188 FERC ¶ 61,089
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Willie L. Phillips, Chairman;
Mark C. Christie and David Rosner.

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

ORDER ACCEPTING PROPOSED TARIFF REVISIONS

(Issued July 31, 2024)

1. On May 31, 2024, California Independent System Operator Corporation (CAISO) submitted, pursuant to section 205 of the Federal Power Act,[1] and Part 35 of the Commission's regulations,[2] revisions to its Open Access Transmission Tariff (Tariff)[3] to enhance cost-verified bidding above CAISO's $1,000/MWh soft energy bid cap consistent with Order No. 831.[4] First, CAISO proposes to remove the current restriction in its Tariff that scheduling coordinators submit reference level adjustment requests to raise their default energy bids (DEB) above $1,000/MWh when their DEBs would, by their own calculation, rise above $1,000/MWh. Second, CAISO proposes to establish a real-time energy bid cap that can exceed $1,000/MWh for energy storage resources[5] to

[1] 16 U.S.C. § 824d.

[2] 18 C.F.R. pt. 35 (2023).

[3] California Independent System Operator Corporation, CAISO eTariff, § 30.7.12 (Validation of Bids in Excess of Bid or Minimum Load Cost Cap) (4.0.0); *id.* § 30.11.2 (Reference Level Change Requests) (5.0.0); *id.* § 39.7.1 (Calculation of Default Energy Bids) (47.0.0).

[4] *Offer Caps in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Order No. 831, 157 FERC ¶ 61,115 (2016), *order on reh'g and clarification*, Order No. 831-A, 161 FERC ¶ 61,156 (2017).

[5] In this order, the term "energy storage resources" refers to energy storage resources using the Non-Generator Resource model to which CAISO's second proposed Tariff enhancement applies, as discussed further below.

account for intra-day opportunity costs.[6] In this order, we accept CAISO's proposed Tariff revisions, effective August 1, 2024, as requested.

I. Background

2. Order No. 831 required each Regional Transmission Organization and Independent System Operator (RTO/ISO) to make revisions to its tariff to: (1) cap each resource's incremental energy offer at the higher of $1,000/MWh or that resource's verified cost-based incremental energy offer; (2) cap verified cost-based incremental energy offers at $2,000/MWh when calculating locational marginal prices (LMP); (3) establish a verification process for cost-based incremental offers above $1,000/MWh that ensures that a resource's cost-based incremental energy offer reasonably reflects that resource's actual or expected costs;[7] (4) permit market participants to submit virtual transactions up to $2,000/MWh;[8] and (5) permit import and export transactions up to $2,000/MWh.[9]

3. Each RTO/ISO or its market monitor must verify bid costs above $1,000/MWh. The Commission specified that the verification process must ensure that a resource's cost-based incremental energy offer above $1,000/MWh "reasonably reflects that resource's actual or expected cost."[10] Although the Commission did not prescribe how RTOs/ISOs or Market Monitoring Units should conduct the verification process, the Commission stated that it expected RTOs/ISOs to build upon their existing mitigation process for calculating or updating cost-based incremental energy offers.[11] The Commission required that RTO/ISO compliance filings explain what factors the cost verification process would consider and whether such factors are currently considered in the market power mitigation process, or whether new provisions would be necessary. Additionally, the Commission explained that the verification requirement was "designed

[6] Transmittal at 1-2.

[7] Order No. 831, 157 FERC ¶ 61,115 at P 1.

[8] *Id.* P 172.

[9] *Id.* P 192.

[10] *Id.* P 140.

[11] *Id.* P 141.

to ensure that a cost-based incremental energy offer above $1,000/MWh is not an attempt by the associated resource to exercise market power."[12]

4. In Order No. 831, the Commission recognized that pre-market cost verification is not always possible. The Commission found that if a resource's incremental energy offer above $1,000/MWh is not verified, but the resource is still dispatched, that resource would be eligible to receive an uplift payment to recover its after-the-fact verified costs.[13] The Commission also found that neither virtual transactions nor exchange transactions necessarily required cost verification.[14]

5. The Commission accepted CAISO's Tariff revisions to comply with Order No. 831 on September 21, 2020.[15] As part of those revisions, CAISO implemented a two-tier cap structure: (1) a soft energy bid cap of $1,000/MWh, which applies to all energy bids except for virtual bids and bids for non-resource-specific system resources (i.e., import bids that come from a resource not identified as a specific resource located outside of CAISO balancing authority area); and (2) a hard energy bid cap of $2,000/MWh, which applies to all energy bids.[16] A DEB is CAISO's resource-specific cost-based bid and is the main mechanism for applying energy bid mitigation.[17]

6. Under CAISO's cost verification process, a scheduling coordinator whose CAISO-calculated DEB does not exceed the $1,000/MWh soft energy bid cap, and that intends to submit an energy bid that exceeds that bid cap, is required to submit a reference level change request.[18] In addition, scheduling coordinators are required to submit reference level change requests in order to increase their DEBs over $1,000/MWh, even when the

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[12] *Id.* P 143.

[13] *Id.* P 146.

[14] *Id*. PP 172, 192.

[15] *Cal. Indep. Sys. Operator Corp.*, 172 FERC ¶ 61,262, at P 1 (CAISO Compliance Order), *notice of denial of reh'g by operation of law*, 173 FERC ¶ 62,096 (2020).

[16] CAISO, CAISO eTariff, § 30.7.12 (Validation of Bids in Excess of Bid or Minimum Load Cost Cap) (3.0.0), §§ 30.7.12.1, 30.7.12.3; *id.* § 39.6.1 (Maximum Bid Prices) (18.0.0), §§ 39.6.1.1.1, 39.6.1.1.2; *id.* app. A (Definitions), Hard Energy Bid Cap (1.0.0); *id.* Soft Energy Bid Cap (1.0.0).

[17] *Id*., app. A (Definitions), Default Energy Bid (2.0.0).

