



California ISO

Gas Resource Management Working Group
Discussion Paper
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California Independent System Operator

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Executive Summary

The GRM Working Group series is a pre-initiative process to deliver on the commitment the ISO made to continue working collaboratively with stakeholders to explore some of the gas management challenges stakeholders are facing in their participation in the Western Energy Imbalance Market (WEIM) and potentially the extended day-ahead market (EDAM). The ISO anticipates the GRM Working Group will give stakeholders a more active role in informing the policy vision and direction for gas resource management. The resultant work product will identify scope, prioritization, and ultimately develop a GRM Action Plan for a future policy initiative.

This paper provides stakeholders with an overview of the upcoming ISO-hosted and stakeholder-driven Gas Resource Management (GRM) Working Group meetings. Specifically, the paper discusses the background on the working group effort. As the working group process proceeds the paper will offer a strawman for the structure of the GRM Working Group, and a synthesis of the GRM stakeholder comments on the topics proposed the working group should consider. This paper is a tool to assist the GRM Working Group participants in organizing discussions and a means of accelerating collaboration between stakeholders. A recommended output of this effort is a “GRM Action Plan”, containing recommendations to the ISO for a future GRM policy initiative to support GRM design(s) that are durable and meet the needs of stakeholders.

This document outlines proposed topics for the working group based on comments through the stakeholder page to date. The second discussion coalesced around five problem statements: a) alignment of gas market timelines, b) existing cost recovery mechanisms, c) bidding flexibility, d) ensuring resource specific limitations are considered, and e) appropriate reflection of gas limitations within the market.

Introduction

Background

During the early stages of Western Energy Imbalance Market (WEIM) expansion, the California ISO and stakeholders explored market functionality to support gas resource management. The Commitment Cost Enhancement initiatives¹ intended to provide more flexibility for participants to represent gas costs, a more accurate representation of actual gas costs being utilized for the resource by the market, and adequate accounting for opportunity costs. In subsequent initiatives concluding in 2017 and 2020 respectively, the CAISO developed further enhancements to market participation mechanisms through the Bidding Rules Enhancements² and Commitment Costs and Default Energy Bid Enhancements³ initiatives. These efforts intended to enhance inputs to calculated cost parameters and provide an avenue for cost adjustments based on gas market volatility.

The growth of the WEIM and the efforts of the Extended Day Ahead Market (EDAM) initiative have highlighted a need to revisit resource modeling in both the day-ahead and real-time market horizons from a more diverse regional perspective. Specifically, the supply commitment and resource sufficiency evaluation working group of the EDAM highlighted the need to continue to consider gas management challenges⁴. The GRM working group effort is intended to extend a forum for stakeholders to assess existing market functionality and bring forth new and persistent challenges for community consideration.

Gas Resource Management Working Group Process

The working group process reflects general stakeholder feedback and incorporates this input before the 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 proposal development;

1. Define and illustrate principles for market design and gas resource management.

¹ CCE1: <http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=d64f16be-45f4-4c71-a44a-4f2d958fd047>; CCE2: <http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=61e75ea2-85ea-4a2a-a0ac-de3b24eb57eb>; CCE3:

<http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=a2844d76-b015-4094-aa74-caba0e46fea4>

² <http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=511740b8-6a9a-4d1c-b4c4-65af45799d4b>

³ <https://stakeholdercenter.caiso.com/StakeholderInitiatives/Commitment-costs-and-default-energy-bid-enhancements>

⁴ Gas Resource Management was also discussed during the WEIM Regional Issues Forum in June 2023.

2. Form problem statements reflecting stakeholder concerns.
3. Align on priorities and establish cadence to balance staff and stakeholder bandwidth.
4. Illustrate problem statements by exploring current ISO market operations, functionality, and processes, and developing a methodology for assessment.
5. Determine action items for each problem statement to provide a bridge between working groups and proposal development.

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.

