



California ISO

Price Formation Enhancements


Discussion Paper and Stakeholder Recommendations
Stakeholder Meeting

September 30, 2024

Reminders

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- You may also send your question via chat to either **Brenda Marquez** or to all panelists.

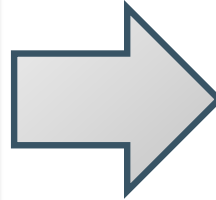
ISO Policy Initiative Stakeholder Process



Stakeholder Process Overview

Phase 1

- 18 working group meetings (August 2023 onwards)
- Identified problem statements
- Established guiding principles
- Prioritized issues



Phase 2

- Iterative design process
- Active stakeholder engagement
- Detailed proposals and analysis

Phase 2 will feature a collaborative approach similar to EDAM stakeholder process with continuous integration of stakeholder feedback

Transition to Phase 2

MPM/Scarcity Pricing

- Addressed as a single, integrated policy
- Iterative straw proposal development begins October 2024
- Target Straw Proposal – May 2025

Fast-Start Pricing

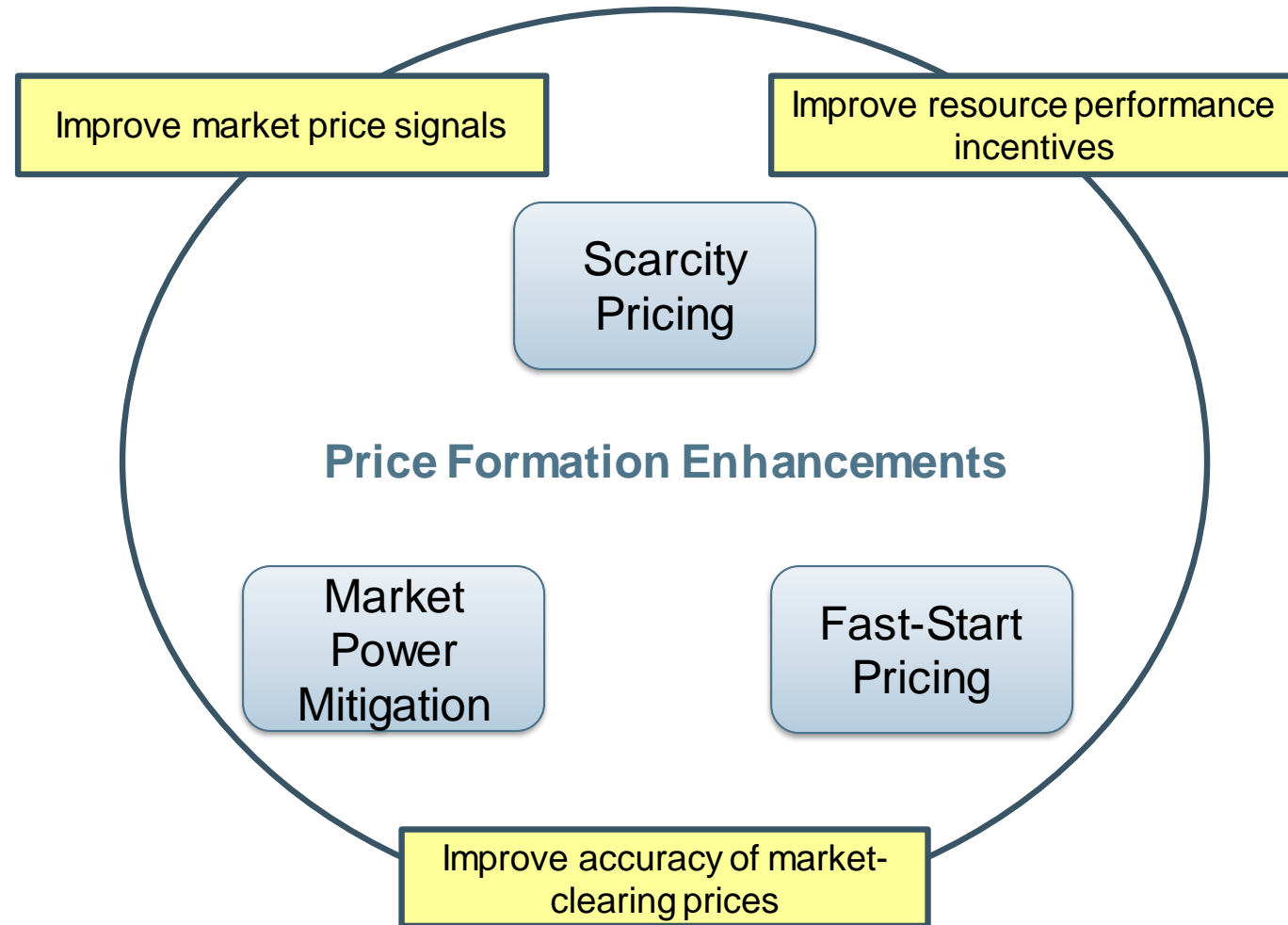
- Addressed in a separate, parallel process
- Working groups begin Q4 2024
- Iterative proposal development expected 2025

