



California ISO

Western EIM Base Schedule Submission Deadline

Draft Final Proposal

October 30, 2020

Prepared by: Market and Infrastructure Policy

California Independent System Operator

Table of Contents

1 Executive Summary 3

2 Stakeholder Comments and Changes 3

3 Initiative Scope 5

4 Background 5

 4.1 EIM Base Schedule Submission 5

 4.2 Energy below minimum load 6

5 Proposal 6

 5.1 EIM Base Schedule Submission Deadline 6

 5.2 EIM Base Schedule Energy Below Minimum Load 8

6 Stakeholder engagement and next steps 10

 6.1 Energy Imbalance Market Governing Body 10

 6.2 Schedule 11

1 Executive Summary

In the Bonneville Power Authority (BPA) Energy Imbalance Market (EIM) implementation agreement the CAISO proposed to examine moving the final market closing timeline for financially binding hourly resource plans via a stakeholder process. Consequently, in this policy initiative, the CAISO proposes to move this final market closing timeline from forty minutes prior to the operating hour (T-40) to thirty minutes prior to the operating hour (T-30). This is intended to provide EIM entities with additional flexibility to submit more accurate base schedules closer to the operating hour.

The CAISO proposes associated changes to ensure EIM entities do not experience operational issues with a final resource sufficiency evaluation (RSE) conducted later at T-30 instead of T-40. The CAISO proposes to add an additional RSE at T-40 that uses the same resource initial conditions, variable energy schedules, and load forecast as the final RSE at T-30. This will preserve EIM participants' time before the operating hour to take operational actions based on the T-40 test as well as increase their ability to pass the final RSE at T-30.

The CAISO also proposes to allow EIM entities to submit base schedules with energy below a resource's minimum load. This proposed modification will allow CAISO and EIM Entities to more accurately capture startup energy within base schedules, thus increasing their ability to pass the RSE while lowering their exposure to uninstructed imbalance energy settlement. This is particularly important for large conventional resources.

2 Stakeholder Comments and Changes

In response to the CAISO's initial proposal for moving the final base schedule submission from T-40 to T-30 prior to the operating hour, general support was offered. Stakeholders supported the additional ten minutes to submit base schedules created by the proposal. They stated that this additional time will allow for more accurate base schedules which will in turn reduce uninstructed imbalance energy settlement.

However, EIM entities raised a concern regarding the RSE accompanying the final base schedule submission deadline that would also move from T-40 to T-30. They stated that this would reduce the time available for them to take operational actions in response to the final RSE results prior to the operating hour, such as starting additional generation, which could have negative reliability and/or market impacts.

The EIM entities requested that the CAISO retain the T-40 RSE as advisory, in addition to the final RSE which would be run shortly following the T-30 base schedule submission deadline. They expressed this additional test would help to increase their ability to pass the final T-30 RSE by providing an additional test and subsequent curing period prior to the revised deadline. They also offered this as a potential solution to the

reliability concern created by the reduction of ten minutes between the completion of the final RSE and the operating hour.

Given the broad support for a T-40 RSE the CAISO proposes in this draft final proposal to add an additional RSE, so that the RSE would be conducted at both T-40 and T-30. The CAISO believes this additional run will help to reduce chances of a failure of the T-30 RSE by providing an additional RSE and subsequent curing period with the same resource initial conditions as those used in the T-30 RSE, while also helping to mitigate the reliability concern that has been raised. Further discussion and additional details of the newly proposed T-40 RSE can be found in Section 5.1 of the paper.

Stakeholders expressed concern regarding the market system performance implications of moving the final base schedule deadline from T-40 to T-30 as this would involve shortening the solution time available for the real time pre-dispatch (RTPD) interval that initiates at T-37.5. Multiple stakeholders raised concerns on how this would interact with the implementation of the CAISO's nodal flexibility ramping modeling,¹ planned to be implemented in fall 2021. SCE in particular requested the ability for the CAISO to revert to the T-40 final base schedule deadline should performance degrade and an increase occur in direct current (DC) solutions within the RTPD interval.