[18] *Id.* § 30.11.2 (Reference Level Change Requests) (4.0.0).

calculated value of the DEB would exceed $1,000/MWh under the established formula. Once CAISO validates and approves the reference level change request, the scheduling coordinator can submit an energy bid up to the price of the adjusted DEB. CAISO uses a "reasonableness threshold" to determine whether to approve requested adjustments for its automated process. CAISO also allows scheduling coordinators to submit manual reference level change requests when they believe costs will materialize beyond what the automated processes will approve. The Commission found that CAISO's reference level change request processes verify that a resource's bid reasonably reflects its actual or expected costs, consistent with Order No. 831.[19]

7. The Commission accepted CAISO's further Tariff revisions related to bid validation rules for imports, exports, demand, and virtual bids greater than $1,000/MWh on April 27, 2021.[20] CAISO revised its existing bid validation rules and related Tariff provisions to accept non-resource adequacy import bids, export bids, demand bids, and virtual bids priced above the soft energy bid cap only when CAISO has cost-verified a bid or has calculated a Maximum Import Bid Price (MIBP) that exceeds the soft energy bid cap. CAISO calculates hourly MIBPs for the day-ahead market and real-time market, separately, including for on-peak and off-peak hours. CAISO calculates the hourly MIBP as 110% of the greater of the published bilateral electric index prices for the Mid-Columbia or Palo Verde trading hub locations, multiplied by an hourly shaping ratio. The Commission accepted CAISO's proposal to use the MIBP based on these hub prices because the Mid-Columbia and Palo Verde hubs are the primary liquid trading hubs for bilateral electric transactions in the Western Interconnection.[21]

II. CAISO Filing

8. CAISO explains that restricting bid cap calculations to the soft energy bid cap is unnecessary and can inhibit resources from submitting cost-justified bids, particularly hydroelectric resources with intra-day opportunity costs.[22] CAISO states that storage and hydroelectric resources are unable to successfully adjust their DEBs through the automated reference level change request process, in contrast to gas resources. CAISO explains that the reference level change request process was designed for gas resources that faced discrepancies between their actual fuel costs and the costs used to calculate

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[19] CAISO Compliance Order, 172 FERC ¶ 61,262 at P 35.

[20] *Cal. Indep. Sys. Operator Corp.*, 175 FERC ¶ 61,076 (2021).

[21] *Id*. P 43.

[22] Transmittal at 8.

their DEBs.[23] For instance, CAISO explains that the reasonableness threshold it applies to automated requests evaluates changes in fuel and fuel-equivalent costs and may not capture the full scope of costs defined in the DEB formulas for hydroelectric or energy storage resources.[24] CAISO states that it does not have rules to determine a reasonable cost expectation upon which to base an intra-day opportunity cost adjustment request.[25]

9. CAISO explains that intra-day opportunity costs represent resources' foregone profits of producing energy now rather than producing energy later. CAISO states that, for resources that operate based on finite resources like reservoir levels or state of charge, supplying energy earlier in the day often means that they cannot supply energy later at the time of higher demand. CAISO states that this is a significant concern because if these resources are depleted earlier in the day, CAISO must depend on a more limited pool of resources to meet its later net peak demand. CAISO states that sending the correct price signals to the market will avoid the need for out-of-market actions to keep limited resources available for the net peak hours and meet their day-ahead schedules.[26]

10. CAISO proposes two sets of Tariff revisions to enhance cost-verified bidding above CAISO's $1,000/MWh soft energy bid cap. First, CAISO proposes to remove its current restriction that scheduling coordinators must submit reference level change requests to raise their DEBs above $1,000/MWh when the DEBs would, by their own calculation, rise above $1,000/MWh.[27] Under the proposal, each resource will automatically be able to bid above the soft energy bid cap in those intervals when its DEB is above the soft energy bid cap.[28] CAISO states that its proposed Tariff revision

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[23] *Id.*, attach. C (Rules for Bidding above the Soft Offer Cap Final Proposal), at 6.

[24] *Id.* at 8.

[25] *Id*. (citing CAISO, CAISO eTariff, § 30.11.3 (Automated Reference Level Change Requests) (1.0.0), § 30.11.3.1).

[26] *Id.* at 9.

[27] *Id.* at 9-10 (citing CAISO, CAISO eTariff, § 30.7.12 (Validation of Bids in Excess of Bid or Minimum Load Cost Cap) (4.0.0), § 30.7.12.2; *id*. § 30.11.2 (Reference Level Change Request) (5.0.0), § 30.11.23; *id*. § 39.7.1 (Calculation of Default Energy Bids) (47.0.0)).

[28] *Id.* CAISO states that resources could still submit reference level change requests to bid above their DEBs if they believe their costs are greater and can still receive after-market compensation if their requests are rejected before the market, but justified after. *Id.* at 10. CAISO explains that all energy bids, including DEBs, will still be subject to the hard energy bid cap of $2,000/MWh. *Id.*

will enable cost-justified bidding, which will promote more efficient dispatch on constrained days.[29] CAISO asserts that the artificial restriction to cap DEBs at $1,000/MWh is unnecessary and counterproductive to using DEBs for cost verification.

11. Second, CAISO proposes to create a custom bid cap in its real-time market exclusively for energy storage resources using the Non-Generator Resource model,[30] allowing their bids to exceed $1,000/MWh when certain proxies rise above $1,000/MWh, as discussed further below.[31] CAISO states that its first set of proposed Tariff revisions, removing the $1,000/MWh cap on DEBs, is not likely to enable energy storage resources to bid above the soft energy bid cap when justified. CAISO explains that currently the storage resource option DEB includes intra-day opportunity costs, but the real-time opportunity costs are based on day-ahead prices.[32] CAISO states that energy storage resources are generally modeled as four-hour resources and that this opportunity cost is usually based on the fourth-highest priced hour. CAISO argues that day-ahead prices in these intervals historically rarely rise above the soft energy bid cap, even when the energy storage resources' actual opportunity costs are well above the soft energy bid cap. CAISO states that energy storage resources' day-ahead DEBs cannot inform their energy bids because the DEBs are unavailable until after the energy bids are submitted. CAISO argues that enhancements to the storage resource option DEB would take time to develop and cannot be implemented for this summer.

