



California ISO

**Price Formation Enhancements:
Rules for bidding above the soft offer cap
Issue Paper**
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PFE Rules for bidding above the soft offer cap

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1.0 Executive Summary

1.1 Purpose and Scope

Stakeholders are urging the ISO to develop interim functionality that would enable certain resource types, whose costs may at times exceed \$1,000/MWh due to intra-day opportunity costs, to represent these costs in their supply offers prior to or during summer 2024.

This paper combines the working group discussion paper, Stakeholder Recommendations for Policy, and the Issue Paper for policy development. The ISO is conducting an assessment of stakeholder-recommended solutions to determine which, if any, are feasible by summer. This paper describes stakeholder recommendations and seeks feedback on whether those recommendations align with the broader stakeholders community's intentions.

Ultimately, stakeholders and the ISO are in full agreement that resources subject to the soft offer cap should have the ability to reflect their costs, including valid opportunity costs, in their supply offers when those costs rise above \$1,000/MWh. Stakeholders and the ISO also agree that further discussion is necessary to achieve a more robust and durable approach. This paper describes stakeholder-recommended scope items for consideration in a comprehensive policy initiative process.

The ISO appreciates and agrees with the stakeholder-recommended objectives described in Section 3.4 of this paper. These objectives seek an interim approach, including leveraging existing system logic to allow bidding in excess of \$1,000/MWh during summer 2024. ISO policy staff considered additional alternatives to stakeholder proposed solutions that may meet or achieve a different balance of these objectives.

The ISO highlights some existing tools mentioned by stakeholders that can help maintain a resource's desired schedule. The ISO is seeking feedback to better understand the opportunities and limitations of these tools as a solution to problem statements described by stakeholders.

Section 2 serves as the issue paper. The background offered in this section significantly expands on working group discussions. This section identifies outstanding policy, legal, and technical challenges necessary to meet the ISO's expectations of a comprehensive policy for bidding rule enhancements.

Section 3 codifies the stakeholder recommendations for policy based on stakeholder comments and working group discussions to date. These recommendations include principles, problem statements, and the three main approaches for solution development.

1.2 Tentative schedule for interim policy development

The following is based on scheduled milestones and existing constraints:

Date	Milestone
Week of April 22, 2024	Straw Proposal working group
May 2, 2024	Hold working group date (if needed)
May 21-23, 2024	ISO Board of Governors and Western EIM Governing Body meetings
May 24, 2024	File at FERC
July 25, 2024	Decision from FERC
August – September 2024	End of Summer Implementation

2.0 Issue Paper

2.1 Introduction

ISO has been evaluating opportunities to advance price formation in its markets through the Price Formation Enhancements (PFE) initiative. As part of this initiative, stakeholders have prioritized CAISO policy efforts to improving bidding rules in tight system conditions.

Resources should be able to accurately reflect their operating costs in their bids. Bids capped below actual costs may suppress marginal prices below the marginal cost of supply needed to meet load. To ensure this does not occur due to market power mitigation, the ISO calculates default energy bids (DEBs) to ensure that resources can bid their marginal cost, even when subject to mitigation, to ensure competitive outcomes.

FERC, through Order No. 831¹, requires that supply offers from resource-specific system resources are capped at \$1000/MWh or they must cost-verify those bids to set the market clearing price. The ISO's cost-verification process today builds on the process for calculating DEBs and the process for submitting reference level change requests, as introduced in the Commitment Cost and Default Energy Bid Enhancements (CCDEBE) initiative.

The ISO notes in the 2019 FERC Order No. 831² compliance filing that, at that time, storage and demand response resources were not subject to market power mitigation and did not have a DEB. Since 2019, the ISO and stakeholders have developed tools to offer suppliers more flexibility to manage capacity and reflect costs. In 2020, FERC approved a standard storage DEB option with a definition of opportunity costs developed through the ISO stakeholder process, but no definition has been considered to account for costs that rise above \$1000/MWh in real-time.

Opportunity costs are often resource specific and intertemporal. Some stakeholders have defined opportunity costs for storage and hydro as replacement costs, which may change over the course of a day relative to the optimal schedule determined by the day-ahead market. The opportunity to be paid a higher price later in the day introduces uncertainty and risk in a supplier's decision to hold or discharge its resource's state of charge. FERC recognizes that short run marginal costs may be opportunity costs, but does not prescribe how ISOs/RTOs should verify those costs above \$1,000/MWh.

Stakeholders ask the ISO to commit to defining and calculating intra-day opportunity costs such that a process could be built to validate and reflect those costs in the market.

