2023 Integrated Resource Plan Public-Input Meeting February 23, 2023




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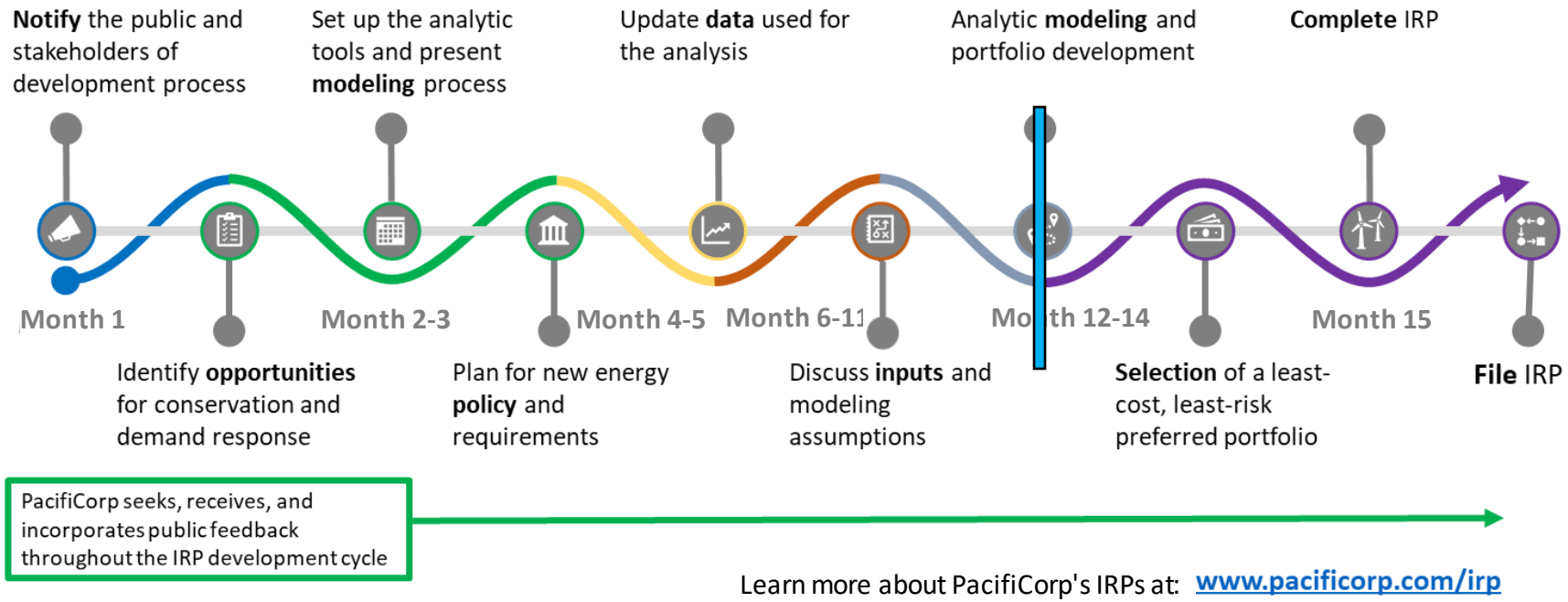
Agenda

- This is a **RECORDED MEETING**
- Approximate times shown in Pacific time zone

- Introduction
- Expanded Public Comment Opportunities
- Energy Efficiency Bundling
- Modeling Updates
- Lunch (45 minutes)
- Forward Price Curve Updates
- Stakeholder Feedback Update
- Next Steps

Overview of PacifiCorp's IRP Development Process



Learn more about PacifiCorp's IRPs at: www.pacificorp.com/irp

Status Update

2023 IRP Upcoming Public Input Meeting Date(s)
February 25, 2022 - Public Input Meeting 1
April 7, 2022 - Public Input Meeting 2
May 12, 2022 - Public Input Meeting 3
June 10, 2022 - Public Input Meeting 4
July 14, 2022 - Public Input Meeting 5
September 1-2, 2022 - Public Input Meeting 6
October 13-14, 2022 - Public Input Meeting 7
December 1, 2022 - Public Input Meeting 8
January 12-13, 2023 - Public Input Meeting 9
February 23, 2023 - Public Input Meeting 10

Expanded Public Comment Opportunities

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Scheduling Updates

- Extended process following March 31st filing
  - Public comments to be submitted from April 1st-30th
  - Addendum changes will be made from May 1st-31st, filing June 1st
- State-specific topics will be addressed at separate meetings:
  - IRP Public Input Meeting-February 23, 2023
  - Oregon Clean Energy Plan Meeting-February 24, 2023

