Gas Resource Management
Working Group 8

March 5, 2024

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- If you are connected to audio through your computer or used the “call me” option, select the raise hand icon  located on the bottom of your screen.
- **Note**: #2 only works if you dialed into the meeting.
  - Please remember to state your name and affiliation before making your comment.

- You may also send your question via chat to either Isabella Nicosia or to all panelists.

Agenda

Time	Topic	Presenter
1:00 - 1:05	Welcome & introduction	Isabella Nicosia
1:05 - 1:15	Transitioning to Policy Development	Mark Richardson, Sylvie Spewak
1:15 - 1:35	Survey results, summary feedback, and action items from WG7	Mark Richardson
1:35 - 2:30	ISO Staff Presentation: Assessment of Problem Statements 1-2	Sylvie Spewak
2:30 - 3:00	Recommendations for Policy Development and next steps	Mark Richardson

TRANSITIONING TO POLICY DEVELOPMENT

Transitioning to Policy Development

- Upcoming deliverables will provide the roadmap for policy development:
  - Stakeholder Recommendations for Policy Development
  - Issue Paper

- After these are finalized and published, working groups will focus on straw proposals and policy development

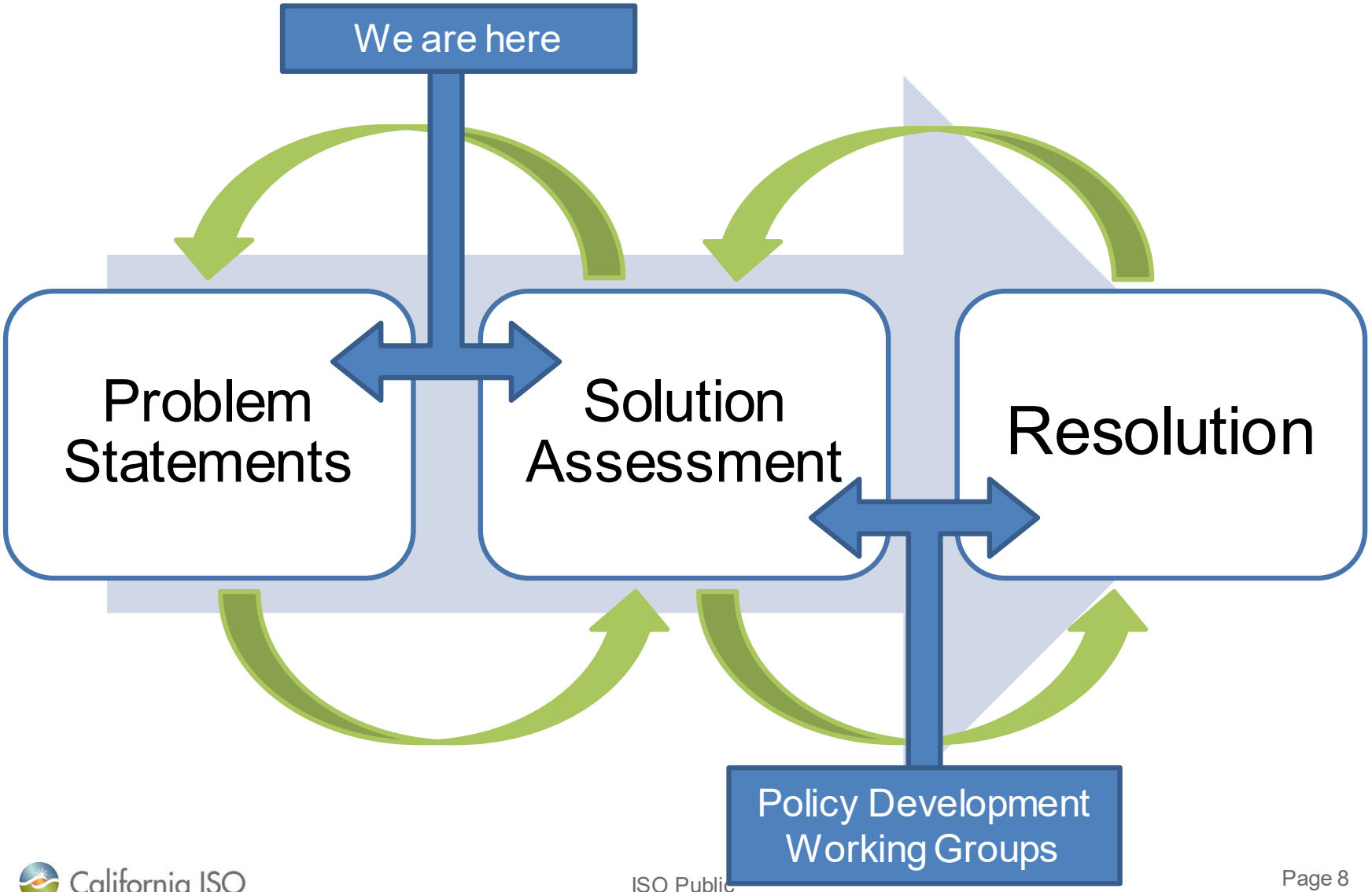
Proposal to move to next phase

- Stakeholders have collaboratively developed
  - Problem statements that are specific and well informed
  - An initial roadmap of potential solutions
  - Action items for improving analysis and policy context

- Stakeholders have expressed interest in presenting solutions

- Consensus on moving to policy development would allow for deeper dive in solution-focused discussion and further policy development for consideration of straw proposals

Working group progress to date



Working Group 7:

SUMMARY FEEDBACK AND ACTION ITEMS

What we heard from stakeholder comments for WG7

General feedback:

- Data request for “Cold Snap” event
- ISO interpretation and conclusion of data presented
- Manual Reference Level adjustments clearly are not working based on the number that have been approved vs requested
- Gas Procurement Strategies request
- Proposal to use the 125% adder based on greater of day ahead or balance of the month gas price

Responses to feedback and action items

- **What's the goal of reviewing this data prior to policy development?** The goal is to move into the policy development phase with an informed foundation of analysis. We want to ensure:

  – The initial analysis developed by ISO staff accurately represents diverse stakeholder experiences

  – Stakeholders have the opportunity to enhance the relevance of data and inform future iterations of analysis

Responses to feedback and action items

- **Stakeholders requested that the ISO provide more clarity, context, or interpretations of data being discussed**
  - A more robust narrative of analysis by ISO staff will be included in the Issue Paper or a separate white paper,
  - But we want the process to be collaborative and stakeholder-vetted before forming conclusions