Section 2 serves as the Issue Paper for intra-day opportunity costs, and provides the relevant background for stakeholders to understand the opportunities and guidelines for enhancements to bidding rules for resources with bids limited by the soft offer cap. This section expands on content discussed during PFE working groups in response to stakeholder questions and recommendations.

¹ Order No. 831 at P 1.

² CAISO [Order No. 831 compliance filing](#).

2.2 FERC Order No. 831

FERC issued Order No. 831 in 2016. Order No. 831 had two primary requirements for ISO/RTOs: “(1) cap each resource’s incremental energy offer at the higher of \$1,000/megawatt-hour (MWh) or that resource’s verified cost-based incremental energy offer;” and “(2) cap verified cost-based incremental energy offers at \$2,000/MWh when calculating locational marginal prices (LMP) (hard cap).”³

FERC issued these requirements because it was concerned that certain ISO/RTO offer caps at the time could prevent resources from recouping short-run marginal costs by excluding them from energy bids. The example cited by FERC repeatedly in Order No. 831 was when natural gas prices suddenly “increase dramatically,” such as during cold snaps.⁴ When several resources have short-run marginal costs above \$1,000/MWh but are unable to reflect those costs within their incremental energy offers due to the offer cap, the ISO/RTO may be unable to dispatch the most efficient set of resources because it will not be able to distinguish among the resources’ actual costs. FERC found that all supply resources, regardless of “type” should be able to submit cost-based incremental energy bids above \$1,000/MWh.⁵

Although FERC sought for resources to include short-run marginal costs in their energy bids, Order No. 831 required offers above \$1,000/MWh be cost-verified to ensure they “reasonably reflect a resource’s actual or expected costs.”⁶ Each ISO/RTO or its market monitor is thus required to verify bid costs above \$1,000/MWh.

Order No. 831 also expressly intended for cost verification requirements to work in conjunction with market power mitigation procedures “because market power concerns are heightened when a resource’s short-run marginal costs exceed \$1,000/MWh.”⁷ Order No. 831 thus required all incremental energy offers equal to and above \$1,000/MWh be cost-based, “which essentially requires mitigation of all incremental energy offers above \$1,000/MWh.”⁸ FERC explained:

While in this Final Rule we increase the offer cap for cost-based incremental energy offers, we also subject offers above \$1,000/MWh to additional market power mitigation in the form of the verification requirement. The verification requirement is designed 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. The verification requirement is part-and-parcel with the increase

³ Order No. 831 at P 1.

⁴ *Id.* at P 2; Reuters, “Severe US Cold Snap Prompts Peak Power And Natural Gas Demand,” Jan. 17, 2024, <https://www.reuters.com/business/energy/us-natural-gas-demand-hits-record-high-amid-severe-cold-snap-2024-01-17/>.

⁵ Order No. 831 expressly recognized that demand response resources are particularly unique, and thus “the verification process for demand response resources will necessarily differ from the verification process for generation resources.” However, FERC expressly declined requests to exempt demand response resources “from any additional verification requirements associated with this Final Rule, because such an exemption does not constitute comparable treatment.” Order No. 831 at P 158.

⁶ Order No. 831 at P 140.

⁷ *Id.* at P 139.

⁸ *Id.* at P 142.

of the offer cap for cost-based incremental energy offers. We find that it would be inappropriate to raise the offer cap without imposing a verification requirement. The verification requirement thus serves as an additional backstop market power mitigation measure.⁹

Order No. 831 recognized that pre-market cost verification is not always possible. It thus found that “if a resource’s incremental energy offer above \$1,000/MWh is not verified but that resource is nonetheless dispatched, that resource would be eligible to receive an uplift payment to recover its verified costs.”¹⁰ FERC also found that neither virtual transactions nor exchange transactions—imports and exports—necessarily required cost verification because they generally offer additional supply and increase competition; however, FERC noted it would consider proposals by ISOs/RTOs to verify their costs where warranted. The CAISO, unlike other ISOs/RTOs, often is dependent on import bids to meet demand. As such, the CAISO implemented cost screening criteria for imports simultaneous with its Order No. 831 compliance, as discussed below.

2.3 Compliance with FERC Order No. 831

The soft offer cap and hard offer cap groups represent two distinct categories of resources and bidding rules:

Hard offer cap group: Demand bids, virtual bids, imports and exports

This group is made up of resources that cannot practically cost-verify, and cannot identify pre- or post-market, like demand bids and virtual bids. When the required conditions arise,¹¹ the ISO caps the bids of these external transactions at \$2,000/MWh without subjecting them to cost verification.

