Price Formation Enhancements

BAA-Level MPM and Scarcity Pricing
Revised Straw Proposal

July 2, 2026

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Executive Summary

This Revised Straw Proposal reflects multiple rounds of stakeholder working group discussions and feedback. The proposal focuses on price formation changes that are ready to advance beyond policy development toward governance approval and implementation. These changes would reduce unnecessary market power mitigation, preserve real-time price signals, and improve how prices reflect severe system stress.

The stakeholder working group process identified two priorities:

- **Reduce unnecessary market power mitigation.** Balancing authority area (BAA)-level mitigation rules prevent suppliers from raising prices when WEIM/EDAM transfer limits isolate an area from outside competition. However, the current test can overlook supply from neighboring BAAs where available transfer capability allows suppliers in those areas to compete with internal suppliers to serve the BAA's load. It can also assume suppliers would withhold generation needed to serve their own customers and mitigate suppliers that are likely too small to drive a noncompetitive outcome. Over-mitigation can suppress legitimate prices, weaken incentives to make supply available, and produce outcomes that do not reflect actual competitive conditions.
- **Better reflect emergency conditions in market prices.** During severe system stress, prices may not fully reflect supply scarcity or the actions operators take to protect reliability. That can weaken the response from generation, imports, storage, and flexible demand when the system needs them most.

To address these priorities, CAISO proposes to:

- **Target market power mitigation to WEIM and EDAM entities more precisely** by testing interconnected BAAs together when transfer capability allows neighboring supply to compete, reducing each supplier's potential withholding amount by the generation needed to serve its own load, and mitigating only suppliers identified as pivotal.
- **Strengthen emergency price signals** by treating firm load shed as unserved demand in the real-time market and reflecting the cost of using capacity held back for contingencies.

Under this proposal, the CAISO BAA would keep its current default competitive status for BAA-level market power mitigation. It preserves the status quo because CAISO is currently the only BAA in the WEIM/EDAM footprint that allows market participants to submit economic offers on its interties, and the proposed test does not yet fully capture the competition those offers provide. CAISO's analysis showed that applying the test to the CAISO BAA could understate competitive supply and alter mitigation outcomes, particularly in tight evening hours, across the market footprint. CAISO plans to revisit this issue in a future phase of this initiative.

CAISO also convened dedicated stakeholder working groups to evaluate comprehensive, footprint-wide scarcity pricing. Stakeholders disagreed on the timing, design, and customer impacts of broader scarcity pricing changes, so CAISO is deferring a broader redesign for now. CAISO plans to restart those discussions after it secures governance approval for the changes described in this proposal.

1 Changes from Straw Proposal and Responses to Stakeholder Feedback

This revised straw proposal includes the following changes:

- **Refines language throughout the proposal regarding non-pivotal suppliers' ability to raise prices.** As noted by the Department of Market Monitoring (DMM), non-pivotal suppliers may still be able to set market prices above their marginal costs under certain conditions.
- **Distinguishes the use of the term "competitive MEC" from the term "competitive LMP" throughout the proposal.** Competitive MEC establishes the baseline competitive energy price for the entire BAA based on transfer constraints, while the competitive LMP is the final resource-specific mitigation threshold that incorporates that MEC along with adjustments for local physical transmission congestion.
- **Clarifies the terminology used to describe BAA-level MPM mechanics throughout the proposal.** CAISO recognizes that applying the local MPM terms "supply of counterflow" and "demand for counterflow" to BAAMPM creates confusion. Those terms suggest a flow-based counterflow concept that does not exist at the BAA level. At the BAA level, the MPM process tests the competitiveness of the power balance constraint, not a flowgate. Physical counterflow and shift factors do not apply to the power balance constraint. Using counterflow terminology therefore obscures what the market is actually testing – whether available competitive supply is sufficient to meet BAA demand.
- **Adopts "export transfer connection" as the single standard term to define how groups connect.** The straw proposal used loose terms like "direct transfer connection" and "direct transfer capability" to define group connectivity. This proposal standardizes the terminology.
- **Updates Section 3 to summarize stakeholder engagement since the straw proposal.**
- **Withdraws the straw proposal's recommendation to remove the CAISO BAA's default competitive status in Section 4.1.1.** The ISO initially proposed to include the CAISO BAA in the BAA-level MPM grouping algorithm and remove the CAISO BAA's default competitive status so that all participating BAAs would be evaluated under a common framework. After stakeholder discussion, MSC review, and additional analysis, the ISO now proposes to retain CAISO's current

default competitive status for BAA-level MPM at this time. Under the revised design, any group containing the CAISO BAA will pass without an RSI calculation.

The ISO makes this decision because the current record does not yet support applying the BAA-level MPM test to the CAISO BAA. Before doing so, the stakeholder record indicates that the ISO would need either to better account for import competition into CAISO or to show, with empirical evidence, that existing BAA-level market power in CAISO is causing harm.[1] The record does not yet satisfy either condition.

The ISO continues to view the grouping approach as an important improvement for non-CAISO BAAs. It allows the test to recognize competitive supply from connected BAAs instead of evaluating each BAA alone. This supports a core objective of this initiative – to reduce unnecessary mitigation.

However, the record convinces the ISO that the current three-pivotal-supplier test would not accurately measure BAA-level competitiveness if applied to the CAISO BAA.

The key issue is how the current test accounts for import competition. The CAISO BAA currently allows market participants to submit economic intertie import offers. Other BAAs in WEIM and EDAM generally rely on self-scheduled intertie transactions and WEIM or EDAM transfers. That distinction matters because CAISO may have uncleared import offers that could become economic if internal suppliers attempted to withhold supply. The current test would credit CAISO only for cleared net imports and would not adequately credit the broader set of available import offers that could discipline CAISO prices. As a result, the test may understate the competitive supply available to CAISO and may identify BAA-level market power when the result is instead driven by an incomplete treatment of import competition.

This concern also relates to scarcity pricing. Expanding BAA-level mitigation to CAISO without a test that adequately accounts for import competition could suppress prices in the same tight conditions in which accurate scarcity pricing matters most. Several stakeholders have argued that the ISO should not apply BAA-level mitigation to the CAISO BAA without also reforming scarcity pricing so

[1] For this purpose, harm means evidence that uncompetitive conduct raised prices. Such evidence could include sustained markups above competitive benchmarks that cannot be explained by fuel price volatility, scarcity, opportunity costs, or other legitimate market conditions.

that prices can reflect scarcity before emergency conditions arise. Because this proposal does not include a comprehensive scarcity pricing redesign, the ISO will defer BAA-level mitigation in the CAISO BAA until the Price Formation Enhancements (PFE) working group can evaluate both issues together.

The empirical record also supports this decision. CAISO's analysis showed that the revised grouping framework, including the load-serving obligation adjustment, can reduce mitigation compared with the current approach, even when it includes the CAISO BAA. The ISO therefore does not conclude that including the CAISO BAA would necessarily increase mitigation relative to the existing framework. Instead, the concern is more specific. Within the revised grouping framework, including the CAISO BAA in the BAA-level test can still change mitigation outcomes during tight evening hours. CAISO's January 2026 analysis presented to the MSC showed that pass rates for all BAAs fell during hours ending 19 through 21 when the grouping approach included the CAISO BAA. The load-serving obligation adjustment improved the results, but it did not address the separate concern that the test may understate available import competition into CAISO.

MSC member Scott Harvey made the point that changed mitigation outcomes do not, by themselves, prove that BAA-level market power is widespread in CAISO. He explained that the analysis showed some applications of the three-pivotal-supplier test would fail for CAISO and surrounding regions, but did not show that CAISO market outcomes were actually noncompetitive. To make that showing would require evidence that suppliers significantly withheld supply in specific intervals, and that the withholding changed dispatch and materially increased prices after accounting for fuel price uncertainty, opportunity costs, and other legitimate reasons for high bids or prices.

The ISO therefore concludes that it should not expand BAA-level MPM to the CAISO BAA based only on structural test failures. Before doing so, the PFE working group should either develop a test that more accurately reflects available import competition into CAISO or develop an empirical record demonstrating BAA-level market power harm that warrants mitigation.

The proposal preserves the benefits of grouping for non-CAISO BAAs while deferring application of BAA-level MPM to the CAISO BAA. The ISO intends to reevaluate this issue in a future phase alongside broader scarcity pricing reforms.

- **Improves the grouping approach algorithm by testing lower-priced groups individually when they fail after being merged with higher-priced groups.** DMM noted that the proposed grouping approach, which ranks BAAs from highest to lowest MEC, can cause a lower-priced BAA that would pass the market power test on its own to appear non-competitive when tested as part of a group that includes a larger, non-competitive BAA. DMM asked CAISO to consider ranking and testing BAAs from lowest to highest MEC instead. DMM suggested that this approach could identify lower-priced BAAs that are competitive on their own before grouping them with higher-priced BAAs that fail the test.

The ISO evaluated this suggestion but did not adopt it. The ISO's primary concern is that testing from lowest to highest MEC can conflict with the economic direction of the binding transfer constraints that create price separation. When a constraint limits transfers from a lower-priced area to a higher-priced area, it physically blocks competition from the lower-priced side and gives suppliers in the higher-priced area market power. In some cases, a low-to-high approach would treat the lower-priced area's fringe supply as if it were fully available to serve demand in the higher-priced area, even though the transfer limit prevents it. This approach could under-mitigate by understating the market power of suppliers behind the constraint.

At the same time, the ISO shares DMM's concern that a strict high-to-low ranking can over-mitigate by classifying a lower-priced BAA as non-competitive only because the algorithm tests it in a group with a higher-priced BAA that fails the test. To address this concern while retaining the high-to-low ranking that aligns with the economic direction of binding transfer constraints, the ISO proposes an improvement to the grouping algorithm.

Under the improved approach, the algorithm still ranks BAA groups from highest MEC to lowest MEC. When a lower-priced group has an export transfer connection to one or more previously tested groups, the algorithm first merges it with the connected higher-priced group(s) and tests the combined group. If the combined group fails the test, the algorithm then tests the lower-priced group on its own. If the lower-priced group passes the test on its own, the algorithm designates the BAAs in that group as competitive.

This directly addresses the path dependency issue DMM raised. A BAA group that is competitive on its own will not be mitigated only because it interconnects with a neighboring group that fails the test.

- **Affirms in Section 4.1.2 the use of group demand as the RSI denominator for the BAA-level MPM test is appropriate.** Some stakeholders argued that demand in the RSI denominator should reflect only gross exports over a constrained transfer path. This proposal does not adopt that approach. BAA-level MPM does not test whether suppliers can provide physical counterflow over a flowgate. It tests whether available competitive supply can meet the demand forecast for the BAA or BAA group when imports into that BAA or group are constrained.

When imports into a BAA or BAA group are constrained, the load behind the constraint is exposed to the potential exercise of market power by suppliers within the constrained BAA or BAA group. For that reason, the relevant demand value is BAA/group demand, not gross exports. Gross exports are not equivalent to local counterflow because the binding constraint at the BAA level is the BAA power balance constraint. Internal MWs satisfy that constraint one-for-one regardless of resource location. The RSI therefore compares available competitive supply against the BAA/group demand forecast.

- **Incorporates a MEC materiality threshold in the grouping approach in Section 4.1.2.** To account for negligible price differences that do not reflect genuine congestion, the proposal adds a defined tolerance to the grouping algorithm so that BAAs with effectively identical MECs are treated as a single group rather than being separated by de minimis variations.
- **Provides a detailed example in Section 4.1.2 to explain the proposed BAA grouping methodology.**
- **Clarifies in Section 4.1.2 how MEC price separation can occur from imbalance reserve transfers in DAME/EDAM.** Imbalance reserve transfers can exhaust transfer capacity and cause MEC separation between BAAs.
- **Clarifies this proposal does not extend BAA-level MPM to day-ahead imbalance reserve up (IRU) or reliability capacity up (RCU) bids at this time.** Extending BAA-level MPM to IRU bids would offer little practical benefit under the current design because the default availability bid is $55/MWh, which matches the IRU bid cap. More broadly, this initiative focuses on improving the existing BAA-level MPM framework for EDAM and WEIM energy bids and reducing unnecessary mitigation. Extending BAA-level MPM to IRU or RCU bids is not a high-priority change within the current scope.
- **Affirms in Section 4.1.2 that BAAMPM should use MEC, not MEC plus GHG components or full LMP.** BAAMPM identifies structural market power when binding BAA transfer constraints or scheduling limits prevent external competitive supply from reaching an import-constrained BAA. MEC is the right metric because it reflects the BAA power balance constraint and best captures

price separation driven by transfer constraints. GHG-related price differences should not determine whether BAAMPM treats a BAA as structurally import constrained.

- **Replaces the quarterly net buyer exclusion with the interval-specific approach for BAAMPM in Section 4.1.3.** Under the current Tariff, the MPM process does not treat "net buyers" as pivotal suppliers because they generally lack an incentive to withhold supply needed to serve their own load. Today, CAISO identifies net buyers quarterly by comparing an affiliate portfolio's metered supply and demand over the most recent 12 months.

  This proposal would eliminate quarterly net buyer status for BAA-level MPM. Instead, the MPM process would determine whether each affiliate is a net buyer or net seller in each interval using the proposed withholdable capacity calculation that accounts for load-serving obligations.

  This approach is more precise because it excludes affiliates from the pivotal supplier test when they have no withholdable capacity in the binding interval. It also includes affiliates when they have excess capacity and can exercise market power, even if they were historical net buyers over the prior year. This change would apply only to BAA-level MPM and would not change the local MPM process.

- **Shifts the LSO calculation in Section 4.1.3 from a historical-data method to a method that uses market-clearing outcomes and demand forecasts.** The straw proposal presented several candidate measures for determining LSO such as using historical demand forecasts or metered load for the entire BAA and then developed an illustrative profile option in detail. This option used prior-year metered data to build average hourly profiles (categorized by season, day-type, and hour). The straw proposal identified several weaknesses in relying on historical averages, including their inability to capture real-time weather impacts, load migration, or recent load growth. Stakeholder feedback largely validated these concerns.

  This proposal introduces an updated approach:

  - Day-ahead market: Set the affiliate's LSO to its total scheduled load (physical + net virtual demand) from the MPM pass of the Integrated Forward Market (IFM).
  - Real-time market (single-affiliate BAA): Set the affiliate's LSO to the BAA's real-time demand forecast for the relevant interval.

- Real-time market (multi-affiliate BAA in EDAM): Set the affiliate's LSO to the BAA's real-time demand forecast multiplied by the affiliate's historical percentage share of BAA load using metered data.
- Real-time market (multi-affiliate BAA not in EDAM): Use affiliate-level metered load if available. If not available, set the affiliate's LSO to zero for the interval.

The use of demand forecasts and market-clearing outcomes aligns with recommendations from stakeholders to favor more contemporary information over static, historical profiles.

For the WEIM, this proposal adds an affiliate's base scheduled net exports for the interval to the obligation used in the minimum output calculation. The exporting BAA must either provide the physical supply to cover the export or buy the power to meet it. Because it must be covered one way or another, this volume has the same effect as a load-serving obligation for purposes of the withholdable capacity calculation in that it reduces the supplier's capacity available to withhold.

- **Retains in Section 4.1.3 the straw proposal's approach of treating the greater of physical minimum generation or LSO as non-withholdable output, but revises the formula to make clear that this non-withholdable floor cannot exceed available supply, so withholdable capacity cannot be negative.**
- **Proposes in Section 4.1.4 a revised algorithm for mitigating only pivotal suppliers.** The Straw Proposal considered two options. Option 1 took a more conservative and straightforward approach that would mitigate the top three suppliers and then iteratively test for a fourth, fifth, etc. Stakeholders who supported Option 1 argued that it reduced the risk of Type II errors (failing to mitigate a supplier who exercises market power) and strengthened consumer protection. Opponents argued that it was overly conservative and created an unacceptably high risk of Type I errors (mitigating a supplier who would not have exercised market power) by mitigating suppliers who did not drive the uncompetitive outcome.

  Most stakeholders gravitated toward Option 2. This option used a more precise sequence of 1PS, 2PS, and 3PS tests to identify the minimal set of pivotal suppliers. Many stakeholders agreed that this approach struck a better balance between Type I and Type II errors.