12. As such, CAISO proposes to create a custom mechanism to recognize when energy storage resources' intra-day opportunity costs warrant real-time energy bids above the $1,000/MWh soft energy bid cap. CAISO explains that its proposal would allow

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[29] *Id.* at 11.

[30] CAISO's Tariff defines Non-Generator Resources as "[r]esources that operate as either Generation or Load and that can be dispatched to any operating level within their entire capacity range but are also constrained by a MWh limit to (1) generate Energy, (2) curtail the consumption of Energy in the case of demand response, or (3) consume Energy." CAISO, CAISO eTariff, app. A (Definitions), Non-Generator Resources (2.0.0).

[31] Transmittal at 12-13. CAISO notes that this bid cap would not apply to Hybrid Resources because they manage their own state of charge and their intra-day opportunity costs are different than those of energy storage resources. *Id.* CAISO notes that Hybrid Resources may elect to be or convert to Co-located Resources instead, availing the storage components to the energy storage bidding options proposed in the filing. *Id.* at 13.

[32] *Id.* at 12 (citing CAISO, CAISO eTariff, § 39.7.1 (Calculation of Default Energy Bids) (47.0.0), § 39.7.1.8).

energy storage resources to bid to the higher of: (a) the fourth-highest calculated hourly value of the MIBP for that trading day; (b) the highest-priced cost-verified energy bid for the applicable trading hour;[33] and (c) the resource's DEB if it uses the variable cost option, LMP option, or the negotiated rate option.[34] CAISO proposes to use the fourth-highest hour of the MIBP for the entire trading day to reflect that CAISO energy storage resources are almost universally four-hour resources, and that energy storage resources' opportunity costs should be based on when the resource would elect to begin discharging.[35] CAISO argues that these values provide the best potential proxies to calculate energy storage resources' real-time opportunity costs.

13. CAISO proposes to enable energy storage resources to bid above the soft energy bid cap based on the proposed proxies in the real-time markets only.[36] CAISO states that expanding this proposal to day-ahead market bids would be premature and could lead to unintended results. CAISO notes that, while it is generally preferable to have rules aligned in the day-ahead and real-time markets, CAISO has not had sufficient time to explore with its stakeholders the historical data and potential consequences in the day-ahead market. CAISO states that the day-ahead market's 24-hour horizon will optimize the use of energy storage resources and result in day-ahead discharge schedules in the highest value hours.

14. CAISO requests that the Commission approve these enhancements as just and reasonable and consistent with Order No. 831.[37] CAISO states that these enhancements are not CAISO's final steps, but that it proposes these two enhancements now to address CAISO's most critical needs, and because these processes have a strong foundation in

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[33] *Id.* Virtual bids, export bids, demand bids, and non-resource specific system resource bids would not be eligible. *Id.* at 13 n.41.

[34] *Id.* at 13. The variable cost option is based on the variable costs of the unit. CAISO, CAISO eTariff, § 39.7.1 (Calculation of Default Energy Bids) (47.0.0). The LMP option is a weighted average of the lowest quartile of LMPs at the Generating Unit PNode in periods when the unit was dispatched during the preceding 90-day period for which validated LMPs are available. *Id.* Scheduling coordinators that elect the more flexible negotiated rate option submit a proposed DEB along with supporting documentation for approval by DMM and CAISO. *Id.*

[35] Transmittal at 14-15 (noting that bilateral hub prices that support offers greater than $1,000/MWh have occurred only a handful of days in recent years (i.e., six trade dates thus far in 2024)).

[36] *Id.* at 15.

[37] *Id.* at 16.

historical data and can be implemented before the peak-demand summer months.[38] CAISO argues that these enhancements provide meaningful cost-verification and market power mitigation based on rules currently in use that have been approved by the Commission.[39] CAISO requests that the Commission consider its proposal as a single, unified filing and that the Commission approve the Tariff revisions, effective August 1, 2024.[40]

III. Notice and Responsive Pleadings

15. Notice of CAISO's filing was published in the *Federal Register*, 89 Fed. Reg. 48,420 (June 6, 2024), with interventions and protests due on or before June 21, 2024. California Public Utilities Commission (CPUC) filed a notice of intervention and comments. Timely motions to intervene were filed by Calpine Corporation; Pacific Gas and Electric Company; Public Citizen, Inc.; California Energy Storage Alliance (CESA); California Municipal Utilities Association; Balancing Authority of Northern California; the cities of Anaheim, Azusa, Banning, Colton, Pasadena, and Riverside, California; Vistra Corp. and Dynegy Marketing and Trade, LLC; the City of Santa Clara, California; Southern California Edison Company; San Diego Gas & Electric Company; Northern California Power Agency; CAISO's Department of Market Monitoring (DMM); Portland General Electric Company (Portland General); and California Department of Water Resources. Terra-Gen, LLC filed a motion to intervene out-of-time. CESA, DMM, and Portland General filed comments. CAISO filed an answer on July 8, 2024. CPUC filed an answer on July 23, 2024.

1. Raising the Cap on DEBs

a. Comments/Protests

16. DMM, Portland General, and CESA support increasing the cap on all DEBs to $2,000/MWh. DMM states that it is unnecessary for scheduling coordinators to submit reference level change requests to increase their DEBs over $1,000/MWh because the formulas used to calculate DEBs are well established and reflect the marginal cost of a resource. Additionally, DMM agrees with CAISO that the cap should be removed because there are technical limitations to certain resource types submitting reference level

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[38] *Id.* at 2.

[39] *Id.* at 16.

