# Gas Resource Management: Issue Paper stakeholder call

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- These collaborative working groups are intended to stimulate open dialogue and engage different perspectives.
- Please keep comments professional and respectful.

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- Please remember to state your name and affiliation before making your comment.
- You may also send your question via chat to all panelists.

# Issue Paper Overview

- **Section 3 Reader's Guide:** use as a roadmap and reference guide
  - Section 3.1: Establishes shorthand consistent with the rest of the paper

- **Section 4-7: Issue areas for policy development**
  - Informing Fuel Procurement
  - Accommodating Regular Cost Variation
  - Accessibility of the RLCR Process
  - Gas Burn Limitations

Each section has call outs related to prompts in the comment template to show where the ISO is seeking specific stakeholder input.

# Goals for today

- Tentative schedule for policy development

- For each issue area (and issue paper section)
  - Review key concepts, IT/implementation feedback to inform feasibility of different stakeholder suggestions
  - Highlight areas where the ISO is currently seeking feedback
  - Propose next steps to address feedback to date

- Appendix slides contain additional background, lower priority discussion items

# Tentative Schedule for Policy Development

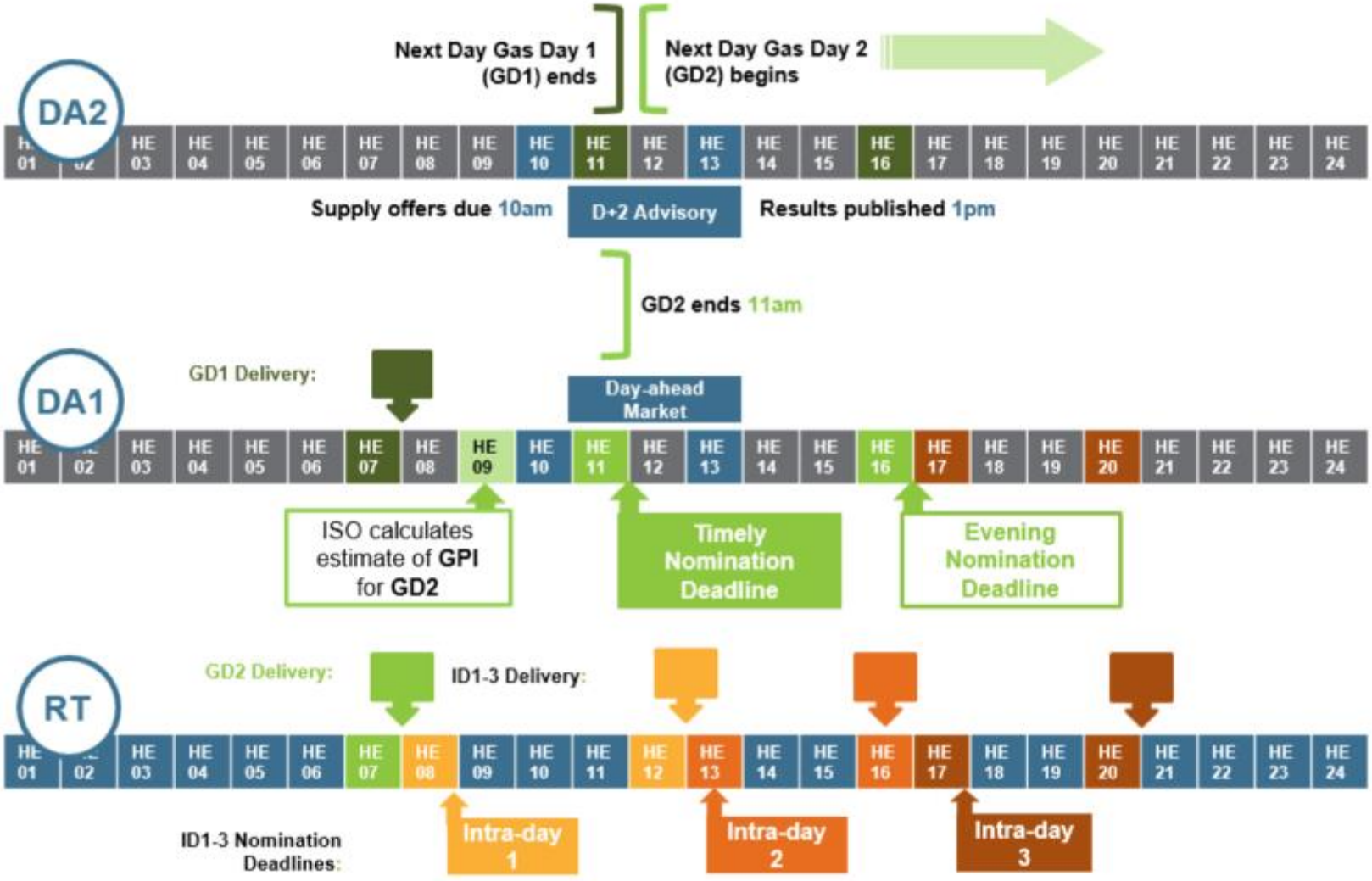
| 2025 | Proposal Development | Stakeholder Engagement | Analysis |
|---|---|---|---|
| Jan. | Issue Paper | | |
| Feb. | | Stakeholder Call | |
| Mar. | | • Working Group Meeting: Align on prioritization and scope of Straw Proposal | |
| Q2 | Straw Proposal | Stakeholder Call | |
| | | • Working Group Meeting: Accommodating cost variation<br>• Working Group Meeting: D+2 Coordination, Gas burn limitations<br>• MSC Discussion | **Final Analysis** |
| Q3 | DFP | Stakeholder Call | |
| | | | |
| Q4 | | **Target Board Decision** | |

# Gas and electric market timelines and processes (Section 3.1)

TD-2, D+2

TD-1, day-ahead

TD, trade-day



# Informing Fuel Procurement (Issue Paper Section 4)

- Most stakeholders identified accurate information to inform fuel procurement as the highest priority item in GRM working groups
  - The ISO is already developing a new, more direct indicator of day-ahead schedules via a separate market process (D+2)

- Some stakeholders questioned the potential, feasible value add of additional efforts in this area
  - The issue paper describes stakeholder perspectives from prior efforts in this area,
  - discusses how evolving market participant characteristics warrant revisiting these efforts, and
  - Identifies new opportunities for improvements.

