



Integrated Resource Plan

2021 IRP Public-Input Meeting

August 27, 2021



Agenda



- 9:00am-9:15am Pacific – Introductions
- 9:15am-10:15am Pacific – 2021 IRP Preferred Portfolio
- 10:15am-11:15am Pacific – 2021 IRP Action Plan
- 11:15am-11:45am Pacific – 2021 IRP Portfolio Development Cases
- 11:45am-12:15pm Pacific – Lunch Break
- 12:15pm-2:15pm Pacific – Additional Portfolio Development and Selection Process
- 2:15pm-3:15pm Pacific – Washington Clean Energy Transformation Act Scenarios
- 3:15pm-3:30pm Pacific – Washington Clean Energy Implementation Plan Update
- 3:30pm-3:45pm Pacific – Stakeholder Feedback Form Update
- 3:45pm-4:00pm Pacific – Wrap Up / Next Steps



2021 IRP Preferred Portfolio



Preferred Portfolio Overview



- Based on an 18-month development cycle with extensive technical and data analysis and stakeholder-input, PacifiCorp has identified P02-MM-CETA as the 2021 IRP preferred portfolio.
- This resource plan furthers investments in new wind and transmission, while adding significant new solar and storage resources, demand-side management resources, and for the first time, advanced nuclear. There are no new fossil-fueled resources in the preferred portfolio.
- The preferred portfolio includes significant investments in new renewables and storage:
 - By the end of 2024, the preferred portfolio includes the 2020 All-Source RFP final shortlist resources including 1,792 MW of wind, 1,302 MW of solar additions, and 697 MW of battery storage capacity – 497 MW paired with solar and a 200 MW standalone battery. During this time, it also includes the acquisition and repowering of Rock River 1 (49 MW) and Foote Creek II-IV (43 MW) wind projects.
 - Through the end of 2026, the preferred portfolio includes an additional 745 MW of wind and an additional 600 MW of solar co-located with storage.
- Through 2040, the preferred portfolio includes 3,628 MW of new wind, 5,628 MW of new solar co-located with storage (including 95 MW of standalone solar), 1,400 MW of standalone battery and 4,781 MW of storage co-located with new solar resources, and a 500 MW pumped storage project.
- For the first time, the preferred portfolio includes nuclear resources - the 500 MW Natrium™ advanced nuclear demonstration project in 2028. Through 2040, 2,726 MW of advanced nuclear and non-emitting peaking resources are included.
- The preferred portfolio continues significant investment in demand-side management with energy efficiency outpacing levels in the 2019 IRP. By 2040, the 2021 IRP includes 4,290 MW of energy efficiency capacity savings along with 2,448 MW of demand response programs.

Preferred Portfolio Overview (con't)



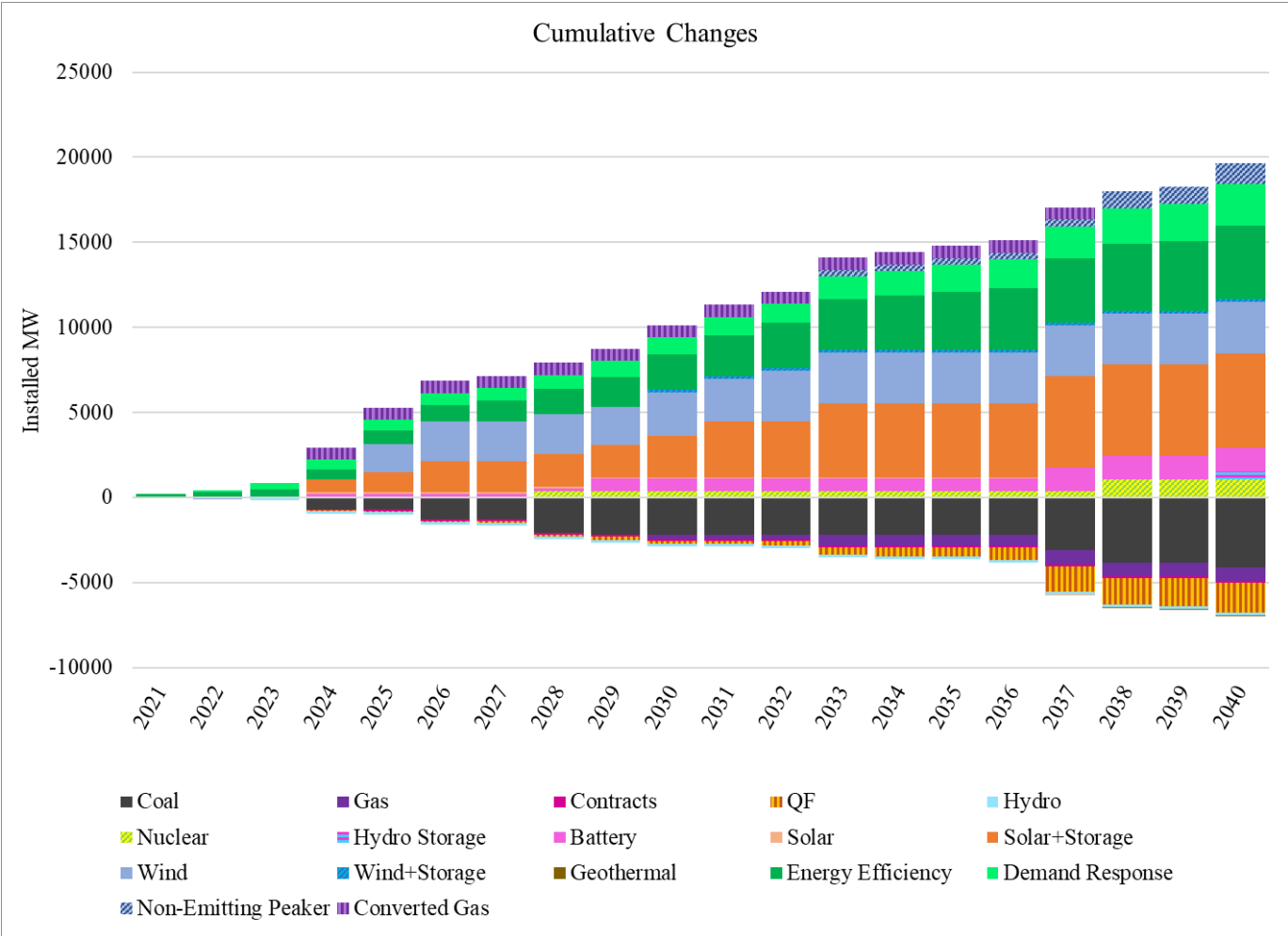
- Jim Bridger Units 1 and 2 convert to natural gas peaking units in 2024. No new proxy natural gas resources are included in the preferred portfolio.
- Coal-fueled generation capacity is reduced by 1,300 MW by the end of 2025, 2,211 MW by the end of 2030, and 4,087 MW by the end of 2040. Coal resources have been an important resource in PacifiCorp's portfolio and will continue to play an important role as units approach retirement dates.
- Through 2040, the preferred portfolio includes 1,554 MW of gas retirements including retirement of existing gas and natural gas-fueled converted coal units.
- To facilitate the delivery of new energy resources, the preferred portfolio calls for construction of the 416-mile, 500-kilovolt Energy Gateway South transmission line by the end of 2024 and the Energy Gateway West Subsegment D.1 project - a new 59 mile high-voltage 230-kilovolt transmission line.
- The preferred portfolio also includes the 290-mile, 500-kilovolt Boardman-to-Hemingway transmission line to come online in 2026, along with several other transmission upgrades across PacifiCorp's system that facilitate continued and long-term growth in new resources and increase supply reliability and resilience.
- Reliance on market purchases during summer peak periods averages 366 MW per year over 2020-2027—down 60 percent from market purchases identified in the 2019 IRP preferred portfolio. This reduction in market purchases coincides with the period over which there are resource adequacy concerns in the region.
- In the preferred portfolio, system CO₂ emissions are down from the year 2021 by 24 percent in 2025, 54 percent in 2030, and 73 percent in 2035, and 88 percent in 2040. Relative to a 2005 baseline, system CO₂ equivalent emissions are down 53 percent in 2025, 74 percent in 2030, 83 percent in 2035, 92 percent in 2040, 94 percent in 2045, and 98 percent in 2050.
- Resources were added to meet requirements of Washington's Clean Energy Transformation Act.