[40] *Id.* at 2. CAISO notes that approving one set of Tariff revisions but not the other may help one resource class, but exacerbate the current challenges for the other by causing even greater bid separation among the resource classes.

change requests.[41] Specifically, DMM states that hydroelectric resources are currently unable to reflect intra-day opportunity costs in their bids even when the formula used to calculate their DEBs would exceed $1,000/MWh. Portland General states that CAISO's proposal would create tools for Western Energy Imbalance Market (WEIM) Participating Resource Scheduling Coordinators to manage energy deployment during scarcity events by giving hydroelectric resources more flexibility in managing intra-day hydro capacity limits, and enhancing market efficiency and reliability.[42] CESA contends that CAISO's revisions to the cap on DEBs are necessary to eliminate discriminatory treatment of certain types of resources and allow more resources to accurately reflect their costs in energy offers.[43] CESA states that without remedying the shortcomings of the reference level change request process to permit resources that do not use a fuel or fuel-equivalent cost formula to update their DEBs in the real-time market, such resources face a structural disadvantage under the CAISO Tariff, which produces the market inefficiencies that Order No. 831 was intended to address.[44]

17. CESA states that it supports CAISO's interim proposal but finds it inadequate as a long-term solution because it does not permit storage resources to update their DEBs in both the Day-Ahead Market and the Real-Time Market. CESA asks the Commission to urge CAISO to pursue a more holistic solution on a timeline that will permit the CAISO market to efficiently value and dispatch energy storage resources during the 2025 summer season.[45]

18. In contrast, CPUC argues that the proposed changes are not targeted enough to address the intra-day opportunity costs of hydroelectric resources. CPUC claims that lifting the bid cap in the day-ahead market is not necessary because the market is already able to optimize resource schedules, so there are no intra-day opportunity costs in the day-ahead market.[46] DMM cautions that because the DEB is calculated as a static daily amount for hydroelectric resources and intra-day opportunity costs may change hourly, CAISO should initiate a future proceeding to develop hourly DEB calculations for hydroelectric resources to reflect changing intra-day opportunity costs for greater

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[41] DMM Comments at 3.

[42] Portland General Comments at 4-5.

[43] CESA Comments at 4.

[44] *Id.* at 5.

[45] *Id.* at 7.

[46] CPUC Comments at 25.

accuracy and to prevent the possible exercise of market power in hours where the static DEB could overstate intra-day opportunity cost.[47]

19. In addition, CPUC contends that the hydroelectric resource DEB formula was not designed for above-cap bidding and therefore does not result in values that satisfy the Order No. 831 cost justification requirements.[48] CPUC further notes that not every hydroelectric resource is use-limited in the diurnal timeframe – hydroelectric resources can have hourly constraints or monthly use limitations that the DEB framework does not distinguish. CPUC asserts that a hydroelectric resource with sufficient capacity and willingness to discharge all day does not have intra-day opportunity costs and should not be permitted to bid above $1,000/MWh, and that bids for a resource with use limitations should be capped at the highest price it would forgo.[49]

b. CAISO Answer

20. CAISO reiterates that its proposal would remove unnecessary administrative hurdles for CAISO and scheduling coordinators to have cost-justified bids and enable hydroelectric resources to bid above the soft energy bid cap.[50] CAISO disagrees with CPUC's arguments that lifting the DEB cap in the day-ahead market is unnecessary and that the hydroelectric DEB was not designed for "above cap bidding." Rather, CAISO argues that artificially capping any resource's DEB at $1,000/MWh in the day-ahead market could lead to inefficient scheduling. Further, CAISO asserts that CPUC's arguments criticizing the hydroelectric DEB are outside the scope of this proceeding, as CAISO did not propose to revise the hydroelectric DEB. CAISO emphasizes that Order No. 831 and CAISO's compliance are structured to use DEBs as an approved, filed method of cost verification.[51]

c. CPUC Answer

21. CPUC asserts that the Commission should consider the potential ramifications of the U.S. Court of Appeals for the District of Columbia Circuit's recent remand decision

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[47] DMM Comments at 4-5.

[48] CPUC Comments at 25.

[49] *Id.* at 29.

[50] CAISO Answer at 11.

[51] *Id.* at 12.

in *Shell Energy North America (US), L.P. v. FERC*[52] on CAISO's proposal.[53] CPUC states that the court found that the Commission must conduct a *Mobile-Sierra* public-interest analysis[54] before ordering refunds on bilateral spot market transactions in the Western Electricity Coordinating Council (WECC) territory, where the price exceeds the WECC $1,000/MWh soft price cap. CPUC states that *Shell Energy v. FERC* requires a departure from the Commission's current practice, under which sellers must justify above-$1,000/MWh sales subject to refund. CPUC acknowledges that the Commission has not yet determined how to implement *Shell Energy v. FERC*'s ruling on remand but contends that the decision may incentivize or facilitate higher prices on spot market sales in WECC, including at bilateral indices used to calculate hydroelectric DEBs. According to CPUC, it is critical that the Commission limit the potential impacts of *Shell Energy v. FERC* on CAISO's market price caps. CPUC reiterates its request that the Commission only accept the filing as a temporary measure subject to a January 1, 2025 sunset date.

2. Establishing a Real-Time Bid Cap for Energy Storage Resources

a. Comments/Protests

22. CESA supports the proposed real-time bid cap for energy storage resources. CESA explains that although CAISO's first proposal to uncap the DEB would permit hydroelectric resources to update their offers to reflect costs above $1,000/MWh, it would not permit energy storage resources to reflect short-run marginal costs above $1,000/MWh in their energy offers. CESA states, however, that CAISO should pursue a more holistic solution because the proposed bid cap will not be available to all energy storage resource configurations (i.e., Hybrid Resources). Portland General supports the increased flexibility for energy storage resources to verify their opportunity costs and asserts that this would lead to more efficient dispatch.[55]

23. DMM does not oppose the proposed real-time bid cap as a short-term measure but does not believe that the proposed revisions should apply to the entire day. Similar to its concern with hydroelectric resources, DMM notes that, due to the technological limitations of implementing the proposed revisions, a static bid cap is unable to target the

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[52] No. 22-1116, 2024 WL 3335557 (D.C. Cir. July 9, 2024) (*Shell Energy v. FERC*).

[53] CPUC Answer at 1-2.

[54] *See generally United Gas Pipe Line Co. v. Mobile Gas Serv. Corp.*, 350 U.S. 332 (1956); *Fed. Power Comm'n v. Sierra Pac. Power Co.*, 350 U.S. 348 (1956).