CAISO proposes to adopt a variant of Option 2. The revised algorithm runs 1PS tests until one supplier passes. It then uses that supplier as the anchor for 2PS tests until one pair passes. It then uses the first passing pair as the anchor for 3PS tests until one triad passes, and uses the first passing 3PS test to set the mitigation cutoff. This approach is less aggressive than the original Option 2 in minimizing the set of pivotal suppliers, but CAISO believes it better balances the objective of reducing unnecessary mitigation against DMM's concern that some non-pivotal suppliers may still exercise market power.

DMM cautioned that limiting mitigation to pivotal suppliers would remove an indirect benefit of the current "mitigate all" framework in that it constrains non-pivotal suppliers that may still exercise market power. DMM distinguished "pivotality" (having enough capacity to create scarcity) from "market power" (the ability to raise prices above cost). Because the pivotal supplier test identifies only pivotal capacity, it may miss non-pivotal suppliers that can exploit thin segments of the supply curve to raise prices. Thus, limiting mitigation to pivotal suppliers could create a new risk of undetected market power.

CAISO agrees with DMM that non-pivotal suppliers can sometimes set prices above competitive levels. The pivotal supplier test is a structural test that is not designed to detect the specific form of market power DMM describes, in which a supplier exploits a thin segment of the supply curve. This can occur even when a market passes the 3PS test. That said, CAISO expects it more likely that non-pivotal suppliers can successfully exercise this type of market power when the 3PS test fails because a structurally uncompetitive market is thinner, which increases the probability that demand will land in a less competitive portion of the supply stack where a non-pivotal supplier can set the price.

The current "mitigate all" rule reduces Type II error by capturing some non-pivotal suppliers that may exercise market power, but it increases Type I error by unnecessarily mitigating other suppliers. This proposal accepts the remaining Type II risk to reduce unnecessary mitigation of non-pivotal suppliers, who are generally less likely to exercise market power because the market can be served without relying on their supply. CAISO believes this is the correct tradeoff – to accept a higher risk of unmitigated non-pivotal market power in exchange for a lower risk of over-mitigating suppliers who are not pivotal.

- **Clarifies in Section 4.1.4 that, once the MPM process finds a supplier pivotal, it does not exempt output equal to the supplier's LSO from mitigation.** LSO affects whether a supplier is pivotal but does not limit mitigation after the supplier is identified as pivotal.

- **Adopts in Section 4.2.1 the in-market approach to trigger scarcity pricing when operators shed firm load.** The straw proposal presented three options: reflect load shedding through an adjusted demand input in the real-time dispatch (RTD), apply an after-the-fact administrative settlement adjustment, or rerun market pricing after the fact. Many stakeholders supported the in-market approach because it is the only option that can directly affect dispatch and price-responsive behavior during the emergency.

  The ISO agrees that an after-the-fact settlement adjustment would not directly change real-time dispatch instructions. On the other hand, the ISO also recognizes that a settlement-only rule could still affect participant behavior during an emergency. For example, if market participants expect scarcity-level settlement prices during load-shed events, they may offer more supply, including intertie supply.

  For that reason, the ISO does not view post-market approaches as ineffective. The ISO instead prefers the in-market approach because it provides both settlement incentives and a real-time dispatch signal.

  The straw proposal also identified operational risks from the in-market approach, including over-dispatch, ACE management, and interactions with operator actions. Several stakeholders agreed that the ISO should address these risks with safeguards. The ISO shares that concern and proposes to allow operators to pause the mechanism when needed and to limit financial exposure through a “circuit breaker”.

  Stakeholder feedback also persuaded the ISO to expand the proposal beyond the RTD-only design in the straw proposal. Several stakeholders argued that an RTD-only design could fail to send the right price signal to resources and transfers that settle or are scheduled in the fifteen-minute market (FMM). In response, the ISO now proposes to apply the mechanism in both the RTD and the FMM.

- **Refines the financial circuit breaker in Section 4.2.1.** The straw proposal offered four hours only as a starting point for stakeholder feedback. Although some stakeholders questioned whether four hours is too long or too short, the ISO maintains it reasonably balances a sustained scarcity signal against credit risk. The proposal now specifies that the circuit breaker deactivates scarcity-level pricing for a BAA after four cumulative hours of load-shed conditions in a rolling 24-hour period.

- **Clarifies definitions and concepts in Section 4.2.2.** Market participants asked CAISO to define arming load, distinguish armed load from armed reserves, and explain how arming load affects the fifteen-minute market (RTPD or real-time pre-dispatch) and RTD. The revised section also adds a detailed example.
- **Revises the mathematical formulations in Section 4.2.2 by renaming decision variables and simplifying constraints.**
- **Replaces the three-tier reserve slack penalty curve in Section 4.2.2 with a single reserve slack penalty price.** This change preserves the core pricing logic for reserve opportunity costs and reduces implementation complexity.
- **Explains in Section 4.2.2 why the proposed mechanism does not extend to WEIM BAAs at this time.** CAISO will address that issue through any future policy effort for broader ancillary services procurement.
- **Declines to propose a generic administrative pricing mechanism for emergency actions in Section 4.2.3.** Emergency programs and operator actions differ across BAAs, so a generic rule could produce inconsistent, duplicative, or inaccurate prices. This section also explains that a future operating reserve demand curve (ORDC), energy supply margin, or similar scarcity pricing framework may provide a better long-term approach because it would base prices on actual real-time market conditions, not on whether operators took specific emergency actions.
- **Discusses the future of comprehensive scarcity pricing in Section 4.2.4.** This proposal does not include comprehensive scarcity pricing. CAISO recognizes that scarcity pricing supports efficient price formation, but this proposal focuses on targeted enhancements that are ready to advance now. CAISO plans to resume discussions on comprehensive scarcity pricing in the PFE working group after the governance process concludes for the current changes.
- **Adds a comparison of BAAMPM and local MPM in Appendix Section 7.1.**
- **Explains in Appendix Section 7.1 why the physical counterflow approach used in local market power mitigation does not fit BAA-level market power mitigation.**
- **Further explains how CAISO determines affiliate groups in Appendix Section 7.2.** CAISO determines affiliate groups by consolidating all entities linked through any chain of common control relationships into a single affiliate group.

- **Elaborates on price formation changes resulting from EDAM, including the role of the marginal energy cost (MEC) in Appendix Section 7.3.** Under EDAM, the market will shift from using a single system-wide marginal energy cost (SMEC) to a BAA-specific marginal energy cost (MEC), which means that price differences resulting from transfer constraints will be reflected in the energy component of the LMP rather than the marginal cost of congestion.
- **Corrects the RSI equation in Appendix Section 7.4, Figure 5 so that the minimum supply contribution of potentially pivotal suppliers is added (not subtracted).**
- **Defers the suggestion to exclude capacity from resources that bid at very low or negative prices in the pivotal supplier calculation.** Although this idea may warrant future discussion, it affects a core element of all market power tests and would greatly expand the initiative's scope and complexity.

2 Introduction

2.1 BAA-Level Market Power Mitigation

2.1.1 *Background and Context*

Balancing Authority Area (BAA)-level market power mitigation (MPM) helps ensure competitive prices in the Western Energy Imbalance Market (WEIM) and Extended Day-Ahead Market (EDAM). It applies when binding transfer constraints isolate participating BAAs from the broader market, which limits competition from outside suppliers. When those constraints bind, suppliers inside the constrained BAA may face too little competition to prevent them from raising prices above competitive levels. Unlike local MPM, which addresses market power created by constraints within a BAA, BAA-level MPM addresses market power created by constraints between BAAs.[2]

CAISO developed BAA-level MPM during the early design of the WEIM, when the market footprint was much smaller.[3] To identify market power, BAA-level MPM tests whether

[2] The market uses "scheduling limits" to manage transfers between BAAs. A scheduling limit is a contractual limit on the amount of energy that can be scheduled between BAAs (it is not a physical transmission limit).

[3] Section 1.1.1 of the straw proposal provides more information on the origin and history of BAA-level market power mitigation.

suppliers inside each BAA face enough competition, and it conducts that test separately for each BAA.

That single-BAA test can overstate market power in today's larger and more interconnected WEIM/EDAM footprint. Suppliers in neighboring BAAs can often compete to serve load in another BAA, subject to available transfer capability. Because the test evaluates each BAA in isolation, it can ignore competition from neighboring BAAs that can reach the constrained area through market transfers. As a result, the test can trigger unnecessary mitigation even when the broader market is competitive.

2.1.2 *BAA-Level MPM in the CAISO Markets*

Under the current BAA-level market power mitigation framework, the market evaluates whether a BAA may have structural market power when its marginal energy cost exceeds that of the CAISO BAA, which the framework assumes is competitive. That price difference suggests that the BAA may be cut off from outside competitive supply. The market then tests whether there is enough competitive supply available to meet demand in that BAA without relying on potentially pivotal suppliers. If the BAA fails that test, the market mitigates bids that exceed a set of competitive reference prices before the binding market run. For a more detailed description of how the current BAA-level market power mitigation framework works, including illustrative examples, see Appendix Section 7.4.

This revised straw proposal does not change these basic mechanics. Instead, it addresses the main limitation in the current design, which is that the market evaluates competitiveness one BAA at a time. That approach can overstate market power because it does not fully account for supply available from fringe suppliers in neighboring BAAs. The proposed grouping approach instead allows the market to evaluate interconnected BAAs together. As a result, mitigation would better reflect actual regional competitive conditions and better fit the broader WEIM/EDAM footprint.

2.1.3 *Problem Statements and Objectives*

This proposal seeks to improve the BAA-level market power mitigation framework so that mitigation outcomes better reflect competitive conditions in the evolving western market footprint.

The current framework raises three concerns. First, it generally evaluates each BAA separately. That approach can overlook competitive supply available from neighboring BAAs and can cause the market to apply mitigation more broadly than necessary. Second, the current pivotal supplier test can overstate a supplier's incentive and ability to exercise market power because it does not fully account for supply the supplier must use to serve its own load-serving obligations. Third, once a BAA fails the competitiveness test, the current framework applies mitigation to all suppliers in that BAA, including suppliers that are not pivotal to the noncompetitive outcome.

The proposed reforms address those concerns in three ways. They would move to a more regionally informed grouping approach, account for supplier load-serving obligations in the withholdable capacity calculation, and apply mitigation more selectively to pivotal suppliers.

For more information on the underlying problem statements and objectives, see Section 1.1 of the straw proposal.

2.2 Scarcity Pricing

2.2.1 *Background and Context*

Scarcity pricing helps ensure that market prices reflect the marginal reliability value of reserves during tight system conditions. Involuntary load curtailment is costly because consumers and producers incur real economic losses when they lose electric service. Reserves reduce the risk of curtailment because the market (and operators) use them to respond to unexpected events such as generator outages, forecasting errors, or sudden changes in load.

When reserves are abundant, an additional megawatt of reserves contributes little to reliability because the probability of curtailment is already near zero. But as reserves become scarce, that probability rises, and each remaining megawatt of reserves becomes increasingly valuable because it reduces the risk of curtailment. Energy prices based only on the short-run marginal cost of production do not capture that increasing reliability risk.

Scarcity pricing addresses that gap by adding an administrative scarcity value to market prices. That value is typically based on an estimate of the Value of Lost Load (VOLL), which represents the economic cost of involuntary load curtailment. Market operators usually implement that value through an operating reserve demand curve or a similar mechanism that raises prices as reserves become scarcer. These prices signal system stress, encourage resources to remain available when the system needs them most, and motivate demand to reduce or shift consumption during critical periods.

U.S. ISOs and RTOs generally use scarcity pricing, although their specific approaches differ. For a general overview of scarcity pricing, including Value of Lost Load theory, operating reserve demand curve concepts, and comparisons across other ISOs and RTOs, see Section 1.2 of the straw proposal.

The market currently uses several tools to signal tight supply conditions, including the Scarcity Reserve Demand Curve, the Flexible Ramping Product and Imbalance Reserve demand curves, and administrative penalty prices for power balance constraint violations. However, these tools do not always cause market prices to reflect severe system stress during emergency operations.

They also do not consistently reflect the reliability value of reserves in market prices before an actual shortage occurs. Instead, the market often relies on administrative scarcity mechanisms that activate only after reserve shortages, binding constraints, or emergency actions occur. As a result, prices can understate the value of preserving reserves before an emergency. That weakens the price signal needed to attract supply, reduce demand, and support reliability before conditions worsen.

2.2.2 *Scarcity Pricing in the CAISO Markets*

CAISO uses three main scarcity pricing mechanisms -- the scarcity reserve demand curve (SRDC), the flexible ramping product (FRP) demand curve, and the imbalance reserve demand curve.

The SRDC applies only in the CAISO BAA because only CAISO procures ancillary services through the market. When the market cannot meet CAISO's ancillary service requirements, the SRDC sets predefined scarcity prices. Because CAISO co-optimizes ancillary services and energy, those prices can also affect energy prices across the broader market footprint.

The FRP and imbalance reserve demand curves differ from the SRDC in an important way. They let the market trade off the value of holding flexible ramping capacity or imbalance reserves against the cost of procuring them. If meeting the requirement becomes too costly, the market can forgo some of the requirement at a specified price. By contrast, the SRDC allows the market to forgo ancillary service requirements only when there are insufficient bids or insufficient physical capacity.

CAISO also uses other rules that can raise prices during tight system conditions. These include:

- Administrative penalty prices, which apply when the market must relax constraints, such as power balance or transmission constraints, to produce a feasible dispatch;

- Emergency pricing rules, which govern how the market prices reserves released for energy and applies bid requirements to reliability demand response resources; and
- The higher verified cost-based offer cap and related penalty price changes that CAISO implemented in response to FERC Order No. 831.

In the WEIM, CAISO also applies an Assistance Energy Transfer surcharge when a BAA fails the WEIM resource sufficiency evaluation and chooses to receive assistance transfers. Although the surcharge does not change market price, it relates to scarcity pricing because it increases the cost of relying on external energy or flexibility during tight conditions and encourages each BAA to offer enough resources to meet its own obligations.

WECC reliability rules require each jurisdictional BAA, including CAISO, to maintain enough contingency reserves to cover its largest single contingency. The CAISO BAA meets this requirement through the ancillary service market.

Section 1.2 of the straw proposal discusses CAISO's current scarcity pricing mechanisms, WECC operating reserve requirements, and how CAISO's reserve framework differs from scarcity pricing designs used by other ISO/RTOs.

2.2.3 *Problem Statements and Objectives*

CAISO's current scarcity pricing mechanisms do not consistently cause real-time energy and reserve prices to reflect the reliability value of reserves as system conditions tighten. This is because the real-time market does not fully re-optimize ancillary services across the entire market footprint.

In real time, CAISO procures only the incremental ancillary services needed beyond the quantities procured in the day-ahead market, and only for the CAISO BAA.[4] CAISO also does not procure or re-optimize ancillary services in the five-minute market. These limits can prevent prices from rising gradually before shortages occur to reflect tightening system conditions. They also can produce inconsistent scarcity signals across the broader western market footprint. As a result, imports, fast-start resources, storage, and price-responsive demand may have less opportunity to respond before operators must take emergency actions.

[4] BAAs that participate in the WEIM or EDAM procure their own operating reserves outside the CAISO market.

Prices also may not fully reflect scarcity when operators arm load or shed firm load to protect reliability. This proposal targets near-term enhancements that improve price formation during severe system stress. It leaves broader scarcity pricing reforms, including more comprehensive footprint-wide scarcity pricing, for a longer-term track.

For more information on the scarcity pricing problem statements and objectives, please see Section 1.2 of the straw proposal.

3 Stakeholder Process and Timeline

Section 2 of the straw proposal summarized the stakeholder process that informed the initial proposals on BAA-level market power mitigation and scarcity pricing, including the relevant working group discussions, written stakeholder comments, and Market Surveillance Committee discussions.[5]

That record remains relevant background for this revised straw proposal. This paper builds directly on that record and does not repeat it here.

Since publishing the straw proposal, the ISO has continued to engage stakeholders and has used that feedback to refine the proposals in this revised straw proposal. Section 1 summarizes those changes, and Section 3 summarizes the subsequent stakeholder process.

3.1 Stakeholder Engagement Since the Straw Proposal

3.1.1 *September 2025 Straw Proposal Stakeholder Meeting (Day 1)*

At this meeting, the ISO presented the straw proposal's BAA-level MPM framework and asked stakeholders for initial feedback. Stakeholders supported several of the mitigation concepts, but they raised major methodological questions and asked the ISO to update its analysis before they could endorse the framework.