- Some recommendations for ISO analysis have included:
  - Provide more context around the characterization of volatile periods identified
  - Refine commitment cost analysis to look at subgroups, e.g. by geography, commitments above the base schedule

Responses to feedback and action items

- **Stakeholders expressed interest in an analysis of January 13-15 (MLK weekend)**
  - On March 11, Market Performance and Advanced Analytics will present the winter report for MLK weekend during the Market Performance and Planning Forum (MPPF)
  - Agenda-Market-Performance-Planning-Forum-Mar-11-2024.pdf (caiso.com)

Commodity market inputs used for market operations– **Problem Statement Suggested Refinements**

- PS3/4: Reference levels may not precisely represent resource costs because **they do not account for the spread of prices for cleared transactions in gas markets or premiums paid for fixed rate contracts**

- PS3/4: Reference levels may not precisely represent resource costs because **increasing volatility can cause gas prices to deviate significantly from the median or index price used**

Stakeholder suggested solution: Using a different gas price index, like the greater of the DA or balance of the month, would accommodate a greater portion of actual costs

Resource-specific cost adjustments – **Problem Statement Suggested Refinements**

- PS6A: The automated reference level change request process **is complex and does not always lead to change request approval**

ASSESSMENT OF PS1-2

Certainty for advance fuel procurement – **Problem Statements**

- PS1: Market participants must rely on the illiquid evening or intra-day gas cycles because they do not have their day ahead schedules in time to inform procurement during the liquid timely nomination cycles, and do not have confidence in the accuracy of information provided in the 2 day ahead advisory intended to inform procurement.

- PS2: In response to unexpected changes in real-time, stakeholders face uncertainty around cost recovery and/or may not be able to procure additional supply.

Background: Aliso Canyon gas-electric coordination policy

- **Goal:** Increase access to information prior to trading activity and procurement in the timely nomination cycle

- **Solution:** Provide SCs access to D+2 residual unit commitment advisory schedules

Background: Aliso Canyon gas-electric coordination policy

- **Pros:**
  - Accessible prior to the close of the timely nomination cycle
  - Market run includes constraints stakeholders otherwise would not have visibility into
  - Low implementation cost as the ISO already runs a 2DA to inform operations

- **Cons:**
  - Precise constraints change between market runs
  - Results would only be as meaningful as there are available bids
  - Variance between DA and RT limits the effectiveness of earlier schedules to reduce reliance on intra-day trading

Stakeholder discussed solutions in GRM working groups

- Existing policy: **D+2 advisory schedules**
  - Working group participants cited a lack of confidence in the accuracy of these schedules

- Stakeholder recommended solution: **A full non-binding market run between D+2 and the DAM**
  - Greater confidence in forecast accuracy (Load & VER)
  - Results by 4am would inform trading activity leading up to the nomination deadline

- Stakeholder recommended solution: **Provide a fuel burn advisory & advisory energy schedules**

Open questions from stakeholder discussions

How will a changing resource mix impact uncertainty in the D+2?

- Impact of increasing penetration of VER capacity on forecast accuracy
- Impact of battery storage on price volatility

What is the source of incremental accuracy in a market run ~15 hours after the D+2?

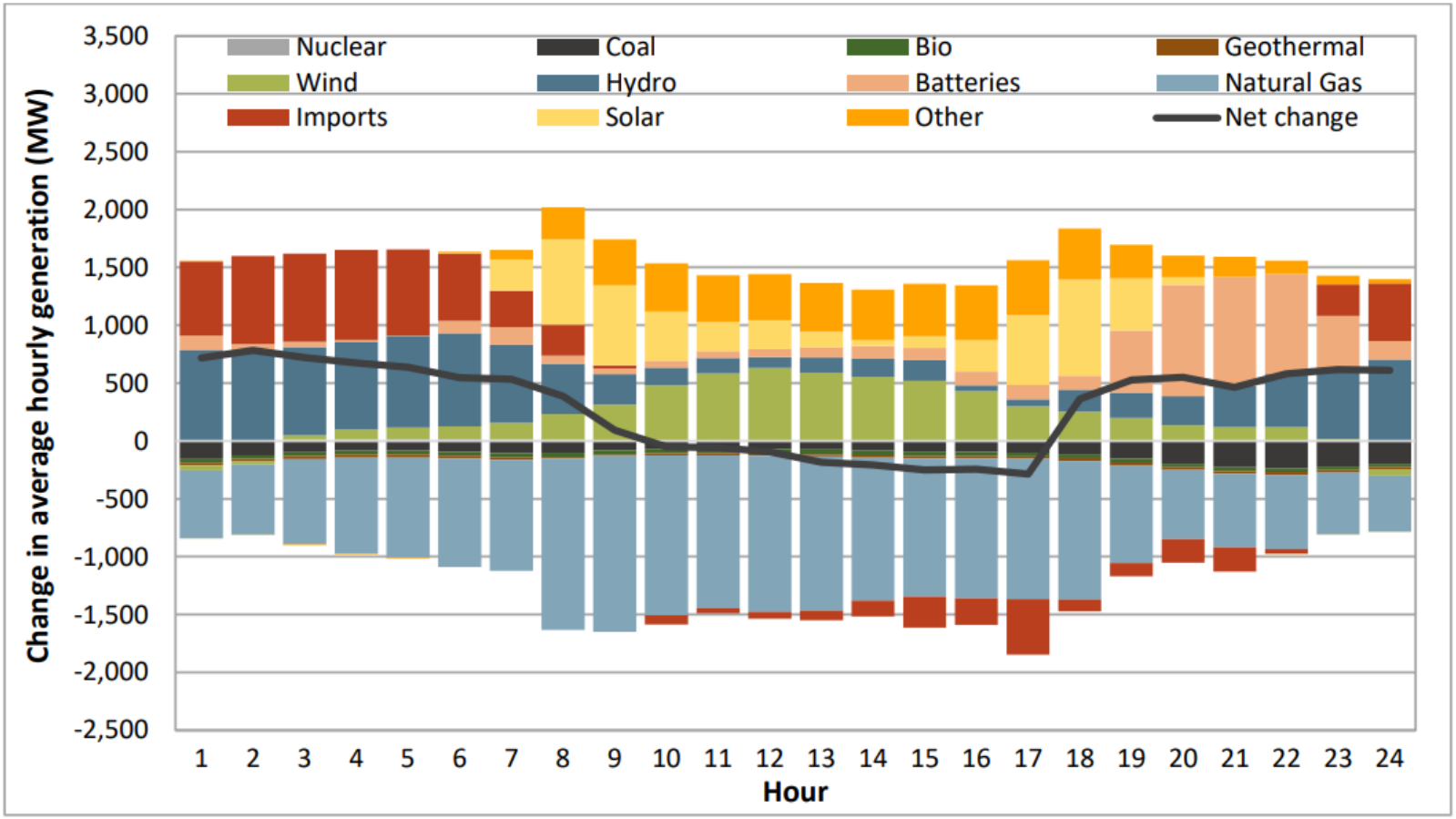
- Accuracy of forecasts
- Quality of available bids

What is the role of market products in a market with high renewable penetration?