Energy Efficiency Bundling




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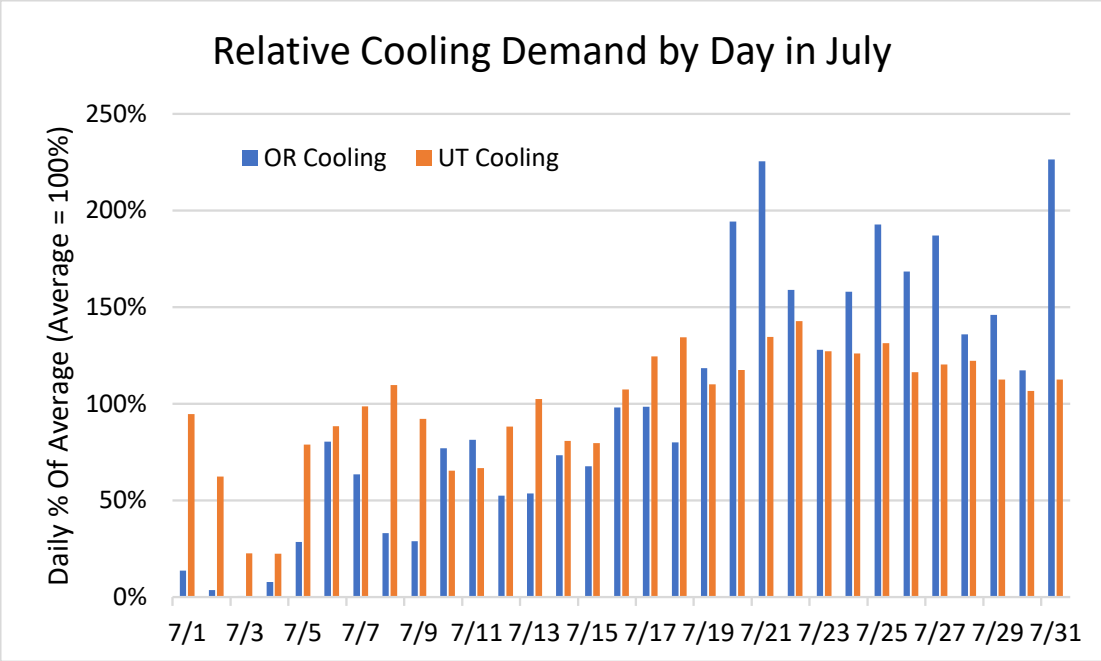
Energy Efficiency Bundling

- The goal of energy efficiency bundling:
  - Distill thousands of potential measures into a manageable set of modeling inputs, while retaining differentiation to capture both benefits and costs.
- We want the model to be able to select the best available energy efficiency, without measures that are not suited to the need or significantly more expensive relative to their benefits.
- With regard to the need, for the 2023 IRP, energy efficiency is first classified into one of four categories:

	Temperature-Dependence	
Season	Cooling	Summer
	Heating	Winter

Temperature-Dependent Measures

- Examples: air conditioning, heat pumps, insulation.
- Savings proportionate to temperature-sensitive load forecasted for each state.
- The day with the highest temperature will have the highest temperature-sensitive demand.
- Higher savings when temperatures are high in summer or low in winter
- Values shown are relative, not total savings potential
- Utah temperatures are more consistently high, so less variation, peak is 43% higher than average.
- Oregon has many mild days in the summer, peak is 126% higher than the average (more than double)



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Classifying and Bundling

Classifying:

- Measures are classified as temperature-dependent if at least 25% of their savings are from temperature-dependent end uses.
- Measures with both heating and cooling are classified based on whichever has greater volume.
- Measures that aren't temperature dependent are classified for whichever season has a higher capacity contribution.

Bundling:

- As in the 2021 IRP, measures are ranked on Net Cost of Capacity (per kW-yr):

  *= (LCOE - Energy Value) * (Load Factor * Hrs/yr) / Cap. Contrib. / (kW/MW)*

- A lower net cost of capacity can come from:
  - Energy Value: higher savings during high-price conditions (like summer evenings);
  - Capacity Contribution: higher savings during hours with potential reliability conditions; or
  - Levelized Cost of Energy (LCOE): lower measure costs.

Bundles

- PacifiCorp's models are configured for 28 energy efficiency bundles, one of which is reserved for home energy reports.
- There is little need to differentiate bundles that will provide value in nearly all conditions. Measures with a net cost less than zero have energy benefits that exceed their costs, such that their capacity value (reliability benefits) are "free".
  - These are separated into two bundles, temperature-dependent and non-temperature dependent, and represent roughly half of the total potential.
- Roughly equal volumes are spread among the remaining 25 bundles, the number of each type varies by state depending on the potential in each.
- Successive bundles in each category have measures with a higher and higher net cost of capacity.

