

Memorandum

To: ISO Board of Governors

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

Date: October 21, 2022

Re: Briefing on MSC activities from August 23 to October 20, 2022

This memorandum does not require Board action.

The Market Surveillance Committee of the California ISO held two general session meetings on September 19 and 26, 2022, respectively. Those meetings addressed specific topics under several of the ISO's initiatives, including energy storage enhancements, day-ahead market enhancements, and resource sufficiency evaluation, Phase 2.¹ Summaries of these discussions are presented below. In addition, a draft opinion was posted on October 14, 2022 on the Phase 2 proposal of the resource sufficiency evaluation enhancements initiative, which is also summarized below.² This draft was then discussed in a public meeting on October 17, 2022, but no vote was held concerning its adoption because the ISO announced that it would delay submission of the proposal until December 2022.

1. General Session Meeting of September 19, 2022

The agenda items discussed by MSC members, ISO staff, and stakeholders include the resource sufficiency enhancements, Phase 2 initiative, and the proposed formulation of a state-of-charge constraint for storage batteries that provide ancillary services. Because of time limits, another agenda item, which would have addressed the energy storage enhancements initiative, was deferred to the general session meeting of September 26, 2022.

1.1 Resource sufficiency enhancements, Phase 2

Three components of this proposal were discussed by Mr. Danny Johnson, Market Design Sector Manager, Market and Infrastructure Policy:

1. Adjusting California ISO obligations in the resource sufficiency evaluation to account for low-priority exports that clear against Western energy imbalance market energy transfers;

¹www.caiso.com/informed/Pages/BoardCommittees/MarketSurveillanceCommittee/Default.aspx

² J. Bushnell, S.M. Harvey, and B.F. Hobbs, "Opinion on Energy Imbalance Market (EIM) Resource Sufficiency Evaluation Enhancements, Phase 2," Draft Opinion of the Market Surveillance Committee of the California ISO, Posted Oct. 14, 2022, *ibid*.

2. Requiring that ISO low-priority exports be e-tagged as “Firm Provisional”; and
3. Providing for a balancing area authority that fails the resource sufficiency evaluation to be able to receive assistance energy transfers, as long as the economic value of those transfers (as evaluated by the market software, net of marginal cost) exceeds a specified hurdle rate cost.

1.2 Ancillary service state-of-charge constraint

In this agenda item, Mr. Gabe Murtaugh, Storage Sector Manager at the ISO, described the formulation of an active constraint in the market designed to ensure that storage batteries that are scheduled to provide ancillary services have sufficient charge to support provision of those services for a specified minimum period of time. Also discussed were the problems that arise in real-time when this constraint binds and compels a storage unit to be discharged at times that real-time prices are high, potentially resulting in a real-time market bid shortfall and a qualification for bid cost recovery. Mr. Bill Weaver, Assistant General Counsel at the ISO, then presented a tariff amendment filed with the Federal Energy Regulatory Commission on Sept.19, 2022 that makes storage resources ineligible for bid cost recovery in that circumstance. Mr. Murtaugh also announced that a new ISO initiative addressing state-of-charge constraints for ancillary service providers has now been initiated.

Stakeholder discussion addressed several issues, including the particular parameters to be applied in the constraint, such as the amount of state-of-charge to be maintained, as well as need for and content of the tariff amendment.

2. General Session Meeting of September 26, 2022

The agenda of this meeting consisted of two items as follows.

2.1 Energy storage enhancements discussion

In this agenda item, Mr. Murtaugh reviewed six of the components of the energy storage enhancements proposal. The first three components consisted of enhancements intended to improve system reliability, including:

1. Improved accounting for state-of-charge while providing regulation, by netting out average changes in state-of-charge due to deployment of regulation. The estimated hour-by-hour coefficients to be used were discussed by stakeholders. MSC members suggested that it might be appropriate to use more conservative values rather than the average change, and that it would be useful to understand whether the rate of change in state-of-charge is correlated with stressed system conditions.
2. Enhanced bidding requirements for storage resources providing ancillary services, in particular a requirement that such a resource also submit energy bids so it could be charged or discharged in order to maintain the capability of its ancillary services to be deployed, if needed. Numerical examples were provided by Mr. Murtaugh.

