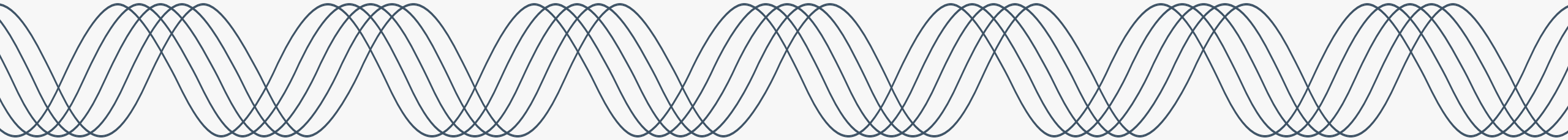
PGE CEP & IRP Roundtable 25-5

July 23rd, 2025



July 23rd, 2025 – Agenda

9:00	Welcome | Meeting Logistics
9:05	Office Hours – Clarifying Questions on the 2023 CEP/IRP Update
10:15	Request for Feedback on Assumptions for 2026 IRP/CEP Analysis
11:00	Closing Remarks | Next Steps

Meeting Details

1

Electronic version of presentation

https://portlandgeneral.com/about/who-we-are/resource-planning/combined-cep-and-irp/combined-cep-irp-public-meetings

2

Zoom meeting details

- Join Zoom Meeting https://us06web.zoom.us/j/9291862450?pwd=xVXQI4jljt7FdetDzWD0G35FFvayF8.1&omn=84372774388
- Meeting ID: 929 186 2459
- Passcode: 108198

3

Participation

- Use the raise the hand feature to let us know you have a question
- Unmute with microphone icon or *6

Meeting Logistics

Focus on Learning & Understanding

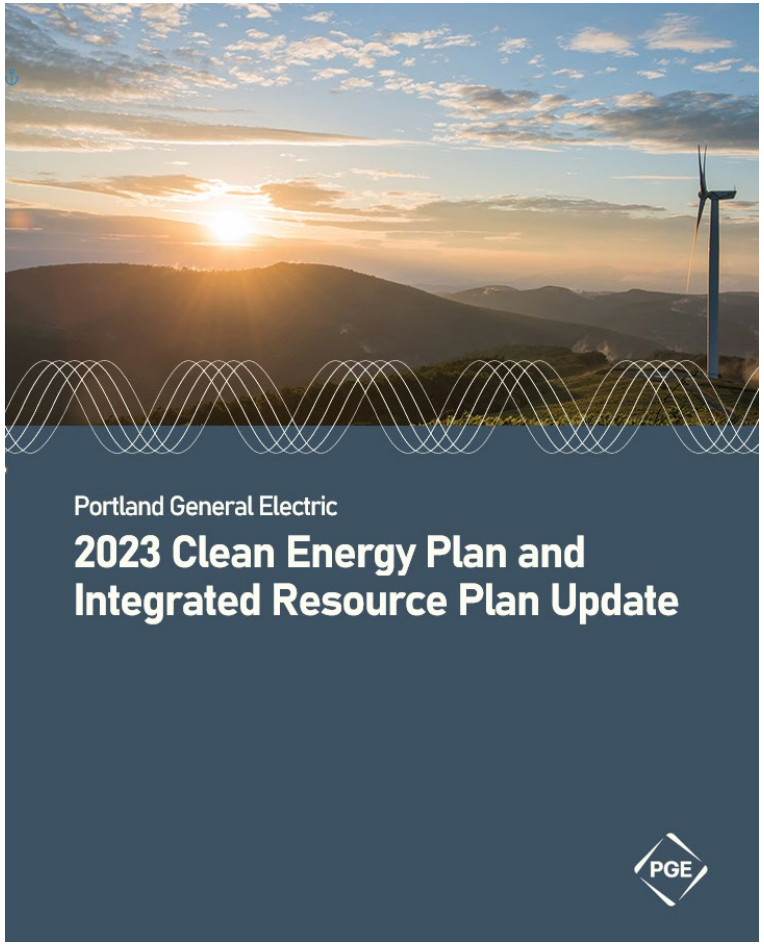
- There will be no chat feature during the meeting to streamline taking feedback
- Team members will take clarifying questions during the presentation, substantive questions will be saved for the end (time permitting)
- Attendees are encouraged to ‘raise’ their hand to ask questions