State	HER	Zero	Cool	Heat	Summer	Winter	Total
CA	1	2	7	5	3	10	28
OR	1	2	7	11	0	7	28
WA	1	2	7	6	1	11	28
UT	1	2	12	6	1	6	28
ID	1	2	8	9	2	6	28
WY	1	2	8	3	1	13	28

Modeling Updates




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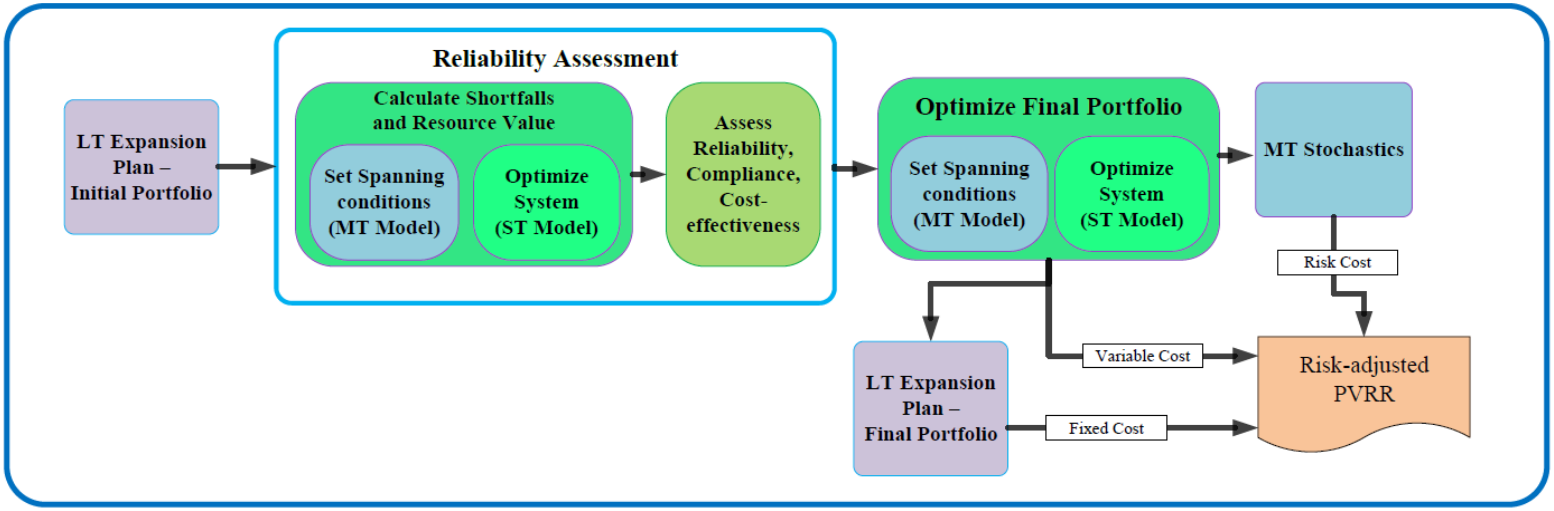
Reliability Assessment Updated Reporting



- The assessment step includes consideration of:
  - Reliability
  - Compliance
  - Cost-effectiveness
- Resources are evaluated based on model results
- Not restricted to any subset of technologies
- Data used for evaluation and selections for each portfolio will be reported

Shared Interconnection and Energy Storage

- Resources can share a single interconnection: either as a hybrid (multiple technologies added at the same time), or as surplus (new technology added to an existing resource)
- On 12/30/22, PacifiCorp filed with FERC (docket ER23-754) to request that energy storage resources be allowed to interconnect and operate subject to pre-defined operating conditions, which may reduce transmission upgrades for these resources. This docket is pending. https://www.oasis.oati.com/woa/docs/PPW/PPWdocs/Energy_Storage_Resources_Study_Assumptions_ER23-754_Complete_File.pdf
- In light of the above, for the 2023 IRP:
  - New resources can be "hybrid", and combined subject to an aggregate hourly generation limit for their location.
  - Existing thermal resources are eligible for surplus interconnection, and can be combined with new resources subject to an hourly generation limit.
  - Energy storage is not subject to interconnection limits: this represents opportunities for surplus interconnection at existing facilities and the potential results of the pending energy storage study changes.

Cluster 2 Transmission Options

- Transmission upgrade options were presented at the Oct. 13, 2022 public input meeting.
- Cluster 2 interconnection study results were posted in November 2022 and summarized at the Dec. 1, 2022 public input meeting.
- For the 2023 IRP, only Cluster 2 options available through 2028 were added, as shown in the table.
- Previously identified long-term options remain unchanged.
- To accommodate growing load and resource needs, starting in 2033, transmission can be selected on a partial basis and/or multiple times.