# The 48-hour residual unit commitment is functionally different from the D+2

| Time of Publication | | Day-Ahead Market Process | | D+2 Market Run | GRM Suggestion |
|---|---|---|---|---|---|
| TD-2 | 1pm | $IFM_{TD-2}$ + 24 Hour RUC | 48-hour RUC | | |
| | 6pm | | | D+2 | D+2 |
| TD-1 | 4am | Real-Time$_{TD-1}$ (12am – 12am) | | | D+1.5 |
| | 1pm | | $IFM_{TD-2}$ | $IFM_{TD-1}$ | $IFM_{TD-1}$ |
| Trade-day | | | Forecasted Real-time Advisory | Real-time | Real-time |

The 48-hour RUC tells you what the forecasted reliability needs are two days out. The D+2 forecasts the next day's IFM results

# Today SCs may receive residual unit commitment advisory schedules from the 48-hour RUC, not from the separate D+2

| Time of Publication | | Day-Ahead Market Process | | D+2 Market Run | GRM Suggestion |
|---|---|---|---|---|---|
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| | 1pm | | $IFM_{TD-2}$ | $IFM_{TD-1}$ | $IFM_{TD-1}$ |
| Trade-day | | | Forecasted Real-time Advisory | Real-time | Real-time |
| Who gets what on TD-2: | | SCs with day-ahead participating gas resources may receive 48-hour RUC advisory schedules | | Gas pipeline companies receive volumetric gas burn from the D+2 | |

# Tomorrow, advisory schedules will come from the separate D+2 market run

| Time of Publication | | Day-Ahead Market Process | | D+2 Market Run | GRM Suggestion |
|---|---|---|---|---|---|
| TD-2 | 1pm | $IFM_{TD-2}$ + 24 Hour RUC | | | |
| | 6pm | | | **D+2** | D+2 |
| TD-1 | 4am | Real-$Time_{TD-1}$ (12am – 12am) | | | D+1.5 |
| | 1pm | | | **$IFM_{TD-1}$** | **$IFM_{TD-1}$** |
| Trade-day | | | | Real-time | Real-time |

The ISO is seeking feedback to ensure the D+2 advisory results are useful to inform gas procurement during GD2

# Stakeholder engagement and D+2 coordination

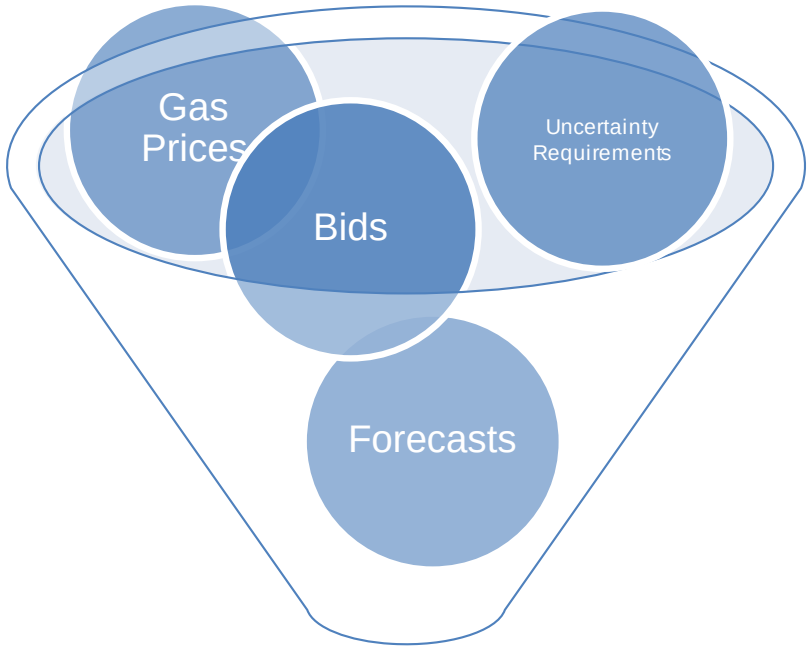
- The ISO expects that planned improvements, like use of the D+2 and implementation of imbalance reserves, will benefit gas generators

- The ISO is open to developing a new market run but recommends (in the near term) focusing on developing the D+2 to maximize the use of, and more clearly identify the limits of, planned improvements

# Areas for stakeholder input in D+2 assessment and development

**Inputs and Modeling Assumptions:**
- Bid set from 7 days prior
- Forecasts
- Uncertainty Requirements (DA, D+2, D+3)

**Accuracy Assessment:**
- How should we define accuracy? With respect to RT, DA?
- Without historical data, how should we assess accuracy for regional market participants?

