Comments on Extended Day-Ahead Market Draft Final Proposal

Department of Market Monitoring
November 22, 2022

Summary

The Department of Market Monitoring (DMM) appreciates the opportunity to comment on the *Extended Day-ahead Market – Draft Final Proposal*.[1]

- In previous comments, DMM has described how the day-ahead imbalance reserve product included in the EDAM design will not be sufficient for ensuring sufficient resources for each EDAM balancing area in real-time.[2] The draft final proposal addresses this concern by allowing each BAA to set a net EDAM export constraint at a level designed to maintain the capacity necessary to meet its own reliability needs given inherent uncertainty between the day-ahead and real-time markets. DMM recommends that the tariff or BPM specifications for setting this net export constraint not be so prescriptive as to prevent each balancing area's operators from incorporating into the net export limit a conservative (i.e. high) estimate of the uncertainty in the balancing area's specific resource mix that gets bid into the EDAM on a particular day.
- While the net export constraint can protect a BAA from being exposed to reliability risks from other EDAM BAAs' capacity shortfalls, the net export constraint does not directly prevent other BAAs from seeking to rely on EDAM rather than procuring sufficient supply in advance of the EDAM. Based on DMM's understanding of the draft final report, if a BAA anticipates excess supply being made available by other EDAM BAAs, the resource sufficiency evaluation failure consequences may not create additional incentives for a BAA to procure sufficient supply in advance of the EDAM market to meet its own load and uncertainty. As a result, DMM suggests that stakeholders may want to consider revising consequences of failing the EDAM RSE to provide a stronger incentive for each BAA to procure sufficient capacity to meet its load and uncertainty rather than relying on EDAM to meet its reliability needs.
- DMM supports the ISO's proposed resource specific approach to greenhouse gas (GHG) accounting. However, DMM continues to recommend that the ISO consider LADWP's proposed variation of the resource specific approach as a future enhancement.

---

1 *Extended Day-ahead Market – Draft Final Proposal*, California ISO, October 31, 2022: http://www.caiso.com/InitiativeDocuments/DraftFinalProposal-ExtendedDay-AheadMarket.pdf

2 For example, see *Comments on Day-Ahead Market Enhancements: Third Revised Straw Proposal,* Department of Market Monitoring, May 19, 2022, pp. 5-6: http://www.caiso.com/Documents/DMM-Comments-Day-Ahead-Market-Enhancements-3rd-Revised-Straw-Proposal-May-20-2022.pdf

- DMM requests clarification of numerous other aspects of the draft final proposal, as described in these comments.

Comments

I. Confidence in market transfers

Net export constraint is a critical aspect of overall EDAM design

DMM supports the proposal to allow each EDAM balancing authority area (BAA) to utilize a net export constraint to determine hourly limits on net exports of EDAM energy, imbalance reserve up (IRU) and reliability capacity up (RCU). DMM recommends that tariff requirements for specifying how each BAA will derive the final limit each hour not be too prescriptive, so that each balancing area's operators have the discretion to reduce the limit as they see fit under tight conditions to account for uncertainty in their balancing area's resource mix. We provide more detail on these views below.

In the draft final proposal, the ISO has clarified that it intends for the real-time market optimization to prioritize EDAM transfers of energy, imbalance reserve up (IRU) and reliability capacity up (RCU) over native load. Given imbalance reserve and EDAM resource sufficiency evaluation (RSE) design described below, the proposed net export constraint is a critical aspect of the overall EDAM design. Situations can arise in tight system conditions in which a balancing area may need to rely on carefully setting the net export constraint to limit EDAM energy, IRU, and RCU transfers to only the amount of capacity that balancing area operators are confident is in excess of what its balancing area may need to meet its own load and uncertainty.

In previous comments, DMM has described how the day-ahead imbalance reserve product included in the EDAM design will not be sufficient for ensuring sufficient resources for each EDAM balancing area in real-time.[3] With the addition of the net export constraint, each balancing area will be able to maintain the capacity necessary to meet its own reliability needs given inherent uncertainty between the day-ahead and real-time markets. The constraint can be utilized in tight system conditions to prevent a balancing area from having to rely on imbalance reserves procured within its area or from another EDAM balancing area. This will be critical in tight system conditions because imbalance reserves procured to meet the 97.5% level

[3] For example see *Comments on Day-Ahead Market Enhancements: Third Revised Straw Proposal,* Department of Market Monitoring, May 19, 2022, pp. 5-6: http://www.caiso.com/Documents/DMM-Comments-Day-Ahead-Market-Enhancements-3rd-Revised-Straw-Proposal-May-20-2022.pdf

of uncertainty will not be sufficient to ensure reliability in 2.5% of days under tight system conditions.[4]

As described in the section of these comments on the EDAM resource sufficiency evaluation (RSE), the current EDAM RSE design appears to allow EDAM balancing areas that are short on capacity to schedule EDAM energy, IRU, and RCU capacity from other balancing areas up to the quantity that those other balancing areas make available to the EDAM. For a balancing area that allows virtual supply, this may create capacity shortfalls and reliability concerns for the source balancing area, as described in more detail below. Therefore, in the absence of further refinements to the EDAM RSE design, the net export constraint will be a critical tool for preventing the EDAM from transferring capacity needed by a resource sufficient BAA to a resource insufficient BAA.

