

Comments on Day-Ahead Market Enhancements Revised Draft Final Proposal

Department of Market Monitoring

April 24, 2023

Summary

The Department of Market Monitoring (DMM) appreciates the opportunity to comment on the *Day-ahead Market Enhancements Revised Draft Final Proposal (Proposal)*.¹ Changes included in the revised draft final proposal represent significant improvements over prior proposals. As explained in these comments, DMM supports these changes, but offers recommendations for further refinements to the proposal. DMM recognizes the ISO's goal of moving forward with a day-ahead imbalance reserve product as a way of supporting the ISO's EDAM proposal. To the extent the ISO and stakeholders view a day ahead imbalance reserve product as essential for EDAM, we support moving forward given the significant benefits of EDAM. However, as noted in prior comments, DMM does not think that imbalance reserves are an essential component of EDAM given the EDAM and WEIM resource sufficiency tests, and the EDAM net export transfer constraint.

Imbalance reserve demand curve

The ISO now proposes to calculate an imbalance reserve demand curve with the same method as the flexible ramping product demand curve with two changes. First, the calculation will apply the ancillary service penalty price of \$247 rather than the power balance violation penalty of \$1,000 to the probability distribution. Second, the overall demand curve will also be capped at \$55 per megawatt-hour.

While the new proposal is a significant improvement over prior proposals, the value of the imbalance reserves could still be significantly less than the newly proposed demand curve values. A demand curve that overvalues imbalance reserves will add unnecessary costs to the day-ahead market and could create arbitrage opportunities that reverse the imbalance reserve procurement and do not add value to the market.

¹ *Day-Ahead Market Enhancements Revised Draft Final Proposal*, California ISO, April 6, 2023:
<http://www.caiso.com/InitiativeDocuments/DraftRevisedFinalProposal-Day-AheadMarketEnhancements.pdf>
Day-ahead Market Enhancements Addendum: Imbalance Reserve Demand Curve:
<http://www.caiso.com/InitiativeDocuments/Addendum-ImbalanceReserveDemandCurve-Day-AheadMarketEnhancements.pdf>

The ISO proposes to periodically review market outcomes and adjust the demand curve to better reflect the value of imbalance reserves. DMM agrees this is prudent when implementing an imbalance reserve product in the day-ahead market.

To reiterate previous DMM comments, DMM does not think that imbalance reserves are an essential component of EDAM given the EDAM and WEIM resource sufficiency tests, and the EDAM net export transfer constraint. Nor would imbalance reserves be effective at ensuring deliverability of EDAM transfers.² Therefore, having imbalance reserve demand curve prices above the value of day-ahead reserves is not needed to support the EDAM.

Imbalance reserve 30-minute deliverability

The ISO proposes that imbalance reserves be deliverable as energy within 30-minutes rather than the previous proposal of 15-minutes. The ISO made this change after commenters, including DMM, and the MSC pointed out that the day-ahead to real-time net load uncertainty materializes over *hours* and not all within 15-minutes.

While 30-minute deliverability is an improvement over prior proposals, it is likely still too stringent. Ideally some reserves would be deliverable within 15-minutes, some within 30-minutes, 1-hour, 2-hours, and 3 hours etc. Having that many reserve products would be difficult to implement. Determining what length of time is the best to cover the overall day-ahead to real-time uncertainty is not straight forward.

DMM thinks an hourly product is a reasonable time frame to start with. This would align with the existing day-ahead energy and ancillary service products. Further, because much of the uncertainty materializes over hours, an hourly reserve would allow resources that are dispatchable hourly, and who can respond to day-ahead to real-time net load changes, to be able to be awarded and to be paid for imbalance reserves.

Similar to its approach with the demand curve, the ISO should continue analyzing the imbalance reserve deliverability timeframe to determine if adjustments could increase overall market efficiency.

Modeling transmission in the deployment scenarios

The ISO proposes to use wide discretion on which constraints to enforce in the imbalance reserve deployment scenarios. The ISO would be able to enforce or not enforce individual constraints in the deployment scenarios and will have a 'tunable' parameter that can reduce the overall amount of reserves modeled as flowing over the transmission system.

DMM thinks this is reasonable. How net load changes will materialize in real-time is uncertain. Precisely modeling potential flows based on one set of distribution factors that will likely be different than the actual distribution of net load changes across the system is not needed.

² *Comments on Day-Ahead Market Enhancements March 2023 Workshops*, DMM, March 31, 2023: <http://www.caiso.com/Documents/DMMComments-DAMEMarch2023Workshops3-31-2023.pdf>

Rather, ensuring that imbalance reserves are procured in a reasonable way, without undue amounts stranded behind transmission constraints is the purpose of the nodal procurement. The ISO's current proposal is consistent with procuring imbalance reserves that are reasonably deliverable.

Further, the ability to remove some or all transmission constraints from the deployment scenarios will allow the ISO to protect the day-ahead market from any unintended and adverse outcomes caused by the nodal procurement of imbalance reserves. This includes the ability to ameliorate potentially excessive costs in local areas caused by the demand curve overvaluing the imbalance reserve product.

The ISO should reconsider imbalance reserves resettlement

Imbalance reserves and the flexible ramping product are not the same products. The proposal's changes to the demand curve and the 30-minute deliverability of reserves makes these products even more different. Incremental settlement, even if only on a portion of the schedule changes, between these two different products could lead to unintended consequences and complications.

For example, one complication could arise from the fact that real-time flexible ramping prices can rise higher than \$55. A resource that bids its marginal costs in both the day-ahead and real-time markets could be awarded day-ahead imbalance reserves and real-time energy schedules. If the real-time flexible ramping price is higher than \$55, the resource may be forced to buy back the imbalance reserve awards at a loss.

