sufficiency Evaluation Enhancements Stakeholder Initiative

The CAISO formally commenced the RSE Enhancements initiative in June 2021 by posting an issue paper and hosting a two-and-a-half-day series of virtual workshops to consider the scope of the initiative, options, and alternative solutions to identified issues.¹⁸ The CAISO's focus for the initiative was on a wide range of market rules and procedural changes that could improve the RSE. Working with stakeholders on the various issues, some of which were more significant than others and presented varying levels of controversy and complexity, the CAISO decided to proceed with RSE enhancements that it could reasonably implement by summer 2022. This was important given the broad consensus that enhancements to the RSE were critical to the ongoing evolution and expansion of the WEIM and that the CAISO should implement the resulting changes as soon as possible.

On August 23, 2021, the CAISO held a call with stakeholders to discuss its straw proposal to address issues following the workshops. The CAISO discussed its proposals at a Market Surveillance Committee (MSC) meeting on August 27, 2021. The CAISO next posted a draft final proposal on October 8, 2021, held a stakeholder call to discuss the proposal on October 12, 2021, and engaged in further discussion with the MSC on November 19, 2021. The CAISO provided stakeholders an opportunity to submit written comments on the issue paper, straw proposal, and draft final proposal. The CAISO reevaluated several key aspects of its proposal and posted a revised draft final proposal (Revised Draft Final Proposal) on December 16,¹⁹ held a stakeholder call on December 21, 2021, with written comments received on January 10, 2022. On February 2, 2022, the MSC discussed and adopted an opinion on the phase 1 RSE enhancements.²⁰

¹⁸ The record of the CAISO's 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>.

¹⁹ The Revised Draft Final Proposal is available at <http://www.caiso.com/InitiativeDocuments/RevisedDraftFinalProposal-EIMResourceSufficiencyEvaluationEnhancements.pdf>.

²⁰ MSC Opinion on Energy Imbalance Market (EIM) Resource Sufficiency Evaluation Enhancements (Feb. 2, 2022) (MSC Opinion), available at <https://www.caiso.com/Documents/MSCFinalOpiniononEIMResourceSufficiencyEvaluationEnhancements>

On February 9, 2022, the WEIM Governing Body and Board of Governors, under their recently implemented joint authority, unanimously approved the CAISO's proposal to enhance the RSE in advance of summer 2022 as presented in this filing.²¹ This completed phase 1 of the RSE Enhancements initiative with phase 1b, which will build on stakeholder efforts to date, commencing early in 2022.²² The goal of phase 1b is to address unresolved policy issues identified in phase 1, prior to beginning phase 2 where consequences for failing the RSE will be considered. This transmittal letter discusses below comments from stakeholders regarding phase 1 as they relate to specific proposals in this filing. In addition to informing the Commission, the CAISO discusses in Section V of this transmittal letter (1) the RSE transparency enhancements that do not require tariff support and (2) potential future RSE enhancements beyond the scope of this filing that will be considered in subsequent phases of this initiative.

Stakeholders agree that moving forward with these enhancements to the RSE is necessary and appropriate—no stakeholder opposes the proposal in its entirety and the Department of Market Monitoring (DMM) and MSC support the proposal, with the DMM not opposed to one element.²³ However, some stakeholders challenge certain elements of the proposal or are not satisfied with deferring certain matters until a subsequent phase of the initiative (or the proposed timing of such consideration). The CAISO discusses below the adverse or alternative positions of stakeholders regarding (1) the proposed phase 1 revisions and (2) planned issues to be addressed in subsequent phases of the initiative.

IV. Proposed Tariff Revisions

Through phase 1 of the RSE Enhancements stakeholder process, the CAISO developed market rule changes and market enhancements that it identified as feasible for summer 2022 implementation. Below, the CAISO discusses the proposed phase 1

[-Phase1.pdf](#).

²¹ The February 2, 2022 Memorandum and February 9, 2022 Presentation to the Joint WEIM Governing Body and Board of Governors regarding the Decision on Resource Sufficiency Evaluation Enhancements Phase 1, *i.e.*, for summer 2022 Readiness are included in Attachment C to this filing.

²² Phase 1b of the RSE Enhancements initiative commenced on February 16, 2022.

²³ DMM Comments to the Joint WEIMGB/Board at: <https://www.westerneim.com/Documents/DMM-Comments-Western-EIM-Resource-Sufficiency-Evaluation-Enhancements-Initiative-Phase-1-Feb-9-2022.pdf>. Note that the one element the DMM raised some concern about in its comments is not included in this filing, *i.e.*, whether taking emergency actions should result in a failure of the RSE. DMM was not opposed to an element of this proposal; *i.e.*, the discounting of CAISO interchange transactions without an associated e-Tag transmission profile as described in Section IV.F below.

tariff revisions implementing the market enhancements it developed through the stakeholder process.²⁴

A. Excluding Certain Entities Not Subject to the Balancing Test from Potential Revenue Allocation

The CAISO proposes one modification to the existing balancing test -- entities not subject to the balancing test will not be eligible for an allocation of revenues arising from WEIM entities' failure to meet the test. This means the CAISO will no longer be eligible to share in the revenues resulting from balancing test failures.

The CAISO designed the balancing test to offer a financial incentive for WEIM entity BAAs to provide base schedules near forecasted demand and ensure equitable and robust participation. The balancing test determines if a submitted base schedule is within 1% of forecasted demand; a base schedule outside this tolerance band is subject to the over- and under-scheduling test.²⁵ This process within the RSE has not been applied to the CAISO BAA because the CAISO does not actively make available to the market its supply through the base scheduling process.²⁶

In this context, the CAISO BAA is not similarly situated to WEIM entity BAAs. For the CAISO, real-time market imbalance energy is settled relative to day-ahead schedules produced by the CAISO's integrated forward market. Although CAISO day-ahead schedules depend on the schedules and bids submitted by market participants, various mechanisms exist to incent scheduling to the demand forecast in the integrated forward market, *i.e.*, market prices and convergence bids. Although the CAISO BAA's load forecast may change between the day-ahead market and real-time, it would be inequitable to apply the balancing test to the real-time demand forecast as it may be significantly different than the forecast that was used in the day-ahead timeframe. Similar application would be inequitable because the real-time market imbalance energy in the CAISO BAA is settled against integrated forward market schedules. Conversely,

²⁴ The CAISO also proposes revisions to the titles of current CAISO Tariff Sections 29.34(j), 29.34(k), 29.34(l), and 29.34(m) to clarify that these provisions as amended correspond to the RSE feasibility test, balancing test, capacity test, and flexibility test respectively.

²⁵ The 1% tolerance band for what constitutes a balanced base schedule is derived from the 1% threshold for over- and under-scheduling penalties applicable to WEIM entities using the CAISO demand forecast, and is documented in the Business Practice Manual for the Energy Imbalance Market. The proposed revisions to current CAISO Tariff Section 29.34(k), which corresponds to the RSE balancing test, clarify this application of the tolerance band. The CAISO has determined it is appropriate to provide these clarifications by incorporating into the tariff certain details currently set forth in the Business Practice Manual.

²⁶ See, e.g., *Cal. Indep. Sys. Operator Corp.*, 153 FERC ¶ 61,087 at P 72 (applying the capacity test to the CAISO balancing authority area without consideration of including the CAISO balancing authority area in the balancing test).

WEIM base schedules are the reference for settling real-time imbalance energy in WEIM entity BAAs outside of the CAISO. WEIM entities submit these base schedules in the same timeframe that the demand forecast used by the balancing test is produced, leading to a much more accurate reference for imbalance settlement.

Some stakeholders urged extending the balancing test to the CAISO BAA or eliminating it altogether. The CAISO understands stakeholder concerns regarding resources in the CAISO BAA being re-dispatched as a result of out-of-balance WEIM entity base schedules, as well as concerns regarding the CAISO's potential to be under-scheduled as a result of its market clearing process. Nonetheless, the CAISO concluded it is reasonable to continue the balancing test, while excluding the CAISO BAA and any other BAA that does not use the base scheduling process as its means of participation in the WEIM from the balancing test.²⁷ The test is designed to provide financial incentives for base schedules to align more closely with forecasted demand; the CAISO market process has several inherent market features that are explicitly intended to ensure that same alignment, so applying the balancing test to the CAISO would be problematic.²⁸

As a consequence of this approach, the CAISO will exclude any BAA not subject to the balancing and subsequent over- and under-scheduling tests from the potential revenues resulting from failures of other BAAs that are subject to these tests because the excluded BAAs are not subject to the test that derives these revenues.²⁹ Precluding a BAA like the CAISO BAA that is not subject to the balancing test from any revenues derived from the balancing test, even if that balancing authority area ultimately helps to cure the over- or under-scheduled base schedules, is reasonable, as the area is not subject to the balancing test in the first place. This approach provides a balanced and equitable solution that accounts for the different ways entities participate in the real-time market now and into the future.

²⁷ Currently this includes only the CAISO BAA, but this would also facilitate extending the day-ahead market to other BAAs because those entities would have day-ahead market results similar to the CAISO's day-ahead results today and, thus, application of the balancing test to them would be unnecessary.

²⁸ The CAISO recognizes this process, by its very nature, is open to potential over- or under-scheduling in an attempt to exploit systemic differences in congestion, but has not proposed to eliminate it altogether because of its important relationship with the over- or under-scheduling charge framework. See *supra* Section II(B) of this transmittal letter (providing further discussion of this relationship).

²⁹ See revised CAISO Tariff Section 29.34(k).

B. Improved Accounting of Supply in the Capacity Test

The capacity test assumes the availability of all supply base schedules and bids within each BAA.³⁰ Certain conditions in the real-time market affecting supply, such as a resource's start-up time and cycling time, are not currently considered in the RSE.³¹ This creates the potential for the capacity test to overestimate the supply available in the real-time market because some supply may actually be unavailable or limited.