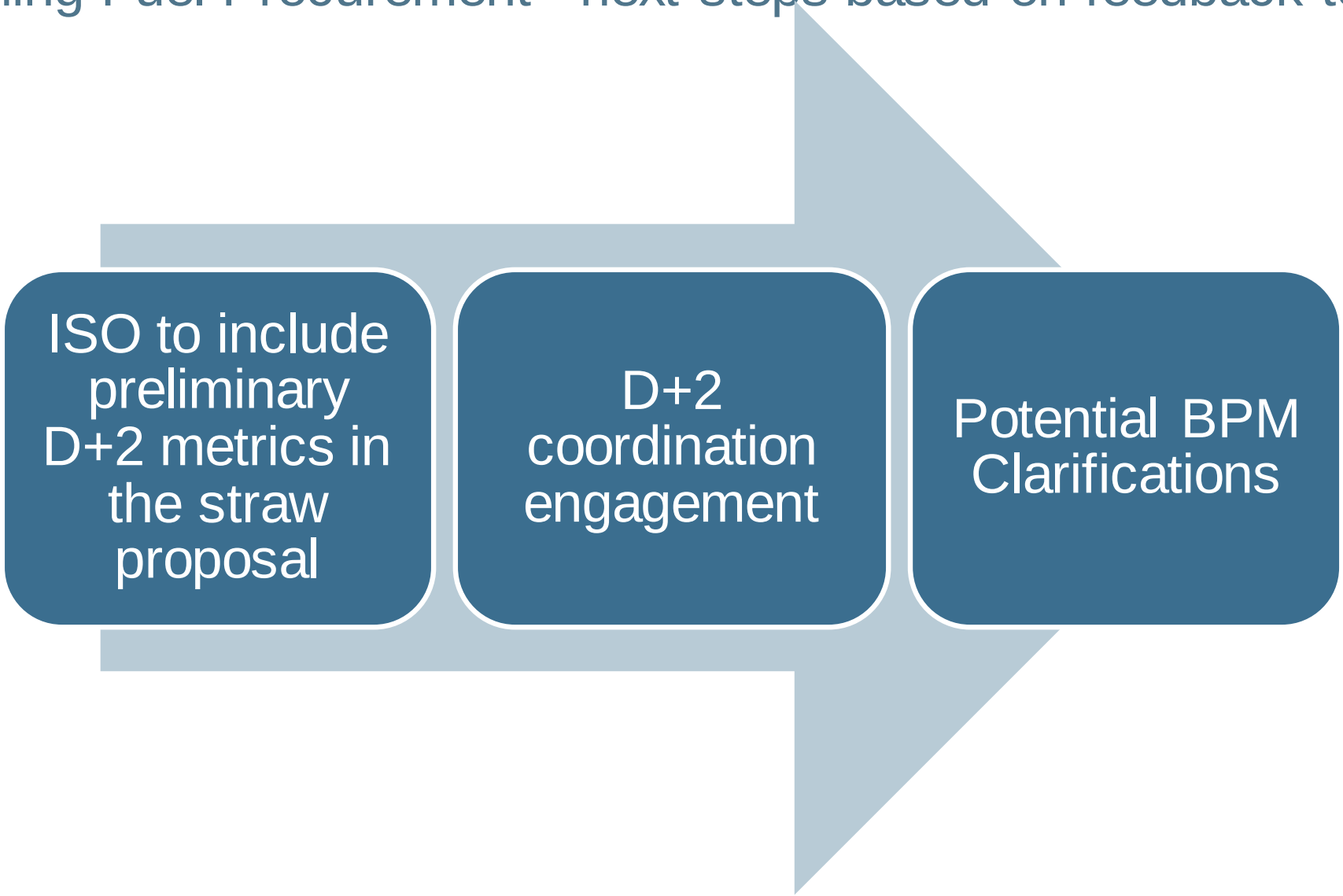



D+2 Advisory schedules

**Imbalance Reserves:**
- IR is expected to improve visibility for gas resources
- Uncertainty requirement indicates potential error between DA and FMM forecasts

**Market Data Representation:**
- What information, beyond advisory schedules, would inform fuel procurement?
- What information would improve confidence in using D+2 information?

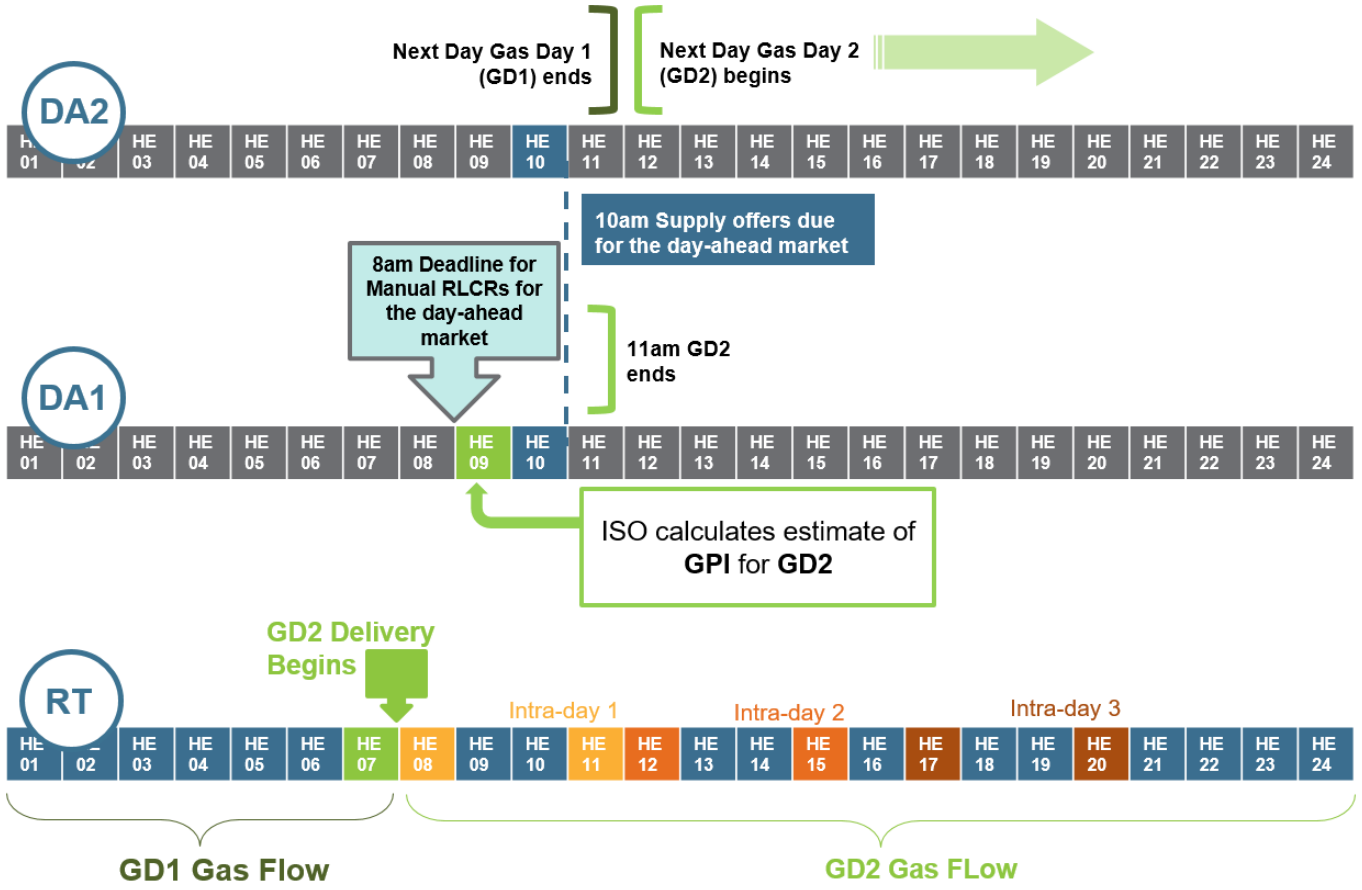
# Informing Fuel Procurement– next steps based on feedback to date



# Accommodating gas cost variation in reference levels (Issue Paper Section 5), and accessibility of cost adjustments (Issue Paper Section 6)

- Sections 5 and 6 cover stakeholder identified problem statements and suggested approaches related to:
  - Improving the accuracy of the gas price index (GPI) the ISO uses to calculate reference levels,
  - ways to assess, and support potential modifications to, the reasonableness threshold,
  - accommodations for unique supply arrangements,
  - timing and accessibility of the reference level change request process.

# What information the ISO uses depends on what's available when it's needed




Updating the index price in ISO systems is a manual process.