[55] Portland General Comments at 5.

specific hours where intra-day opportunity costs are most likely to exceed $1,000/MWh and would allow bids that exceed the intra-day opportunity costs in some hours.[56]

24. DMM explains that an energy storage resource's intra-day opportunity costs depend on expected hourly prices and the physical limitations of the battery, including its state of charge and ability to replenish stored energy over the course of the day. DMM states that, regardless of a resource's ability to recharge, the intra-day opportunity costs approach zero during and after the highest priced hours in CAISO in the late afternoon. DMM and CPUC assert that the bid cap proposed by CAISO would allow energy storage resources to bid substantially in excess of their intra-day opportunity costs during high priced hours when the system is tight and the opportunity cost is known to approach zero. CPUC avers that this approach is in tension with Order No. 831 and raises concerns about market power and prices increasing.[57] While DMM recommends that the bid cap for energy storage resources only allow bidding over $1,000/MWh for a limited number of hours when intra-day opportunity costs are likely to exceed $1,000/MWh, it acknowledges that CAISO has indicated there are technological limitations to the logic that determines the value of the bid cap in each hour. CPUC asserts that CAISO's technological limitations in accommodating a more targeted approach should not justify an imperfect Tariff amendment remaining in place longer than necessary.[58]

25. Additionally, DMM raises concerns about the proposed Tariff revisions' potential to exacerbate existing flaws in bid cost recovery and the MIBP. Specifically, DMM claims that even if higher energy bids from energy storage resources are aligned with intra-day opportunity costs, there could be further unwarranted bid cost recovery payments to energy storage resources on days the $2,000/MWh hard energy bid cap is in effect.[59] DMM notes that it has previously expressed concern that the MIBP is being calculated incorrectly. DMM advises that if the Commission accepts CAISO's proposal, CAISO should fix the MIBP calculation before it is used as an input in the bid cap for energy storage resources.[60] CPUC echoes DMM's concerns about the MIBP and contends that the MIBP is also problematic because: (1) it is based on thinly traded bilateral indices; (2) there can be significant price separation between the bilateral indices and the CAISO market, calling into question the appropriateness of the MIBP as a proxy price for CAISO resources; and (3) it does not reflect actual storage opportunity costs

[56] DMM Comments at 6-7.

[57] CPUC Comments at 16.

[58] *Id.* at 17-18.

[59] DMM Comments at 11.

[60] *Id.* at 13.

sufficient to justify bids above $1,000/MWh, as Order No. 831 requires. CPUC asserts that resources seeking intertemporal opportunity costs in CAISO should have similar evidentiary requirements to those the Commission has required of sellers in the bilateral WECC context to justify locational opportunity costs, such as a robust showing that the resource will have the ability to sell at a later, higher price.[61]

26. DMM also argues that its review of the data does not support the immediate need for a higher storage bid cap this summer as CAISO claims.[62] DMM submits an analysis of market data indicating that even on days when the $2,000/MWh hard energy bid cap was in effect, 85% of storage capacity bid less than the $1,000/MWh cap during the hours in which their intra-day opportunity costs were the highest (e.g., the three hours prior to the highest priced hours). CPUC agrees with DMM that is it unclear whether there is a pressing bid cap problem for energy storage resources that needs resolution by this summer, and notes that CAISO acknowledges it does not anticipate summer reliability issues.[63] In addition, CPUC contends that CAISO has the existing ability to manage energy storage resources through exceptional dispatch to hold back resources from discharging, should such discharge threaten reliability.

27. CPUC alleges that the proposed Tariff revisions were developed under an extremely expedited time frame and that more robust long-term solutions were not examined. CPUC requests that the Commission condition any approval on a January 1, 2025 sunset date and require that CAISO include a mechanism to disable the proposed revisions if unintended consequences arise.[64]

b. <u>CAISO Answer</u>

28. CAISO responds that neither CPUC nor DMM provide any basis to conclude that proposing a bid cap that may be static throughout the day rather than targeting specific hours in which resources' intra-day opportunity costs are most likely to exceed $1,000/MWh is unjust, unreasonable, or unduly discriminatory.[65] CAISO reiterates that it uses the fourth-highest hour of the MIBP for the whole trading day rather than matching hour to hour to reflect that CAISO storage resources are almost universally

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[61] CPUC Comments at 7 (citing *Cal. Indep. Sys. Operator Corp.*, 163 FERC ¶ 61,211 (2018)).

[62] DMM Comments at 8-9.

[63] CPUC Comments at 12-13.

[64] *Id.* at 14-15.

[65] CAISO Answer at 5.

four-hour resources. CAISO explains that the opportunity cost of an energy-limited resource does not vary over the hours of the day in the same way as those of a thermal resource for which the MIBP hourly shaping of opportunity costs were designed.[66] CAISO asserts that its proposal recognizes when real-time prices may materialize from other resources that can bid beyond the soft energy bid cap, thus creating opportunity costs for energy-limited resources in those hours.[67] According to CAISO, while energy storage resources could theoretically submit bids beyond their actual costs in some hours under a soft offer cap, this does not mean they will. CAISO argues that this is no different than other resources' abilities under Order No. 831.[68] CAISO states that CPUC and DMM offer no data showing that resources have bid above their actual costs since Order No. 831. Moreover, CAISO contends that bidding above costs also comes with risk in that if a resource bids above its marginal cost, it will miss out on any market award and compensation.

29. CAISO also argues that there is no basis to conclude that the proposed Tariff revisions will result in the exercise of market power.[69] CAISO states that CPUC offers no evidentiary support for its assertion that the proposal removes a key market power mitigation safeguard. CAISO explains that the current Tariff stipulates that if CAISO mitigates an energy storage resource's bid for market power, the bid is replaced with the resource's DEB, as is the case for all other resources. CAISO contends that CPUC's complaint that energy storage resource bids are infrequently mitigated only demonstrates that its system is working and that there is no evidence to conclude that energy storage resources will begin to exercise market power and submit higher bids.[70] CAISO contends that, while costs may only rise above the soft energy bid cap on a handful of days, it disagrees with CPUC's and DMM's view that action is unnecessary.[71] CAISO states that these handful of days are generally critical days with significant fuel or capacity constraints and argues that the Commission issued Order No. 831 for this precise reason. In response to CPUC's claim that CAISO can rely on its existing mechanisms, CAISO notes that, while exceptional dispatch is a necessary tool that can be used to hold back

[66] *Id.* at 6 (citing Transmittal, attach. E).