Given the important nature of the net export constraint to the reliability of an EDAM BAA in tight system conditions, it will be critical that each area be allowed and prepared to set the net export constraint for energy, IRU, and RCU each hour in tight conditions to only allow EDAM transfers out of capacity that is in excess of what the BAA may need to meet its own load and uncertainty. The draft final proposal specifies that each EDAM BAA must "describe either in its OATT or business practice manuals (a) the formulation for deriving the confidence factor applicable to non-RSE eligible bid in supply and (b) factors/criteria for deriving the additional margin that further reduces the constraint limit."[5]

DMM recommends that these specifications not be so prescriptive as to prevent each balancing area's operators from incorporating into the net export limit a conservative (i.e. high) estimate of the uncertainty in the balancing area's specific resource mix that gets bid into the EDAM on a particular day. For example, operators may need the discretion to create more additional margin on a day when larger, older, less reliable gas units bid into the EDAM than on a day when such capacity is on outage and not bidding in. More specifically, operators must be able to use a conservatively high upper bound for the load forecast and a conservatively low lower bound for available capacity each hour on tight days to ensure that the level of capacity exported as EDAM energy, IRU, or RCU would not undermine standard reliability criteria for the balancing area, such as loss of load in less than 1 day every 10 years.

[4] DMM appreciates that the ISO has proposed a configurable diversity benefit parameter to potentially reduce probability of EDAM footprint capacity shortfalls below 2.5%. However, in the absence of more detailed descriptions of how this parameter will be set to ensure capacity levels are sufficient to meet standard reliability criteria such as loss of load in no more than 1 day every 10 years, it does not seem reasonable for a balancing area to let its own reliability rely on how the Market Operator sets this parameter.

[5] ISO's *October 31 EDAM Draft Final Proposal*, p. 76.

Clarify how real-time penalty prices will be set to ensure the delivery of EDAM imbalance reserve and reliability capacity awards in the real-time market

The proposal states that in "stressed system conditions, after WEIM has exhausted available supply, the WEIM will signal infeasibility by relaxing the power balance constraint in the BAA with insufficient supply."[6] The draft final proposal is not clear on how the ISO will implement penalty prices in the real-time market so that a BAA that was scheduled in EDAM to provide IRU or RCU to another BAA can send that energy to the other BAAs in real-time while facing a power balance constraint violation in its own BAA.

The final example in section II.2.(b) of the draft final proposal shows EDAM awarding imbalance reserve up capacity from BAA C to BAA B, and reliability up capacity from BAA C to BAA A.[7] In real-time, when large load uncertainty is realized in BAA C, the example shows BAA C actually delivering the energy from the EDAM imbalance reserve award to BAA B and actually delivering the energy from the reliability capacity up award to BAA A. The ISO provided additional details of the proposed changes to the mathematical formulation of the WEIM "confidence in transfers" power balance constraint presented on page 70 of the ISO's September 7-8 EDAM slide presentation.[8]

Based on this information, DMM understands that including the EDAM IRU and RCU awards in the positive base net transfer definition in real-time will cause the WEIM power balance relaxation constraints *to not prevent* IRU and RCU awards from leaving a balancing area, such as BAA C in the example. Before this adjustment to the positive base net transfer definition, BAA C's power balance relaxation constraint would have by itself prevented the real-time delivery of the IRU and RCU awards if that delivery would cause BAA C to have a power balance constraint relaxation. However, it is not clear that the real-time optimization would not still choose to keep the energy in the source balancing area of the IRU/RCU (i.e. BAA C), and allow a power balance constraint relaxation in an area that was supposed to receive the IRU or RCU (BAA A or B), due to the interaction of other penalty parameters in the real-time market.

In these examples, the market software must choose between a power balance violation in the source BAA of the IRU/RCU (BAA C) and a power balance violation in the sink BAA of the IRU/RCU (BAA A or B). Given that all of the power balance relaxation parameters are the same in the BAAs, DMM notes that it seems the small cost adder currently applied to WEIM transfers may cause the energy to stay in the IRU/RCU source BAA (BAA C) because it would be less

---

6 ISO's *October 31 EDAM Draft Final Proposal*, p. 22.

7 Ibid, pp. 27-28.

8 Note that this is the same example as the final example from section II.2 (b) of the Draft Final Proposal. We reference these slides because the draft final proposal does not seem to list the revised WEIM power balance constraints. *EDAM Revised Straw Proposal-Stakeholder Meeting*, presented by California ISO, September 7, Slide 70: http://www.caiso.com/InitiativeDocuments/Presentation-ExtendedDay-AheadMarket-Sep7-8-2022.pdf

costly to the real-time objective function to relax the power balance constraint in the sink BAA (BAA A or B) and avoid that small energy transfer cost.