Process Notes

- Reflects stakeholder priorities and complexity differences
- Allows progress on urgent issues while thoroughly evaluating fast-start pricing
- Iterative, working group style for both processes
- Timelines adjustable based on stakeholder feedback and market needs

Introduction to Price Formation Enhancements

- Working groups launched in August 2023 to explore comprehensive price formation reforms
- Enhancements play a critical role in evolving the western grid by increasing market efficiency and reliability with accurate, consistent, and transparent pricing mechanisms across BAAs



Scarcity Pricing: Overview

What is Scarcity Pricing?

A market mechanism that determines market prices when there is insufficient supply to meet demand

Helps maintain grid reliability by sending price signals that encourage increased generation or reduced demand during scarcity conditions, which helps prevent emergency actions like load shedding.

Scarcity Pricing: Overview

Effectuated by reserve shortage pricing

More supply reserves
→ more reliable grid

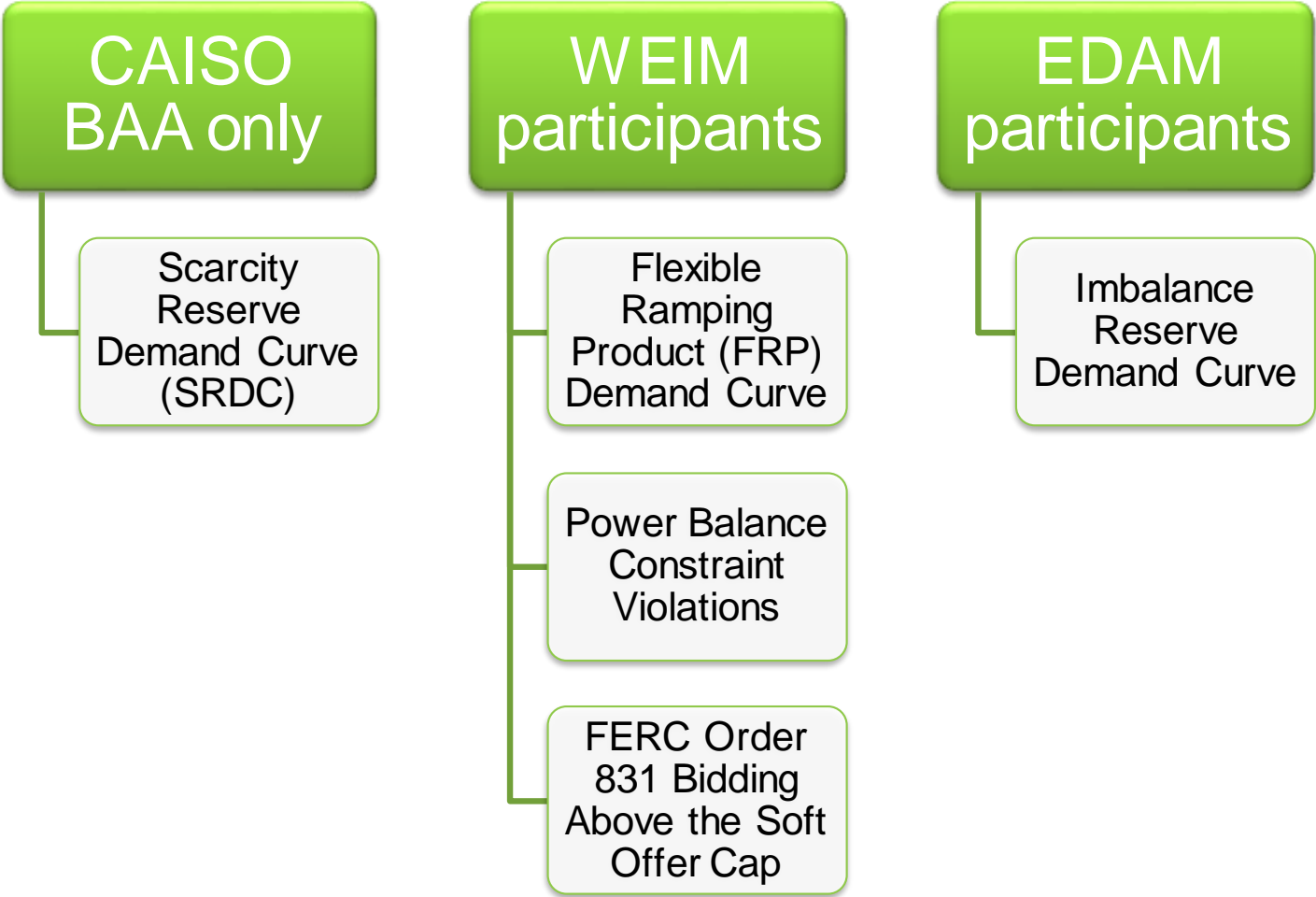
As available reserves decrease, loss of load expectations increase