The discussion focused on four primary design elements.

[5] Price Formation Enhancements: BAA-Level MPM and Scarcity Pricing Straw Proposal § 2, Stakeholder Process and Timeline (Aug. 22, 2025). https://stakeholdercenter.caiso.com/InitiativeDocuments/StrawProposal-Price-Formation-Enhancements-BAA-Level-MPM-Scarcity-Pricing.pdf.

BAA Grouping

The ISO explained its proposed algorithm for grouping BAAs. Stakeholders supported testing interconnected BAAs as groups, but they raised technical questions about how the algorithm would work. Participants asked how the ISO calculates the marginal energy cost and applies it across each group. They also asked how price formation changes in EDAM will affect that calculation (Appendix Section 7.3 discusses these questions in more detail).

Some stakeholders asked why the ISO proposes a BAA-level MEC test for transfer constraints rather than expanding the existing LMPM design. ISO staff explained that BAA-level MPM tests the competitiveness of each BAA's power balance constraint, while LMPM tests the competitiveness of specific transmission constraints (more discussion on this point can be found in Appendix Section 7.1).

Inclusion of the CAISO BAA

ISO staff reviewed the proposal to stop treating the CAISO BAA as inherently competitive. Staff presented 2024 counterfactual data showing that, when the proposed BAA-level MPM test is applied to the CAISO BAA in the same way it is applied to other BAAs, the CAISO BAA would often fail the test during summer evening peaks. Some stakeholders argued that the result does not justify treating the CAISO BAA as structurally competitive. They asked the ISO to update the analysis with 2025 data that reflects recently added resource capacity and intertie imports before advancing this design element.

Load-Serving Obligations and Mitigation of Pivotal Suppliers Only

CAISO staff reviewed the proposal to include load-serving obligations (LSO) in the BAA-level MPM process. Participants generally agreed that this change would better reflect supplier incentives and help avoid over-mitigating entities that serve retail load.

Stakeholders asked the ISO to distinguish between the 12-month long-term net buyer test and the interval-by-interval short-term LSO calculation. They also asked the ISO to explain how it defines and distinguishes affiliates, especially when third-party scheduling coordinators manage multiple unrelated loads.[6]

[6] More on this discussion can be found in Appendix Section 7.2.

Stakeholders also relayed an MSC inquiry about whether the ISO should exclude resources with deeply negative bid prices (such as wind/solar resources) from the withholdable capacity calculation.[7]

The ISO also presented two options for limiting mitigation to pivotal suppliers.

3.1.2 *September 2025 Straw Proposal Stakeholder Meeting (Day 2)*

This meeting addressed the scarcity pricing elements of the straw proposal. Stakeholders disagreed about the proper sequence for market reforms, especially whether the ISO should wait to complete other market enhancements before it redesigns scarcity pricing.

The discussion centered on four issues: the timing of comprehensive reform, prices during firm load-shedding events, the proposed "armed reserves" mechanism, and administrative pricing for other emergency actions.

Sequencing of Comprehensive Reform

The ISO proposed a phased approach. Under this approach, the ISO would adopt narrow scarcity pricing changes now and would defer a broader redesign (such as a footprint-wide Operating Reserve Demand Curve) until after the ISO improves the Flexible Ramping Product (FRP) and real-time ancillary service procurement.

Several stakeholders opposed this timeline. They argued that the ISO has recognized the need for stronger scarcity pricing for several years. They also rejected the ISO's position that scarcity pricing reform must wait for changes to FRP or ancillary service procurement. They described those dependencies as artificial barriers.

These stakeholders urged the ISO to develop an "energy supply margin" (or "latent reserve") design now. They argued that this design could raise prices proactively as capacity tightens without depending on the current AS or FRP designs. They also warned that weak scarcity prices could discourage suppliers from voluntarily offering supply into the CAISO market as competition among Western markets increases.

The ISO explained the rationale for its phased approach. It cited a lack of stakeholder consensus on a specific design and raised concerns that an energy supply margin design could create false scarcity signals in WEIM BAAs.

The ISO explained that WEIM entities can use non-participating resources to serve load, even though those resources do not submit supply bids directly into the real-time

[7] More on this discussion can be found in Section 1.

market. As a result, the bids offered into the market do not represent all physical supply that a BAA can use to serve its load. If the market software measures scarcity by comparing only participating bids with demand, it could trigger extreme prices even when the BAA has plenty of physical supply to serve load.

Some stakeholders responded that scarcity pricing should encourage suppliers to voluntarily offer that unbid capacity into the market.

Pricing During Firm Load Shedding

Stakeholders generally supported the principle that market prices should reach the prevailing bid cap during firm load-shedding events.

The ISO presented three ways to achieve this result: one in-market adjustment (Option 1) and two post-market settlement adjustments (Options 2A and 2B). One stakeholder supported Option 2B and noted it resembles mechanisms used in other ISOs.

The ISO also requested feedback on a proposed "circuit breaker" that would deactivate load-shed scarcity pricing after four hours to limit financial risk. The ISO noted that the duration should balance market incentives against credit protection.

Pricing Armed Reserves in RTD

The ISO proposed a mechanism to preserve scarcity signals between real-time market runs. The mechanism would reflect a scarcity price whenever capacity released through the "armed load" process is dispatched as energy.

The discussion primarily clarified the proposal. One participant asked the ISO to define "armed reserves" more clearly and to include a worked example in the next proposal.

The ISO also asked whether it should develop a similar mechanism for WEIM BAAs or wait for a fully integrated, footprint-wide ancillary service solution.

Emergency Action Triggers

The ISO treated administrative pricing for other operator actions as an exploratory issue. The current proposal applies only to Energy Emergency Alert (EEA) 3 firm load shedding.

One stakeholder urged the ISO to expand the triggers to include other actions that can suppress prices, including demand response deployments (whether in-market or out-of-market), the release of strategic reliability reserves, and Assistance Energy Transfers.

The ISO invited stakeholders to provide written comments explaining whether it should expand the trigger list beyond firm load shedding.

3.1.3 September 2025 Stakeholder Comments to the Straw Proposal

BAA-Level MPM

The comments showed broad conceptual support for the grouping approach but revealed sharp divisions over two issues – whether to include the CAISO BAA and how to mitigate pivotal suppliers.

- **BAA Grouping:** Stakeholders broadly supported replacing the individual BAA assessment with a grouping approach. They said a grouping approach would better account for regional supply capability and energy transfers, reduce unnecessary mitigation, and reflect actual market conditions more accurately. Some stakeholders asked for more detailed examples that show how the grouping approach determines the competitive locational marginal price and calculates counterflows.
- **CAISO BAA Competitiveness:** Stakeholders disagreed on whether the proposal should remove the CAISO BAA's default competitive status. Some stakeholders supported the change because it would treat all areas in the EDAM and WEIM footprints more consistently. Other stakeholders opposed the change or raised concerns. They argued that recent capacity additions have changed CAISO's structural competitiveness and asked CAISO to update its analysis with 2025 data. Several stakeholders argued that CAISO should not expand BAA-level mitigation for the CAISO BAA unless it simultaneously adopts robust scarcity pricing that allows prices to rise before emergency conditions.
- **Net Buyer Exclusion and LSO Integration:** Stakeholders broadly supported excluding net buyers in the EDAM from the pivotal supplier designation and including load-serving obligations in the withholdable capacity calculation. They agreed that load-serving entities have no economic incentive to withhold capacity they need to serve their own load. Stakeholders disagreed, however, on how CAISO should determine load-serving obligations. Some stakeholders questioned whether estimated historical load would produce accurate results and urged CAISO to use scheduled load from the market power mitigation run instead.
- **Identifying Suppliers to Mitigate (Option 1 vs. Option 2):** Stakeholders split over how CAISO should identify suppliers for mitigation. Some stakeholders supported Option 1. They said Option 1 gives CAISO a clear and conservative way to reduce the risk that CAISO fails to mitigate a supplier that exercises market power. Others supported Option 2. They said Option 2 targets only suppliers that

are truly pivotal and avoids unnecessary mitigation of fringe suppliers. The Department of Market Monitoring opposed limiting mitigation to pivotal suppliers. It showed that non-pivotal resources located between low-cost and high-cost supply can still exercise market power.

Other stakeholders proposed different approaches. Calpine and Powerex supported a conduct-and-impact test. WPTF proposed a different residual supply index formula that would isolate transfer congestion costs rather than test the marginal energy cost.

Scarcity Pricing

Stakeholders split on scarcity pricing. Some stakeholders supported CAISO's incremental approach while others urged CAISO to adopt a comprehensive scarcity pricing framework immediately.

- **Comprehensive Redesign**: Stakeholders were divided over when CAISO should pursue broader scarcity pricing reforms. Some stakeholders opposed delaying a footprint-wide redesign and urged CAISO to develop such a design immediately. Some said CAISO should base the design on an energy supply margin or latent reserve approach so prices rise proactively as supply tightens. Other stakeholders supported CAISO's more cautious approach. They agreed that CAISO should first resolve issues with the Flexible Ramping Product and ancillary service procurement before it redesigns scarcity pricing across the full footprint. The Department of Market Monitoring continued to urge CAISO to prioritize a new hour-ahead uncertainty product over broader redesign efforts.
- **Pricing During Load Shedding:** Stakeholders broadly agreed that real-time prices should reach the applicable bid cap when operators shed firm load. They disagreed on how CAISO should implement that pricing rule. Some stakeholders supported Option 1, which would set the price through the market process. They said this approach would send an immediate real-time price signal, influence dispatch, and encourage emergency supply. Other stakeholders supported Options 2A and 2B, which would adjust prices after the market clears. They said an in-market solution could create serious operational risks or large settlement deviations. Stakeholders also generally supported a circuit breaker, but many questioned CAISO's proposed four-hour limit. Some argued that four hours appears arbitrary and urged CAISO to use a loss-of-load expectation study or historical analysis to support the chosen duration.
- **Pricing Armed Reserves in RTD:** Stakeholders generally supported co-optimizing armed reserves for energy in the Real-Time Dispatch based on those reserves'

opportunity cost. They agreed that this change would preserve scarcity signals between the 15-minute market and the 5-minute market. Some questioned whether this change would justify the significant implementation effort, especially if CAISO plans to fully re-optimize ancillary services soon. Others opposed the change entirely and described it as an administrative mechanism that would inflate prices.

- **Administrative Pricing for Emergency Actions:** Stakeholders disagreed on whether out-of-market emergency actions should trigger administrative scarcity pricing. Some argued that CAISO should expand the triggers for scarcity pricing. They said prices should reflect scarcity when CAISO uses Reliability Demand Response Resources, strategic reserves, or Assistance Energy Transfers to prevent outages. Otherwise, they argued, the market would artificially suppress prices. Others opposed scarcity pricing for ratepayer-funded out-of-market actions, such as emergency demand response. They argued that this approach would force CAISO ratepayers to pay twice for emergency mitigation – first through the programs that fund emergency demand response, and again through higher administrative scarcity prices.

3.1.4 *October 2025 WEM Governing Body Spotlight on PFE*

On October 28, 2025, the ISO briefed the Western Energy Markets Governing Body on this initiative. The meeting moved the initiative beyond technical working-group discussions and placed it before a broader governance audience focused on the market's future design.

The ISO opened the session by explaining how scarcity pricing and market power mitigation interact. ISO staff identified the central market design challenge – the market must distinguish true system-wide scarcity from artificial shortages caused by market power. The ISO explained that BAA-level market power mitigation protects against uncompetitively high prices when a BAA is isolated from the broader market. Scarcity pricing, by contrast, should allow prices to rise to reflect the value of reliability during true supply shortages.

The ISO invited Vitol to present a stakeholder perspective directly to the Governing Body. Vitol urged the ISO to redesign scarcity pricing rather than rely on incremental fixes. Vitol supported the ISO's proposal to price load-shedding events as a useful first step, but also urged the ISO to adopt an enhanced operating reserve demand curve tied to the Value of Lost Load and loss-of-load probability. Vitol cited recent Midcontinent Independent System Operator reforms as a model. Vitol argued that efficient prices should reflect reliability value before actual shortages occur so they can improve price convergence, encourage demand response, and support forward contracting.

WPTF, echoed by CESA during public comment, argued in public comments and in a formal letter to the Governing Body that the ISO should not expand BAA-level mitigation, especially to the CAISO BAA, unless it also adopts a strong scarcity pricing design. WPTF and CESA warned that broader mitigation, without a mechanism that lets prices rise during tight supply conditions, would suppress prices, understate the value of scarce supply, and discourage regional resources from participating in the market.

In a joint letter, CalCCA, Six Cities, NCPA, PG&E, and SCE opposed immediate scarcity pricing reforms of the nature supported by Vitol and WPTF. They urged the Governing Body to reject directives for an operating reserve demand curve based on Value of Lost Load. They cited the risk of higher costs for ratepayers, the difficulty of applying ancillary service-based scarcity pricing across multiple BAAs, and the addition of 13 gigawatts of storage to the CAISO system, which they said has fundamentally changed grid conditions since 2020. They supported the ISO's plan to prioritize EDAM and DAME implementation and to limit near-term changes to the targeted scarcity pricing improvements in the straw proposal.

3.1.5 *November 2025 Scarcity Pricing Working Group Sessions*

During the November working group sessions, the ISO announced a two-track policy plan in response to earlier stakeholder feedback. Under the first track, the ISO would draft a final proposal for the near-term scarcity pricing and BAA-level market power mitigation measures identified in the August proposal. Under the second track, the ISO would continue working group discussions on options for a comprehensive scarcity pricing design across the full market footprint.

The ISO described two ways to implement forward-looking scarcity prices across the regional footprint:

1. Create a new reserve product with an operating reserve demand curve and co-optimize that product with energy.
2. Add an energy supply margin risk cost directly to the market's objective function.

The ISO explained that both approaches could produce the same dispatch, locational marginal prices, and reserve prices if they use perfectly consistent parameters. The ISO then identified five design questions for stakeholders:

1. **In-market or post-market:** The ISO strongly preferred adding scarcity value directly to the market-clearing process. The ISO said this approach would

produce correct dispatch, align prices with dispatch, and properly affect energy, reserves, and intertie schedules.

2. **Time horizon:** The ISO asked how far into the future the market should measure available capacity. A shorter horizon may identify scarcity too late. A longer horizon may add uncertainty and unnecessary cost.
3. **Geographic scope:** The ISO asked whether scarcity pricing should apply across the full footprint, within each BAA, or at individual nodes. The ISO noted that one footprint-wide price could socialize scarcity costs and create free-rider incentives.
4. **Deliverability:** The ISO asked what level of deliverability supply must satisfy before it counts toward the available supply margin.
5. **Day-ahead market application:** The ISO asked whether applying the design in the day-ahead market would improve unit commitment and price convergence, despite potential overlap with the new imbalance reserve product.

The sessions included presentations from two stakeholder coalitions and showed a continuing divide over whether the ISO should redesign scarcity pricing now.

Joint LSEs Presentation

The Joint LSEs opposed continuing the comprehensive design track at this time. This coalition included CalCCA, BAMx, NCPA, PG&E, Six Cities, SDG&E, and SCE. They argued that the market does not need comprehensive reform now. They cited the 13 gigawatts of storage added since the 2020 scarcity events, existing resource adequacy must-offer obligations, and the expected reliability benefits of the EDAM. They urged the ISO to postpone comprehensive scarcity pricing discussions until after the ISO implements the EDAM and DAME. They argued that a complex scarcity pricing redesign would divert resources, provide limited near-term value, and risk inequitable costs for ratepayers.

WPTF Presentation

WPTF urged the ISO to adopt comprehensive reforms immediately. WPTF presented a supply margin scarcity pricing design that would increase energy prices as available supply tightens. WPTF argued that the ISO could implement this approach soon, without waiting for a fully integrated ancillary services market or creating a new reserve product. They argued that waiting years to assess EDAM operations would create unacceptable reliability risk. They said the market needs a mechanism that raises prices gradually and attracts voluntary supply before operators must shed load.

Working Group Feedback

The working group discussion reflected the same divide. Some argued that, without a proactive price signal, the market relies too heavily on out-of-market operator actions and fails to encourage generation and flexible demand. Others responded that higher administrative prices, without stronger real-time demand response, would mainly give suppliers windfall profits without improving reliability.

