



California ISO

# **EIM Resource Sufficiency Evaluation Enhancements Phase 2**

Straw Proposal

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Prepared by

Danny Johnson

California Independent System Operator

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## 1 Introduction

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

The second phase of this initiative proposes to include:

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

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

## 2 RSE Background

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

### 2.1 Resource Sufficiency Evaluation Purpose and Principles

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

The WEIM RSE's capacity and flexible ramping tests address the first objective of preventing inappropriate leaning; while the balancing test also provides a level of

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protection against inappropriate leaning, that is not its primary objective. Leaning has been previously understood as a BAA participating in the WEIM without bringing sufficient capacity and ramping flexibility to cover its expected demand, including net load uncertainty; the concept of BAA self-sufficiency is part of the scope for phase 2.

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

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

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

- Inappropriate leaning is participation in the WEIM without sufficient capacity and ramping capability to meet expected load;
- WEIM RSE failures should not cause operational or reliability issues; and
- The WEIM RSE does not dictate resource adequacy or integrated resource plans in individual BAAs.

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

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

### 3 Stakeholder engagement

Between Phase 1 and Phase 2 of this initiative, the CAISO held multiple workshops. These workshops examined WEIM RSE function during emergency conditions, the potential to leverage the WEIM RSE for energy assistance, and the interaction between the WEIM RSE and the CAISO's flexible ramping product refinements. The CAISO also held multiple calls to facilitate discussion of the results of the data analysis performed by the CAISO.

Stakeholders have offered broad support for the concept of utilizing the WEIM to provide energy assistance. NVE went so far as to put forward a proposal to implement interim emergency assistance during the summer of 2022. However, comments indicate the need for additional policy development on topics that include the methods for implementation and revenue allocation resulting from assistance energy transfers.

### 4 Phase 2 – Accuracy Enhancements

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

#### 4.1 Load forecast adjustments “Load conformance”

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

During the RSEE Phase 1 policy development, stakeholders raised concerns that the use of load conformance was inappropriately advantaging the CAISO BAA in passing the WEIM RSE. However, the existing design of the WEIM RSE does not count WEIM transfers as available supply in the bid-range capacity test. Intrinsic to the design, the use of load conformance cannot help any BAA pass the WEIM RSE capacity test. The

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flexible ramping sufficiency test uses the financially binding market results for the 15-minute interval immediately prior to the hour under evaluation as a reference point to determine the upward and downward ramping requirements in each 15-minute interval in the following hour. To the extent that load conformance drives WEIM transfers that unload resources internal to a BAA, the resulting lower operating level of those resources would be reflected as additional upward ramping capability in the flexible ramping sufficiency test. Limited analysis in Phase 1 showed that load conformance did result in an increase to WEIM transfers, however, this analysis did not show load conformance resulted in a 1-for-1 increase in WEIM transfers.<sup>2</sup> Given the complex interactions that drive market outcomes, the CAISO deferred additional consideration of load conformance until Phase 2 to allow time for more robust analysis.

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

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

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

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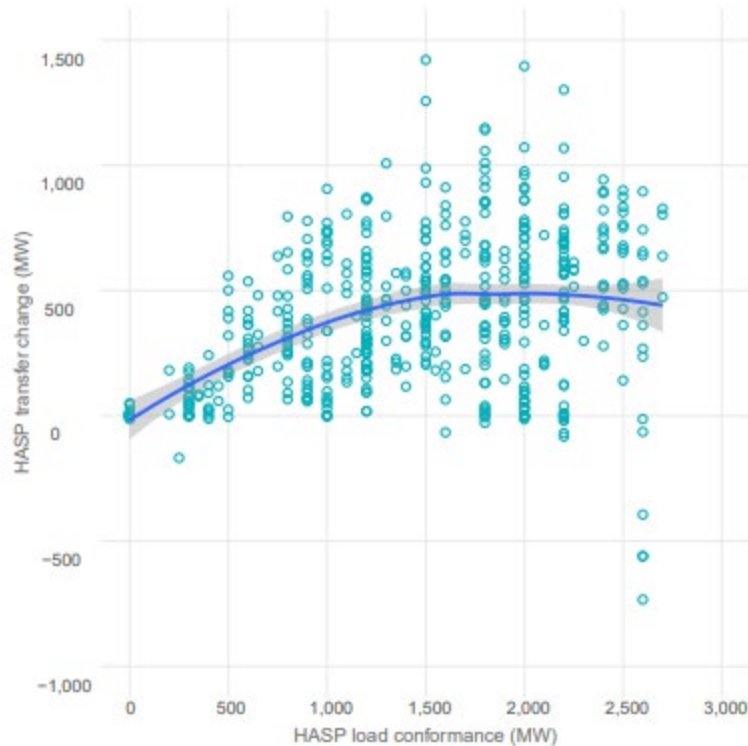