- Imbalance Reserve Product
- Flexible Ramping Product

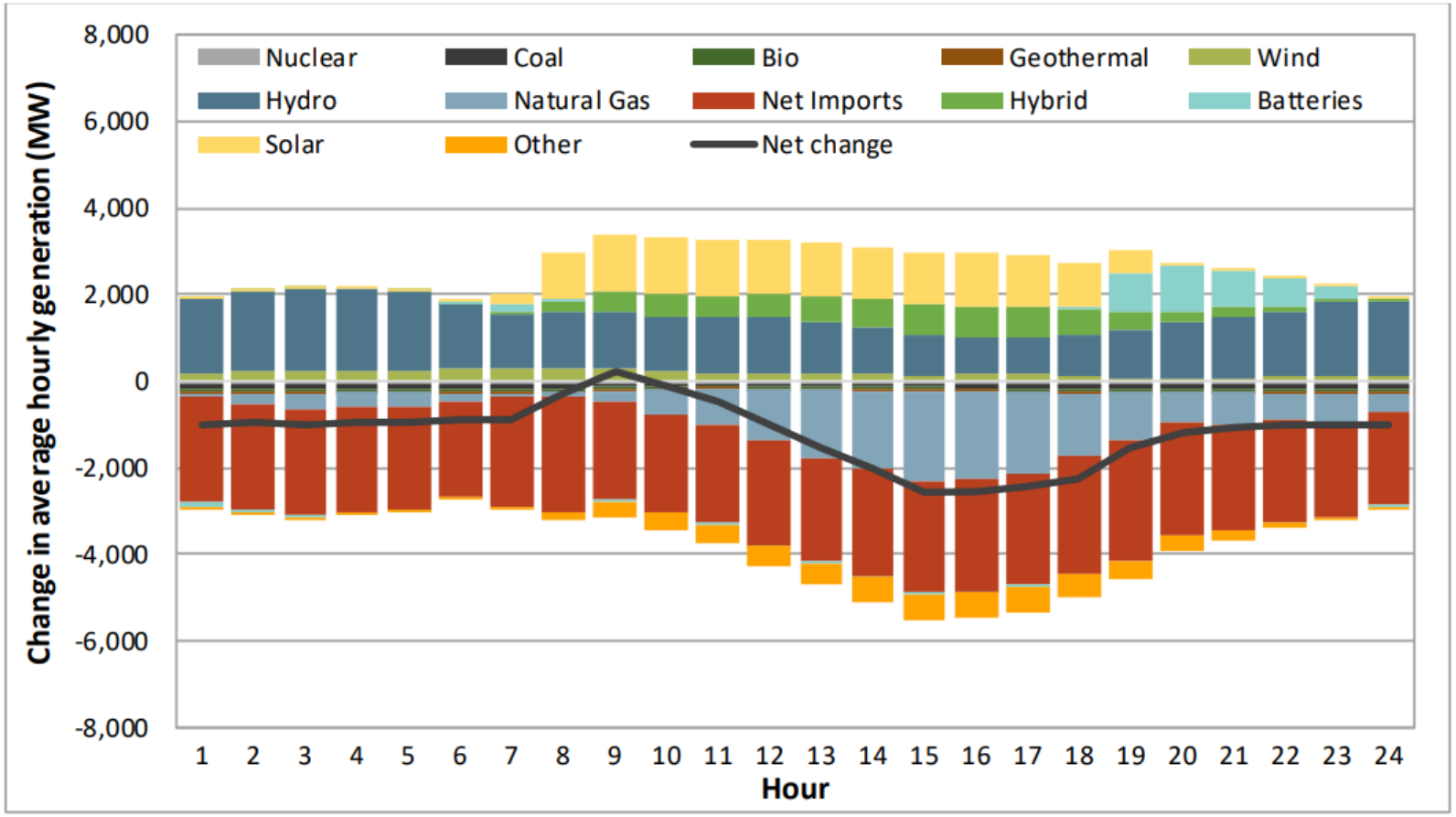
Department of Market Monitoring report on Market Issues and Performance 2022

Figure 1.6 Change in average hourly generation by fuel type (Q2 2021 to Q2 2022)



Department of Market Monitoring report on Market Issues and Performance 2023

Figure 1.4 Change in average hourly generation by fuel type (Q3 2022 to Q3 2023)



Renewable Forecasting

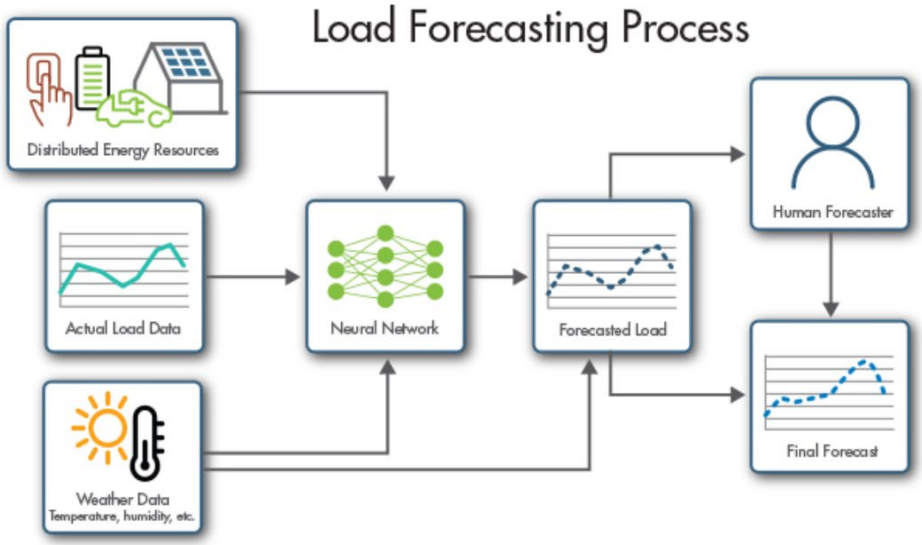
- EIM entities can use the CAISOs or their own forecasting service provider (FSP)

