



California ISO

Price Formation Enhancements Working Group
Discussion Paper
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California Independent System Operator

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Executive Summary

This paper provides stakeholders with an overview of the ongoing ISO-hosted and stakeholder-guided Price Formation Enhancement (PFE) Initiative Working Group. It discusses the background of the working group effort, chronicles stakeholder feedback, and captures action items from past sessions. This paper is also a tool to assist the PFE Working Group in its discussions and accelerate collaboration between stakeholders.

While the PFE initiative predated the introduction of this Working Group, the PFE Working Group effort is meant to bring the conversation back to a pre-initiative process to deliver on the commitment ISO made to continue to work collaboratively with stakeholders on these pivotal topics:

- 1) Scarcity Pricing
- 2) BAA-Level Market Power Mitigation
- 3) Fast-Start Pricing

The PFE Working group focuses on Scarcity Pricing in conjunction with the BAA-Level Market Power Mitigation currently applied in WEIM and proposed for the EDAM, as well as collaboratively identifying the scope of analysis required for a comprehensive discussion of Fast-Start Pricing.

The PFE Working Groups are intended to enhance the quality of market policy design by empowering stakeholders with a more active role in informing proposal development. The culmination of this effort is a PFE Action Plan, capturing context on the final principles, problem statements, and priorities identified by Working Group participants. The Action Plan will inform a future PFE initiative for policy design(s) that are durable and balance the needs of stakeholders across the region.

This document organizes stakeholder feedback into topic areas that reflect major themes from initial working group discussions to facilitate the development of related problem statements and action items:

- 1) review of existing ISO mechanisms and policies intended to ensure reliability,
- 2) reflecting the value of reliability in market prices,
- 3) defining triggers to enact and end scarcity pricing
- 4) factoring the impact of out of market actions
- 5) assessing scarcity pricing's competitiveness with bi-lateral transactions occurring during scarce conditions
- 6) ensuring compatibility with pricing and RA designs in the broader West.

Introduction

Background

Scarcity Pricing

Price formation in organized electricity markets establishes market clearing prices for energy, ancillary services, and ramping products. How prices are set during conditions of scarcity is critical to appropriate price formation and ensuring a reliable electricity supply. Effective scarcity price signals attract supply and reduce demand during tight system conditions, and incentivize resources to be available and perform.

Tightening system conditions across the west point to the need for the ISO to review and potentially enhance its scarcity pricing provisions. The ISO conducted a limited review of market scarcity provisions as part of its recent market enhancements for summer 2021 readiness policy initiative. This initiative resulted in an enhancement that releases contingency reserves as energy at the energy bid cap price when there is insufficient supply to meet both energy and contingency reserve requirements.

The PFE Working Group discussions will expand on the previously considered initiative to allow stakeholders to incorporate their perspectives, values, and experiences into the strategy for analysis and future policy development.

BAA-Level MPM

While price signals can support the delivery of sufficient supply during tight conditions, the benefits of these price signals must be balanced with the need to limit the exercise of market power. The potential for higher prices creates an opportunity for resources to bid strategically by withholding capacity or inflating prices, and can exacerbate reliability risks or unnecessarily increase costs to consumers. Conversely, over mitigation can lead to market prices that do not support the operating cost of capacity, and can reduce the incentive for demand to hedge risk through long-term bilateral contracting.

Prior ISO initiatives have focused on developing a methodology to identify structural market power and limit potentially uncompetitive bids. Mitigation in the WEIM is based on the same automated approach used in the ISO's day-ahead market. The EDAM final proposal extended the WEIM MPM methodology, (including BAA-Level MPM measures) to the EDAM as it has functioned well and there is strong familiarity with the design.

Through the PFE working groups the ISO will continue its commitment to stakeholders in the EDAM final proposal to evaluate potential enhancements to the BAA-Level MPM methodology and further explore the question of the CAISO

BAA’s inclusion to the BAA-Level MPM tests and looks forward to the robust discussion on these two topics.

Fast Start Pricing

The ISO has previously held workshops regarding the potential to incorporate Fast Start Pricing along with its Flex Ramp product. Within this first phase of the PFE Working group, we are seeking Stakeholder feedback in developing a scope for analysis on Fast Start Pricing to allow for robust discussion in subsequent phases on its inclusion to the ISO markets. While this conversation is yet to occur within the PFE working groups, the initial analysis scoping conversation will occur in Working Group session #6.