Follow Up

If we don’t have time to cover all questions, we will rely on the CEP/IRP feedback form

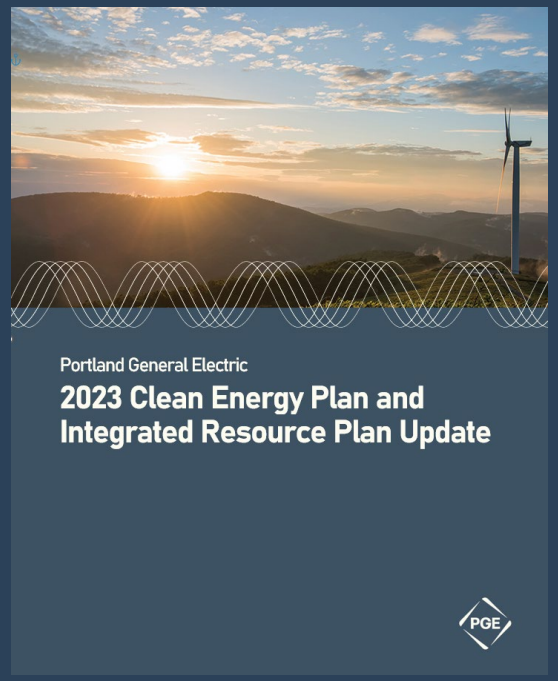
2023 CEP/ IRP Update Report Structure

Jimmy Lindsay, Director Resource Planning



Clean Energy Plan & Integrated Resource Plan

Filing the Integrated Resource Plan and Clean Energy Plan Update jointly June 18, 2024.



Report structure

7 Chapters

- Introduction
- Chapter 1. CEP Update
- Chapter 2. Planning environment
- Chapter 3. System needs
- Chapter 4. Transmission landscape
- Chapter 5. Resource options
- Chapter 6. Resource plan
- Chapter 7. Action Plan

10 Appendices

- Appendix A Federal Grant Funding
- Appendix B Sequoia methodological update
- Appendix C QF capacity update
- Appendix D Hourly emissions methodology
- Appendix E Energy Trust of Oregon (ETO)
- Appendix F Market for non-emitting energy
- Appendix G Stakeholder engagement
- Appendix H Regional planning processes
- Appendix I Inputs for state RA requirements portfolio
- Appendix J Transmission Options Study

Ch 1: Clean energy plan Update

- Chapter 1. CEP Update
  - 1.1 Overview
  - 1.2 Historical emissions trends and resource mix
  - 1.3 Pathways to emissions targets
  - 1.4 Progress in the CEP Update
    - 1.4.1 Annual goals
    - 1.4.2 GHG emissions
    - 1.4.3 GHG emissions intensity
    - 1.4.4 Average electric rates for Oregon customers
    - 1.4.5 Community impacts and benefits
  - 1.5 High-level opportunities, potential barriers, critical dependencies
  - 1.6 Acknowledged Actions, Order requirements and other updates

Chapter Highlights & Updates Following 2023 CEP/IRP

- PGE is reducing emissions and maintaining reliable service by replacing emitting generation and market purchases with non-emitting energy and capacity resources.
- Uncertainties regarding the most cost-effective path to accelerate emissions reductions have increased due to external factors such as likely changes to federal tax credits, trade policy, and more.
- Transmission solutions are integral to maintaining reliability and providing long-term pathways for decarbonized power supply.
- Updated analysis finds 2030 emissions targets can be met by technologies and resources that are currently known and commercially available, though assumed resource costs have increased and the timing of additions may be constrained.

Ch 2: Planning environment

- Chapter 2. Planning environment
  - 2.1 EPA powerplant rules
  - 2.2 Market development
    - 2.2.1 CAISO's Extended Day Ahead Market
    - 2.2.2 Western Resource Adequacy Program (WRAP)
  - 2.3 Transmission coordination
    - 2.3.1 Western Transmission Expansion Coalition (WestTEC)
  - 2.4 Semiconductor and data center growth
    - 2.4.1 General trends in electricity demand across the Western Interconnection
    - 2.4.2 Data center growth in the Pacific Northwest
    - 2.4.3 Regulatory and policy responses to large customer demand growth
  - 2.5 Federal administration changes
    - 2.5.1 Tax credit policy
    - 2.5.2 Grant Funding
    - 2.5.3 BPA