The ISO acknowledged the divide but said it would continue the working group discussions to determine whether stakeholders can identify a viable design for implementation after the EDAM begins.

3.1.6 *January 2026 MSC Meeting*

On January 16, 2026, the MSC held a general session on this initiative. CAISO staff presented updated data analysis and proposed mechanics for the BAA-level market power mitigation design. Committee members then assessed the theoretical and practical implications of CAISO's proposed market power mitigation and scarcity pricing frameworks.

Updated Analysis and Load-Serving Obligation (LSO) Mechanics

CAISO staff presented an updated counterfactual analysis using market data from third quarter 2025. The analysis tested eight algorithm variants to measure the effects of the adjusted grouping algorithm, the inclusion of the CAISO BAA, and the addition of the load-serving obligation component.

The results showed that the load-serving obligation component would reduce mitigation in many cases across the market footprint. It does so by recognizing that load-serving entities have no economic incentive to withhold supply needed to serve their own retail load.

CAISO staff also described possible methods for calculating an affiliate's load-serving obligation. For the day-ahead market, CAISO considered using cleared scheduled load and discussed whether to include net virtual demand. For the real-time market, CAISO proposed allocating each BAA's real-time demand forecast among affiliates based on historical metered load shares. CAISO also noted that this method would create administrative challenges for WEIM BAAs that have multiple affiliates and do not participate in the EDAM.

CAISO staff also discussed stakeholder arguments about whether CAISO should include the CAISO BAA in the market power mitigation test. Staff noted that some stakeholders view the CAISO BAA as structurally different from other BAAs because it can access price-sensitive import offers on its interties. These stakeholders argue that the three-pivotal-supplier test does not fully account for the competitive pressure from those imports and therefore may produce false positives when applied to the CAISO BAA.

MSC Perspectives on Market Power Mitigation

MSC member Scott Harvey evaluated the structural market power tests. Harvey stated concerns that a counterfactual analysis showing that the CAISO BAA fails the three-pivotal-supplier test does not, by itself, prove systemic market power.

Harvey identified two core flaws in the three-pivotal-supplier test. First, the test can be too stringent because it assumes that the three largest suppliers withhold all of their output, which requires a very large surplus supply margin to pass. Second, the test can be too permissive because it measures raw capacity rather than economic competitiveness. As a result, a BAA may pass the test by relying on high-cost fringe supply that does not meaningfully discipline market-clearing prices. Harvey also noted that counterfactual price impacts may be the result of inaccurate default energy bids rather than actual market power, especially during volatile gas days or for energy-limited storage resources.

Harvey then described the mechanics of a conduct-and-impact test. He said CAISO should not adopt this test in the near term because it would require multiple market runs and significant computation. But he suggested that CAISO may consider the test over the long term as the resource mix becomes more energy limited. He explained that a conduct-and-impact test would focus on whether potentially uncompetitive bids affect prices. This approach could better target smaller resources (such as batteries) by applying mitigation only when their offers would meaningfully change the market-clearing price.

MSC Perspectives on Scarcity Pricing

MSC member James Bushnell addressed the scarcity pricing elements of the initiative. He noted that stakeholders have focused heavily on how CAISO should raise prices as the market approaches scarcity, such as through an operating reserve demand curve or an energy supply margin. He said stakeholders have paid less attention to how CAISO should price energy when the system is already short.

Bushnell argued that CAISO could make a simpler near-term improvement by reexamining the administrative penalty values in the current market design, especially the $1,000/MWh power balance constraint penalty that has remained in place since 2011. He emphasized that these penalty values affect both real-time operations and long-term investment incentives. Higher real-time penalty prices may increasingly encourage storage resources to preserve state of charge for scarcity conditions, ensure scheduled imports are delivered, and allow the EDAM to compete for scarce supply across the West.

Bushnell agreed that CAISO should wait for EDAM operating experience before it creates major new reserve products. But he argued that this does not justify leaving current penalty prices unchanged. He recommended that CAISO consider phasing in higher penalty values over time so prices better reflect the reliability value of supply during tight system conditions.

Harvey also prepared a separate presentation on scarcity pricing and reserve product issues.[8] He emphasized that real-time prices help attract imports and impose consequences on suppliers, load-serving entities, and other market participants during stressed system conditions. Using the August 2020 outages as an example, Harvey argued that low real-time prices before scarcity conditions can weaken incentives for hourly imports and imbalance performance.

Harvey also argued that CAISO should eventually introduce a 30- or 60-minute reserve product (or another reserve product with a start-up and notification period longer than the flexible ramping product) to better manage net load uncertainty. He said this product would replace the costly implicit reserve procurement that CAISO now achieves through load conformance.

Harvey cautioned that CAISO would need to resolve existing flexible ramping product and imbalance reserve issues before it introduces any new product. These issues include storage state-of-charge accounting, deliverability testing, and interactions among reserve demand curves. Because those changes may take years, Harvey urged CAISO and stakeholders to begin that work now rather than defer it.

3.1.7 *March 2026 WEM Governing Body Policy Spotlight on Scarcity Pricing*

On March 3, 2026, the ISO briefed the WEM Governing Body on scarcity pricing. The briefing reviewed the initiative's development since October 2025 and included stakeholder presentations on the urgency and sequencing of broader reform.

The ISO explained to the Governing Body its plan to proceed on two parallel tracks. Track 1 would advance BAA-level MPM and targeted scarcity pricing rules from the

[8] CAISO published the presentation with the meeting materials, but the meeting did not leave enough time for Harvey to present it.

straw proposal. Track 2 would continue technical work on a broader scarcity pricing redesign.

The ISO framed four core questions for the Governing Body:

1. Should the ISO improve scarcity pricing now or wait for post-EDAM data?
2. Does reliability require scarcity price signals, or can resource sufficiency and long-term capacity planning address the need?
3. How important will scarcity pricing remain as demand-side participation grows?
4. How can the ISO apply scarcity price signals consistently across the full market footprint?

The Governing Body heard from four invited stakeholder presenters — Six Cities (on behalf of a broader LSE coalition), Calpine, Portland General Electric, and the Public Generating Pool — followed by written comment letters from CESA and The Energy Authority (TEA) and spoken public comment from several additional parties.

Some stakeholders urged the ISO to wait. Six Cities, speaking for a coalition that included BAMx, CalCCA, NCPA, PG&E, SDG&E, and SCE, argued that the ISO should not pursue comprehensive reform now. The coalition described EDAM and DAME as the most significant market changes since 2009 and recommended that the ISO wait for operational experience with the new markets before redesigning scarcity pricing. Portland General Electric supported this view and warned against adding a major redesign while core EDAM components are still maturing. NV Energy also supported a short pause to allow market data to accumulate and argued that a design adopted without that data would likely need continuous revision.

Some stakeholders urged the ISO to act sooner. Calpine argued that the current design sends scarcity prices only after a shortage occurs, which is too late to shape supply and demand behavior. Calpine said the ISO should implement scarcity pricing alongside BAA-level market power mitigation to avoid artificial price suppression and should target implementation by late 2027 or early 2028. Middle River Power echoed this point and noted that, when the ISO launched the PFE initiative in June 2022, it intended to advance scarcity pricing and market power mitigation together.

Other stakeholders emphasized regional competition and policy timing. The Energy Authority argued that accurate price formation will become more important as the ISO competes for uncommitted supply at its interties with SPP's RTO-E (since launched in April 2026) and Markets+ (expected in October 2027). In a written letter, CESA criticized the ISO for revisiting the project's timing after the 2026–2028 Policy Initiatives Roadmap had already scheduled a Q4 2026 decision. CESA also argued that the ISO does not need footprint-wide ancillary service co-optimization before it can adopt effective scarcity pricing.

Some stakeholders supported a narrower path. Public Generating Pool supported adopting the Track 1 targeted improvements now while continuing technical work on broader regional reforms. BAMx in its public comments similarly urged the working group to assess whether the straw proposal's targeted measures could address many of the price formation problems that reform advocates identified.

The Governing Body also reviewed technical guidance from the Market Surveillance Committee. The ISO noted Dr. Bushnell's suggestion that the ISO could raise existing market penalty values as an interim measure. It also noted Dr. Harvey's view that the ISO may need to improve reserve modeling before scarcity pricing can work effectively.

The CPUC Energy Division echoed the LSEs' caution and suggested that DAME's new products may meet market needs without additional scarcity pricing.

4 Proposals

4.1 BAA-Level Market Power Mitigation

Summary of Key Changes

1. The BAAMPM test would apply to groups of BAAs based on shared prices and connectivity, rather than individual BAAs.
2. The BAAMPM test would derive competitive MECs from the lowest MEC within a passing group and no longer default to the CAISO MEC.
3. The BAAMPM test would incorporate an affiliate's Load-Serving Obligation (LSO) to determine its withholdable capacity within a group and replace the quarterly process that excludes net buyers from being identified as pivotal suppliers in the BAAMPM test.
4. After a BAA group fails the BAAMPM test, a separate process would determine which suppliers in that group are subject to mitigation. The market would mitigate only those suppliers rather than every supplier in the noncompetitive group.

4.1.1 *Retain CAISO BAA's Default Competitive Status in the BAA-Level MPM Grouping Algorithm*

The ISO initially proposed to include the CAISO BAA in the BAA-level MPM grouping algorithm and remove the CAISO BAA's default competitive status so that all participating BAAs would be evaluated under a common framework. After stakeholder discussion, MSC review, and additional analysis, the ISO now proposes to retain CAISO's current default competitive status for BAA-level MPM at this time.

The grouping algorithm will continue to rank BAAs, form groups, test non-CAISO groups, and establish competitive MECs under the grouping methodology. However, any group that includes the CAISO BAA will be deemed competitive.

This decision applies only to BAA-level MPM. Local market power mitigation and other applicable rules will continue to apply where provided for under existing market rules.

Accordingly, the ISO proposes to proceed with the grouping approach while retaining CAISO's default competitive status for BAA-level MPM. This approach preserves the benefits of grouping for non-CAISO BAAs while allowing the PFE working group to continue evaluating CAISO BAA-level mitigation alongside broader scarcity pricing reforms in a future phase of this initiative.

4.1.2 *Transition to a Grouping Approach for BAA-Level mitigation*

This proposal outlines the methodology to transition the BAA-level MPM framework from an individual BAA assessment to a grouping approach.

Proposed Methodology

The BAA grouping approach involves the following sequential steps for each market interval:

1. **Rank BAAs and Form Initial BAA Groups**

   The grouping algorithm would rank all participating BAAs by their marginal energy costs (MECs) in descending order.

   It then constructs an export transfer connectivity matrix, where $C(i, j) = 1$ if an export transfer connection exists (defined as an EDAM/WEIM transfer connection that allows non-zero export transfers from BAA i to BAA j) and $C(i, j) = 0$ otherwise.

Next, the algorithm merges BAAs with equal MECs[9] to form initial BAA groups. The algorithm places BAAs with equal MECs in the same group if they form a connected set, where for any group that contains more than one BAA, every BAA has an export transfer connection to or from at least one other BAA in the group.

The algorithm sets the "Current Group" to the first group in the MEC-ordered list (the group with the highest MEC).

2. Test the Current Group

If the Current Group includes the CAISO BAA, the algorithm deems the Current Group competitive without calculating an RSI. The algorithm marks any BAA in the Current Group that does not yet have a competitiveness status as **competitive.** It sets the group's competitive MEC equal to that group's MEC. The algorithm then proceeds to Step 3.

If the Current Group does not include the CAISO BAA, the algorithm applies the three-pivotal-supplier test and calculates the RSI for the Current Group. The RSI measures structural competitiveness and is defined as:

RSI = (Available Competitive Supply) / (Demand)

Where:

"Available Competitive Supply" equals the sum of (1) capacity from fringe competitive suppliers (those not among the three largest suppliers), (2) cleared net imports (imports minus exports between the group and BAAs outside the group), and (3) the minimum supply contribution of the three largest suppliers (reflecting their maximum potential withholding) including their load-serving obligations as described in Section 4.1.3.

"Demand" is the demand forecast for the group being tested.

- **If the current group passes (RSI ≥ 1):**
  - The algorithm marks all BAAs in the Current Group that do not yet have a competitiveness status as **competitive**.
  - For each BAA in the Current Group that does not yet have a competitive MEC, the algorithm sets the competitive MEC equal to the lowest MEC in that group.

[9] Subject to a defined tolerance to account for de minimis price differences. The ISO will specify and maintain the specific value of this MEC tolerance in its BPM.

- **If the current group fails (RSI < 1):**
    - The algorithm marks all BAAs in the Current Group that do not yet have a competitiveness status as **uncompetitive**.

3. **Process the Next Group**

- **If no groups remain:**
    - For any BAA that still does not have a competitive MEC after the previous steps, the algorithm sets the competitive MEC to the bid price floor ($-150/MWh). [10]
    - The algorithm terminates.
- **Otherwise, the Next Group is the group with the next-highest MEC in the ranking.**

  The algorithm then searches the previously tested groups for an export transfer connection from any BAA in the Next Group to any BAA in a previously tested group. Once the algorithm merges groups for testing, they remain associated as a single group for purposes of subsequent merging.

    - **If no export transfer connection exists between the Next Group and any previous group:**
        - The Next Group becomes the new Current Group.
        - The algorithm returns to Step 2.
    - **If one or more export transfer connections exist:**
        - **Test Merged Group First:** The algorithm merges every previously tested group that is export-connected to the Next Group with the Next Group itself. If the merged group includes the CAISO BAA, the algorithm deems the merged group competitive without calculating an RSI. The algorithm marks all BAAs in the Next Group that do not yet have a competitiveness status as **competitive.** For each BAA in the merged group that does not yet have a competitive MEC, the algorithm sets the competitive MEC equal to the Next Group's MEC.

[10] This floor is only a placeholder. It lets the mitigation logic continue to compare bids against the higher of the competitive LMP or the resource's DEB. Because the floor will not exceed the DEB, mitigation for these BAAs effectively uses only the DEB.

The algorithm then remains in Step 3 to select the group with the next highest MEC.

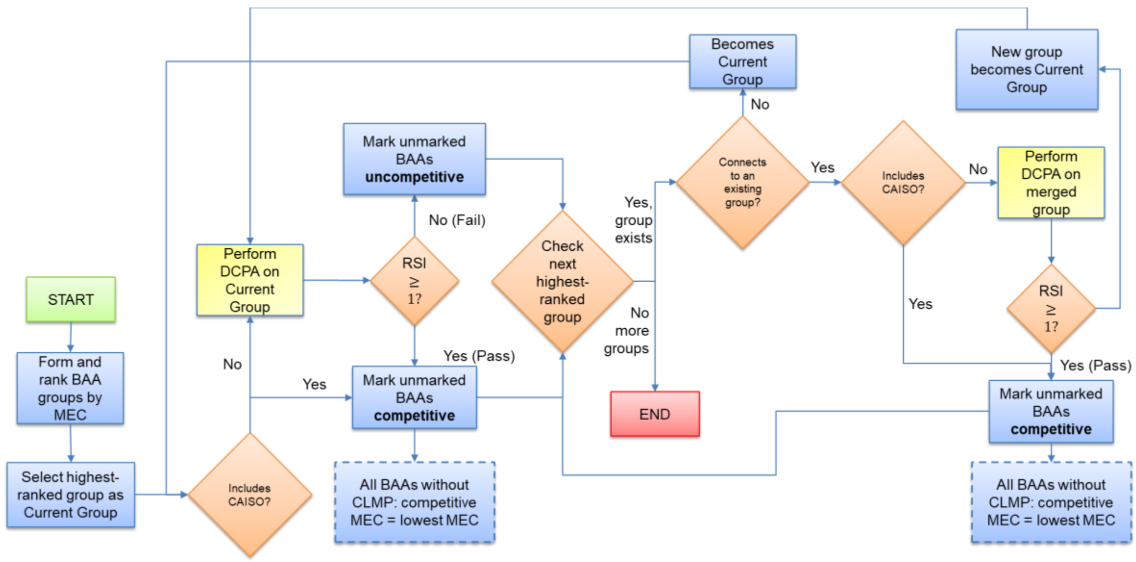
If the merged group does not include the CAISO BAA, the algorithm applies the test to the merged group.