[67] *Id.* at 5.

[68] *Id.* at 6.

[69] *Id.* at 7.

[70] *Id.* at 7-8 (noting that DMM stated that it did not see any indication energy storage resources would exercise market power at the CAISO Board of Governors meeting in May 2024 that approved CAISO's proposal).

[71] *Id.* at 2-3.

resources from discharging, relying on exceptional dispatch affects market efficiency and imposes a large administrative burden on CAISO because exceptional dispatch is a manual process, often carried out by phone calls to each resource's scheduling coordinator.[72] CAISO states that it prefers that energy storage resources, which now comprise roughly one fifth of CAISO's historical peak demand, submit accurate bids, receive fair awards, follow optimal schedules, and avoid the need to use exceptional dispatch.

30. CAISO agrees with DMM that current bid cost recovery rules are an imprecise fit for the unique bid costs of energy storage resources.[73] However, CAISO states that the risk of potentially higher bid cost recovery payments to energy storage resources is not cause to prohibit energy storage resources from bidding their actual costs, and that DMM exaggerates how much CAISO's proposal could affect bid cost recovery on the very few days when resources submit bids above the soft energy bid cap. Further, CAISO asserts that the status quo is inconsistent with Order No. 831 principles and creates real risks on stressed days. CAISO states that CPUC erroneously concludes, based on September 6, 2022 data where real-time prices did not reach $2,000/MWh, that energy storage resources should not have been able to bid to $2,000/MWh because it did not represent their opportunity costs.[74] According to CAISO, CPUC misunderstands the relationship between bidding ability and prices. CAISO argues that the relevant factor in determining energy storage resources' opportunity costs is what other resources could bid to. Otherwise, energy storage resources' bids will be below their opportunity costs, they will be dispatched before these other resources, and they may deplete their state of charge before the end of the four-hour peak.[75] CAISO contends that it is a red herring that prices never reached $2,000/MWh, as CAISO did not propose to use locational marginal prices to inform the proposed energy storage resource bid cap.

31. Finally, CAISO argues that CPUC's alternative proposals to include a sunset date for the Tariff revisions and a mechanism to disable these rule changes via market notice are outside the scope of the proceeding. CAISO asserts that its proposed Tariff revisions are just and reasonable today and will be just and reasonable if used in 2025. CAISO states that, although it will identify further enhancements for cost-justified bidding on high-priced days, it did not premise the proposals in this proceeding on a temporary need. CAISO also notes that if market issues arise that warrant changing or removing these

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[72] *Id.* at 3-4.

[73] *Id.* at 8-9.

[74] *Id.* at 10.

[75] *Id.* at 11.

enhancements, it will work with CPUC and stakeholders to do so. Thus, CAISO requests that the Commission disregard CPUC's requests.[76]

c. CPUC Answer

32. CPUC states that *Shell Energy v. FERC* may incentivize or facilitate higher prices on spot market sales in WECC, including at the bilateral indices used to calculate the MIBP. According to CPUC, *Shell Energy v. FERC* could allow energy storage resources to bid higher because the MIBP is used to set the bid cap for energy storage resources, which could make it more likely that the CAISO market and WEIM clear at prices above $1,000/MWh. CPUC argues that it is critical the Commission limit the potential impacts of the decision on CAISO's market price caps.[77]

IV. Discussion

A. Procedural Matters

33. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2023), the notice of intervention and timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding.

34. Pursuant to Rule 214(d) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214(d), we grant Terra-Gen, LLC's late-filed motion to intervene, given its interest in the proceeding, the early stage of the proceeding, and the absence of undue prejudice or delay.

35. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.213(a)(2) (2023), prohibits an answer to a protest or answer unless otherwise ordered by the decisional authority. We accept CAISO's and CPUC's answers because they have provided information that assisted us in our decision-making process.

B. Substantive Matters

36. We find that CAISO's proposed Tariff revisions are just and reasonable and not unduly discriminatory or preferential, and therefore accept them, effective August 1, 2024, as requested. We find that, by enabling hydroelectric and energy storage resources to better reflect their opportunity costs in their incremental cost-based energy offers, CAISO's proposal will reduce the need for manual dispatch of resources outside the market and enable these resources to provide energy when it is most needed during tight

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[76] *Id.* at 13.

[77] CPUC Answer at 3.

conditions.[78] As discussed below, we also find that the proposed Tariff revisions satisfy the requirements of Order Nos. 831 and 831-A, as they will ensure that a resource's cost-based incremental energy offer reasonably reflects that resource's actual or expected costs.[79]

37. First, we find that CAISO's proposal to remove the restriction that scheduling coordinators for all resource types manually submit reference level change requests to raise their DEBs above $1,000/MWh when the DEBs would, by their own calculation, rise above $1,000/MWh is just and reasonable and not unduly discriminatory or preferential. We find that allowing resources to bid up to their DEBs—even when they exceed $1,000/MWh—is consistent with Order No. 831's requirement that bids above the soft offer cap be cost-verified, because DEBs are calculated via pre-established cost-verified formulas. We agree with DMM that it is unnecessary to require a resource to submit a reference level change request to allow it to bid up to its calculated DEB, which is designed to provide an accurate representation of resource-specific, verifiable marginal costs. In addition, as CAISO does not have reasonableness thresholds or other criteria against which to validate default energy bid adjustments due to changes in costs other than fuel and fuel equivalent costs,[80] we agree with CAISO that this Tariff revision will help to ensure hydroelectric and energy storage resources' bids are not artificially capped by the $1,000/MWh soft energy bid cap when their calculated DEB value exceeds $1,000/MWh under the established formula.[81] This revision should thus help to ensure that these resources have a comparable opportunity to other resources to submit cost-justified bids above the soft energy bid cap, consistent with Order No. 831.