During August 2020, the CAISO BAA experienced a severe heat wave. On August 14 and 15, this heat wave resulted in CAISO being unable to meet its contingency reserve requirements through arming firm load as reserves and eventually led to firm load shedding. During this time, the CAISO passed the RSE's capacity test in some intervals, in part, due to counting long-start resources returning from outages.³² The CAISO proposes herein to include certain conditions limiting the available supply that can be considered in the capacity test.³³ This enhancement will address counting of capacity like that occurring during the August 2020 events when the CAISO received credit for a long-start generator during several hours in which the generator was starting-up after an outage. Also, the enhancements will generally improve the existing capacity test by more accurately accounting for the supply available in the real-time market. The CAISO describes below the specific tariff changes it proposes.

The CAISO's real-time market consists of two different processes that issue start-up instructions to offline resources: the short-term unit commitment process, or STUC, and the RTPD. The STUC starts up resources whose start-up time plus minimum run time is within its 4.5 hour look-ahead time horizon, which is beyond the time horizon considered by the RTPD. The RTPD starts up resources whose start-up time plus minimum run time is within the time horizon of the particular RTPD run, which ranges from a 1-hour to a 1.75-hour look-ahead.

³⁰ See current CAISO Tariff Section 29.34(l) (establishing the rules for evaluation of the WEIM entity resource plans and the CAISO equivalent for purposes of the capacity test).

³¹ The capacity test does not consider resource ramping constraints because they are accounted for in the flexibility test (which accounts for online conventional resources' ability to ramp to the balancing authority area's forecasted demand, plus an additional amount for uncertainty within the hour under evaluation).

³² See Revised Draft Final Proposal at Appendix 1. See also Presentation of Bautista Alderete, Guillermo and Kalaskar, Rahul: Resource Sufficiency Evaluation Bid Range Capacity Test, March 30, 2021 (providing analysis details) at <http://www.caiso.com/InitiativeDocuments/Presentation-ResourceSufficiencyEvaluationAnalysis-Mar30-2021.pdf>.

³³ See revised CAISO Tariff Section 29.34(l)(2) (accounting for the conditions affecting the supply counted in the capacity test, as well as clarifying changes to distinguish the balancing test and the capacity test).

The CAISO first proposes to modify the capacity test to consider a resource's start-up time when evaluating an offline, bid-in resource that the real-time market is capable of starting. A short start unit will count in the upcoming hour's capacity test even if it had a start-up time longer than the RTPD time horizon, but only if there was a bid for the resource through the upcoming hour, the resource is currently offline in the last 15-minute interval before the hour under evaluation, and the resource has remaining start-ups in that day, *i.e.*, it can be started.³⁴

For example, a resource with a four-hour start-up time would be counted in the capacity test conducted for hour ending 18 only if bids for the resource were in the market for hour ending 18 when the market was running during hour ending 14 through hour ending 18. It is reasonable for the capacity test to count resources that have start-up and minimum run times no longer than what can be started by the STUC process because this is the real-time market time horizon, and the energy imbalance market is an extension of that market. This approach ensures capacity capable of being available for dispatch within the STUC time horizon, regardless of economic decisions made by the real-time market to replace that capacity with other more economic resources, is counted towards passing the capacity test. The MSC supports continuing to include resources with start times within the STUC time horizon as a test that the BAA has the necessary resources to meet its load and did not commit them, perhaps because they were not needed given system conditions.³⁵

In connection with the aforementioned enhancement, the CAISO proposes additional related tariff revisions regarding the capacity test. Within the construct of including resources committed within the STUC and RTPD time horizons, the CAISO proposes to refine the test further to account more accurately for capacity available to the real-time market. Specifically, during this period a short start unit with a bid in the real-time market which received a start-up instruction that was subsequently not followed will not be counted as available capacity; *i.e.*, it failed to initiate start-up.³⁶ In addition, a short start unit that is on outage during the upcoming hour, or has returned from outage but is unable to start up within the hour being evaluated, will not be counted.³⁷ It would be inappropriate to continue counting capacity from a resource through the STUC time horizon if that resource declined a dispatch instruction. This would contradict the policy of counting resources with long start-up times if they would otherwise be available. Similarly, if the resource is on outage it would be inappropriate to continue counting capacity from the resource through the STUC time horizon.

³⁴ Proposed CAISO Tariff Section 29.34(l)(2)(A)(i).

³⁵ MSC Opinion at 25-26.

³⁶ Proposed CAISO Tariff Section 29.34(l)(2)(B)(i).

³⁷ Proposed CAISO Tariff Section 29.34(l)(2)(B)(ii).

The CAISO also proposes tariff language to count capacity from a multi-stage generating resource with bids through the hour under evaluation for capacity that is available at the time the resource is transitioned to another configuration.³⁸ For example, if a resource has a two-hour state-transition time and is online at hour ending 16, but receives a state-transition instruction that runs through hour ending 18, it would receive credit for the bid-in capacity that would have been available but for the market instruction. This will ensure that a resource following a dispatch instruction does not have its output discounted, leading to an inadvertent failure of the capacity test.

With the enhancements above, it is just and reasonable to continue counting the capacity of a resource through the STUC and RTPD time horizons. Some stakeholders argued that only capacity more immediately available to the real-time market, *i.e.*, capacity that is subject to the real-time unit commitment or capacity effectively available in the next operating hour, should count towards passing the test. The CAISO disagrees and believes capacity should not be considered unavailable if it was scheduled or bid into the real-time market but is limited because of previous results of the real-time market's economic optimization. Discounting this available capacity would undermine the real-time market's efficiency and could create adverse market incentives. All capacity that is made available for the real-time market to use optimally should count towards an entity's capacity showing for the RSE in meeting its forecasted obligations. An approach that would not count capacity from these resources could promote behavior inconsistent with economic efficiency. It could instead incentivize self-scheduling or price changes to ensure the resource is running and counts towards the capacity test, rather than for more optimal economic or operational reasons. The alternatives suggested by stakeholders would effectively require shortening the time horizon of the real-time market, and go well beyond the scope of the CAISO's proposal and represent a different approach. Adopting them would require fundamental reconsideration of the sequencing of the real-time market runs to work properly and is not part of the CAISO's proposal. Absent holistic reconsideration of the real-time market procedures, which is far beyond the scope of the CAISO's proposal and underlying stakeholder process, these alternative proposals would undercount capacity because the STUC is an integral part of the real-time market and resources that can only be started by the STUC are nonetheless available to the real-time market. Simply because the STUC may not start a particular resource because there are more optimal resources available does not mean they should not be accounted for.

An illustrative example shows the inappropriateness and unfairness of these stakeholders' position. Three hours before the operating hour the CAISO optimization could choose to not start a CAISO BAA resource with a three-hour startup time and instead choose an available inertia bid. Under these stakeholders' view, if that inertia bid did not materialize by the HASP, the CAISO could fail the capacity test as a result of following the market's optimal dispatch. However, if the market had dispatched the less

³⁸ Proposed CAISO Tariff Section 29.34(l)(2)(A)(ii).

optimal alternative, the CAISO would pass the test. The alternative approach ignores that the CAISO had sufficient capacity to meet the test, but for the optimal market dispatch, and is therefore unreasonable on its own.

An approach that would not count capacity from these resources in this circumstance is inconsistent with the fundamental design principles underlying the real-time market and would create adverse incentives to self-schedule or to change bid prices to ensure resources are running so they count towards the capacity test. It could also create incentives not to follow dispatch instructions (e.g., to shut down or move to a lower multi-stage generator configuration). For example, limiting available capacity to this proposed truncated time horizon has the potential to create competing incentives for participation from resources with a longer start-up time. These incentives include the potential for uneconomic commitment decisions for the purpose of passing the RSE and ensuring future access to incremental transfers as opposed to supporting optimal dispatch. A BAA should not be dis-incentivized from using a more cost-effective resource elsewhere. This type of economic displacement is inherent to the commitment and dispatch decisions made under a centrally cleared market and is a primary benefit of a BAA's participation in the WEIM.

Stakeholders also raised concerns that counting capacity in the STUC time horizon without also accounting for ramping constraints potentially could over-count the capacity available. The CAISO believes adding ramping constraints to the test is unnecessary because it would (1) significantly complicate the capacity test and (2) duplicate the ramping constraints for online resources that are embedded in the flexible ramping sufficiency test.³⁹ The CAISO believes that accounting for ramping capability from online resources in the flexibility test provides a more refined view of the available supply than in the capacity test. Since the capacity test and flexibility test are performed in sequence, and the failure consequences of either are identical, *i.e.*, transfers are held to the level of the prior 15-minute interval, it is unnecessary to consider resource characteristics accounted for in the flexibility test separately in the capacity test. Any incremental accuracy in the counting of capacity is outweighed by the complexity of including ramping constraints and is not driven by necessity—they are already considered in the RSE. Ramping constraints for online resources are already accounted for in the flexible ramping sufficiency test to the extent their output is necessary to meet the upward flexibility requirements in the interval under evaluation. Accounting for ramping constraints for offline resources in the capacity test is complicated by all of the previous commitment or dispatch decisions that were made within the STUC time horizon; *i.e.*, capacity accounting covers a longer time horizon

³⁹ Accounting for flexibility for online resources as well provides a better version of the flexible ramping test in the capacity test; which creates redundancy between the two tests. The CAISO even raised the idea of a single super test in the stakeholder process, but stakeholders stated they preferred the two-test approach, which meant the CAISO needed implementable capacity test changes.

than flexible ramping capability accounting, which brings into scope numerous additional constraints and complexities.

Nonetheless, in response to the aforementioned stakeholder concerns and as a further refinement, the CAISO proposes tariff revisions to enable it to adjust the supply from bid in off-line short start resources counted as available under the capacity test as revised by this filing.⁴⁰ Any adjustment must be identified and documented by the CAISO with supporting analysis. The support for any CAISO adjustment would likely come either from regular RSE reporting conducted by the DMM or a root-cause analysis conducted by the CAISO indicating that the supply available significantly over-represents the capacity available from a resource in accordance with procedures and timelines to be documented in the Business Practice Manual for the Energy Imbalance Market.⁴¹ The CAISO will initially credit up to the maximum bid-in capacity of the resource as it does today, until such time as documentation and analysis indicates an adjustment is warranted. This approach supports appropriate counting of supply and will facilitate flexibility and expediency if there are identified concerns. Relying on identified and documented over counting of supply as the driver of any CAISO adjustment will ensure transparency and independence appropriate for this enhancement.