Instead of incremental settlement of two different products, DMM recommends the ISO consider only having financial consequences for imbalance reserves that are not available in real-time because of outages or a lack of real-time energy offers. This would keep incentives for imbalance reserves to submit real-time energy offers without the potential complications and unintended consequences of incremental settlement between two different products. One possibility is to have a "no pay" for day-ahead imbalance reserves plus a charge at the fifteen-minute market flexible ramping price for imbalances reserves not bid into the real-time market.

DMM supports the inclusion of storage resources in the residual unit commitment (RUC) process.

The draft revised final proposal includes provisions for energy storage resources to participate in the RUC process. DMM supports the inclusion of storage resources in the RUC process. However, because RUC awards will be constrained by the IFM state of charge, the proposal may lead to limited additional battery capacity awards in RUC. Further, any RUC capacity awarded to storage resources may ultimately depend on real-time exceptional dispatch to ensure real-time availability.

DMM understands that the implication of a RUC reliability capacity up (RCU) or reliability capacity down (RCD) award for a storage resource is a real-time must offer obligation for the

awarded hours, in the direction of the awarded capacity. The notion of commitment does not exist for battery storage resources, and DMM supports this inclusion of storage capacity in RUC in this manner as it has potential to avoid more costly commitment of other generators in some scenarios.

The proposal includes extension of state of charge constraints used in the IFM to ensure that IFM awards remain deliverable in conjunction with RUC awards, and resource SOC limitations are not violated. However, as the ISO clarified in an April 18, 2023 stakeholder presentation, RUC commitments will not impact state of charge.³ Therefore, while RUC may result in RCU and RCD awards where compatible with the level of SOC remaining after the IFM, the proposed RUC process may result in little additional real-time available capacity when a resource has exhausted SOC or has full SOC in a given hour after the IFM. This holds even if it may be physically possible to provide additional capacity with additional charging or discharging schedules beyond those received in the IFM.

The RUC process could award reliability capacity to batteries that depends on charging or discharging earlier in the day to manage state of charge. When this occurs, real-time exceptional dispatch may be required to ensure deliverability of the awarded RUC capacity in real-time. Even if a resource submits real-time energy offers for the hours of charging or discharging to manage state of charge, the time horizon of the real-time market optimization may be insufficient to ensure the necessary state of charge is available to support RUC schedules. Therefore, CAISO operators may need to issue exceptional dispatches to achieve and hold the required real-time state of charge to ensure availability of RUC capacity from storage resources when needed.

Accounting for ancillary services and reliability products in IFM and RUC state of charge constraints maximizes the likelihood that these awards will be deliverable in real-time.

In order to support feasible awards of all market products (energy, ancillary services, and reliability products), the ISO proposes to modify existing constraints and implement new constraints on state of charge in the IFM and RUC processes in the day-ahead market.

DMM supports the expansion of the day-ahead ancillary services state of charge constraint to include IRU and IRD in the IFM, and to further include RCU and RCD in ancillary services state of charge constraints in RUC. These constraints are important to ensure that awards for ancillary services and reliability products are feasible for an hour in the day-ahead market, as required by the CAISO tariff for ancillary services.

³ See *Presentation – Day-Ahead Market Enhancements – April 17, 2023*, Slide 18, California ISO: <http://www.caiso.com/InitiativeDocuments/Presentation-Day-AheadMarketEnhancements-Apr17-2023.pdf>

The ISO's proposed "envelope constraints" appear to be a reasonable approach to ensure that the impacts of awards in opposite directions do not cancel out, and that the impacts of energy, IRU, and IRD awards within an hour would not exceed the limitations of the resource. This may be important since, as the ISO notes, when IRU or IRD are deployed as energy in real-time, this is likely to occur in a single direction even when awards may exist in both directions.⁴

The use of separate envelope constraints may be especially important when estimates of hourly deployment probability are poorly estimated or do not vary among products or hours of the day. In these scenarios, impacts reflected in a single constraint may be more likely to cancel out in a way that does not reflect their true deployment probability in a given direction.

Where the SOC is modeled, such as in the IFM, using a single constraint similar to that modeling the impacts of regulation awards on state of charge may yield similar results when hourly specific multipliers are used and sufficiently different across products.⁵ This approach appears more similar to one proposed by some stakeholders, but would require further modification to the proposal to include SOC modeling in RUC.

In general, the use of multipliers and constraints in the day-ahead market processes to estimate state of charge impacts of day-ahead awards may improve - but will not guarantee - the real-time deliverability of day-ahead storage awards of any product. Estimating multipliers specific to each product and hour seems likely to provide the best estimate of real-time availability. However, as with RUC awards, the availability of IRU and IRD capacity in real-time may ultimately rely on real-time exceptional dispatch to ensure real-time deliverability.

Finally, as with the implementation of any new or modified market constraint, the addition of new or modified state of charge constraints has potential to interact in unexpected ways with existing constraints. DMM recommends the ISO carefully monitor the implementation of the newly proposed SOC constraints, and be prepared to quickly modify the implementation as needed to address any unexpected market outcomes.

⁴ *Day-Ahead Market Enhancements: Draft Revised Final Proposal*, p.56, California ISO, April 6, 2023: <http://www.caiso.com/InitiativeDocuments/DraftRevisedFinalProposal-Day-AheadMarketEnhancements.pdf>

⁵ *Energy Storage Enhancements: Final Proposal*, p.11, California ISO, October 27, 2022: <http://www.caiso.com/InitiativeDocuments/FinalProposal-EnergyStorageEnhancements.pdf>