Memorandum

To: ISO Board of Governors and WEIM Governing Body

From: Eric Hildebrandt, Executive Director, Market Monitoring

Date: March 14, 2023

Re: **Department of Market Monitoring report**

This memorandum does not require ISO Board of Governors or WEIM Governing Body action.

EXECUTIVE SUMMARY

This memo provides comments by the Department of Market Monitoring (DMM) on three market design proposals from Management.

- **Market parameter changes enhancement.** DMM supports these proposed changes to shift factor thresholds for some nodes, which should help increase market dispatch and efficiency. Both the ISO and DMM should monitor to ensure that these changes are correctly implemented and for any significant unintended consequences of this design change. DMM also supports the proposal to establish ISO tariff authority to temporarily modify the numerical value of specific scheduling run parameters to prevent market outcomes that do not align with relative scheduling priorities assigned to different schedule types in the tariff. The proposal includes important provisions to ensure that the ISO will notify market participants of any temporary changes and only utilizes this authority to help maintain the scheduling priorities intended under the approved market design.

- **Minimum state of charge extension.** The ISO has completed the design of the enhanced exceptional dispatch tools that will replace the minimum state of charge constraint currently used by operators to manage batteries under tight system conditions. However, the ISO will not be able to implement these new exceptional dispatch features until the fall of 2023. DMM supports extending operators' ability to use the constraint pending implementation of enhanced exceptional dispatch tools.

- **Capacity procurement mechanism enhancements.** Management is proposing several rule changes to increase the amount of capacity made available for significant event capacity procurement mechanism awards. DMM supports the proposed changes, which may increase ISO balancing area reliability in anticipated stressed system conditions.

This memo provides a more detailed discussion and recommendations on these three proposals.

MARKET PARAMETER CHANGES

Reducing shift factor thresholds

Management proposes to reduce the shift factor thresholds for the ISO balancing area's major distributed load aggregation points (DLAPs) and trading hubs, and to have the tariff authority to reduce the shift factor thresholds for large intertie scheduling points. DMM supports this proposal but notes that it warrants careful monitoring. Both the ISO and DMM should monitor for the correct implementation of the intended design, as well as for significant unintended consequences of the design.

A shift factor at a node for a specific transmission constraint is the percentage of a one MW injection at the node that is modeled as flowing over the constraint.[1] Currently, the software disregards any shift factor below 2 percent. This simplification is needed to decrease the time it takes each market run to find a solution. The threshold also prevents the potential large swings in the schedules from one interval to another of individual generators whose output has relatively little impact on a constraint.

Reducing this threshold from 2 percent to 0.2 percent for nodes with large injections or withdrawals should result in more efficient market outcomes. If a node with large injections or withdrawals currently falls below the 2 percent threshold for a particular constraint, the market software will not consider adjusting any of the injections or withdrawals at that node when trying to optimally manage congestion over that constraint. Therefore, reducing the threshold for large nodes could significantly increase the injection and withdrawal options available to the market software to consider when managing congestion on particular constraints. In such cases, this could also reduce the total bid costs of load and generation receiving schedules from the market software. DMM supports the proposal because of this potential enhancement to transmission management and efficiency of market solutions,

Ideally, the ISO would reduce the shift factor threshold for all nodes, and not just the large nodes. However, reducing the threshold for all nodes could have a significant detrimental impact on market software run time and decrease the ability of the software to incorporate other potential valuable future market design enhancements. DMM understands this proposal is designed to achieve some efficiency benefits, while limiting detrimental modeling impacts by only decreasing the threshold for the largest nodes.

This proposal involves changes to a highly technical detail of the ISO's optimization software. As with any such change, this warrants careful monitoring. Both the ISO and DMM should monitor for the correct implementation of the intended design, as well as for significant unintended consequences of the design.

[1] For example, a node with a shift factor of 3 percent for a constraint indicates that if 1 MW of additional supply is injected at the node, .03 MW of the 1 MW injection will flow over the constraint.

Market parameter change process

Management proposes to establish ISO tariff authority to temporarily modify the numerical value of specific scheduling run parameters to prevent market outcomes that do not align with relative scheduling priorities assigned to different schedule types in the tariff. The proposal includes the important provision that this will not authorize the ISO to change the numerical parameters in a way that changes the *order* of different schedule types in the tariff. The proposal also includes the important provision that the ISO will notify market participants of any temporary change to tariff-specified parameters within one business day of a change. DMM supports management's proposal.

The numerical values of scheduling run parameters for all types of supply or demand schedules is an important aspect of the market design. If the tariff lists the parameter for one type of schedule as larger than another, this represents a market design that is intended to prioritize one type of schedule over the other in conditions when the optimization cannot economically redispatch the system to honor both schedules. Therefore, DMM believes the ISO should not have the authority to change the scheduling run parameters in a way that changes the *order* of these scheduling priorities without filing such a change in policy at FERC.

However, it is important for the ISO to have the ability to quickly change the relative size of the numerical scheduling run parameters in a way that does not change the tariff-defined order of schedules. This is because the initial difference in size between the numerical parameters for schedules may not always result in the optimization dispatching resources in the order of priorities defined in the tariff.