3. Exceptional dispatch tools for storage resources to hold state of charge, and development of a tool to estimate opportunity costs to be compensated.

The fourth and fifth components of the proposal discussed by Mr. Murtaugh were enhancements to the model of co-located (and not the "hybrid" model) storage and variable renewable resources. The first of these two components included an electable mechanism in which the scheduling coordinator could elect to prevent the ISO from 'grid charging', which is the charging of a storage resource at a rate exceeding the amount of power supplied by the co-located variable renewable resource. There then followed discussion of estimation of the cost of such charging to be reimbursed if ISO operators charged more than the elected amount, which would result in a partial forfeiture of investment tax credits by the battery owner. The second of these two components was a proposed extension of the co-located model to pseudo-tie resources, which did not result in significant discussion.

The final component of the proposal discussed under this agenda item consisted of changes to the day-ahead storage default energy bid to add an opportunity cost component. This engendered significant discussion by MSC members and stakeholders concerning the nature and estimation of these costs, and their applicability when the day-ahead model automatically calculates opportunity costs through its multiperiod (24 hour) optimization.

2.2 Day-Ahead Market Enhancements Discussion

This agenda item consisted of a presentation by James Friedrich, who is Lead Policy Developer at the ISO. Three specific topics concerning imbalance reserves and reliability capacity were discussed:

1. A real-time energy offer cap for imbalance reserve capacity, based on forecast levels of real-time prices with a specified probability of exceedance (e.g., 10% or 2.5%). Alternative quantile regression-based approaches for estimating specified percentiles of real-time prices, using gas prices and (in one case) net load as regressors were reviewed, and sample results discussed and compared.
2. Energy storage resources and capacity procurement. This topic consisted of adjusting the resource's state-of-charge to account for typical changes that would be anticipated due to real-time deployment, in order to avoid overestimating real-time availability of discharge energy.
3. Local market power mitigation of imbalance reserves and reliability capacity, addressing default bids to be used for day-ahead availability bids.

3. Draft Opinion on Phase 2 of the Resource Sufficiency Evaluation Process Initiative

The Market Surveillance Committee was asked to comment on Phase 2 of the proposed enhancements to the Western energy imbalance market's resource sufficiency evaluation

process.³ This initiative is a continuation of the ISO's refinement of the resource sufficiency evaluation in the energy imbalance market that began with the summer 2021 readiness initiative.⁴ As part of that initiative, a set of changes to the RSE were approved and adopted for summer 2022 as Phase 1 of this process.⁵ Phase 2 is addressing several outstanding questions and issues that remained unresolved by Phase 1. In a previous opinion addressing the Phase 1 proposal,⁶ we extensively discussed the motivation for the resource sufficiency evaluation and many of the issues addressed in the August 25, 2022 version of the Phase 2 proposal.

The major points made in the draft opinion can be summarized as follows.

First, we discussed the major purpose of the resource sufficiency evaluation, which we see as an evaluation of whether each balancing area authority is capable of meeting its own net load with its own available resources. Only if an authority has that capability should it be allowed to benefit from transacting power through transfers through the energy imbalance market from other balancing authorities. The capacity and flexible ramping evaluations are the tests designed to accomplish this evaluation and have been the primary focus of the enhancement initiatives. The sufficiency evaluation was implemented because the authorities who initially established the energy balancing authority viewed its purpose as the promotion of economic power exchanges in real-time between independent balancing areas who remained responsible, along with their local regulatory authority, for their own balancing area's reliability.

