UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corporation	)	**Docket No. ER24-2168-000**

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. SUMMARY

In this filing, CAISO proposes two tariff changes to enhance the process for allowing cost-verified bids over the $1,000/MWh soft energy bid cap. The first proposed tariff change would increase the $1,000/MWh cap on all default energy bids to $2,000/MWh. This would allow scheduling coordinators to bid up to the lesser of their default energy bid or $2,000/MWh, when their calculated default energy bid exceeds $1,000/MWh. The second proposed change would establish a new bid cap for battery storage resources that would allow batteries to bid over $1,000/MWh in the real-time market on days when the $2,000/MWh bid cap is in effect. This newly proposed bid cap is meant to reflect intra-day opportunity costs of battery storage resources on days when

the $2,000/MWh bid cap is in effect.

DMM supports increasing the cap on default energy bids (DEBs) from $1,000/MWh to $2,000/MWh, given the DEB calculations are based on pre-established formulas that are designed to accurately reflect each resource's marginal cost. DMM does not oppose the proposal to establish a special real-time energy bid cap for battery storage resources based on potential intra-day opportunity costs that may exceed $1,000/MWh on days when the $2,000/MWh hard bid cap is in effect.

DMM agrees that resources with daily limitations, such as battery storage resources, may have intra-day opportunity costs that exceed $1,000/MWh on days when the $2,000/MWh hard bid cap is in effect. However, DMM questions the urgency of needing to implement a higher bid cap for battery storage resources by summer 2024. Analysis by DMM shows that in practice, a limited portion of battery capacity was constrained by the $1,000/MWh bid cap on the days when these proposed changes would have been triggered.[1]

The CAISO faces a number or technical limitations on the changes that can be made to implement a new bid cap by summer 2024. In particular, the CAISO has indicated that it is not feasible to limit the increased bid cap to specific hours of the day where intra-day opportunity costs are most likely to exceed $1,000/MWh. This has required the CAISO to adopt a less targeted approach that may allow resources to bid above $1,000/MWh during hours when their intra-day opportunity costs are much lower. DMM

[1] *DMM Comments on Price Formation Enhancements: Rules for Bidding above the Soft Offer Cap Straw Proposal,* April 30, 2024: https://www.caiso.com/documents/dmm-comments-on-pfe-rules-for-bidding-above-the-soft-offer-cap-straw-proposal-apr-30-2024.pdf

further notes that allowing higher bids from storage resources may increase the magnitude of bid cost recovery payments to storage resources. Under CAISO's current market design, bid cost recovery payments to storage resources may be inappropriate or inefficient in some circumstances.

II. COMMENTS

Raising the cap on default energy bids

CAISO proposes to increase the cap on all default energy bids (DEBs) to $2,000/MWh. DEBs are calculated using established formulas that are designed to reflect the marginal cost of a resource. Currently, scheduling coordinators are required to submit reference level change requests in order to increase their DEBs over $1,000/MWh, even when the calculated value of the DEB would exceed $1,000/MWh under the established formulas. Since DEB calculations are designed to provide an accurate representation of marginal costs, DMM agrees that it seems unnecessary to require resources to submit a reference level change request to allow the resource to bid up to its calculated DEB. In addition, CAISO has indicated that there are currently technical limitations that prevent certain resource types, including hydroelectric and battery storage resources, from submitting reference level change requests. For these reasons, DMM supports raising the cap on DEBs from $1,000/MWh to $2,000/MWh.

Raising the cap on default energy bids may allow hydroelectric resources to better reflect intra-day opportunity costs in bids

DMM understands that CAISO's proposal to increase the cap on DEBs is in part aimed at hydroelectric resources that may have intra-day opportunity costs in excess of $1,000/MWh. These resources currently cannot reflect such costs in their bids, even

when the formulas used to calculate their DEBs would exceed $1,000/MWh. This change may allow those resources to better incorporate intra-day opportunity costs in their bids when their hydroelectric DEB exceeds $1,000/MWh.

