

# Memorandum

**To:** ISO Board of Governors

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

**Date:** March 10, 2022

**Re:** **Briefing on MSC activities from December 3, 2021 to March 8, 2022**

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

During this time period, the MSC prepared an opinion on the ISO's proposed energy imbalance market resource sufficiency evaluation enhancements, and formally adopted it on February 2, 2022.<sup>1</sup> The most important of the conclusions from the opinion are excerpted in the first section of this memo.

The MSC also held a general session meeting on February 11, 2022. Three topics were addressed during the meeting, including performance and price formation of the flexible ramp product, the day-ahead market enhancements initiative, and market power mitigation in the storage enhancements initiative. The discussions are summarized in the second section below.

## **1. Opinion on Resource Sufficiency Evaluation Enhancements**

The Market Surveillance Committee was asked to comment on the proposed enhancements to the energy imbalance market resource sufficiency evaluation process.<sup>2</sup> The major purpose of the resource sufficiency evaluation is to evaluate whether each balancing area authority is capable of meeting its own net load with its own available resources before allowing it to exchange power through the market with other authorities.

The MSC concluded that in order to continue to improve the resource sufficiency evaluation, several aspects of the energy imbalance market's design and implementation that impact the resource sufficiency evaluation, as well as elements of the evaluation itself. Some of the most important of these conclusions are summarized below

First, the ISO needs to fix the pricing of flexiramp in the fifteen-minute and five-minute markets. There are flaws in the current implementation of the flexiramp product in the real-time market that result in zero prices for flexiramp outside of the ISO area in the energy imbalance market when flexiramp is actually very scarce. These flaws are a critical issue that underlie several problems

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<sup>1</sup>[www.caiso.com/informed/Pages/BoardCommittees/MarketSurveillanceCommittee/Default.aspx](http://www.caiso.com/informed/Pages/BoardCommittees/MarketSurveillanceCommittee/Default.aspx)

<sup>2</sup> D. Johnson and B. Dean, *EIM Resource Sufficiency Evaluation Enhancements, Phase 1: Revised Draft Proposal*, CAISO, Dec. 16, 2021, [www.caiso.com/InitiativeDocuments/RevisedDraftFinalProposal-EIMResourceSufficiencyEvaluationEnhancements.pdf](http://www.caiso.com/InitiativeDocuments/RevisedDraftFinalProposal-EIMResourceSufficiencyEvaluationEnhancements.pdf)

involving the resource sufficiency evaluation. The nodal deliverability test that the ISO is developing is intended to address a portion of this problem. The implementation timing, design, and performance of the nodal delivery test should be reviewed with stakeholders. Depending on the outcome of this review it may be appropriate to consider an alternative interim, or even long-run designs. This is particularly important for areas outside the ISO in the near term in order to provide an appropriate price signal for scheduling transfers in the fifteen-minute market.

Second, it is important that the ISO replace the current approach for calculating the resource sufficiency requirements with better statistical methods. We understand that the quantile regression method is intended to replace the current methodology for calculating the net load uncertainty requirement. However, it is not presently clear to us or stakeholders how these designs will likely work. We have pointed out above that the use of a small sample size leads to unstable and difficult to predict estimates under both the current and proposed methods, so it is important to assess how well the quantile regression will perform for energy imbalance market entities as well as the ISO. It is our understanding that the ISO plans to develop a new method for determining the intertie deviation requirement in a stakeholder process.

Third, it is important that the inconsistency between the evaluation in the hour-ahead scheduling process and the resource sufficiency capacity test for the ISO be addressed. The hour-ahead scheduling process results may not result in the market software scheduling transactions needed for the ISO balancing authority area to pass the resource sufficiency evaluation unless ISO operators have taken compensating actions such as higher load conformance adjustments. This issue is also related to the underpricing of flexiramp outside of the ISO region described above. Zero prices for flexiramp outside the ISO result in the market software tending to dispatch resources outside the ISO region for energy in order to unload capacity within the ISO region and meet the ISO's locational capacity requirement when it is binding. It would be possible to address this inconsistency by including an additional set of constraints. It may be that this would be the best approach, but such a resolution would add complexity and solution time to the market scheduling tools, and has the potential for unintended impacts.