For clarification of these issues, DMM requests that the ISO provide additional details of how it plans to implement the penalty prices for power balance violations and EDAM energy, IRU, and RCU in the real-time market in order to effectuate the outcomes described in the "edge case" example on pages 27-28 of the draft final proposal.

II. EDAM resource sufficiency evaluation

Failure consequences may not provide additional incentives for each EDAM BAA to forward contract for all of its individual capacity requirements

DMM's understanding of EDAM RSE failure consequences

In the concluding paragraph of the draft final proposal section on the EDAM RSE "Consequences of Failure," the ISO explains when an EDAM BAA would or would not be removed from the EDAM pool for the WEIM RSE:

> If the IFM can fully resolve the deficiency and cure the EDAM BAA through the market optimization, the EDAM BAA would be treated as a member of the pool of passing BAAs as the EDAM results are used in the WEIM RSE. The proposal is that if the market is unable to resolve the entire deficiency, the EDAM BAA would retain its ability to participate in the pool of passing BAAs if, by the STUC horizon ending in the hour of their shortage, the BAA can backfill the deficiency with supply.[9] (underlining emphasis added)

If an EDAM BAA fails the EDAM RSE, the BAA will still be part of the EDAM pool for WEIM RSE if the IFM "resolve(s) the deficiency and cure(s) the EDAM BAA through the market optimization." DMM asks that the ISO clarify exactly what it means for the IFM to *resolve a deficiency* and *cure the BAA*. Based on this section of the proposal, it appears that the IFM will be able to resolve the failing BAA's deficiency and cure the BAA if the EDAM BAA is able to (1) economically clear its bid-in load and (2) meet its IRU requirements in the IFM with a combination of its own supply and EDAM energy and IRU transfers from other EDAM BAAs. In other words, a BAA that fails the EDAM RSE would remain in the EDAM pool for WEIM RSE – just as if it had passed the EDAM RSE – so long as the BAA's IRU requirement is not relaxed in the IFM and the BAA does not have a power balance constraint violation in the IFM.

This interpretation is reinforced by the proposal's descriptions of the out-of-market surcharge that an EDAM BAA would face if it fails the EDAM RSE and the deficiency could not be fully "cured through surplus supply offers that have been willingly bid into the EDAM."[10] For example, if an EDAM BAA fails the EDAM RSE, "but the market is able to meet demand,

[9] ISO's *October 31 EDAM Draft Final Proposal*, p. 70.

[10] Ibid, p. 67.

ancillary services, and (at least) 50% of the BAA's upward imbalance reserve requirement," that BAA's surcharge for the amount of the imbalance reserve requirement that had to be relaxed would remain at the Tier 2 level.[11] If the EDAM BAA that failed the EDAM RSE ends up in the IFM market as (1) not having any of its IRU requirement relaxed and (2) does not have a power balance constraint relaxation, then under the ISO's proposal the EDAM RSE failure deficiency will be considered to have been "cured by the market." In this scenario, the EDAM BAA will face no consequences – financial or being dropped from the EDAM pool for WEIM RSE – after having failed the EDAM RSE.

The rest of this section describes two ways in which this EDAM RSE design may allow an EDAM BAA to not procure sufficient capacity in advance of the day-ahead timeframe and fail the EDAM RSE, but still rely on excess capacity from other EDAM balancing areas without any consequences so long as other EDAM balancing areas have made excess supply available through their net export constraints.

One BAA's virtual supply curing another BAA's supply deficiency

First, we will describe a scenario involving an EDAM BAA that has more than sufficient physical supply for its own needs, but which allows virtual supply bids. Based on DMM's understanding of the draft final proposal, such a BAA could have its reliability jeopardized in tight system conditions if it does not carefully set its net export constraint to only allow out a quantity of EDAM energy and IRU transfers that is in excess of its potential reliability needs.

If BAAs such as this do not set their net export constraints to prevent this, another EDAM BAA that had insufficient capacity and failed the EDAM RSE could cure its deficiency via firm EDAM energy transfers in the IFM backed by virtual supply out of BAAs that had sufficient physical supply. This can result in the EDAM BAA that passed the EDAM RSE with sufficient physical capacity having a capacity shortfall in RUC and being assigned the ultimate power balance shortfall in the real-time market. This can also cause the entire EDAM pool for the WEIM RSE to fail the WEIM RSE.

Before getting into an example of this scenario, we also note that in practice there are typically large quantities of virtual supply offered into the CAISO IFM at very high bid prices. If IFM prices rise to the bid cap, virtual supply bid at or near $2,000/MWh has very little risk of loss and a high expected profit. These virtual supply bids sell at or near $2,000/MWh in the IFM and buy back at what usually is a lower price in the FMM.

