

# Memorandum

**To:** ISO Board of Governors

**From:** Benjamin F. Hobbs, Chair, ISO Market Surveillance Committee

**Date:** May 10, 2023

**Re:** **Briefing on MSC activities March 17 to May 10, 2023**

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***This memorandum does not require Board action.***

During this period of time, the Market Surveillance Committee (MSC) of the California ISO wrote an Opinion<sup>1</sup> on the day-ahead market enhancements (DAME) initiative.<sup>2</sup> The Opinion was adopted in a general session MSC meeting on May 4, 2023. The major conclusions of the Opinion are summarized below.

## **Opinion on the Day-Ahead Market Enhancements: General Conclusions**

As we stated in our previous Opinion<sup>3</sup> on the ISO's extended day-ahead market (EDAM) initiative,<sup>4</sup> we agree with the assessment of many stakeholders that there are significant potential benefits to an expansion of the current west-wide energy-imbalance market into an operationally feasible day-ahead market design. Most power trades well in advance of real-time markets, and commitments often must be made day-ahead to ensure that fuel and resources are available to manage real-time imbalances. There is abundant empirical evidence that day-ahead markets, such as the ISO integrated forward market and residual unit commitment processes, can improve the efficiency of power-system operations and lower the cost of serving customers. These benefits stem from both the ability of such markets to optimize and deploy resources across relatively large footprints and the removal of various trading frictions that increase transaction costs in existing trading hub-based markets.

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<sup>1</sup> James Bushnell, Scott M. Harvey, and Benjamin F. Hobbs, *Opinion on Day-Ahead Market Enhancements*, Market Surveillance Committee of the ISO, May 4, 2023, [www.caiso.com/informed/Pages/BoardCommittees/MarketSurveillanceCommittee/Default.aspx](http://www.caiso.com/informed/Pages/BoardCommittees/MarketSurveillanceCommittee/Default.aspx)

<sup>2</sup> California ISO, *Day-Ahead Market Enhancements, Revised Draft Final Proposal*, May 1, 2023, [www.caiso.com/InitiativeDocuments/RevisedFinalProposal-Day-AheadMarketEnhancements.pdf](http://www.caiso.com/InitiativeDocuments/RevisedFinalProposal-Day-AheadMarketEnhancements.pdf).

<sup>3</sup> James Bushnell, Scott M. Harvey, and Benjamin F. Hobbs, *Opinion on Extended Day-Ahead Market*, Market Surveillance Committee of the ISO, Jan. 27, 2023, [www.caiso.com/Documents/MSCFinalOpiniononExtendedDay-AheadMarket.pdf](http://www.caiso.com/Documents/MSCFinalOpiniononExtendedDay-AheadMarket.pdf).

<sup>4</sup> *Extended Day-Ahead Market, Final Proposal*, ISO, December 7, 2022, [www.caiso.com/InitiativeDocuments/FinalProposal-ExtendedDay-AheadMarket.pdf](http://www.caiso.com/InitiativeDocuments/FinalProposal-ExtendedDay-AheadMarket.pdf).

The proposed day-ahead market enhancements address several key market design issues that we believe must be addressed in order for the EDAM initiative to achieve its goals to enhance efficiency and reliability across the west. Notably, the creation of day-ahead products designed to enable power systems to effectively manage real-time load imbalances that arise from day-ahead net load forecast errors and unexpected net load ramps is, we believe, a prudent feature to add to the ISO administered day-ahead market. This is especially true as the rapid increase in variable renewables increase the likelihood of more extreme forecast errors and ramps.

The issues that the DAME initiative addresses are very important, not just for the success of the EDAM, but for improving the efficiency and transparency of the ISO market. The extensive degree to which the current ISO market relies upon operator judgement to bias load in various market runs has been a significant and under-appreciated issue for many years. While such operator interventions may be necessary to maintain stable operations, they can have a substantial impact on market outcomes and almost certainly result in a sub-optimal deployment of internal resources and intertie schedules. The chronic longstanding differential between prices in the hour-ahead scheduling process (HASP) and the fifteen minute real-time market is but one example of these impacts. Another is the large amount of additional residual unit commitment (RUC) that operators consistently create through load adjustments during periods of tight conditions. These create hidden costs often recovered through uplift or complicated interactions with resource adequacy and other procurement markets.

Therefore, we agree that integrating as much of this non-market activity as possible into the actual market would increase transparency and allow for operator concerns to be met through market optimization, rather than the ad-hoc tools at operator disposal. The creation of a co-optimized additional imbalance reserve product, as well as updating the current RUC system into a reliability capacity process, and improving the modeling of storage state of charge, are sensible concepts that can potentially advance these goals. We therefore support the ISO proposal, with the testing and monitoring framework laid out in the parameters table.

That said, many significant uncertainties surround the current proposal. Important fundamental elements such as the methods for calculating the amount and location of imbalance reserves to be acquired and constraints on deliverability and storage provision of imbalance reserves are untested and may require further development. The degree to which the market software is able to accurately estimate locational uncertainty will be an important factor in determining the benefit of procuring imbalance reserves nodally rather than zonally. Without a fully specified methodology for calculating the quantities demanded from the market, it is impossible to credibly estimate the price and cost impacts of the design.