Resource Changes (P02-MM-CETA)



- The Washington Clean Energy Transformation Act (CETA) establishes targets including:
 - By 2025, utilities remove coal-fired generation from Washington’s retail allocation of electricity;
 - By 2030, Washington retail sales are carbon-neutral;
 - 80% from long-term system resources
 - 20% alternative compliance using purchase of unbundled RECs
 - By 2045, retail sales are 100 percent renewable and non-carbon-emitting
- PacifiCorp evaluated the P02-MM portfolio (the top performing portfolio) relative to the requirements of CETA. A shortfall of 69 MW in 2030 (highest year) or 49 MW in the first four-year window (2030-2033) was identified.
- Resources were added to meet CETA requirements:
 - Added incremental WA DSM (selected from the P02-SCGHG case)
 - In 2030, reconfigured a 160 MW of a system solar and storage resource in P02-MM to be a Washington situs-assigned 160 MW resource that includes wind, co-located with the solar and battery resource in Yakima, Washington
- PacifiCorp is in the process of scheduling a technical workshop for mid-September to discuss P02-MM-CETA and how it informs the Washington Clean Energy Implementation Plan.

Preferred Portfolio Resources (P02-MM-CETA)





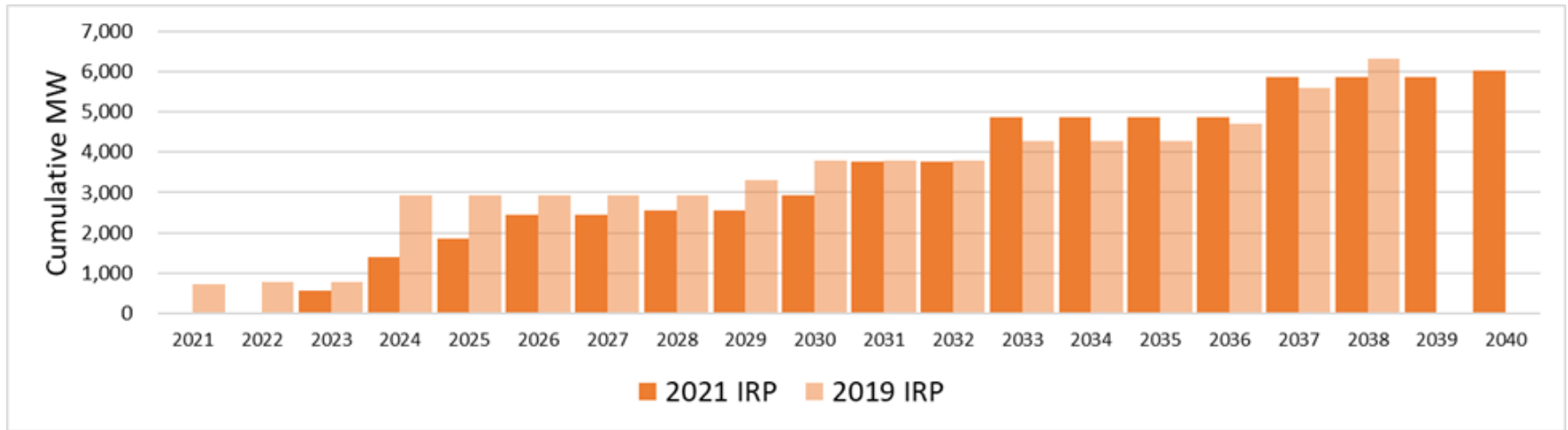
New Transmission (P02-MM-CETA)