FERC Order No. 831 does not have cost-verification requirements for bids supported by resources that cannot be identified pre- or post-market. But in response to stakeholder concerns over the absence of cost verification for imports that might bid up to \$2,000/MWh, ISO has developed limited rules and policies applicable to resources for the hard offer cap group.

These rules are not intended to meet the standards of the soft offer cap group’s cost verification requirements but provide an incremental level of protection from exercise of market power.

⁹ *Id.* at P 143.

¹⁰ *Id.* at P 146.

¹¹ Either the ISO-calculated Maximum Import Bid Price (MIBP) rises above \$1,000/MWh or a resource specific system resource submits a cost-verified energy bid above \$1,000/MWh. The MIBP is discussed further in this paper. See the BPM for Market Instruments Attachment P for more information on the existing logic.

Soft offer cap group: Generators including hydro, battery storage, and proxy demand response

The soft offer cap applies to resource specific system resources. These are resources the ISO can identify in connection with their bids, and for which the ISO has information about their underlying physical characteristics and marginal cost.

The soft offer cap group is required to cost-verify bids above the soft offer cap. To facilitate and automate cost-verification above the soft offer cap, the ISO developed a process using default energy bids which provides a comparable pathway to cost-verify across different resource technologies.

2.4 The reference level change request process

The ISO process for suppliers to request and cost-verify bids builds on the ISO's process for calculating default energy bids (DEBs). The DEB is intended to ensure competitive outcomes in conditions where participants might have market power by reflecting a resource's marginal costs in the market. Absent perfect information, the DEB can serve as a reasonable benchmark for a resource's specific short run marginal costs.

When a resource submits bids into the bidding application (scheduling infrastructure business rules platform, or SIBR), the bid is capped by the soft offer cap under normal operating conditions. When a resource attempts to submit an energy bid above the soft offer cap, SIBR uses the DEB as a key reference to cost-verify the bid.

The DEB is calculated in separate internal systems, depending on the DEB type, and is capped to \$1,000/MWh in each respective internal system. Even if the DEB is determined to be greater than \$1,000/MWh based on its uncapped formula, it is always capped at \$1000/MWh by the time it is used by downstream systems like SIBR.

- Example: A scheduling coordinator for a hydroelectric generator uses the hydro DEB option. On a high priced day, bilateral prices used in that resource's hydro DEB might get high enough to force the DEB calculation over \$1,000/MWh, but the internal calculation system caps it at \$1,000/MWh before sending it to downstream systems like SIBR and the market.

To bid above the soft offer cap, a resource must receive an adjusted DEB through the reference level change request (RLCR) process. Successful cost-verification through the RLCR process does not 'lift the cap' on the DEB, but supplants the capped DEB with a new adjusted DEB, which represents that resource's new energy bid cap.

There are two options available to scheduling coordinators¹² under the umbrella of the RLCR process:

¹² These options are available whenever a generator wishes to request that the ISO use a different fuel or fuel-equivalent cost in its reference level calculations, whether bidding above the soft offer cap or not. The RLCR options also encompass changes to the default commitment cost values (i.e. startup cost, minimum load cost, and transition cost). Refer to the BPM for Market Instruments Attachment O for details on the RLCR processes.

1. Manual RLCR: scheduling coordinators submit their actual or expected fuel/fuel-equivalent costs directly to the ISO and if approved, the ISO recalculates reference levels (DEBs and commitment costs).
2. Automated RLCR: scheduling coordinators submit their recalculated reference levels directly into SIBR. The submitted values are screened against an ISO-calculated reasonableness threshold and will be accepted up to the reasonableness threshold value. This is described further below.

A reasonableness threshold facilitates automated RLCR for adjusting DEBs

The reasonableness threshold is calculated by the ISO and is based a resource's specific operational characteristics. Headroom between the reasonableness threshold and the DEB accounts for potential differences between a resource's actual and expected costs.

The reasonableness threshold is calculated for all resources, regardless of their DEB option or resource type, using the variable cost-based DEB calculation with an additional 10 or 25 percent scalar on the resource's fuel or fuel-equivalent cost. In effect, the limit of what is considered a reasonable range within which to cost-verify is 10 or 25 percent of a resource's fuel or fuel-equivalent costs.

If the cost submitted in the automated RLCR is equal to or less than the resource's reasonableness threshold, the verified cost will be accepted and applied in the next applicable market run. If the submitted cost exceeds the resource's reasonableness threshold, the request will be capped at the level of the reasonableness threshold, and used in the next applicable market run.