The CASIO understands these concerns and will endeavor to ensure this initiative does not degrade existing market performance or impact the implementation of the flexible ramping product (FRP). The CAISO plans to implement this functionality concurrently with FRP, however will delay the activation of this functionality in production, including the additional RSE at T-40, until testing indicates no expected issues.

EIM entities requested the CAISO also consider moving the T-55 RSE to T-50. The entities indicate the five minute change would create additional flexibility for the submittal of base schedules by their transmission customers. The CAISO had not proposed a change to the T-55 base schedule submission deadline, however understands why stakeholders also requested the CAISO consider this change within the base schedule submission initiative. To accommodate this change the solution time allowed for the RTPD interval that currently initiates at T-52.5 would have to be shortened, the variable energy resource and load forecasting inputs used for the T-55 RSE would also have to be adjusted. The CAISO is not prepared to expand the scope of this initiative to include this change at this time as no testing has been performed with a shorten solution time for the RTPD interval which currently initiates at T-52.5. The CAISO proposes to examine the impact of running with a shortened RTPD interval while conducting performance testing for the implementation of this initiative. The CAISO will publish these results for stakeholder consideration and potential use within a future stakeholder process.

Idaho Power Company and Powerex also asked for additional clarification on the benefits of revising the final base schedule submission deadline to T-30. The CAISO refers this comment to section 5.1 of this paper for additional discussion.

¹ <https://stakeholdercenter.caiso.com/StakeholderInitiatives/Flexible-ramping-product-refinements>

In addition to the baseline schedule submission deadline change being proposed by the CAISO, the issue paper/straw proposal introduced the proposal to allow startup energy to be included in a resource's base schedule. Stakeholder response to this was generally supportive, with few concerns or questions. The primary concern raised was in regards to whether the CAISO real-time market would send a dispatch operating target to resources for this startup energy. The CAISO clarifies that it is not proposing that the market will send a dispatch operating target for the startup energy represented by a base schedule below a resource's minimum load. This would entail modeling startup energy in the market, which would involve significant design effort and system changes and could not be accomplished within the timeline of implementing the changes proposed in this initiative.

Multiple stakeholders also requested additional information on the validation and monitoring the CAISO described in its issue paper/straw proposal. The draft final proposal clarifies that there will only be after-the-fact monitoring of base schedules containing energy below Pmin.

3 Initiative Scope

This initiative proposes updates to the base schedule submission timeline as well as the inclusion of startup energy below a resource's minimum load:

- Move the market closing timeline for financially binding base schedules from forty minutes prior to the operating hour (T-40) to thirty minutes prior to the operating hour (T-30).
 - Create an additional resource sufficiency evaluation at forty minutes prior (T-40) to the operating hour
- Allow startup energy to be accounted for in a resource's base schedule. This will allow for its inclusion in the RSE and a potential reduction of imbalance energy settlement.

4 Background

4.1 EIM Base Schedule Submission

EIM entities are required to submit resource plans on an hourly basis. The CAISO as the market operator then evaluates these plans prior to the operating hour². The current EIM design utilizes a sequential base schedule submission process. The first base schedule deadline at T-75 contains non-participating resources hourly base schedules, EIM participating resource scheduling coordinator energy bids, and base schedules for participating resources for the upcoming operating hour. Each 15-minute

² BPM for Energy Imbalance Market p51:
[https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Energy Imbalance Market](https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Energy%20Imbalance%20Market)

interval is then evaluated for capacity and flexible ramping. A second base schedule submission deadline at T-55 is designed to allow EIM entities to review and update their base schedule following validation by the market operator between the first and second submission deadlines. An additional round of validation is performed by the market operator and a final, base schedule submitted by the EIM entity scheduling coordinator is due to the market operator at T-40 of the operating hour. This base schedule is used to balance against the load forecast and serves as the baseline for settling imbalance energy in the EIM.