The hydroelectric DEB is calculated as the maximum of three components: (1) the gas component, (2) short-term component, and (3) long-term component.[2] The short-term component is meant to incorporate a variety of opportunity costs the hydroelectric resource may face depending on different limitations. Specifically, the short-term component is 1.4 multiplied by the maximum of three different bilateral indices at the resource's local default electricity pricing hub: (1) the day-ahead on-peak index price, (2) the on-peak balance of the month futures index price, and (3) the on-peak monthly futures index price.[3] Therefore, when the day-ahead price at a resource's local electricity pricing hub is sufficiently high, some hydroelectric DEBs may exceed $1,000/MWh on days when high bilateral price indices may trigger the $2,000/MWh bid cap.[4]

Static daily DEBs may not capture hourly changes to intra-day opportunity costs

Currently, hydroelectric DEBs are calculated daily and remain static across all hours of the day, as they are not designed specifically to address intra-day opportunity

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[2] California ISO, *Local Market Power Mitigations Enhancements ER19-2347 Tariff Amendment,* July 2019, p 40: Jul2-2019-TariffAmendment-LocalMarketPowerMitigationEnhancements2018-ER19-2347.pdf (caiso.com)

[3] Business Practice Manual for Market Instruments, D.8 https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Market%20Instruments

[4] The maximum import bid price is based on the maximum bilateral block price from either Mid-Columbia or Palo Verde while the day-ahead on-peak index price used in the hydroelectric default energy bid is specific to the electricity pricing hub assigned to each resource.

costs. In practice, intra-day energy costs for resources with daily energy limits can vary by hour. For example, a resource with enough energy to operate only four hours of the day would have a very high opportunity cost during lower priced hours of the day, but would have a relatively low opportunity cost during the four hours of the day in which prices were expected to be highest.

Because intra-day opportunity costs can vary hourly, this proposal represents a policy trade-off. While it may increase the amount of supply voluntarily offered into the market by hydroelectric resources with estimated costs exceeding $1,000/MWh, it also increases the ability of some hydroelectric resources with daily energy limits to exercise market power in hours when the static DEB overstates intra-day opportunity costs.

DMM agrees that DEB calculations should be capped at $2,000/MWh rather than $1,000/MWh. However, DMM recommends that in a future initiative the CAISO develop hourly DEBs for hydroelectric resources with daily limitations, to more accurately reflect changing intra-day opportunity costs.

Modifying the bid cap for storage resources

The second component of the CAISO's tariff filing would create a special bid cap for battery storage resources in the real-time market that may exceed $1,000/MWh on days when the $2,000/MWh hard bid cap is in effect. This change is designed to avoid a scenario in which a large portion of the battery fleet gets dispatched prior to the highest priced and most operationally challenging hours of the day (generally hours 17-20). On days when the $2,000/MWh cap is in effect, this could occur if prices reach

$1,000/MWh prior to the highest priced and most operationally challenging hours later in the day.

DMM does not oppose this tariff change as a short-term measure until a more effective solution can be developed. However, DMM questions the urgency of implementing a short-term approach to increase the bid cap for battery storage resources by summer 2024. DMM agrees there are some hours in which battery resources are unable to reflect intra-day opportunity costs that exceed $1,000/MWh. However, analysis of bidding data on days when the $2,000/MWh cap was in effect shows that, historically, the $1,000/MWh cap has limited the market bids of a relatively small portion of battery capacity.

In addition, due to technological limitations, the CAISO is proposing a bid cap that may be static throughout the day, rather than targeting specific hours where intra-day opportunity costs are most likely to exceed $1,000/MWh. This less targeted approach would allow bids that are likely to exceed intra-day opportunity costs for some hours of the day. Finally, DMM notes that allowing higher bids from battery resources carries risk of increasing unwarranted bid cost recovery payments to batteries on days when the $2,000/MWh hard bid cap is in effect.

DMM conceptually supports battery storage resources being able to reflect intra-day opportunity costs in bids, but recommends a higher bid cap only in limited hours

Allowing resources to reflect intra-day opportunity costs can support efficient dispatch and reliability by preserving limited energy for the highest valued and most operationally critical hours of the day. On days where there are hours in which the

$2,000/MWh bid cap is in effect, resources with daily energy limitations may have intra-day opportunity costs higher than $1,000/MWh in the hours preceding the highest priced hours. In the CAISO, these highest priced hours routinely occur in the later afternoon and early evening hours when solar output drops off and demand increases.

In practice, a battery's intra-day opportunity costs depend on expected hourly prices, the storage limitations of the resource, and the ability of the resource to replenish stored energy throughout the day. However, regardless of whether a resource can recharge before reaching the highest priced hours, the intra-day opportunity costs approach zero during and after the highest priced hours.

Therefore, DMM recommends only raising the bid cap for batteries to allow for bidding over $1,000/MWh in a limited number of hours where intra-day opportunity costs are most likely to exceed $1,000/MWh.[5] However, the CAISO has indicated that there are limitations to the logic that determines the value of the bid cap in each hour. The bid cap proposed by CAISO allows resources to bid substantially higher than their intra-day opportunity cost during the high priced hours when system conditions are tightest.