Assume there are two BAAs in EDAM (BAA 1 and BAA 2).

- BAA 1 allows virtual bids. BAA 1 has a load forecast of 1,000 MW (which it self-schedules in the IFM), an IRU requirement of 100 MWs, and it has 1,100 MWs of reliable physical

[11] Ibid, p. 68.

capacity to meet its requirements. BAA 1 passes the EDAM RSE, and does not set its net export constraint.

- BAA 2 does not allow virtual bids. BAA 2 has 800 MW of load (which it self-schedules in the IFM), an IRU requirement of 80 MWs, and 100 MWs of reliable physical capacity. BAA 2 fails the EDAM RSE.
- Assume there is plenty of transfer capacity between BAA 1 and BAA 2.

DMM's understanding of the proposed EDAM design is that in this scenario the IFM would clear as follows:

- BAA 1's 1,100 MWs of physical generation would meet its 1,100 MWs of load and IRU obligations.
- BAA 2's 100 MWs of physical generation could meet its 80 MW IRU requirement and 20 MWs of BAA 2's load.
- The remaining 780 MWs of BAA 2's load would be served by virtual supply bids in BAA 1. As previously noted, even in very tight system conditions, a large quantity of virtual supply bids would face very little risk of bidding at the $2,000/MWh bid cap, selling at $2,000/MWh and hoping the 15-minute market cleared below the $2,000/MWh cap.

In this scenario, BAA 2's EDAM RSE deficiency has been "cured" by the IFM market. Both balancing areas will qualify to be in the EDAM pool for the WEIM RSE.

In RUC, DMM's understanding is that the 780 MW EDAM energy transfer from BAA 1 to BAA 2 (supported by virtual supply) would be modeled as a firm transfer out of BAA 1, increasing BAA 1's total RUC requirement by 780 MWs. Because the IFM energy transfers were supported by virtual supply and BAA 2 arrived to the EDAM short of capacity, there is not enough capacity to meet BAA 1's RUC requirement. BAA 1 will have the RUC capacity shortfall of 780 MWs even though it arrived to EDAM with sufficient physical generation to meet its load and uncertainty.

In the real-time market, the entire EDAM pool for the WEIM RSE would be at risk of failure in a scenario such as this where virtual supply cures a deficient EDAM BAA's capacity shortfall. Moreover, even if no uncertainty materializes in real-time, this EDAM pool of BAAs will have insufficient physical supply to meet its total load due to the deficient BAA's shortfall being cured by virtual supply in the IFM.

In this example, BAA 1's obligations in the real-time market would be 1,000 MWs of its own load plus 780 MWs of firm EDAM energy transfers to BAA 2. BAA 2's obligations would be 800 MWs of its own load. DMM's understanding from the ISO's "confidence in transfers" section of the draft final proposal is that the optimization would utilize BAA 2's 100 MWs of physical generation and 700 MWs of the EDAM energy transfer to satisfy BAA 2's load. The EDAM energy transfer from BAA 1 to BAA 2 would be reduced from 780 MWs to 700 MWs, but the 600 MW power balance relaxation would remain in BAA 1, as BAA 1 is now the area that does not have sufficient supply to meet its real-time obligations.

BAA with insufficient EDAM supply curing its deficiency by bidding its load into IFM

Based on DMM's current understanding of the proposal, a BAA that has not procured sufficient capacity in advance of the EDAM market could also rely on excess capacity from other EDAM BAAs without EDAM RSE failure consequences by economically bidding its load into the IFM. If a balancing area short on capacity that has failed the EDAM RSE economically bids its load into the IFM, its available capacity could serve its IRU requirements, and the amount of its load that received an IFM schedule would simply clear at a volume potentially significantly below its load forecast.

Whether or not other EDAM BAAs had made enough capacity available to meet the short BAA's load forecast in IFM or RUC, DMM's understanding of the proposal is that the BAA would be deemed to have had its RSE deficiency cured by the IFM because it did not have a power balance constraint relaxation and its IRU requirement was not relaxed. If other EDAM BAAs make enough excess physical supply available in EDAM to meet the actual load forecast of the short BAA, RUC would transfer RCU from other BAAs to the BAA that was short on capacity to ensure the BAA's reliability in real-time.

If, on the other hand, other EDAM BAAs had not made sufficient capacity available to meet the short BAA's load forecast, the short BAA would face a capacity shortfall in RUC. However, this BAA would still be part of the EDAM pool for the WEIM RSE. Moreover, it would not face any of the out-of-market financial consequences described in the draft final proposal. Its capacity shortfall could put the entire pool at risk of failing the WEIM RSE. However, if other EDAM BAAs ultimately make sufficient capacity available in real-time to the EDAM pool, the capacity-short BAA would face no consequences from having not procured sufficient capacity in advance of the EDAM.