Lastly, the CAISO proposes tariff revisions to include the ramping capability available from a multi-stage generating resource transitioning between configurations in the flexibility test. The capacity test generally accounts for the supply available from a multi-stage generator while it transitions between configurations, which the market software accomplishes in the fewest number of intervals possible. The CAISO believes it is appropriate also to consider the ramping capability available during transitions as additional upward or downward ramping capability in evaluating a WEIM BAA's flexibility. This ramping capability does support a WEIM BAA and should be accounted for because while a multi-stage generating resource provides both capacity and flexibility during a transition, currently only the capacity is considered. Also, including the ramping capability from transitioning resources will more accurately account for their contribution towards the flexibility test. Accordingly, the CAISO proposes to include the ramping capability available from a multi-stage generating resource transitioning between configurations when performing the flexibility test, in addition to counting the associated supply in the capacity test.⁴² The same provision will apply to a short start

⁴⁰ See proposed CAISO Tariff Section 29.34(I)(2)(C).

⁴¹ Going forward, the DMM will exclusively provide capacity and flexible ramping failure information for all balancing authority areas as part of its regular reporting activities. See Revised Draft Final Proposal at 33 (explaining the DMM's expanded role in WEIM reporting to increase independence of these important WEIM evaluations consistent with stakeholder feedback).

⁴² Proposed CAISO Tariff Section 29.34(I)(2)(A)(iii).

unit moving through a forbidden operating region.⁴³ This will ensure consistent accounting of multi-stage generator transitions between configurations in both the capacity test and the flexibility test. Unlike the decision discussed above to decline to include resource constraints in the capacity test because it would be unduly complex, accounting for the ramping capability from a transitioning multi-stage generating resource in the flexibility test is relatively straightforward; *i.e.*, the increased accuracy of the flexibility test outweighs the implementation challenge.

C. Adjustment of the Upward Flexible Ramping Capability Requirement

The flexibility test currently measures a BAA's ability to ramp between forecasted demand variations, including uncertainty, for each 15-minute interval within the hour under evaluation.⁴⁴ The flexible ramping upward and downward capability requirements are calculated using the RTPD interval results immediately prior to the hour being evaluated in the RSE. If the market solution contains a power balance constraint relaxation,⁴⁵ however, that quantity may artificially bias the upward and downward capability requirements because the resulting calculation will not reflect the expected operating conditions from which the test is ensuring the ability to ramp.

To increase the accuracy of this test, the CAISO proposes to calculate the quantity of any power balance constraint relaxation that is present in the market solution. This quantity will then be accounted for in the flexibility test for both the upward and downward capability requirements, exclusive of any constraint relaxation due to operator load conformance inherent to the market schedule.⁴⁶ Constraint relaxation due to load conformance is excluded to ensure accurate calculation of the flexible ramping requirement from the expected demand forecast in the interval immediately preceding the hour, to the 15-minute intervals in the following hour.

This enhancement will ensure the market schedule that is used as the reference point in the flexibility test does not have an artificially biased ramping requirement due to capacity shortfalls preventing market schedules from fully balancing to demand. This will increase the accuracy of the flexibility test because the requirements will be more consistently calculated from the forecasted demand referenced in one interval to the forecasted demand referenced in other intervals under evaluation.

⁴³ *Id.*

⁴⁴ Current CAISO Tariff Section 29.34(m).

⁴⁵ Power balance constraint relaxation is necessary for the market optimization to reach a feasible solution and can occur under a variety of established conditions.

⁴⁶ Proposed CAISO Tariff Section 29.34(m)(1)(C). Details on how this will be implemented will be set forth in the applicable Business Practice Manual.

D. Consideration of the State of Charge for Storage Resources in the Capacity and Flexibility Tests

Accounting for storage resources' capacity and ramping capability involves unique issues. Storage resources are different from conventional resources because they have limited continuous energy production, which is dependent on whether they were charging or discharging during previous market intervals. The current provisions of the RSE may not fully account for storage resources because their energy availability, and thus their available capacity, depends on their market dispatch prior to the time the RSE is run. Counting a storage resource considering its potential to charge or discharge within the STUC time horizon without consideration of its capability to charge or discharge based upon conditions; *i.e.*, its state of charge, creates the potential for the RSE to overstate these resources' capabilities. Thus, the CAISO proposes to limit the counting of these resources to the capacity and ramping capability corresponding to their amount of charge at the time of the RSE, plus any additional amount made available through energy bids.⁴⁷

For example, consider a storage resource that has 100 megawatt-hours (MWh) of charge immediately prior to the hour the RSE is evaluating with a maximum ability to discharge, as registered with the CAISO, of 200 megawatts (MW) during an hour. If the resource had bids to discharge 200 MW during the hour, but only 100 MWh of stored energy, counting the full bid-in capacity would over-count the ability of the storage resource to meet the demand obligations in the upcoming hour. The CAISO's proposal would limit the bids that count for purpose of passing the RSE to what can be supported by the resources state of charge, which in this example would be 100 MWh.

This treatment of storage resources balances the capacity they make available, while also preserving the accuracy of the capacity test by considering their capability to produce energy in prior market runs. Specifically, the CAISO will consider the state of charge in the reference market interval occurring at 7.5 minutes before the operating hour (T-7.5), as well as any bids, throughout the operating hour to either charge or discharge as the bounds on flexibility offered by a storage resource. This will ensure the CAISO accurately assesses the flexibility provided by the resource at the time of the test, in addition to its ability to provide flexibility in the upcoming hour.

At least one stakeholder remains concerned that accounting for the state of charge under this proposal requires additional development and validation and opposed the change as proposed. The stakeholder's concern is premised on the CAISO having state of charge telemetry available from storage resources to implement the proposal. The CAISO, through the development of the business requirements to implement the policy, believes that the state of charge can be accounted for through using the expected state of charge during the real-time markets reference interval immediately

⁴⁷ Proposed CAISO Tariff Section 29.34(l)(2)(A)(iv).

prior to the hour the RSE is evaluating. Moreover, the CAISO believes its proposal will facilitate more accurate accounting of the capacity available from storage resources because this capacity would otherwise be credited to the storage resource's full output, regardless of the underlying energy supply necessary to support that operating range. The CAISO may consider further refinements to the consideration of storage and its treatment in the RSE in a subsequent phase of this initiative. But the proposed modification is just and reasonable on its own and will more accurately reflect the available capacity of storage resources compared with the existing tariff provisions.

E. Allowing WEIM Entities to Adjust Demand Forecast Changes to Account for Demand Response Not Represented in the Real-Time Market

Stakeholders requested the opportunity to account for demand response administered by a WEIM entity BAA that can reduce load and in turn, free up resources to participate in the real-time market. In response, the CAISO proposes to adjust its counting methodology to facilitate a WEIM entity's use of demand response in support of the RSE.⁴⁸ Specifically, the CAISO proposes to give a WEIM entity the ability to adjust the demand forecast used by the RSE to account for demand response programs that currently cannot be represented within the CAISO market.⁴⁹ These adjustments can be made anywhere within the real-time operating horizon, including the STUC. The demand response programs can be reflected as an increase in load that captures expected "pre-cooling" as well as a decrease in forecasted load that reflects the demand response event itself. Changes will be reflected in the demand forecast used to determine the requirements in both the capacity and flexible ramping sufficiency tests, through either an increase or a decrease in those requirements.

The load modification a demand response program provides can be performed at the customized load aggregation point using load distribution factors provided by the WEIM entity. The CAISO would also allow the demand response reductions to be included in, or excluded from, the generated forecast on a BAA-by-BAA basis, based on an attestation provided to the CAISO pursuant to the procedures and timelines in the Business Practice Manual for the Energy Imbalance Market.⁵⁰ Allowing these entities to

⁴⁸ A WEIM entity can include demand response as supply through registration and bidding as a proxy demand response resource using the CAISO's existing proxy demand response model. See current CAISO Tariff Section 29.4(d) (supporting demand response services as authorized by the WEIM entity). This proposal will allow for adjustment of the demand forecast to account for demand response that otherwise does not qualify as supply. Demand forecast calculation procedures only count WEIM entity demand response programs in excess of 4% of a WEIM entity's load in the demand forecast that serves as an input to the RSE. The CAISO would update these forecasting procedures to account for the proposal discussed above and continue to produce an accurate demand forecast.

⁴⁹ See proposed CAISO Tariff Section 29.34(l)(2)(D).

⁵⁰ *Id.*

adjust their demand forecast will enable them to decide which demand response programs they operate and may be appropriate for consideration in the capacity, flexibility, and balancing tests. This optionality will allow each WEIM BAA to utilize both demand response and the most accurate forecast possible within the market. The default will be to include the demand reduction in the load forecast. This will preserve the ability for each WEIM entity to work with the CAISO to represent its demand response programs, while also ensuring the WEIM entities are able to achieve accurate settlement of imbalance energy. The proposed enhancements discussed above will accommodate the increasing role for demand response in the future.

The CAISO will continue to settle imbalance charges against metered demand and will apply them to the extent demand response programs do not operate as expected. This provides some incentive to adjust the demand forecast only for demand response expected to perform accordingly. However, incurring a small additional imbalance energy charge is by itself is an insufficient deterrent to the potential avoided cost of additional forward procurement. The CAISO is concerned there is potential for fictitious demand adjustments to be made for the purpose of passing the RSE despite the imbalance energy settlement disincentive. The CAISO has previously proposed enhancements to classify expected demand response participation through forecast adjustments as a WEIM entity generated forecast, which results in the automatic application of the under-scheduling test. Stakeholders raised concerns that automatic application of the under-scheduling test creates significant financial risk if the forecast varies significantly from actual demand, with no consideration given to the entity's base schedule accuracy compared with the demand forecast. The CAISO understands this concern and proposes to remove any unique penalties associated with the use of demand response in phase 1 of the RSE Enhancements initiative. Accordingly, the CAISO will only require that each WEIM entity that plans to utilize a demand response program sign an attestation stating that adjustments made to the demand forecast used by the RSE correspond to expected increases or reductions in demand provided by its program.⁵¹ The CAISO will not include penalties for misusing this functionality unless justified at some point in the future. Instead, the CAISO will monitor and review the use of this functionality and, if warranted, develop targeted penalties to address any misuse.