Chapter Highlights & Updates Following 2023 CEP/IRP

- On June 28th, 2024, PGE has signed an implementation agreement to join CAISO's Extended Day-Ahead Market (EDAM) with go-live scheduled for October 2026.
- PGE is currently developing regional alignment on Resource Adequacy planning standards as a precursor for a regional reliability program.
- The Western Transmission Expansion Coalition's (WestTEC) West-Wide Transmission Study Project represents a new regional effort to address transmission constraints.
- Significant expansion in expected future load growth for large industrial customers compared to the 2023 CEP/IRP assumptions.
- At the federal level, the EPA is reconsidering the powerplant emission limit final rules under Section 111 of the Clean Air Act that were established on April 25, 2024, under the previous administration.
- Congress is also actively evaluating proposals that would remove federal tax incentives for new non-emitting generation and storage resources.

Ch 3: Systems needs

- Chapter 3. System needs
  - 3.1 Econometric load forecast
    - 3.1.1 Energy forecast
      - 3.1.1.1 Energy Forecast Methodological Changes
      - 3.1.1.2 Large customer forecast
      - 3.1.1.3 Resulting Energy Forecast
      - 3.1.1.4 Energy High and Low Forecasts
      - 3.1.1.5 IRP Update Comparison to 2023 CEP/IRP
    - 3.1.2 Seasonal peak demand forecast
      - 3.1.2.1 Peak Forecast Methodological Changes
      - 3.1.2.2 Resulting Peak Forecast
      - 3.1.2.3 Peak High and Low Forecasts
      - 3.1.2.4 IRP Update Comparison to Previous Filings
    - 3.1.3 Load forecasts – excluding large customer load
      - 3.1.3.1 Methodology: Excluding load from large customers
      - 3.1.3.2 Resulting forecast – excluding large customer load
  - 3.2 2023 RFP results
    - 3.2.1 Target and need
    - 3.2.2 2023 RFP proxy
  - 3.3 Energy need
  - 3.4 Capacity need
    - 3.4.1 Seasonal need – reference case
    - 3.4.2 Changes to modeling capacity need
      - 3.4.2.1 Updated analysis period
      - 3.4.2.2 Load forecast updates
      - 3.4.2.3 Supply-side updates
    - 3.4.3 Capacity need under different futures
  - 3.5 State policy requirements
    - 3.5.1 HB 2021
    - 3.5.2 RPS obligation
    - 3.5.3 Small scale renewables standard

Chapter Highlights & Updates Following 2023 CEP/IRP

- Twenty-year average annual growth rates are estimated at 2.8 percent annually, a 1.2 percentage point increase from the 2023 CEP/IRP Addendum forecast. Growth is driven primarily by unprecedented industrial sector expansion, especially in semiconductor manufacturing and data centers.
- Resources assumed to be added following the conclusion of the 2023 RFP reduce long term capacity needs and make important contributions to addressing near-term capacity deficits.
- PGE continues to procure resources as part of the 2025 RFP. Such resource additions are likely to enter the system approximately 2029, limiting near-term emissions reductions.
- Monthly assessment of PGE's long-term energy need increases resource need relative to annual energy accounting.



Ch 4: Transmission landscape

Chapter Highlights & Updates Following 2023 CEP/IRP

- PGE's transmission system is highly constrained, with limited capacity for new resources—especially on BPA's system—until upgrades occur.
- Since August 2023, the North of Pearl (NOPE) flowgate has posed major operational challenges, requiring multiple reliability projects to address rising south-to-north power flows.
- Transmission is essential for accessing diverse generation outside PGE's territory; several projects are underway to connect to new renewable resources.

Ch 5: Resource options

Chapter Highlights & Updates Following 2023 CEP/IRP

- Resource costs have risen, mainly due to fixed costs, with varying benefits across energy, capacity, and storage; potential tax credit reductions are also analyzed.
- Including non-cost-effective DERs helps assess their future role in a decarbonized grid.
- Community Benefit Indicators (CBI) assumptions were refined to reflect stakeholder input and now include measurable metrics for resilience, health, environment, equity, and economic impact.