Gas Resource Management Working Group Deliverables

Evolving This Discussion Paper

The GRM discussion paper will serve as a resource for stakeholders by reflecting the discussion and decisions that occur during the working group process. After each working group meeting, ISO facilitators and scribes will provide notes, key decisions, and action items identified by stakeholders. The ISO will post these notes for review between working group meetings.

Gas Resource Management Working Group Action Plan

The final discussion paper is intended to serve as a “GRM Action Plan” that reflects the outcome of stakeholder discussions during the working group process. The recommendations in the GRM Action Plan will ensure that ISO initiative process reflects the stakeholder determined vision and roadmap.

Discussion Paper Summary

Gas Resource Management Working Group Topics

The topics proposed in this first iteration of the Discussion Paper are designed to synthesize stakeholder feedback from the July 27th GRM Meeting and submitted comments prior to the call.

1. Alignment of Electric and Gas Market Timelines
2. Existing Cost Recovery Mechanisms
3. Bidding Flexibility
4. Resource Specific Limitations
5. Gas System Limitations

The August 22nd GRM meeting continued further discussion on the items above, illustrated the true definition and meaning of a problem statement, and challenged stakeholders to further define the root problem they face with each of the topics above. Through comments, a few new topics were raised that will be further detailed below, these topics included;

1. Gas transportation rate accounting
2. Commitment Cost Default Energy Bid Enhancements (CCDEBE) interplay
3. Bid mitigation in the context of cost recovery
4. Existing issues with the Multi-Stage Generator (MSG) model

Gas Resource Management Working Group Principles

Throughout the working group process, stakeholders will consider how problem statements relate to market design principles to facilitate assessment of prioritization and potential trade-offs between approaches. The ISO encourages feedback on these principles:

1. Efficiency
 - Basic market design principles: Incentive compatibility, dispatch on offered prices will minimize actual system production costs, assets want to produce awarded amount
 - GRM principle: Incentives to reflect verifiable cost expectations
2. Simplicity
 - Basic market design principles: simple logic that applies broadly like uniform pricing

- GRM principles: Reasonable accommodation for cost adjustments that apply broadly, minimize accommodations for edge case scenarios
3. Transparency
- Basic market design principle: Market prices are transparent and known to participants
 - GRM principles: Sufficient information is available when making bidding and procurement decisions
4. Feasibility
- Basic market design principle: prescribed process is operationally feasible, the market can resolve with prescribed timelines
 - GRM principle: Participant data confidentiality is respected

The August 22nd GRM meeting briefly touched on the defined principles above. The community, through comments on the first discussion paper and verbal confirmation during the meeting, agree with these principles and believe they adequately incorporate the foundational principles that the GRM working group should keep in mind while they work through the definition of problem statements. There was a comment to consider the associated principles that were established for CCDEBE to determine if they fit within this initiative. The CAISO encourages stakeholders to continue assessing their concerns regarding gas management within the context of the draft topics, principles, and problem statements that are being developed in this forum.

Gas Resource Management Working Group Problem Statements

Identified problem statements should offer a clear path toward analysis and proposal development that honor and consider the principles. These were discussed during the July 27th call and were further developed during the August 22nd GRM meeting.

Proposed Problem Statements and Discussion Topics

As part of ISO’s role facilitating these discussions, the ISO gathered proposed problem statements that will be utilized as discussion topics to further understand and ask the group “what is the problem statement with this issue?” to help inform direction of policy. This section synthesizes those points below.

During the Working Group 2 call, stakeholders were presented with key elements on how to build a problem statement, these elements included;

- Reflect principles by describing how basic principles of market design are not being met

- Identify the root cause of problem in terms of existing CAISO market design and processes meant to achieve desired market outcomes
- Justify or illustrate how problems might impact the market's ability to achieve desired outcomes

1. Alignment of Electric and Gas Market Timelines

This topic reflects stakeholders' interest in exploring the trade-offs associated with aligning the day-ahead electricity market with the existing gas market timelines.