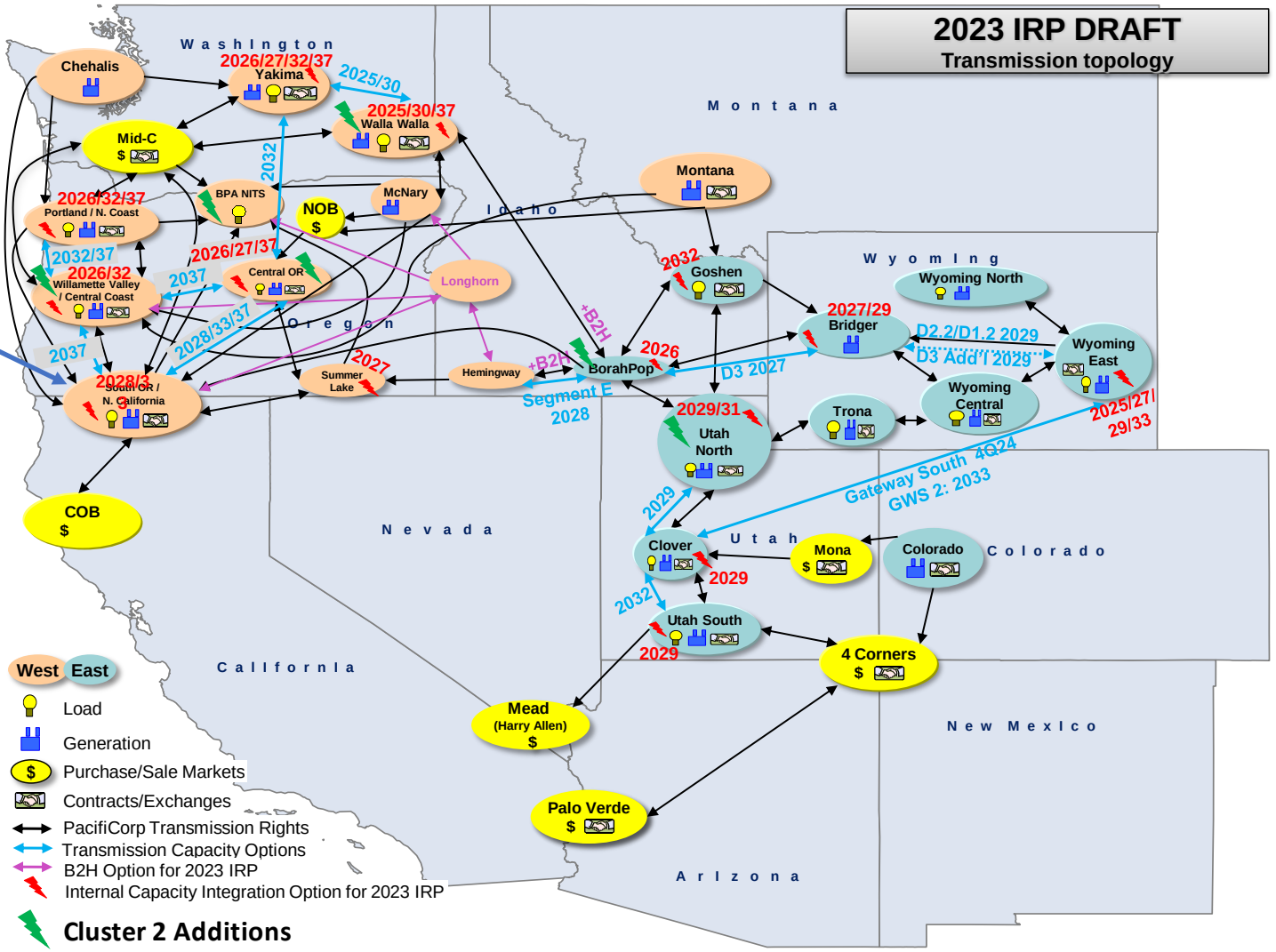
Cluster 2 Area	Location	Year	Capacity (MW)
5	Borah	2026	1100
8	Utah North	2028	2358
10	Utah North	2026	20
11	Utah North	2026	20
15	Walla Walla	2027	733
18	Central Oregon	2028	2024
21	BPA NITS	2026	160
22	Willamette Valley	2025	9
23	Willamette Valley	2026	719

2023 IRP Transmission Options

Multiple dates indicate multiple upgrade options in an area.