Figure 1: HASP Load Conformance vs WEIM Transfers

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

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<sup>4</sup> *Id.*, at 3

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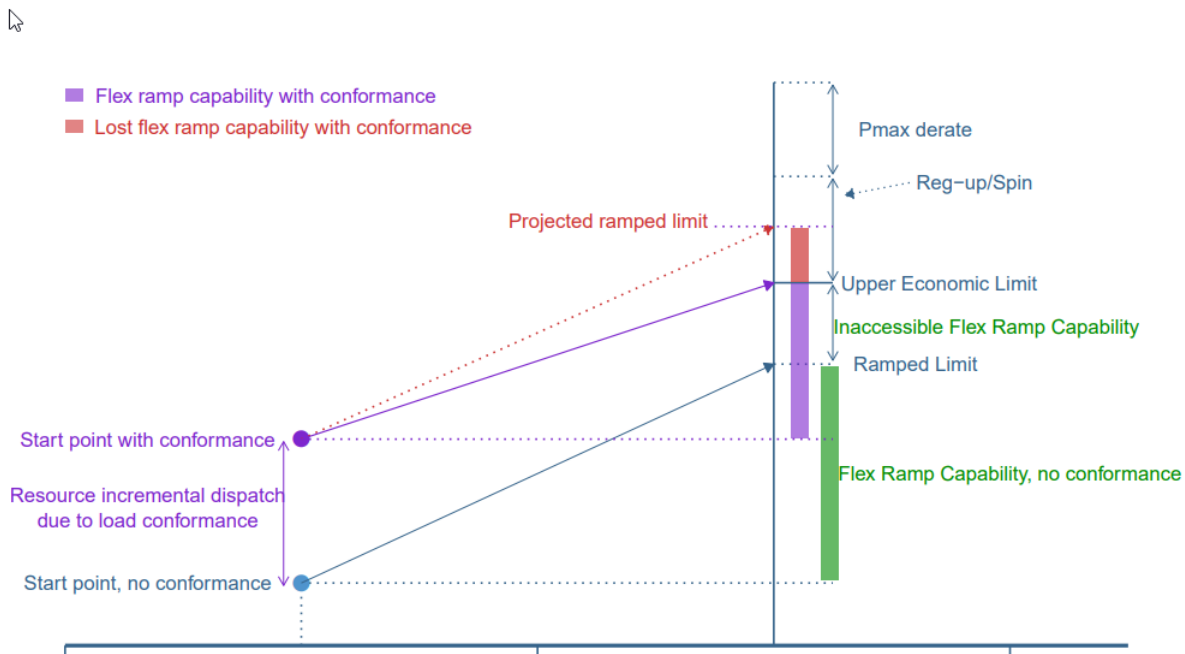


Figure 2: Illustration in reduction in resource flexibility due to load conformance

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

### 4.2 Interaction between advisory WEIM transfers and HASP

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



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### 4.2.1 *WEIM transfers and HASP - Background*

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

Under the existing WEIM RSE design, awarded HASP exports are added to the CAISO BAA's WEIM RSE obligation, yet the advisory WEIM transfers are not counted as available supply. Under this design, the CAISO BAA can have sufficient supply to meet its own obligations over the upcoming hour, but fail the WEIM RSE due to insufficient capacity to support the block hourly export transfers cleared through access to advisory WEIM supply. This result can lead to the WEIM RSE outputting false failures for the CAISO BAA. Analysis published by the CAISO on June 21, 2022 confirms that this dynamic occurs.<sup>6</sup>

In performing this analysis, production market cases were rerun with adjustments made to account for unrealized WEIM transfers in the real-time dispatch (RTD)<sup>7</sup>. The analysis shows that this interaction has the potential to result in hundreds, if not thousands of additional MW of obligation for the CAISO BAA. However, given the complex interaction that leads to this outcome, the analysis did not show a strong correlation between the volumes of WEIM import transfers and HASP exports. Results from July 9<sup>th</sup> can be seen below in Figure 3, while as simplified, graphic example of this interaction can be seen below in Figure 4.

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<sup>5</sup> [CAISO Business Practice Manual for Market Operations Section 7.5](#)

<sup>6</sup> *Supra*, note 2

<sup>7</sup> RTD is a 5-minute security constrained economic dispatch application that re-optimizes the results of the unit commitment performed through the 15-minute granularity RTUC process