The ISO has actively engaged in discussions surrounding the alignment of the day-ahead electric market with existing gas markets. The ISO has participated in ISO-run stakeholder processes and contributed to FERC and NAESB proceedings. For more background on the proceedings and the specific concerns identified, can be found in Appendix A.

This working group topic offers stakeholders an opportunity to review past proceedings to support their own assessment of previously identified trade-offs. This topic offers a venue to explore the challenges stakeholders have identified in association with the difference in timelines, and will facilitate the identification or development of market mechanisms or tools to mitigate these issues.

During Working Group 1, stakeholders identified the following issues associated with the gas and electricity market timelines:

1. Market participants do not have sufficient information to make gas procurement decisions
2. Recent increases in variable energy resource capacity has increased forecast uncertainty in determining gas procurement

During Working Group 2, stakeholders raised challenges arising from the misalignment of the gas and electric markets. Challenges raised in comments on the first discussion paper and during the call on this issue are captured below;

1. Market participants do not have sufficient information to make gas procurement decisions
 - a. Gas procurement takes place before 8am for the forward market cycle leaving potentially large exposure
 - b. Two-Day Ahead advisory schedule is not sufficient due to volatility
 - i. A brief comment was made around having a 5am energy advisory schedule run for following trade date
 - c. Weekend cycle where gas needs to be procured for potentially up to four days presents challenges

- d. RUC awards that are not binding require RT offers which leads to potential of getting picked up in RT
- e. Need for a fuel burn advisory
- 2. Increased forecast uncertainty in determining gas procurement, in part due to recent increases in variable energy resource capacity
 - a. Visibility to the gas spot market price isn't apparent/available for some participants
 - b. Operational flow orders for both min and max need to be accounted for and represented in market
 - c. Illiquidity in evening nomination

From these discussions the ISO has synthesized the following draft problem statements:

Draft problem statement 1: Participants do not have certainty in the advisory awards and forecasts to utilize as a procurement target for gas.

- Market outcome: generators unable to meet awards (reliability)
- Policy: Advisory schedule accuracy
- Policy principle: Transparency?

Draft problem statement 2: During episodes of natural gas system constraints, generators encounter difficulties in representing their costs within the energy Market.

- Market outcome: generators unable to meet awards (reliability)
- Policy: ?
- Policy principle: Efficiency?

2. Cost Recovery Mechanisms

Stakeholders highlighted the existing process for cost recovery may be overly burdensome.

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

1. More timely and straight forward cost recovery process
2. Penalties and risk-associated costs are difficult to reflect in bids

Stakeholder Problem Statements:

1. Current after-market cost recovery process may result in FERC filing which can be burdensome.

During Working Group 2, stakeholders express the existing cost recovery functionality was overly burdensome. Challenges raised via comments on the first discussion paper and during the call on this issue are captured below;

1. More timely and straight forward cost recovery process
 - a. Deadline with the reference level adjustments cause issues for traders attempting to set up their positions prior to the bidding deadlines
 - b. Submitting per resource is just not easy and takes too long
 - c. Deadline should be extended through-out the day so that traders can reflect updated costs for each associated gas nominal cycle in the spot markets

From these discussions the ISO has synthesized the following draft problem statements:

Draft problem statement 1: Reference level adjustment process is too burdensome and its deadline does not allow adequate time to submit.

- Market outcome: generators unwilling to offer in additional capacity (reliability)
- Policy: Cost recovery
- Policy principle: Simplicity, Efficiency?

Draft problem statement 2: Lack of confidence in cost recovery mechanisms, due to true commitment costs inability to be reflected in bids, may result in generators not coming to the market.

- Market outcome: generators unwilling to participate in market (reliability)
- Policy: commitment cost caps
- Policy principle: Efficiency

3. Bidding Flexibility

Stakeholders expressed a desire for more bidding flexibility better reflect their verifiable cost expectations in the market. Participants expressed that the current default commitment cost caps of 125% and the current variable cost-based default energy bid caps of 110% do not always cover their costs or exposure.