- ➔ Example: The scheduling coordinator from the previous example wants to receive an adjusted DEB since their bid was capped at the soft offer cap. The resource's hydro DEB is set by the bilateral electric hub prices, but the variable cost option used to calculate the reasonableness threshold does not capture this bilateral price and yields a negligible range for the scheduling coordinator to make adjustments.

The reasonableness threshold is a way to automate requests within a reasonable range, but suppliers also can use the manual process when they face costs outside that range. The manual process can be leveraged at any time, subject to the BPM criteria¹³, however it should preferably be used when costs are not fully accepted (i.e. capped at the reasonableness thresholds) through the automated process.

Stakeholders and the ISO agree that solutions should leverage the automated RLCR process, which can accommodate a large volume of requests if necessary. Stakeholder recommendations to modify the reasonableness threshold are highlighted in Section 3.

¹³ See BPM for Market Instruments Attachment O.1.3

A successful manual RLCR results in changes to resource's reference levels. Once verified, the ISO recalculates all reference levels, including the DEB. Changes accepted through the manual process apply to reference levels for the full day.

2.5 Default Energy Bid Options

SCs must opt-in to a DEB option. In addition to the three original methodologies for calculating the DEB—LMP option, variable cost option, negotiated rate option—SCs may also choose a hydro or storage DEB option.

The hydro DEB uses bilateral electric hub index prices to represent a short run opportunity cost, dependent on the maximum amount of storage (in months) a hydro resource has when cycling reservoirs throughout the year. The hydro DEB also considers a gas floor that represents the opportunity cost of substituting energy from a typical gas peaking resource.

The storage DEB considers three components: energy costs to charge, variable operations costs, and opportunity costs. Both the energy cost and opportunity cost components use day-ahead LMPs. The day-ahead DEB uses LMPs from the MPM pass of the market and the real-time DEB uses LMPs from the IFM pass. The opportunity cost reflects the n^{th} highest LMP, where n is the discharge duration of the resource (e.g. 4 hours). This opportunity cost does not capture real-time price movement. Because this DEB is calculated within the day-ahead market, it is not available prior to the day-ahead market close, which poses challenges for cost-verification in day-ahead.

A full description of all of these options can be found in the BPMs for Market Instruments Appendix D.¹⁴

An SC may pursue a negotiated DEB option by providing the ISO with a proposed DEB formulation and justification for that formulation. The negotiated DEB may reflect opportunity costs if applicable, formulas or other criteria to modify the DEB in response to potential changes in costs, operational or market conditions, or other relevant factors.

DEBs have a static value throughout the day.

DEBs do not represent an hourly cost curve, rather they are represented as a single calculated number in day-ahead and real-time (e.g. the 4th highest day-ahead LMP).

Consistent with the DEB design, the reasonableness threshold is also a static value and thus the automated RLCR process intended to facilitate hourly adjustments is using a static reasonableness threshold value to screen such adjustments.

PDR does not have a DEB

Demand response resources with cost-based energy bids are subject to the soft offer cap and required to cost-verify if proposed cost-based energy bids exceed \$1,000/MWh.

¹⁴[https://bpmcm.caiso.com/BPM%20Document%20Library/Market%20Instruments/BPM for Market%20Instruments_V85_Clean.doc](https://bpmcm.caiso.com/BPM%20Document%20Library/Market%20Instruments/BPM%20for%20Market%20Instruments_V85_Clean.doc)

Proxy Demand Response (PDR) resources participate in the market by submitting cost-based energy bids, so these resources are subject to the soft offer cap and cost-verification requirements.

2.6 The Maximum Import Bid Price

FERC Order No. 831 does not require the same verification rules for import or virtual bids as it does resource-specific system resources. However, the ISO identified a need to provide some reassurance of protection from the potential exercise of market power when the proportion of imports meeting demand might increase during structurally uncompetitive conditions.

The ISO's import bidding and market parameters initiative¹⁵ sought to ensure import energy bidding rules were generally consistent with the CAISO's bidding rules for other resources subject to cost-verification measures, given these resources cannot cost-verify their energy bids in the same manner.

The ISO's market rules governing participation at its interties makes physically verifying import costs infeasible. Unlike resource-specific system resources, an importing resource may not be identifiable pre- or post-market, nor does the ISO have information about the physical characteristics of the supply supporting imports.

In another distinction from system resources, import suppliers do not consistently participate in the market. The ISO and stakeholders were concerned that requirements or bid caps might deter imports from participating¹⁶, but did not extend this concern to resource adequacy (RA) resources, which generally have a must-offer obligation.