38. We disagree with CPUC's argument that lifting the DEB cap in the day-ahead market is not necessary because opportunity costs are already accounted for in the day-ahead market. As CAISO explains, a resource's DEB reflects its verified costs based on its unique constraints and operating characteristics.[82] Therefore, artificially capping any resource's DEB at $1,000/MWh in the day-ahead market could lead to inefficient

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[78] *See* CAISO Answer at 1 ("As DMM and the CPUC both acknowledge, without the CAISO's tariff revisions, roughly one-fifth of the CAISO's generation fleet cannot submit energy bids above the soft energy bid cap on what are likely to be the most critical days of demand this summer.").

[79] Order No. 831, 157 FERC ¶ 61,115 at P 140; Order No. 831-A, 161 FERC ¶ 61,156 at PP 38-39.

[80] Transmittal at 8-9.

[81] *Cal. Indep. Sys. Operator Corp.*, 168 FERC ¶ 61,213, at P 36 (2019).

[82] Transmittal at 5.

scheduling because resources would be deprived of the ability to bid their actual, verified costs when those costs exceed $1,000/MWh. Accordingly, we find that CAISO's proposal is reasonable because it will permit cost-verified bids above the soft offer cap, consistent with Order No. 831. Further, we find CPUC's and DMM's arguments regarding the hydroelectric DEB formula's calculation of intra-day opportunity costs to be outside the scope of this proceeding because CAISO has not proposed to revise the hydroelectric DEB formula here. Nonetheless, we encourage CAISO to consider future refinements to its hydroelectric DEB formula to account for variable intra-day opportunity costs, as DMM suggests.[83]

39. Second, we find that CAISO's proposal to create a custom mechanism to recognize when energy storage resources' intra-day opportunity costs warrant real-time energy bids above the soft energy bid cap will also help to "ensure that a resource's cost-based incremental energy offer reasonably reflects that resource's actual or expected costs," as Order No. 831 requires.[84] The Commission has previously found CAISO's inclusion of opportunity costs in a hydroelectric resource's DEB to be just and reasonable. In accepting that proposal, the Commission stated that "CAISO's proposal represents a transparent alternative to the existing negotiated DEB option that will allow hydroelectric resources with storage to reflect their opportunity costs in their DEBs, and in turn will ensure that hydroelectric resources will be dispatched when they are most needed."[85] Here, too, we find that it is just and reasonable for CAISO to include opportunity costs as part of a resource's cost-verified incremental energy offer. Indeed, in Order No. 831-A, the Commission expressly found that "[o]pportunity costs are legitimate short-run marginal costs and not adders above cost" and that "[o]pportunity costs should be considered part of a cost-based incremental energy offer."[86] By reflecting these opportunity costs, we find that CAISO's proposal will lead to more efficient scheduling of storage resources and less reliance on out-of-market actions to maintain reliability during the net peak hours.

40. We find that CAISO's proposal to use the fourth-highest calculated hourly value of the MIBP for the trading day is a reasonable metric for validating intra-day opportunity costs of energy storage resources in CAISO, which are typically four-hour duration resources. We find that because certain imports can bid up to the MIBP on high-priced days, it is reasonable to use the MIBP as a proxy for determining whether energy storage resources are likely to face opportunity costs above the soft energy bid

[83] DMM Comments at 5.

[84] Order No. 831, 157 FERC ¶ 61,115 at P 140.

[85] *Cal. Indep. Sys. Operator Corp.*, 168 FERC ¶ 61,213 at P 36.

[86] Order No. 831-A, 161 FERC ¶ 61,156 at P 38.

cap. Further, the Commission has previously accepted CAISO's use of the MIBP to validate import bids in CAISO's markets, allowing imports over $1,000/MWh where bilateral market prices warrant it.[87] Specifically, the Commission found that "CAISO's approach to validating import bids represents a balanced approach between allowing high prices during times when prices in the Western Interconnection are high and ensuring bids by resource adequacy resources reflect prevailing market conditions."[88]

41. We find CPUC's concerns regarding the MIBP unpersuasive. As to CPUC's analysis of price separation between the MIBP and CAISO real-time prices, we note that CPUC's analysis is limited to a brief period during the extreme conditions of the September 2022 heat wave.[89] In addition, CPUC claims that CAISO's proposal would allow energy storage resources to bid above their opportunity costs on days where the MIBP exceeds ultimate real-time energy prices. However, a resource owner must estimate its intra-day opportunity costs before peak periods occur and final real-time energy prices are formed. As CAISO notes, the relevant factor for this estimate is the prices other resources could offer into the market at the time resource offers are due, because real-time prices are calculated after resource bids are due.[90] Therefore, the fact that the MIBP may exceed final real-time energy prices on some days does not indicate that the MIBP is an unreasonable proxy for expected intra-day opportunity costs. Further, we agree with CAISO's answer that bidding above costs also comes with risk: if a resource bids above the marginal bid in the market, it will miss out on any market award and compensation.[91] As such, such behavior runs the risk of the resource offering at a level greater than other resources and not clearing the market as a result. We also find CPUC's arguments that *Shell Energy v. FERC* could increase the likelihood of high-priced transactions in WECC, which could, in turn, affect the MIBP, to be speculative. Finally, we find that CPUC's and DMM's arguments regarding the calculation of the MIBP are outside the scope of this proceeding,[92] as the Commission has found CAISO's use of the MIBP to be just and reasonable.[93] We note that CPUC may file a complaint or

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[87] *Cal. Indep. Sys. Operator Corp.*, 175 FERC ¶ 61,076 at P 43.

[88] *Id.*

[89] CPUC Comments at 32-33.

[90] CAISO Answer at 10-11.

[91] *Id.* at 6.

[92] CPUC Comments at 30-31; DMM Comments at 11-13.

[93] *Cal. Indep. Sys. Operator Corp.*, 175 FERC ¶ 61,076 at PP 42-43.

DMM may submit a referral for a tariff violation if either believes that CAISO's application of the MIBP is inconsistent with the CAISO Tariff.