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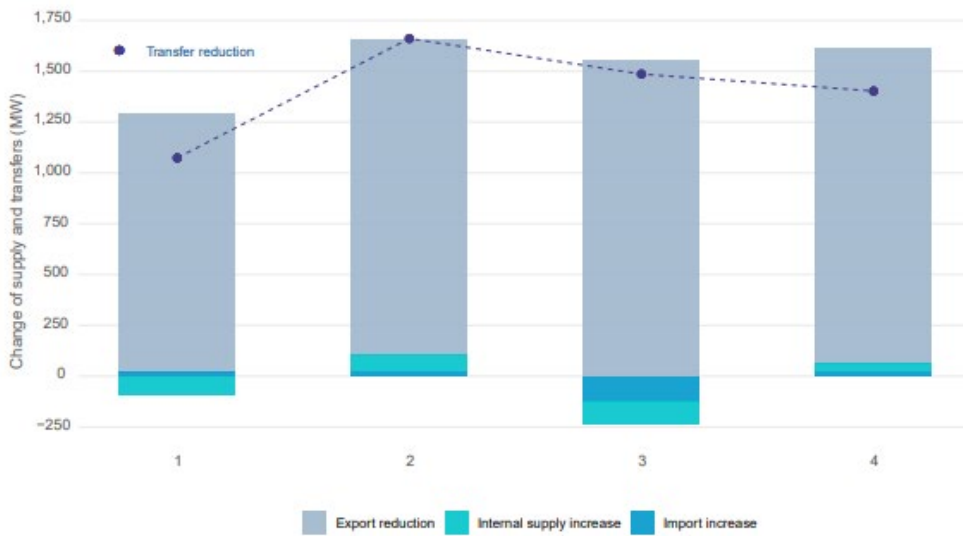


Figure 3: Changes of exports and supply relative to changes in WEIM transfer -July 9, 2021, HE19

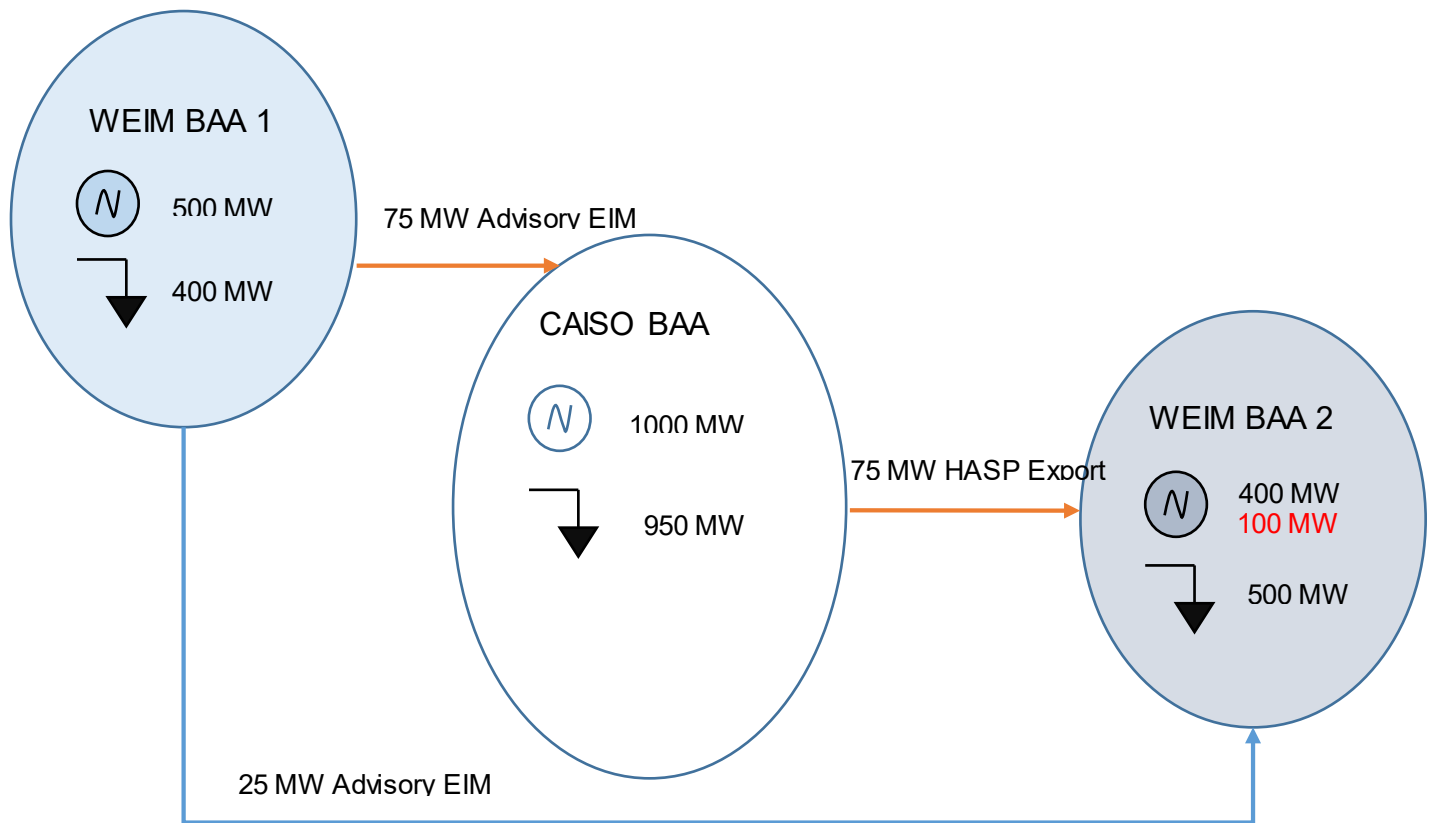


Figure 4: Graphic Example of HASP Export Advisory WEIM import interaction

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In this example each balancing authority area is resource sufficient