- Two forecast service providers each provide hourly DA forecasts for each eligible intermittent resource out 4 days
  - Updated at 5:30am and 8:45am day previous

Load Forecasting

Inputs include:

- Weather conditions like temperature and cloud cover
- Actual load information accounting for day of week, holidays
- Load reduction like BTM solar, demand response



- Configurable load forecasting platform provides hourly day ahead forecasts 4 hours to 9 days out
  - Updated at 9am day previous

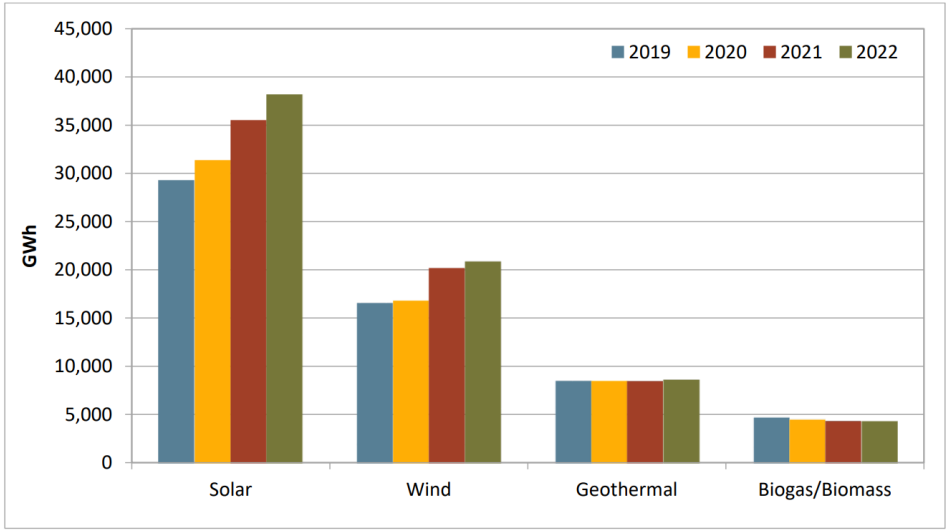
Trends in forecasting accuracy year-to-year

- Mean average percentage errors (MAPEs) are from the CAISO forecasts of CAISO resources
  - EIM entities have the option of using their own forecasts, not included in the following slides

Context:

- VER capacity has been increasing over the period shown
- What should we expect from forecasting accuracy?

Figure 1.10 Total renewable generation by type (2019–2022)

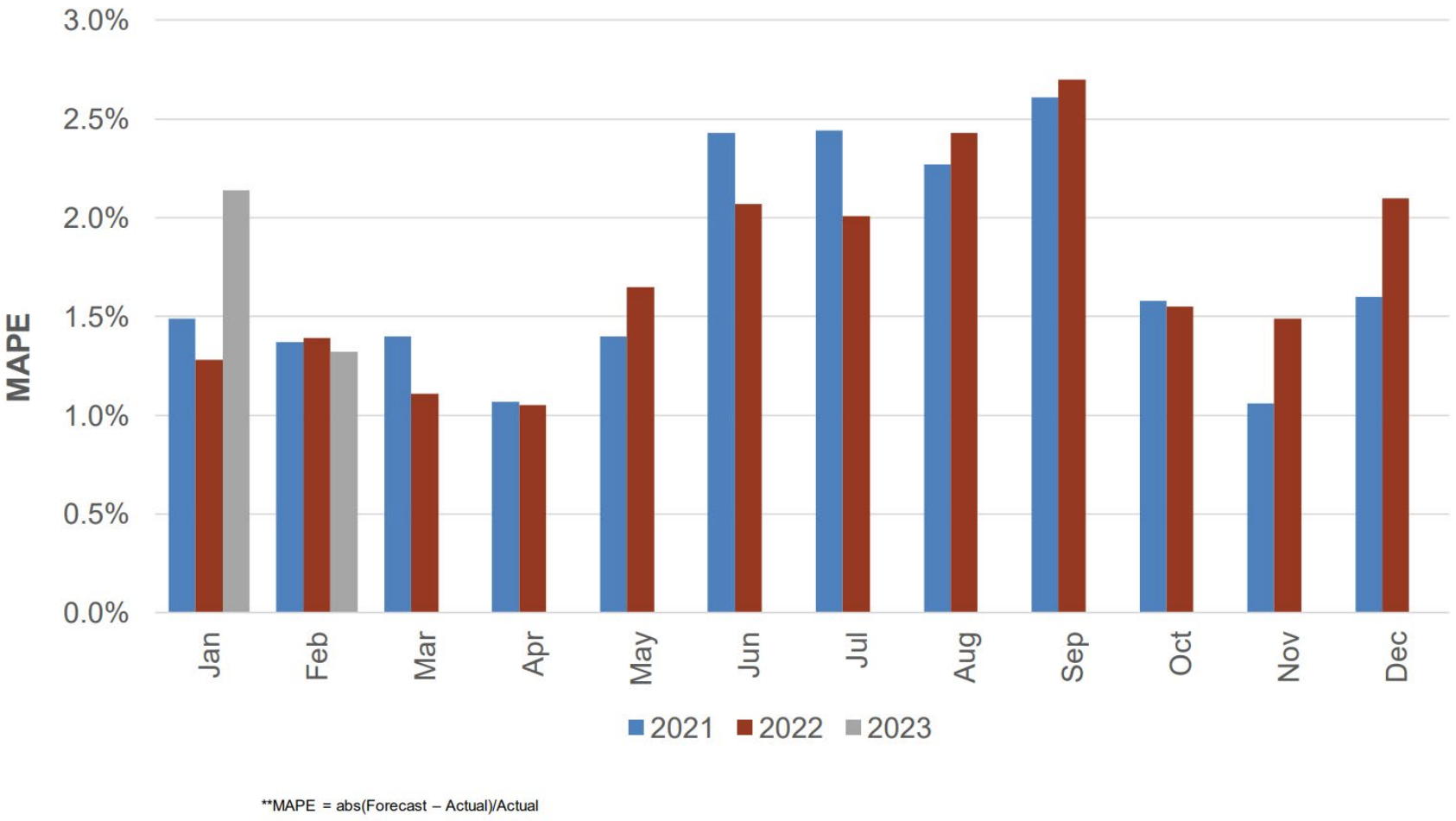


Source: 2022-Annual-Report-on-Market-Issues-and-Performance-Jul-11-2023.pdf (caiso.com)