Ch 6: Resource plan

- Chapter 6. Resource plan
  - 6.1 Portfolio analysis design and scoring
    - 6.1.1 GHG emissions
    - 6.1.2 Energy need
    - 6.1.3 Capacity need
    - 6.1.4 Resource availability
    - 6.1.5 Transmission constraints and options
    - 6.1.6 Portfolio scoring
  - 6.2 Preferred Portfolio
    - 6.2.1 Yearly cost estimates
    - 6.2.2 Hourly energy and emissions accounting results
    - 6.2.3 Preferred Portfolio resource adequacy testing
  - 6.3 Portfolio sensitivities
    - 6.3.1 Reliability needs only
    - 6.3.2 Further Reliability need sensitivities
    - 6.3.3 Large industrial customer growth
    - 6.3.4 Market scenarios
    - 6.3.5 State RA requirements
    - 6.3.6 Resource Community Benefits Indicator (rCBI)
    - 6.3.7 Absence of non-emitting market
  - 6.4 Small scale renewables plan
    - 6.4.1 SSR needs assessment
      - 6.4.2 Contributions from baseline resource acquisition
      - 6.4.3 Remaining SSR need
    - 6.4.4 SSR compliance cost assessment
    - 6.4.5 SSR acquisition strategy
  - 6.5 Portfolio CBIs
  - 6.6 Federal tax credit availability scenarios
  - 6.7 Net cost of capacity resources

Chapter Highlights & Updates Following 2023 CEP/IRP

- The updated Preferred Portfolio meets HB 2021 targets through the 20-yr planning horizon with a least-cost, least-risk mix: 1,362 MW wind, 1,089 MW solar, 1,750 MW storage, and 155 MW CBRE by 2030.
- Hourly emissions analysis shows compliance with the 2030 emission target, with thermal use concentrated in winter.
- Winter adequacy challenges highlight the need for substantial storage and better long-term capacity resources suited for cold-season demand.

Ch 7: Action Plan

- Chapter 7. Action Plan
  - 7.1 Action Plan
    - 7.1.1 Customer resource action
    - 7.1.2 CBRE action
    - 7.1.3 Energy action
    - 7.1.4 Capacity action
    - 7.1.5 Transmission expansion action
  - 7.2 Conclusion

Chapter Highlights & Updates Following 2023 CEP/IRP

- PGE is not requesting Oregon Public Utility Commission acknowledgement of this IRP Update and is therefore maintaining its Action Plan that was acknowledged as part of the 2023 CEP/IRP.
- The acknowledged Action Plan continues to represent the best combination of cost, risk, community benefit, and emission reductions to guide near-term energy and capacity actions.
- PGE continues to identify the need for more RFPs to procure additional resources for resource adequacy, reliability, and compliance with HB 2021 emissions reduction targets.
- Updated analysis described in this Update suggests resource need has increased.