- 2000 MW Supply for 1850 MW Load
- The optimal HASP solution clears 75 MW of advisory WEIM transfers into the CAISO BAA and 25 MW of transfers directly from BAA 1 to BAA2. This allows supply in the CAISO BAA to support a firm hourly export to BAA2 since its supply is seen as cost effective in future advisory intervals
- Post HASP the CAISO's obligation is 1025 MW, and the CAISO BAA only has 1000 MW supply; the CAISO BAA would fail the WEIM RSE.

While the example above highlights a snapshot showing the potential for WEIM import transfers to add to the CAISO BAA's obligation, the table below shows how this phenomenon can occur across an hour. Specifically how the CAISO BAA can fail the RSE mid-hour, and the resulting limitation of incremental WEIM import transfers can exacerbate the capacity shortfall.

Table 1: Numeric Example of WEIM Transfers Facilitating HASP Exports

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

Following a failure of the WEIM RSE, the current design is to limit incremental transfers in the direction of failure to the greater of either the base transfer or the transfer in the most recently passed 15-minute interval. Should the CAISO fail the RSE due to this interaction, its incremental WEIM transfers are likely to be limited to the most recently passed 15-minute interval. While this proposal also considers financial consequences to allow additional incremental transfers; curing an insufficiency at administratively set

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prices due to a failure in the WEIM RSE under the existing design is not an optimal solution.

Should the CAISO BAA not have sufficient capacity to meet demand and all export schedules, potentially due to the CAISO BAA being limited from receiving additional WEIM imports that originally supported the export, curtailments of the lower priority exports may be required.

**4.2.2 WEIM transfers and HASP – HASP export firmness**

The CAISO under its existing tariff authority retains the ability to curtail lower priority exports to maintain its own load serving obligations as a balancing authority.<sup>8</sup> HASP export transfers that meet all criteria to qualify as high priority exports will be given equal priority to CAISO load, and can be tagged as firm-energy; this requires the designation of a non-RA resource internal to the CAISO BAA to back the export. The CAISO is proposing that all other exports will be treated and tagged as firm-provisional energy. While these LPT exports would not be classified as firm energy, the CAISO would expect them to still flow to the extent that internal supply, HASP hourly import schedules, and WEIM transfers remain available to the market. The CAISO BAA would propose to carry operating reserves for these exports. The CAISO BAA would only look to curtail these LPT exports to the extent contingency reserves had been deployed and were unable to be recovered, or an event outside of existing planning criteria occurs wherein the CAISO is unable to meet its internal demand through the exercise of its reserves.

The CAISO also proposes to differentiate and provide priority to LPT exports that have cleared the day-ahead process over LPT exports that are made in real-time only. This differentiation will serve to provide additional certainty for market participants who scheduled their LPT exports from the CAISO market on a day-ahead basis.

The CAISO also proposes to retain operator supervision on the curtailment of LPT export transfers out of the CAISO BAA. The advisory results produced by the CAISO's RTPD process will return a list of potential lower priority export transfer curtailments necessary to preserve CAISO load. The CAISO systems, with affirmation of the system operator, will issue pro-rata curtailments of these exports for all BAA's, with the default being to exclude curtailments into BAA's that have entered into an EEA-2.

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<sup>8</sup> [CAISO Tariff Section 34.12](#)

### **4.2.3 WEIM transfers and HASP – Resource Sufficiency Evaluation Treatment**

The CAISO proposes to only count high priority block hourly export transfers and lower priority block hourly transfers that it has a reasonable expectation were sourced from its control area in the net scheduled interchange that is used to inform its WEIM RSE obligation. This provides equivalent treatment to how interchange schedules are made and represented by WEIM entities through the base scheduling process. Bilaterally, only schedules that the WEIM entity can confidently support are sold as firm energy, reflected in the base schedules, and tested against in the RSE. As described in section 4.2.2., given the interaction of the HASP optimization and advisory WEIM supply offers, the CAISO is not able to confidently support all LPT exports from supply internal to its balancing authority area.

For WEIM entities who are awarded LPT HASP export schedules that do not meet the high priority criteria, the CAISO proposes a pro-rata adjustment to block hourly LPT export schedules that are available to be shown as supply in the WEIM BAA's RSE, in equal amount to the discount applied to the CAISO's BAA's RSE obligation. This provides symmetric treatment of LPT transfers between the CAISO and the receiving BAA. The remainder of the LPT export schedules would be available to be counted as firm supply for the purpose of passing the WEIM RSE. The CAISO believes this is appropriate for the following reasons: 1) the CAISO BAA cannot guarantee the firmness of all LPT exports, 2) should not fail the WEIM RSE due to clearing LPT exports that may not be backed by supply internal to the CAISO BAA, and 3) counting the full volume of LPT HASP exports by a WEIM BAA may inadvertently allow WEIM BAAs to count in their base schedules WEIM transfer supply that is "firmed up" by the CAISO's HASP process.