As loss of load expectations increase, higher willingness to pay for additional reserves

The energy price reflects both the cost of energy production and the opportunity cost of not providing reserves at the scarcity price

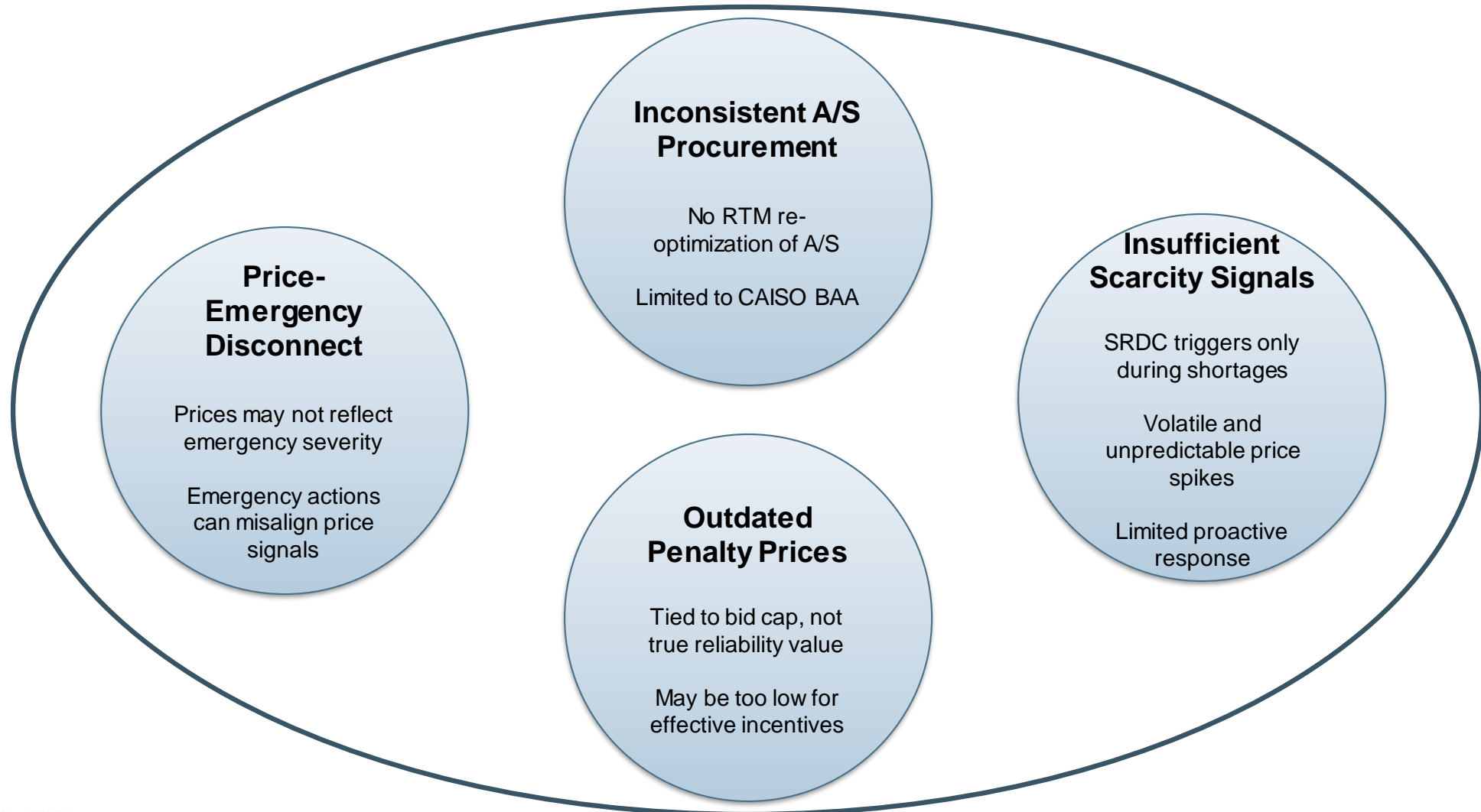
Scarcity Pricing: Overview

Current Scarcity Pricing Mechanisms in the CAISO Markets



Scarcity Pricing: Problem Statements

Key Drivers for Reform



Scarcity Pricing: Problem Statements Goals and Challenges

Goals of Scarcity Pricing Reform

Improve market signals during tight supply conditions

Incentivize resource performance and demand reductions