This scenario illustrates that if a BAA anticipates excess supply being made available by other EDAM BAAs, the EDAM RSE failure consequences may not create additional incentives for the BAA to procure sufficient supply in advance of the EDAM market to meet its own load and uncertainty. Thus, while the net export constraint can protect a BAA from being exposed to reliability risks from other EDAM BAAs' capacity shortfalls, the net export constraint does not directly prevent other BAAs from seeking to rely on EDAM rather than procuring sufficient supply in advance of the EDAM market to meet its own load and uncertainty. As a result, DMM suggests that stakeholders may want to consider revising consequences of failing the EDAM RSE to create additional incentivizes for each BAA to procure sufficient capacity to meet its load and uncertainty before the EDAM market.

The consequences for untagged imports and other capacity that counts in the EDAM RSE but is unavailable for the real-time market should be clarified and potentially enhanced

The ISO proposes to count non-resource specific imports under "forward supply contracts" as meeting an EDAM BAA's EDAM RSE requirements.[12] For such imports that receive EDAM schedules, if "the EDAM BAA does not tag the outstanding [import] schedules prior to the start of the STUC run, the proposal is to remove the BAA from the pooled WEIM RSE approach."[13]

This statement appears unclear as to whether failing to tag just 1 MW of imports by the deadline would cause the EDAM BAA to be removed from the EDAM pool for the WEIM RSE, or if perhaps all such imports would have to fail to tag. In a subsequent section of the final draft report specifically focused on the "EDAM Entities Pooled WEIM RSE," the proposal implies that there are no consequences for EDAM schedules ultimately becoming unavailable in real-time. In this section, the ISO explains that "(t)he proposal is that all parties that pass the EDAM RSE would be tested as a pool in the WEIM RSE" and that "(e)ach participating BAA is expected to address any intra-day outages that render any of the capacity used to back EDAM schedules prior to the running of the WEIM RSE (sic)."[14]

The proposal continues without listing any consequences for BAAs that fail to meet that expectation.

DMM recommends that the ISO clarify precisely what tagging failure may cause an EDAM BAA to be removed from the EDAM pooled WEIM RSE. If an EDAM BAA passes the EDAM RSE with a significant excess of supply, removing that BAA from the EDAM pooled WEIM RSE due to 1 MW of untagged imports seems unreasonable in light of other aspects of the proposal. For example, as previously discussed in these comments, the draft final proposal would not remove a BAA from the EDAM pooled WEIM RSE under a scenario where that BAA (1) fails the EDAM RSE, (2) has its capacity deficiency "cured" by EDAM energy transfers from another BAA, and (3) then has a large, old, unreliable gas unit that had counted towards the EDAM RSE declare itself unavailable.

DMM shares stakeholder community concerns about the potential for non-resource specific imports that EDAM BAAs count towards the EDAM RSE not actually being backed by firm generation or not being able to secure transmission. However, other types of resources, such as VERs, gas peaking plants, and old combined cycle units can also have more of their capacity counted towards meeting the EDAM RSE requirements than ultimately is available in real-time under tight system conditions. DMM suggests that the ISO and stakeholders consider enhancing the proposed consequences for EDAM RSE capacity that does not show up in

[12] ISO's *October 31 EDAM Draft Final Proposal*, p. 64.

[13] ISO's *October 31 EDAM Draft Final Proposal*, p. 65.

[14] ISO's *October 31 EDAM Draft Final Proposal*, p. 72.

real-time to more appropriately penalize EDAM BAAs whose uncured, underperforming capacity threatens the ability of the EDAM pool to pass the WEIM RSE.

The automated import tag verification process should be clarified and potentially enhanced

The ISO's proposal for verifying that imports counting towards the EDAM RSE have a forward contract for firm energy is not clear. DMM recommends that the ISO clarify its proposal and potentially enhance the verification process to ensure imports to non-CAISO EDAM BAA's have forward contracts before being counted towards meeting the EDAM RSE requirements. DMM also recommends that the ISO potentially enhance its proposed automated e-Tag verification process prior to the final STUC run to ensure that the tagged energy for all EDAM BAA's is non-recallable. This section provides more detail on these recommendations.

The draft final proposal lists criteria that import bids at CAISO BAA interties must meet in order to qualify as an import with a forward supply contract that can then count towards meeting the CAISO area's EDAM RSE requirements. These criteria can either already be verified in an automated fashion, or the ISO proposes to "provide a means for load serving entities to link intertie bids with a forward contract."[15] The ISO does not seem to propose anywhere to provide a similar means for load serving entities in non-CAISO EDAM BAAs to link imports counted in the EDAM RSE with a forward contract. DMM asks the ISO to clarify that it will be providing a means for imports of any EDAM BAA counted towards the EDAM RSE to demonstrate they have a forward contract. DMM also asks the ISO to clarify that the ISO is proposing to automate the verification that any import has a forward contract before it can be counted towards any EDAM BAA's EDAM RSE.