Year	Resource(s)	From	To	Description
2025	1,641 MW RFP Wind (2025)	Aeolus WY	Clover	Enables 1,930 MW of interconnection with 1700 MW of TTC: Energy Gateway South
2026	615 MW Wind (2026)	Within Willamette Valley OR Transmission Area		Enables 615 MW of interconnection: Albany OR area reinforcement
2026	130 MW Wind (2026)	Portland North Coast	Willamette Valley	Enables 2080 MW of interconnection with 1950 MW TTC; Portland Coast area reinforcement, Willamette Valley and Southern Oregon
	450 MW Wind (2032)		Southern Oregon	
	650 MW Battery (2037)			
2026	600 MW Solar+Storage (2026)	Borah-Populous	Hemingway	Enables 600 MW of interconnection with 600 MW of TTC: B2H Boardman-Hemingway
2028	41 MW Solar+Storage (2028) 377 MW Solar+Storage (2030)	Within Southern OR Transmission Area		Enables 460 MW of interconnection: Medford area reinforcement
2030	160 MW Solar+Wind+Storage (2030) 20 MW Solar+Storage (2030)	Yakima WA Transmission Area		Enables 180 MW of interconnection: Yakima local area reinforcement
2031	820 MW Solar+Storage (2031) 206 MW Non-Emitting Peaker (2033)	Northern UT Transmission Area		Enables 1040 MW of interconnection: Northern UT 345 kV reinforcement
2033	400 MW Non-Emitting Peaker (2033) 1100 MW Solar+Storage (2033)	Southern UT	Northern UT	Enables 1500 MW of interconnection with 800 MW TTC: Spanish Fork - Mercer 345 kV; New Emerg - Clover 345 kV
2040	156 MW Solar+Storage (2040) 500 MW Pumped Storage (2040)	Central OR	Willamette Valley	Enables 980 MW of interconnection with 1500 MW of TTC
2028*	500 MW Adv Nuclear (2028)	Southwest Wyoming Transmission Area		Reclaimed transmission upon retirement of Naughton 1 & 2
2029*	549 MW Battery (2029)	Eastern Wyoming Transmission Area		Reclaimed transmission upon retirement of Dave Johnston Plant
2037	909 MW Solar+Storage (2037)	Southern Utah Transmission Area		Reclaimed transmission upon retirement of Huntington 1 & 2
2038	412 MW Non-Emitting Peaker (2038) 1000 MW Adv Nuclear (2038)	Bridger WY Transmission Area		Reclaimed transmission upon retirement of Jim Bridger Plant
2040	206 MW Non-Emitting Peaker (2040) 60 MW Wind (2040)	Eastern Wyoming Transmission Area		Reclaimed transmission upon retirement of Wgodak

Note: TTC = total transfer capability. The scope and cost of transmission upgrades are planning estimates. Actual scope and costs will vary depending upon the interconnection queue, the transmission service queue, the specific location of any given generating resource and the type of equipment proposed for any given generating resource.

* Reclaimed transmission is committed with resources with a commercial operation date later than the date of retirement.

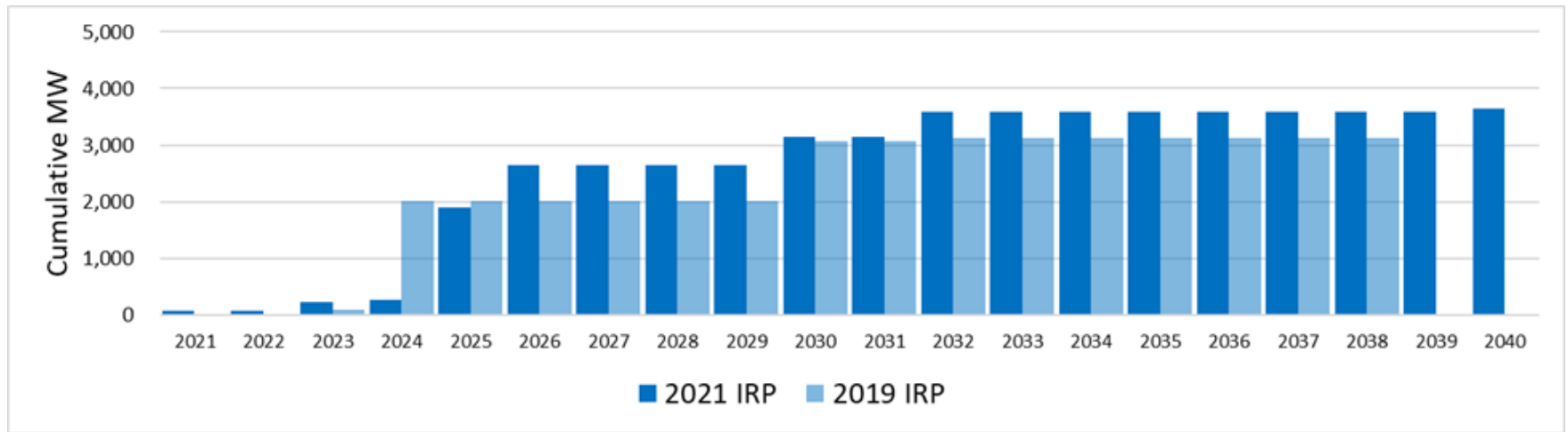
New Solar Capacity (P02-MM-CETA)



*Note: 2021 IRP solar capacity shown in the figure includes solar resources coming via the 2020 All-Source Request for Proposals by the end of 2024. Resources are shown in the first full year of operation (the year after the year-online dates).

- The preferred portfolio includes 1,302 MW of new solar by the end of 2024 and 1,902 MW by the end of 2026.
- Through 2040, new solar capacity increases to 5,628 MW.

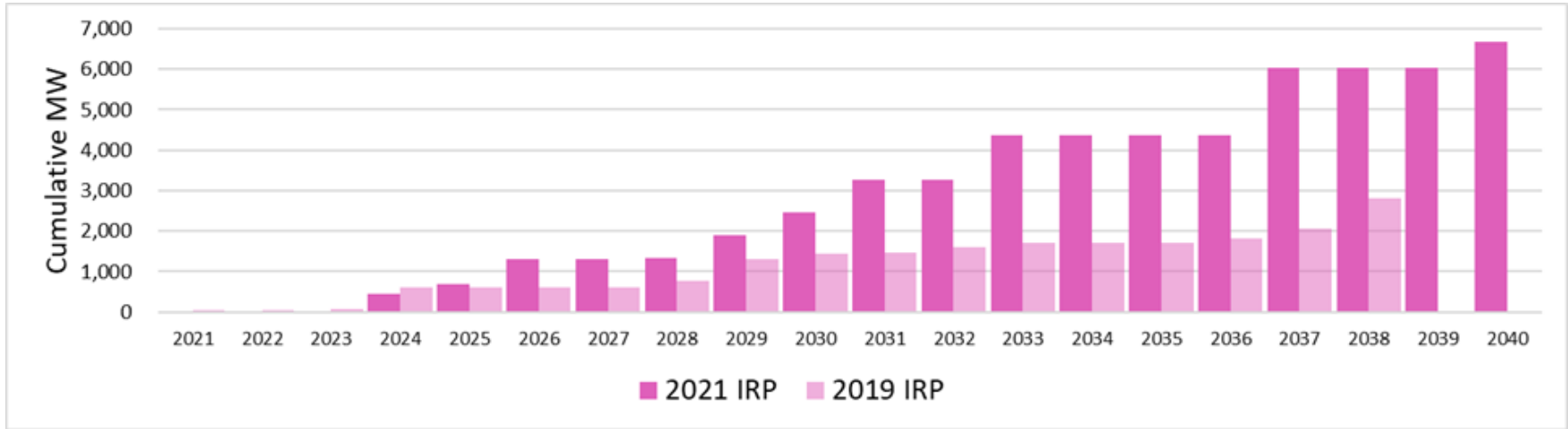
New Wind Capacity (P02-MM-CETA)



*Note: Wind additions shown are incremental to Energy Vision 2020 and other projects that have come online over the past few years. Resources are shown in the first full year of operation (the year after year-end online dates).