Align prices with real-time grid conditions across the WEIM

Challenges Identified

Address discrepancies in how scarcity pricing applies across different balancing authorities

Identify consensus-driven method to scale and anchor penalty prices

Scarcity Pricing: Stakeholder Feedback



Feedback on specific problem statements



Additional issues to explore



Prioritization of issues



Additional analyses requested

BAA-Level Market Power Mitigation: Overview

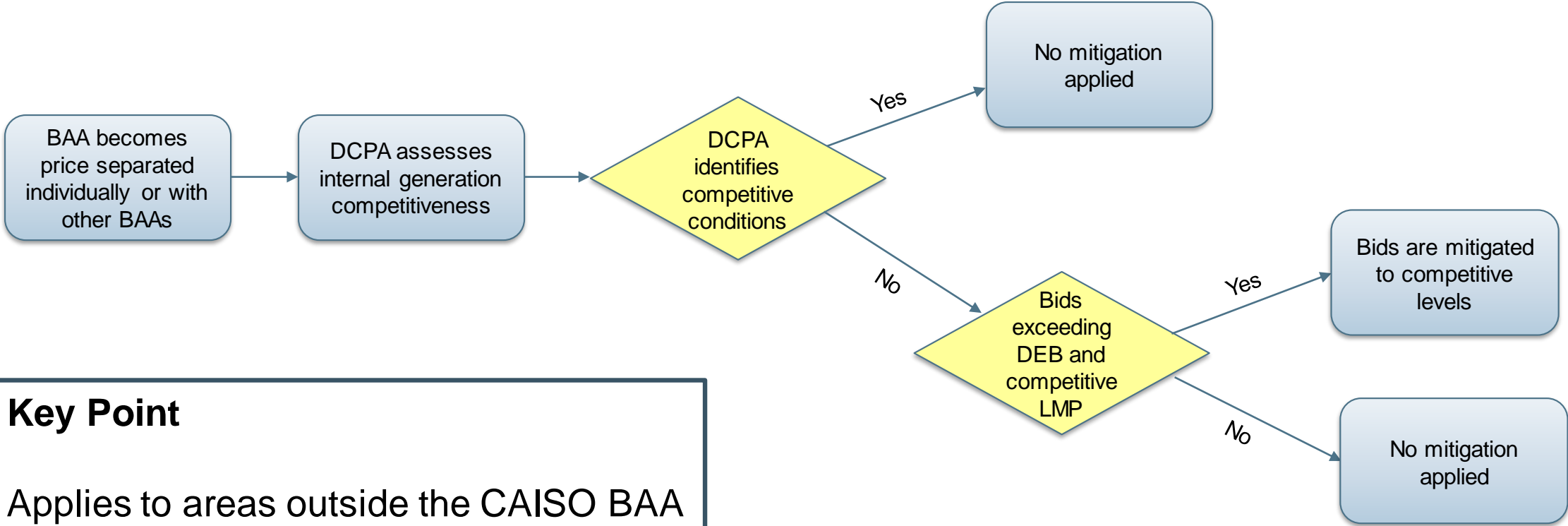
Prevents exercise of structural market power when a BAA is price-separated (import constrained) from the CAISO