Some stakeholders requested the RSE also account for demand response programs that cannot be represented by the proxy demand response or reliability demand response models that operate within the CAISO BAA. This would entail including optional non-supply side "no pay/no performance" programs. The CAISO is not proposing to allow these programs to count explicitly for the RSE because it has already developed robust mechanisms in partnership with the California stakeholders for demand response participation in the CAISO markets. To the extent these programs are utilized by California entities, they will already be accounted for in the

⁵¹ *Id.*

autoregressive demand forecast created by the CAISO for the CAISO BAA. Thus, explicitly accounting for them in the RSE would essentially result in double-counting.

F. Discounting CAISO Interchange without a Tagged Transmission Profile

The CAISO proposes to discount in the RSE any CAISO interchange schedules not supported by a transmission profile e-Tag equal to their HASP award submitted by the deadline of forty minutes prior to the operating hour (T-40).⁵² Interchange schedules supported by an e-Tag with a valid transmission profile should be accounted for as they provide a reasonable representation of an interchange schedule awardee's intent to deliver on or receive its award in the CAISO BAA, which serves to increase the accuracy of how interchange schedules are reflected in the RSE. The CAISO uses the schedules produced by the RTPD run at 52.5 minutes prior to the hour (RTPD-6) as its input to the final RSE. With the current sequencing of the RSE and RTPD market runs, the automatic reduction of import awards that have not submitted a transmission profile by the T-40 deadline are incorporated in the RTPD run that initiates following the final RSE (RPTD-5), which run begins 37.5 minutes prior to the operating hour. Accounting for this potential undelivered capacity can be done by reducing the RTPD-6 import awards that are used as an input for the RSE in the CAISO BAA.

WEIM entities, through the base scheduling process, have an opportunity to reflect their expected bilateral interchange schedules accurately through changes to their base schedules up until when the final RSE is run at T-40. Interchange between WEIM BAAs is represented through the base scheduling process, which is a reflection of transactions that occur through the bilateral market. There is no indication the interchange conducted under the open access transmission tariff (OATT) framework is open to the same type of bidding as the CAISO's intertie market bidding and scheduling process that may raise concerns about undelivered awards. The CAISO intertie deviation settlement policy uses financial incentives to address the potential for inefficiencies resulting from awarded interchange transactions that are not delivered through charges for undelivered awards with submitted transmission profiles equal to 75% of the higher of the real-time dispatch or fifteen-minute market LMP. In their comments during the RSE Enhancements stakeholder process, most stakeholders supported the CAISO's proposal to reduce import awards.

The CAISO also believes it is appropriate to apply the same requirements to export awards to ensure there is no increase in the CAISO BAA's obligations for passing the RSE without a reasonable expectation the awardee can accept the delivery. This will also ensure alignment with the CAISO's intertie deviation settlement policy

⁵² Proposed CAISO Tariff Section 29.34(l)(2)(B)(iii). This proposal is a severable element of this filing. See *supra* n.7 (describing the severable nature of the seven elements in this filing).

because that policy likewise requires submission of the transmission profile for an export award forty minutes prior to the operating hour.⁵³ In accepting the CAISO's intertie deviation settlement policy, the Commission explained that the policy "improve[s] CAISO's current Tariff rules, which otherwise may not sufficiently incentivize a market participant to deliver an awarded intertie transaction."⁵⁴

At least one stakeholder opposed the proposal to discount any interchange awards that have not submitted an e-Tag equal to their HASP awards by T-40, based on concerns that (1) CAISO analyses show the interaction between the HASP and the RSE during stressed system conditions already significantly disadvantages the CAISO BAA in passing the RSE and (2) the proposal will exacerbate such disadvantages. The stakeholder's concerns relate to the HASP process optimally scheduling exports based on import supply offers made available at its interties. This stakeholder's position suggests it would be unduly discriminatory for the CAISO to subject itself to a requirement that other WEIM entity BAAs are not subject to, particularly if the CAISO is required to support exports even when the interchange does not materialize in real-time. However, the CAISO and WEIM entities are not similarly situated in the specific context to which the CAISO's proposal applies.

The CAISO acknowledges its proposal potentially increases the possibility the CAISO will fail the RSE through disqualification of its import supply, and that there is some asymmetry in this approach. But the asymmetry is justified by the differences between how intertie transactions are handled in the CAISO – specifically how the CAISO clears exports in the HASP – as compared to bilateral OATT transactions that occur in other WEIM BAAs. The CAISO cannot justify counting import supply for purposes of passing the RSE if it does not have a reasonable assurance of that supply being delivered. Because the CAISO is not similarly situated to other WEIM BAAs, this proposal provides for more equitable treatment regarding the import supply the CAISO can count in meeting its RSE obligations. In addition, the CAISO has no evidence that bilateral OATT transactions create the potential for inefficiencies resulting from awarded intertie transactions that are not delivered. WEIM entities have represented in CAISO stakeholder processes that their final T-40 interchange base schedules only show bilateral transactions with an identified source, which essentially goes one-step farther than the T-40 transmission profile requirement for the CAISO. Requiring the transmission profile for CAISO interchange schedules by T-40 provides a further degree of assurance of delivery from interchange sources of supply. Absent evidence of comparable delivery issues for other WEIM BAAs, the CAISO does not believe a similar e-Tag requirement for those BAAs is warranted, particularly because such a requirement could implicitly establish a T-40 e-Tag deadline for bilateral transactions to count for the RSE, potentially reducing the benefits of WEIM. In short, the CAISO is not

⁵³ See current CAISO Tariff Section 11.31.1.2.

⁵⁴ *Cal. Indep. Sys. Operator Corp.*, 172 FERC ¶ 61,234 at P 23 (2020).

similarly situated to other WEIM BAAs in this respect. Therefore, the CAISO's proposal is just and reasonable and not unduly discriminatory.⁵⁵

As noted *supra*, each individual proposal in this filing is separate and discrete from, and not interdependent with, every other individual proposal. Commission action on the CAISO's proposed tagging requirement does not affect Commission action on any other element of the CAISO's filing and vice-versa. The justness and reasonableness of each of the CAISO's proposals stand on their individual merits.

The CAISO does not believe requiring a full e-Tag at T-40, prior to the standard T-20 deadline for completing-tags (*i.e.*, completing the energy profile section), is an appropriate pre-condition for participation in the real-time market. Requiring full e-Tags prior to this deadline would preclude access to energy supply that is made available following T-40 (*e.g.*, renewable or slice supply in the Pacific Northwest whose allocations are determined after this deadline).⁵⁶ The CAISO recognizes the proposed timing of discounting of the import awards does not provide the CAISO BAA with a cure period to re-procure the supply that was discounted for purposes of passing the RSE. The MSC noted this concern in its Opinion, and the MSC suggested monitoring this matter but nonetheless supported the proposal.⁵⁷ The CAISO's existing practice of not dispatching these resources makes it inappropriate to count them for purposes of passing the RSE. This approach equitably treats the CAISO BAA and WEIM BAAs in terms of this aspect of the RSE.

G. Eliminating the Historical Intertie Uncertainty Calculation

The historical net import/export deviation calculates, with a 95% confidence interval, a future projection of intertie deviation between T-40 and T-20. It uses a retroactive review of deviations from the previous 90 days for purposes of the capacity test.⁵⁸ This ensures the largest 2.5% of deviations are excluded from the calculation.

⁵⁵ Section 205 of the FPA prohibits a public utility from "mak[ing] or grant[ing] any undue preference or advantage to any person or subject[ing] any person to any undue prejudice or disadvantage." FPA Section 205(b), 16 U.S.C. § 824d(b). So long as there is no undue preference or discrimination, the public utility satisfies the requirements of Section 205. "Whether a rate or practice is unduly discriminatory depends on whether it provides different treatment to different classes of entities and turns on whether those classes of entities are similarly situated." *Calpine Corp. v. PJM Interconnection, L.L.C.*, 171 FERC ¶ 61,035 at P 318 (2020). See also *Town of Norwood v. FERC*, 202 F.3d 392, 402 (1st Cir. 2000) ("But differential treatment does not necessarily amount to undue preference where the difference in treatment can be explained by some factor deemed acceptable to regulators (and the courts).") (emphasis omitted).

⁵⁶ See Revised Draft Final Proposal at 28-29 and Figure 5.

⁵⁷ MSC Opinion at 26-27.

⁵⁸ See current CAISO Tariff Section 29.34(l)(4). See also Business Practice Manual for the Energy

Consequently, it ensures the largest magnitude of inertia uncertainty regarding a failure to deliver is not added to the capacity requirement. In connection with the stakeholder initiative leading to this filing, the CAISO undertook an analysis detailing the impact of the current inertia uncertainty calculation methodology.⁵⁹ That analysis shows the inertia uncertainty calculation has significantly affected the results of the capacity test. In addition, it shows that the current confidence interval of 95% using a 90-day look-back is not a sufficiently accurate indicator of future expected inertia uncertainty to justify its increased requirements in the test. Given this inaccuracy, stakeholders requested the CAISO terminate this calculation until a more accurate inertia uncertainty calculation can be developed. The MSC summarized the statistical issues with the inertia uncertainty adder in its Opinion supporting the proposal, noting that this design change would avoid inappropriate failures of the capacity test due to anomalous inertia deviation requirements arising from the statistical issues discussed.⁶⁰

The CAISO intends to implement changes to its flexible ramping product in the fall of 2022, which will include a proposed quantile regression methodology (and its ability to calculate uncertainty relative to real-time net load and variable energy output).⁶¹ Although not a complete solution to the challenge of estimating uncertainty for purposes of the RSE, applying this functionality will provide additional information and context for consideration. It is possible the uncertainty calculation in the RSE will improve because of this functionality alone, or that some combination of this feature with other suitable calculations will be necessary to achieve the desired accuracy. In any event, it has been documented that the current inertia uncertainty adder is problematic and the CAISO therefore proposes in this filing to remove this requirement. The CAISO will revisit the methodology for calculating this type of uncertainty in a subsequent phase of the RSE Enhancements initiative.⁶² The CAISO believes this will

Imbalance Market, Section 11.3.2.2.