Questions

2026 CEP/IRP and Future Planning

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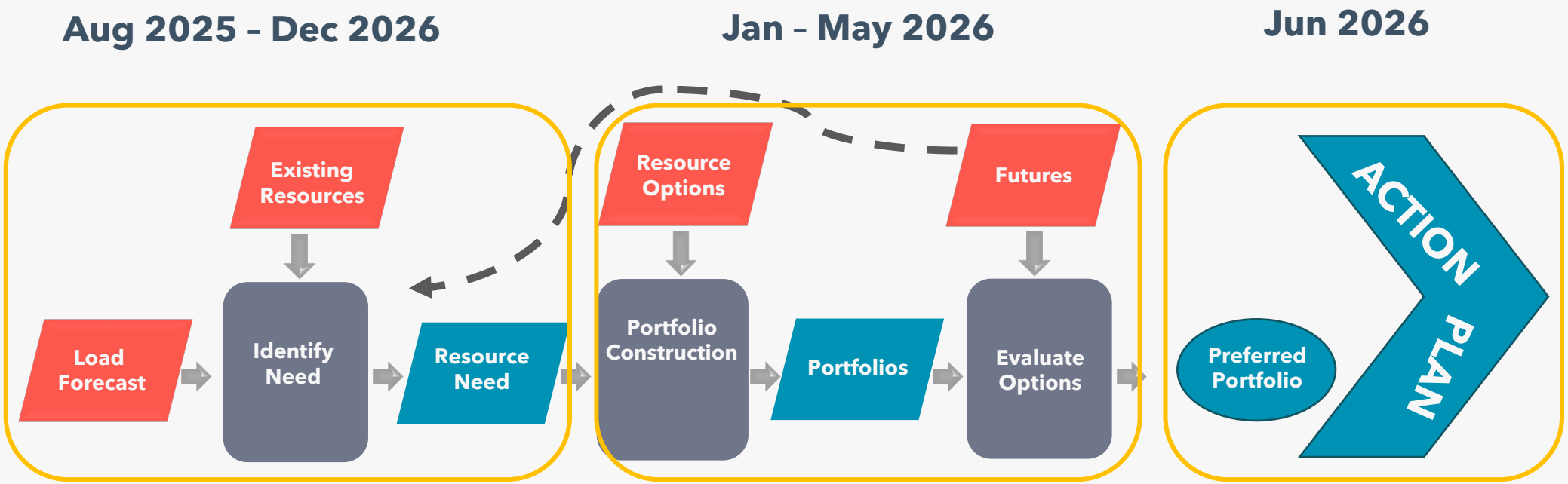
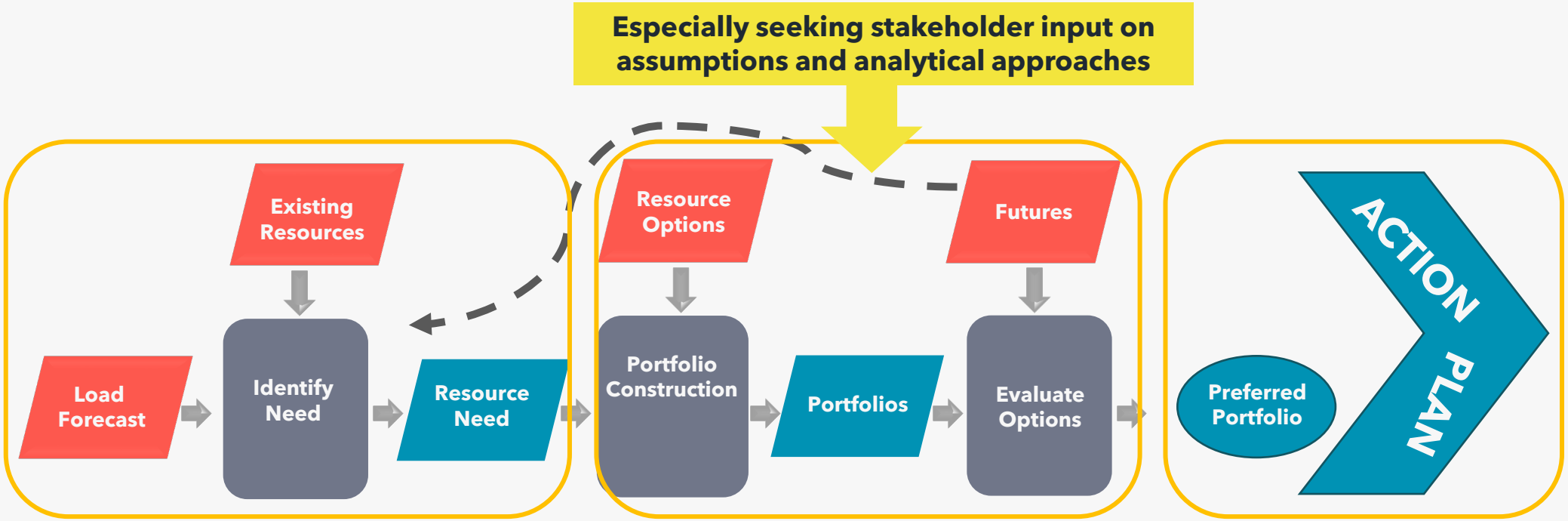
IRP Analysis Process and High-Level Schedule



Key Areas for Stakeholder Feedback



- **Opening the floor today at the beginning of this process**
- **Future roundtables will also seek feedback in a more targeted way**

Whiteboard Questions to Guide the Feedback – Share your feedback via this Form

Resource Need

What do you think are the most important drivers of resource need?

Resource Options

- Compared to the 2023 IRP and IRP Update, what other resource options (transmission, supply-side, demand-side) do you think should be analyzed?
- Can you recommend sources for resource information (costs, parameters, etc.) that PGE should consider using for the next IRP?