MPM protects third-party transmission customers who rely on the WEIM for imbalance energy service. This group includes smaller load-serving entities, independent/renewable generators, etc.

Most entities must file for market-based rate authority to transact in the WEIM. The market's automated MPM forms part of the basis to grant that authority.

BAA-Level Market Power Mitigation: Overview

Dynamic Competitive Path Assessment (DCPA)



Key Point
Applies to areas outside the CAISO BAA

BAA-Level Market Power Mitigation: Overview

Problem Statements

Structural market power may be overestimated in individual BAAs

- Introduce a “grouping approach” to BAA-level mitigation

Exclusion of the CAISO BAA from the DCPA may lead to under-mitigation

- Apply consistent mitigation across all BAAs, including CAISO, during price separation events

Frequent mitigation during off-peak hours with low prices raises questions about current triggers

- Introduce “impact tests” to mitigate bids only if the LMP change exceeds a defined threshold

Key Priority

Ensure competitive pricing while refining mitigation mechanisms for WEIM/EDAM BAAs

BAA-Level Market Power Mitigation: Stakeholder Feedback



Support for exploring BAA grouping concept



Request for more technical details and examples



Concerns about design complexity vs. benefits



Support for exploring BAA-MPM in CAISO



Mitigation occurs off-peak with cheap renewables prevalent

Fast-Start Pricing: Overview

What is Fast-Start Pricing?

Fast-Start Pricing integrates commitment costs of fast-start resources into market prices

Fast-start resources are those capable of starting quickly and generating electricity within a short time window (15 to 60 minutes)

Fast-start pricing recognizes that fast-start resources may serve as the **marginal resource** used to meet the next increment of energy or operating reserves demand. However, they often have output levels that prevent them from being fully dispatchable and thus are often **ineligible to set the LMP.**

Fast-Start Pricing: Analysis Approach

Goal: Use historical bid data to estimate the potential market impact of fast-start pricing



12 Sensitivity Scenarios Explored

Varying amortization methods: constant, adjusted constant, and averaged
Time thresholds: 30-minute and 60-minute scenarios
Market configurations: BAA-level and system-wide pricing

Key Components Analyzed

Resource characteristics, historical BCR data, unit commitment patterns

Unique Considerations

Base schedules for WEIM resources, multi-stage generator transitions, minimum online constraints

Fast-Start Pricing: Analysis

Key Findings

Overall Impact

Generally moderate, with variations based on design elements and generation mix

Price Changes

- **Range:** Generally low due to focus on real-time supply changes from base or day-ahead schedules, ranging from \$0/MWh to \$8.70/MWh in the real-time market.
- **Seasonal trend:** Higher increases during summer months
- **Time of day:** Primarily during morning and evening peak hours
- **Frequency:** No price impacts in 75-97% of intervals, depending on scenario