⁵⁹ The CAISO published an analysis on the inertia uncertainty adder. This analysis highlighted the potential for the accuracy of this calculation to be improved, which the CAISO proposes to consider in phase 2 of the RSE Enhancements initiative: *Analysis of the Inertia Deviation Adder Used in the Capacity Test* available at <http://www.caiso.com/InitiativeDocuments/Analysis-InertiaDeviationAdderUsed-CapacityTest.pdf>.

⁶⁰ MSC Opinion at 10-13. See also MSC Opinion on Market Enhancements for 2021 Summer Readiness (Mar. 8, 2021) (concerning the calculation of the uncertainty requirement. Available at http://www.caiso.com/Documents/MSCOpiniononMarketEnhancementsfor2021SummerReadiness-Mar8_2021.pdf.

⁶¹ See Fall 2022 release information and documentation available on the CAISO website at <http://www.caiso.com/informed/Pages/ReleasePlanning/Default.aspx>.

⁶² The CAISO proposes to reflect this in the deletion of current CAISO Tariff Sections 29.34(l)(4) and 29.34(m)(6). The removal of both tariff sections will address any potential redundancy and support comprehensive consideration of inertia uncertainty in phase 2 of this initiative, particularly taking into account the flexible ramping product rules that are expected to be in effect at that time and the associated performance of the RSE.

also allow stakeholders to consider both intertie and net-load uncertainty holistically as the maximum amounts of uncertainty are unlikely to occur coincidentally.⁶³

In addition, some stakeholders commented that the inclusion of the net-load uncertainty adder in the capacity test, which was added just prior to summer 2021, is problematic. They cited DMM analyses indicating that including the adder resulted in a significant increase in failures of the capacity test.⁶⁴ Further, the MSC Opinion describes statistical issues with the net-load uncertainty adder, suggesting the increase in failures may be due to unresolved issues with the methodology.⁶⁵ Although the increase in capacity test failures was not an unexpected outcome of this recent change, the frequency or magnitude of capacity test failures was unintended. The CAISO believes this unintended result may arise from the continued use of the histogram methodology, which statistically is not well correlated with an increase in accuracy of the test.

The CAISO has existing tariff authority not to include this net-load uncertainty requirement in the capacity test upon issuing a market notice at least three (3) business days in advance if: (A) the frequency or magnitude of capacity test failures supports a conclusion that the results were unintended and caused by including the uncertainty requirement; (B) the CAISO submits an informational report to the Commission within 30 days explaining and supporting its conclusion; and (C) the uncertainty requirement remains excluded from the capacity test unless and until the Commission otherwise authorizes.⁶⁶ The CAISO provided initial notice to market participants on February 8, 2022 followed by an updated notice on February 14 clarifying that it would remove this requirement effective February 15, 2022.⁶⁷ The CAISO removed this requirement and submitted the Informational Report Filing to the Commission on February 25, 2022 supporting this conclusion. The CAISO accordingly proposes to clean up the tariff in this filing to reflect removal of the net-load uncertainty requirement from the capacity test as previously authorized by the Commission.

⁶³ See *supra* n.50.

⁶⁴ CAISO Department of Market Monitoring Resource Sufficiency Evaluation in the Energy Imbalance Market Report for July-August 2021, pp 12-13. Available at: <http://www.caiso.com/Documents/Report-on-Resource-Sufficiency-Evaluation-in-the-Energy-Imbalance-Market-for-July-and-August-2021-Sep-23-2021.pdf>.

⁶⁵ MSC Opinion at 10-13.

⁶⁶ See current CAISO Tariff section 29.34(l)(5). The CAISO also proposes in this filing to remove references to the net-load uncertainty calculation from current CAISO Tariff Section 29.34.

⁶⁷ Market notices are available on the CAISO website at: <http://www.caiso.com/dailybriefing/Pages/default.aspx>.

V. Additional Transparency

Stakeholders have urged the CAISO to provide additional transparency on the performance and accuracy of the RSE through regular reporting. The CAISO agrees further transparency would be beneficial in helping BAAs better understand the RSE. These transparency improvements do not require an amendment to the CAISO Tariff, but they are useful in understanding the full scope of phase 1 of the RSE Enhancements initiative and the additional steps the CAISO has taken to address stakeholder concerns.

In undertaking these transparency improvements, the CAISO recognizes it serves as both the market operator and as a BAA that participates in the WEIM, and that reporting from an independent third party would allow for increased transparency from an entity not serving such roles. Therefore, the DMM will undertake future reporting regarding capacity and flexibility test failure information for all BAAs, and the CAISO will continue to provide all data necessary to the DMM to assist it in its reporting role. The CAISO has provided, and will continue to provide, overall market performance reports for anomalous events, such as stressed system conditions (e.g., the conditions that occurred in August 2020 and on July 9, 2021).

The CAISO agrees that additional data transparency is beneficial and proposes to provide each BAA with interval-specific RSE results for advisory and binding iterations of the capacity and flexible ramping tests. The CAISO proposes to provide this data through the CAISO Market Results Interface (CMRI) and the balancing authority area operations portal (BAAOP). Although stakeholders have requested this information be made available through the Open Access Same-Time Information System (OASIS), given the resource-specific nature of this information the CAISO believes that CMRI or BAAOP remain the appropriate places to provide this information. This additional data will enable WEIM BAAs to spot-check their own performance of the RSE. This will allow for validation that inputs to the capacity and flexibility tests are correct, and in turn will ensure that the results of these tests are being accurately calculated and producing results consistent with expected data inputs. The CAISO also believes this additional data will enable participants to formulate their base schedules into the WEIM more accurately.

VI. Subsequent Phases of the Stakeholder Initiative

The CAISO intends to consider and address identified concerns with the RSE in subsequent phases of the RSE Enhancements stakeholder initiative. The CAISO will undertake an intermediate phase 1b of the RSE to address outstanding issues regarding the accuracy of the RSE prior to beginning the planned second phase, which will address consequences of failing the RSE. Deferring additional RSE accuracy enhancements to a subsequent phase ensures the enhancements proposed as part of phase 1 of this initiative are not delayed and can begin benefitting customers as soon as practicable, particularly for summer 2022. In some cases, the CAISO deferred topics

due to implementation issues; other potential RSE revisions require further analysis and/or consideration of potential adverse impacts. The CAISO will make the next RSE phase of policy development a high priority in 2022 with the goal of implementing any changes as soon as practicable. The CAISO held an initial stakeholder meeting on February 16, 2022 to consider and prioritize additional RSE issues raised in phase 1.

To inform the Commission, the CAISO provides the following summary of some significant issues raised in phase 1 that the CAISO expects to address in subsequent phases:⁶⁸

- Consideration of the impact of upward operator adjustments (*i.e.*, load conformance) in the load forecast used by the real-time market on the CAISO's ability to pass the RSE;⁶⁹ [phase 1b];
- Methods to account for CAISO hourly export awards that clear the HASP based on access to advisory WEIM transfers [phase 1b];
- Further refinements to the treatment of storage resources within the RSE [phase 1b];
- Consideration of treatment for distributed energy resources [phase 1b];
- Potential revisions to the consequences for failing the RSE, including possible financial consequences, which will be informed by a holistic review of the consequences of RSE failure [phase 2];
- Consideration of relaxation of the flexible ramping sufficiency down requirement during periods of high marginal energy prices [phase 2]; and
- Consideration of potential further measures to prevent misusing the ability to adjust the load forecast used by the RSE to account for demand response, taking into account monitoring the CAISO proposes to undertake as part of the tariff revisions proposed in this filing [phase 1b and phase 2].

VII. Effective Date and Request for Commission Order by May 27

The CAISO respectfully requests the Commission issue an order by May 27, 2022, accepting the proposed tariff revisions to be effective on or after June 1, 2022. June 1, 2022 is the targeted CAISO implementation date for these changes in preparation for summer 2022. The CAISO further requests authorization to inform the

⁶⁸ Additional elements that were discussed in the first phase but are not the subject of this tariff amendment involve changes to the existing Commission-accepted CAISO tariff beyond the scope of this proceeding. Mandating any of these additional elements at this time would require a showing that the existing CAISO tariff is unjust or unreasonable.

⁶⁹ Ongoing CAISO analysis will inform this effort.

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, 2022. 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.⁷⁰

VIII. Communications

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

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*Individual designated for service pursuant to Rule 203(b)(3).⁷¹

IX. 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.

X. 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 ⁷²
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⁷⁰ See *Cal. Indep. Sys. Operator Corp.*, 172 FERC ¶ 61,263 at PP 1, 39. 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.

⁷¹ 18 C.F.R § 385.203(b)(3).

⁷² The CAISO has included pending revisions to Section 29.34 as clean underlying text in the

Attachment B	Red-lined document showing the revisions in this tariff amendment
Attachment C	Memorandum to the WEIM Governing Body and Board of Governors, and Presentation to the WEIM Governing Body and Board of Governors
Attachment D	Table of proposed tariff changes

XI. Conclusion

For the reasons set forth in this filing, the CAISO respectfully requests the Commission issue an order by May 27, 2022, approving the proposed tariff revisions effective on or after June 1, 2022 consistent with the discussion in this filing.

Respectfully submitted,

/s/ John C. Anders

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proposed tariff records submitted with this filing, in the anticipation that those pending revisions will likely be accepted as effective by the time the revisions proposed in this filing take effect. In the event that the pending revisions in Docket No. ER22-869 are not accepted for any reason, the CAISO will make a reconciliation filing as necessary to remove the unapproved tariff language.