Fourth, sufficiency evaluation penalty failures are a subject for phase 2 of the initiative. We agree with stakeholders who have pointed out that capping energy imbalance market transfers at the current level can be an ineffective penalty for failing these tests if transfers were already high at the time of the sufficiency evaluation failure. On the other hand, extreme penalties for sufficiency evaluation failures are not appropriate until the issues identified above are addressed so that high penalties are not imposed for spurious failures. Finally, we do not think it would be an intended nor acceptable outcome to require an energy imbalance market entity to shed load that could have been met with transfers when the sufficiency evaluation results do not allow enough time to schedule hourly base imports or even to arrange emergency imports.

Fifth, we agree with the ISO that load conformance adjustments by the ISO or other entities should not always be added to load in applying resource sufficiency evaluations. If there is an issue with a balancing area's load forecast consistently understating its real-time load, that outcome should be addressed, but there is no reason to artificially inflate the load used in the resource sufficiency evaluation if currently used values are to compensate for unmodeled constraints and do not reflect changes to the load forecast itself. Correcting problems with

flexiramp pricing might be effective in dealing with the issues that have motivated some stakeholders to ask that conformance adjustments be added to load in the evaluations.

As a general conclusion, the use of resource sufficiency evaluations to limit participation in the energy imbalance market's real-time dispatch is, in general, reasonable. That use is analogous to the resource adequacy requirements historically imposed for participation in tight power pools. The presence of such a requirement for participation in the west-wide real-time dispatch likely enhances the confidence that balancing area authorities have that they would not be adversely impacted by undue leaning on the pool by other balancing areas, thereby increasing their willingness to participate in the west-wide market. However, the current penalty structure may fail to consistently deter undue leaning for several reasons. At the same time, however, willingness of balancing areas to participate in the energy imbalance market requires assurance that balancing areas will not be required to shed load because of another balancing area's inadequate resources. Well-designed enhancements of the resource sufficiency evaluation process should encourage participation, increase cost-effective power exchanges across the west, and improve reliability by providing appropriate incentives to coordinate dispatch and at the same time discourage leaning.

## **2. General Session Meeting of February 11, 2022<sup>3</sup>**

### **2.1 Flexible Ramp Product Performance and Price Formation**

This agenda item consisted of an extensive presentation by Dr. Guillermo Bautista-Alderete, Director of Market Analysis and Forecasting and Mr. Abhishek Hundiwale, Senior Advisor--Market Analysis, and accompanying MSC and stakeholder discussion. The presentation addressed several interrelated topics:

- trends in recent flexiramp prices in 2019, especially after the implementation of a minimum requirement in the ISO area in 2020;
- how the effective flexiramp requirement within a particular balancing authority area is, in general, driven by the net import and export capabilities of the area;
- trends in amounts of flexiramp procurement by the ISO since 2019;
- the mathematical formulation of the constraints driving flexiramp procurement in the real-time market software and its implications for pricing;
- an in-depth analysis of the interaction of flexiramp prices, energy prices, and effective requirements during the tight supply conditions of July 9, 2022; and
- the issue of flexiramp deliverability, and the enhancements scheduled for Fall 2022.

Discussion focused on the mathematical formulation, its effect on prices, and the implications for the price behavior on July 9.

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<sup>3</sup> [www.caiso.com/Pages/documentsbygroup.aspx?GroupID=3A06A717-11DC-4C84-A956-7F5FF7E3C682](http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=3A06A717-11DC-4C84-A956-7F5FF7E3C682)

## **2.2 Day-Ahead Market Enhancements**

This agenda item was organized around two presentations by ISO staff. The first presentation, by Dr. Bautista-Alderete and Dr. Kun Zhao, Senior Quantitative Analyst, summarized their analyses of historical data concerning outcomes and performance of the ISO's day-ahead market that are relevant to the design of the day-ahead market enhancements. Sets of outcomes discussed included:

- distributions of imbalances between the day-ahead and real-time markets;
- imbalance reserve requirements that would be implied by those imbalances, based upon quantile regression analyses;
- adjustments to requirements in the day-ahead residual unit commitment process that have been made to account for uncertainties in real-time needs for flexible capacity; and
- the actual flexibility characteristics of capacity procured in the residual unit commitment process.