Regional Variations

- **Largest increases:** Southwest and CAISO areas
- **Minimal changes:** Pacific Northwest areas

Key Influencing Factors

- Resource qualification criteria (most significant factor)
- Amortization method for commitment costs
- Regional differences in generation mix

Fast-Start Pricing: Stakeholder Comments



Support for fast-start pricing



Opposition to fast-start pricing



Clarifications suggested

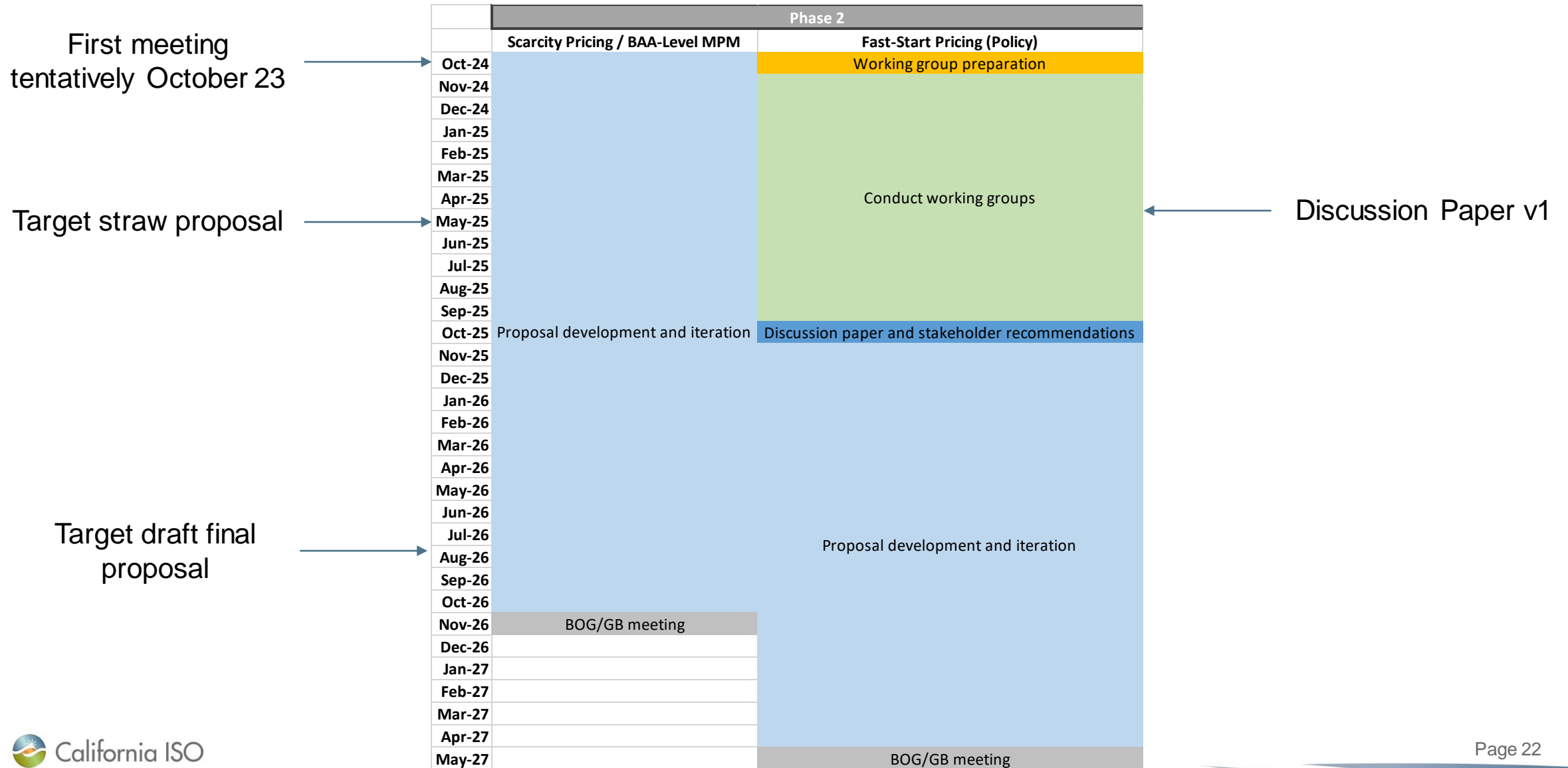


Suggestions for future analysis



Prioritization relative to other PFE topics

Phase 2 Timeline



BAA-Level MPM: Proposed Scope

Scope	Progress	Complexity	Stakeholder Priority / Urgency
	Low progress (1) – High progress (5)	Low complexity (1) – High complexity (5)	Low priority (1) – High priority (5)
<p>Consideration of how to define the groups and sequence the assessments.</p> <p>Detailed examples and walk-throughs of how the grouping approach would work.</p> <p>Analysis of how the grouping approach impacts the frequency and accuracy of mitigation compared to the current approach.</p>	4	4	4
<p>Consider modifications to the BAA-level mitigation approach, such as only mitigating pivotal suppliers rather than all suppliers.</p>	2	4	3
<p>Consider modifications to the BAA-level mitigation approach, such as an “impact test” to only mitigate offers with LMP impacts above a defined threshold.</p>	1	5	4
<p>Determine if the CAISO BAA should be included in the BAA-level market power mitigation and treated like any other BAA, rather than assuming it is always competitive.</p> <p>Provide data analysis on the competitiveness of the CAISO BAA.</p>	2	3	4

Scarcity Pricing: Proposed Scope

Scope	Progress	Complexity	Stakeholder Priority / Urgency