Attachment A – Clean Tariff
Resource Sufficiency Evaluation Enhancements
California Independent System Operator Corporation
March 11, 2022

29.34 EIM Operations

* * * * *

- (j) **CAISO Validation and Feasibility Test.** The CAISO Markets systems will validate the initial EIM Resource Plan by 1:00 p.m. on the day before the Operating Day, and within 15 minutes of the submission of EIM Base Schedules or adjustments to EIM Base Schedules, the CAISO will validate the EIM Resource Plan and notify the EIM Entity Scheduling Coordinator-
- (1) if the EIM Resource Plan is not balanced;
 - (2) if the EIM Resource Plan provides insufficient Flexible Ramping Product capacity to meet requirements determined pursuant to Section 29.34(m); and
 - (3) if the CAISO anticipates Congestion based on the submitted EIM Resource Plans.
- (k) **EIM Resource Sufficiency Evaluation – Balancing Test.**
- (1) **EIM Base Schedule Adjustment.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules according to Section 29.34(f)(1)(c), Supply in the EIM Base Schedules does not balance the Demand Forecast, the CAISO will adjust the Demand in the EIM Base Schedule to equal Supply.
 - (2) **EIM Base Schedule Balancing Test.** The EIM Base Schedules of Supply included in the EIM Resource Plan must balance the Demand Forecast for each EIM Entity Balancing Authority Area.
 - (A) An EIM Entity Balancing Authority Area will be balanced if the sum of Supply from the EIM Base Schedules, including Interchange with other Balancing Authority Areas, is within one percent above or below the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority Area.
 - (B) An EIM Entity Balancing Authority Area will be out of balance if the sum of Supply from the EIM Base Schedules, including Interchange with other

Balancing Authority Areas, is more or less than one percent above or below the total Demand Forecast the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority Area.

- (C) If an EIM Entity Scheduling Coordinator elects to use the CAISO Demand Forecast and is not balanced as determined in Section 29.34(k)(2)(B) or the EIM Entity Scheduling Coordinator elects to use their own demand forecast, then the EIM Entity Balancing Authority Area will be assessed for over-scheduling or under-scheduling charges pursuant to Section 29.11(d)(3).
- (D) A Balancing Authority Area in the EIM Area that is not subject to the balancing test in this Section 29.34(k) will not be eligible for revenue apportionment and allocation pursuant to Section 29.11(d)(3).

(I) **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 Area, 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.

(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).

(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;
 - (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 value for the last 15-minute interval.
 - (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.

* * * * *

Attachment B – Marked Tariff
Resource Sufficiency Evaluation Enhancements
California Independent System Operator Corporation
March 11, 2022

29.34 EIM Operations

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- (j) **CAISO Validation and Feasibility Test.** The CAISO Markets systems will validate the initial EIM Resource Plan by 1:00 p.m. on the day before the Operating Day, and within 15 minutes of the submission of EIM Base Schedules or adjustments to EIM Base Schedules, the CAISO will validate the EIM Resource Plan and notify the EIM Entity Scheduling Coordinator-
- (1) if the EIM Resource Plan is not balanced;
 - (2) if the EIM Resource Plan provides insufficient Flexible Ramping Product capacity to meet requirements determined pursuant to Section 29.34(m); and
 - (3) if the CAISO anticipates Congestion based on the submitted EIM Resource Plans.
- (k) **EIM Resource Sufficiency Evaluation — ~~Plan-Balancing~~ Test.**
- (1) **EIM Base Schedule Adjustment.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules according to Section 29.34(f)(1)(c), Supply in the EIM Base Schedules does not balance the Demand Forecast, the CAISO will adjust the Demand in the EIM Base Schedule to equal Supply.
 - (2) **EIM Base Schedule Balancing Test.** The EIM Base Schedules of Supply included in the EIM Resource Plan must balance the Demand Forecast for each EIM Entity Balancing Authority Area.
 - (A) An EIM Entity Balancing Authority Area will be balanced if the sum of Supply from the EIM Base Schedules, including Interchange with other Balancing Authority Areas, is within one percent above or below the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority Area.
 - (B) An EIM Entity Balancing Authority Area will be out of balance if the sum of Supply from the EIM Base Schedules, including Interchange with other

Balancing Authority Areas, is more or less than one percent above or below the total Demand Forecast the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority Area.

(C) If an EIM Entity Scheduling Coordinator elects to use the CAISO Demand Forecast and is not balanced as determined in Section 29.34(k)(2)(B) or the EIM Entity Scheduling Coordinator elects to use their own demand forecast, then the EIM Entity Balancing Authority Area will be assessed for over-scheduling or under-scheduling charges pursuant to Section 29.11(d)(3).

(D) A Balancing Authority Area in the EIM Area that is not subject to the balancing test in this Section 29.34(k) will not be eligible for revenue apportionment and allocation pursuant to Section 29.11(d)(3).

(I) **EIM Resource SufficiencyPlan Evaluation – Capacity Test.**

(1) **Requirement.** The Supply~~EIM Base Schedules for resources, as applicable and as detailed in Business Practice Manuals, included in—~~

(A) the EIM Resource Plan must ~~balance~~ meet the Demand Forecast for each EIM Entity Balancing Authority Area ~~and the Uncertainty Requirement determined in accordance with Section 44.2.4, and~~

(B) for the CAISO Balancing Authority Area the RUC Schedules, the HASP Advisory Schedules and HASP Intertie Block Schedules or the FMM Schedules, ~~as applicable and as detailed in Business Practice Manuals,~~ must ~~meet~~ balance the Demand Forecast for the CAISO Balancing Authority Area ~~and the Uncertainty Requirement determined in accordance with Section 44.2.4.~~

(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.

~~(32)~~ **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 from non-participating resources and the sum of the incremental or decremental highest quantity 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 is less than the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority Area— and the Uncertainty Requirement determined in accordance with Section 44.2.4, and

(B) _____ for the CAISO Balancing Authority Area 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, as applicable and as detailed in Business Practice Manuals, is not sufficient to meet are less than the total Demand Forecast for the CAISO Balancing Authority Area and the Uncertainty Requirement determined in accordance with Section 44.2.4.

~~(3)~~ **Excess Supply.** An EIM Resource Plan or the CAISO equivalent shall be deemed to have excessive Supply if the sum of EIM Base Schedules from non-participating resources and the sum of the lowest quantity Bids in the Energy Bid

~~range from EIM Participating Resources is greater than the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority Area plus the Uncertainty Requirement determined in accordance with Section 44.2.4, and for the CAISO Balancing Authority Area the RUC Schedules, the HASP Advisory Schedules and HASP Intertie Block Schedules or the FMM Schedules, as applicable and as detailed in Business Practice Manuals, are greater than the total Demand Forecast and the Uncertainty Requirement determined in accordance with Section 44.2.4.~~

~~(4) **Additional Hourly Capacity Requirements.**~~

~~(A) **In General.** If the CAISO determines under the procedures set forth in the Business Practice Manual for the Energy Imbalance Market that a Balancing Authority Area in the EIM Area has historically high import or export schedule changes between forty minutes and twenty minutes before the start of the Trading Hour, the CAISO will add to the Balancing Authority Area in the EIM Area's capacity requirements an additional requirement.~~

~~(B) **Additional Capacity Requirement.** On a monthly basis, according to procedures set forth in the Business Practice Manual for the Energy Imbalance Market, the CAISO will calculate for each Balancing Authority Area in the EIM Area histograms of the percentage of the difference between imports and exports scheduled at forty minutes before the start of the Trading Hour and the final imports and exports at twenty minutes before the start of the Trading Hour based on the submitted E-Tags at those times and calculate additional upward and downward requirements for the capacity test component of the resource sufficiency evaluation.~~

~~(5) **Removal of the Uncertainty Requirement.**~~

~~For a period of 12 months after the Uncertainty Requirement has been included in accordance with this Section 29.34(l), the CAISO may upon Market Notice of~~

~~at least three (3) Business Days no longer include the Uncertainty Requirement if—~~

~~(A) —the frequency or magnitude of capacity test failures supports a conclusion that the results were unintended and caused by including the Uncertainty Requirement;~~

~~(B) —the CAISO submits an informational report to FERC within 30 days explaining and supporting its conclusion; and~~

~~(C) —the Uncertainty Requirement remains excluded from the capacity test unless and until FERC authorizes otherwise.~~

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

(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 ~~Day-Ahead Schedules~~ 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), ~~and (6)~~.

(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.

~~(6) **Incremental Requirements.**~~

~~(i) **In General.** If the CAISO determines under the procedures set forth in the Business Practice Manual for the Energy Imbalance Market that an EIM Entity Balancing Authority Area or the CAISO Balancing Authority Area has historically high import or export schedule changes between T-40 and T-20, the CAISO will add to the EIM Entity's or the CAISO's flexible capacity requirement an additional incremental requirement.~~

~~(ii) **Additional Incremental Requirement.** On a monthly basis, according to procedures set forth in the Business Practice Manual for the Energy Imbalance Market, the CAISO will calculate for each EIM Entity Balancing Authority Area and the CAISO Balancing Authority Area histograms of the percentage of the difference between imports and exports scheduled at T-40 and the final imports at T-20 based on the E-Tags submitted at T-40 and T-20 and calculate additional incremental and decremental requirements for the capacity test component of the resource sufficiency evaluation.~~

(n) **Effect of EIM Resource Capacity or Flexibility Plan Insufficiency.**

- (1) **Insufficient Capacity Resource Plan Balance.** 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 Ssupply 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;
- (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 value for the last 15-minute interval.

(2) **Insufficient Flexible Ramping Capacity/Insufficiency**. 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.

* * * * *

Attachment C – Board Memo and Presentation
Resource Sufficiency Evaluation Enhancements
California Independent System Operator Corporation
March 11, 2022



Memorandum

To: ISO Board of Governors and EIM Governing Body

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

Date: February 2, 2022

Re: Decision on EIM Resource Sufficiency Evaluation Enhancements – Phase 1

This memorandum requires Board of Governors and EIM Governing Body action.

