

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

**California Independent System) Docket No. ER21-2779-000
Operator Corporation)**

**MOTION TO INTERVENE AND COMMENTS
OF THE DEPARTMENT OF MARKET MONITORING
OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION**

Pursuant to Rules 212 and 214 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission (“FERC” or “Commission”), 18 C.F.R. §§385.212, 385.214, the Department of Market Monitoring (“DMM”), acting in its capacity as the Independent Market Monitor for the California Independent System Operator Corporation (“CAISO”), submits this motion to intervene and comment in the above-captioned proceeding.

I. MOTION TO INTERVENE

DMM respectfully requests that the Commission afford due consideration to these comments and motion to intervene, and afford DMM full rights as a party to this proceeding. Pursuant to the Commission’s Order 719, the CAISO tariff states that “DMM shall review existing and proposed market rules, tariff provisions, and market design elements and recommend proposed rule and tariff changes to the CAISO, the CAISO Governing Board, FERC staff, the California Public Utilities Commission, Market Participants, and other interested entities.”¹ As this proceeding involves

¹ CAISO Tariff Appendix P, Section 5.1.

CAISO tariff provisions which affect the efficiency of CAISO markets, it implicates matters within DMM's purview.

II. COMMENTS

In this tariff filing, the CAISO proposes three tariff changes to enhance market participation models for energy storage and demand response resources.² These changes include:

- Creating an optional biddable end-of-hour state of charge parameter for energy storage resources;
- Applying market power mitigation to energy storage resources and developing a framework for calculating default energy bids for these resources; and
- Allowing demand response resources to reflect maximum run times

DMM supports these proposed tariff revisions as enhancements to existing market participation models for storage and demand response resources. However, DMM recommends that the ISO monitor and consider further enhancements to several elements of these designs as the ISO continues to integrate increasing amounts of energy storage and distributed energy resources into its market. We provide additional details below.

² *California Independent System Operator Corporation Energy Storage and Distributed Energy Resources Phase 4*, California Independent System Operator Corporation, Docket No. ER21-2779-000. ("Transmittal Letter").

A. Biddable end-of-hour state of charge parameter

DMM supports the ISO's proposal to develop a feature that would allow energy storage resources to specify target state of charge levels at the end of an hour in the real-time market. The ISO's real-time market look-ahead horizon is currently limited, where 15- and 5-minute real-time market runs cannot see both net load trough and peak hours which are generally the lowest and highest priced hours in a day. Storage resources today largely manage real-time state of charge through hourly energy bids or self-schedules. However, DMM has observed that when suppliers make significant changes to energy bids hour to hour to manage state of charge (e.g. increase charge bids in certain hours to ensure charge), these changes could result in battery resources being dispatched spuriously due to interactions between energy bids across hours. DMM believes that the end-of-hour state of charge feature should provide energy storage resources with an additional, effective tool to help storage resources manage state of charge in real time, given the limited real-time look ahead horizon.

Bid cost recovery rules and settlements

DMM supports the ISO's proposed bid cost recovery rules when the end-of-hour state of charge feature is used. However, DMM suggests that the ISO monitor impacts and potentially consider further refinements to these rules. The ISO proposes to make resources ineligible for bid cost recovery in the hour where an end-of-hour state of charge constraint is used, and in the immediately preceding hour. Under the ISO proposal, potential revenue shortfalls incurred in those hours would not be included in the real-time bid cost recovery calculation. The ISO also proposes

that potential revenue surpluses would continue to be included in the real-time bid cost recovery calculation in those hours.