- *If the merged group passes the test (RSI ≥ 1):*
  - The algorithm marks all BAAs in the Next Group that do not yet have a competitiveness status as **competitive**.
  - For each BAA in the merged group that does not yet have a competitive MEC, the algorithm sets the competitive MEC equal to the lowest MEC in that group.
  - The algorithm remains in Step 3 to select the next highest MEC group.
- *If the merged group fails the test (RSI < 1):*
  - Test Next Group Alone: The algorithm applies the test to the Next Group by itself.
  - *If the Next Group passes the test (RSI ≥ 1):*
    - The algorithm marks all BAAs in the Next Group that do not yet have a competitiveness status as **competitive**.
    - For each BAA in the Next Group that does not yet have a competitive MEC, the algorithm sets the competitive MEC equal to the lowest MEC in that group.
    - The algorithm remains in Step 3 to select the next highest MEC group.
  - *If the Next Group fails the test (RSI < 1):*
    - The algorithm marks all BAAs in the Next Group that do not yet have a competitiveness status as **uncompetitive**.
    - The algorithm remains in Step 3 to select the next highest MEC group.

BAAs marked competitive keep their competitive designation even after the algorithm includes them in a larger merged group. BAAs marked uncompetitive also keep their uncompetitive designation for the interval, even if the algorithm later includes them in a merged group that contains CAISO. The CAISO automatic pass rule applies only to BAAs that do not yet have a competitiveness status when the algorithm includes them in a group that contains CAISO.

Figure 1: Flowchart of the Proposed BAA Grouping Methodology illustrates this process.

Figure 1: Flowchart of the Proposed BAA Grouping Methodology



Detailed Example

Table 1: BAA Grouping Example Inputs

BAA	MEC ($/MWh)	Demand (MW)	Total Supply (MW)
A	100	500	600
B	80	400	700
C	80	300	600
D	60	600	900
E (CAISO)	60	400	700

Network Topology: A—B—C—D—E (connections in a chain)[11]

[11] This simplified example assumes a connected chain topology. The algorithm also handles disconnected regions where separate subgroups are tested independently but this would require a more complex example to demonstrate. In such a case, a lower MEC group that does not merge with a group that contains CAISO would continue to be tested and could fail.

RSI Assumptions (for simplicity):

- Cleared net imports between grouped BAAs = 0 (internal transfers net out)
- Minimum output and load-serving obligations of top three suppliers = 0 MW
- Therefore: Available Competitive Supply = Total Supply – Withholdable Capacity of Top 3 Suppliers

Iteration 1: Test Current Group {A}

The algorithm forms and tests the group {A}.

Assume top 3 suppliers in {A} control 400MW.

Demand: 500MW. Available competitive supply: 200MW.

RSI = 200 / 500 = 0.40 < 1 ✗ FAILS

Mark A as **uncompetitive**.

Iteration 2: Process Next Group {B, C}

{B, C} connects to {A} via the A-B link.

The algorithm forms and tests the merged group {A, B, C}.

Assume the top 3 suppliers in {A, B, C} control 900MW.

Demand: 1200MW. Available competitive supply: 1000MW

RSI = 1000 / 1200 = 0.83 < 1 ✗ FAILS

Since the merged group failed, the algorithm now tests {B, C} alone.

Assume the top 3 suppliers in {B, C} control 500MW.

Demand: 700MW. Available competitive supply: 800MW

RSI = 800 / 700 = 1.14 ≥ 1 ✓ PASSES

Mark B and C as **competitive**.

Competitive MEC for B and C is $80 (lowest MEC in the passing group). Note that A does not receive a competitive MEC because the merged group {A, B, C} failed and A was not part of the passing group {B, C}.

Iteration 3: Process Next Group {D, E}

{D, E} connects to {A, B, C} via the C-D link.

The algorithm forms the merged group {A, B, C, D, E}. Because the merged group includes CAISO, the algorithm deems the merged group competitive without calculating an RSI.

Mark D and E as **competitive**.

Competitive MEC for A, D, and E is $60 (lowest MEC in the passing merged group). Note that A, which was marked uncompetitive in Iteration 1 and did not receive a competitive MEC in Iteration 2, now receives a competitive MEC because the merged group {A, B, C, D, E} passed. B and C retain their previously assigned competitive MEC of $80.

These results follow from the design because, once A, D, and E are tested together with the broader connected group and that group passes, the MPM process has now identified enough competitive supply within the connected footprint to discipline prices for those BAAs at the group's lowest MEC of $60. B and C keep their $80 competitive MEC because they had already passed in a smaller, higher-priced group, so the later broader test does not override the more specific competitive price established for them.

Impact of Imbalance Reserve Transfers on BAA Grouping

EDAM will apply the same inter-BAA transfer constraints to optimize transfers for both energy and imbalance reserves (IR) across the market footprint. As a result, IR transfers can influence how the grouping algorithm forms BAA groups in the BAA-level MPM process.

If IR transfers exhaust the remaining capacity on a transfer path, the market cannot schedule additional energy into the import-constrained BAA. In that case, the binding transfer constraint can cause the MECs in the two BAAs to diverge.

This dynamic affects the grouping algorithm for the following reasons:

1. The grouping algorithm forms initial BAA groups based on MECs. If IR transfers bind a BAA transfer constraint, the MEC in the import-constrained BAA can rise above the MEC of the export BAA. The algorithm would then place them in different groups.
2. When IR transfers cause MECs to separate, the higher-priced BAA cannot receive incremental energy from its neighbor at the margin. This means external suppliers cannot compete to lower the energy price in the constrained BAA and internal suppliers in the import-constrained BAA may possess market power.

Use of MEC for BAAMPM in GHG-Regulated Areas

BAAMPM is designed to identify structural market power that occurs when binding BAA transfer constraints or scheduling limits keep external supply from disciplining internal suppliers. The concern is not price separation by itself – it is import transfer constraints that make suppliers inside a constrained BAA pivotal.

MEC is the appropriate metric for BAAMPM because it reflects the shadow price of the BAA power balance constraint. This distinction is especially important under EDAM because CAISO no longer calculates a single system marginal energy cost (SMEC).[12] Instead, EDAM and WEIM now enforce BAA-specific power balance constraints, and the shadow price of each BAA-specific power balance constraint is the MEC for that BAA. When transfer or scheduling constraints bind, the resulting price separation will appear in the differences between those BAA-specific MECs. The proposed grouping approach therefore ranks and groups BAAs by MEC, which aligns BAAMPM with the BAA-level marginal energy condition that matters for constrained imports.

GHG-related price effects are modeled separately from MEC. Before EDAM, the marginal cost of GHG emissions was embedded in SMEC and then subtracted from non-California BAAs LMPs. After EDAM, the marginal cost of GHG emissions is accounted for outside MEC and applies within GHG regulation areas.[13] This means GHG costs may affect the final LMP within a GHG regulation area without changing the BAA-specific MEC used to identify import transfer constraints.

The EDAM GHG model uses GHG attributions, GHG bid adders, and a GHG import allocation constraint to reflect the cost of imports into GHG regulation areas. Those GHG regulation areas may not match BAA boundaries. The shadow price of the GHG import allocation constraint defines the GHG price, or marginal GHG cost, and becomes part of LMP within the GHG regulation area while remaining separate from the shadow price of the BAA power balance constraint.[14]

For that reason, BAAMPM is better aligned with its intended purpose when it relies on MEC, without adding GHG components or using full LMP. Adding GHG-related price components could cause BAAMPM to treat a GHG compliance or attribution cost as evidence of BAA-level structural market power. That could lead to false positives, with mitigation triggered by regulatory cost differences rather than by transfer limits that prevent competitive external supply from reaching the BAA.

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[12] See Appendix Section 7.3 for more information about price formation changes under EDAM.

[13] See CAISO, Extended Day-Ahead Market Performance May Report, June 24, 2026, pages 30–34.

[14] See CAISO, Extended Day-Ahead Market Performance May Report, June 24, 2026, pages 83–86.

When both transfer constraints and GHG constraints bind, BAAMPM should focus on the MEC separation caused by transfer constraints. GHG costs may affect the final LMP in the GHG area, but they should not determine whether a BAA is structurally import constrained for BAAMPM purposes. Even if MECs are lower than LMPs because GHG costs are accounted for outside MEC, that does not undermine the BAAMPM test. The key point is that GHG costs are treated consistently, so BAAMPM continues to measure relative MEC separation caused by transfer constraints, not differences in GHG compliance or attribution costs.

4.1.3 *Integrate Load-Serving Obligations into Withholdable Capacity Calculation*

This section proposes to adjust how the market calculates withholdable capacity to account for each affiliate's load-serving obligation in both EDAM and WEIM.

The current three pivotal supplier test assumes an affiliate can and will withhold all available capacity. However, for an affiliate that also has load-serving obligations (LSO), it would be economically irrational to withhold the supply needed to serve its own retail customers, as it would procure that energy at the inflated price it helped create. To reflect this, this proposal would treat the energy needed to satisfy an affiliate's LSO as non-withholdable, subject to the affiliate's physical maximum available supply. This calculation would apply only to the BAA-level MPM test at this time and would not extend to local MPM in this initiative.

For each affiliate in the BAA group under test, define:

S_{max}: the sum of max output across the affiliate's resources for the interval.

S_{min}: the sum of min output across the affiliate's resources for the interval.

LSO: the affiliate's load-serving obligation for the interval.

First calculate the affiliate's non-withholdable minimum output (MO) as:

$$MO = \min\{S_{max}, \max(S_{min}, LSO)\}$$

Then calculate withholdable capacity (WC) as:

$$WC = \max(0, S_{max} - MO)$$

This calculation establishes an affiliate's non-withholdable output floor at the greater of its aggregate minimum generation (S_{min}) or its LSO, but capped at its maximum available supply (S_{max}). The capacity an affiliate could potentially withhold is only the amount above this non-withholdable level.

Example: consider an affiliate with S_{max} = 1000 MW, S_{min} = 100 MW, and LSO = 600 MW.

Then $MO = \min\{1000, \max(100{,}600)\}$ = $\min\{1000{,}600\}$ = 600MW.

So $WC = \max(0{,}1000 - 600)$ = 400MW. Without this adjustment, WC would have been 1000 – 100 = 900MW.

If LSO exceeds available supply in an interval ($LSO > S_{max}$), then $MO = S_{max}$ and $WC = 0$. This outcome reflects that the affiliate cannot withhold more than it can physically supply.

After calculating the adjusted WC values for all affiliates, the market would rank them to identify the top three pivotal suppliers for the RSI test.

The RSI formula structure described in Section 4.1.2 would remain the same, but the input for the "minimum output of the three largest suppliers" would change. In the standard test, the RSI numerator ("available competitive supply") adds, for each potentially pivotal supplier, that supplier's physical minimum generation (S_{min}), and assumes the supplier withholds all capacity above that level. Under this proposal, for any supplier with a load-serving obligation, the RSI numerator instead would add the supplier's non-withholdable minimum output (MO) defined above. Thus, the "minimum output of the three largest suppliers" term becomes:
$\sum MO = \sum \min(S_{max}, \max(S_{min}, LSO))$.

Proposed Methodology

This proposal defines a tiered approach to determine each affiliate's LSO:

1. **Day-Ahead Market (DAM) LSO**
    - In the DAM run, the MPM process would set each affiliate's LSO equal to its total scheduled load (physical load + net virtual demand) from the MPM pass of the IFM.
2. **Real-Time Market (RTM) LSO**
    - **For WEIM BAAs with a single affiliate:** the MPM process would set the affiliate's LSO equal to the BAA's total real-time demand forecast for the market interval.
    - **For EDAM BAAs with multiple affiliates**: the MPM process would allocate the BAA's total real-time demand forecast among affiliates using each affiliate's historical percentage share of BAA load:

Affiliate LSO = (BAA Real-Time Demand Forecast) x (Affiliate's Historical % Share)

The historical share will be calculated for each hour, day-type (e.g., weekday/weekend), and season based on the previous calendar year's metered data. An entity may request a prospective adjustment where documented mid-year load changes (such as load migration or a large new load addition) make the prior-year data no longer representative.

- For WEIM-only participants, the obligation used in the minimum output calculation will equal the affiliate's calculated LSO plus base scheduled net exports ($max(0, LSO + \ Base\ Scheduled\ Net\ Exports)$) for the specific market interval.[15]

Multi-Affiliate WEIM-Only BAAs

Most WEIM BAAs have only one affiliate. However, the ISO recognizes that some WEIM-only BAAs have multiple affiliates.

Unlike EDAM participants, WEIM-only participants generally do not provide the affiliate-level metering and data needed for the ISO to disaggregate its load between affiliates. As a result, when a WEIM-only BAA has multiple affiliates, the ISO may not have enough information to apply the RTM LSO allocation methodology described above. Therefore, the ISO proposes the following:

- If affiliate-level load metering exists (or is already available to the ISO):
    - Use the same metered load-share approach described above.
- If affiliate-level load metering is not available:
    - Set each affiliate's LSO = 0.
    - An affiliate may receive LSO credit only if it provides verified affiliate-level load metering sufficient to support the affiliate's load-serving exposure for the relevant interval.

4.1.4 *Mitigate only Pivotal Suppliers*

Mitigation would no longer apply by default to all suppliers within a noncompetitive BAA group. Instead, suppliers would be subject to potential bid mitigation based on an algorithm that determines which specific suppliers are pivotal. This process would apply

[15] Positive values = net export and negative values = net import.

only after the standard three-pivotal supplier test has already determined that the BAA group is noncompetitive. Furthermore, the proposal builds on the foundational principle that affiliates classified as net buyers lack the incentive to exercise market power. As such, it would exclude affiliates that are net buyers due to their load-serving obligations in the relevant interval from being designated as pivotal suppliers, since they would have no withholdable capacity (as detailed in Section 4.1.3).

The algorithm below does not change the assessment of the group's competitiveness. Its sole purpose is to limit bid mitigation to only those suppliers identified as pivotal, rather than mitigating all suppliers in the noncompetitive group.

Proposed Algorithm

The proposed process begins after a BAA group fails the initial 3PS test using its three largest suppliers. That failure establishes that S1, S2, and S3 are jointly pivotal, but it does not establish whether a supplier is individually pivotal or whether a two-supplier combination is jointly pivotal. The algorithm therefore evaluates suppliers, ranked from largest to smallest, to identify the suppliers subject to potential mitigation and establish the cutoff below which suppliers are not pivotal.

A. The algorithm performs a one-pivotal-supplier (1PS) test on the highest-ranked supplier not yet tested in Step A.
    a. **If it fails:** The tested supplier is individually pivotal and is identified for potential mitigation. The process repeats Step A using the next lower-ranked supplier.
    b. **If it passes:** The tested supplier is not individually pivotal and becomes the anchor supplier for the 2PS testing in Step B. Once the algorithm proceeds to Step B, it does not return to Step A. Because suppliers are ranked from largest to smallest, every supplier ranked below a supplier that passes the 1PS test would also pass a 1PS test.
B. The algorithm performs a two-pivotal-supplier (2PS) test using the anchor supplier from Step A and the next lower-ranked supplier.
    a. **If it fails:** The two tested suppliers are jointly pivotal and are identified for potential mitigation. The process repeats Step B by retaining the anchor supplier and replacing the supplier in the second position with the next lower-ranked supplier.

  b. **If it passes:** The two tested suppliers are not jointly pivotal and become the anchor pair for the 3PS testing in Step C. Once the algorithm proceeds to Step C, it does not return to Step B.

C. The algorithm performs a three-pivotal supplier (3PS) test on the anchor pair from Step B and the next lower-ranked supplier.

  a. **If it fails:** The three tested suppliers are jointly pivotal and are identified for potential mitigation. The process repeats Step C by retaining the anchor pair and replacing the supplier in the third position with the next lower-ranked supplier.

  b. **If it passes:** The three tested suppliers are not jointly pivotal. The first passing 3PS test establishes the mitigation cutoff. The supplier in the third position of that test and all lower-ranked suppliers are not subject to mitigation under this process. Suppliers that failed earlier 1PS, 2PS, or 3PS tests remain subject to potential mitigation. The process ends.

Illustrative Example

The following simplified example illustrates the algorithm above. The listed amounts represent the supply attributed to each supplier for purposes of the pivotal supplier test in the relevant market interval. It omits other inputs to the BAA-level MPM calculation.