4.2 Energy below minimum load

The CAISO Tariff limits the submission of EIM base schedules with energy above zero but below a resource's minimum load. Energy is produced in this region when a resource is starting and ramping to its minimum load (Pmin). It is possible for resources to have multi-hour start times and minimum loads in the hundreds of MW. This limits an EIM scheduling coordinator's ability to accurately account for startup energy in their base schedule submission for the RSE. This leaves the EIM entity with two options: either exclude this energy from the base schedule, which results in no inclusion in the RSE, or reallocate this energy to other online resources. Neither of these options allows the EIM entity to accurately capture a potentially significant amount of energy produced while a resource is starting.

5 Proposal

5.1 EIM Base Schedule Submission Deadline

The CAISO proposes to move the final base schedule submitted by the EIM entity scheduling coordinator from T-40 to T-30 of the operating hour. To accommodate this revised submission deadline, the CAISO plans to make application changes that will run RTPD interval that currently starts at T-37.5, RTPD 5, on an abbreviated timeline. The final base schedule RSE will also be moved to after the T-30 deadline. The RTPD interval will complete at the same time as the current design, prior to the T-20 tagging deadline.

Revising the submission deadline will offer benefits to all EIM participating entities via the ability to submit more accurate schedules closer to the operating hour. More accurate base schedules, specifically non-participating balancing schedules, will improve the physical modeling of flows in the RTPD run that currently starts at T-37.5 leading to more efficient market results. The additional time will also allow the EIM entity scheduling coordinators to minimize the financial impact of imbalance settlement.

BPA provides a good example of how this additional time can be leveraged. A portion of BPA's customers operate on slice contracts³ which can be updated past T-40 from the operating hour. Should they elect to utilize this functionality, BPA would be able to update base schedules at T-30 to reflect these slice nominations, and potentially limit exposure to imbalance energy charges. To offer this additional flexibility, the CAISO will be shortening the run time of the T-37.5 RTPD interval; this has been tested and is viewed as feasible.

The CAISO is proposing to add an additional RSE at T-40 to the operating hour while still moving the final RSE to T-30. This additional RSE will provide EIM entities with an additional test and curing period, as well as an opportunity to initiate manual actions should EIM entities have concerns about their ability to pass the T-30 RSE.

To reduce variability between RSE's, the current EIM design fixes the variable energy resource and load forecasts used in the T-55 and T-40 RSE at the T-55 forecast for T-7.5 of the operating hour. The tests however still use different initial resource schedules calculated within the sequential market solutions as inputs. The RTPD run initiated at T-67.5 for the T-55 RSE and the RTPD initiated at T-52.5 for the T-40 RSE. The different initial schedules used as inputs in the two evaluations has the potential to result in a failure of the T-40 RSE following the successful passing of a T-55 RSE. This existing concern would further be exacerbated by moving the existing T-40 RSE to T-30, as EIM entities would have 10 fewer minutes to resolve the potential imbalance prior to the start of the operating hour.

To mitigate this concern as well as reduce an EIM entities potential reliability risk associated with a failure of the T-30 RSE, the CAISO proposes to run a RSE at T-40 that uses the RTPD interval initiated at T-52.5, and its initial resource schedules, as an input. These same initial conditions would again be used in the T-30 RSE as no additional RTPD run will have been conducted between the RSE's. This proposal will create an additional RSE prior to the final binding RSE where the only variables in input between the two evaluations are at the discretion of the EIM entity. Figure 1 shows this modified submission timeline.