The resource sufficiency evaluation Phase 1 and Phase 2 initiatives have highlighted the many technical and policy choices to be made in implementing this general vision of the sufficiency evaluation, both with regards to the measurement of resource needs and the appropriate consequences for balancing area authorities failing that evaluation. We argue that these choices need to balance the trade-offs between the benefits and risks of increased regional integration. On one hand, strict and severe enforcement of the evaluation can minimize the risk of the imbalance market being used in a way that causes scarcity to "spill over" from under-resourced authorities, or undermine the diversity benefit on which other authorities rely upon in committing generation and scheduling imports and exports. At the same time, an inaccurate or overly rigid resource sufficiency evaluation could also dilute many of the economic and diversity benefits

³ D. Johnson and B. Cooper, *EIM Resource Sufficiency Evaluation Enhancements: Phase 2. Draft Final Proposal*. CAISO, August 25, 2022. www.caiso.com/InitiativeDocuments/DraftFinalProposal-WEIMResourceSufficiencyEvaluationEnhancementsPhase2.pdf

⁴ *Market Enhancements for 2021 Summer Readiness: Final Proposal*. California Independent System Operator. March 19, 2021, www.caiso.com/InitiativeDocuments/FinalProposal-MarketEnhancements-Summer2021Readiness.pdf

⁵ 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

⁶ J. Bushnell, S. Harvey, and B.F. Hobbs, *Opinion on EIM Resource Sufficiency Evaluation Enhancements*, Market Surveillance Committee of the CAISO, Feb. 2, 2022, www.caiso.com/Documents/MSCFinalOpiniononEIMResourceSufficiencyEvaluationEnhancements-Phase1.pdf

provided by the market. The implementation of the evaluation therefore needs to balance not only considerations of the reliability implications of various aspects of the test, but also the implications about how the test might expand or limit the benefits of the energy imbalance market.

Although several aspects of the evaluation were considered during the stakeholder process of Phase 2, there are only two significant changes that are proposed the presently implemented evaluation process by the current version of the Phase 2 proposal:

1. The removal from the ISO's evaluation of day-of low-priority exports that are potentially supported by transfer imports from the energy imbalance market; and
2. The introduction of an energy assistance option as an alternative consequence for failure of the evaluation.

We supported both of these changes on the grounds that they constitute improvements in the resource sufficiency evaluation relative to current practice. However, it is our belief that these changes still leave this evaluation process almost certainly in need of further refinement. Several issues remain unresolved or are awaiting further data and developments, notably including calculation and consideration of uncertainty adders, along with several issues concerning the interaction of the hour-ahead scheduling process and the resource sufficiency evaluation.

Other possible changes to features of the resource sufficiency evaluation were discussed during the stakeholder process, in particular the treatment of load conformance and the inclusion of an uncertainty adder in the capacity test. Ultimately, however, no changes were proposed at this time. Although we support the ISO's position regarding the uncertainty element at this time, we believe that an uncertainty adder should eventually be included in the resource sufficiency capacity evaluation (as well as in the flexibility evaluation). We agree with other stakeholders that this inclusion should not be implemented until the new quantile regression-based methodology for calculating the uncertainty requirement has been implemented and the ISO, and stakeholders reach the conclusion that it is producing appropriate outcomes. In addition, there are other issues that will deserve more analysis and stakeholder discussion once more information is available.

One concept we suggest for consideration is that the several aspects of the RSE could be designed to better differentiate between (a) violations under severe, regionally stressed conditions, and (b) violations occurring when either (i) there is plentiful low cost supply available in the region around a failing balancing area authority that is in fact suffering scarcity (perhaps as a result of an unexpected variation in net load or other unexpected events), or (ii) when the authority fails as a result of anomalous data flowing into the evaluation itself. It is situation (a) that the RSE was envisioned for, but treating all violations, including (b)(i) and (ii), as if they had similarly serious consequences is both inaccurate and inefficient. We also discussed the possible use of tiered hurdle rates for transfers into an authority that fails the test, depending on prevailing system conditions (West-wide stress and high prices, or not) and the magnitude of the failure.