- The preferred portfolio includes 1,792 MW of new wind generation resulting from the 2020 All-Source RFP and the acquisition and the acquisition and repowering of Rock River I (49 MW) and Foote Creek II-IV (43 MW) wind projects in Wyoming.
- Through the end of 2026, the preferred portfolio includes an additional 745 MW of new wind and more than 3,700 MW of new wind by 2040.

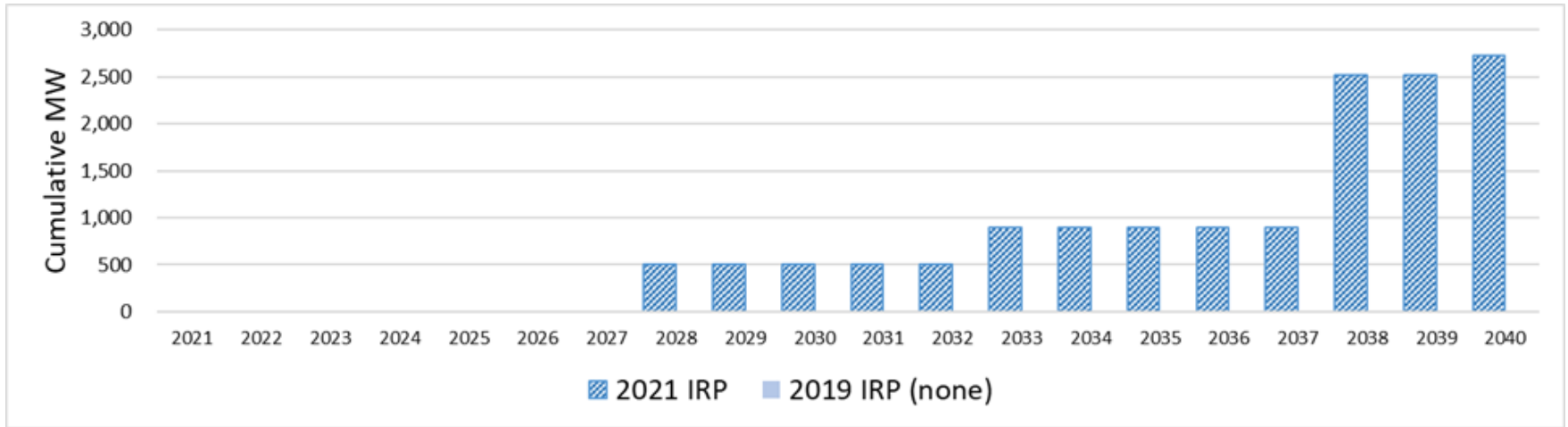
New Storage Capacity (P02-MM-CETA)



*Note: Resources are shown in the first full year of operation (the year after the year-end online dates).

- The preferred portfolio includes nearly 700 MW of battery storage by the end of 2024 – 200 MW of which is a standalone battery and the remaining portion paired with solar resources resulting from the 2020 All-Source Request for Proposals.
- Through 2040, the 2021 IRP includes 4,781 MW of storage co-located with solar resources, 1,400 MW of standalone battery, and 500 MW of pumped hydro.

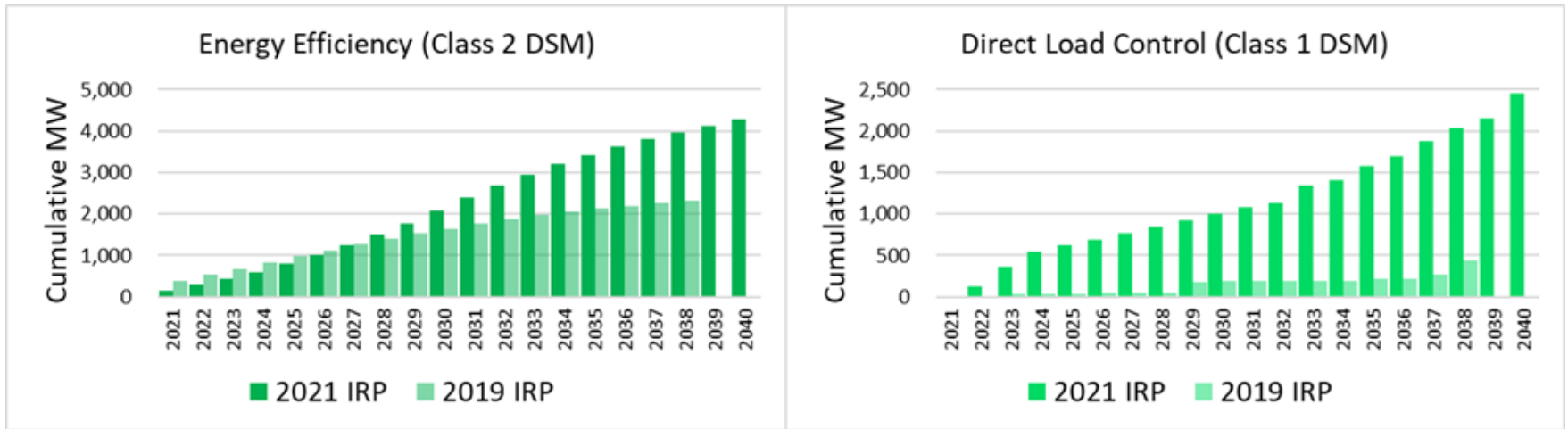
Other Non-Emitting Resources Capacity (P02-MM-CETA)



*Note: Resources are shown in the first full year of operation (the year after the year-end online dates).