Assume the BAA group has demand of 100 MW and six suppliers ranked from largest to smallest:

Table 2: Pivotal Supplier Algorithm Example Inputs

Supplier	Withholdable Capacity (MW)
S1	60
S2	30
S3	25
S4	18
S5	15
S6	5

Total	**153**

For this example, a pivotal supplier test passes when the supply remaining after removing the tested supplier or suppliers is at least the BAA group's 100 MW demand. The test fails when the remaining supply is less than 100 MW.

Step A — 1PS testing

1. Test S1: 153 − 60 = 93 MW < 100 → **fails**. S1 is individually pivotal → flagged for mitigation. Repeat Step A with the next-largest supplier.
2. Test S2: 153 − 30 = 123 MW ≥ 100 → **passes**. S2 is not individually pivotal and becomes the anchor supplier for Step B.

Step B — 2PS testing (anchor = S2)

1. Test {S2, S3}: 153 − 30 − 25 = 98 MW < 100 → **fails**. S2 and S3 are jointly pivotal → both flagged for mitigation. Keep S2 as anchor and replace S3 with the next lower-ranked supplier.
2. Test {S2, S4}: 153 − 30 − 18 = 105 MW ≥ 100 → **passes**. (S2, S4) become the anchor pair. Proceed to Step C.

Step C — 3PS testing (anchor pair = S2, S4)

1. Test {S2, S4, S5}: 153 − 30 − 18 − 15 = 90 MW < 100 → **fails**. S2, S4, and S5 are jointly pivotal → all three flagged for mitigation. Keep (S2, S4) as the anchor pair and replace S5 with the next lower-ranked supplier.
2. Test {S2, S4, S6}: 153 − 30 − 18 − 5 = 100 MW ≥ 100 → **passes**. This first passing 3PS test establishes the cutoff. The supplier in the third position (S6) and every lower-ranked supplier are not subject to mitigation. The algorithm ends.

Result

Suppliers subject to mitigation through the failed supplier tests are S1, S2, S3, S4, and S5. S6, and any lower-ranked suppliers, are not subject to mitigation under this process.

This example also demonstrates that the result of one test does not determine a supplier's status in every combination. S2 passes the 1PS test but is identified as jointly pivotal through later failed 2PS and 3PS tests. Similarly, S4 is part of a passing 2PS test but is later identified as jointly pivotal through the failed 3PS test.

Mitigation Application

For all suppliers identified for mitigation under this process, if a submitted bid exceeds both the resource's Default Energy Bid (DEB) and the competitive LMP, the market would mitigate the bid to the higher of those two values. For this purpose, the competitive LMP would reflect the competitive MEC assigned through the BAA-level MPM grouping algorithm, along with any applicable resource-specific local congestion adjustments.

Section 4.1.3 uses load-serving obligations to test whether a supplier is pivotal, but these values would not restrict mitigation once the market finds a pivotal supplier. When the market finds a supplier pivotal, the entire bid of the supplier's resources are subject to mitigation within the uncompetitive BAA group. The market would not exempt an amount of generation equal to the LSO from mitigation.

4.2 Scarcity Pricing

Summary of Key Changes

1. The real-time market would treat firm load shedding as unserved demand.
2. The RTD optimization would incorporate the opportunity cost of dispatching armed reserve capacity for energy into the RTD energy price.

4.2.1 *Trigger Scarcity Pricing when Operators Shed Load*

When a BA operator directs firm load shedding to address a BAA-wide supply insufficiency, this proposal would adjust that BAA's real-time market demand input to reflect the shed load as unserved demand.

CAISO's real-time market uses a demand input derived from a persistence forecast. A persistence forecast estimates near-term demand based on recently observed metered load. Under normal conditions, this approach is appropriate because recent metered load is a reasonable indicator of load in upcoming real-time market intervals.

During firm load-shedding events, however, this forecasting logic can produce the wrong market signal. When a BA operator issues a firm load shed instruction, responsible entities disconnect firm load to maintain reliability. That disconnection reduces metered load. As the persistence forecast incorporates the lower metered load over subsequent intervals, the market demand input may fall even though the underlying supply insufficiency remains. The optimization may then treat the emergency curtailment as a reduction in demand rather than as unserved firm load. If that occurs, market prices may fall to non-scarcity levels while firm load remains curtailed.

To address this issue, the ISO proposes to modify the demand input used by the market optimization during firm load shedding events so that the market recognizes curtailed firm load as demand that remains unserved.[16]

Proposed Design

The ISO will modify the market optimization during firm load shedding events so that the demand input used by the market continues to recognize curtailed firm load as unserved demand. This is the proposed policy design. The ISO is still evaluating the precise technical method for implementing that design, including the two options below. Each is intended to produce the same market design result.

Implementation Option A: Add verified firm load shed to market demand.

Under this implementation, the ISO would add the verified MW quantity of firm load shed to the applicable market demand input. This approach would directly restore the curtailed quantity to the market demand target.

Because the quantity of firm load directed or verified as shed may not precisely equal the estimated supply shortfall, the implementation must define the quantity that the market will add to the persistence forecast. That quantity could be based on the operator instruction, verified disconnection, or another measure intended to represent unserved firm load without materially overstating the underlying supply insufficiency.

Implementation Option B: Switch to a non-persistence demand forecast during firm load shedding.

Under this implementation, the ISO would replace the persistence forecast demand input with a standard weather-based forecast. This approach would avoid relying on a recent metered load signal that has already been affected by emergency curtailment.

The ISO will continue to evaluate which implementation method is more feasible and accurate. The implementation may use either approach, or a combination of the two, depending on software feasibility, operator visibility, the accuracy of available load-shed data, and the comparative operational and market effects of each method.

[16] This is consistent with MISO scarcity pricing reforms (accepted by FERC) in Docket No. ER25-579 that preserve scarcity prices during EEA Level 3 load shedding conditions.

Market Scope and Trigger Rules

The ISO proposes to apply the mechanism in both the RTD and the FMM.

Applying the mechanism in FMM extends that scarcity signal to the broader WEIM optimization and to CAISO intertie resources that settle on FMM prices. This is important because the relevant supply response during a firm load-shed event may come not only from resources internal to the shedding BAA, but also from WEIM transfers or CAISO intertie supply that can be delivered over available transfer capability.

RTD Trigger: The mechanism will apply in RTD when a BAA is in EEA Level 3 and the BAA operator has issued a firm load shed instruction.

FMM Trigger: The mechanism will apply to an FMM interval when, at the time the FMM run is executed, the BAA is in EEA Level 3 and a firm load shed instruction is active.

Applying this change to both FMM and RTD is complicated because the relevant FMM run prices a future fifteen-minute interval while RTD solves much closer to real time. In current timing, the FMM run is approximately 37.5 minutes ahead of the binding FMM interval, while RTD solves approximately five minutes ahead of its binding interval.

This means the ISO may know that a BAA is shedding firm load at the time of the FMM run but may not know whether the same load-shed instruction will remain in effect during the RTD intervals that settle against that FMM interval. If the load-shed instruction is reduced or cancelled before one or more of those RTD intervals, FMM prices may reflect scarcity conditions that no longer exist in RTD. Conversely, if the ISO waits until RTD to apply the mechanism, the market would not provide a scarcity signal in FMM to WEIM transfers or CAISO intertie resources during an active load-shed event. The ISO believes that preserving the FMM scarcity signal during an active firm load-shed event is the better reliability tradeoff.

The ISO will continue to evaluate the exact interval-mapping rules for implementation, including the start and end points for applying the mechanism in FMM and the treatment of the RTD intervals associated with each FMM interval. The ISO expects the final design to specify how the mechanism applies when a firm load-shed instruction begins or ends within an FMM interval.

Optimization and Pricing Logic

When the mechanism is active, the market optimization will use a demand input that recognizes firm load shed as unserved demand. If available supply cannot meet that adjusted demand input, the power balance constraint will bind at the applicable penalty price. In that case, the MEC will reflect the applicable power balance penalty price (the value of which is subject to the prevailing bid cap).

The optimization will continue to calculate congestion and loss components. As a result, LMPs at specific nodes may be above or below the PBC violation price depending on active transmission constraints, greenhouse gas compliance costs, and marginal losses.

Scarcity prices may also spread to neighboring BAAs through the WEIM and EDAM optimization when transfer paths are uncongested. This outcome is appropriate because, when transfer capability is available, energy from a neighboring BAA can support the BAA shedding load and has the same marginal reliability value. If transfer constraints bind, the scarcity price will not spread across the constrained path, and resources that cannot help resolve the shortage will not receive the scarcity price.

Operational and Settlement Safeguards

The ISO recognizes that adding unserved firm load to market demand may cause the market to dispatch more supply than actual connected load requires, particularly during the intervals before the persistence forecast has fully reflected the reduced metered load. The ISO also recognizes the quantity of firm load directed to be shed may not precisely equal the estimated supply shortfall because operator judgment and the physical configuration of load interconnected with the transmission system may require curtailment in quantities that do not exactly match the shortfall. This creates both operational and settlement tradeoffs.

To manage operational risk, the ISO will retain authority to suspend or reduce the mechanism when needed to preserve reliability, manage Area Control Error, or avoid infeasible dispatch instructions. Operators may also use existing load conformance tools and manual dispatch instructions to align physical dispatch with actual grid conditions.

To manage settlement risk, the ISO will monitor whether the mechanism creates excessive Real-Time Energy Imbalance Offset. This offset could arise when instructed supply exceeds connected load or when market demand differs from metered demand as the system enters or exits firm load shedding.

Financial Circuit Breaker

The ISO will use a cumulative circuit breaker to limit systemic credit risk. The circuit breaker will deactivate the mechanism for a specific BAA after four cumulative hours of load-shed conditions within a rolling 24-hour period.

The ISO proposes a cumulative design because a non-cumulative timer could reset after brief load reconnections or short pauses in applying the mechanism, even if the same emergency continues. A cumulative rule better captures the total financial exposure from an extended load-shed event and reduces the risk that brief changes in operating status could avoid the circuit breaker.

Several stakeholders questioned whether a four-hour circuit breaker is too long, too short, or appropriate at all during an ongoing load-shed event. The ISO continues to believe that four hours is a reasonable balance. It gives the market time to send a sustained scarcity signal while limiting open-ended exposure to scarcity-level settlements during a prolonged outage.

After the circuit breaker activates, the market will return to the otherwise applicable demand input. Prices may then fall even if the BAA remains in firm load shed. This is an inherent feature of any circuit breaker design. To that point, the ISO seeks feedback on the extent to which a circuit breaker may reduce the likelihood that demand flexibility and neighboring BAA unit commitments are available to support reliability during these circumstances.

Interaction with Future Comprehensive Scarcity Pricing Mechanisms

This mechanism is compatible with a future ORDC or energy supply margin mechanism. Both mechanisms would price scarcity as reserves decline before the system reaches firm load shedding. This proposal defines how the market should represent when firm load has already been curtailed because available supply was insufficient.

Without an explicit rule for how the market should represent curtailed firm load, the market could treat emergency load shedding as a reduction in demand rather than as unserved demand. That would allow prices to fall after operators curtail firm load, even though the system has moved beyond reserve shortage into actual service interruption. This proposal prevents that outcome by ensuring that unserved firm load remains visible to the market optimization.

Summary of Expected Outcomes

This proposal will:

1. Preserve real-time scarcity price signals during firm load shed events.
2. Encourage storage discharging when available during load shed events.
3. Provide FMM scarcity signals for WEIM transfers and CAISO intertie resources that can provide supply.
4. Align settlements for demand response and other reliability resources with the value of energy during emergency conditions.

5. Establish a terminal scarcity pricing rule that can later be integrated into an ORDC or energy supply margin framework.

4.2.2 *Pricing Armed Reserves to Ensure Consistent Scarcity Signals in the RTD*

The real-time market operates through two interconnected but distinct processes. The Real-Time Pre-Dispatch process (RTPD) runs every 15 minutes and, when the market procures incremental ancillary services (AS), evaluates the economic tradeoff between dispatching a resource's capacity for energy or reserving that capacity for AS. This process establishes real-time AS marginal prices, and when scarcity conditions emerge, those AS prices help send a scarcity signal because the market reflects the opportunity cost of using limited capacity for energy instead of reserves.

However, the RTD is an energy-only economic dispatch. RTD does not re-procure or re-optimize AS. Instead, it treats AS awards from RTPD as fixed and optimizes only the remaining energy bids to meet the 5-minute demand forecast. This means that a scarcity price signal reflected in RTPD may not carry through to RTD. Without an additional mechanism, RTD LMPs may reflect only the bid of the marginal energy resource and may omit the opportunity cost of consuming reserve capacity during emergency conditions.

This issue becomes particularly important when CAISO operators arm load. Arming load is an emergency operational practice in which operators instruct utilities or load-serving entities to prepare specific amounts of firm load for disconnection. The armed load functions as a contingency reserve substitute. By designating firm load that can be dropped if needed, CAISO can release physical generating capacity that had previously been held back to satisfy operating or contingency reserve requirements.

For clarity, this proposal distinguishes between two related but different concepts:

- **Armed load** means firm load designated by operators as available for immediate controlled disconnection. Armed load serves as the substitute reserve capability.
- **Armed reserves** means the physical generating capacity that had previously been held as contingency reserves but is released into the energy market because armed load is now serving as the contingency reserve backstop.

Thus, arming load does not create new physical generation capacity. Rather, it changes the reliability posture of the system by allowing capacity that had been held for reserves to become available for energy dispatch. The purpose of this proposal is not to create capacity or administratively increase prices for their own sake. The purpose is to ensure

RTD prices reflect the opportunity cost of consuming reserve capability that was released only because operators armed load.

This proposal presents a mechanism to ensure RTD reflects the scarcity value of AS established in the RTPD when operators arm load and the market dispatches previously reserved capacity. The core concept is to enhance RTD with a mechanism that allows it to dispatch energy from a resource's previously awarded AS capacity, but only if the market economically justifies doing so based on the opportunity cost of the resulting reserve shortage. RTD would price the opportunity cost by leveraging values from the SRDC employed in the RTPD to ensure price consistency. This approach ensures the RTD LMPs reflect the true marginal cost of meeting energy demand, including any reserve scarcity, despite the limitation that RTD does not re-procure AS.

Stakeholders requested additional clarity on how CAISO's existing load arming procedures work, how operating reserves are released during emergency conditions, how released reserves are currently priced when dispatched for energy, and how prior load arming events affected market and operational outcomes. In addition to the descriptions and examples below, CAISO has addressed these issues in prior materials.[17]

Effect of Arming Load in RTPD and RTD

Arming load affects RTPD and RTD differently.

In RTPD, released reserve capacity becomes available to the market, but RTPD still attempts to solve for both energy demand and reserve requirements. As a result, even after operators arm load and release capacity that had previously been held for contingency reserves, RTPD may procure some or all of that same capacity back as contingency reserves. If RTPD cannot meet the reserve requirements with available supply, it may relax the reserve requirement and price the reserve shortage according to the SRDC.

In RTD, however, the released reserve capacity is available to dispatch for energy regardless of what the associated RTPD run did. RTD does not perform the same AS procurement tradeoff. It sees the released reserve capacity as energy capability that can be used to meet 5-minute demand. Therefore, when RTD dispatches armed reserves for energy, the proposed mechanism is needed to cause the RTD price to reflect the opportunity cost of consuming capacity that had been held for reliability.

[17] Relevant materials include: CAISO Summer Market Performance Report — July 2021; CAISO Summer Market Performance Report — September 2022; MSC Opinion on Market Enhancements for Summer 2021 Readiness; and CAISO March 26, 2021 FERC tariff amendment for Summer 2021 Readiness.

When RTD dispatches armed reserves for energy, that dispatch also becomes an initial condition for the next RTPD run. The next RTPD run will observe that some of the released reserve capacity is being used for energy and will again attempt to meet both energy demand and reserve requirements. Depending on system conditions, RTPD may procure that capacity back as contingency reserves, procure different capacity, or, if there is insufficient available reserve capability, relax the ancillary service procurement constraints and price that relaxation using the SRDC.

Conceptual Framework

The following conceptual framework illustrates how RTD could reflect the opportunity cost of dispatching armed reserves for energy. This framework is intended to help stakeholders understand the concept and is not intended to prescribe a final software formulation.

This proposal would enhance RTD with a new decision variable for each resource and two additional constraints that link energy dispatch to reserve availability.

A new variable, $ReserveDispatch_i$, would represent the amount of previously awarded contingency reserve capacity from resource *i* that RTD dispatches for energy after operators arm load. This variable would be bounded as follows:

$$0 \leq ReserveDispatch_i \leq ArmedReserve_i$$

where $ArmedReserve_i$ represents the amount of resource i's capacity that becomes available for energy dispatch as a result of operators arming load.