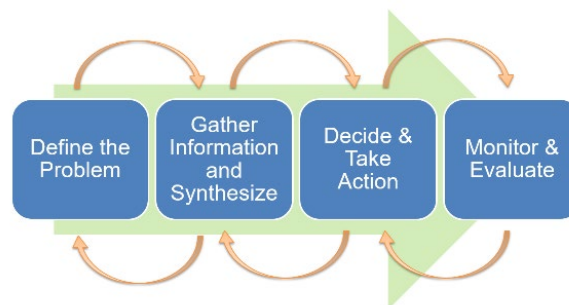
Price Formation Enhancement Working Group Process

The ISO recognizes that stakeholder input is essential for effective and balanced policy outcomes. The working group process reflects general stakeholder input early in an initiative process, which can lead to more alignment on the scope of an initiative and proposed design.

Stakeholders have the opportunity to provide input on key components leading up to policy proposal development.

Working Group Discussion Goals

Stakeholders, including the ISO, will have different perspectives and experiences that can illustrate a problem’s root cause, relevant principles, and measurable outcomes. Working groups will consider and collaboratively build on concepts introduced by participants as part of the iterative problem statement formation process.



1. Form Problem Statements:
 - a. Identify the root cause of stakeholder concerns related to policy and intended market outcomes
 - b. Define and illustrate principles for market design
2. Illustrate/Justify problem statements:
 - a. Explore current ISO market operations, functionality, processes meant to address problem statements
 - b. Develop methodology for analysis, define data needs
3. Determine Action Items
 - a. Align on priorities
 - b. Provide a bridge between working groups and proposal development with next steps, timelines, and targets

Should subject matter be identified as technically complex and require further discussion, the ISO is open to hosting additional stakeholder workshops or providing additional background and education on key elements of the proposal.

Working Group Process

Stakeholders can provide input on cadence, deliverables, targets and timeline, etc.

[1] Stakeholders recommended reducing the cadence of working group meetings to once every other week. Stakeholders also recommended exploring supplemental ways to share information and provide education.

Price Formation Enhancements Working Group Deliverables

Evolving This Discussion Paper

[2] This Discussion Paper will serve as a resource by reflecting the discussions and decisions that occur during the working group process. After each working group session, ISO facilitators and scribes will provide notes, key decisions, and action items identified by stakeholders. The ISO will post these notes, as well as any relevant material, for review and comment between working group meetings.

Revision tracking in the appendix of the Discussion Paper provides a transparent record of changes to ensure stakeholders understand how their input informs the stakeholder process. The Action Items are tracked in the appendix to ensure stakeholder requested action items are recorded and resolved. The ISO encourages stakeholders to clarify input through comments should their feedback not be accurately or comprehensively reflected.

The ISO welcomes stakeholder feedback on the layout and proposed evolution of this paper.

Price Formation Enhancements Working Group Action Plan

The final discussion paper is intended to serve as the “PFE Action Plan” that reflects the outcome of stakeholder discussions during the working group process. It will capture context on the final principles, problem statements, and priorities from the Working Group discussions, inform the Price Formation Enhancements issue paper, and serve as the transition from Working Group to policy development.

Discussion Paper Summary

Price Formation Enhancements Working Group Summary to date

[3] The topics proposed in the Discussion Paper are designed to synthesize stakeholder feedback on the Price Formation Enhancements Overview, the first 3 PFE Working Group Sessions, and comments received on the PFE Initiative page. Topics are intended to meet stakeholders where they are by identifying major themes, facilitate working group scheduling and goals, and help stakeholder prepare targeted presentations and comments.