Evaluate enhancements to ancillary service procurement in the real-time market to improve the ability of the SRDC to reflect tight supply conditions and scarcity value of reserves, such as: Considering enhancements to ancillary service deliverability and full re-optimization of ancillary services in real time; Procuring ancillary services in RTD; Exploring SRDC-like mechanisms for WEIM areas outside of the CAISO BAA that don't procure ancillary services through the market	3	4	4
Develop market-based mechanisms for prices to rise gradually as the risk of shortages increases and the system approaches scarcity conditions, such as: Considering a new 30-minute reserve product and demand curve; Evaluating refinements to the Flexible Ramping Product to support price formation ahead of shortages; Exploring other mechanisms to reflect tightening supply such as a demand curve based on “latent supply”	2	4	4
Review and consider updates to key pricing run penalty prices to ensure alignment with current Western Interconnection market conditions and incentivize participation during tight supply. Potentially anchor them to Value of Lost Load (VOLL) estimates.	1	3	3
Develop market mechanisms to incorporate the pricing impacts of emergency actions during scarcity events, such as activation of emergency demand response, dispatch of backstop supply, firm load shed orders, out-of-market operator actions that affect supply and demand during tight conditions.	3	3	4

Fast-Start Pricing: Proposed Scope

Scope	Progress	Complexity	Stakeholder Priority / Urgency
<p>Propose a fast-start pricing design:</p> <ul style="list-style-type: none"> -Define qualifying resources based on start-up times and minimum up times -Select an amortization methodology -Consider interactions with other market features like flexible ramping product, multi-interval optimization, HASP/FMM, multi-stage generator modeling, EDAM/WEIM transfers and WEIM base scheduling practices, GHG constraints, and pricing run penalty parameters -Consider the feasibility of some areas of analysis to support policy development 	3	5	3