A separate but related concern is that the proposal does not describe exactly what will be verified in the proposed automated e-Tag verification process prior to the final STUC run. The proposal describes removing the BAA from the pooled WEIM RSE approach if the EDAM BAA does "does not tag the outstanding (import) schedules prior to the start of the STUC run."[16] This seems to imply that the ISO will only be verifying that the import has tagged the requisite *quantity* of transmission and energy. However, if the quality of the energy is not firm, non-recallable, the import will have failed to meet the criteria described in the draft final proposal. Therefore, DMM recommends that the ISO's final e-Tag verification process include verifying that the tagged energy is firm, non-recallable. The import should then fail the verification process and contribute to whatever the consequences of failing end up being, if either the quantity or the quality of the tagged energy by the start of the STUC run does not meet the requirements.

[15] ISO's *October 31 EDAM Draft Final Proposal*, p. 65.

[16] Ibid.

Implementation needs to ensure availability of requisite e-Tag data for DMM and for ISO monitoring of import tagging

The ISO explains "(t)he proposal is that the Department of Market Monitoring report monthly on the volume of day-ahead non-resource specific schedules that fail to submit valid e-tags prior to conclusion of the WEIM RSE." DMM will add the requested metrics to its WEIM reports, if the ISO can provide DMM with the requisite e-Tag data. We highlight the necessity of the ISO implementation to ensure the availability of the appropriate e-Tag data for this kind of reporting because DMM has put some effort into shaping into a usable format the e-Tag data currently available to DMM in CAISO databases. DMM appears to only currently have database access to e-Tag data for transactions that touch the CAISO balancing area. DMM requests the ISO provide, in databases that DMM can access, the requisite e-Tag data for all imports and exports for all EDAM and WEIM BAAs.

III. Greenhouse gas accounting and reporting

The resource specific GHG accounting proposal is reasonable, but DMM recommends the ISO consider the LADWP approach as a future enhancement

DMM supports the ISO's proposed resource specific approach to greenhouse gas (GHG) accounting. It strikes a reasonable balance between (a) minimizing total production costs by ignoring secondary dispatch and (b) preventing a low cost dispatch with constraints that attempt to eliminate secondary dispatch. However, DMM continues to recommend that the ISO consider LADWP's proposed variation of the resource specific approach as a future enhancement. The rest of this section provides clarification of these points.

The ISO's GHG accounting proposal is reasonable

The market software's primary objective is to minimize the total dispatch cost, subject to GHG zone regulators' accounting constraint of determining the GHG emissions caused by EDAM imports into each GHG zone. The original EIM GHG accounting design optimally accomplished the primary objective of minimizing the total dispatch cost by deeming the dispatches from resources with the lowest emissions outside of a GHG area as the resources that the GHG area would choose to import. This formulation ignores the fact that if the optimization is importing zero emissions resources from non-GHG areas such as solar into a GHG area to displace emitting resources such as natural gas, the non-GHG area may be backfilling the solar it sold with even higher emitting resources such as coal. This "secondary dispatch" of the high emitting coal to ultimately displace the lower emitting natural gas can occur because the optimization does not consider the emissions costs of power produced and consumed in a non-GHG area.

Most of the controversial aspects of the ISO's GHG design involve constraints on the original GHG accounting formulation that limit what the optimization can deem delivered to GHG areas in order to reduce the potential for the optimization to dispatch up higher emitting resources in

a non-GHG area that ultimately displace lower emitting resources in a GHG area. None of the additional constraints considered eliminate secondary dispatch. Each of the constraints that has been considered to try to limit secondary dispatch has a significant drawback that has to be weighed against the extent it may help to limit secondary dispatch.

Some stakeholders have argued to limit the power that can be deemed delivered from each resource to a GHG area to the resource's incremental production between the counterfactual GHG market run and the binding market run. DMM does not support this stakeholder proposal due to the inconsistencies it creates between resource's prices and costs, as the ISO has explained in its draft final proposal and the stakeholder meeting for that proposal.[17]

The ISO has proposed a GHG net export constraint to limit the GHG attributions in a non-GHG balancing area to the increase in the BAA's net exports between the counterfactual GHG run and the binding market run. DMM appreciates the analysis the ISO has done to help assess the tradeoff between the extent to which this constraint limits transfers to GHG areas and its potential to reduce secondary dispatch. Based on the ISO's analysis, the proposed GHG net export constraint does not seem to overly constrain the availability of GHG bids. The constraint may be a reasonable feature to help limit secondary dispatch.

DMM supports the ISO's GHG accounting proposal overall as a reasonable compromise between features that help to reduce secondary dispatch without escalating total dispatch costs by overly limiting the bid set that can be deemed delivered to GHG areas.