## **4.3 RSE measures of uncertainty**

### **4.3.1 Background on existing measures of uncertainty**

During the RSEE Phase 1 policy development stakeholders raised concerns that the WEIM RSE's existing measures of uncertainty may not be a sufficiently accurate predictor of future uncertainty as to increase the accuracy of the WEIM RSE when referenced to the demand that materializes.

Since November 1, 2016, the CAISO has had Flexible Ramping Product (FRP) Requirements in place for the 15-minute and 5-minute markets. These products provide additional upward and downward flexible ramping capability to account for uncertainty

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due to gross load, wind and solar forecasting errors. The forecast uncertainty is measured by Net Load (NL),  $\text{Net Load} = \text{Load (L)} - \text{Wind (W)} - \text{Solar (S)}$ . In each market, FRP needs to estimate both Flexible Ramping Up (FRU) and Flexible Ramping Down (FRD) requirements. The current implemented approach to do this, commonly referred to as the histogram methodology, uses the upper 97.5 and lower 2.5 percentiles of observed net load uncertainty from the previous rolling 40 matching week days and 20 matching weekend days to set the FRP requirement. Within this methodology two main limitations have been observed; 1) no incorporation of the future impact of weather conditions on the net load uncertainty, and 2) the historical sample set utilized. Developed concurrent with the FRP refinements stakeholder initiative that was approved through the CAISO's governance on October of 2020, the CAISO proposed enhancements to the FRP formulation, colloquially referred to as the quantile regression methodology.<sup>9</sup>

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

In addition, the CAISO as an outcome of the phase 1 policy development suspended the inertia uncertainty adder<sup>10</sup> from the RSE's capacity test. This adder set an hourly uncertainty requirement based on observed deviations from what was shown in the final WEIM RSE forty minute prior to the hour (T-40) and what was eventually tagged at twenty minute prior to the hour (T-20). The methodology calculates a highest relative deviation<sup>11</sup> and a highest absolute deviation<sup>12</sup>. The uncertainty requirement is then determined by taking the minimum of the absolute deviation or the relative deviation multiplied by the scheduled net interchange. The requirement was set to a 95% confidence interval; resulting in only the upper and lower 2.5% of observations not being included in the derivation of the requirement. The small retroactive sample size used,

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<sup>9</sup> [Flexible Ramping Product Requirements - Appendix C "Quantile Regression Approach"](#)

<sup>10</sup> FERC Order Accepting Tariff Revisions (ER22-1278)

<sup>11</sup>  $\text{Relative deviation} = \frac{\sum \text{Base Schedules}_{T-40} - \sum \text{Tagged Schedules}_{T-20}}{\sum \text{Base Schedules}_{T-40}}$

<sup>12</sup>  $\text{Absolute deviation} = \sum \text{Base Schedules}_{T-40} - \sum \text{Tagged Schedules}_{T-20}$

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the previous 3 months, is largely due to the changing nature of system operations through the year; using a longer more robust sample reduces accuracy of the intertie uncertainty adder as the system conditions the adder is being applied to are more likely to vary from the observed conditions the adder is being calculated on. This results in a small sample which is then prone to increased error and accuracy of the calculated adder due to outlier events driving future requirements. Analysis published by the CAISO on April 26, 2022 further confirms the existing methodology is prone to inaccurate estimations of future uncertainty.<sup>13</sup>

### ***4.3.2 Revisions to Uncertainty in the WEIM RSE***

The CAISO is planning to utilize the quantile regression methodology to calculate net-load uncertainty in both the capacity and flexible ramping sufficiency tests as part of the ongoing implementation effort of the FRP enhancements. Since no methodology can guarantee a 100% accuracy in estimating uncertainty, the CAISO acknowledges that this methodology still has the potential to lead to a BAA inappropriately passing or failing the WEIM RSE. However, the inclusion of historic data as well as how forecasted weather effects net-load presents an improvement in accuracy.

The CAISO would propose this requirement not be activated within the capacity test until CAISO has been able to assess its performance with respect to the following metrics: 1) coverage; 2) requirement; 3) closeness; 4) exceedance, as explained in CAISO's previous analysis of the quantile regression methodology.<sup>14</sup> That analysis effort also included the step-by-step description of the quantile methodology for participants to be able to develop their own calculation and assessment of the requirements. This methodology is part the FRP enhancements expected to be deployed in Fall 2022; and would be used in the flexible ramping sufficiency test at that time. Participants will have an opportunity to participate in the standard process of implementation which can include a simulation phase. The CAISO would propose to test for the ability to meet uncertainty in the capacity test concurrent with the planned implementation of RSEE Phase 2 enhancements in the summer of 2023, allowing entities further to familiarize themselves with the expected results of the methodology.