1. Review existing ISO market mechanisms
2. How to reflect the value of reliability in prices during scarce conditions
3. How and when to enact and end scarcity pricing
4. Out of market actions
5. Scarcity pricing’s competitiveness with bi-lateral transactions occurring during scarce conditions
6. Compatibility with pricing and RA in broader West and other markets to appropriately signal (i.e. reflective of performance and delivery) voluntary supply.
7. BAA-Level Market Power Mitigation enhancements

Price Formation Enhancements Working Group Principles

The following principles are broadly applied electricity market design principles, and reflect a starting point for the PFE working group discussion. Throughout the working group process, stakeholders will consider how problem statements relate to these principles to facilitate problem statement comparison, prioritization, and assessment of potential trade-offs. The ISO encourages feedback on these principles:

1. Efficiency: dispatch on offered prices will minimize actual system production costs; assets want to produce at the awarded amount

2. Simplicity: market rules apply consistently and indiscriminately
3. Transparency: sufficient information exists to make competitive bidding decisions
4. Feasibility: the market can resolve within prescribed timelines (operational feasibility), consideration of implementation timelines

[4] August working groups reviewed the four principles listed above, provided feedback on ISO suggested principles based on prior initiatives, and developed additional recommendations for ongoing group reflection as problem statements are identified and refined.

[5] Stakeholders also proposed the inclusion of 3 new principles for consideration in the PFE Working Group discussions.

1. Accuracy
2. Effectiveness
3. Competition

Price Formation Enhancements Working Group Problem Statement Formation

As part of the ISO's role facilitating working group discussions, the ISO synthesized feedback from the first four working groups into major themes. Working group participants will work to identify and refine concepts related to these themes into full problem statements.

This categorization is intended to help stakeholders to organize their thoughts, determine feasible schedules and targets, and build on the diverse perspectives of the broad community. The ISO encourages feedback on the organization of these themes.

1. Review of existing ISO market mechanisms

Stakeholders have asked how and why existing market policy may be insufficient to prevent reliability risks. Stakeholders expressed the need to consider how existing policies interact and to balance goals associated with existing policies with separate goals or adverse risks associated with policies being considered.

This topic will provide stakeholders with the opportunity to review existing policy to create a benchmark for comparison and analysis. Stakeholders may decide what opportunities for review would best suit their needs (e.g. presentations from the ISO, briefing documents), and help identify appropriate subject matter experts.

Stakeholders have suggested the following items be considered for problem statement formation:

1. Review current scarcity pricing mechanism to:
 - a. Inform a comparative analysis to scarcity pricing in other energy markets
 - b. Inform development of analysis or monitoring
2. Review policies related to scarcity pricing to inform comparative analysis or assess interactions:
 - a. Ancillary Services shortage pricing
 - b. Flexible Ramping product
 - c. Interaction between RA and scarcity conditions
3. Review existing ISO market mechanism of BAA-Level Market Power Mitigation and provide data driven analysis to illustrate if a need exists to include the CAISO BAA in the BAA-Level MPM tests.

2. Reflecting the value of reliability in prices

Stakeholders have discussed different approaches to valuing reliability and reflecting this value through price signals. This section captures methods of calculating and reflecting the value of reliability directly in prices, and trade-offs associated with diverging from marginal cost-based pricing.

Stakeholders have suggested the following items be considered for problem statement formation:

1. Determining the Value of Lost Load (VOLL) and its applicability
2. Using dynamic demand curves and penalty mechanisms
3. Incentives to ensure accurate Day-Ahead schedules
4. Balancing price incentives with consumer protection

3. How and when to enact and end scarcity pricing

This topic reflects stakeholder interest in considering issues regarding the appropriate triggers, duration, and cessation of a Scarcity Pricing mechanism.

Stakeholders have suggested the following items be considered for problem statement formation:

1. Mechanisms to signal scarce conditions are eminent
2. Incorporating a mechanism to avoid prolonged periods of scarcity pricing.
3. Ensuring resilience to triggering scarcity pricing at inappropriate times

4. Out of Market actions

This topic reflects stakeholder feedback related to how to appropriately account for costs operators incur in maintaining reserves and other reliability actions.

Stakeholders have suggested the following items be considered for problem statement formation:

1. How operator's out of market actions impact real-time prices
2. Considering tools used by other ISOs such as Reliability Deployment Price Adders (RDPA)
3. Factoring other reliability actions such as the Strategic Reserve Resources, load biasing, etc.

5. Scarcity Pricing's competitiveness with bi-lateral transactions that occur during scarce conditions

This topic reflects stakeholder feedback that Scarcity Pricing be commensurate with bi-lateral transactions in the broader Western Interconnection.