DMM recommends considering LADWP approach as future enhancement

DMM continues to recommend that the ISO consider a resource specific GHG accounting approach similar to the model proposed by LADWP.[18] The proposal would eliminate the need for resources outside of a GHG area to interact with other states' regulators and ensures GHG congestion rents are being allocated to the entities paying for emissions allowances. The LADWP proposal is flexible to accommodate additional state-run cap-and-trade programs while maintaining the benefits of a resource-specific optimization.

DMM continues to believe that the ISO should maintain flexibility in its GHG design so that it can be adapted to best suit the specific regulations of each unique GHG program. While the ISO's proposed constraints on non-GHG area dispatch that can be deemed delivered to a GHG area aim to address secondary dispatch, it is possible that the state regulator may not fully incorporate or reflect the ISO market's GHG attributions in their GHG program design. For example, CARB's regulations currently collect allowances for all WEIM MWh deemed delivered to California at the unspecified emissions rate, regardless of what resources the market deems

[17] ISO's *October 31 EDAM Draft Final Proposal*, p. 101.

[18] *Comments on Extended Day-Ahead Market Straw Proposal*, Department of Market Monitoring, June 17, 2022: http://www.caiso.com/Documents/DMM-Comments-Extended-Day-Ahead-Market-Straw-Proposal-June-17-2022.pdf

as delivered.[19] While emitting resources outside of California who are deemed delivered are responsible for the share of allowances associated with their specific emission rates, California utility distribution companies (UDCs) are responsible for all remaining EDAM/WEIM emissions allowances.

LADWP's approach proposes that the state's UDCs be responsible for all their state's EDAM/WEIM emissions, instead of collecting allowances from resources outside the state. Because UDCs would be responsible for the GHG compliance costs of all EDAM/WEIM emissions, these entities would receive the GHG rents. There are a number of benefits to this design. First, resources outside of GHG areas will not need to interact with other states' regulators. In addition, the LADWP approach ensures that GHG rents are allocated to the entities paying for the emissions allowances. This protects UDCs if their state's GHG program, similar to California's CARB program, does not incorporate the ISO market's GHG attribution outcomes into their regulations. For example, when a hydro resource is deemed delivered to California in the WEIM, the California UDCs will need to retire allowances for those MWh at the unspecified emissions rate while the GHG rents will be allocated to the hydro resource. Under LADWP's proposal, the California UDCs will still need to retire emissions allowances for those MWh, but the UDCs will also be receiving the GHG rents.

The GHG counterfactual market run is aimed to address secondary dispatch and may allow for more flexibility in how state regulators design GHG programs. States could choose an approach like CARB or base the number of emissions allowances on the ISO market's GHG attribution outcomes. Concerns have been raised about the incentive/ability for resources to game the GHG reference pass in order to create headroom and be deemed delivered in a later market run. Another benefit of the LADWP proposal is that allocating GHG rents to UDCs, rather than resources, would mitigate these gaming concerns.

As suggested by LAWDP, this model would be better constructed with an opt-out approach for resources versus opt-in. Resources that did not opt-out would have a GHG bid adder inserted by the ISO. A potential drawback of this proposal is whether resources will have enough incentive not to opt-out if they are not receiving the GHG congestion rents. Although it is likely that the opportunity to be delivered to a GHG area and receive inframarginal rents on energy will be incentive enough, if many resources choose to opt-out this will affect the supply of GHG bids.

The LADWP approach, as a relatively straightforward variation of the ISO's current resource-specific approach, allows the optimization to use resource-specific inputs and protects non-GHG areas from being exposed to higher prices due to the GHG compliance costs. However, under the LADWP approach, state regulators collect compliance costs associated with EDAM/WEIM emissions entirely from their state's UDCs, rather than having resources outside

[19] *CARB Electricity Sector Greenhouse Gas Accounting Presentation*, slide 9*:* http://www.caiso.com/InitiativeDocuments/CARBPresentation-ElectricitySectorGreenhouseGasAccounting-EDAMWorkingGroup%203-Feb152022.pdf

the state interact with the regulators. This makes the EDAM more flexible to accommodate additional cap-and-trade programs down the road.

IV. Transfer revenue and congestion revenue allocation

The ISO's proposed transfer and congestion revenue allocation appears to be an improvement over the existing approach for the WEIM

The EDAM draft final proposal appears to retain some elements of the existing WEIM transfer and congestion revenue allocation, including a 50/50 split of transfer revenue in some circumstances, and 100 percent allocation of congestion revenue from ITCs and internal constraints to the BAA where the constraint is modeled. However, the EDAM proposal makes the following key changes:

1. The ISO proposes to create a marginal energy component (MEC) of LMP specific to each BAA. DMM understands that this BAA-specific MEC will reflect the shadow price of each BAA's power balance constraint, and will replace the current approach for WEIM that uses a system marginal energy component and includes the BAA specific power balance shadow prices in the marginal congestion component of LMP. The ISO then proposes to calculate the transfer revenue based upon the difference of each BAA's energy component of LMP.