³ Conformed Slice Block Template: <https://www.bpa.gov/p/Power-Contracts/Regional-Dialogue/Pages/Regional-Dialogue.aspx>

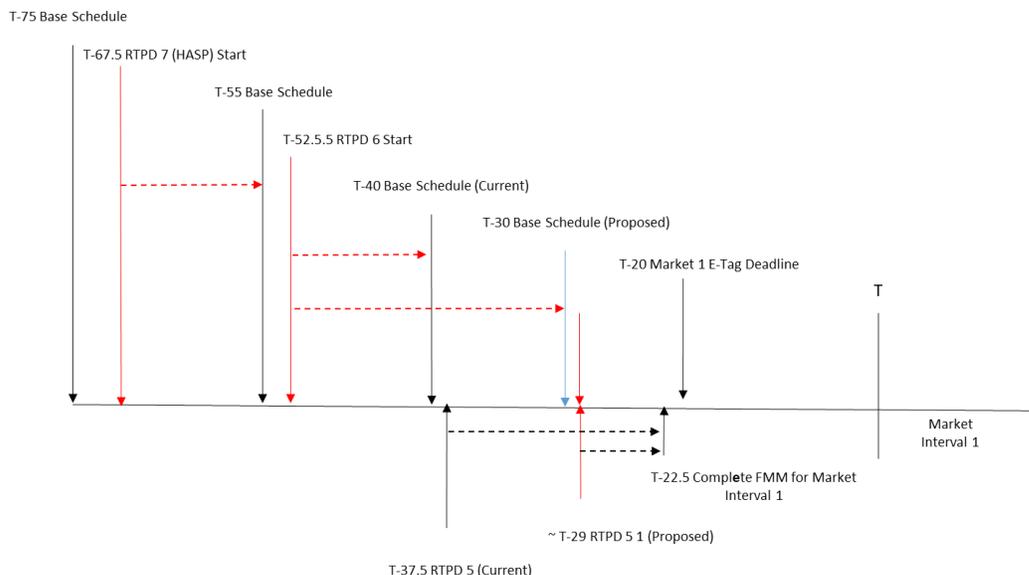


Figure 1: Revised Base Schedule Submission Timeline

5.2 EIM Base Schedule Energy Below Minimum Load

The CAISO proposes to allow resources' startup energy to be included within all EIM entities' hourly resource plans. To accommodate this, the CAISO plans to modify the logic of the Base Schedule Aggregation Portal (BSAP) and the RSE to allow startup energy to be submitted as part of a resource's base schedule; current validation rules reject schedules below a resource's Pmin. For EIM entities, the submission of more accurate base schedules will minimize uninstructed imbalance energy settlement, since the startup energy can be reflected in a base schedule instead of the alternatives described in section 4.2.

This energy will be counted as part of an EIM entity's RSE for the EIM area balancing test, however no changes will be made to the capacity and flexible ramp sufficiency tests themselves, since the startup energy does not represent an energy bid, nor to the transmission feasibility test. The CAISO recognizes this creates a difference on how startup energy will be treated for EIM and CAISO resources. The CAISO produces balanced day-ahead schedules via its Integrated Forward Market (IFM), while EIM entities are responsible for the creation of their own balanced schedules. This difference allows EIM entities to include this information directly in the submission of their base schedules. To achieve similar treatment for the CAISO, the IFM would need to include this startup energy within its optimization. Any after-the-fact inclusion of this energy to balanced day-ahead schedules would potentially create upward flexibility, at the expense of downward flexibility. As the CAISO schedules are already balanced, the CAISO does not believe this additional upward flexibility is worth the potential risk of

failing the RSE in the downward direction. Rather, the CAISO believes the inclusion of startup energy within the day-ahead market should be done holistically through either the ongoing EDAM initiative or a future initiative.

The CAISO proposes that startup energy be included as part of an EIM entity's base schedule, with deviations from the base schedule settled as uninstructed imbalance energy (UIE). No changes will be made to the settlement of startup energy for resources internal to the CAISO. To ensure equitable bid cost recovery (BCR) allocation between EIM entities and the CAISO, the CAISO is proposing to modify how BCR is allocated. BCR is currently calculated as the sum of net EIM transfers (exports from a BAA) divided by the sum of the absolute value of UIE load, the absolute value of supply UIE, the absolute value of unaccounted for energy (UFE), and the net scheduled interchange out of the balancing authority area (BAA)⁴. The startup energy submitted as part of an EIM entity base schedule will be added back into denominator as an additional variable ensuring there is no cost shift between BAAs. A simplified equation representing the revised BCR calculation for an EIM entity can be seen below in Figure 2.