Bidding Above Soft Offer Cap: Updates and Future Enhancements

Milestones reached

✓ **FERC approved tariff revisions**

July 31, 2024

✓ **Policy implemented**

August 1, 2024

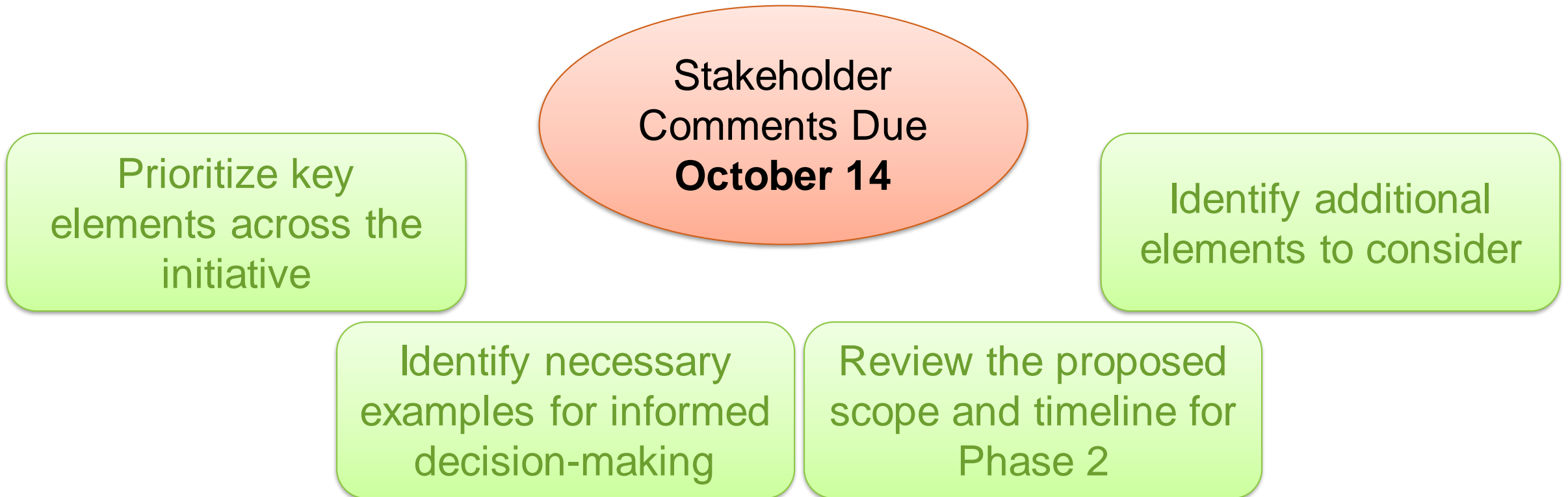
Ongoing Analysis and Stakeholder Engagement

- Storage Bid Cost Recovery and Default Energy Bids Enhancements
- Maximum Import Bid Price Shaping Factor

Additional Future Considerations

- Explore opportunity costs for hybrid resources and PDRs
- Explore potential changes to storage bid cap in day-ahead market

Next Steps and Stakeholder Feedback



Questions?

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For reference

- Visit Price Formation Enhancements Working Group initiative webpage for more information:
<https://stakeholdercenter.caiso.com/StakeholderInitiatives/Price-formation-enhancements>
- If you have any questions, please contact Brenda Marquez at bmarquez@caiso.com or isostakeholderaffairs@caiso.com

New Policy Initiatives Timeline

The California ISO has launched the Policy Initiatives Timeline to offer stakeholders a concise overview of ongoing policy initiatives. At a glance, it offers a snapshot view of key details such as the status of each initiative, projected timelines, and the current phase of the stakeholder engagement process. Updates to this timeline will be made weekly and posted on the [policy initiatives landing page](#). For more information, stakeholders are encouraged to reach out to ISOStakeholderAffairs@caiso.com.



ENERGY matters

The California ISO's blog highlights its most recent news releases, and includes information about ISO issues, reports, and initiatives.



Energy Matters blog provides timely insights into ISO grid and market operations as well as other industry-related news.

<https://www.caiso.com/about/news/energy-matters-blog>



Story | Transmission

New tools and data to support ISO's interconnection process

09/16/2024



Story | Transmission

DOE grant gives boost to grid-enhancing technologies on the transmission network

By Jeff Billinton

08/08/2024

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2024 STAKEHOLDER SYMPOSIUM

Welcome reception - Oct. 29
at Kimpton Sawyer Hotel, Sacramento, CA

Symposium program - Oct. 30
SAFE Credit Union Convention Center
Sacramento, CA

Visit the event website: www.reg.eventmobi.com/2024stakeholdersymposium

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