UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corporation	)	**Docket No. ER25-576-000**

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 these comments in the above-captioned proceeding.

I. COMMENTS

Summary

In this filing, CAISO proposes limiting the bid prices used for calculating bid cost recovery payments for energy storage resources. Rather than directly using the market bids in the calculation, CAISO proposes to restrict the bid values within the thresholds described in the filing. DMM does not oppose the CAISO's proposed tariff revisions as a temporary short-term measure that may limit inappropriate bid cost recovery payments. The proposal should limit the potential for gaming of bid cost recovery rules for batteries. However, CAISO's proposed changes do not fully eliminate gaming concerns, and do not address the underlying problematic bidding incentives created by current bid cost recovery rules for batteries. Even with the proposed changes, CAISO's bid cost recovery

rules for batteries may lead to inefficient battery dispatches and reduce the reliability benefits of energy storage resources.

DMM acknowledges that CAISO has recently taken steps to further develop bid cost recovery rules for batteries through a newly launched stakeholder initiative. DMM supports the CAISO's continued work in this area.

Current bid cost recovery rules create inefficient bidding incentives for batteries and are susceptible to gaming. CAISO's proposed revisions only address gaming potential.

The 24-hour optimization used in the CAISO's day-ahead market provides a very effective mechanism for optimally scheduling battery resources to charge during mid-day hours when prices are lowest, and then discharge in the late afternoon and evening hours when prices are highest. To also be optimally dispatched in real-time, batteries must submit real-time bids to charge during the low-priced mid-day hours that reflect their opportunity cost of not charging during these hours (i.e., the cost of charging in higher priced hours, or not having energy to discharge in the highest priced hours). Battery bids to discharge during these mid-day hours should represent opportunity costs of potential foregone profits associated with future high-priced hours in the later afternoon and evening hours.

A primary purpose of bid cost recovery is to incentivize resources to submit bids that accurately reflect actual hourly costs (including opportunity costs), so that the real-time market optimization achieves efficient market outcomes. However, CAISO's current bid cost recovery rules for batteries do the opposite, and instead create incentives to bid inconsistent with real-time opportunity costs prior to the hours in which batteries have either day-ahead charge or discharge schedules. This can prevent batteries from being

sufficiently charged to provide energy during the peak net load hours—when prices are highest and capacity is most critical for system reliability.

Changes to bid cost recovery rules for batteries need to account specifically for battery state-of-charge constraints that can drive battery dispatch in real-time, regardless of bid and market prices. Battery operators can manage state-of-charge and modeled state-of-charge limits through market bids and submitted resource parameters. When resources hit these state-of-charge constraints, this can cause batteries to be dispatched when bids are otherwise uneconomic relative to market prices, leading to bid cost recovery payments.

The primary manner in which binding state-of-charge constraints lead to bid cost recovery observed by DMM is through the uneconomic reversal of day-ahead schedules, when the battery's real-time state-of-charge is insufficient to meet its day-ahead schedule. This is by far the largest driver of bid cost recovery paid to battery resources, and results from a combination of two sources:

- Revenue losses, which occur when incremental real-time revenue is insufficient to cover the real-time cost of reversing an infeasible day-ahead schedule.
- Bid-cost losses, which occur when the incremental bid cost associated with real-time dispatch is greater than the avoided bid cost from reversing an infeasible day-ahead schedule.

As bid cost recovery rules are currently applied to batteries, each of these components of the bid cost recovery calculation can create inefficient bidding incentives. Further, the bid-cost component of the calculation is susceptible to gaming. CAISO's proposed tariff revisions address only the bid-cost component of the bid cost recovery calculation. This

approach reduces gaming potential, but does not address inefficient bidding incentives created by the revenue component of the calculation. A more detailed explanation of each of these sources of bid cost recovery is provided below.

The revenue portion of the real-time bid cost recovery calculation removes a battery's exposure to real-time prices when day-ahead schedules become infeasible due to state-of-charge constraints.

Bid cost recovery associated with real-time revenue losses removes battery operators' exposure to real-time prices in the intervals where day-ahead schedules are infeasible due to insufficient state-of-charge in real-time. This makes battery operators at least as well off from a revenue perspective, between managing state-of-charge to deliver the day-ahead schedule, or dispatching earlier in the day, leading to insufficient state-of-charge in the hours of the day-ahead schedule. Because of this, current bid cost recovery rules may incentivize battery resources to seek dispatch in the intervals leading up to a day-ahead schedule, without regard to the potential expense of a future undeliverable day-ahead schedule.

Specifically, consider the case where bid cost recovery payments can create incentives for batteries to bid below cost in the hours preceding a day-ahead energy discharge schedule, in an effort to receive an early dispatch. If real-time prices during the early dispatch hours are higher than real-time prices during the day-ahead schedule hours, the battery makes additional real-time revenue from discharging their energy before their day-ahead schedule—they are paid more for their early discharge than they pay for buying back the day-ahead schedule. If real-time prices are lower in the early dispatch hours than in the day-ahead schedule hours, the battery would lose money. However, in this situation, the bid cost recovery payments make the battery operator

whole. The battery operator is not exposed to the real-time prices at which the infeasible day-ahead schedule is bought back.