- The ISO normally re-calculates reference levels twice a day– once for each market
- The ISO uses vendor published indices
- Vendors do not similarly index intra-day trading cycles

# The ISO's GPI calculation procedure differs for day-ahead and real-time

| | Procedure | Justification |
|---|---|---|
| **Day-ahead** | The ISO uses an approximation of the GD2 GPI for all gas (variable cost, proxy cost) reference levels | Demonstrated improvement over using the settled GD1 index, this eliminates the 'lag' for two thirds of the electric trade day and potential impact of day-over-day volatility |
| **Real-time** | • The ISO uses the settled GD2 index<br>• The ISO will re-calculate the real-time reasonableness threshold if observed ID1 prices exceed 110% of GD2 | • GD2 is the prevailing cost of fuel for flows beginning 7am in real-time.<br>• Intra-day adjustments are limited by reasonableness threshold due to feasibility (and policy) concerns |
| **Mondays** | The ISO uses a Monday only GPI when available, and the weekend gas package otherwise | Monday only is the best indicator of the cost of fuel delivered on Monday. The ISO does not use non-standard products. |

# The ISO uses cost-based reference levels in certain market operations

- Cost-based offers include only the direct cost of starting up, staying at min load, providing incremental energy
  - **Default energy bids** serve as a mitigation floor when the ISO detects local market power
  - **Proxy commitment cost calculations** are used to validate start up/min load bids before sending them to market

- The ISO cannot practically capture each resource's costs perfectly

Cost adjustment opportunities are designed to balance feasibility and administrative effort with other policy trade-offs

# The RLCR process supports least-cost dispatch and market efficiency

- Process makes it easier for the ISO to get information that supports market efficiency by
  - incentivizing market participants to come to the table
  - serving as an intentional check-point for auditing and monitoring

- Pre-market cost adjustment requests may be limited to protect against speculative and strategic bidding
  - Automated requests are validated against the reasonableness threshold
  - Manual requests require supporting documentation with price and quantity

- Costs requested but not validated through these processes are eligible for recovery through the streamlined after-market process

# Overview of the reference level change request process

| | ISO Calculated Gas Price Index (GPI) | | Resource Requested Fuel Cost | Streamlined after-market cost recovery |
|---|---|---|---|---|
| | **Default Calculations** *incidental risk* | **Reasonableness Threshold** *volatility and illiquidity* | The ISO recalculates all reference levels, default calculations and the reasonableness threshold, using approved fuel costs | SCs may request recovery of actual costs, unrecoverable through pre-market opportunities |
| **Energy Bids** | Default Energy Bid (DEB) includes **110% multiplier** | Caps DEB adjustment requests at **125% of GPI** | | |
| **Commitment Costs** | Default Commitment Cost cap includes a **125% multiplier** | Caps adjustments:<br>- **110% of GPI** on days with a published gas price index<br>- **125% of GPI** on days with out a published gas price index | | |
| | | **Automated RLCR Process** | **Manual RLCR Process** | |

# The RLCR process does not directly account for the cost of fuel procured intra-day

- The reasonableness threshold represents the range within which the ISO and stakeholders previously determined automatic validation is reasonable
  - Based on GD2, and covers most variation between GD2 and ID cycles
  - Informed by fuel costs observed over time, excluding outliers

- The ISO may update the real-time reasonableness threshold for certain resources when:
  - The ISO observes gas prices in ID1 exceed 110% of the GD2 GPI
  - The ISO receives three or more manual requests at one gas hub
  - The ISO observes a resource's actual costs are systematically greater than the GPI the ISO uses for that resource

# The ISO is seeking stakeholder feedback to inform the potential value and feasibility of different approaches to policy development

- **Scalar assessment and methodology to determine threshold values**
  - What metrics– % trade-volume, # of outliers, $ degree of impact– would be useful to assess reasonableness?
  - How should the process accommodate differences between gas hubs?

- **Observable triggers for exceptional circumstances**
  - Under what specific conditions or scenarios do sudden price spikes occur?
  - Under what specific conditions or scenarios is volatility in ID2-3 not related to volatility between GD1 and ID1?
  - What predictive methods might be used to make changes to the reasonableness threshold more pro-actively?

# The ISO is seeking stakeholder feedback on tools described in the issue paper to prioritize policy development

- Pros/cons are based on experience with prior policy development initiatives, feedback from IT/implementation, working group feedback

- Suggested approaches may have different pros/cons depending on the use-case, e.g. day-over-day volatility

# Example: Day-over-day volatility may impact reference level accuracy for HE01-07

| Price movement outside the 110/125 thresholds | | Policy today | Increase the reasonableness threshold | Use 'the right price' |
|---|---|---|---|---|
| **Prices go down** between GD1 and GD2 | **HE1-7** | Under-estimate costs | Accurate | Accurate |
| | **HE8-24** | Accurate | Over-estimate costs | Accurate |
| **Prices go up** between GD1 and GD2 | **HE1-7** | Over-estimate costs | Over-estimate costs | Accurate |
| | **HE8-24** | Accurate | Over-estimate costs | Accurate |

- Key takeaways:
  - Policy today may over- or under-estimate costs for one third of the RT trade-day, but the ISO does not observe systematic error
  - Using the right price would deliver better overall market outcomes than modifying the reasonableness threshold

# Pros/Cons of approaches to accommodate cost variation

- **Gas price index used in reference levels**
  - Pro: accuracy can reduce the need for cost adjustments, better reflect sudden changes in gas market conditions
  - Cons: the ISO may not have access to additional information, updates require meaningful IT and business process changes

# Pros/Cons of approaches to accommodate cost variation

- **Reasonableness threshold**
  - Pros: allows pro-active adjustments while providing a check-point for monitoring, reduces manual adjustments
  - Cons: cannot practically capture all costs all the time, inappropriate costs cannot be undone

- **Reasonableness threshold adjustments in exceptional circumstances**
  - Pros: reduce reliance manual adjustments without broad modifications to the reasonableness threshold
  - Cons: triggers are manual and based on observations (not proactive)