42. We also find that CAISO's two other proposed proxies will help to ensure that energy storage resources' incremental energy offers would reasonably reflect their actual or expected costs. With respect to the proxy of the highest-priced cost-verified energy bid for the applicable trading hour, we agree with CAISO that the proposal recognizes that other resources that can bid beyond the soft energy bid cap may set real-time market clearing prices, creating opportunity costs for energy-limited resources in those hours.[94] If energy storage resources' bids are constrained and unable to reflect these opportunity costs, these resources may be prematurely dispatched before other resources and deplete their state of charge before net peak demand periods. Regarding CAISO's proposal to use the resource's DEB if it uses the variable cost option, LMP option, or negotiated rate option as a proxy, we find that this proxy meets Order No. 831's cost verification requirement because DEBs are pre-established formulas designed to serve as an accurate representation of a resource's marginal costs, as discussed above.

43. DMM and CPUC raise concerns that CAISO's proposed energy storage bid cap may not target specific hours where intra-day opportunity costs are most likely to exceed \$1,000/MWh, and that resources could theoretically submit bids beyond their actual costs in some hours. We find that CAISO's proposal to use the fourth-highest hour of the MIBP for the entire trading day is a reasonable approach to reflect that energy storage resources in CAISO are typically four-hour resources, and that their opportunity costs should be based on when the resource would elect to discharge. We recognize that predicting energy storage resources' intra-day opportunity costs (i.e., their expected costs) must necessarily be based on limited, imperfect information. However, the Commission in Order No. 831-A found that opportunity costs are legitimate costs to be included in resources' cost-based incremental energy offers, and the Commission in Order No. 831 acknowledged that RTOs/ISOs may need to verify costs based on estimates or imperfect information.[95] Accordingly, we find that CAISO's proposal is consistent with Order Nos. 831 and 831-A. In addition, we find that CAISO has demonstrated that its proposal does not raise market power concerns, as its current market power mitigation rules will remain in place, and uncompetitive bids will continue

[94] CAISO Answer at 5.

[95] Order No. 831, 157 FERC ¶ 61,115 at P 84 ("Accordingly, the RTO/ISO or Market Monitoring Unit will have to verify that such offers reasonably reflect the associated resource's expected short-run marginal costs, which necessarily involves an estimate. Furthermore, the information that RTOs/ISOs and/or Market Monitoring Units have to estimate and/or verify the short-run marginal costs of some resources may be imperfect.").

to be mitigated under such rules. We agree with CAISO that, when a resource does not have the ability to exercise market power, it will be disincentivized from offering above its expected costs to avoid the risk of losing the opportunity for an energy market award. Furthermore, we agree with CAISO that CPUC and DMM provide no data showing that resources have bid above their actual costs since Order No. 831's adoption.

44. We find misplaced CPUC's contention that intertemporal opportunity costs in CAISO should face similar evidentiary requirements from resources to those the Commission has required of sellers in the bilateral WECC context to justify locational opportunity costs, such as a showing that the resource will have the ability to sell at a later, higher price.[96] In the WECC context, the Commission found that verifying intertemporal opportunity costs, and their applicability, in the context of bilateral spot market sales is likely inappropriate.[97] As such, the Commission limited the justification of sales based on opportunity costs to a showing of the ability to have made an alternative transaction(s) at the time the transaction in question occurred (i.e., forgone opportunities). The Commission further noted that "[i]ntertemporal opportunity costs are typically applied to use-limited resources, which, in producing energy in a given interval, reduce their ability to produce energy in future intervals."[98] We find CPUC's comparison inapposite, because CAISO's proposal pertains to the intra-day opportunity costs that energy-limited resources face in CAISO's real-time organized market, and the Commission has found that, in the context of RTO/ISO markets, opportunity costs are legitimate short-run marginal costs that should be included in cost-based incremental energy offers.[99]

45. As to DMM's concern that inefficient bid cost recovery payments to energy storage resources could theoretically increase as a result of CAISO's proposal, we find that this risk does not outweigh the benefit of allowing energy storage resources to more accurately reflect their opportunity costs in their cost-based incremental energy offers, consistent with Order No. 831. We note, however, that CAISO agrees with DMM that current bid cost recovery rules are an imprecise fit for the unique bid costs of energy storage resources and that CAISO recently launched a new initiative on bid cost recovery for energy storage resources.[100]

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[96] CPUC Comments at 7.

[97] *ConocoPhillips Co.*, 175 FERC ¶ 61,226 (2021).

[98] *Id.* P 17.

[99] Order No. 831-A, 161 FERC ¶ 61,156 at P 38.

[100] CAISO Answer at 8.

46. As we find CAISO's proposed Tariff revisions just and reasonable and not unduly discriminatory or preferential, we dismiss CPUC's request for the Commission to accept the proposal subject to a sunset date or a mechanism to disable the revisions. As stated above, we find that CAISO's proposal will help to ensure that energy-limited resources are able to reflect their opportunity costs in their cost-verified bids, similar to other resources. We find that accounting for these opportunity costs will enable CAISO to more optimally manage these resources' energy limitations over the day, and thereby improve CAISO's ability to reliably and economically meet its net peak demand. Further, as CAISO indicates, if future market issues arise that warrant changes to or removal of these Tariff revisions, CAISO states that it will work with CPUC and other stakeholders to do so.[101] Finally, in response to commenters' requests that the Commission urge CAISO to pursue other various price formation improvements, we note that CAISO is currently examining further potential enhancements throughout its ongoing, more comprehensive Price Formation Enhancements stakeholder initiative.[102] We encourage CAISO to continue to work with DMM and other stakeholders to further refine its price formation rules through this and other future stakeholder initiatives.

<u>The Commission orders</u>:

CAISO's proposed Tariff revisions are hereby accepted, effective August 1, 2024, as requested, as discussed in the body of this order.

By the Commission. Commissioner See is not participating.
Commissioner Chang is not participating.

(S E A L)

Debbie-Anne A. Reese,
Acting Secretary.

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[101] *Id.* at 13.

[102] Transmittal, attach. D (CAISO Board of Governors Memo), at 2.