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<sup>13</sup> [CAISO Report on Intertie Deviation adder for the WEIM Resource Sufficiency Evaluation Enhancements](#)

<sup>14</sup> [Flexible Ramping and Intertie Deviation Uncertainty in the Western Energy Imbalance Market; June 22, 2022](#)

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While the CAISO proposes to include net-load in the capacity and flexible ramping sufficiency test, it requests stakeholder feedback on whether uncertainty procured to the existing requirements is appropriate to test for. Currently, net-load uncertainty is procured to a 95% confidence interval that translates to a 97.5% upwards uncertainty requirement and 2.5% downwards uncertainty requirement. The probability of uncertainty materializing in the upwards direction outside of this requirement is effectively 1 in 40. The existing uncertainty requirements in the RSE are the procurement targets for the FRP; FRP is procured on a demand curve that is based upon the decision not to procure resulting in a power-balance constraint relaxation. Ensuring the WEIM is able to procure the full allotment of FRP without any relaxations to the demand curve reduces the occurrence of power balance constraint relaxations as well as area control error (ACE) excursions. The CAISO requests feedback on if this is the correct level of upward uncertainty to test for, and if not, what is an appropriate level of uncertainty that should be procured in the WEIM RSE. The CAISO also requests stakeholder feedback on if 2.5% down uncertainty is appropriate for to test for in the WEIM RSE.

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

## **5 Phase 2 – Energy assistance through the WEIM**

The CAISO also proposes to leverage the WEIM for energy assistance during under and oversupply conditions by allowing incremental transfers following the failure of the WEIM RSE at preset financial consequence levels. The WEIM is not intended to cure deficiencies in forward planning; however, to the extent it can facilitate energy assistance in real-time without undermining the existing incentives for sufficient forward procurement, it will look to do so.



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## 5.1 Curing Resource Undersupply conditions

The CAISO proposes to optionally allow a BAA to cure a resource insufficiency due to an undersupply condition through the WEIM market optimization. This will be effectuated through a hurdle rate priced at the bid cap, either \$1000 / MWh or \$2000 / MWh depending on cost verified bids above the soft bid cap.<sup>15</sup> This will ensure that a BAA has utilized their supply prior to accessing assistance through the WEIM, and will price such assistance comparable to what can be obtained through bilateral emergency energy assistance transactions.

The existing WEIM market design possess a constraint which will not allow a WEIM BAA to export in the WEIM if either their power balance constraint has been relaxed, or they have exercised available balancing capacity. Effectively this constraint will ensure that should an insufficient BAA be able to incrementally participate in the WEIM, that no BAA that provides energy assistance does so at the risk to their own reliability.

The CAISO proposes that BAAs are able to elect to utilize energy assistance through the WEIM. The election will be made in the CAISO masterfile and any changes to a BAAs election would occur through the existing master file process. This allows BAAs optionality in curing resource insufficiency, including the ability to utilize WEIM, or to access emergency supply or load modification programs native to their BAA that are not available for dispatch through the WEIM. Any incremental imbalance charges that arise due to the utilization of this functionality will be settled per that BAA's OATT.

### 5.1.1 *Misuse of WEIM to cure real-time resource insufficiencies*

The concern that the WEIM could be used as an alternative to avoid sufficient forward contracting has existing since the inception of the WEIM. This was one of the primary reasons that incremental WEIM transfer are limited following a failure of the WEIM RSE. As the CAISO is proposing to relax this limitation, additional consequences may be needed to ensure this practice does not take place.

The CAISO is open to administrative consequences for BAA's that are misusing this functionality. However the CAISO would like to solicit feedback from stakeholders on both what those consequences should be as well as what constitutes misuse. In providing feedback the CAISO asks that stakeholders consider the following questions

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<sup>15</sup> [CAISO Tariff Section 30.7.12](#)

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- 1) What is the relationship between many small failures and fewer large failures? For example what is the impact of a 1 MW failure for 3 straight hours as compared to a 40MW failure during a single interval;
- 2) Do failures during varying system conditions represent the same level of misuse of functionality? To the extent they do not, is weighting the impact of failures during varying conditions appropriate?