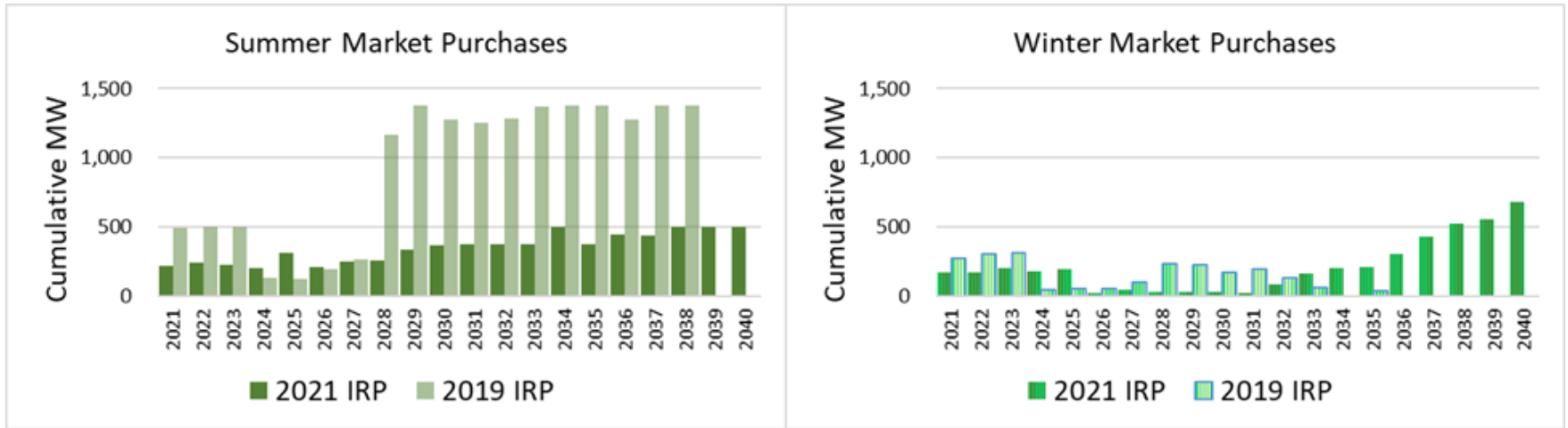
- This is the first PacifiCorp IRP that includes new advanced nuclear and non-emitting peaking resources as part of its least-cost, least-risk preferred portfolio.
- The 500 MW advanced nuclear Natrium™ demonstration project will come online by summer 2028.
- Through 2040, the preferred portfolio includes 1,000 MW of additional advanced nuclear resources and 1,226 MW of non-emitting peaking resources.

Demand-Side Management Resources (P02-MM-CETA)



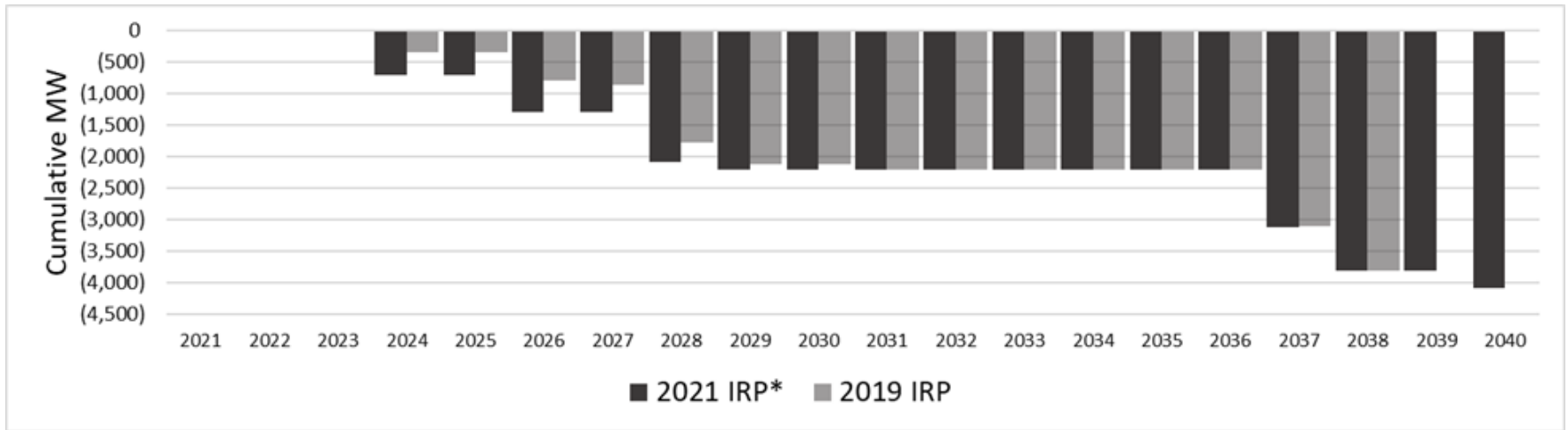
- DSM resources continue to play a key role in PacifiCorp’s resource mix.
- Energy efficiency capacity savings in the preferred portfolio include 4,290 MW by the end of the planning period.
- In addition, the preferred portfolio shows an increasing role for incremental direct load control programs.
- The preferred portfolio has a total incremental capacity of direct load control programs reaching 2,448 MW by 2040 – an over 400 percent increase over the planning horizon from the 2019 IRP preferred portfolio.

Market Purchases (P02-MM-CETA)



- The preferred portfolio shows an overall decline in reliance on wholesale power market firm purchases relative to the 2019 IRP preferred portfolio.
- Reliance on wholesale power market purchases during summer peak periods in the preferred portfolio averages 366 MW per year over the 2020-2027 timeframe—down 60 percent from purchases identified over the same timeframe in the 2019 IRP preferred portfolio.
- This reduction in wholesale power market purchases coincides with the period over which there are resource adequacy concerns in the region. While wholesale power market purchases increase beyond 2027, PacifiCorp is actively participating in regional efforts to develop day-ahead markets and a resource adequacy program that will help unlock regional diversity and facilitate market transactions over the long term.