EXECUTIVE SUMMARY

Management proposes enhancements to the EIM’s resource sufficiency evaluation so it will more accurately assess whether a balancing authority area in the EIM is scheduling or bidding sufficient supply in the upcoming hour to meet its demand. These enhancements will also result in more appropriately allocating resource sufficiency evaluation penalty revenues. The proposed enhancements are the product of an extensive and collaborative stakeholder process conducted over the past several months to further refine the resource sufficiency evaluation following last year’s *Market Enhancements for Summer of 2021* initiative.

The resource sufficiency evaluation is intended to limit “leaning,” which is a balancing authority area’s participation in the EIM without having sufficient supply to meet its load and instead relying on EIM energy transfers. It also has a component intended to address strategic under- or over-scheduled base schedules.

The proposed enhancements to the resource sufficiency evaluation are composed of:

- Changes to the “capacity test” to more accurately count a balancing authority area’s available supply capacity.
- Changes to the “flexible ramping test” to more accurately count available resource energy ramping capability.
- Changes to more accurately account for imports and exports.
- No longer include the ISO balancing authority area in the allocation of the “balancing test” penalty revenues.

- Changes to consider certain actions balancing authority areas take outside of the ISO market.

Management also plans system enhancements to provide EIM participants with more of the data the resource sufficiency evaluation uses to test their balancing authority area. This will enable them to better ensure their balancing authority area passes the resource sufficiency evaluation and more readily identify data errors.

Because the resource sufficiency evaluation is an important element of the EIM, Management has set their implementation by summer 2022 as a priority. In addition, Management has already started stakeholder efforts to consider additional resource sufficiency evaluation enhancements.

Moved, that the ISO Board of Governors and EIM Governing Body approve the resource sufficiency enhancements as described in the memorandum dated February 2, 2022; and

Moved, that the ISO Board of Governors and the EIM Governing Body authorize Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposal described in the memorandum, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.

BACKGROUND

The resource sufficiency evaluation tests each hour that each EIM balancing authority area has scheduled or bid sufficient supply in the ISO real-time market to meet its demand. The real-time market limits “leaning” by limiting a balancing authority area’s energy transfers in the corresponding fifteen-minute interval if it fails either the resource sufficiency evaluation’s “capacity test” or its “flexible ramping test. Depending on the nature of the failure, EIM import or export transfers will be limited to the preceding interval’s schedules.

The “capacity test” assesses whether the maximum supply capacity provided through base schedules and energy bids for a balancing authority area are sufficient to meet its forecast demand. This also currently includes an additional amount to account for uncertainty in its net demand forecast.

The “flexible ramping sufficiency test” assesses whether the energy ramping capability provided through a balancing authority area’s resources’ base schedules and energy

bids can meet its forecast 15-minute net load changes plus an additional amount to account for net load uncertainty.

The resource sufficiency evaluation's "balancing test" is to provide a financial incentive not to strategically schedule to gain from real-time market imbalance energy. For example, an EIM entity could conceivably submit base schedules that strategically gain through supply and demand price differences in imbalance energy settlement. The balancing test provides for financial penalties for EIM entities if they submit base schedules that under- or over-schedule supply relative to their actual demand. The ISO currently allocates the penalty proceeds to all the balancing authority areas participating in the EIM, including the ISO.

PROPOSAL

The following describes Management's proposed resource sufficiency evaluation enhancements and its plans to make additional resource sufficiency evaluation related data available to market participants.

Capacity Test

Management proposes three changes to the resource sufficiency evaluation's capacity test to more accurately count a balancing authority area's available supply.

The first change is to more accurately account for the capacity of resources that are offline by considering their start-up time. The capacity test currently does not consider a resource's start-up time, which can be particularly problematic following a resource outage. This can overstate available capacity as some resources can take as long as multiple hours to come online.

Management proposes that the capacity test would only consider an offline resource's capacity as available if the ISO real-time market can start the resource (or multi-stage generator configuration) by the upcoming hour being tested, or if the real-time market could have started the resource by the hour being tested. It will determine this by testing whether there were bids for the resource in previous hours, in addition to the hour being assessed, that would have enabled the market to start it by the upcoming hour. It does not require resources with longer start times to be online or in the process of coming online to count in the capacity test. This approach recognizes that the real-time market commits resources based on economics and that, consequently, a longer start time resource was nonetheless available to the real-time market even if the market did not start it.

Management also proposes that the ISO would have the ability to configure in the systems that amount of longer-starting resources' capacity that the capacity test counts as available. It would be configured based on the actual amounts of capacity that turn

out to be available in the actual market outcomes. This recognizes that not all of the capacity of these resources may be available in the hour because of ramping constraints.

The second capacity test change Management proposes is to remove the additional amount that accounts for a balancing authority area's net load uncertainty from the demand forecast the capacity test uses. This additional amount to account for net load uncertainty was only recently added to the capacity test as a result of last year's *Market Enhancements for Summer 2021* policy initiative. However, the interaction of inaccuracies in the net load uncertainty calculation and the capacity test framework has produced spurious capacity test failures.

The third change Management proposes is for the capacity test to consider how charged a storage resource is when calculating its available ramping capability. This will more accurately reflect the capacity storage resources can provide, which depends on their charge.

Flexible Ramping Test

Management proposes three changes to the resource sufficiency evaluation's flexible ramping test to more accurately reflect a balancing authority area's 15-minute energy ramping needs and its resources' ramping capability.

The first change applies to the narrow circumstance that occurs under very tight supply conditions when there is insufficient supply in the real-time market for it to meet a balancing authority area's load. When this occurs, Management proposes that the flexible ramping test for the following hour adjusts the demand forecast it uses as the starting point for calculating the balancing authority area's fifteen-minute ramping needs. The starting point would be inaccurate without this adjustment.

The second change Management proposes to the flexible ramping test is for it to also consider the ramping capability provided by multi-stage generators' when they are transitioning between configurations. The capacity test already accounts for this ramping capability.

Similar to as proposed above for the capacity test, the third change Management proposes is for the flexible ramping test to consider the amount a storage resource is charged when calculating its available ramping capability.

Imports and Exports

Management proposes two changes so that the capacity and flexible ramping tests more accurately account for balancing authority area's imports and exports.

The first change pertains to which hourly intertie schedules can be used by the ISO balancing authority area in the capacity and flexible ramping tests.¹ Management proposes that the ISO exclude hourly import and export intertie schedules for which an e-tag has not been submitted by the time of the final hourly resource sufficiency evaluation run at 40 minutes before the hour. Because they do not have an e-tag by this time, these imports/exports are not likely to be delivered and the fifteen-minute market will dispatch them to zero. This rule does not apply to other EIM balancing authority areas because the ISO real-time market does not dispatch imports at their interties.

The second import/export related change Management proposes is to remove an adjustment made to a balancing authority area's available supply in the capacity and flexible ramping tests to account for scheduled imports and exports that may not be delivered. The adjustment is made by looking back at past undelivered imports and exports in the same hour over the previous three months. Analyses have shown the current methodology does not accurately predict future undelivered imports and exports. Management plans to work with stakeholders to revise the methodology in a subsequent initiative phase.

Balancing Test

Management proposes to no longer include the market participants in the ISO balancing authority area in the allocation of resource sufficiency evaluation balancing test penalty proceeds. The ISO balancing authority area is not subject to the balancing test because ISO market participants use the ISO day-ahead market instead of submitting base schedules to the real-time market. Likewise, allocating them balancing test penalty proceeds does not serve as an incentive to adjust their scheduling behavior.

Balancing Authority Area Actions

The final set of changes Management proposes is that the resource sufficiency evaluation consider certain actions balancing authority areas take outside of the ISO market.

Management proposes that EIM entities have the ability to decrease the load forecast the resource sufficiency evaluation uses for their balancing authority area to represent smaller demand response programs they dispatch outside of the ISO real-time market. The current rules only allow them to adjust their load forecast if this out-of-market demand response is at least four percent of their load.

¹ Note that these hourly import/export schedules at the ISO interties are distinct from energy transfers the EIM dispatches.

Data Enhancements

Management also plans system enhancements to provide EIM entities with more of the data the resource sufficiency evaluation uses to test their balancing authority area. This includes detailed data that will allow each EIM entity to understand how the resource sufficiency evaluation considered their schedules and bids. This will enable them to better ensure their balancing authority area passes the resource sufficiency evaluation and more readily identify data errors.

STAKEHOLDER POSITIONS

Although some stakeholders may not support certain elements of Management's proposed changes outlined in this memorandum, they generally support this package of enhancements and believe it is important to move forward with them so the ISO can implement them by summer 2022. Stakeholders also generally agree that it is important for the ISO to continue to work with them to continue to address resource sufficiency evaluation related issues.

Stakeholders outside the ISO balancing authority area believe it is important to continue to explore resource sufficiency evaluation enhancements to address load conformance adjustments (*i.e.*, upward adjustment to the load forecast the real-time market uses) the ISO makes for its balancing authority area. They maintain that increased transfers resulting from these load conformance adjustments result in the ISO leaning on the rest of the EIM.

Stakeholders both inside and outside the ISO balancing authority area believe it is important to address a related issue, which is the interactions between the resource sufficiency evaluation, EIM transfers into the ISO, and hourly exports at the ISO interties. The ISO real-time market may rely on scheduling EIM transfers into the ISO to support hourly exports at the interties out of the ISO. This points to potential inequities in the resource sufficiency evaluation as the exports add to the ISO's capacity test obligations while the EIM transfers into the ISO do not count towards its supply.

Management plans to continue to work with stakeholders to address the interactions between the resource sufficiency evaluation, load conformance, and hourly exports at the interties. Additional analysis and discussion is needed because of the complex interactions between these elements. For example, although load conformance can increase EIM transfers into the ISO, it can also result in scheduling additional non-EIM import supply or starting-up internal ISO generation.