# Pros/Cons of approaches to accommodate cost variation

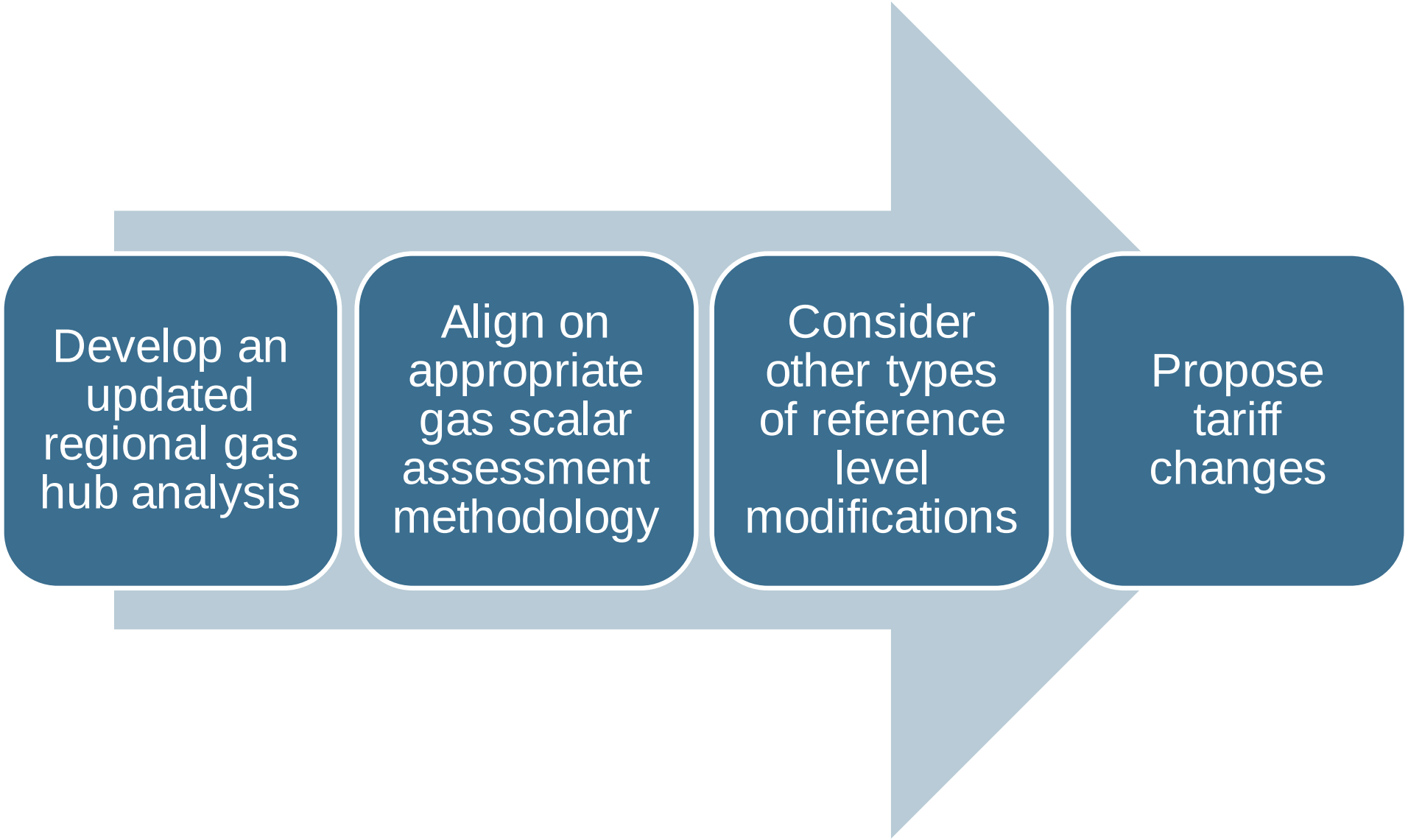
- **Modifications to the reference level change request process, timeline, functionality**
  - Pros: improve the ISO's access to timely gas cost information, improve market efficiency
  - Cons: would not reduce the need for cost-adjustments, modifications may create more opportunities for speculative behavior, may require significant IT and business process changes

# Pros/Cons of approaches to accommodate cost variation

- **Resource-specific negotiated and customized parameters**
  - Pros: reduce a specific resource's reliance on cost adjustments to accommodate error by establishing a resource-specific equilibrium
  - Cons: static and backward looking, upfront process can be burdensome for market participants that choose this option

- **Standard blended fuel region methodology**
  - Pros: offers resources with a pre-approved alternative for representing fuel costs from multiple hubs or regions
  - Cons: static and backward looking, requires broad stakeholder engagement to develop, may still over- or under-estimate a specific resource's costs over time

# Accommodating gas cost variation: next steps based on feedback to date



# Managing Gas Burn Limitations (Issue Paper Section 7)

- Stakeholders requested overview of gas constraint nomograms
  - Issue paper overview describes how they're activated, and how they support reliability without distorting market outcomes
  - Important tool in the ISO's tool box, but complexities limit use to specific situations

- Stakeholders suggest the ISO and stakeholders explore functionality to improve market efficiency with respect to gas limitations
  - Issue paper provides lessons learned from previous stakeholder discussions on this issue,
  - identifies preliminary guidelines and considerations

# Overview of gas constraint nomograms for reliability

- **How it works:**
  - a gas constraint nomogram suppresses LMPs in the constrained area to make a gas generator in that area appear uneconomic, shifting dispatch elsewhere
  - the cost of the constraint does not show up in prices to settle demand

- **Important reliability tool, but impractical for regular use:**
  - Activation is a manual process that requires coordination and communication with multiple entities
  - Simplifying assumptions are necessary but can reduce precision
  - Requires significant computational resources

# Exploring new methods to support efficient gas burn limitation management

- Gas nomogram constraint may not fit the bill
- Stakeholders cited concerns with efficiency and economic management, not necessarily reliability
- Stakeholders described gas limitations as regular and hourly
- Some stakeholders suggested an approach that would allow resources to reflect the cost of staying within nominations and managing pipeline restrictions

The ISO will provide guidelines for regional BAs to explore and initiate gas nomogram development