The maximum import bid price (MIBP) is a proxy for the import's highest potential opportunity cost and represents electricity prices in the bilateral market outside of the ISO's balancing authority area. The MIBP calculation is an hourly value, calculated separately for the day-ahead and real-time markets, and uses both CAISO energy prices and the maximum bilateral index prices at either Mid-C or Palo Verde. The corresponding on-peak or off-peak bilateral price¹⁷ will be used in conjunction with an hourly shaping price factor to map the block bilateral price to the hourly granularity.

The same bilateral index hub prices, Mid-C and Palo Verde, are also used in the short run marginal cost component of the hydro DEB option. However, the MIBP represents a price screening methodology and is not necessarily a resource-specific cost like the hydro DEB which considers other unique resource-specific parameters.

The MIBP is an important input for the purposes of capping RA imports above the soft cap, and generally enabling bidding above the soft cap for other non-resource-specific resource types. When the MIBP is calculated above \$1,000/MWh,¹⁸ non-resource-

¹⁵ [California ISO - FERC Order 831 - Import bidding and market parameters \(caiso.com\)](#)

¹⁷ Bilateral prices trade in on-peak and off-peak blocks where on-peak represents a 16-hour firm energy product from 6:00am-10:00pm and off-peak represents a 8-hour product for all other hours. Bilateral prices for Sundays and holidays are entirely off-peak for all 24 hours.

¹⁸ Or the ISO receives a cost-verified bid above \$1,000/MWh

specific resources like imports and virtual bids can be submitted above the soft cap as outlined in sections above.¹⁹ RA imports are capped at the higher of the MIBP or the highest cost-verified bid.

3.0 Stakeholder Recommendations for Policy

This section describes stakeholders' recommendations for policy development.

Stakeholders have requested that the ISO comment on the feasibility of stakeholder recommended solutions. To fairly represent the full the scope and intent of stakeholder recommendations, the ISO provides limited feedback in this section but will provide a comprehensive assessment in its forthcoming straw proposal.

3.1 Progress to Date

The ISO brought up the topic of battery storage resources and FERC Order No. 831 in PFE working groups. The ISO sought comments from the stakeholder community, encouraged additional feedback through the Policy initiatives roadmap, and hosted a follow up discussion on March 12, 2024.

Stakeholder comments through PFE were generally supportive of allowing certain resources to bid above the soft offer cap. Stakeholders described this topic as a high priority.

Stakeholders raised this topic through the annual policy initiatives roadmap process.²⁰ Of the 31 stakeholders (or joint stakeholders) who submitted a total of 92 unique requests/recommendations, nine stakeholders requested the ISO address this issue: BPA, CESA, DMM, PGP, SDG&E, Seattle City Light, SCE, Terra-Gen, Vistra.

As part of the revamped 2024 Policy Initiatives Catalog and Roadmap, Stakeholders also shared Regional Issues Forum (RIF) sector priorities during a round table discussion. During this prioritization discussion the WEIM, California ISO PTO, Consumer Owned Utility, Independent Power Producer and Market, Consumer Advocates, Power Marketing Administration sectors all raised the topic of bidding above the bid cap for Energy Storage and Hydro resources as a high priority item for the ISO to address. During the Energy Storage and Market Integration topic at the same RIF meeting, CESA also provided a presentation highlighting concerns with the current bid caps impact to intra-day opportunity costs leading towards sub-optimal dispatches.

Additionally, during the March 20th WEIM Governing Body meeting stakeholders including PGE provided comments on the DEB for energy limited resources during

¹⁹ Not withstanding specific bidding rules or prohibitions imposed by local regulatory authorities that may exist.

²⁰ <https://stakeholdercenter.caiso.com/RecurringStakeholderProcesses/Annual-policy-initiatives-roadmap-process-2024>

energy limited hours with the current bid cap at \$1,000. They stated that while using a bidding strategy has been an effective tool in the past to manage the deployment of an energy limited resource during the best hours for deployment (particularly peak hours), when prices approach the bid cap outside the peak hours, the current bid cap limits the ability to manage the deployment of the same assets. PG&E also shared their appreciation for the ISO addressing this issue during the March 12th Working Group, and supported a focus on addressing resources currently limited by the \$1000 cap reiterating the need for a solution before this summer.

Stakeholders have asked for an immediate assessment of feasible approaches for summer of 2024, and that the ISO commit to defining and calculating intra-day opportunity costs such that a process could be built to validate and reflect them in the market.