One stakeholder opposes moving forward now with Management's proposal for the resource sufficiency evaluation to only consider ISO import and export schedules for

which an e-tag has been submitted by the time of the final hourly resource sufficiency evaluation run at 40 minutes before the hour. It maintains that given the issues with the interrelationship between the resource sufficiency evaluation, EIM transfers, and hourly exports described above that potentially unfairly disadvantage the ISO in the resource sufficiency evaluation, the ISO should not move forward with this change that could make it harder for the ISO to pass the resource sufficiency evaluation.

Management believes its proposal for the resource sufficiency evaluation to not consider these imports is reasonable as they most likely will not be delivered. Management believes this is a separate issue from EIM transfers supporting exports and does not justify not making this change at this time.

Stakeholders support a resource sufficiency change for the capacity test to consider a resource's start-up time. However, some stakeholders maintain that only resources that the real-time market can start by the upcoming hour should count and that it should not count longer offline starting resources.

Management believes excluding offline longer-starting resources would be an inappropriate approach, as it would in large part result in assessing the real-time market's commitment decisions rather than the supply a balancing authority area makes available. Such an approach would also potentially incentivize inefficient market behavior such as self-scheduling resources merely to ensure passing the capacity test.

As part of this stakeholder initiative, Management considered provisions to deem a balancing authority area as failing the resource sufficiency evaluation and accordingly limit its EIM transfers under certain emergency conditions that would indicate the balancing authority area has a supply shortfall. Stakeholders provided feedback that the ISO should use clear criteria for the emergency conditions that would result in automatic failure of the resource sufficiency evaluation. Management is continuing to carefully consider the alternative criteria to trigger such failures and will take its proposal to the Board of Governors and Governing Body in March after it has completed its evaluation.

The ISO Department of Market Monitoring supports Management's proposal, stating it will more accurately reflect the capacity made available to the EIM.

The Market Surveillance Committee generally supports the proposed enhancements. They believe additional analysis is necessary before exploring additional resource sufficiency enhancements because of the complex market interactions between the resource sufficiency evaluation, EIM transfers, and imports and exports at the ISO interties. The Market Surveillance Committee's formal written opinion is included as Attachment A.

CONCLUSION

Management requests the ISO Board of Governors and the EIM Governing Body approve Management's resource sufficiency evaluation enhancements described in this memorandum. These enhancements will more accurately assess whether each balancing authority area's bid or scheduled supply is sufficient to meet its demand and they will more appropriately allocate resource sufficiency evaluation penalty revenues.



California ISO

WESTERN EIM

Decision on western EIM resource sufficiency evaluation enhancements – phase 1

Greg Cook

Executive Director, Market and Infrastructure Policy

Board of Governors and EIM Governing Body Joint Meeting

General Session

February 9, 2022

Management proposes several enhancements to improve the accuracy of the EIM resource sufficiency evaluation (RSE)

- RSE tests if a balancing authority area has scheduled or bid sufficient supply to prevent leaning
 - Capacity test assesses whether scheduled and bid-in supply capacity can meet its forecast demand
 - Flexible ramping sufficiency test assesses whether there is sufficient energy ramping capability to meet 15-minute load variations
- Failure of either test results in limiting additional EIM transfers into or out of the balancing authority area
- Balancing test assesses whether base schedules are submitted that under- or over-schedule supply relative to demand
 - financial penalties are applied to EIM entities that fail the test

Management proposes enhancements to the capacity test to more accurately account for available supply

- Only count capacity that is online or that the real-time market could start for the upcoming hour
 - Avoids including capacity that is unavailable from resources returning from outage
- Remove net load uncertainty from the capacity test requirement
 - Net load uncertainty calculation has proven to be inaccurate and can produce spurious capacity test failures
 - Revisit in subsequent initiative phase
- Remove inertia uncertainty from the capacity test requirement
 - Allow time to address accuracy of the calculation

Management proposes three enhancements to the flexible ramping test to more accurately count ramping capability

- If supply shortfall occurs, adjust load forecast to account for the shortfall in the preceding hour to determine ramping capability requirement
 - The starting point for calculating ramping needs would be inaccurate without accounting for the shortfall
- Account for multi-stage generators' ramping capability when transitioning between configurations
- Consider storage resources' state of charge in calculating their ramping capability

Management also proposes enhancements to more accurately account for imports and exports in the RSE

- Exclude ISO hour-ahead scheduling process schedules if e-tag not submitted by the final hourly RSE run (40 minutes prior to the hour)
 - These imports/exports are not assured of being delivered and are dispatched to zero in the fifteen-minute market
- Remove RSE component that accounts for potential undelivered imports/exports based on past amounts
 - Analyses have shown the current methodology does not accurately predict undelivered amounts
 - Revise methodology in subsequent initiative phase

Management proposes to exclude the ISO balancing authority area from the allocation of balancing test penalty revenues

- ISO balancing authority area is not subject to the balancing test because it uses its day-ahead market instead of submitting base schedules to the real-time market
- However, ISO balancing authority area is currently eligible for allocation of balancing test penalty proceeds
- Propose to exclude ISO from allocation of penalty revenue
 - Allocating balancing test penalty proceeds to ISO market participants does not provide incentives for scheduling behavior

Proposal also includes enhancements to consider certain actions EIM balancing authority areas take outside of the ISO market

- Allow EIM balancing authority areas to reduce RSE load forecast to represent dispatch of smaller demand response programs
 - Demand response load forecast reductions are currently limited to programs that are at least 4 percent of the load forecast
- Considered measures to deem a balancing authority area as failing the RSE under certain emergency conditions
 - Continue to develop clear criteria for emergency conditions that would result in RSE failure

Management is planning system enhancements to increase the RSE related data available to market participants and has worked with the ISO Department of Market Monitoring to improve reporting

- System enhancements will provide additional data so EIM balancing authority areas can better understand their RSE requirements
- Department of Market Monitoring has assumed primary role in RSE reporting and analysis to ensure objectivity and increase the information available

Stakeholders support the proposal as providing incremental improvements to the RSE

- Stakeholders support further consideration of additional topics in subsequent phase of the initiative
 - recognize the complexity of accounting for load conformance and how export transfers are cleared in HASP
 - Management has committed to resolving these issues as soon as feasible
- Some stakeholders concerned that enhancements for counting capacity for the RSE does not go far enough and may continue over count available supply
- Some stakeholders believe that hourly EIM participation should be limited following the declaration of a NERC EEA 2
 - Management believes this proposal needs further consideration to determine appropriate criteria
 - Bring proposal to subsequent EIM Governing Body/ISO Board meeting

Management requests the ISO Board and the EIM Governing Body approve this set of enhancements to the resource sufficiency evaluation

- Enhancements provide more accurate assessment of whether a balancing authority areas supply is sufficient to meet its demand
- Enhancements more appropriately allocate RSE penalty revenues
- Management is continuing to work with stakeholders to further enhance the accuracy of the resource sufficiency evaluation

Board of Governors and EIM Governing Body February 9, 2022

Decision on Western EIM Resource Sufficiency
Evaluation Enhancements – Phase 1

General Session

Motion

Moved, that the ISO Board of Governors and EIM Governing Body approve the resource sufficiency enhancements as described in the memorandum dated February 2, 2022; and

Moved, that the ISO Board of Governors and the EIM Governing Body authorize Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposal described in the memorandum, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.

EIM Governing Body vote:		5-0		Action: Passed				
Board of Governors vote:		5-0						
Name	Position	Body	Move/ Second	Yes BoG	No BoG	Yes GB	No GB	Other
Bhagwat	Chair	Board	Moved	Y				
Borenstein	Governor	Board		Y				
Decker	Chair	GB	Second			Y		
Fong	Member	GB				Y		
Galiteva	Governor	Board		Y				
Gardner	Member	GB				Y		
Kondziolka	Vice Chair	GB				Y		
Leslie	Vice Chair	Board		Y				
Prescott	Member	GB				Y		
Schori	Governor	Board		Y				
Vote Count								

Motion Number: 2022-02-JG1

Attachment D – Table of Proposed Tariff Changes
Resource Sufficiency Evaluation Enhancements
California Independent System Operator Corporation
March 11, 2022

Summary Table of Proposed RSE Enhancements

Balancing Test

Today	Proposed Change
A. All BAAs receive an allocation of over-under scheduling penalties.	A. Excludes BAAs not subject to the balancing test from revenue allocation because they are not subject to the penalty.

Capacity Test

Today	Proposed Change
B. Conditions in the real time market horizon can affect the availability of supply but are not necessarily accounted for the capacity test.	B. Accounting for additional conditions through the real time market horizon will improve the accuracy of the capacity test.
G. A historical intertie uncertainty calculation is applied to adjust the capacity requirement.	G. This uncertainty adder can be problematic in some circumstances, and removing it and revisiting it in a subsequent phase is appropriate.

Flexibility Test

Today	Proposed Change
B. Ramping capability from MSG and FOR resources during transitions is not always accounted for in the hour under evaluation.	B. Including the ramping capability from MSG and FOR transitions would more accurately represent the available flexibility.
C. Changes in supply due to power balance constraint relaxations are not factored into the demand forecast referenced in the flexibility test.	C. Accounting for constraint relaxation will provide a more consistent point of reference across intervals in terms of the ramping requirements.

Capacity and Flexibility Tests

Today	Proposed Change
D. Storage resources may not be accurately counted because their available supply is dependent on their market dispatch across intervals, which is not currently reflected.	D. Limiting these resources to the capacity corresponding to their amount of charge at the time of the test will improve the accounting of a storage resource's capacity/flexibility.
E. Some EIM entity demand response programs can't count as supply because they don't participate in the WEIM and existing forecasting limitations prevent them being accounted for.	E. Allowing these EIM entities to adjust their demand forecast referenced in the RSE will account for their demand response without requiring complex modeling changes.
F. Interchange schedules to serve CAISO demand are counted as available supply regardless of whether they have registered a transmission profile in an e-tag.	F. Requiring a transmission profile would be more indicative of availability for delivery to, or to receive delivery from, the CAISO BAA in counting the available capacity/flexibility.