Stakeholders have suggested the following items be considered for problem statement formation:

1. Review scarcity pricing levels and methodologies in other markets
2. Should ISO scarcity pricing design provide competitive market
3. How EDAM/WEIM can attract bi-laterally attained supply
4. How to address potentially reduced liquidity and availability of bi-lateral supply with propagation of regional markets within WECC

6. Compatibility with pricing and RA in broader West and other markets to appropriately signal (i.e. reflective of performance and delivery) voluntary supply

This topic reflects stakeholder interest in considering issues regarding the different RA and pricing constructs that exist within the West.

Stakeholders suggested the following scope items be part of discussion for problem statement formation:

1. How different RA programs and bidding rules across the regional market footprint might influence market outcomes
2. Factoring that CAISO is only BAA to co-optimize energy and AS, and how this will impact prices in CAISO BAA vs others.
3. Factoring in potential seams issues with other markets during tight system conditions
4. Future coordination with other markets

7. BAA-level MPM

[6] The CAISO wishes to clarify the scope of BAA-Level MPM within the working group process as it was presented in the PFE Overview document. Working groups will consider enhancements to the existing BAA-Level MPM methodology, and whether the CAISO BAA should be included in the BAA-Level MPM tests.

Similar to flow-based transmission constraints, BAA transfer constraints create isolated, price-separated, local areas within the larger system. These constraints are subject to market power mitigation (MPM) procedures to ensure competitive market outcomes. This is referred to as “BAA-Level MPM”.

Stakeholders suggested the following scope items be part of discussion for problem statement formation:

1. Ensure design does not create over-mitigation impacting competitive market conditions for supply participation.
2. Benefits and costs of current BAA-Level MPM construct and comparison to alternatives used in other markets
3. Mechanism to designate the grouping, and subsequent sequencing of, potential DCPA solution.
4. Ensuring potential group DCPA solution would not result in failures for a BAA that would not have occurred with today’s current design

Appendix

Revision Tracking

The table below summarizes changes made to this document based on working group discussions and written comments.

Revision #	Category	Revision Summary
Working Groups 1-3, August 2023		
1	Process	Stakeholders agreed on a different cadence, and requested additional modalities for information sharing
2	Process	On July 17, 2023, the ISO published a Price Formation Enhancements Overview containing a preliminary list of issues raised through previous initiatives. During the review of the principles and issues raised in the initial document, stakeholders expressed the need to substantially broaden the scope of issues under consideration. The ISO has adopted a Discussion Paper format to comprehensively capture stakeholder feedback, and provide a transparent record of how stakeholder input impacts the decision making process.
3	Topics	Topics proposed in this discussion paper reflect stakeholder feedback to consider
4	Principles	Stakeholders generally support the basic principles of market design, but found it difficult to actively engage without a more clear understanding of objectives and problem statements. One stakeholder suggested a pivot in discussion order. The principles section now reflects the basic principles of market design for stakeholders to reflect on. As working groups progress, this section may contain a record of principles actively under discussion.
5	Principles	Stakeholders in Working Group sessions 1 & 2 also proposed additional principles of Accuracy, Effectiveness, and Competition for consideration in the working group discussions. These principles were proposed as unique and separate from the originally proposed principles.
6	Topics	Stakeholders requested clarity on the goals of BAA-level MPM working groups.

Action Items

Action Item	Assigned Party	Progress/Resolution
Working Groups 1-3, August 2023		
Stakeholders requested broader consideration of market mechanisms in use today	ISO	[1] The ISO expanded the scope of the Discussion Paper to accommodate broad consideration of reliability mechanisms. ISO subject matter experts will provide an overview of the current ISO mechanism for the topic area that is the subject of each Working Group.
Stakeholders requested clarity on the scope of discussion for BAA-level MPM	ISO	The ISO posted a Revised Price Formation Enhancements Overview clarifying the scope of the BAA-level MPM discussion.
ISO requests Stakeholders prepare presentations to share their perspectives on the topic areas identified for problem statement formulation	Stakeholders	The ISO has heard from several stakeholders within the working group sessions of willingness to present, and will solicit presentations on the specific topics outlined above for future sessions.
Stakeholder request that guiding principles should include that all issues and problem statements are supported by data and analysis	ISO	The description of the Price Formation Enhancements Working Group Process reflects this comment.