Analysis of historical bid data does not support the need for a higher battery storage bid cap in summer 2024

Based on analysis of market data from prior days when the $2,000/MWh bid cap was in effect, DMM questions the urgent need for a quickly developed and

[5] *DMM Comments on Price Formation Enhancements: Rules for Bidding above the Soft Offer Cap Issue Paper,* April 22, 2024: https://www.caiso.com/documents/dmm-comments-on-price-formation-enhancements-rules-for-bidding-above-the-soft-offer-cap-issue-paper-apr-22-2024.pdf

imprecise short-term solution by that deadline. DMM analyzed storage bidding behavior on two days when the $2,000/MWh bid cap was in effect: September 6, 2022 and August 16, 2023. On each of these days, portions of the battery fleet began to receive market dispatch instructions to discharge prior to the most critical evening hours when prices are typically highest, and were therefore not fully available during the highest priced and most critical evening hours.

Figures 1 and 2 show the volume of real-time bids submitted by battery storage resources by bid price range (prior to any bid mitigation) in each hour on these two days. The aqua colored portion at the top of each bar represents capacity from battery resources submitted at the $1,000/MWh cap. On these days, around 85 percent of storage capacity bid less than the $1,000/MWh cap during the hours in which their intra-day opportunity costs were highest (generally, hours 13 through 16) prior to the highest priced hours (hours 17 through 20).