3.2 Problem Statements

1. Resources with intra-day opportunity costs may not be able to reflect a bid high enough to preserve its SOC, and limited energy, for highest price hours.
 - a. Intra-day opportunity costs are difficult to reasonably estimate pre-market
2. Resources with intra-day opportunity costs may be unable to hold their day-ahead market schedules when prices rise above \$1,000/MWh in real-time.
3. Scheduling coordinators of non-gas resource-specific resources have challenges verifying and reflecting costs in the market when the costs are above \$1,000/MWh. DEBs are capped at \$1,000/MWh unless the SC cost-verifies a higher DEB through the RLCR process.
 - a. The reasonableness threshold, which is based on the variable cost DEB and used in the automated RLCR process, is insufficient to validate DEB adjustments for non-gas resources and enable cost-verified bidding above \$1,000/MWh.
4. Existing values intended to estimate opportunity costs in storage and hydro DEBs may not ensure efficient schedules under tight system conditions.
 - a. The existing storage DEB option does not capture intra-day opportunity costs.

3.3 Scope of Technologies Under Consideration

Most stakeholders support enhancements for resources with intertemporal opportunity costs including battery storage, hydro, and PDR. Stakeholders cite impacts common across such resource types including risk of pre-mature dispatch and not having sufficient capacity in critical hours.

- Battery storage: stakeholders broadly support focusing on battery storage resources.
- Hydro: Stakeholders have noted that bidding rules must support the optimal flow management of cascading hydroelectric systems and preserve planned operation as best as possible.
- PDR: Some stakeholders recommend that options being discussed for battery storage and hydro also extend to PDR resources. Some stakeholder recommend extending the rules to PDR that currently apply to RDRR; when the hard offer cap is in effect, RDRR bids are automatically re-rated up to \$1,900/MWh or 95% of the cap.²¹ One stakeholder notes that changes to PDR will provide limited benefits because PDR is subject to CPUC rules that require PDR resources to bid no greater than \$949²² and would require that the CPUC change its rules.

Stakeholders understand that the unique challenges (and appropriate solutions) associated with each of these classes of resources should be evaluated in more detail as resource types have different characteristics and requirements.

While many stakeholders recommended narrowing the scope for summer 2024 to battery storage, the ISO believes all resources should have the ability to accurately represent their costs and that it is appropriate to consider all resource classes recommended by stakeholders as part of the feasibility assessment for this summer.

3.4 Approach for Policy Development

Stakeholders support a summer 2024 solution to support resource's ability to hold their positions in the supply stack and retain their DA schedules. Higher temperatures and load over the summer, and risk of tight conditions which have historically materialized in August and September, are cited as a sources of urgency. Stakeholders understand that a summer 2024 timeline is highly constrained and may not support a holistic policy discussion or novel technology development. They encourage the ISO to do the following:

²¹ Section 2.5 of this paper explains how FERC Order No. 831 compliance differs for PDR. PDR participates by submitting cost-based bids and is subject to soft offer cap group rules.

²² In the January WG, the ISO mentioned that RDRR gets automatically revised from a min bid of \$950 to \$1900.

- Leverage existing logic and functionality for a faster approval process and implementation
- Provide reasonable confidence in Board and FERC approval
- Develop a plan for monitoring and evaluation, and take lessons learned into account to inform a longer-run approach

Most stakeholders acknowledge an interim solution may not be optimal but would improve on the status quo, while a few stakeholders request a more robust discussion of potential trade-offs. They urge CAISO to share its perspective on feasibility and the required implementation period for stakeholder recommended solutions.

The ISO agrees with stakeholder recommended objectives for assessing the feasibility of a solution for summer 2024, understanding that the final solution will be constrained by technical feasibility. The straw proposal will provide an evaluation of stakeholder recommended solutions and their feasibility.

Stakeholders simultaneously support a more robust initiative to serve the broader problem statement of improving resources' ability to cost-verify long-term while reflecting costs more accurately in the interim. While a short term approach may eliminate the opportunity cost of discharging prematurely, an initiative would support developing a definition of and calculation for intertemporal opportunity costs for use in DEBs and the real-time optimization.

3.5 Stakeholder Recommended Solutions

The ISO has organized stakeholder recommended solutions into the three approaches for ease of reference, and has also offered some additions and modifications for consideration. This section also provides some detail on the process mechanics of implementing these proposed solutions.

The ISO highlights three approaches to solution development based on stakeholder feedback:

1. **Approach 1: Allow resources to bid up to pre-determined cap.** Options described under Approach 1 consider allowing certain resources to bid up to a specified cap whose value has been pre-determined by the ISO, and can serve as the basis for cost verification.
2. **Approach 2: Leverage existing tools to position resources in the bid stack.** Options described under Approach 2 are intended to ensure resources can maintain their DA schedules using existing functionality.