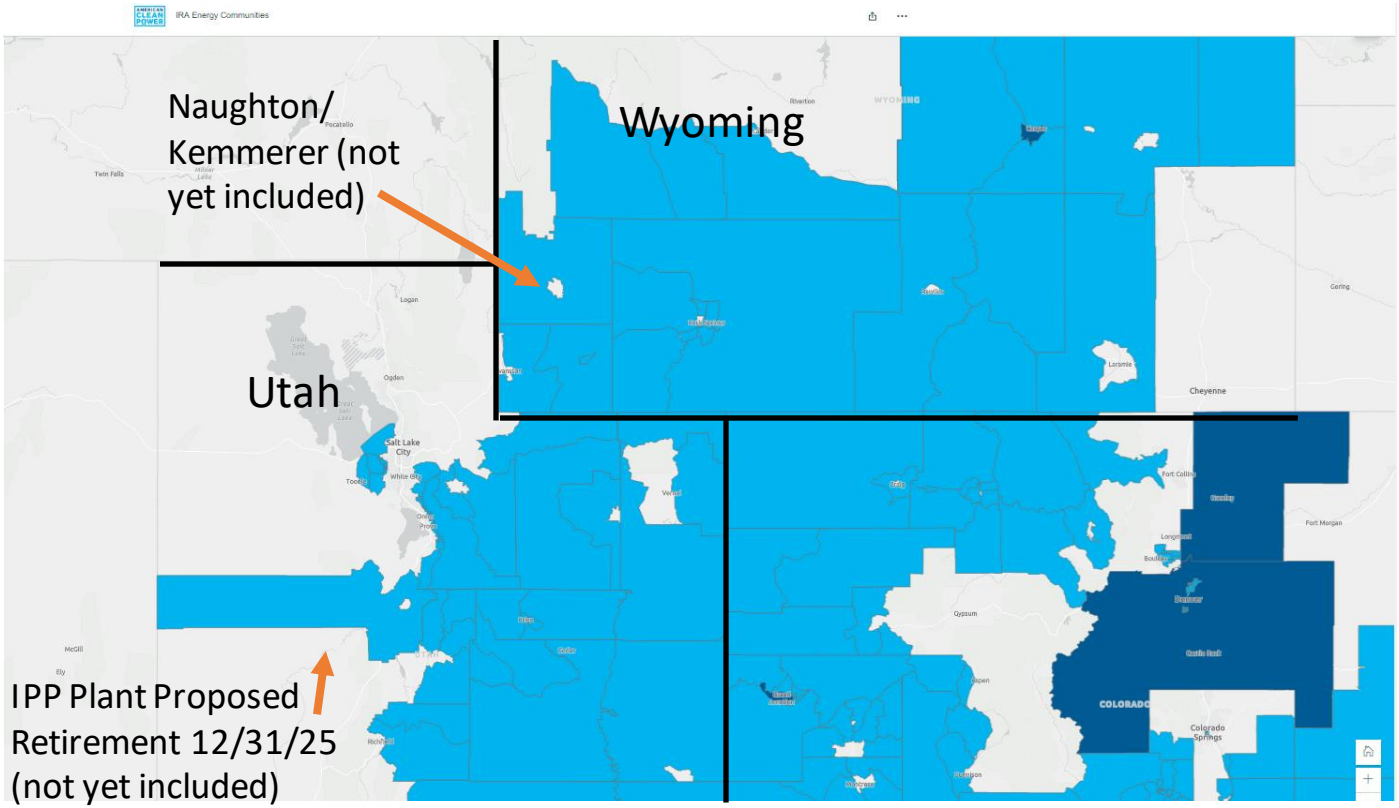
The first available date for each upgrade or set of upgrades is shown.

Generally, upgrades must be completed in succession.



Inflation Reduction Act: Energy Communities

- Under the IRA, Energy Community resources get a 10% PTC or ITC bonus.
- This applies to census tracts where a coal mine closed after 12/31/99 or a coal plant closed after 12/31/09, and adjoining census tracts.



Source: American Clean Power Association IRA Energy Communities
https://storymaps.arcgis.com/stories/844bd085378b4c1c9da9bf1081d5bb66

- In the 2023 IRP, resources in Utah South and all of Wyoming are assumed to receive the 10% Energy Community bonus, resulting in a 110% PTC (wind, solar, other energy resources) or 40% ITC (energy storage and peaking resources).