2. The ISO proposes to generally allocate transfer revenues across all EDAM BAA interfaces in a 50:50 split, subject to certain commercial arrangements that may require exception. This appears to be a departure from the existing WEIM framework which allocates 100 percent of transfer revenues to an entity that brings transmission rights "to" but not "through" an interface with another BAA.

3. The ISO proposes to allocate 100 percent of transfer revenue associated with Bucket 2, Pathway 2 transmission released to EDAM in advance of the market run to the transmission customer releasing those transmission rights.

DMM does not oppose the ISO's proposal to establish a marginal energy component of LMP for each BAA rather than using the system marginal energy component and including BAA specific shadow prices in the congestion component of LMP. DMM requests that the ISO publish a mathematical formulation for the proposed approach, clearly specifying the formulation of each BAA's power balance constraint, transfer constraints, and how the respective shadow prices enter the formulation of LMP for each BAA.

The ISO's proposal to allocate most transfer revenues in a 50/50 split may be an improvement over the existing WEIM approach to transfer revenue allocation. Allocating transfer revenue in a 50/50 split reduces incentives for any entity to withhold capacity in order to increase transfer revenues. However, the ISO's proposal still allows 100 percent of transfer revenue to the entity bringing the transmission rights in some circumstances. Any proposal where 100 percent of

transfer revenue is allocated to an entity making transmission available to EDAM for transfers may create incentivizes to withhold transmission in order to cause transfer constraints to bind and maximize transmission revenues.

These incentives are unique to the EDAM and WEIM market designs where transmission is required to facilitate transfers, but is provided voluntarily by market participants. This is a distinctly different concept from a standard ISO/RTO framework where all available transmission is routinely made available to the market, without concern for other commercial decisions. However, when an EDAM and WEIM transfer constraint binds, generators in the area on the exporting side of the binding constraint realize lower prices. In the WEIM, the entities providing transmission for WEIM transfers are typically affiliates of the majority of generation within the BAA. Therefore, any additional transfer revenues realized by withholding transmission would be largely offset by lower prices realized by affiliated generators.

DMM believes this outcome largely mitigates incentives to withhold transmission in the WEIM context, and may continue to do so in EDAM. However, this potential mitigation in EDAM is not guaranteed, and the EDAM design should carefully consider what incentives it creates for entities to provide transmission to, or withhold transmission from, the market. This includes careful consideration of the congestion rent allocation framework.

The ISO's proposal would also continue to allow BAAs modeling ITCs to retain all congestion revenues associated with the ITC. DMM notes that although all congestion revenues are retained by the entity modeling the ITC, in the case of the CAISO, ITC limits are determined by well-documented and defined operating procedures. As such, this ITC capacity is not subject to the same withholding incentives as some other EDAM or WEIM transfer capacity, and is not determined arbitrarily on a day-to-day basis dependent on commercial considerations.

The proposed allocation of transfer revenue appears to create new avenues for monetization of transmission rights

DMM notes that the ability of a BAA (e.g., CAISO) to retain congestion revenues associated with an ITC within the BAA is not a new concept with the proposal of EDAM. It has long been the case that entities can offer day-ahead import bids at CAISO interties without first securing upstream transmission, and that these import bids can lead to congestion revenues which are retained by the CAISO BAA. DMM understands that the transmission rights upstream of CAISO BAA interties have historically been monetized by means other than congestion revenues associated with CAISO ITCs. Therefore, while the ISO proposes to continue allowing the CAISO BAA and any other BAA modeling ITCs to fully retain the associated congestion revenues, the proposed EDAM design actually appears to create new avenues for monetization of transmission rights upstream of CAISO interties when these rights are offered to EDAM and become eligible to receive transfer revenues.

DMM requests clarification of some transfer revenue allocation scenarios

The ISO proposes a 50/50 split of transfer revenues for EDAM transfers, as well as an option for entities to retain 100 percent of transfer revenues on Bucket 2, Pathway 2 transmission made available to the EDAM in advance of the market run. DMM requests additional clarification of how the ISO plans to implement the allocation of 100 percent of transfer revenues where proposed.

Consider a case where an entity in BAA 1 brings Bucket 2 transmission to EDAM in advance of the market run to facilitate EDAM transfers with BAA 2. There is additional Bucket 3 transmission made available in BAA 1. All transmission made available for EDAM transfers in BAA 2 is Bucket 3 transmission.

In this scenario, would the total transfer revenues be allocated 50/50 among the BAAs, with the entity offering Bucket 2 transmission in BAA 1 retaining 100 percent of their MW proportionate share of total transfer revenues allocated to that BAA? Similarly, how would the transfer revenue allocation occur if EDAM transmission in both BAA 1 and BAA 2 were exclusively Bucket 2 transmission made available before the start of the EDAM market? DMM requests that the ISO provide examples to clarify the proposed allocation of transfer revenues in these and other potential scenarios.