3. **Approach 3: Enhance resources' ability to accurately identify and reflect costs:** Options described under Approach 3 involve modifications to DEBs and/or the reference level change request process.

Approach 1: Directly adjust the soft offer cap for resources subject to the soft offer cap to allow them to bid above \$1,000/MWh when the hard offer cap is in effect.

Stakeholders expect that these recommendations are sufficiently simple to be implementable for summer 2024. Generally, these recommendations might be applied to storage, hydro, and PDR. Stakeholders note that they are willing to accept a less refined solution that has a higher probability of summer implementation.

- Stakeholder Recommendation 1: Increase the bid cap for soft offer cap resources to the same cap currently applied to the bids of non-resource-specific system resource that are RA.

Today, bids from unspecified source resources that are RA are not subject to the soft offer cap but are capped by the higher of the MIBP (which has varying values across hours) and the highest cost-verified bid. Stakeholders recommend extending this logic to storage, hydro, and PDR resources in the soft offer cap group.

Stakeholders suggest this as a solution to problem statement 1—that storage resources may not be able to reflect a bid high enough to preserve SOC for highest value hours.

This recommendation is intended as a simple adjustment that does not modify the DEB. If identified for market power mitigation through LMPM or BAA-level MPM, impacted resources would be mitigated down to their unadjusted DEB as currently formulated.

- Stakeholder recommendation 2: Modify the existing bid cap logic to cap bids by a single, higher static value over the full operating day.

This recommendation improves on Recommendation 1 by ensuring hydro, storage, and PDR resources have sufficient headroom to bid above the highest priced bids in each hour of the real-time market. Stakeholders note that Recommendation 1 may still result in these resources being dispatched earlier in the day because the real-time market does not look ahead to all hours.

Possible values for the static cap:

- One stakeholder recommends setting the cap at the higher of the highest value of the MIBP or the highest cost-verified bid. Some stakeholders recommend setting the cap at \$2,000/MWh.
- In response to stakeholder concerns around the liquidity of the bilateral index prices used in the MIBP, the ISO suggests that stakeholders may consider a modification to the capping logic where bids are capped by the higher of the soft

offer cap, the DEB, and the Highest DA SMEC * 110%. The 10 percent scalar is consistent with the scalar used in the reasonableness threshold, DEBs, and other stakeholder recommendations.

- Stakeholder recommendation 3: Remove the \$1,000/MWh soft offer cap from DEBs

Today, DEBs are capped by \$1,000/MWh unless SCs request and receive an adjusted DEB through the RLCR process. This option would allow resources to bid up to the value of the DEB when the DEB is above \$1,000/MWh, eliminating the need to submit an RLCR.

One stakeholder recommends this in addition to recommendation 2, allowing resources to bid up to a static value greater than the highest expected cost bid. Neither recommendations 1 or 2 impact the DEB, so the intended benefits of those recommendations would be unwound if a resource's bid is mitigated through LMPM or BAA-level MPM.

Approach 2: Leverage existing tools to position resources in the bid stack.

Stakeholders identified opportunities to leverage tools that exist today. Some options under this approach might solve problem statement 2—that resources with intra-day opportunity costs may not be able to hold their day-ahead market schedules when prices rise above \$1,000/MWh in real-time.

- Stakeholder recommendation 1: Manage SOC through the existing end-of-hour state-of-charge tool

This option directly addresses stakeholder problem statements 1 and 2 and exists today. This feature provides battery operators with a more flexible option to manage real-time schedules than relying on self-schedules.

- Stakeholder recommendation 2: Self-Schedule day-ahead schedules in real-time

One stakeholder notes that storage resources could self-schedule in real-time to follow their day-ahead market awards. However, others noted that this is not consistent with Flex RA obligations to offer economically.

- Stakeholder recommendation 3: Exceptional dispatch functionality

The ISO has authority through its exceptional dispatch state of charge tool to provide a reliability backstop when it is concerned real-time price signals may inadvertently discharge storage resources and make them less available when the CAISO system needs them most.²³ This functionality was developed as part of the Energy Storage Enhancements stakeholder initiative.²⁴

²³ FERC [ER23-1533](#)

²⁴ Energy Storage [Enhancement](#) Initiative

Approach 3: Enhance the existing cost-verification process.