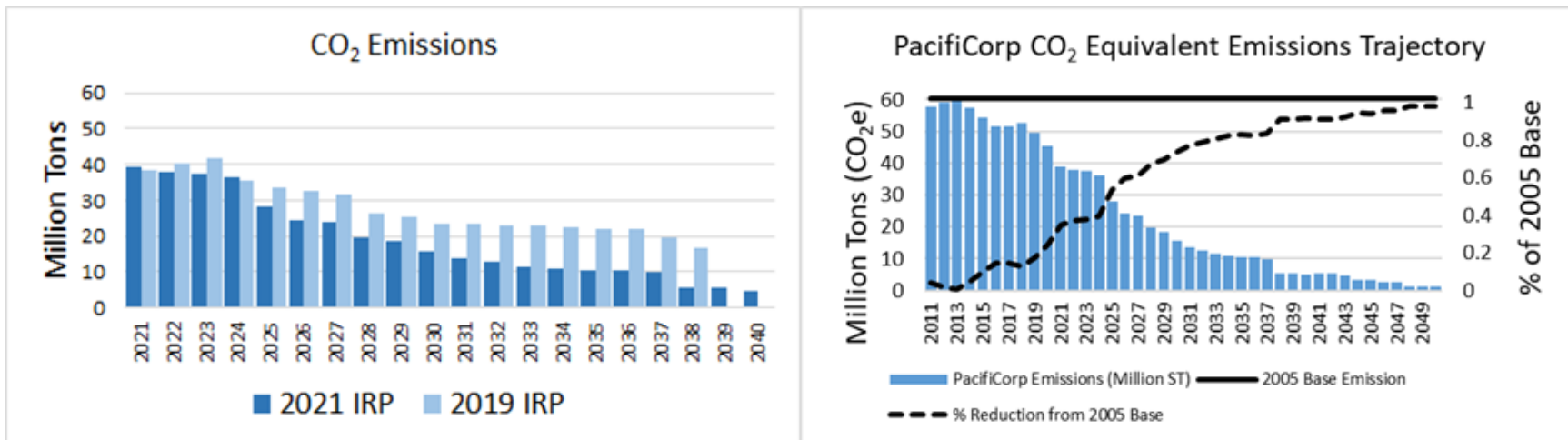
Coal Retirements/Gas Conversions (P02-MM-CETA)



* Note: Coal retirements are assumed to occur by the end of the year before the year shown in the graph. The graph shows the year in which the capacity will not be available for meeting summer peak load. All figures represent PacifiCorp’s ownership share of jointly owned facilities.

- Driven in part by ongoing cost pressures on existing coal-fired facilities and dropping costs for new resource alternatives, of the 22 coal units currently serving PacifiCorp customers, the preferred portfolio includes retirement of 14 of the units by 2030 and 19 of the units by the end of the planning period in 2040.
- Coal unit retirements/gas peaking unit conversions in the 2021 IRP preferred portfolio will reduce coal-fueled generation capacity by 1,300 MW by the end of 2025, over 2,200 MW by 2030, and over 4,000 MW by 2040.
- PacifiCorp’s coal resources will continue to play a pivotal role in following fluctuations in renewable energy as the remaining coal units approach retirement dates.

CO₂ Emissions (P02-MM-CETA)



- The chart on the left compares projected annual CO₂ emission between the 2021 IRP preferred portfolio and the 2019 IRP preferred portfolio. Emissions are not assigned to market purchases or sales.
 - Average annual CO₂ emissions are down 26 percent in 2026, down 34 percent by 2030 and down 52 percent in 2035 relative to the 2019 IRP preferred portfolio.
 - By 2040, system CO₂ emissions are projected to fall from 39.1 million tons in 2021 to 4.8 million tons in 2040—a reduction of 88 percent.
- The chart on the right includes historical data, assigns emissions at a rate of 0.4708 tons CO₂ equivalent per MWh to market purchases (no credit to market sales), includes emissions specified with purchases and extrapolates projections out through 2050. The emissions trajectory does not incorporate clean energy targets set forth in Oregon House Bill 2021 or any other state-specific emissions trajectories.
 - Relative to a 2005 baseline, system CO₂ equivalent emissions are down 53 percent in 2025, 74 percent in 2030, 83 percent in 2035, 92 percent in 2040, 94 percent in 2045, and 98 percent in 2050.



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Existing Resource Actions

Colstrip Units 3 and 4:

- PacifiCorp will begin the process of retiring or divesting Colstrip units 3 and 4, with a planned exit date no later than December 31, 2025.
- PacifiCorp will continue to work closely with co-owners to seek the most cost-effective path forward.

Naughton Units 1 and 2:

- PacifiCorp will initiate the process of retiring Naughton Units 1-2 by the end of December 2025, including completion of all required regulatory notices and filings.
- By the end of Q2 2023, PacifiCorp will confirm transmission system reliability assessment and year-end 2025 retirement economics in 2023 IRP filing.
- By the end of Q4 2023, PacifiCorp will initiate the process with the Wyoming Public Service Commission for approval of a reverse request for proposals for a potential sale of Naughton Units 1 and 2.
- By the end of Q4 2023, PacifiCorp will administer termination, amendment, or close-out of existing permits, contracts, and other agreements.

Jim Bridger Units 1 and 2 Gas Conversion:

- PacifiCorp will initiate the process of ending coal-fueled operations and seeking permitting for a natural-gas conversion by 2024, including completion of all required regulatory notices and filings.
- By the end of Q2 2022, PacifiCorp will finalize an employee transition plan.
- By the end of Q2 2022, PacifiCorp will develop a community action plan in coordination with community leaders.
- By the end of Q4 2023, PacifiCorp will administer termination, amendment, or close-out of existing permits, contracts, and other agreements.
- By the end of Q4, 2023, PacifiCorp will remove units 1 and 2 from Washington's allocation of electricity.

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Existing Resource Actions

Carbon Capture, Utilization, and Sequestration/Wyoming House Bill 200 Compliance:

- PacifiCorp issued a carbon capture, utilization, and sequestration (CCUS) request for expression of interest (REOI) on June 29, 2021. PacifiCorp will complete the 2021 CCUS REOI process and utilize any new relevant information. Additional model sensitivities will be run accordingly.
- PacifiCorp will issue a CCUS RFP in 2022. The 2021 CCUS REOI responses will inform the scope of the CCUS RFP.
- A completed CCUS FEED Study based on a new CCUS technology was submitted to PacifiCorp in July 2021 for Dave Johnston unit 2. Third party evaluations of the FEED study will be completed before Q1 2022, and model sensitivities will be run with FEED Study assumptions and inputs as appropriate.
- Subject to finalization of rules by the Wyoming Public Service Commission to implement HB 200, the Wyoming Low Carbon Energy Standard (anticipated by Q4 2021), by March 31, 2022, PacifiCorp will file with the Wyoming Public Service Commission an initial CCUS application to establish intermediate CCUS standards and requirements.
- Subject to finalization of rules by the Wyoming Public Service Commission to implement HB 200, the Wyoming Low Carbon Energy Standard (anticipated by Q4 2021), no later than March 31, 2024, PacifiCorp will submit for Wyoming PSC approval a final plan with its proposed energy portfolio standard for dispatchable and reliable low-carbon electricity, its plan for achieving the standard, and a target date of no later than July 1, 2030.

Regional Haze Compliance:

- Following the resolution of first planning period regional haze compliance disputes, and the submission of second planning period regional haze state implementation plans, PacifiCorp will evaluate and model any emission control retrofits, emission limitations, or utilization reductions that are required for coal units.
- PacifiCorp will continue to engage with the Environmental Protection Agency, state agencies, and stakeholders to achieve second planning period regional haze compliance outcomes that improve Class I visibility, provide environmental benefits, and are cost effective.