Price Futures

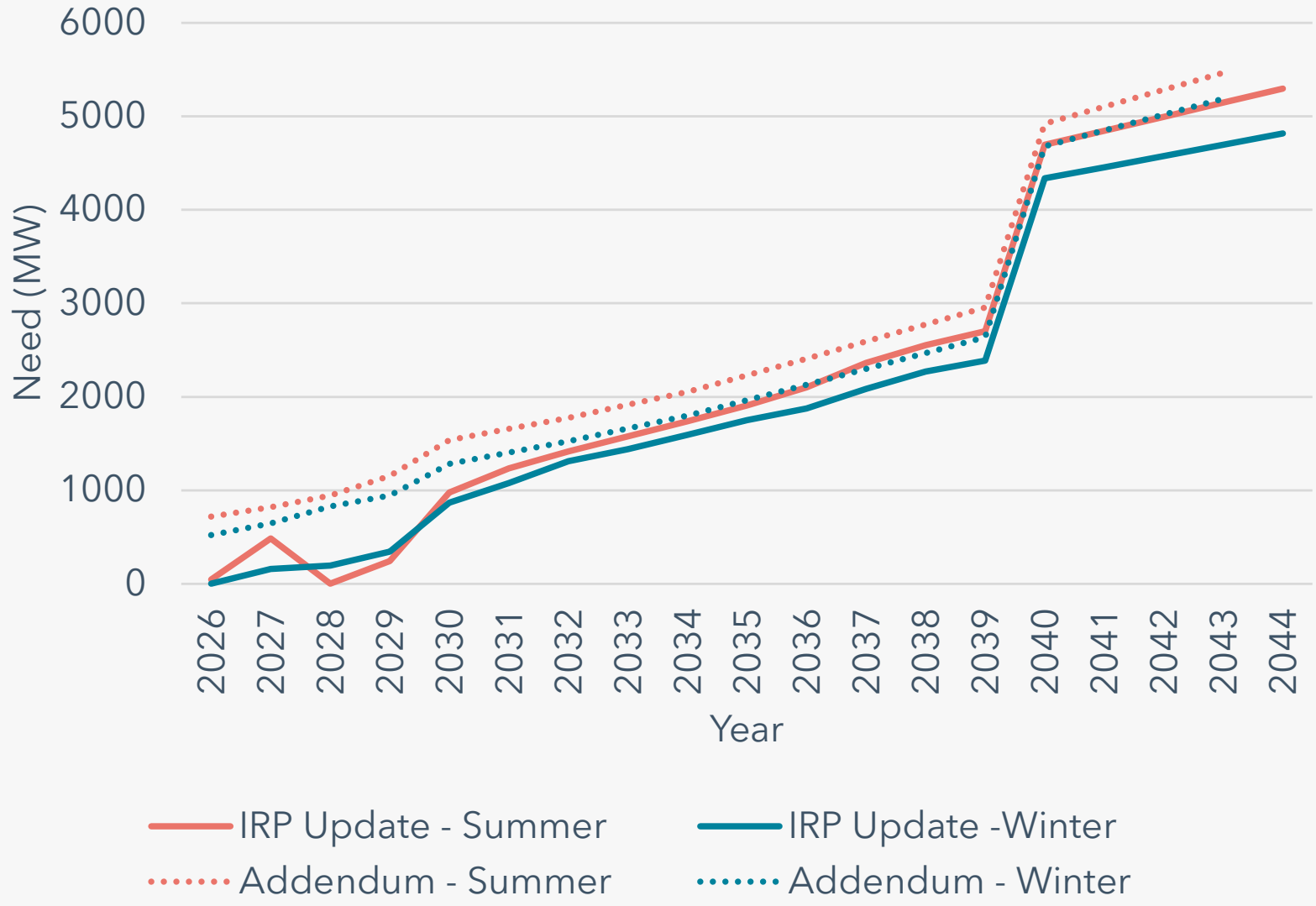
- What 2 future uncertainties do you think are most important in IRP analysis (commitment uncertainty, hydro conditions, natural gas volatility and carbon pricing, or otherwise)
  ✓Each user gets 2 icons to vote
- Share resources (data, reports) here that PGE should consider to inform future uncertainties analysis focused on price futures, or more broadly.
  ✓Buckets for each topic

Portfolios

- What kinds of portfolios/scenarios do you want to see analyzed in the IRP? e.g,. alt. decarbonization pathways, federal/state policies under consideration, etc.
- Do you think refinements should be made to the portfolio scoring metrics that determine the Preferred Portfolio? If so, what?