Other key elements that may need to evolve over time include, but are not limited to, the fact that imbalance reserve supply will be limited 30 minute rampable capacity, the fact that the schedules for those reserves will be locked in at high penalty prices during the sequential reliability capacity run, uncertainty about what parameters in the state of charge equations will strike an appropriate balance between risk of storage imbalance reserve non-performance and the cost of acquiring those reserves. There are also elements related to interactions with the Extended Day-Ahead

Market design, such as the interaction between imbalance reserve requirements and the resource sufficiency test, and the balancing authority-level export cap that may need to be adjusted with experience.

Furthermore, many of the benefits of these changes hinge upon their impact on operator behavior. As described above, a high level objective of the initiative is shifting procurement away from ad-hoc load biasing and into more formal optimization objectives. However, if the new products do not satisfy operator concerns, the market could continue to experience substantial load-biasing and commitments in the residual unit commitment.

A core fact is that while some elements of the ISO DAME proposal draw upon design elements for two-settlement systems and real-time optimization of energy and ancillary schedules that have been in operation in Mid-Continent ISO and New York ISO for more than a decade, there are many elements of the proposal for which there is no precedent of successful operational experience in other ISOs to learn from. These include the design of the deployment scenarios, methods for estimating net load uncertainty, procedures for assigning net load uncertainty to locations, and methods for accounting for storage resource state of charge over the day in the integrated forward market and day-ahead residual unit commitment. The ISO is the innovator in addressing these issues and will need to adapt the design over time based on the results of testing the full software model when it is developed, and then again based on operational experience.

This adaptation will need to move at a more rapid pace than the glacial speed of typical stakeholder processes if it is to enable the ISO and the Western Electricity Coordinating Council system to meet the reliability needs of its evolving resource mix and public policy goals. At the same time, the ISO should not be given permission to make willy-nilly day-to-day changes in parameters or constraints. There needs to be a process for identifying issues and discussing them with stakeholders, proposing then implementing changes, observing outcomes, and then commencing new cycles if needed. We support the stated intention of the ISO in the revised final proposal to inform and consult carefully with stakeholders in tuning the configurable parameters of the DAME design during testing, implementation, and go-live, and to work with the Department of Market Monitoring to report independently on the performance of alternative parameters and settings before and after implementation.<sup>5</sup>

Given the many new market design concepts, as well as implementation choices, embodied in ISO proposal, we believe it is reasonable to take a conservative approach to implementation. This would involve both substantial testing before implementation and putting guardrails in place at least through a transition period. One critical element is the “demand curve” for imbalance reserve that will set penalty values for relaxing the imbalance reserves constraint. These values will influence not just the cost of imbalance reserves but also energy prices in the integrated

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<sup>5</sup> *Revised Draft Final Proposal, op. cit.*, page 6. See also California ISO, “Flexible Parameter Matrix,” May 1, 2023, [www.caiso.com/InitiativeDocuments/FlexibleParameterMatrix-Day-AheadMarketEnhancements.pdf](http://www.caiso.com/InitiativeDocuments/FlexibleParameterMatrix-Day-AheadMarketEnhancements.pdf).

forward market. If these penalty values are set too high, they could result in a substantial increase in energy prices. We believe that revisions to the DAME proposal announced in late April to harmonize the imbalance reserve-up demand curve between the ISO and non-ISO balancing area authorities, to base the calculation of the sloped portion of its demand curve on a penalty of \$247/MWh, and to cap imbalance reserve-up prices at \$55/MWh are consistent with our recommended conservative approach. Should experience show that higher prices are necessary in order to elicit needed imbalance reserves from the market, the demand curve parameters could then be adjusted.

The many new design elements in the ISO proposed DAME design together imply that there are almost certainly “unknown unknowns”, as we pointed out in our EDAM opinion. These will become apparent only as the initiative proceeds further toward implementation. A common theme in that opinion and the present opinion is the need for detailed pre-implementation software testing and simulation to assess the impacts of different model specifications and parameters, as well as to evaluate how the pieces fit together and function. We agree that this is an appropriate time to take the first formal steps to creating the imbalance reserve products and implementing the other proposed DAME elements. As with the Boards’ decision to initiate EDAM last January, we believe that enabling the ISO to proceed with software development based on the proposed DAME design is a necessary next step that will enable stakeholders and policy makers to complete the hard work that needs to be done to successfully implement the vision of a West-wide day-ahead market.

Given the large potential benefits at stake, and the reality that the evolution of the resource mix in the West will not wait for further improvements to the proposed design, progress on the DAME and EDAM market initiatives is crucial. However, as we note in our opinion on the latter initiative, approval at this time should be viewed as an important intermediate, but no means final, step in the design and implementation process. As we noted in that opinion, the new market designs contain a number of design elements that have not been tested in other ISOs but are important elements of the proposed design. The proposed DAME design will benefit from adjustments based on experience from pre-implementation software testing and subsequent operations. The likelihood that the EDAM will begin operation with a small set of balancing areas that will expand over time will help the ISO and other participants improve the design with accumulating experience. The proposal that the ISO would exercise the flexibility it proposes to build into the software will, we believe, contribute to allowing parameters to be adjusted with needed stakeholder input without undue delay.