Figure 2: Simplified BCR Calculation

$$\frac{\sum EIM\ Transfers\ (Export)}{\sum EIM\ Transfers\ (Export) + |UIE| + |UFE| + Base\ Schedule\ Startup\ Energy}$$

The submission of the startup energy within a base schedule is at the discretion of the EIM entity base schedule coordinator. The amount of energy submitted should be the average hourly startup energy. This can be determined by taking the integral of energy across each 15-minute interval within the hour, then averaging these values to obtain a MWh value.

Ancillary services will not be permitted on a resource during intervals the resource is shown on an EIM base schedule below its minimum load. The CAISO assumes that when producing energy below its minimum load a resource will ramp in a linear manner up to its minimum load, and thus would not be available to provide any ancillary services.

To ensure this functionality is not misused, the CAISO is proposing to perform after-the-fact monitoring on the submitted EIM base schedules that contain resources with startup energy. The conditions the CAISO proposes to monitor, outlined below, align with the expected startup characteristics of conventional resources. The CAISO understands that resources may have unique characteristics and that actions such as

⁴ Energy Imbalance Market-Draft Final Proposal P70:
<http://www.caiso.com/Documents/EnergyImbalanceMarket-DraftFinalProposal092313.pdf>

resource tripping during startup are not uncommon occurrences. As such, the CAISO will be monitoring for patterns of potential misuse of this functionality. Records such as operator logs or webOMS outage cards, if available, will help to resolve any potential dispute.

Potential Monitoring Criteria

- A base schedule below minimum load in an hour when there is a base schedule at or above minimum load in the previous hour.
- A non-monotonically increasing pattern of base schedules below minimum load over consecutive hours.
- Lack of a base schedule in an hour when there is a base schedule below minimum load in the previous hour.
- Base schedules below minimum load for an unreasonably long multi-hour period based on the resource's registered technology and startup profile.

Should patterns of misuse of this functionality be identified the CAISO will apply the CAISO rules of conduct as described in the CAISO Tariff Sections 29.37 and 37 including potential referral to FERC.

6 Stakeholder engagement and next steps

6.1 Energy Imbalance Market Governing Body

This initiative includes proposed changes to base schedule submission timelines as well as the ability to include start up energy within a base schedule. These proposals are severable for purposes of the stakeholder process. Following comments to the draft final proposal the CAISO will decide to keep this initiative intact as described, or split it into two initiatives.

The CAISO believes that this initiative falls within the EIM Governing Body's primary approval authority.

An initiative proposing to change rules of the real-time market falls within the primary authority of the EIM Governing Body if either the proposed new rule is EIM-specific in the sense that it applies uniquely or differently in the balancing authority areas of EIM entities, as opposed to a generally applicable rule or, for proposed market rules that are generally applicable, if "an issue that is specific to the EIM balancing authority areas is the primary driver for the proposed change."

The T-40 to T-30 change while generally applicable is intended to address EIM entity specific issues while only EIM entities will be able to submit energy below a resources minimum load within their base schedules. The two items in this initiative pass the identified tests.

The CAISO encourages stakeholder comments regarding this proposed classification.

6.2 Schedule

The schedule for stakeholder engagement is provided below. The CAISO targets the December 2, 2020 EIM Governing Body and December 16-17, 2020 CAISO Board of Governors' meeting.

Date	Event
September 24, 2020	Post Issue Paper/Straw Proposal
September 30, 2020	Stakeholder Call
October 14, 2020	Comments on Issue Paper/Straw Proposal Due
October 30, 2020	Publish Draft Final Proposal
November 6, 2020	Stakeholder Call
November 13, 2020	Comments on Draft Final Proposal Due
December 2, 2020	EIM Governing Body Meeting
December 16-17, 2020	CAISO Board Meeting

Stakeholders should attend the stakeholder conference call on November 6, 2020 and provide written comments using the commenting tool linked on the initiative [webpage](#) by November 13, 2020.