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New Resource Actions

Customer Preference Request for Proposals:

- Consistent with Utah Community Renewable Energy Act, PacifiCorp continues to work with eligible communities to develop program to achieve goal of being net 100 percent renewable by 2030; PacifiCorp anticipates filing an application for approval of the program with the Utah Public Service Commission in 2022, which may necessitate issuance of a request for proposals to procure resources within the action plan window.

Acquisition and Repowering of Foote Creek II-IV and Rock River I:

- In Q3 2021, PacifiCorp will pursue necessary regulatory approvals to authorize the acquisition and repowering of Foote Creek II-IV in order to issue repowering contracts in Q1 2022 in support of a late 2023 in-service date.
- In Q1 2022, PacifiCorp will pursue necessary regulatory approvals to authorize the acquisition and repowering of Rock River I following the expiration of the existing power purchase agreement in order to issue repowering contracts in Q3 2022 to support a late 2024 in-service date.

Natrium™ Demonstration Project:

- PacifiCorp will continue to monitor key TerraPower milestones for development and will make regulatory filings, as applicable.
- By the end of 2022, PacifiCorp will finalize commercial agreements for the Natrium™ project.
- Q1 2022, PacifiCorp will develop a community action plan in coordination with community leaders.
- By 2025, PacifiCorp will begin training operators.
- PacifiCorp will continue to monitor key TerraPower milestones for development and will make regulatory filings, as applicable, including, but not limited to, a request for the Oregon Public Utility Commission to explicitly acknowledge an alternative acquisition method consistent with OAR 860-089-0100(3)(c), and a request for a waiver of a solicitation for a significant energy resource decision consistent with Utah statute 54-17-501.

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New Resource Actions

2022 All-Source Request for Proposals:

- PacifiCorp will issue an all-source request for proposals (RFP) to procure resources that can achieve commercial operations by the end of December 2026.
- In September 2021, PacifiCorp will file a draft all-source RFP with the Public Utility Commission of Oregon, the Public Service Commission of Utah, and the Washington Utilities and Transportation Commission, as applicable.
- In Q1 2022, PacifiCorp expects to receive approval of the all-source RFP from applicable state regulatory commissions and issue the RFP to the market.
- In Q2 2022, PacifiCorp will identify an initial shortlist in advance of annual Cluster Request Window.
- In Q1 2023, PacifiCorp will identify a final shortlist from the all-source RFP, and file for approval of the final shortlist in Oregon, file, certificate of public convenience and necessity (CPCN) applications, as applicable.
- By Q2 2023 PacifiCorp will execute definitive agreements with winning bids from the all-source RFP.
- By Q4 2025-2026, winning bids from the all-source RFP are expected to achieve commercial operation. Resources must have commercial operation date of December 31, 2026, or earlier.

2020 All-Source Request for Proposals:

- PacifiCorp filed for approval of the final shortlist in Oregon in June 2021.
- In September 2021, PacifiCorp will file CPCN applications in Wyoming, as applicable, for final shortlist.
- In Q4 2021, PacifiCorp will make a filing in Utah for significant energy resources on final shortlist.

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Transmission Actions

Energy Gateway segment D.1 (Windstar - Shirley Basin 230 kV line):

- By Q2 2022, PacifiCorp will receive the final CPCN from the Wyoming Public Service Commission and the Public Service Commission of Utah.
- By the end of Q3 2022, PacifiCorp will issue full notice to proceed to construct Energy Gateway South.
- In Q3 2024, construction of Energy Gateway South is expected to be completed and placed in service.

Energy Gateway Segment F (Aeolus-Clover 500 kV transmission line):

- Obtain Utah and Wyoming Certificates of Public Convenience and Necessity.
- Obtain substation and transmission line notices to proceed.
- Complete support tasks required to achieve a 2024 in-service date.

Boardman-to-Hemingway (500 kV transmission line):

- Continue to support the project under the conditions of the Boardman-to-Hemingway Transmission Project (B2H) Joint Permit Funding Agreement.
- Continue to participate in the development and negotiations of the construction agreement.
- Continue to participate in “pre-construction” activities in support of the 2026 in-service date.
- Continue negotiations for plan of service post B2H for parties to the permitting agreement.

Other Transmission Action Items:

- Initiate Local Reinforcement Projects as identified with the addition of new resources per the preferred portfolio, and follow-on requests for proposal successful bids.
- Continue permitting support for Gateway West segments D.3 and E.



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Demand-Side Management (DSM) Actions

Energy Efficiency Targets:

- PacifiCorp will acquire cost-effective Class 2 DSM (energy efficiency) resources targeting annual system energy and capacity selections from the preferred portfolio as summarized below. PacifiCorp’s state-specific processes for planning for DSM acquisitions is provided in Appendix D in Volume II of the 2021 IRP.
- PacifiCorp will pursue cost-effective energy efficiency resources as summarized in the table below:

Year	Annual 1st Year Energy (GWh)	Annual Incremental Capacity (MW)
2021	510	157
2022	492	138
2023	486	144
2024	529	164

- PacifiCorp will pursue cost-effective Class 1 (demand response) resources targeting annual system capacity¹ selections from the preferred portfolio² as summarized in the table below:

Year	Annual Incremental Capacity (MW)
2021	0
2022	123
2023	242
2024	184

¹ Capacity impacts for demand response include both summer and winter impacts within a year.

² A portion of cost-effective demand response resources identified in the 2021 preferred portfolio are expected to be acquired through a previously issued demand response RFP soliciting resources identified in the 2019 IRP. PacifiCorp will pursue all cost-effective demand response resources identified as incremental to resources subsequently procured under the previously issued RFP in compliance with state level procurement requirements.

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Market Purchases Actions

Market Purchases:

- Acquire short-term firm market purchases for on-peak delivery from 2021-2023 consistent with the Risk Management Policy and Energy Supply Management Front Office Procedures and Practices. These short-term firm market purchases will be acquired through multiple means: Balance of month and day-ahead brokered transactions in which the broker provides a competitive price.
- Balance of month, day-ahead, and hour-ahead transactions executed through an exchange, such as the Intercontinental Exchange, in which the exchange provides a competitive price.

Renewable Portfolio Standards (RPS):

- PacifiCorp will pursue unbundled REC RFPs and purchases to meet its state RPS compliance requirements.
- As needed, issue RFPs seeking then current-year or forward-year vintage unbundled RECs that will qualify in meeting California RPS targets through 2024.