All existing RTD constraints (power balance, ramping, network limits, etc.) would remain unchanged. This proposal would add two conceptual constraints.

First:

$$P_i + (ReserveAward_i - ReserveDispatch_i) \leq Pmax_i$$

Where $ReserveAward_i$ is resource $i's$ AS award from the associated RTPD run.

This constraint ensures that the market respects the physical limit of the resource. The resource's energy dispatch (P_i) plus its remaining reserve obligation after accounting for any armed reserve capacity dispatched for energy, cannot exceed the resource's maximum output ($Pmax_i$).

Second:

$$\Sigma_i ReserveDispatch_i = ReserveSlack$$

This constraint ensures that any RTD dispatch of released armed reserve capacity for energy creates a corresponding quantity of $ReserveSlack$. The $ReserveSlack$ variable does not represent a physical reserve product or additional capacity. It is a pricing variable used to reflect the opportunity cost of consuming reserve capability that was made available only because operators armed load.

The RTD objective function would minimize the combined cost of energy and reserve slack:

$$\min \Sigma_i (P_i \cdot Bid_i) + (CostReserveSlack * ReserveSlack)$$

Because the RTD objective function penalizes $ReserveSlack$ at the applicable reserve slack penalty price, RTD will not treat released armed reserve capacity as ordinary energy. When RTD dispatches that capacity, the objective function reflects both the resource's energy bid and the reserve slack penalty. RTD will use the capacity only when doing so produces a lower-cost feasible solution than the available alternatives, such as dispatching other energy.

CAISO would use a single reserve slack penalty price based on the middle tier of the current SRDC values. This approach preserves the basic economic logic of pricing reserve opportunity cost while reducing implementation complexity relative to a three-tier curve. Using a one-tier value also avoids unnecessary precision for an interim mechanism that may ultimately be replaced by full AS co-optimization or RTD AS re-procurement.

Table 3: Reserve Slack Penalty Price

ReserveSlack quantity	Cost when energy bid cap is $1,000/MWh	Cost when energy bid cap is $2,000/MWh
> 0 MW	$350/MWh	$700/MWh

The reserve slack penalty must be designed so that the penalty price plus the highest possible energy bid price remains below the power balance constraint penalty price. This ensures the market continues to prefer dispatching physically available energy rather than violating power balance.

Numerical Example

Assume the following simplified conditions before operators arm load:

- Resource A has a maximum output of 100 MW.
- Resource A is producing 50 MW of energy.
- Resource A has a 50 MW spinning reserve award.
- Resource A has an economic energy bid of $75/MWh.

- The prevailing energy bid cap is $2,000/MWh so the reserve slack penalty is $700/MWh.
- System conditions deteriorate, and operators determine they need to arm 50 MW of firm load.

Step 1: Before arming load

Before operators arm load, Resource A's 50 MW reserve award is held as contingency reserve capacity. RTD treats that reserve award as unavailable for energy dispatch. Resource A can continue producing 50 MW of energy, but its remaining 50 MW of physical capability is reserved.

In this condition, RTD does not dispatch Resource A's reserve capacity for energy because that capacity is fixed as an AS obligation.

Step 2: Operators arm load

Operators arm 50 MW of firm load. The armed load serves as the contingency reserve substitute, so CAISO releases the 50 MW of physical generating capacity that Resource A had previously been holding as spinning reserves.

At this point, Resource A's released reserve capacity becomes available for energy dispatch. Under existing policy, the released operating reserve capacity is made available to the market at the prevailing energy bid cap. In this example, the released 50 MW is therefore priced at $2,000/MWh.

Step 3: RTPD after arming load

After arming load, RTPD sees that the 50 MW of capacity has been released from its prior reserve obligation. However, RTPD still attempts to solve for both energy demand and reserve requirements. RTPD may procure some or all of Resource A's released capacity back as spinning reserves. If RTPD cannot meet the applicable reserve requirement with available supply, it may relax the reserve requirement and set reserve prices through the SRDC. In either case, RTPD can reflect the opportunity cost of reserves because it evaluates the tradeoff between energy and reserve procurement. As a result, RTPD prices may exceed the energy bid cap when the market uses capacity that otherwise would have been reserved for contingencies. The RTD proposal is intended to preserve that scarcity signal so RTD prices do not fall simply because RTD does not procure reserves.

Step 4: RTD without this proposal

RTD behaves differently. RTD sees the released reserve capacity as available energy capability. It does not perform the same reserve procurement tradeoff as RTPD. Even if

RTPD procured the capacity back as reserves, RTD can still dispatch the armed reserve capacity for energy if needed during the 5-minute interval.

Suppose RTD needs 1 additional MW of energy and dispatches 1 MW from Resource A's released reserve capacity. Without the proposed mechanism, RTD would see the marginal cost as the $2,000/MWh energy bid.

The RTD price would therefore be **$2,000/MWh**.

This price reflects the energy bid for the released capacity, but it does not reflect the additional opportunity cost of consuming reserve capability that was released only because operators armed load.

Step 5: RTD with this proposal

With the proposed mechanism, dispatching 1 MW from Resource A's released reserve capacity creates 1 MW of $ReserveSlack$. RTD would therefore evaluate two costs:

1. The energy bid: $2,000/MWh
2. The opportunity cost of consuming the released reserve capacity: $700/MWh

The RTD marginal price would reflect the combined cost:

$2,000/MWh + $700/MWh = $2,700/MWh

The resulting RTD price would be **$2,700/MWh**.

The higher RTD price communicates that the system is not merely using ordinary energy supply – it is using capacity that had been reserved for contingencies but is being released for extraordinary circumstances.

Step 6: Effect on the next RTPD run

The RTD dispatch then becomes part of the initial condition for the next RTPD run. The next RTPD run observes that 1 MW of Resource A's released capacity is being used for energy. RTPD will again attempt to solve for both energy demand and reserve requirements. Depending on system conditions, RTPD may procure that 1 MW back as reserves, procure reserve capacity from another resource, or violate the SRDC if there is insufficient reserve capability.

This interaction highlights why the RTD mechanism is needed. RTPD can reflect the reserve opportunity cost through AS procurement and the SRDC, but RTD needs a separate mechanism because it sees released armed reserves as dispatchable energy capability and otherwise may not reflect the opportunity cost of consuming that capacity.

Relationship to WEIM BAAs

This proposal does not include an armed reserve pricing mechanism for WEIM BAAs at this time. Stakeholder feedback supported the principle of comparable scarcity pricing treatment across the broader market footprint, but also identified practical concerns with implementing a parallel WEIM mechanism before integrated AS procurement is developed. In particular, WEIM BAAs do not currently have the same market-procured AS framework that allows the CAISO BAA mechanism to map released reserve capacity directly into RTD price formation.

CAISO recognizes that this creates a potential pricing seam between the CAISO BAA and WEIM BAAs. However, attempting to develop a bespoke interim mechanism for WEIM BAAs could introduce additional complexity, create inconsistent administrative treatment across BAAs, and become obsolete once broader AS co-optimization or RTD AS procurement enhancements are developed.

Accordingly, CAISO proposes to document this issue as part of the broader roadmap for integrated AS procurement and scarcity pricing across the EDAM and WEIM footprint. CAISO will continue to evaluate whether future market enhancements should include a footprint-wide approach for reflecting the opportunity cost of emergency reserve actions in real-time prices.

4.2.3 *Administrative Pricing for Emergency Actions*

The working group identified a price formation problem that can arise when operators take out-of-market actions or activate emergency resources during tight system conditions. Emergency demand response programs, backstop capacity, exceptional dispatch, assistance energy, and other operator actions can help maintain reliability or address an emerging shortage. But because these actions add supply or reduce demand outside the market optimization, they can suppress or distort prices when the market most needs accurate scarcity signals.

The ISO does not propose additional administrative pricing rules for emergency actions at this time. The issue remains important, but emergency programs and operator actions differ substantially across BAAs. A market-wide administrative pricing trigger could therefore produce inconsistent, duplicative, or inequitable results.

The ISO distinguishes these issues from firm load shedding. Firm load shedding is a clear and severe scarcity condition, and unlike many BAA-specific emergency programs, it is a type of emergency action that is applied consistently across all BAAs in WEIM.

The ISO also recognizes that a future comprehensive scarcity pricing redesign may provide a better long-term solution. An ORDC, energy supply margin, or similar framework would price scarcity based on the reserves or supply margin the market observes. Prices would rise as shortage risk increases based on real-time market conditions, rather than only after operators declare an emergency or take a specific action. This framework would produce more accurate scarcity prices because prices would track how tight the system is at the margin as conditions change.

4.2.4 Comprehensive Scarcity Pricing

CAISO recognizes the importance of scarcity pricing as a component of efficient price formation. Through this initiative, CAISO and stakeholders have considered whether the market should move beyond this proposal's targeted scarcity pricing enhancements and develop a more comprehensive scarcity pricing framework for the WEIM/EDAM footprint.

This proposal does not include comprehensive scarcity pricing. Instead, this proposal focuses on the set of price formation enhancements that are ready to advance now, including targeted changes that can improve scarcity price signals under existing market structures while maintaining progress on the broader PFE package.

CAISO believes this sequencing is appropriate. A durable scarcity pricing framework requires additional technical development, stakeholder discussion, and analysis of how the framework would interact with related market design elements. The working group record shows that important questions remain regarding reserve modeling, ancillary service procurement, flexible ramping product performance, EDAM/DAME market experience, demand-side participation, geographic scope, emergency actions, and administrative price levels.

Although this proposal defers comprehensive scarcity pricing, CAISO plans to resume discussion of this topic within the PFE working group after the governance decision on the current changes. At that time, CAISO and stakeholders can continue evaluating whether to develop a broader scarcity pricing framework, when to do so, and how any such framework should be integrated into CAISO's broader market design.

5 Governance

This initiative proposes new rules for scarcity pricing and for BAA-level market power mitigation. As explained below, CAISO expects that tariff changes resulting from this initiative will be subject to the primary authority of the WEM Governing Body.

The WEM Governing Body has primary 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 WEIM/EDAM. The scope of this primary authority excludes, without limitation, any other proposals to change or establish tariff rules applicable only to the CAISO balancing authority area or to the CAISO-controlled grid.

Charter for WEIM and EDAM Governance § 2.2.1. The proposed tariff changes would be "applicable to WEIM/EDAM Entity balancing authority areas, WEIM/EDAM Entities, or other market participants within WEIM/EDAM Entity balancing authority areas, in their capacity as participants in WEIM/EDAM." They would not be limited to the CAISO balancing authority area or to the CAISO-controlled grid. Accordingly, the proposed changes fall within the scope of the WEM Governing Body's primary authority.

This expected classification reflects the current preliminary state of this initiative and could change as the stakeholder process moves ahead. We encourage stakeholders to submit a response in their written comments to the proposed classification as described above, particularly if they have concerns or questions.

6 Next Steps

The ISO will discuss the revised straw proposal during two stakeholder meeting sessions in July 2026. Session 1, scheduled for July 13, 2026, will focus on BAA-level Market Power Mitigation. Session 2, scheduled for July 14, 2026, will focus on Scarcity Pricing Enhancements. Meeting information and materials will be available on the initiative webpage.

Following the stakeholder meetings, the ISO will invite written comments on the revised straw proposal, which will be due by July 28, 2026.

The ISO plans to publish a draft final proposal by September 2026 and seek governance approval in October 2026.

7 Appendix

7.1 Comparison with Local Market Power Mitigation (LMPM)

This section presents a side-by-side comparison of the market power mitigation frameworks. These two processes serve different purposes and address different sources of market power. BAA-level MPM addresses market power that arises from scheduling constraints between BAAs, while LMPM addresses market power that arises from congestion on physical transmission constraints within a BAA. Table 4 below outlines how each process works. For more background, see Sections 2.1 and 4.1, and Appendix Section 7.4.

Table 4: Comparison of BAA-Level MPM and Local MPM

Feature	BAA-Level Market Power Mitigation (Proposed)	BAA-Level Market Power Mitigation (Existing)	Local Market Power Mitigation (Existing)
Primary Purpose	Mitigates market power from binding transfer constraints that create price separation between BAAs or groups of BAAs.	Mitigates market power from binding transfer constraints that cause price separation between a WEIM BAA and the CAISO BAA.	Mitigates market power from congestion on physical transmission constraints within a BAA.
Constraint Type	BAA power balance constraint (reflecting a binding transfer constraint between BAAs or BAA groups).	BAA power balance constraint (reflecting a binding transfer constraint between the	Physical transmission constraint (tied to a specific transmission line or flowgate).

		WEIM BAA and the CAISO BAA).	
Dynamic Competitive Path Assessment (DCPA) Trigger (When / For Whom)	In each market run, the grouping algorithm forms and ranks BAA groups by MEC (highest to lowest), and DCPA evaluates the groups in sequence.	DCPA for a WEIM BAA triggers when the MEC in that individual BAA exceeds the MEC of the CAISO BAA (the default reference).	DCPA is performed each MPM run for all modeled transmission constraints in each BAA. Only constraints that bind and are designated non-competitive are relevant for mitigation.
Competitiveness Assessment Method	DCPA evaluates a BAA group with a three-pivotal-supplier test and the RSI.	DCPA evaluates an individual BAA with a three-pivotal-supplier test and the RSI.	DCPA evaluates a specific transmission constraint with a three-pivotal-supplier test and the RSI.
Trigger for Bid Mitigation	Mitigation applies when a BAA group fails the RSI test. Only pivotal suppliers within the group with bids above the competitive LMP / DEB are mitigated.	Mitigation applies when a WEIM BAA fails the RSI test. All suppliers in the BAA with bids above the competitive LMP / DEB are mitigated.	A resource has a positive non-competitive congestion component in its LMP (it provides counterflow to at least one noncompetitive constraint).
Mitigation Targets (Who is mitigated?)	Pivotal suppliers within an uncompetitive group.	All suppliers within an uncompetitive BAA.	All suppliers with a positive non-competitive congestion component (those

			providing counter-flow to a non-competitive constraint).
"Competitive LMP" (Mitigation Reference Price)	Uses the MEC of the first passing group each BAA is part of. Mitigation uses the higher of this competitive LMP or the resource's DEB. If no group passes, uses the bid price floor as a placeholder MEC, effectively using only the DEB.	Uses the CAISO BAA's MEC. Mitigation uses the higher of this competitive LMP or the resource's DEB.	Uses the full LMP minus the non-competitive congestion component (LMP - LMP_{NC}). Mitigation uses the higher of this competitive LMP or the resource's DEB.
Interaction When Both BAAMPM and LMPM Apply	Each resource receives one competitive LMP that incorporates the BAA-level MEC reference and subtracts any local non-competitive congestion components. Mitigation compares the resource's bid to its DEB and this combined reference price.		
Scope of Application	Covers the full WEIM/EDAM footprint, including the CAISO BAA (but CAISO retains its default competitive status).	Covers all WEIM BAAs but excludes the CAISO BAA (assumed competitive).	Covers internal transmission constraints in the CAISO BAA and all WEIM BAAs.

Why the LMPM Physical Counterflow Approach Does Not Fit BAA-Level MPM

Some stakeholders questioned why CAISO needs a separate BAA-level mitigation approach instead of extending the existing Local Market Power Mitigation (LMPM) framework to WEIM and EDAM transfer constraints. LMPM uses shift factors to identify which generators can relieve physical congestion on a modeled transmission constraint.

A shift factor measures how much flow on the constrained element changes when a generator increases output. LMPM then uses each generator's effect on that flow to evaluate whether enough competition exists to relieve the constraint.

BAA-level MPM is different. WEIM and EDAM transfer constraints are scheduling limits, not physical transmission constraints. They may be set below the true physical capability for reliability, operating, or contractual reasons, and they may aggregate multiple physical scheduling points into a single transfer limit. Because those limits do not necessarily correspond to one physical line or flowgate, the market generally cannot calculate a meaningful resource-specific shift factor for them.

For that reason, CAISO cannot simply extend the LMPM physical counterflow framework to BAA-level MPM. LMPM tests competition among suppliers that can relieve a specific physical constraint. BAA-level MPM tests competition among suppliers that can serve load within a BAA or BAA group and satisfy the relevant BAA power balance constraint when imports are limited. To satisfy a BAA power balance constraint, generation located anywhere inside the BAA or BAA group contributes on a one-for-one basis, regardless of resource location.