Forward Price Curves Update

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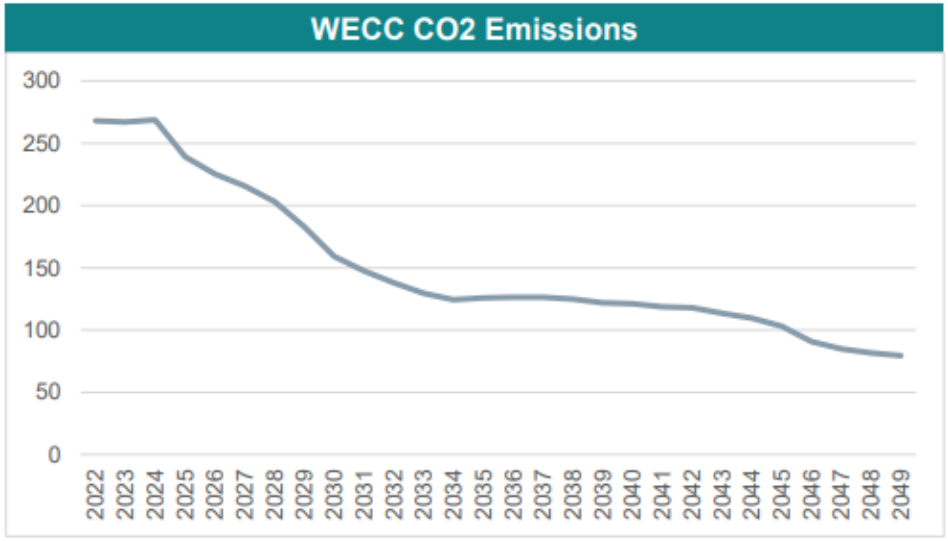
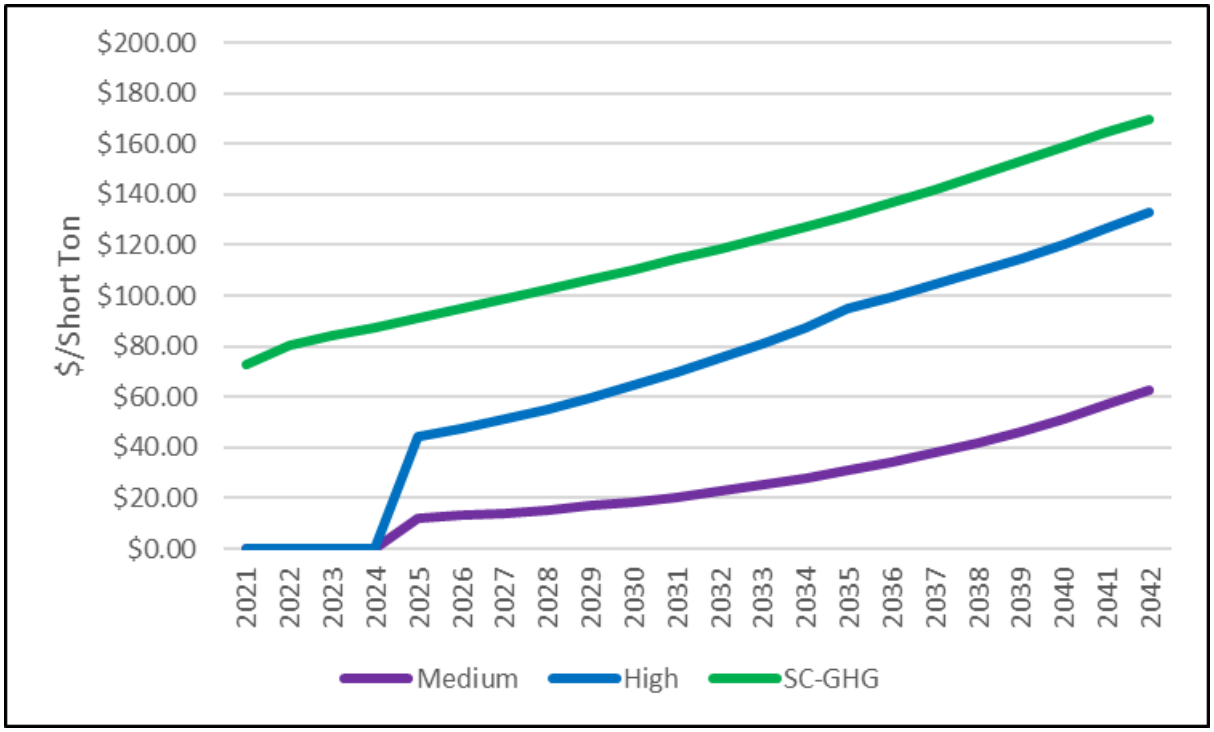
Price Curve Background

- Siemens PTI has been retained by PacifiCorp to develop and deliver customized quarterly price forecast services for gas and electric prices in the WECC region, including all price sensitivities for the IRP.
- The WECC-wide portfolio underlying the forecast reflects state-mandated policy objectives, as well as expectations of future federal CO_2 policy consistent with PacifiCorp's medium CO_2 scenario.
- Henry Hub natural gas prices remain elevated near $8/MMBtu in the near term as supply recovery lags behind global demand.
- The invasion of Ukraine has exacerbated the market volatility, as LNG export utilization has been at all-time highs as European buyers scramble to supply.



CO_2 Price Assumptions

- CO_2 price is a proxy for the continuing pressure to decarbonize through state and federal policy
- Mid- and High-CO_2 assumptions begin in 2025
- In the SCGHG, CO_2 is assumed to have a current and ongoing societal cost
- The "Low" CO_2 assumption is no CO_2 cost