Day-ahead peak to peak forecast accuracy

Source: https://www.caiso.com/documents/presentation-marketperformance-planningforum-sep9-2020.pdf

Day-ahead peak forecast

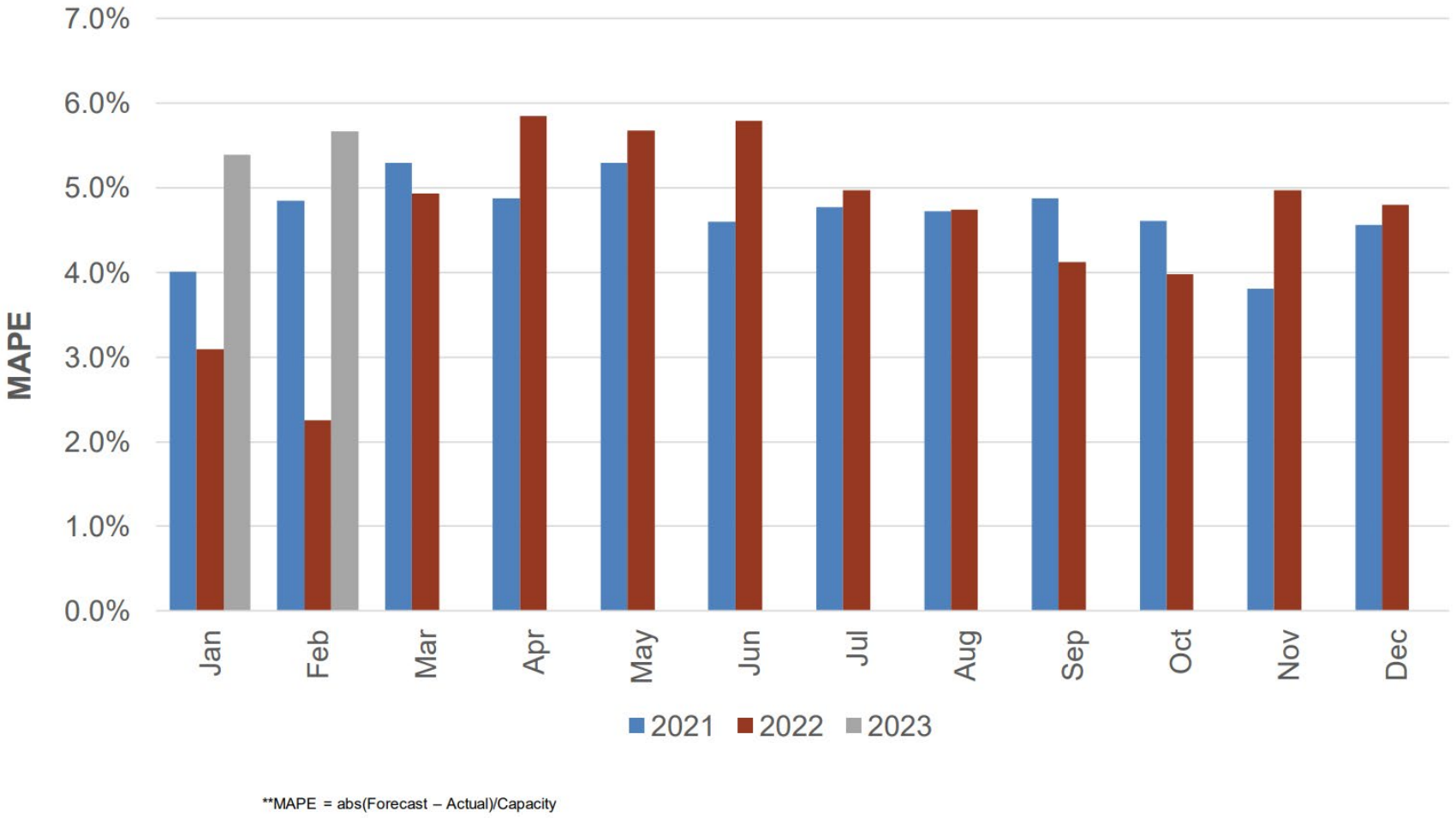


Source: https://www.caiso.com/Documents/Presentation-MarketPerformancePlanningForum-Mar16-2023.pdf

Day-ahead wind forecast

Source: https://www.caiso.com/documents/presentation-marketperformance-planningforum-sep9-2020.pdf

Day-ahead wind forecast



**MAPE = abs(Forecast – Actual)/Capacity

Source: https://www.caiso.com/Documents/Presentation-MarketPerformancePlanningForum-Mar16-2023.pdf