7.2 Determination of Affiliate Groups

The accuracy of the market power mitigation process relies on correctly aggregating resources into supplier portfolios based on corporate control. To capture a supplier's full market share, the ISO aggregates affiliated entities (and their Scheduling Coordinators) into "affiliate groups."

Each Scheduling Coordinator (SC) applicant must submit an "Affiliate Information" form that identifies any affiliate that owns, controls, or schedules resources that may provide energy or ancillary services in CAISO markets. SCs must update this information to the ISO when it changes.

The ISO constructs affiliate groups as a chain of control relationships. The ISO consolidates all entities linked through any chain of common control into a single affiliate group. For example, if Company A affiliates with Company B, and Company B affiliates with Company C, the ISO does not treat them as separate pairs (A-B, B-C). Instead, because B links A and C, the ISO consolidates them into a single affiliate group.

This methodology ensures the market power mitigation processes treat all resources under shared control as a single supplier portfolio. It prevents entities from fragmenting their corporate structure to appear smaller in market power tests and evade mitigation.

For further details, see the BPM for Scheduling Coordinator Certification and Termination, Section 5.3.14.1.

7.3 Price Formation Changes under EDAM

EDAM changes how the market decomposes LMPs in both EDAM and WEIM. Today, the market uses a single system marginal energy cost as the energy component common to the entire WEIM footprint. Each WEIM BAA also has its own power balance constraint, whose shadow price the market defines relative to SMEC and enters the congestion component of LMPs. As a result, price differences between BAAs appear in the marginal cost of congestion (MCC).

EDAM changes that structure. The market treats the shadow price of each EDAM and WEIM BAA's power balance constraint as that BAA's own marginal energy cost (MEC). The energy component of the LMP therefore is BAA-specific rather than system-wide. As a result, when transfer (scheduling) constraints bind and separate BAAs, the market reflects the resulting price differences in MEC rather than in the MCC. In other words, the same economic condition (that one BAA is more expensive than another because transfer capability constrains trade between them) still produces price separation. Under EDAM, however, the market expresses that price separation through differences in BAA-specific MECs rather than through congestion measured against a single SMEC.

These changes affect BAA-level market power mitigation in two main ways.

First, under the current WEIM design, the DCPA triggers when a WEIM BAA clears at a higher price than the CAISO BAA. The market currently represents that condition through a positive shadow price on the WEIM BAA's power balance constraint, calculated relative to the SMEC. Under EDAM, the market represents the same condition when the BAA's MEC exceeds the CAISO BAA's MEC.

Second, the proposed grouping algorithm groups together BAAs with the same MEC and ranks those groups from highest to lowest MEC. Because EDAM calculates a separate MEC for each BAA based on that BAA's own power balance and transfer constraints, BAAs that are not constrained relative to one another will have the same MEC. The algorithm can therefore treat those BAAs as a single competitive region for the purposes of the BAA-level MPM test.

7.4 Current BAA-Level Market Power Mitigation Framework

The primary objective of market power mitigation is to ensure competitive market pricing. Import constraints create conditions where generators within a BAA face no competition on the margin from external suppliers. As a result, the MPM process evaluates whether the internal generation in an import-constrained BAA can meet demand competitively and intervenes if it cannot. Without mitigation, a group of suppliers in an import-constrained BAA could bid prices above their actual costs to inflate the market-clearing price. This is a particular concern for WEIM/EDAM BAAs where a single company may own or control most of the supply. BAA-level MPM protects market participants from excessively high prices by reducing the ability to exploit such market power.[18]

Under current procedures (used in the WEIM and planned for the EDAM), the market dynamically triggers BAA-level mitigation when a BAA shows the potential for market power issues. At a high level, the process works as follows:[19]

1. **Detect Import-Constrained Conditions** - The market software monitors the shadow price of each BAA's power balance constraint.[20] The shadow price represents the added cost to supply one more megawatt of energy in that BAA. This reflects the BAA's marginal energy cost (MEC), which rises when cheaper imports are maxed out and the market must use more expensive internal generation instead. If the MEC of a WEIM BAA exceeds that of the CAISO BAA, it triggers a Dynamic Competitive Path Assessment (DCPA) to determine if that BAA is structurally competitive.
2. **Assess Structural Competitiveness** - Once triggered, the DCPA uses a "three-pivotal supplier test" to evaluate whether the BAA's internal supply is sufficiently

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[18] These measures also help WEIM entities to meet FERC requirements for market-based rate authority. Market-based rate authority is FERC's permission to set wholesale rates based on market prices.

[19] For more detailed information, please refer to the following resources: Section 39 of the CAISO Tariff; Section 6.5 of the Market Operations BPM; Appendix B of the Market Operations BPM; Section 11.3.5 of the Energy Imbalance Market BPM.

[20] This paper describes the market mechanics that apply after EDAM takes effect. EDAM changes how the market decomposes the LMP from a system marginal energy cost (SMEC) to a BAA-specific marginal energy cost (MEC). Appendix Section 7.3 explains these changes and shows how they relate to BAA-level market power mitigation.

competitive. It identifies the three largest suppliers (by affiliate)[21] of supply available to meet the BAA's demand[22] and labels them as "potentially pivotal suppliers." It then checks whether the remaining supply (all other resources not owned by those pivotal suppliers)[23] can meet the BAA's demand without the pivotal suppliers' output. If there is insufficient supply to meet demand after removing the three largest suppliers, the market deems the BAA non-competitive (indicating that those suppliers are jointly pivotal). Conversely, if there is sufficient supply, the BAA qualifies as competitive and is not subject to mitigation at that time. The DCPA runs separately for each constrained BAA and in every market interval.

3. **Mitigate Bids** - If the DCPA determines a BAA is non-competitive, the market lowers any bids priced above a competitive level before running the financially binding market pass. The DCPA defines the competitive level as the higher of the Default Energy Bid (DEB) or a calculated competitive LMP for that location.[24] The market leaves bids that fall below the DEB or competitive LMP unchanged because it has determined they reflect competitive bidding. This mitigation step ensures that the market-clearing price in the BAA reflects competitive bids. If the DCPA finds the BAA competitive, the market accepts all bids as submitted

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[21] CAISO Tariff defines an affiliate as: "With respect to a corporation, partnership or other entity, each such other corporation, partnership or other entity that directly, or indirectly through one or more intermediaries, controls, or is controlled by, or is under common control with, such corporation, partnership or other entity." For details on how the ISO aggregates Scheduling Coordinators into affiliate groups for the purpose of the pivotal supplier test, see Appendix Section 7.2

[22] In the real-time market, the DCPA identifies "potentially pivotal suppliers" based on the amount of supply they can physically withhold. The DCPA defines the "withholdable" portion as the aggregate difference between the highest and lowest feasible MW outputs of the affiliate's resources for the current interval, after accounting for various operational constraints. In the day-ahead market, the DCPA does not use the concept of "withholdable capacity," but instead identifies the top three affiliate portfolios based on their maximum available supply (including virtual supply awards) by assuming that the affiliate's resources can reach any point within their economic bid range.

[23] Also known as "fringe competitive suppliers."

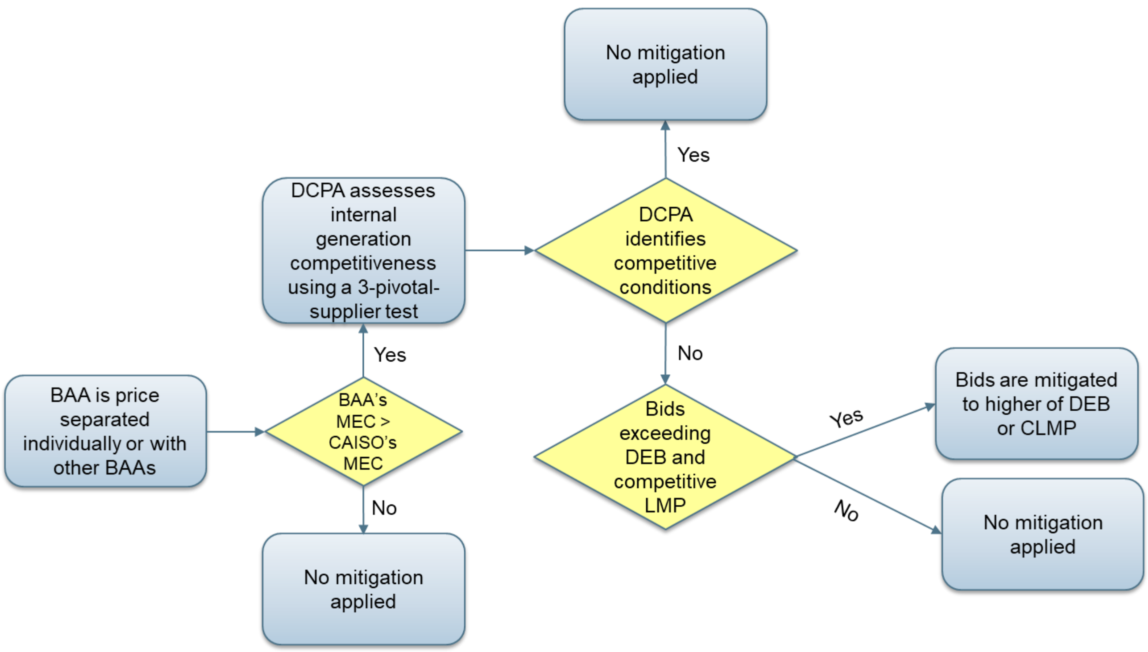
[24] A Default Energy Bid (DEB) is a calculated, pre-determined bid that approximates a resource's marginal cost of operation. Please refer to the BPM for Market Instruments, Attachment D for more information on each DEB methodology and sample calculations. A competitive LMP is calculated by taking the full LMP and subtracting the portion of that price attributable to congestion on non-competitive constraints. See the BPM for Market Operations Section 6.5.1 for more information.

without applying mitigation.

Under the current design, the BAA-level MPM process applies to WEIM BAAs, while the design traditionally has assumed the CAISO BAA to be competitive and excluded from BAA-level tests because of its diverse resource ownership.

Figure 2 provides an illustrative flowchart for the DCPA process.

Figure 2: BAA-Level DCPA Flowchart



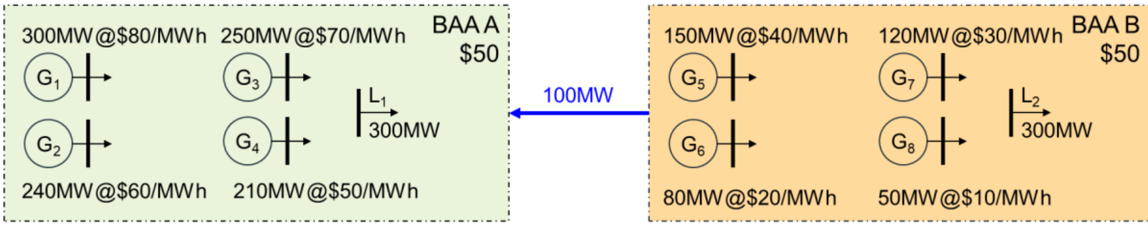
Current BAA-Level MPM Example

Figure 3 illustrates the dispatch that meets the combined load of $L_1 + L_2 = 600MW$ at the minimum total production cost while respecting each generator's capacity limit. In this example, there is no transfer limit.

The cheapest solution would be to schedule BAA B's units first (since all of them are cheaper than any of A's units), then pick up any remaining load from resources in BAA A. 400 MW generated in BAA B covers BAA B's 300 MW load plus it can export up to 100 MW to BAA A. The remaining 200 MW comes from BAA A's cheapest unit (G4).

Since the last increment of power used in the combined system is from G4, the system-wide marginal cost is $50/MWh.

Figure 3: Two-BAA Dispatch (No Transfer Limit)



When the transfer limit is reduced to 80MW (see Figure 4) the market can no longer schedule additional cheaper $40/MWh power from B to A because of the limit. This results in price separation. The price in BAA B falls to $40/MWh, while the price in BAA A stays at $50/MWh, which reflects the cost of its marginal unit (G4).

Since BAA A's marginal energy cost exceeds that of BAA B's, this condition would trigger the DCPA for BAA A. The DCPA would determine if its power balance constraint is non-competitive (if the suppliers in BAA A needed to meet demand are pivotal).

Figure 4: Two-BAA Dispatch (Transfer Limit)

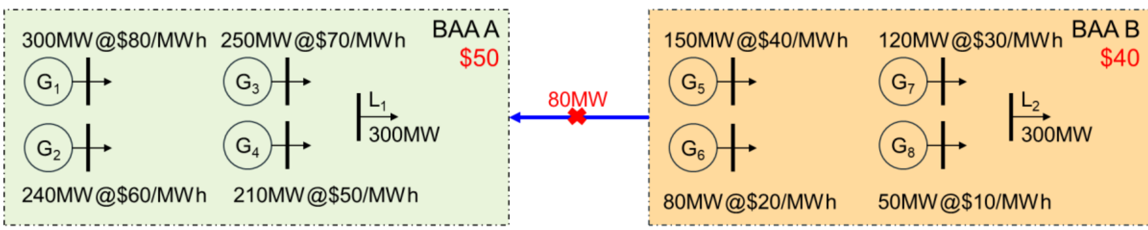


Figure 5 explains how the market applies the RSI test to BAA A, why the RSI ends up less than 1, and why that indicates BAA A is "noncompetitive."

RSI measures whether fringe supply and imports can meet the entire load if the potentially pivotal suppliers (PPS) withhold. If RSI < 1, it means the potentially pivotal suppliers are in fact pivotal (they must produce some power to meet demand) so they have market power.

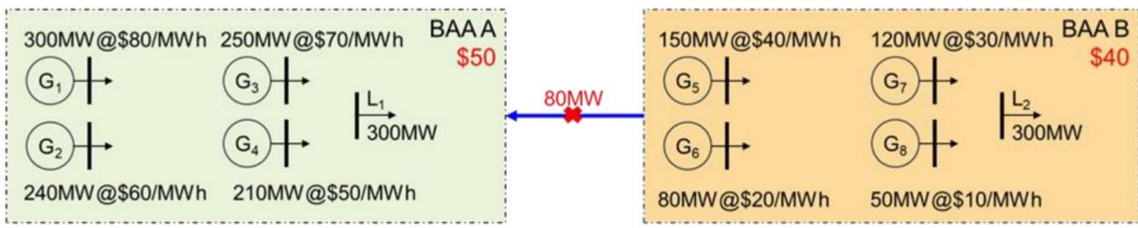
The three largest suppliers in BAA A are G1, G2, and G3. Hence, the fringe competitive supply (FCS) in BAA A can produce at most 210 MW from G4, plus 80 MW of import transfers, for a total of 290 MW. For simplicity, the example assumes the potentially pivotal suppliers could withhold all their capacity, so $\sum_{i \in PPS} \min(S_i)$ is 0 MW. The BAA demand[25] is BAA A's load of 300 MW. So,

[25] Note the CAISO's BPM defines the demand component differently as "cleared MWs on a constraint from participating resources." Based on that definition, the demand equals 220 MW. However, this definition excludes the import transfer from the available competitive supply, which would total 210 MW.

$$RSI = \frac{(210 + 80) + 0}{300} = \frac{290}{300} < 1$$

In summary, this result indicates that the "fringe" supply within BAA A (G_4) plus the maximum allowed import (80 MW) is not sufficient to meet BAA A's total load (300 MW) on their own. Therefore, the market requires generation from at least one of the potentially pivotal suppliers (G_1, G_2, G_3) to meet the load. This dependence on the potentially pivotal suppliers means BAA A fails the DCPA and the market considers it non-competitive under these conditions, which signifies that the pivotal suppliers possess market power.

Figure 5: RSI Calculation for BAA A



$$RSI = \frac{\sum_{i \in FCS} \max(S_i) + \sum_{i \in PPS} \min(S_i)}{D}$$

BAA A: RSI = ((210 + 80) + 0) / 300 < 1 (noncompetitive)

In both cases, this BAA fails the RSI test by 10 MW. Both definitions produce the same outcome; they simply differ on whether imports offset supply (numerator) or demand (denominator).

$$RSI = \frac{(210) + 0}{220} = \frac{210}{220} < 1$$