# Expectations for developing new policy to manage gas limitations

**Reliability:** Policy must not negatively impact reliability

**Transparency:** The ISO needs access to relevant information for implementation and monitoring

**Equity:** Solution should impact all market participants fairly

# Challenges associated with developing new policy to manage gas limitations

**Reliability**

**Transparency**

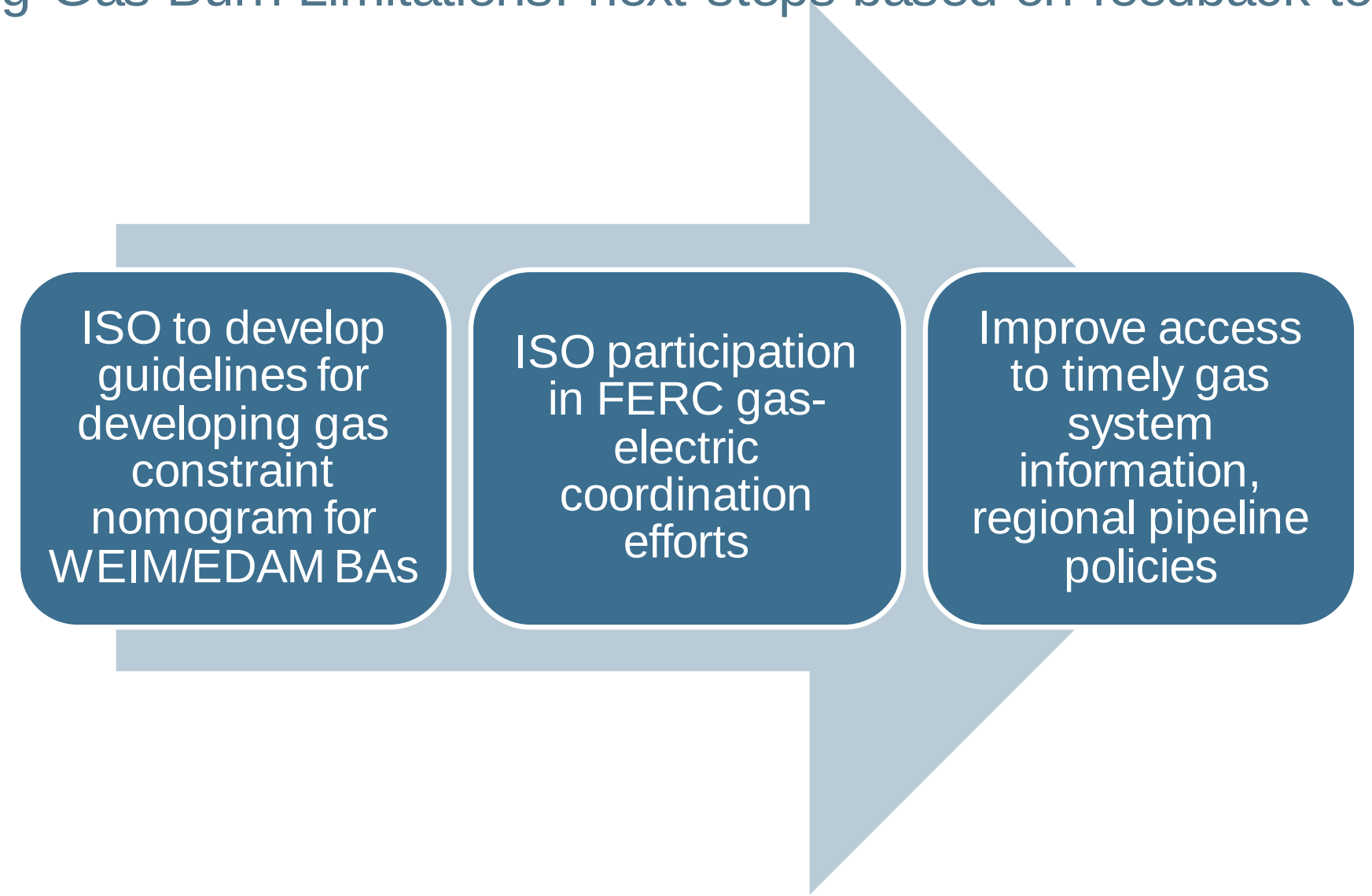
**Equity**

The ISO does not have consistent or timely access to gas system information like volumetric limitations and notifications

or how individual resources are situated

Differences in gas pipeline policies include different definitions of OFOs, timing of notifications, associated penalties, and expected resource behavior as a result of notifications