**5.1.2 Insufficiency Energy Revenue Calculation**

As stated in section 5.1.1, the CAISO proposes that BAAs are able to elect to utilize energy assistance through WEIM optimization. If a BAA has elected to utilize energy assistance and the WEIM RSE determines the BAA is in an undersupply condition, the market will establish hurdle rate on the transfers into the BAA. This hurdle rate ensures that the resources within the BAA are fully utilized before allowing additional energy to transfer into the BAA. This hurdle rate is a constraint into the BAA and associated with the ETSR constraint. As such, the hurdle rate will be incorporated within the marginal cost of congestion of the locational marginal price of nodes and aggregated nodes with shift factors associate with the constraint. During the ISO settlement of the real-time market imbalance, settlements will calculate the real-time market congestion offset for WEIM BAAs. During the calculation of the real-time market congestion offset, the ISO will calculate the real-time assistance energy congestion rent amount. The assistance energy congestion rents are calculated as the sum of the product of resource imbalance energy and the marginal cost of congestion directly attribute to undersupply hurdle rate. The ISO will reduce the real-time congestion offset of the BAA(s) in the undersupply condition by the BAA energy assistance hurdle rate amount, and allocated to WEIM BAA(s); with allocation options further described in section 5.1.3.

**5.1.3 Allocating Insufficiency Energy Revenue**

The CAISO proposes to collect assistance energy revenue on all interties with the insufficient BAA; separate from conventional congestion revenue. This assistance energy revenue will be collected only after the activation of the hurdle rate. As the assistance energy will be cured through the market, no counterfactual to determine which resources incrementally increase their production to cure the insufficiency exists.

The CAISO has identified two potential methods to allocate the assistance energy revenue; the CAISO requests feedback on each method:

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- 1) Allocate assistance energy revenue pro-rata by net WEIM export, to entities that have passed the WEIM RSE. This allocation will ensure that the BAAs whose excess capacity in the WEIM is used to cure a resource insufficiency are compensated for that capacity. Under this allocation methodology BAA's who pass the WEIM RSE but are not net WEIM exporters would receive no revenue. This approach is reasonable as their WEIM net import status indicates their capacity is not going to cure the insufficiency.

The potential for the allocation of assistance energy revenue in this manner may create additional incentive to BAAs to make additional capacity, bid in at marginal cost, available to the WEIM due to the premium that BAA's may receive for being a net WEIM exporter.

- 2) Allocate assistance energy revenue pro-rata to residual capacity as calculated in the final binding WEIM RSE, for BAA's that have passed the WEIM RSE. This allocation will ensure that the BAA's whose residual capacity in the WEIM is made available to cure a resource insufficiency are compensated for that capacity. The potential for emergency energy revenue creates additional incentive to balancing authority areas to make additional capacity, bid in to the WEIM.

The CAISO is leaning towards the first option as the similarity to existing settlements provides WEIM participants with familiarity, while also reducing the implementation burden.

#### **5.1.4 *Curing insufficiency of the CAISO BAA***

While curing resource insufficiency through the WEIM is optional, the CAISO proposes the CAISO BAA would look to cure resource insufficiencies through the WEIM. All incremental energy used to cure an insufficiency would be classified as ED for emergency assistance and would be settled as such.

The CAISO does recognize that the CAISO BAA can fail the WEIM RSE due to shortfalls in adherence to local regulatory authority (LRA) procurement standards by any of its member Load Serving Entities (LSEs); or a failure of the procurement targets to adequately predict real-time conditions. Developing a methodology to more granularly allocate these costs will require coordination and stakeholdering between multiple LRA's and may impinge on the CPUC's existing RA program. To the extent that LSEs within the CAISO BAA believe additional policy development is need on this

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subject, the CAISO proposes to address it in a later iteration of this initiative or through a future initiative.

## 5.2 Oversupply failure consequences oversupply conditions

The CAISO requests feedback from the stakeholder community on if the WEIM RSE should have unique financial consequences that allow incremental exports/imports during oversupply conditions. During intervals when the WEIM footprint has oversupply, the failure of the flexible ramping sufficiency test has the potential to reduce market efficiency. Consider the following examples:

- 1) The WEIM footprint is net long with supply. A WEIM BAA in an oversupply condition, potentially due to excessive variable energy resource output or hydro spill conditions fails the flexible ramping sufficiency down test. As a result, incremental WEIM exports are limited to the most recently passed 15-minute interval. The failed BAA is forced to curtail low cost variable energy resources. This raises total production costs for the footprint since neighboring WEIM BAA's are not able to utilize this supply to meet their obligations and may instead need to utilize more expensive resources to meet their real-time demand.
- 2) The WEIM footprint is net long with supply, with BAA's in oversupply conditions. A neighboring BAA fails the flexibility ramping sufficiency upwards test due to its resource positioning. As a result, their incremental imports are limited to the most recently passed 15-minute interval. To the extent their neighboring BAA's may have a surplus of low cost variable energy supply, those BAA's may be forced to curtail that supply as off-takers to the excess supply are now limited. This raises total production cost for the footprint since neighboring BAA's may need to curtail their VER resources while the failed BAA may need to utilize more expensive internal resources to meet its real-time demand.