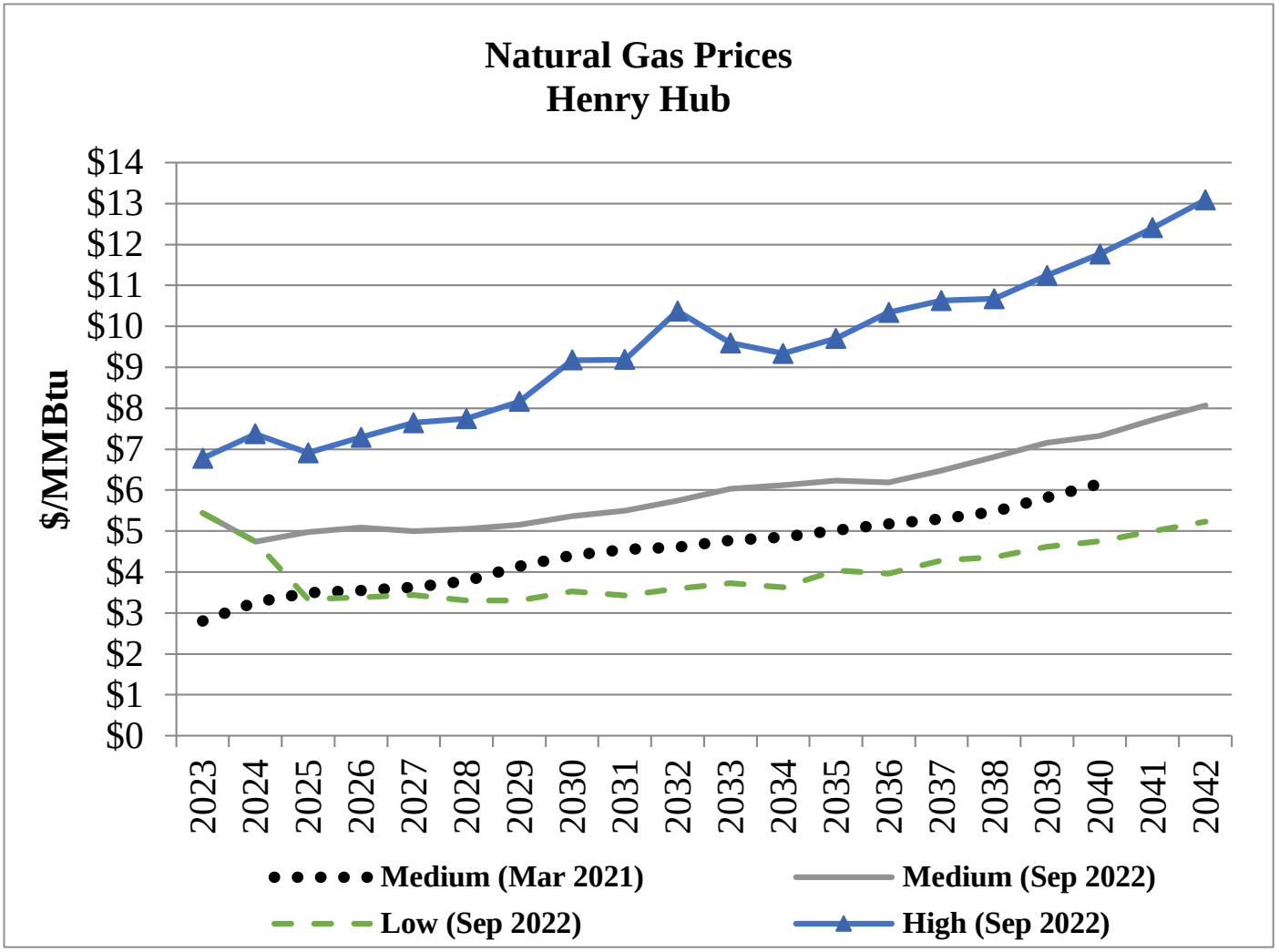


Price-Policy Scenario Assumptions

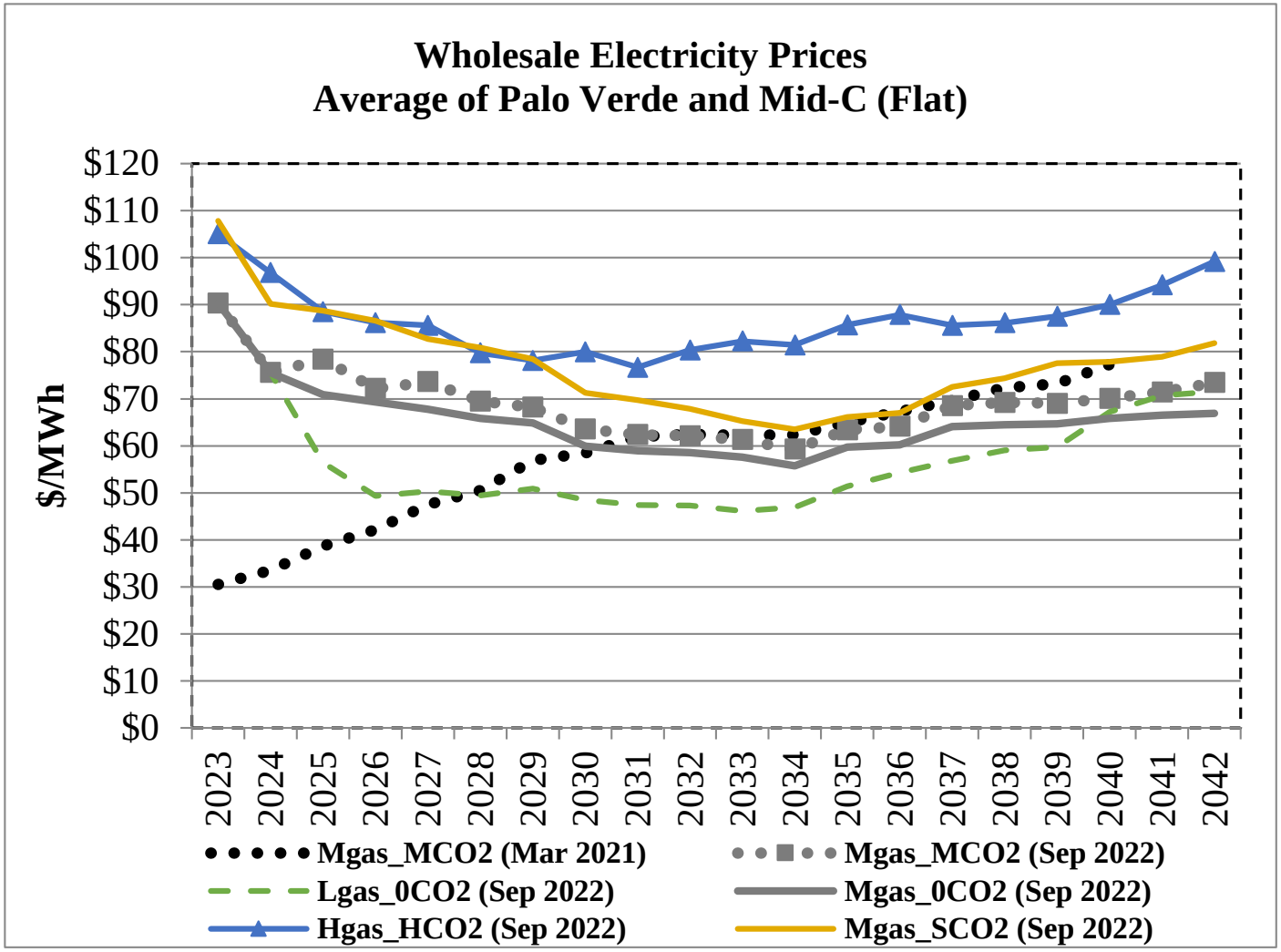
Price-Policy Scenario	Henry Hub Natural Gas Price (Levelized $/MMBtu)*	CO_2 Price Description
MM	Medium Gas: $5.67	$12.10/ton starting 2025 rising to $63.00/ton in 2042
MN	Medium Gas: $5.67	None
LN	Low Gas: $3.67	None
HH	High Gas: $8.94	$44.34/ton starting 2025 rising to $132.70/ton in 2042
SCGHG	Medium Gas: $5.67	$84.03/ton in 2023 rising to $169.93/ton in 2042
*Nominal levelized Henry Hub natural gas price from 2025 through 2040.		

- The first letter in the price-policy scenario generally refers to the natural gas price: **M**edium, **H**igh, or **L**ow.
- The second letter generally refers to the CO_2 price: **N**o, **M**edium, or **H**igh.
- The SCGHG case (also listed as "SC") uses Medium gas, and reflects the definition from Washington statute.

Nominal Natural Gas Price Inputs



Nominal Electric Price Inputs



Stakeholder Feedback

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Stakeholder Feedback Form Update

- 33 stakeholder feedback forms submitted to date
- Stakeholder feedback forms and responses can be located at:
  pacificorp.com/energy/integrated-resource-plan/comments
- Depending on the type and complexity of the stakeholder feedback, responses may be provided in a variety of ways including, but not limited to, a written response, a follow-up conversation, or incorporation into subsequent public-input meeting material
  - Generally, written responses are provided with the form and posted online at the link mentioned above