# Managing Gas Burn Limitations: next steps based on feedback to date



# Next steps

- Comment template has been posted, and comments are due March 11, 2025
- If your organization would like to present on a topic in an upcoming working group, please email isostakeholderaffairs@caiso.com
- Upcoming working groups will include:
  - An opportunity prior to the straw proposal to review feedback and get alignment on prioritization
  - Topic specific working groups to consider stakeholder policy proposals and analysis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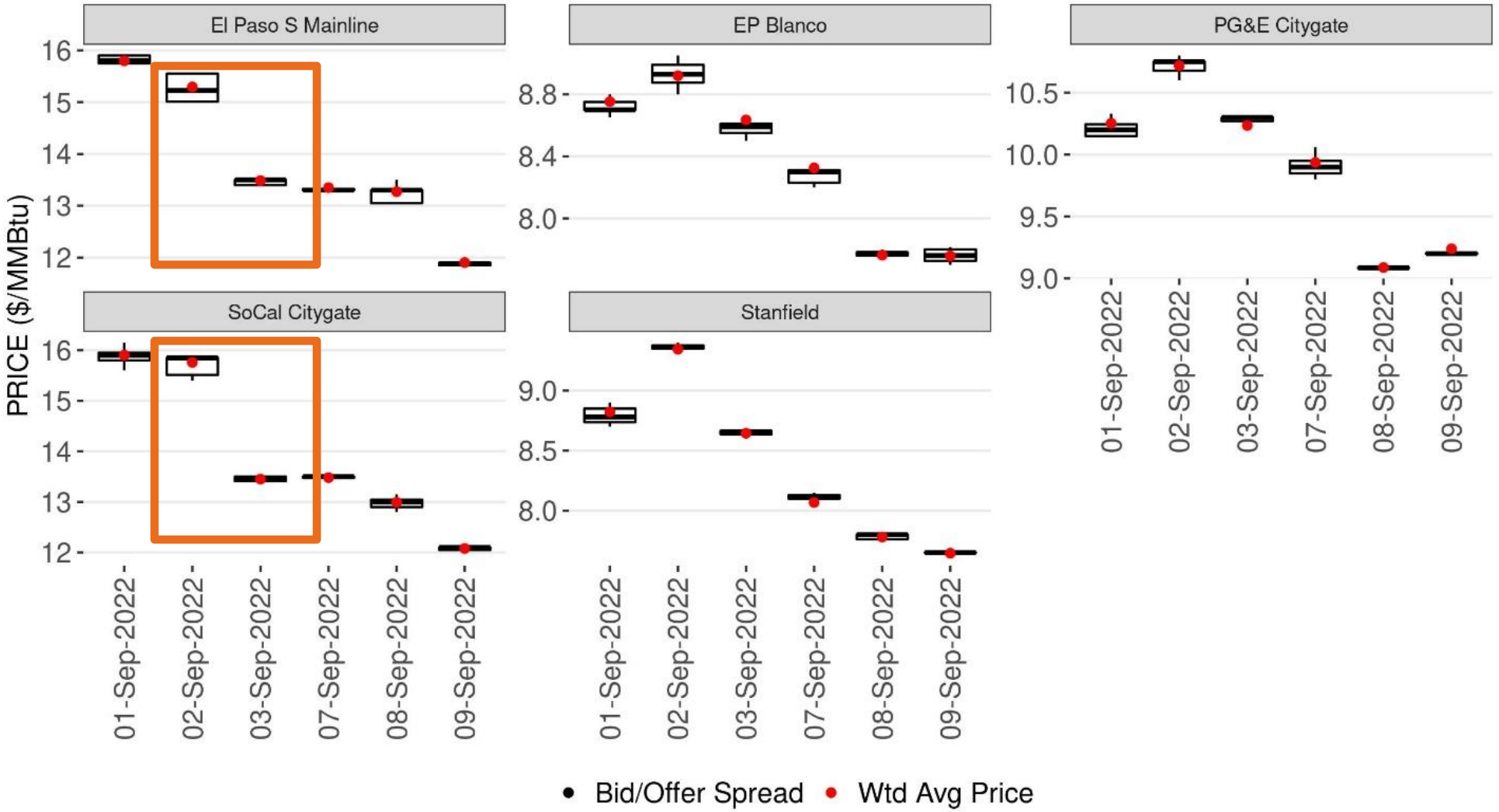
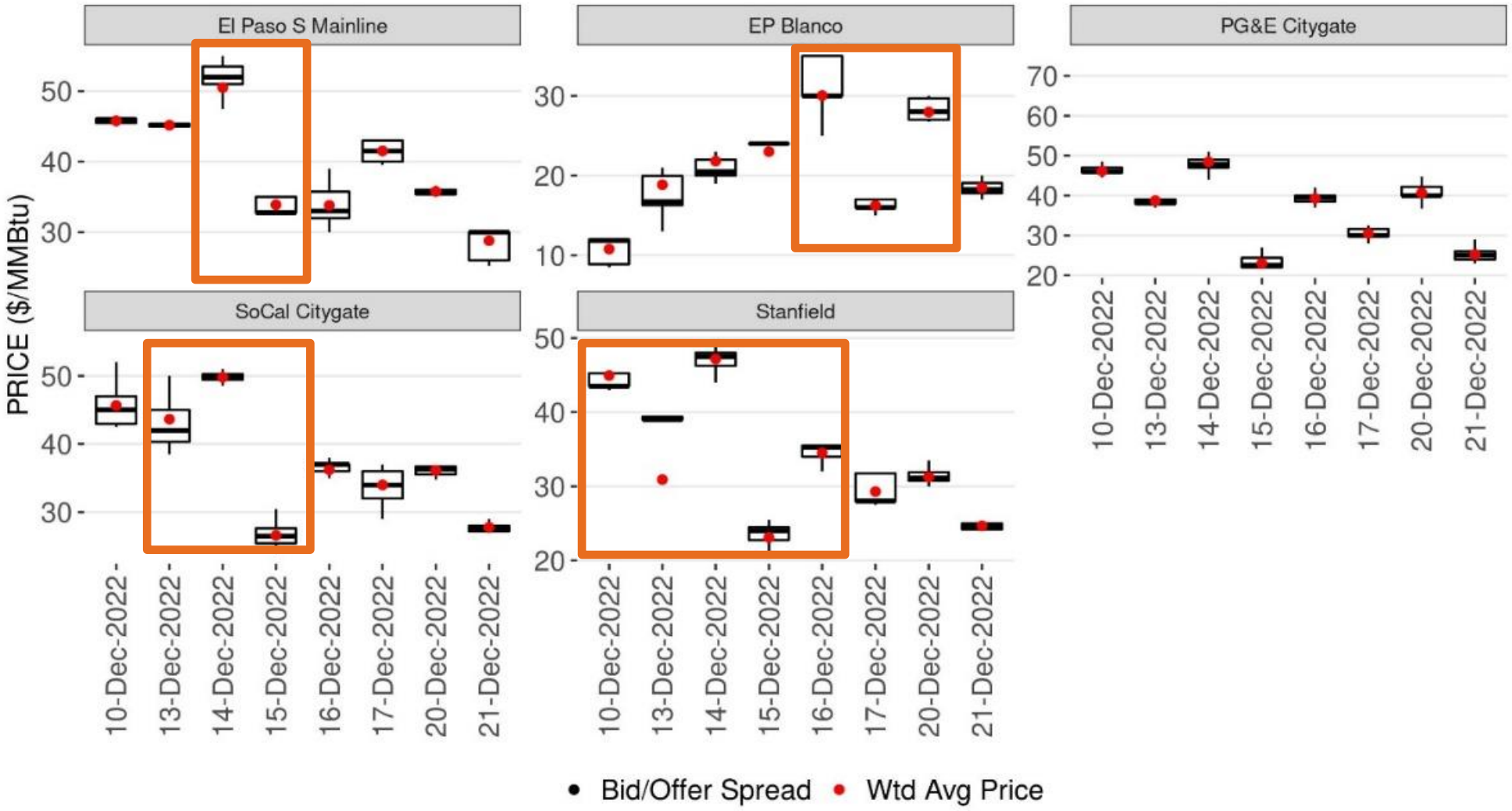
# SUPPLEMENT