Day-ahead solar forecast

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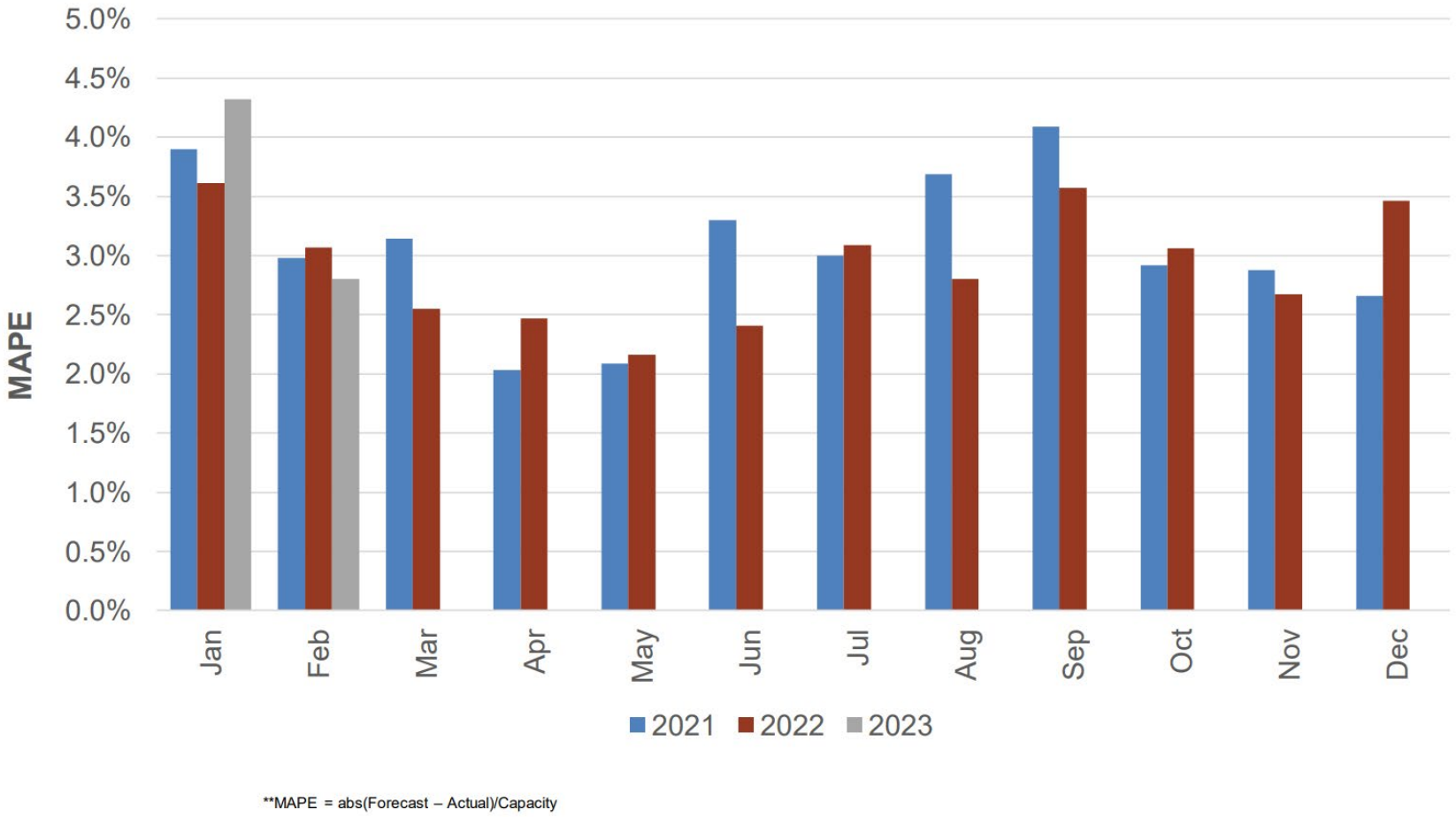
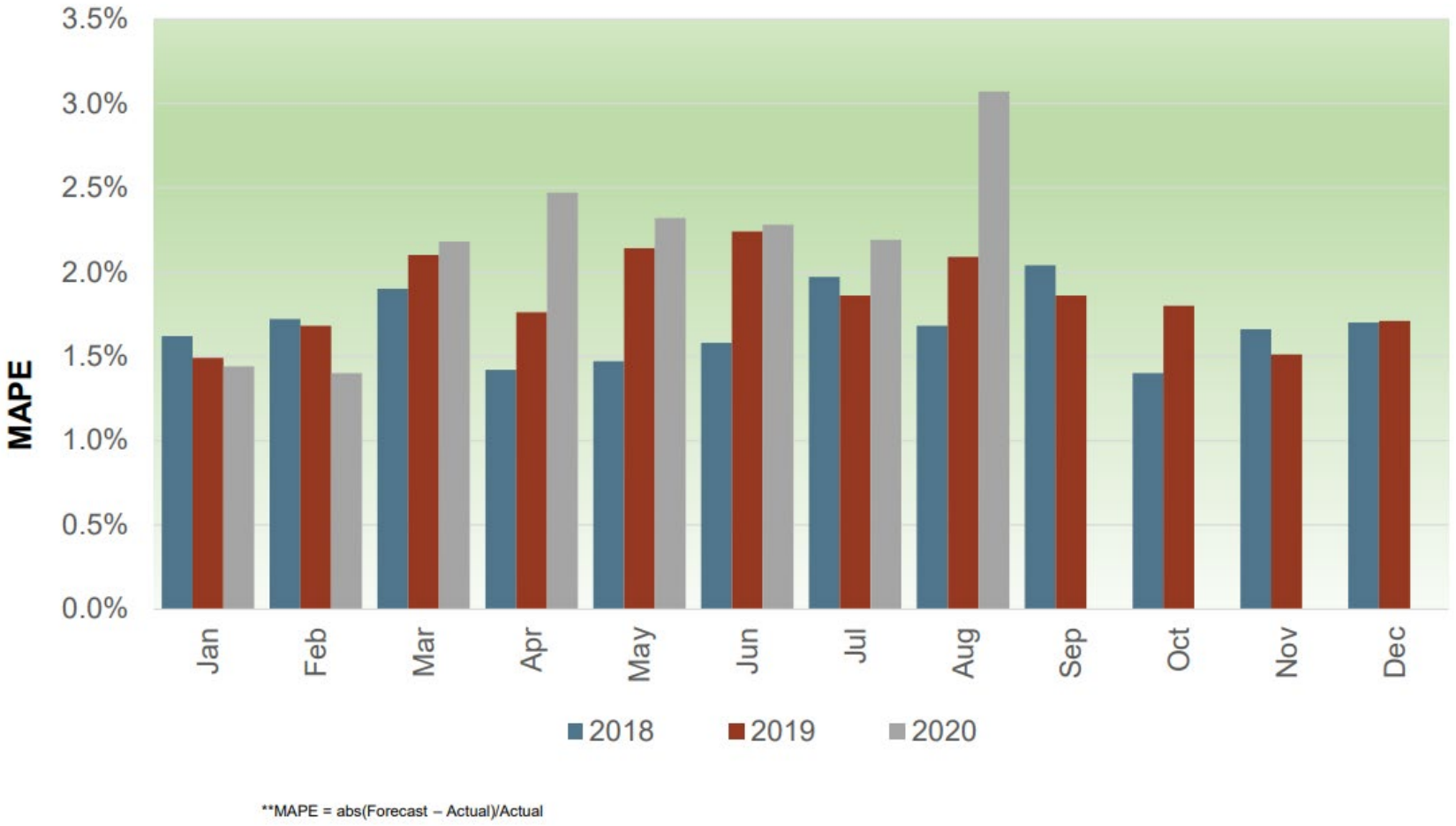