Figure 1: Market bids from batteries to discharge – September 6, 2022

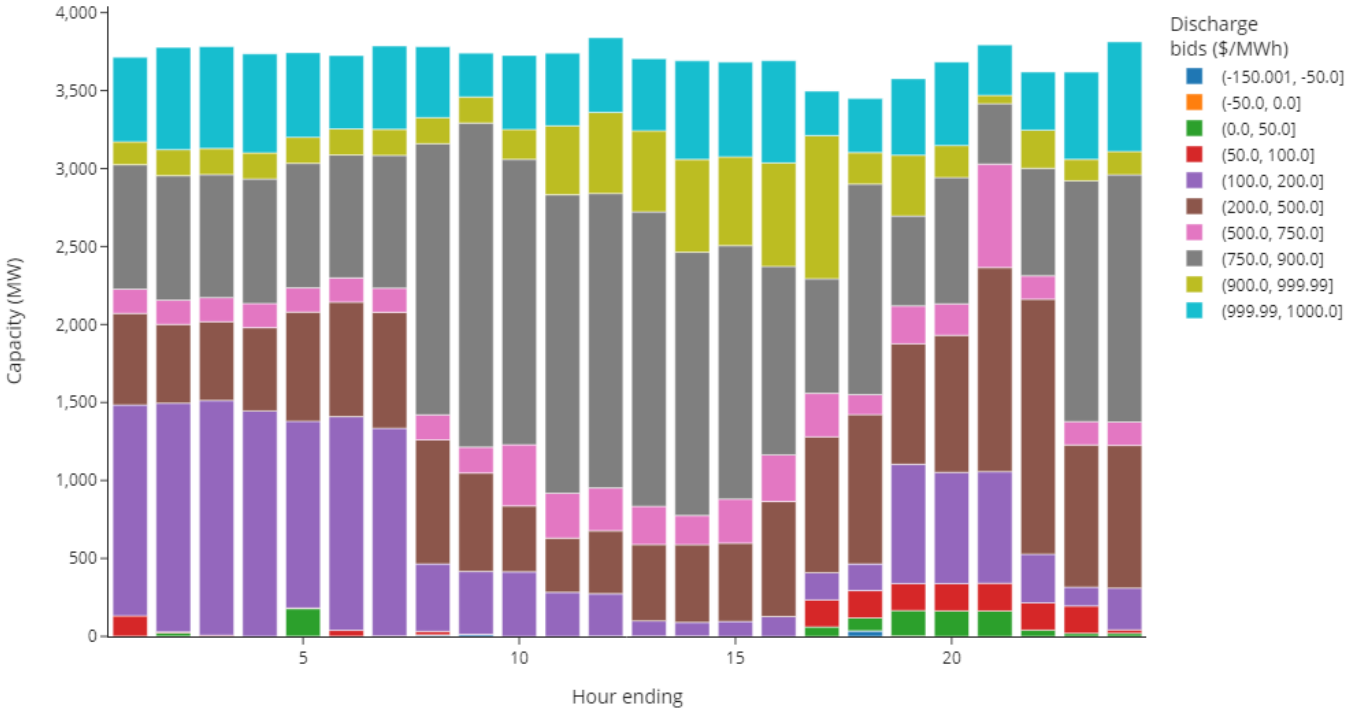
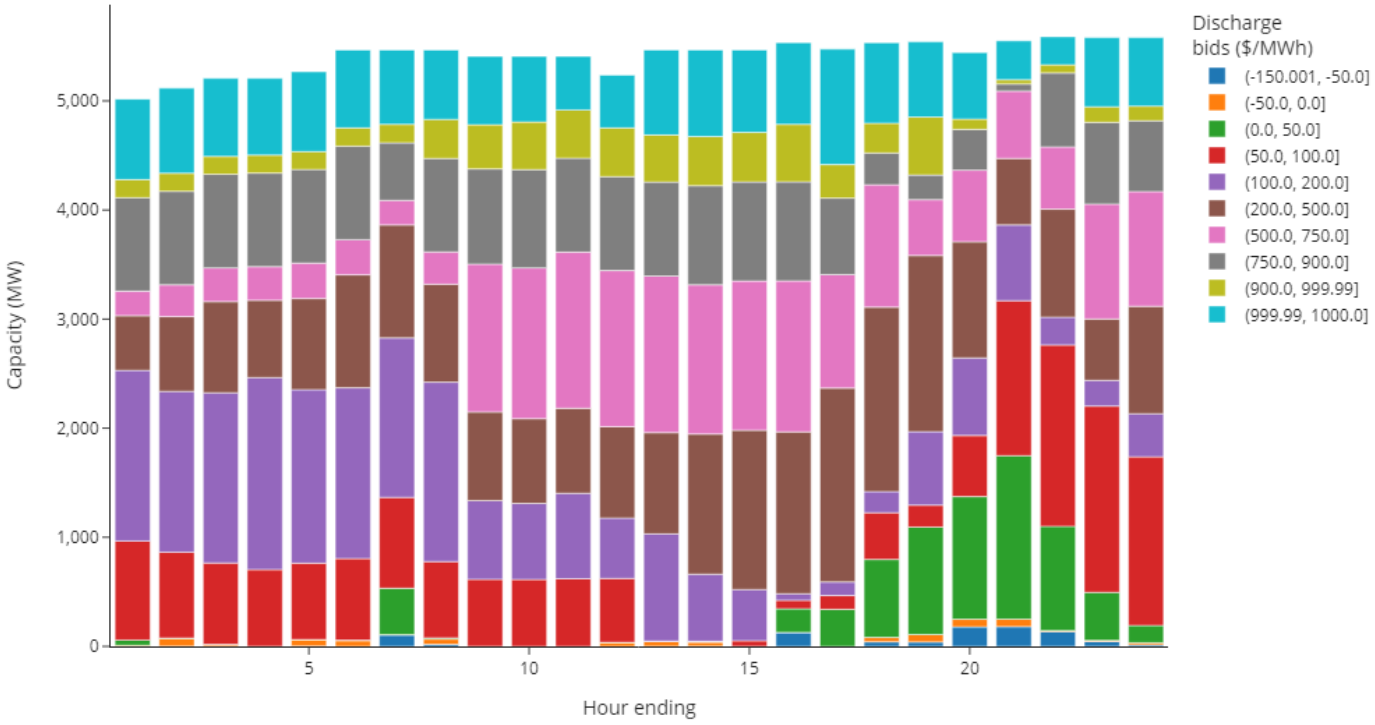


Figure 2: Market bids from batteries to discharge – August 16, 2023



While DMM does not oppose implementing the proposed real-time bid cap for storage resources, DMM cautions that this will allow storage resources to submit bids over $1,000/MWh during hours in which their intra-day opportunity costs are less than $1,000/MWh. This will increase the ability of storage resources to exercise market power in some hours, particularly in the highest priced hours of the day when intra-day opportunity costs are significantly diminished. Under very tight system conditions, almost every resource owner in the CAISO system can have some degree of market power during the peak net load hours when prices are highest.

However, under the CAISO proposal, the risk of local market power will continue to be mitigated by the fact that the CAISO does not propose to change the DEB calculation used for batteries when their bids are subject to the CAISO's local market power mitigation procedures. The CAISO provided analysis demonstrating that even during high-priced days, the uncapped storage DEB used in the real-time market rarely exceeds $1,000/MWh, so that batteries with local market power would be mitigated to DEB values that tend to be lower than the proposed battery bid cap.[6]

Raising the bid cap for battery storage resources has bid cost recovery implications

DMM cautions that allowing for higher bids from storage resources may also impact the bid cost recovery payments to storage resources. There are a number of situations where batteries may receive inappropriate or inefficient bid cost recovery

[6] California ISO, *Price Formation Enhancements Draft Final Proposal,* May 2, 2024: https://stakeholdercenter.caiso.com/InitiativeDocuments/Draft-Final-Proposal-Price-Formation-Enhancements-May-2-2024.pdf

payments. DMM has recommended enhancing bid cost recovery rules for storage resources to consider state-of-charge limitations and other attributes unique to storage resources.[7] Until these issues are addressed, allowing storage resources to submit higher energy bids – even when aligned with intra-day opportunity costs – could further increase unwarranted bid cost recovery payments to storage resources on days when the $2,000/MWh bid cap is in effect.