While DMM believes that the ISO's bid cost recovery rules would significantly limit potential bid cost recovery gaming opportunities when end-of-hour state of charge constraints are used, the ISO's proposed rules represent a conservative approach. DMM has noted that the ISO's proposal could result in under-recovery of bid costs in hours where an end-of-hour state of charge constraint may not have impacted a resource's dispatch (i.e. the market would have moved a resource to a certain state of charge level regardless of the end-of-hour constraint).³ DMM suggests that the ISO monitor and potentially consider more flexible bid cost recovery eligibility rules when the end-of-hour state of charge feature is used. For example, the ISO could consider bid cost recovery rules based on whether the end-of-hour state of charge constraints were actually binding, which would indicate whether use of the end-of-hour state of charge parameter actually impacted a resource's dispatch.⁴

DMM also supports the ISO's proposed bid cost recovery rules for storage resources in the hour preceding a self-schedule. Similar to the bid cost recovery proposal for the end-of-hour state feature, these rules would largely mitigate potential gaming opportunities when self-schedules are used but represent a conservative approach. DMM recommends that the ISO also monitor impacts of these rules to

³ *Comments on energy storage and distributed energy resources phase 4 final proposal*, Department of Market Monitoring, September 16, 2020, pp. 4-5:
<http://www.caiso.com/Documents/DMMComments-EnergyStorageandDistributedEnergyResourcesPhase4-FinalProposal-Sep162020.pdf>

⁴ *Ibid.*

resource settlements and potentially consider more flexible bid cost recovery rules in future proposals.

In the policy development process, DMM also recommended that the ISO consider interactions between the end-of-hour state of charge feature and residual imbalance energy settlements.⁵ While the ISO has not proposed changes to residual imbalance energy settlement calculations, DMM recommends that the ISO continue to monitor the impacts of end-of-hour state of charge constraints on these settlements and potentially refine settlement rules as needed to prevent any potential gaming issues.

Implementation of the end-of-hour state of charge parameter and interaction between 15- and 5-minute markets

While not discussed in the ISO's Transmittal Letter, several details regarding the implementation of the end-of-hour state of charge feature and interactions between the 15- and 5-minute markets were discussed in the ISO policy development process and in the ISO's final proposal.⁶

DMM supported the ISO's proposal to enforce end-of-horizon state of charge constraints in the 5-minute market based on 15-minute market advisory schedules to help resources maintain state of charge trajectories and prevent the 5-minute market from potentially unwinding 15-minute market awards. Because the 5-minute market

⁵ *Comments on energy storage and distributed energy resources phase 4 second revised straw proposal*, Department of Market Monitoring, March 27, 2020, p. 7: <http://www.caiso.com/InitiativeDocuments/DMMComments-EnergyStorage-DistributedEnergyResourcesPhase4-SecondRevisedStrawProposal.pdf>

⁶ *Energy storage and distributed energy resources phase 4 final proposal*, California ISO, August 21, 2020, pp. 9-12: <http://www.caiso.com/InitiativeDocuments/FinalProposal-EnergyStorage-DistributedEnergyResourcesPhase4.pdf>

horizon is shorter than the 15-minute market horizon, without such constraints, large swings in battery schedules could occur in 5-minute market runs that cannot see the end-of-hour state of charge constraints. The ISO's proposed solution could help prevent large swings in schedules between real-time market runs and increase the likelihood that end-of-hour state of charge targets will remain feasible through the real-time market.

However, DMM also raised some concerns that the ISO's proposed implementation of the end-of-hour state of charge tool could restrict the flexibility of storage resources in real-time, particularly when end-of-hour state of charge constraints do not impact a resource's dispatch.⁷ Under the ISO's proposal, whenever the end-of-hour state of charge feature is used, the ISO would enforce end-of-horizon state of charge constraints in the 5-minute market which would put resources on trajectories to meet 15-minute market advisory schedules. The ISO's proposal could therefore limit a resource's ability to deviate from 15-minute market advisory schedules, even when such movement would be beneficial to the market and would not impact the resource's ability to meet end-of-hour state of charge targets. To better preserve the flexibility of battery resources in the 5-minute market, DMM suggested that the ISO consider only enforcing end-of-horizon constraints in the 5-minute market to maintain 15-minute market trajectories when end-of-hour state of charge constraints were actually binding in the 15-minute market.⁸

⁷ *Comments on energy storage and distributed energy resources phase 4 final proposal*, Department of Market Monitoring, September 16, 2020, pp. 3-4: <http://www.caiso.com/Documents/DMMComments-EnergyStorageandDistributedEnergyResourcesPhase4-FinalProposal-Sep162020.pdf>