A full report on these analyses is available.<sup>4</sup> The last set of outcomes stimulated the most discussion during the meeting. This led to a broader discussion of the relative advantages of an imbalance reserve product versus the existing residual unit commitment process for securing needed flexible capacity and managing exports, especially during times of system stress. An MSC member asked about the role of operator discretion versus optimization in the residual unit commitment process outcomes, and then asked whether adjustments to that process might at least partially address concerns over its apparent inability to ensure that flexible rather than inflexible capacity is procured.

The second presentation was made by Mr. James Friedrich, Senior Policy Developer at the ISO. He summarized the initiative's proposal that an imbalance reserve requirement would replace the real-time must offer requirement for resources having resource adequacy contracts. He described anticipated benefits of this replacements, including more tailored procurement based on system conditions and costs, rather than an inflexible must-offer requirement that doesn't account for the costs of making capacity available in real-time. He stated that these benefits would be particularly important in an expanded Western day-ahead market.

There followed a discussion of several issues. MSC members reiterated a point they have made in previous meetings that requiring all imbalance reserves to be dispatchable within 15 minutes is likely to be overly restrictive. This is because a significant fraction of real-time imbalances will be forecastable much earlier than 15 minutes ahead of time. On another issue, a stakeholder expressed skepticism about whether eliminating the must-offer obligation would greatly reduce capacity procurement through the residual unit commitment process, since operators would continue to bias the forecast in that process if they believe they need the capacity. A MSC

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<sup>4</sup>G. Bautista Aldere and K. Zhao, *Day-Ahead Market Enhancements Analysis*, California ISO, Jan. 24, 2022, [www.caiso.com/InitiativeDocuments/Day-AheadMarketEnhancementsAnalysisReport-Jan24-2022.pdf](http://www.caiso.com/InitiativeDocuments/Day-AheadMarketEnhancementsAnalysisReport-Jan24-2022.pdf)

member replied by saying that it is unclear that the present process actually is effective in making flexible capacity available.

### **2.3 Energy Storage Enhancements Initiative: Market Power Mitigation**

This agenda item began with a presentation by Mr. Gabe Murtaugh, Storage Sector Manager at the ISO, who first summarized the recent revisions of the initiative to incorporate bids and offers for stored energy (megawatt hours) rather than charging and discharging power (MW).<sup>5</sup> This proposal has the advantage of allowing storage bids and offers to reflect the dependence of the marginal value of stored energy on the level of charge. He then discussed proposed features of the market power mitigation process. Default energy bids are to be based on incremental cycling costs, estimated power purchase costs, and (in the real-time market only) the opportunity costs of selling energy. A slope for the relationship between state-of-charge and default energy bid is proposed to be based on the distribution of prices within the four hours with the highest day-ahead locational marginal prices.

The presentation stimulated discussion on several issues. One was vulnerability to market power for charging bids, since those are not proposed to be mitigated. Storage resources with market power could then submit large magnitude negative bids. Another issue discussed was whether use of day-ahead prices might be stale and lead to inefficiencies because of rapidly changing expectations about prices as the day progresses. A challenge is that transparent and trustworthy methods for updating those expectations are not presently available. A MSC member suggested that a possible long-run solution is implementation of an intraday market between day-ahead and real-time that would have an extended time horizon.

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<sup>5</sup> *Energy Storage Enhancements, Straw Proposal*, December 9, 2022, California ISO, [www.caiso.com/InitiativeDocuments/StrawProposal-EnergyStorageEnhancements.pdf](http://www.caiso.com/InitiativeDocuments/StrawProposal-EnergyStorageEnhancements.pdf)