Resource Options

Resource Needs



Resource Options

Resource Options

Select topic areas shown; we want to hear what matters to you

Renewables	Supply-side: Utility-scale wind, solar, etc., have been analyzed in the past
Storage	Supply-side: Focus has been on battery storage, increasing interest in longer duration
CBRE and SSR	Community-sited and small-scale renewables
Transmission	Transmission expansion and upgrades
EE and DR	Customer- and Demand-side: energy efficiency and demand response
Emerging Technologies	Usually longer-term options / not within the Action Plan timeframe

Key Considerations:

- HB 2021: GHG emissions reductions, community benefits
- Data availability
  - Costs and trajectories
  - Operating parameters
  - Commercialization
- Uncertainty ranges
- Timeframe until filing

Futures

Price Futures

Select topic areas shown; we want to hear what matters to you

Embedded in Price Futures

Hydro Conditions	High, low and reference case hydro conditions.
Carbon Pricing	Reference and low carbon prices for California and Washington State.
Natural Gas Volatility	High, low and reference natural gas price forecasts.
Commitment Uncertainty	Startup cost included in marginal pricing, net load uncertainty.
Market Clean Energy	Market *Clean Energy Surplus (CES)**, Market Price *Premium for Clean (PfC)**

Key Considerations:

- Balancing cost and risk
- HB 2021: GHG emissions reductions, community benefits
- Data availability
- Uncertainty ranges
- Effect of optimization modeling
- Timeframe until filing

*CES and PfC estimated in the 2024 Brattle Study for PGE's 2023 CEP/IRP Update

Portfolios

Select topic areas shown; we want to hear what matters to you

Scenarios / Sensitivities	Test alternative assumptions to capture uncertainty across key future planning outcomes
Decarbonization Glidepath	Relationship of rate of emissions reduction to serve retail load, cost, and risk
Federal Policies	Power plant GHG emissions regulations, NAAQS, tax credits, tariffs
Targeted Policy	To inform stakeholder discussions on specific policy questions
Scoring Metrics	Combines traditional cost and risk metrics (cost, variability, severity) while considering non-traditional metrics to assess additional risks

Key Considerations:

- Balancing cost and risk
- HB 2021: GHG emissions reductions, community benefits
- Data availability
- Uncertainty ranges
- Effect of optimization modeling
- Timeframe until filing

Other Jurisdictions Resources Recommendations to Review

NEXT STEPS

A recording from today's webinar will be available on our website in one week

Upcoming Roundtable: September 3rd, 2025

Thank you

Contact us at
IRP.CEP@PGN.COM

An

kind of energy

ACRONYMS

ARIMA: autoregressive integrated moving average
ART: annual revenue-requirement tool
ATC available transfer capability
BPA: Bonneville Power Administration
C&I: commercial and industrial
CBI: community benefit indicators
CBIAG: community benefits and impacts advisory group
CBRE: community based renewable energy
CDD: colling degree day
CEC: California energy commission
CEP: clean energy plan
CF conditional firm
DC: direct current
DER: distributed energy resource
DR: demand response
DSP: distribution system plan
EE: energy efficiency
ELCC: effective load carrying capacity
EJ: environmental justice
ETO: energy trust of Oregon
EUI: energy use intensity
GHG: greenhouse gas
HB2021: House Bill 2021
HDD: heating degree day
HVDC: high-voltage direct current
IE: independent evaluator
IOU: investor-owned utilities
ITE: information technology equipment
ITC: investment tax credit
kW: kilowatt
LOLH: loss of load hours
LT/ST: long term/ short term
LTF long-term firm
MW: megawatt
MWa: mega watt average
NAICS: North American industry classification system
NCE: non-cost effective
NG: natural gas
NPVRR: net present value revenue requirement
OASIS Open Access Same Time Information System
ODOE: Oregon department of energy
PPA: power purchase agreement
PSH: pumped storage hydro
PUC: public utility commission
PURPA: Public Utility Regulatory Policies Act
PV: photovoltaic
REC: renewable energy credit
RLRR: low carbon price future
ROSE-E: resource option strategy engine
RPS: renewable portfolio standard
RRRR: reference case price future
RTO: regional transmission organization
SoA: South of Allston
T&D: transmission and distribution
TSR: transmission service request
TSEP: TSR study and expansion process
Tx: transmission
UPC: usage per customer
UPS: uninterruptible power supply
VER: variable energy resources
VPP: virtual power plant
WECC: western electricity coordinating council