- Stakeholder feedback following the previous public input meetings is summarized on the following slides for reference

Summary – Recent Stakeholder Feedback Forms

Stakeholder	Date	Topic	Brief Summary*	Response*
Washington UTC	1/17/23	Draft preferred portfolio, Natrium plant postponement	Feedback outlined concerns with PIM posting timeline and requested an update on Natrium project.	**Pending**
Sierra Club	1/18/23	Various Topics	Reliability Modeling disclosures and recommended portfolio, Inflation reduction Act eligibility in PacifiCorp jurisdictions and Transmission Costs.	**Pending**
R Plus Hydro	2/13/23	Portfolio Selection Options / Energy Storage / Pumped Storage	Assessment of the long-term benefits of hydro pumped storage for ratepayers and eligibility for the Infrastructure Tax Credit under the Inflation Reduction Act.	**Pending**

*Full comments and PacifiCorp's responses can be found online at https://www.pacificorp.com/energy/integrated-resource-plan/comments.html

Wrap-Up/Additional Information




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Additional Information

- 2023 IRP Upcoming Public Input Meetings:
  - February 23-24, 2023 (Thursday-Friday)
- Public Input Meeting and Workshop Presentation and Materials:
  - pacificorp.com/energy/integrated-resource-plan/public-input-process
- 2023 IRP Stakeholder Feedback Forms:
  - pacificorp.com/energy/integrated-resource-plan/comments
- IRP Email / Distribution List Contact Information:
  - IRP@PacifiCorp.com
- IRP Support and Studies:
  - pacificorp.com/energy/integrated-resource-plan/support