As the ISO describes in its paper, the need for increasing the difference between the *size* of parameters in order for the schedules to reflect the correct dispatch *order* may not become apparent until the software actually dispatches schedules in the wrong order under stressed system conditions.[2] Therefore, in order for the ISO to effectuate its FERC-approved policy on the relative order that various schedules should be dispatched in stressed conditions, the ISO should have the ability to temporarily change the size of scheduling parameters as described in Management's proposal.

The proposal explicitly prohibits the ISO from temporarily changing parameter sizes in a way that changes the tariff-specified order of schedules. Therefore, the proposal prevents the ISO from changing its policy on which schedules should have priority over others without filing for FERC's approval of such a change. The proposal also stipulates that the ISO will publicly notify market participants of any temporary parameter changes within one business day. This should allow market participants to identify if any temporary parameter size changes may unintentionally impact the intended scheduling order. DMM believes these two provisions should ensure that the ISO only uses the proposed authority to help effectuate the intended market design.

[2] *Market Parameter Changes Enhancement*, CAISO, February 8, 2023, pp. 38-39: http://www.caiso.com/InitiativeDocuments/Final-Proposal-Market-Parameter-Changes-Enhancement.pdf

MINIMUM STATE OF CHARGE EXTENSION

The minimum state of charge constraint for batteries was approved as a part of the market enhancements for summer 2021 readiness initiative. The ISO only sought authority to use the constraint as an interim measure through May 2023 since the ISO intended to develop and implement new battery exceptional dispatch tools as a replacement for the constraint. The ISO completed the design of the enhanced exceptional dispatch tools that will replace the constraint in the energy storage enhancements initiative in 2022. However, the ISO will not be able to implement the replacement exceptional dispatch tools until the fall of 2023.

Operators have expressed concern about managing batteries in tight system conditions this summer without either the minimum state of charge constraint or the replacement exceptional dispatch tools. Therefore, the ISO proposes to extend the use of the existing minimum state of charge constraint until September 30, 2023. DMM supports this proposal given the potential reliability risk of not extending operators' ability to use the constraint.

The minimum state of charge constraint ensures that in the real-time market during critical hours of the most critical days, batteries have enough charge to meet their day-ahead schedules. In hours when batteries are subject to this constraint, they are not compensated for the opportunity cost of not being able to discharge below that charge level. The replacement exceptional dispatch tools will allow operators to replicate the minimum state of charge constraint, and batteries will be compensated for this opportunity cost through the exceptional dispatch settlement process.

The replacement exceptional dispatch tools will also give operators more flexibility to manage batteries in ways that may differ from their day-ahead awards. Therefore, the new exceptional dispatch tools should be superior to the minimum state of charge constraint from the perspective of both ISO operators and batteries.

DMM agrees with most stakeholders that it would be best to implement the new exceptional dispatch tools rather than to extend the ISO's authority to use the minimum state of charge constraint. However, if the ISO cannot implement the replacement exceptional dispatch tools by this summer, DMM supports extending the authority of ISO operators to use the minimum state of charge constraint this summer.

Without either the minimum state of charge constraint or the replacement exceptional dispatch tools, managing batteries may be significantly more difficult for grid operators in tight system conditions this summer. Operators can currently only use exceptional dispatches to schedule batteries to operate at a specified MW power output level. Operators can instruct batteries to hold their current state of charge by ordering them to operate at 0 MW output. But replicating the current functionality of the minimum state of charge constraint via exceptional dispatches would be complicated. Issuing customized manual instructions to ensure each battery charges and discharges according to day-ahead schedules could add significant burdens on the time and attention of operators during these stressed conditions. Given the potential reliability risk this poses, DMM supports management's proposal.

CAPACITY PROCUREMENT MECHANISM ENHANCEMENTS

Management proposes several new capacity procurement mechanism (CPM) rules to increase incentives for resources to make themselves available to receive these capacity awards. DMM supports the proposed changes.

When the ISO balancing area needs to issue a capacity procurement mechanism award to a resource to address a potential shortfall in resource adequacy capacity, the award creates availability and bidding obligations on the resource. As a result, the ISO attempts to only offer these "significant event" capacity procurement mechanism awards to resources that have voluntarily made themselves available to receive the awards via a competitive solicitation process. If the ISO has to offer a capacity procurement mechanism award to a resource that did not participate in a competitive solicitation process, the resource can turn down the award and the availability obligations it entails.

Resources with capacity procurement mechanism awards are currently required to be bid and available for at least 30 days. Therefore, an award that begins in the middle of a month would place bidding and availability obligations on the resource extending into the following month. If a resource already has an energy or capacity contract for the following month, either for the ISO balancing area or another balancing area, the resource would not be able to accept a 30 day capacity procurement mechanism award. Therefore, the requirement that a resource accept an award for the entire 30 day period can reduce the pool of resources available to meet capacity procurement mechanism awards issued after the start of a calendar month.

To address this issue, management proposes new rules to allow resources to accept all or part of the MW quantity of significant event capacity procurement mechanism awards for less than 30 days in situations when the resource has a capacity contract for the following month that would prevent the resource from accepting a 30 day or longer award. Management also proposes to allow resources that have already accepted a capacity procurement mechanism award to end that award at the end of a month if the resource obtains a new resource adequacy contract for the beginning of the next month. These rules should increase the amount of capacity available for significant event capacity procurement mechanism awards. This can increase ISO balancing area reliability in anticipated stressed system conditions.