⁸ *Ibid.*

As DMM understands, the ISO will also set end-of-horizon state of charge constraints exactly equal to the state of charge levels derived from 15-minute market advisory intervals. The ISO's proposed implementation could be made less restrictive for battery resources if the ISO set end-of-horizon state of charge constraints to minimum or maximum state of charge values instead of exact state of charge values. Setting end-of-horizon constraints to minimum or maximum values instead of exact values could allow the real-time market more flexibility to move resources while still ensuring that a resource could meet its end-of-hour state of charge target. DMM provided detailed example scenarios in comments in the ISO's stakeholder process.⁹

Ultimately, DMM supports the ISO's general approach to maintaining alignment between 15- and 5-minute markets when end-of-hour state of charge constraints are used by enforcing end-of-horizon state of charge constraints in the 5-minute market. However, DMM recommends that the ISO monitor the impacts of end-of-horizon constraints on resource dispatches during implementation and testing. The ISO should consider implementing more refined approaches to enforcing end-of-horizon state of charge constraints in the 5-minute market that could better preserve flexibility on storage resources in real-time.

B. Market power mitigation and default energy bids for storage resources

DMM supports the ISO's proposal to apply market power mitigation to energy storage resources. Batteries represent increasing amounts of capacity participating in CAISO markets, and continue to be sited in areas that are frequently downstream

⁹ *Ibid.*

from uncompetitive constraints (or within transmission constrained load pockets). As battery capacity on the CAISO grid continues to grow and replace traditional generation capacity in local areas, it will be increasingly important that batteries in uncompetitive locations be subject to energy bid mitigation.

DMM also supports the ISO's proposed energy storage default energy bid (DEB) for use in market power mitigation. DMM supports the proposed energy storage DEB as an incremental improvement to the current market design. The proposed energy storage DEB is a conservative approach, and includes a number of simplifications that may overestimate the cost of energy storage resources. However, these resources are currently exempt from mitigation, and a DEB based on conservative assumptions that may at times overstate costs is still an improvement. As DMM has previously commented, DMM believes that it is important that the ISO commit to continuing development and refinement of DEBs for storage resources in future initiatives.¹⁰

C. Maximum run time parameter for demand response resources

DMM supports the ISO's proposal to allow demand response resources to submit a maximum daily run time parameter. CAISO entities have indicated that this parameter would better reflect that many demand response programs are designed based on limited run hours per day rather than a limited amount of energy per day. While DMM supports the ISO's proposal, it will be important for the ISO to work with

¹⁰ *Comments on energy storage and distributed energy resources – storage default energy bid final proposal*, Department of Market Monitoring, November 12, 2020: <http://www.caiso.com/Documents/DMMComments-EnergyStorageandDistributedEnergyResources-StorageDefaultEnergyBidFinalProposal-Nov122020.pdf>

stakeholders to ensure that this new master file parameter accurately reflects underlying resource characteristics.

DMM has described how resource adequacy unavailability can be driven by use of the maximum daily run time parameter and other master file constraints such as the maximum daily energy limit. DMM recommended that the ISO incorporate this unavailability into its Resource Adequacy Availability Incentive Mechanism (RAAIM) calculations.¹¹ DMM has some concern that demand response resources providing resource adequacy could use the maximum daily run time parameter, by itself or in combination with other master file constraints, to significantly limit resource availability. DMM suggests that the ISO monitor entities' use of this new feature and consider whether availability limitations effectuated by this parameter should factor into resource adequacy availability incentives.

¹¹ *Comments on energy storage and distributed energy resources phase 4 final proposal*, Department of Market Monitoring, September 16, 2020, pp. 5-6:
<http://www.caiso.com/Documents/DMMComments-EnergyStorageandDistributedEnergyResourcesPhase4-FinalProposal-Sep162020.pdf>

III. CONCLUSION

DMM respectfully requests that the Commission afford due consideration to these comments as it evaluates the proposed tariff provisions before it.

Respectfully submitted,

/s/ Eric Hildebrandt

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Independent Market Monitor for the California
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CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon the parties listed on the official service lists in the above-referenced proceedings, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California this 17th day of September, 2021.

/s/ Ryan Kurlinski
Ryan Kurlinski