In both of these examples, the footprint has excess low cost supply, however because some combination of economics, regulatory rules or contractual arrangements, a BAA fails the flexible ramping test resulting in increased cost to the entire WEIM. The CAISO proposes that during conditions when the system marginal cost of energy (SMEC) in a balancing authority is negative, a failure of the flexible ramping sufficiency test in the downward direction allows incremental additional export transfers at a pre-determined hurdle rate. The CAISO proposes the hurdle rate be set at \$0/MWh. This provides a

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balanced approach wherein a BAA is still incentivized to provide downward flexibility, while also benefitting through a reduction in exposure to negative prices. The remainder of the WEIM footprint benefits through access to additional low cost supply that would otherwise have to be curtailed. Further, the CAISO seeks additional feedback on conditions where it may be appropriate to allow incremental imports into a BAA that fails the upward flexibility test to ensure their ability to aid in mitigating an oversupply condition in a neighboring WEIM BAA.

## 6 WEIM Decisional Classification

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

- (1) Enhancing the accuracy of the resource sufficiency evaluation by using quantile regression for calculating the uncertainty requirement for each balancing authority area (Section 4.3), and
- (2) When calculating the CAISO balancing authority area's obligation for resource sufficiency as well determining what can be shown as supply on WEIM entity base schedules, adjust for HASP exports that are sourced by EIM transfers (Section 4.2.3).
- (3) Changing the consequences for a balancing authority area that fails to meet the resource sufficiency test through a range of rules that fall within the new framework of "energy assistance through EIM" (Section 5).

In addition, the initiative proposes (4) a change to the rules for tagging exports from the CAISO balancing authority area. Exports that do not meet criteria to qualify for high priority will be tagged as firm-provisional rather than firm energy (Section 4.2.2.). Element (4) is severable from the remaining three elements in the sense that management would proceed to implement it even if the other sets of changes were not approved.<sup>16</sup>

As explained below, CAISO staff believes that the WEIM Governing Body has joint authority with the Board of Governors over all of the proposed changes except for the proposed tagging change in Section 4.2.2, for which it would have an advisory role.

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<sup>16</sup> In addition, several of the proposed rule changes within each of these general categories may be severable from the other proposals. We do not detail every instance of severability, though, because the other instances are not relevant to the decisional classification.

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The role of the WEIM Governing Body with respect to policy initiatives changed on September 23, 2021, when the Board of Governors adopted revisions to the corporate bylaws and the Charter for EIM Governance to implement the Governance Review Committee's Part Two Proposal. Under the new rules, the Board and the WEIM Governing Body have joint authority over any

proposal to change or establish any CAISO tariff rule(s) applicable to the EIM Entity balancing authority areas, EIM Entities, or other market participants within the EIM Entity balancing authority areas, in their capacity as participants in EIM. This scope excludes from joint authority, without limitation, any proposals to change or establish tariff rule(s) applicable only to the CAISO balancing authority area or to the CAISO-controlled grid.

Charter for EIM Governance § 2.2.1. The proposed tariff changes to implement elements (1) through (3) above would all be "applicable to EIM Entity balancing authority areas, EIM Entities, or other market participants within EIM Entity balancing authority areas, in their capacity as participants in EIM." They would not be applicable "only to the CAISO balancing authority area or to the CAISO-controlled grid." Accordingly, these proposed changes to implement elements (1) through (3) would fall within the scope of joint authority.

Element (4), which would change the rules about how to tag exports from the CAISO balancing authority area, are not applicable to WEIM participants in their capacity as WEIM participants. Rather, these rules apply without regard to WEIM, to all exporters from the CAISO balancing authority area. Accordingly, they fall outside the scope of joint authority. The WEIM Governing Body may provide advisory input, however, because this tagging rules apply to the real-time market. The WEIM Governing Body's advisory role extends to any proposal to change or establish tariff rules that would apply to the real-time market but are not within the scope of joint authority.

This proposed classification reflects the current state of this initiative and could change as the stakeholder process moves ahead. Stakeholders are encouraged to submit a response in their written comments to the proposed classification of as described above, particularly if they have concerns or questions.

## 7 Stakeholder Engagement

**Table 2** outlines the proposed schedule to complete the policy for the EIM resource efficiency evaluation enhancements:

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On July 11, 2022 the CAISO will hold a stakeholder call to present its straw proposal, comments on the straw proposal will be due July 25, 2022. The CAISO recognizes this an accelerated timeline for this initiative, however the proposed milestones are being offered in an effort facilitate a summer of 2023 implementation.

**Table 2**

<b>Date</b>	<b>Milestone</b>
<b><i>July 11, 2022</i></b>	Stakeholder Call for Straw Proposal
<b><i>July 25, 2022</i></b>	Comments Due on the Straw Proposal
<b><i>August 17, 2022</i></b>	Publish Draft Final Proposal
<b><i>August, 24, 2022</i></b>	Stakeholder Call for Draft Final Proposal
<b><i>September 26, 2022</i></b>	Publish Final Proposal
<b><i>August / September 2022</i></b>	Development of Draft Tariff Language and BRS
<b><i>October 26, 2022</i></b>	Decision at Joint Governance Meeting
<b><i>June 1, 2023</i></b>	Implementation