Source: https://www.caiso.com/Documents/Presentation-MarketPerformancePlanningForum-Mar16-2023.pdf

Day-ahead load forecast



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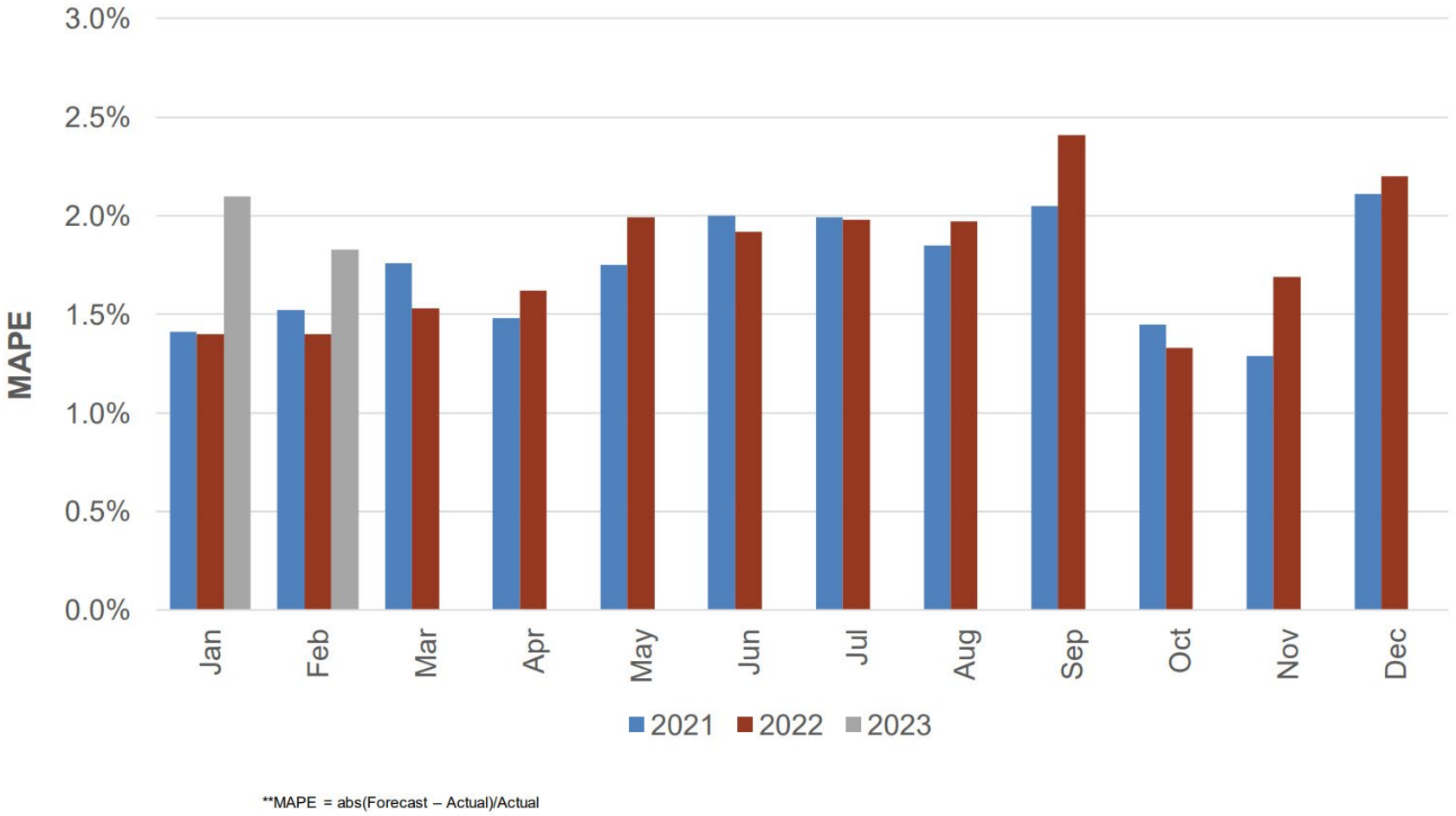
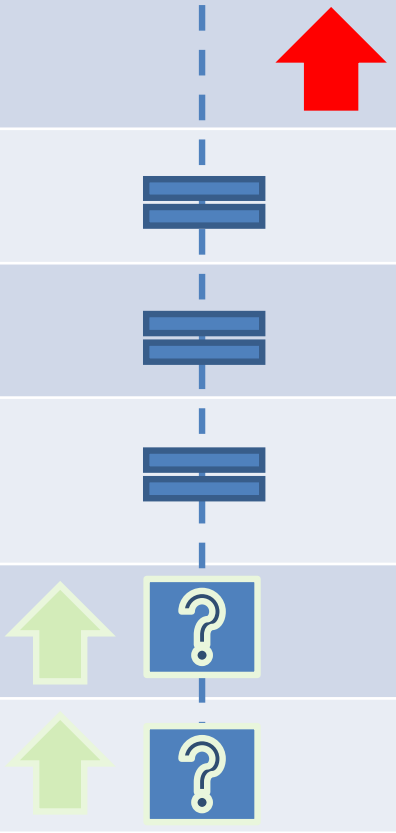
Day-ahead load forecast



**MAPE = abs(Forecast – Actual)/Actual

Source: https://www.caiso.com/Documents/Presentation-MarketPerformancePlanningForum-Mar16-2023.pdf

How does the proposed solution compare to the D+2

	Existing D+2 Advisory	Proposed 4AM Advisory
Implementation cost	Low	
Timing of information accessibility	Prior to timely trading	
Source/quality of bid information	Bids due at 10am prior to DA	
Transmission rights, transfer capability	By 8:30-9:00am	
VER Forecast Accuracy	Updated at 5:30am	
Load Forecast Accuracy	Updated at 9am	

Market products accounting for uncertainty

- Imbalance requirements
  - DA to FMM
- Flexible ramp requirements
  - FMM to RTD
- Regulation Requirements

RECOMMENDATIONS FOR POLICY DEVELOPMENT

Problem Statements

- PS1: Market participants must rely on the illiquid evening or intra-day gas cycles because they do not have their day ahead schedules in time to inform procurement during the liquid timely nomination cycles, and do not have confidence in the accuracy of information provided in the 2 day ahead advisory intended to inform procurement.