Maximum import bid price

In the Transmittal Letter, the CAISO describes a value known as the *maximum import bid price* (MIBP).[8] Currently, the MIBP is used in the CAISO market to determine the hours that the $2,000/MWh bid cap should be in effect and to set the maximum hourly bid prices for many imports on these critical days. The CAISO proposes in this filing to extend the use of the MIBP to be an input in the proposed bid cap for battery storage resources.

DMM has previously noted that the MIBP is not being calculated correctly. The current calculation underestimates the MIBP on the first high priced day of a high priced period.[9] DMM believes that fixing this issue should be a higher priority than the proposed changes to increase the bid cap for storage resources. However, should the

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[7] Department of Market Monitoring, *Special Report on Battery Storage,* July 7, 2023, pp 19-20: https://www.caiso.com/documents/2022-special-report-on-battery-storage-jul-7-2023.pdf

[8] *California Independent System Operator Corporation Tariff Amendment to Enhance Cost-verified Bidding above the Soft Energy Bid Cap*, California Independent System Operator Corporation, Docket No. ER24-2168-000, ("Transmittal Letter").

[9] *DMM Comments on Price Formation Enhancements: Rules for Bidding above the Soft Offer Cap Draft Final Proposal,* May 8, 2024: https://www.caiso.com/documents/dmm-comments-on-pfe-rules-for-bidding-above-the-soft-offer-cap-draft-final-proposal-may-8-2024.pdf

Commission accept and the CAISO implement the proposed changes to the battery storage bid cap, DMM highly recommends the CAISO fix the MIBP calculation to reflect the explanation in the tariff prior to extending the use of this parameter into the bid cap for storage resources.

The MIBP serves as an hourly estimation of prices outside of the CAISO system. The MIBP multiplies the maximum bilateral block price from either Mid-Columbia or Palo Verde by an hourly shaping factor to transform these block prices to hourly prices, and then multiplies this value by a 110 percent multiplier. The hourly shaping factor in the tariff is explained as dividing the day-ahead system marginal energy cost (SMEC) in that hour of a representative high priced trading day by the average day-ahead SMEC of the same representative trading day.

The current implementation of the shaping factor instead divides the hourly day-ahead SMEC on the most recently available day by the average day-ahead SMEC of the representative high priced day. Because the current implementation may use data from two different days, the shaping factor does not make sense statistically. Unless the most recently available day and the representative high priced day happen to be the same, the shaping factor does not average to one across the day and it does not shape bilateral prices to mirror that of the last high-priced day.

The primary concern with the current implementation of the hourly shaping factor of the MIBP calculation is that it may lead to inaccurately low MIBP values when

entering high-priced conditions.[10,11] DMM recommends CAISO update the shaping factor calculation to divide the hourly SMEC in the last high-priced day by the average SMEC of that same last-high priced day. This formulation is consistent with DMM's understanding of the CAISO tariff, results in an hourly shaping factor that averages to one across the day, and shapes bilateral prices to the pattern of prices on the last high-priced day. This will ensure that on the first day during a high-priced event, the shaping factor will correctly shape bilateral prices to mimic the shape of the last high-priced day.

III. 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 "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."[12] As this proceeding involves CAISO tariff provisions that would affect the efficiency of CAISO markets, it implicates matters within DMM's purview.

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[10] *DMM Comments on Maximum Import Bid Price Analysis Workshop to Discuss Hourly Shaping Factor*, June 11, 2024: https://www.caiso.com/documents/dmm-comments-on-maximum-import-bid-pricing-analysis-workshop-to-discuss-hourly-shaping-factor-jun-11-2024.pdf

[11] California ISO, *Maximum Import Bid Price Shaping Factor Analysis,* May 28, 2024: https://www.caiso.com/documents/whitepaper-maximum-import-bid-shaping-factor.pdf

[12] CAISO Tariff Appendix P, Section 5.1.

IV. CONCLUSION

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

Respectfully submitted,

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Dated: June 21, 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 21st day of June, 2024.

/s/ Aprille Girardot
Aprille Girardot