# Day-over-day volatility observed between September 1-9, 2022



# Day-over-day volatility observed between December 10-21, 2022



# Gas Scalar Analysis: Premium needed to reflect highest trade prices vs. index

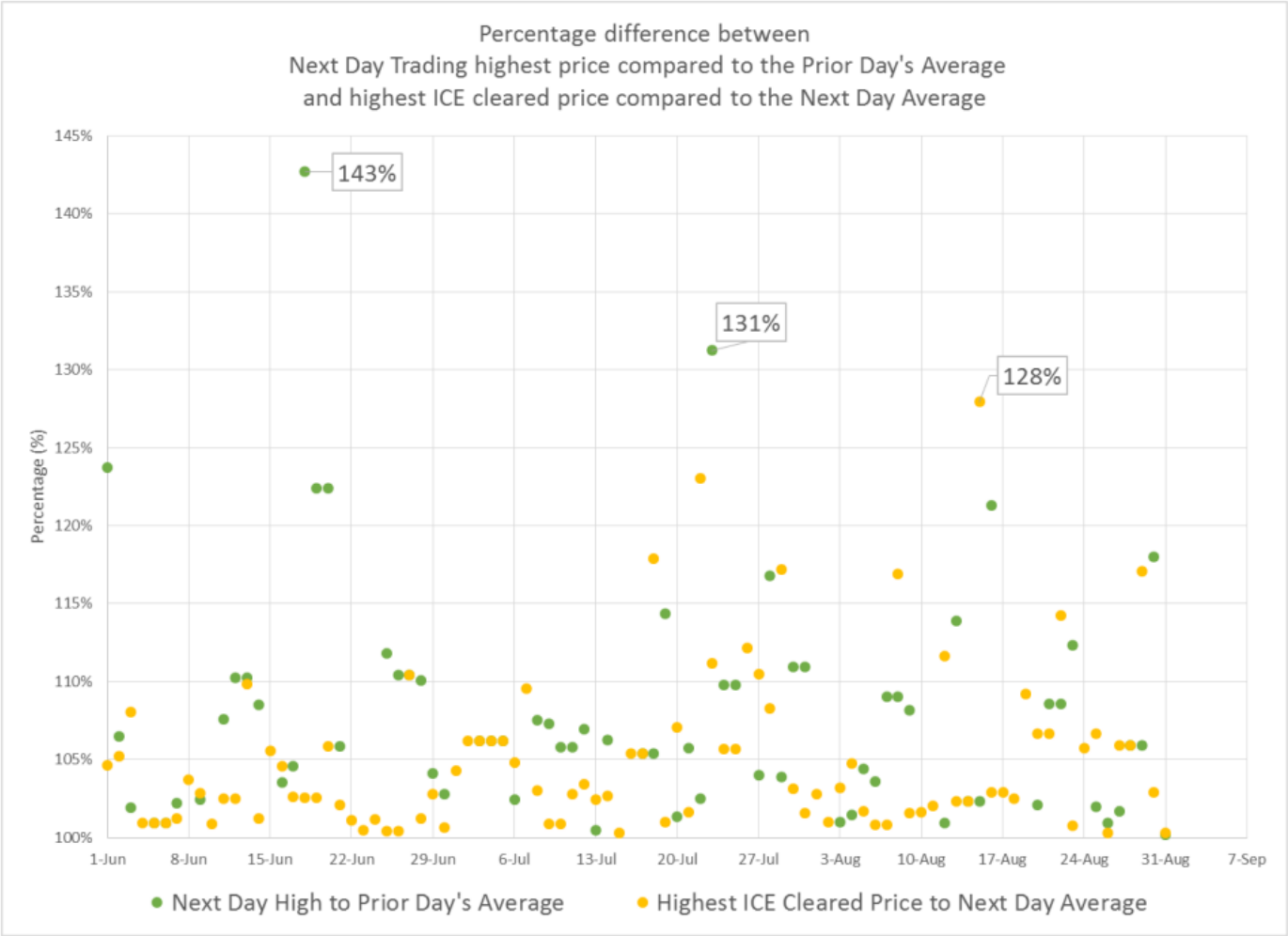
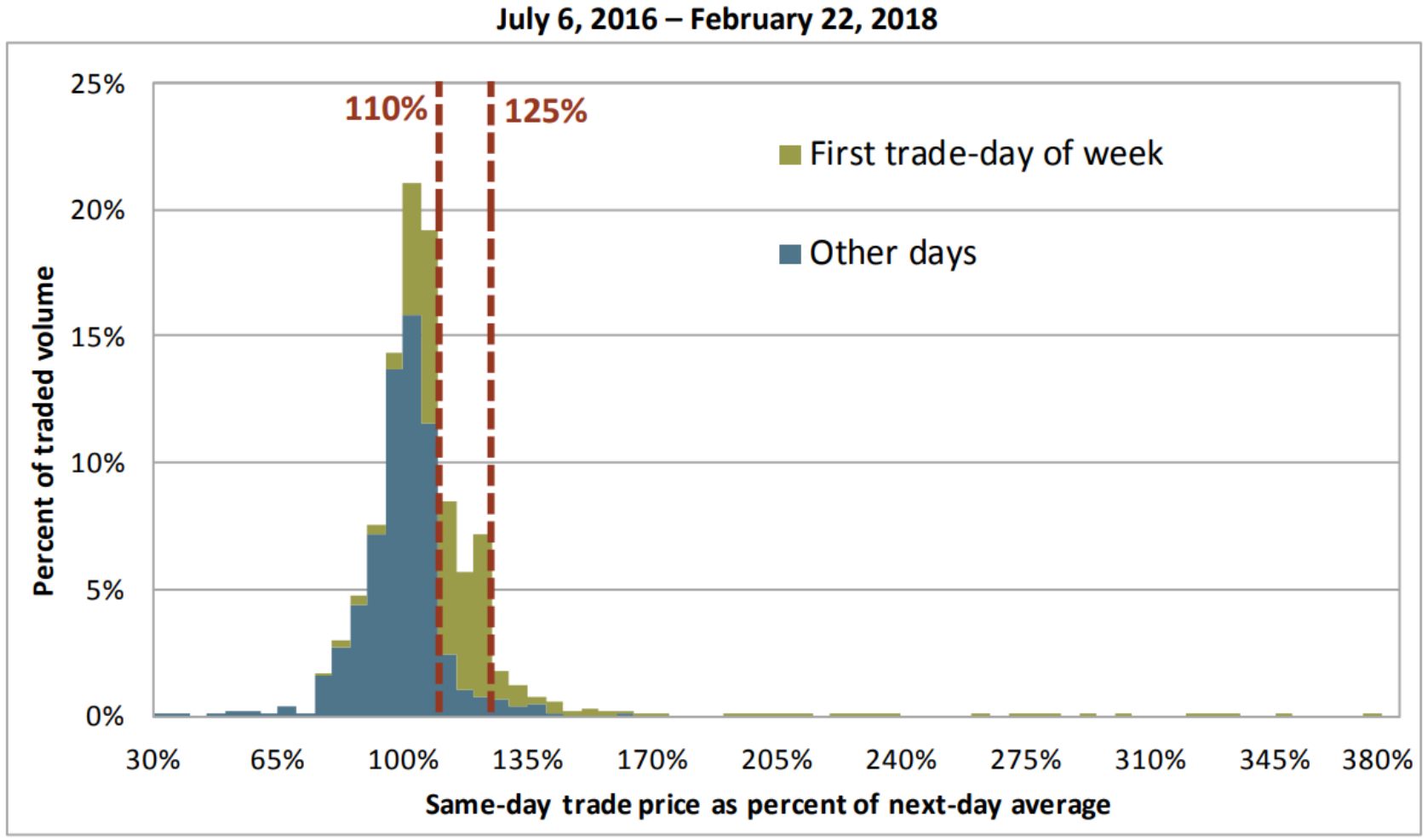



**Figure 2: Compare high trades to next day gas indices**

Aliso Canyon Revised Draft Final Proposal, September 23, 2016: [DraftFinalProposal-AlisoCanyonGasElectricCoordinationPhase2.pdf]

# Gas Scalar Analysis: Same day, and next day trades reported on ICE for SCE Citygate




DMM Analysis for CCDEBE DFP: [dmmcomments-commitmentcostsanddefaultenergybidenhancementsreviseddraftfinalproposal.pdf (caiso.com)]

# The reference level change request process

| | Automated | Manual |
|---|---|---|
| **Timeline** | Prior to close of the applicable market—10am PT for the day-ahead market, T-75 for real-time. | By 8AM PT on the day the applicable market is executed |
| **Submission** | Directly in SIBR | CIDI ticket |
| **Review process** | Automatically validated in SIBR against the Reasonableness Threshold | Manually validated by the ISO between 8-9AM |
| **Supporting documentation** | Retained by SC in the event of an after-the-fact audit | Submitted in CIDI ticket |
| **Resulting ISO system updates** | The requested value supplants the resource's default calculation for the relevant trade-hour(s) in the relevant market. | The ISO re-calculates all reference levels for the relevant trade-day using the requested fuel cost. Recalculated reference levels do not include the incidental or fuel volatility scalars. |
| **Example use-cases** | Day-over-day volatility, GD2 GPI averages up after ISO estimate is pulled, intra-day gas price volatility | Pipeline outages, resource switches fuel type or source |

# Prior proposals to transition to market-based commitment costs

- Three elements of CCDEBE policy were intended to pave the way for market-based commitment costs:
  - Dynamic market power mitigation for commitment costs
  - Negotiated commitment costs
  - 200 percent commitment cost multiplier

- Outstanding concerns would need to be worked through if there was interest in reconsidering this policy direction
  - Both policy development and implementation would be resource intensive

- Based on the ISO's interpretation of the commitment cost analysis, the ISO does not see an immediate need to reconsider these enhancements

# Commitment cost analysis

- The ISO and stakeholders reviewed a commitment cost bidding analysis in the working groups: GRM working group meeting January 25, 2024

- In response to stakeholder feedback, the ISO offers additional context, and limited inferences, for stakeholders to react to in the issue paper
  - If your takeaway is different, what's missing?
  - If not this analysis, what might indicate the commitment cost cap does not currently offer sufficient flexibility?