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

1. Default commitment cost caps are too restrictive
2. Differences in heat rates and ability to account for accordingly

3. Generator reference prices (i.e. default energy bids and commitment costs) are based on electric day, not gas day (market timeline differences)
4. Bid mitigation during periods of gas price volatility

Stakeholder problem statements:

1. Current framework for bid caps may limit generators from reflecting their incurred gas costs into the market.
2. The automated reference level process must be implemented by unit and configuration for all applicable hours, which is labor-intensive for Scheduling Coordinators with a large gas fleet.
3. The manual reference level process requires submission of a CIDI case by 8:00AM Pacific Time that is subsequently reviewed by the CAISO. By the time the costs are approved and updated for the real-time market, several hours have passed in the current gas day.

During Working Group 2, stakeholders reiterated their concern that the current inputs to commitment cost formation and cost caps percentages are overly restrictive. Challenges raised via comments on the first discussion paper and during the call on this issue are captured below;

1. Default commitment cost cap percentages are too restrictive
 - a. Caps do not allow generators to represent OFO exposures
 - b. Caps do not allow generators to reflect volatility and illiquidity in gas spot market
2. Differences in heat rates and ability to account for accordingly
 - a. Stakeholders did not raise strong concerns on this topic as it was noted participants can utilize unit testing to ensure their heat rates are reflective of unit capabilities throughout the season and have their MF values updated accordingly
3. Generator reference prices (i.e. default energy bids and commitment costs) are based on electric day, not gas day (market timeline differences)
 - a. HE1 through HE7 does not reflect correct commitment costs
 - i. Brief mention during call regarding the ability to allow reflected costs for HE1 – HE7 and HE8 – HE24 to be different
 - b. Real-time commitment costs are not flexible enough given they are fixed if awarded one hour in RT for the rest of the trading day
 - c. Existing tools for recourse reference level adjustments, the automated reference level process, exist. This process is viewed as overly burdensome and restrictive

4. Bid mitigation during periods of gas price volatility
 - a. Increase of caps is needed due to risk of energy bids being mitigated if attempting to represent additional costs beyond what is captured by the Default Energy Bid

From these discussions the ISO has synthesized the following draft problem statements:

Draft problem statement 1: The current Default Commitment Cost and Default Energy Bid caps limit generators from reflecting true gas costs.

- Market outcome: generators unwilling to participate (reliability)
- Policy: Bidding flexibility
- Policy principle: Efficiency

Draft problem statement 2: Inability to reflect any change in real-time gas costs due to the RT hourly commitment costs being “locked” for the full trading date once awarded.

- Market outcome: generators unwilling to offer additional capacity (reliability)
- Policy: Bidding flexibility
- Policy principle: Efficiency

Draft problem statement 3: Markets do not capture the correct gas cost that is used in Default Commitment Cost and Default Energy Bid formulation for HE1 through HE7.

- Market outcome: uneconomic dispatch
- Policy: Bidding flexibility
- Policy principle: Efficiency

4. Resource Specific Limitations

Stakeholders expressed interest in considering how market processes can better accommodate resource specific limitations and their associated costs.

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

1. A broader consideration of use limitations
2. Potential heat rate variations
3. Ability to map multiple gas zones to a specific resource

During working group 2, discussion focused on the potential for multiple gas zones, opportunity costs, and introduced questions around gas transportation rates. Challenges raised via comments in the first discussion paper and during the call on this issue are captured below;

1. Use limitations appropriately accounted for
 - a. Current rules around qualification (reliability and ancillary services) for opportunity costs limit a BAA's ability to participate with their entire available generation fleet
2. Potential heat rate variations
 - a. Moved to be part of bidding flexibility
3. Ability to map multiple gas zones to a specific resource
 - a. Participants again reiterated the need to have flexibility to easily transition to a different pre-established gas fuel region on a quicker timeline than current Masterfile processes allow
4. Gas transportation rates impact on bidding and the setting of a system marginal price
 - a. Group discussed how gas transportation rates are currently accounted for through custom fuel region creation to accurately reflect the costs incurred by the generator

