

Memorandum

To: ISO Board of Governors

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

Date: July 7, 2021

Re: Briefing on MSC activities from May 11, 2021 to July 7, 2021

This memorandum does not require Board action.

During this time period, the MSC held a general session meeting on May 21, 2021. Three topics were addressed in this meeting:

- An analysis of the Energy Imbalance Market resource sufficiency evaluation;
- The ISO's energy storage enhancements initiative; and
- The ISO's day ahead market enhancements initiative, in particular the calculation of imbalance settlements for the proposed day-ahead imbalance reserve.

The discussions for each of these topics are summarized below.

1. Resource Sufficiency Evaluation Analysis

The resource sufficiency evaluation analysis was undertaken by the ISO in order to inform the recently commenced initiative on enhancing the energy imbalance market resource sufficiency evaluation.¹ Prior to running the real-time market, the ISO applies tests for each balancing area authority in the market to assess the feasibility of base schedules, determine whether the base schedule of supply and demand balance, and assess the sufficiency of resource capacity and flexible ramping capacity to meet demand. If a balancing authority has sufficient resources, the entity is deemed to be able to meet their area's demand with their own net-supply, and is then allowed to transfer power with other entities through the EIM real-time market. The tests also verify that balanced supply and demand schedules are submitted by the entities to the energy imbalance market, and provides information about potential within-area congestion. The objective of the initiative is to review the balancing, capacity, and flexible ramping tests to determine if any design changes are required to ensure that the tests achieve their purposes.

The focus of this agenda item was a presentation by Dr. Guillermo Bautista Alderete, Director, Market Analysis and Forecasting and Rahul Kalaskar, Manager, Market Validation Analysis on the ISO's analysis of resource capacity test performance during the summer 2020 heatwave.² After reviewing the capacity test, sources of error in the application of the test last summer were described (especially concerning calculation of capacity ranges) which resulted in some false positives (the test was passed when it should have failed) for some entities during critical peak

¹D. Johnson and B. Dean, EIM Resource Efficiency Evaluation Enhancements Issue Paper, May 28, 2021, California ISO, www.caiso.com/InitiativeDocuments/IssuePaper-EIMResourceEfficiencyEvaluationEnhancements.pdf

² The analysis is summarized in *ibid.*, Section 2.3.

intervals. The presentation carefully documented the occurrence of these false positives for several EIM entities. The presentation then noted that adding uncertainty to the test would result in more failures of the tests.

Then followed discussion of the magnitude of errors in the application of the test in the hour-ahead scheduling process, fifteen-minute market, and five-minute dispatch market. Dr. Bautista pointed out that the concept of “actual” capacity is ambiguous in how it is defined and measured. Data shows that the capacity measure tracked most closely then five-minute resource availability.

Dr. Bautista then concluded the presentation by describing for each category of resource how well their capacity measure tracked five-minute availability. For instance, divergences between the capacity measure and five-minute availability occurred for wind and solar resources due in part to their variability. Stakeholders asked questions about definitions of capacity availability and their applicability to imports, short-start units, and other categories of resources.

The MSC looks forward to participating in discussions about how the tests might be enhanced to better represent capacity conditions in the EIM markets.

2. Energy Storage Enhancements Initiative

This agenda item consisted of a presentation by Gabe Murtaugh, Lead Infrastructure and Regulatory Policy Developer at the ISO, who summarized the issue paper for this initiative.³ The presentation stimulated a discussion by MSC members, ISO staff, and attending stakeholders about the goals of this initiative and possible alternatives for achieving those goals. As pointed out in the proposal for the energy storage and distributed energy resources Phase 4 initiative,⁴ and in the MSC opinion⁵ on that initiative, the foreshortened time horizon of the ISO’s real-time markets means that tradeoffs cannot be appropriately evaluated between discharging storage in a binding or advisory interval before the horizon, and saving that energy for use after the horizon. This initiative is intended to address the potential for inefficiency and reliability problems from myopic real-time schedule optimizations.

Mr. Murtaugh reviewed several approaches that are under consideration, including using a price to value the ending state-of-charge for individual resources, creating a so-called “energy shift product” to be scheduled in the day-ahead market, and developing a biddable state-of-charge product. Stakeholders, staff, and MSC members contributed to an active discussion on the general philosophy of alternative approaches, as well as their mechanics. Mr. Murtaugh also described two specific issues that the initiative will address concerning technical complexities of batteries (in particular, declining charge rates as state-of-charge approaches capacity) and compensation for exceptional dispatch of batteries in order to meet a state of charge target.

³ “Energy Storage Enhancements, Issue Paper,” Market and Infrastructure Policy, California ISO, April 28, 2021, <https://stakeholdercenter.caiso.com/StakeholderInitiatives/Energy-storage-enhancements>

⁴ <https://stakeholdercenter.caiso.com/StakeholderInitiatives/Energy-storage-and-distributed-energy-resources>

⁵ J. Bushnell, S. Harvey, and B.F. Hobbs, Opinion on the Energy Storage and Distributed Energy Resources Phase 4 Initiative, Sept. 9, 2020, Market Surveillance Committee of the California ISO, http://www.caiso.com/Documents/MS-OpiniononEnergyStorageandDistributedResourcesPhase4-Sep8_2020.pdf

The design of incentives or rules designed to correct the problems arising from the limited time horizons of real-time scheduling involves important conceptual and practical market design problems. The MSC welcomes the opportunity to participate in discussions contributing to the development and review of the initiative.

3. Day-Ahead Market Enhancements: Imbalance Reserve Deviations and Priority Exports

Mr. Donald Tretheway, Principal, Market Design Policy and Dr. George Angelidis, Principal, Power Systems Technology Development made a presentation that focused on one particular design issue in the day-ahead market enhancements initiative:⁶ the relationship of day-ahead imbalance reserve schedules to real-time energy and flexible ramp product schedules, and the definition and settlement of imbalances of that day-ahead reserve product. The issue is complicated for several reasons, including the different interval lengths in the day-ahead and real-time markets, the much smaller but non-zero net load uncertainty in the real-time time frame, and the relationship of requirements for flexible ramp product in the fifteen-minute market to requirements in each of the three constituent five-minute dispatch intervals, among other issues.

Mr. Tretheway first reviewed the general issues, and then Dr. Angelidis explained the proposed formulas for calculating and settling imbalances between the day-ahead and real-time, together with several detailed examples. Documentation in addition to the spreadsheet examples that have been posted⁷ is expected in the near future.

The day-ahead market enhancements initiative is a potentially important step to realizing further efficiency and reliability improvements from the ISO markets, and, furthermore, to developing a day-ahead market design that could be implemented in conjunction with the energy imbalance market real-time markets in balancing authority areas outside of the ISO.

⁶ <https://stakeholdercenter.caiso.com/StakeholderInitiatives/Day-ahead-market-enhancements>

⁷ Ibid.