- PS2: In response to unexpected changes in real-time, stakeholders face uncertainty around cost recovery and/or may not be able to procure additional supply.

- PS3: When stakeholders increase their bid price to reflect rapid changes in gas system conditions, they risk being mitigated down to a DEB that does not accurately represent their costs.

Problem Statements continued..

- PS4: The reasonableness threshold used to asses automated reference level change requests are too low to allow resources to reflect their costs because they do not account for increasing gas price volatility
- PS5: Gas prices used to calculate commitment costs and default energy bids for HE1-HE7 do not reflect the correct gas price indices for this time period.
- PS6: The automated reference level change request process can only be submitted for one resource at a time
- PS7: Stakeholders to not have the actual gas cost information necessary to submit a manual reference level change request by the 8am deadline

Problem Statements continued…

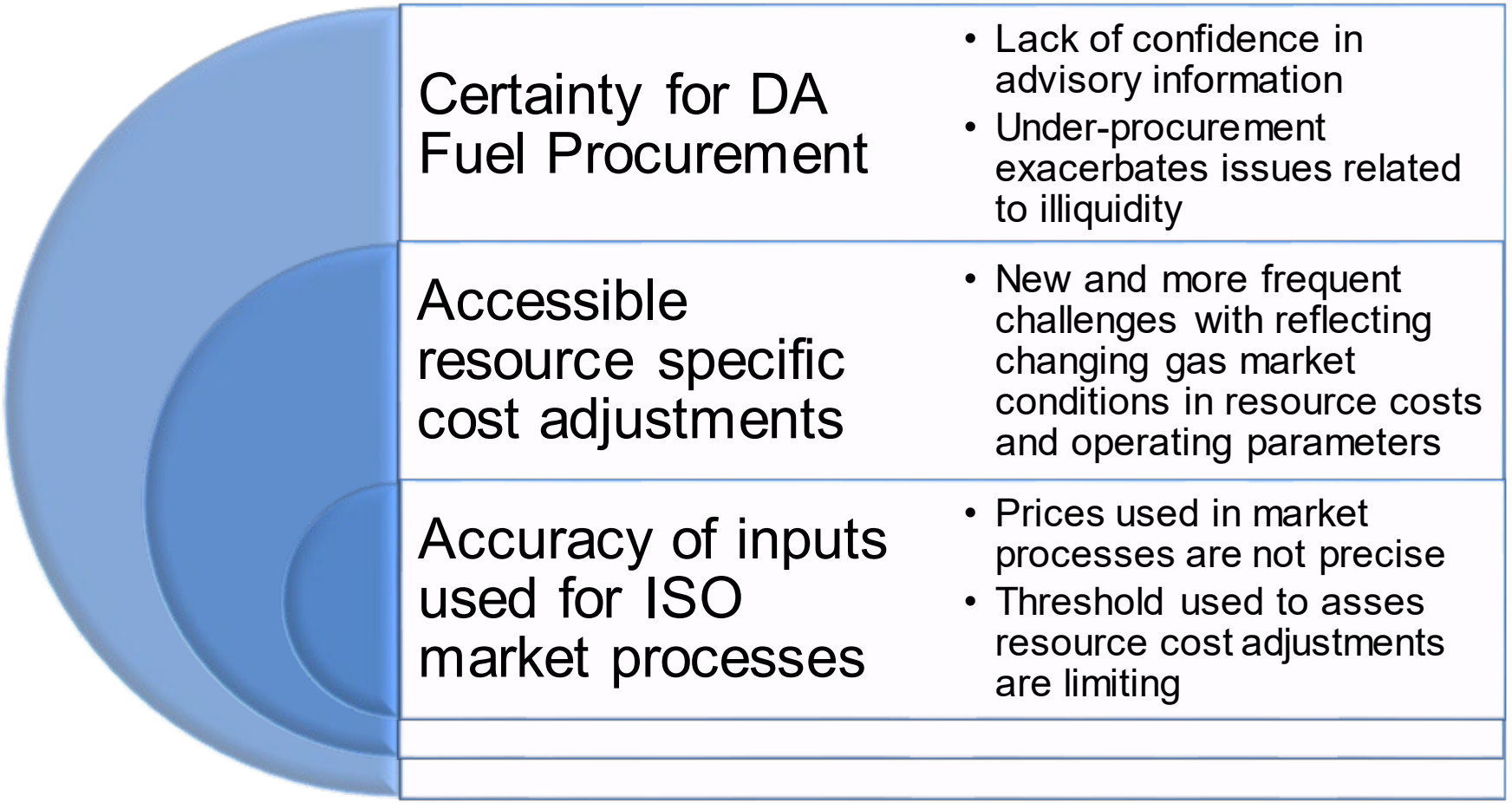
- PS8: Gas burn limitations issued by gas companies are not reflected in the market for WEIM balancing areas, leading to inaccurate commitment or infeasible dispatch instructions.

- PS 9A: When switching fuel hubs/fuel regions **in response to critical events**, generators are unable to reflect accurate costs in the market in a dynamic or timely manner.

- PS 9B: Generators that switch fuel regions **regularly** have trouble reflecting their costs accurately in the market.

- PS 10: When switching fuel types, generators are unable to reflect accurate costs and operating parameters in the market in a dynamic or timely manner

Tying it all together



Next Steps

Item	Date
Comments due on WG8	March 19, 2024
Updated discussion paper that transitions to final discussion and recommendations for policy development posted	March 20, 2024
Supporting slide deck that articulates evolution of problems discussed and associated potential solutions posted	March 20, 2024
Comments due on discussion paper and supporting slide deck	March 29, 2024

Working Group Materials

- All materials related to the Gas Resource Management working group are available on the ISO website at https://stakeholdercenter.caiso.com/StakeholderInitiatives/Gas-resource-management-working-group

- Welcome reception for all attendees the evening of Oct. 29.
- Additional information, including event registration and sponsorship opportunities, will be provided in a future notice and on the ISO's website.

Please contact Symposium Registration at **symposiumreg@caiso.com** with any questions.