From these discussions the ISO has synthesized the following draft problem statements:

Draft problem statement 1: Generators are unable to switch fuel sources in a timely manner

- Market outcome: incorrect costs being utilized (uneconomic)
- Policy: Bidding flexibility
- Policy principle: Efficiency

Draft problem statement 2: Use limitation qualification does not account for or recognize all limitations being faced by the certain resources.

- Market outcome: Unit not offered into market (reliability)
- Policy: Opportunity Costs
- Policy principle: Simplicity?

5. Gas System Limitations

Stakeholder expressed a desire to account for additional gas system limitations that are not fully accounted for in today's design.

The following scope items be part of discussion for problem statement formation:

1. Accounting for differences in gas systems and storage capabilities

2. Gas Burn limitations taken into account
3. Operational flow orders, minimum burn orders to support gas system maintenance
4. Potential loss of firm transportation
5. Liquidity of the different gas markets

During working group 2, stakeholders reiterated the various gas system challenges and limitations listed above. Challenges raised via comments on the first discussion paper and during the call on this issue are captured below;

1. Accounting for differences in gas systems and storage capabilities
 - a. Storage capabilities are not the same across the participant footprint and therefore leads to a need for more accurate schedules and less RT volatility (these two items specifically commented on in Bidding Flexibility section)
 - b. Generators pulling for local system have competitive issues within the EN market due to the utilization of volumetric rate causing lack of EN awards
2. Gas Burn limitations taken into account
 - a. Participants need a way to reflect limitations for a set of generators on a given pipeline
3. Operational flow orders, minimum burn orders to support gas system maintenance
 - a. Participants do not have the ability to reflect OFO costs and exposure in both DA and RT (see bidding flexibility section)
 - b. Constrained gas system due to outages significantly impact spot market prices and 125% cost cap does not suffice (see Bidding Flexibility section)

From these discussions the ISO has synthesized the following draft problem statements:

Draft problem statement 1: BAA's are unable to represent a gas burn limitation within the market for a set of generators.

- Market outcome: inability to meet EN awards (reliability?)
- Policy: ?
- Policy principle: Transparency?

Action Items identified for group

The below items were identified as follow-up items from the previous working group session;

1. Stakeholders to review history of the exploration of aligning Gas and Electric Market timelines (*see Appendix for link*)
2. Understand inputs for the D+2 market run
 - a. Forecast accuracy analysis
 - i. VER and Load
3. Stakeholders to identify analysis needed to illustrate problem statements
 - a. How often 125% cap is utilized/hit
4. ISO to identify outstanding CCDEBE enhancements yet to be delivered that were previously approved
5. Review of proposed draft problem statements above

Appendix

1. Gas and Electric Market Alignment

The existing timing of the day-ahead electric market is intentionally run between the timely and evening nomination cycles, allowing market participants to optimize their gas procurement between the two cycles with knowledge of fixed prices during the timely cycles and fixed quantity during the evening cycle.

Through both CAISO-run stakeholder process as well as CAISO participation in FERC and NAESB proceedings, the CAISO has considered aligning the day-ahead electric market to the timely gas nomination cycle. During these endeavors, the CAISO identified a number of potential issues that lead it to determining aligning the market timelines was not in the best interest of CAISO market participations.

Complications relating to market efficiency due to unknown gas prices, changes to business process, and increased forecast inaccuracy due to earlier timelines were identified as just reasons to not move the day-ahead market clearing timelines⁵.

The CAISO is planning to work with its internal Scheduling Coordinators to revisit if present market conditions erase these concerns, but ask that stakeholders consider the following in their own assessment.

⁵ [CAISO Bidding Rules Enhancements - FERC Order 809](#)