Stakeholders recommend approaching the issue by considering modifications to DEBs and the reasonableness threshold. Some stakeholders intend for these recommendations to be considered as part of long-run bidding rule enhancements, while others have requested their suggested modifications be assessed for summer feasibility.

- Stakeholder recommendation 1: modify the reasonableness threshold used in the automated RLCR process

A modification to the reasonableness threshold would facilitate DEB adjustments to a cap, which here is envisioned to be above \$1,000/MWh. Today, the reasonableness threshold is calculated based on the variable cost DEB for all resources regardless of the DEB option they are using.

Stakeholders recommend a new formula for the reasonableness threshold used to assess storage resource's automated adjustments. The recommended formula is:

$$(\text{MAX} [\text{MIBP, highest cost-verified bid}] / \text{round trip efficiency}) * 110\%$$

Stakeholders explain that this modification would allow storage resources to bid up to \$2,000/MWh while simultaneously submitting an automated RLCR to their DEB, and SIBR would reduce the bid to the lower of the resource's energy bid or adjusted DEB as screened by the reasonableness threshold.

- Stakeholder recommendation 2: Modify the default energy bid for hydro resources

Update the short-term component of the hydro DEB option to reflect the reasonableness threshold applied to non-resource-specific RA resources. This modification would supplant the existing short-term component intended to represent the opportunity cost for hydro to sell electricity generated from gas instead of the hydro resource.

The recommended formula is:

$$\text{Short-Term Component} = \text{MAX} (\text{MIBP, Highest Cost Verified Bid}) \times 110\%$$

Stakeholders explain that during high-priced conditions, hydro resources with an intra-day opportunity cost could bid up to \$2,000/MWh while simultaneously submitting an automated RLCR to their DEB, and SIBR would reduce the bid to the lower of the resource's energy bid or adjusted DEB as screened by the reasonableness threshold.

This recommendation bears some similarity to recommendation 1 but would implement the logic somewhat differently.

- Stakeholder recommendation 3: Explore using a look-ahead horizon to inform intra-day opportunity costs for storage DEBs

Stakeholders note that this task would be complex and resource intensive to develop, so this option would be reserved for the long-run policy discussion.

3.6 Market Monitor Recommendation

Revising the DEB for storage and other resources that may have intraday opportunity costs, and allowing these resources to bid up to \$2,000 in some circumstances, would align with cost when those costs exist. However, the general complexity of calculating an appropriate higher DEB value for some hours might warrant additional discussion, potentially through a full stakeholder working group or initiative process. In the interim, the ISO could continue to rely on the new exceptional dispatch functionality for storage as needed for reliability purposes, and defer implementing a new policy until it can be given the necessary care/consideration.

4.0 Governance Classification: Joint Authority

This initiative discusses potential changes to the ISO tariff related to resource offers in ISO markets. The ISO believes that the WEIM Governing Body has joint authority with the ISO Board of Governors over the proposed tariff rule changes.

The ISO Board of Governors and the WEIM Governing Body have joint authority over any:

proposal to change or establish a tariff rule applicable to the WEIM/EDAM Entity balancing authority areas, WEIM/EDAM Entities, or other market participants within the WEIM/EDAM Entity balancing authority areas, in their capacity as participants in the WEIM/EDAM. The WEIM/EDAM Governing Body will also have joint authority with the Board of Governors to approve or reject a proposal to change or establish any tariff rule for the day-ahead or real-time markets that directly establishes or changes the formation of any locational marginal price(s) for a product that is common to the overall WEIM or EDAM markets. The scope of this joint authority excludes, without limitation, any other proposals to change or establish tariff rule(s) applicable only to the CAISO balancing authority area or to the CAISO-controlled grid. Note: For the avoidance of any doubt, that the joint authority definition is not intended to cover balancing authority-specific measures, such as any parameters or constraints, the CAISO may use to ensure reliable operation within its balancing authority area.²⁵

All of the tariff rule changes anticipated in this initiative would be “applicable to the WEIM/EDAM Entity balancing authority areas, WEIM/EDAM Entities, or other market participants within the WEIM/EDAM Entity balancing authority areas, in their capacity as participants in the WEIM/EDAM.” None of the proposed tariff rules would be applicable

²⁵ Charter for EIM Governance § 2.2.1

“only to the CAISO balancing authority area or to the CAISO-controlled grid.”
Accordingly, this initiative falls entirely within the scope of joint authority.

This proposed classification reflects the current state of this initiative and could change as the stakeholder process proceeds. Stakeholders are encouraged to submit a response to this proposed decisional classification in their written comments, particularly if they have concerns or questions.