If the battery operator were exposed to the real-time cost of buying back an infeasible day-ahead schedule, real-time bids in earlier hours would be expected to reflect this expected opportunity cost. However, under current bid cost recovery rules, battery resources may be incentivized to bid below this expected real-time opportunity cost in attempt to discharge before reaching the day-ahead schedule.

If real-time prices in hours preceding a day-ahead schedule are not likely to be higher than the prices during the hours of the day-ahead schedule, discharging early is inefficient, and a bad bet that is not likely to pay off for the resource operator. But with bid-cost recovery payments covering any losses associated with buying back an infeasible day-ahead schedule, there can be no loss and only a potential gain from making this inefficient bet. As the CAISO's Market Surveillance Committee (MSC) puts it: "…heads the storage resource operator wins, tails it does not lose".[1] This creates incentives to bid in ways that can lead to inefficient dispatches that are not aligned with actual real-time opportunity costs, and can leave resources unavailable when most needed by the real-time market. Having storage resources unavailable when most needed can also create reliability concerns.

[1] *Opinion on Bid Cost Recovery*, James Bushnell, Scott M. Harvey, Benjamin Hobbs; Members of the Market Surveillance Committee, November 1, 2024, p 13: https://www.caiso.com/documents/market-surveillance-committee-final-opinion-storage-bid-cost-recovery-nov-01-2024.pdf

The bid cost portion of the bid cost recovery calculation can create gaming opportunities and increase incentives for inefficient outcomes.

Bid cost recovery from the bid-cost portion of the calculation is driven by the bid prices submitted by battery operators. When state-of-charge constraints bind, a battery can receive dispatches regardless of their bid price and how it compares to the locational price. Therefore, a battery operator could inflate bid cost recovery payments by raising or lowering bid prices, without affecting dispatch. For example, if a battery has no state-of-charge to meet a day-ahead energy schedule to discharge, it cannot receive a real-time dispatch to cover that schedule and must buy the schedule back. Lowering the bid price from $20 to negative $150 would increase calculated bid costs by $170 per megawatt hour—without the possibility of a positive energy dispatch because the lack of charge makes it infeasible. This creates a gaming concern that, when added to the revenue side of the bid cost recovery calculation, could further increase the incentives for batteries to actively try to be dispatched differently than day-ahead schedules, and potentially be unavailable when most needed. It is this gaming concern that CAISO's proposed tariff revisions seek to address.

The MSC highlights the role of the bid-cost portion of the calculation through a series of examples in their recent opinion. As the MSC explains:

> *"…premature dispatch is always profitable if the offer price in the interval in which the resource is dispatched above its day-ahead market schedule… exceeds its offer price in the interval in which it buys back its day-ahead market schedule …"*[2]

And similarly, in the context of charging schedules:

[2] Ibid p 10

> *"…as long as the bid to charge is higher in the hour in which energy is sold back… than in the hour in which energy is purchased… the premature filling of storage will be profitable without regard to real-time prices."*[3]

As highlighted throughout the MSC's opinion, this difference in bid prices across hours can be exploited to maximize bid cost recovery payments under the current rules. The CAISO's proposed changes would significantly limit the ability of participants to affect and game these differences.

The CAISO proposal can limit gaming, but it does not solve the core problem caused by state-of-charge constraints.

CAISO's proposed tariff revisions target the bid cost portion of the bid cost recovery calculation by limiting the ability of battery operators to game bid prices to increase bid cost recovery payments. However, the revenue portion of the bid cost recovery calculation remains unchanged. The proposal does not address the core problem of making bid cost recovery payments when state-of-charge constraints are binding. Making such payments removes exposure to real-time opportunity costs and creates incentives that can drive potential efficiency and reliability issues. This core problem remains unaddressed in the CAISO's proposal. As the MSC states:

> *"The CAISO proposal does not address the problem of incentives for inefficient storage operations created by the current BCR design."*[4]

Before developing the current proposed revisions as filed, the CAISO initially sought to address the underlying issue. As the MSC put it:

> *"The original CAISO proposal … was to identify when a resource could not charge or discharge as a result of a state-of-charge constraint, and eliminate BCR payments in those intervals…..This would be an elegant solution to the problems…"*[5]

[3] Ibid p 12
[4] Ibid p 2
[5] Ibid p 24

DMM agrees with the MSC, and also agrees that:

> *"…the CAISO should almost immediately continue this process into a Phase II that can continue reforms that we believe will ultimately need to greatly reduce the scope of storage BCR to a few isolated conditions."*[6]

DMM acknowledges that CAISO has recently taken steps to further develop bid cost recovery rules for batteries through a newly launched stakeholder initiative. DMM supports the CAISO's continued work in this area.

II. CONCLUSION

DMM does not oppose CAISO's proposed changes to the bid cost recovery calculations outlined in this filing, but hopes that the CAISO will promptly file additional changes that address the core problems with the bid cost recovery rules for storage resources. DMM respectfully requests that the Commission afford due consideration to these comments as it evaluates the proposed tariff provisions before it.

[6] Ibid p 3

Respectfully submitted,

By: *<u>/s/ Eric Hildebrandt</u>*

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Dated: December 17, 2024

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 December, 2024.

/s/ Aprille Girardot
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