Renewable Energy Credit Sales:

- Maximize the sale of RECs that are not required to meet state RPS compliance obligations.



2021 IRP Portfolio Development and Selection Process



Portfolio Development Cases



Case "Name"	Price-Policy	Existing Coal	Existing Gas	Other Existing Resources	Proxy Resources*
P02-MM	MM	Optimized	End of Life	End of Life	No New Gas
P02-MN	MN	Optimized	End of Life	End of Life	No New Gas
P02-LN	LN	Optimized	End of Life	End of Life	No New Gas
P02-HH	HH	Optimized	End of Life	End of Life	No New Gas
P02-SC-GHG	SC-GHG	Optimized	End of Life	End of Life	No New Gas
P03-MM	MM	Retired by 2030	End of Life	End of Life	No New Gas
P03-MN	MN	Retired by 2030	End of Life	End of Life	No New Gas
P03-LN	LN	Retired by 2030	End of Life	End of Life	No New Gas
P03-HH	HH	Retired by 2030	End of Life	End of Life	No New Gas
P03-SC-GHG	SC-GHG	Retired by 2030	End of Life	End of Life	No New Gas

* Excludes new gas proxy resources not including options for gas conversion of specific existing resources that will be optimized.

Portfolio Development Cases (Cont'd)



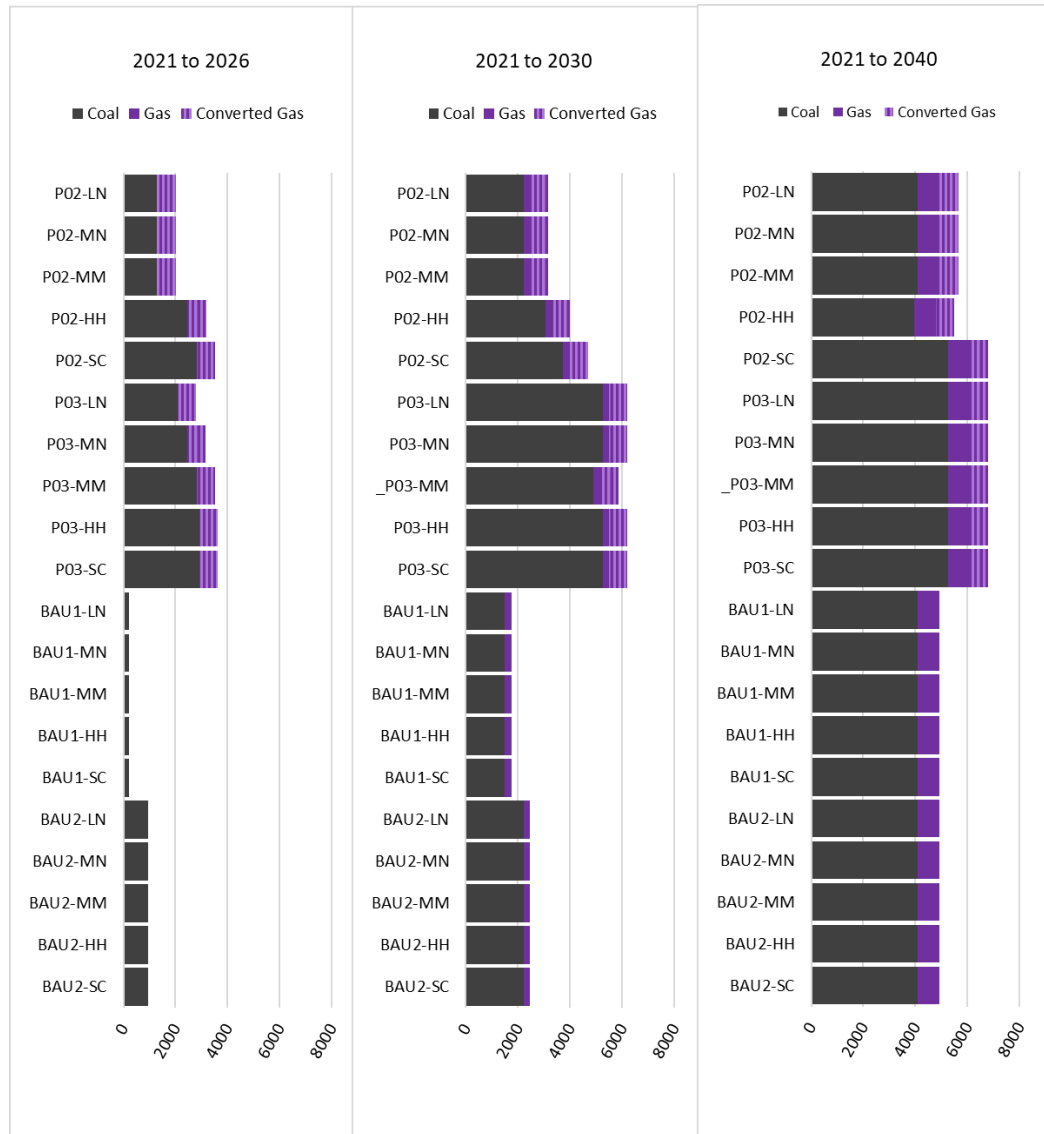
Case "Name"	Price-Policy	Existing Coal	Existing Gas	Other Existing Resources	Proxy Resources*
BAU1-MM	MM	End of Life	End of Life	End of Life	Optimized
BAU1-MN	MN	End of Life	End of Life	End of Life	Optimized
BAU1-LN	LN	End of Life	End of Life	End of Life	Optimized
BAU1-HH	HH	End of Life	End of Life	End of Life	Optimized
BAU1-SC-GHG	SC-GHG	End of Life	End of Life	End of Life	Optimized
BAU2-MM	MM	2019 IRP	2019 IRP	2019 IRP	2019 IRP+
BAU2-MN	MN	2019 IRP	2019 IRP	2019 IRP	2019 IRP+
BAU2-LN	LN	2019 IRP	2019 IRP	2019 IRP	2019 IRP+
BAU2-HH	HH	2019 IRP	2019 IRP	2019 IRP	2019 IRP+
BAU2-SC-GHG	SC-GHG	2019 IRP	2019 IRP	2019 IRP	2019 IRP+

* Excludes new gas proxy resources not including options for gas conversion of specific existing resources that will be optimized.

- Portfolio development cases summarized above produced 20 unique resource portfolios—each will be assessed using the MM, MN, LN, HH, and SC-GHG price-policy assumptions
- Portfolios generated with SC-GHG price-policy assumptions are consistent with RCW19.280.030 in Washington

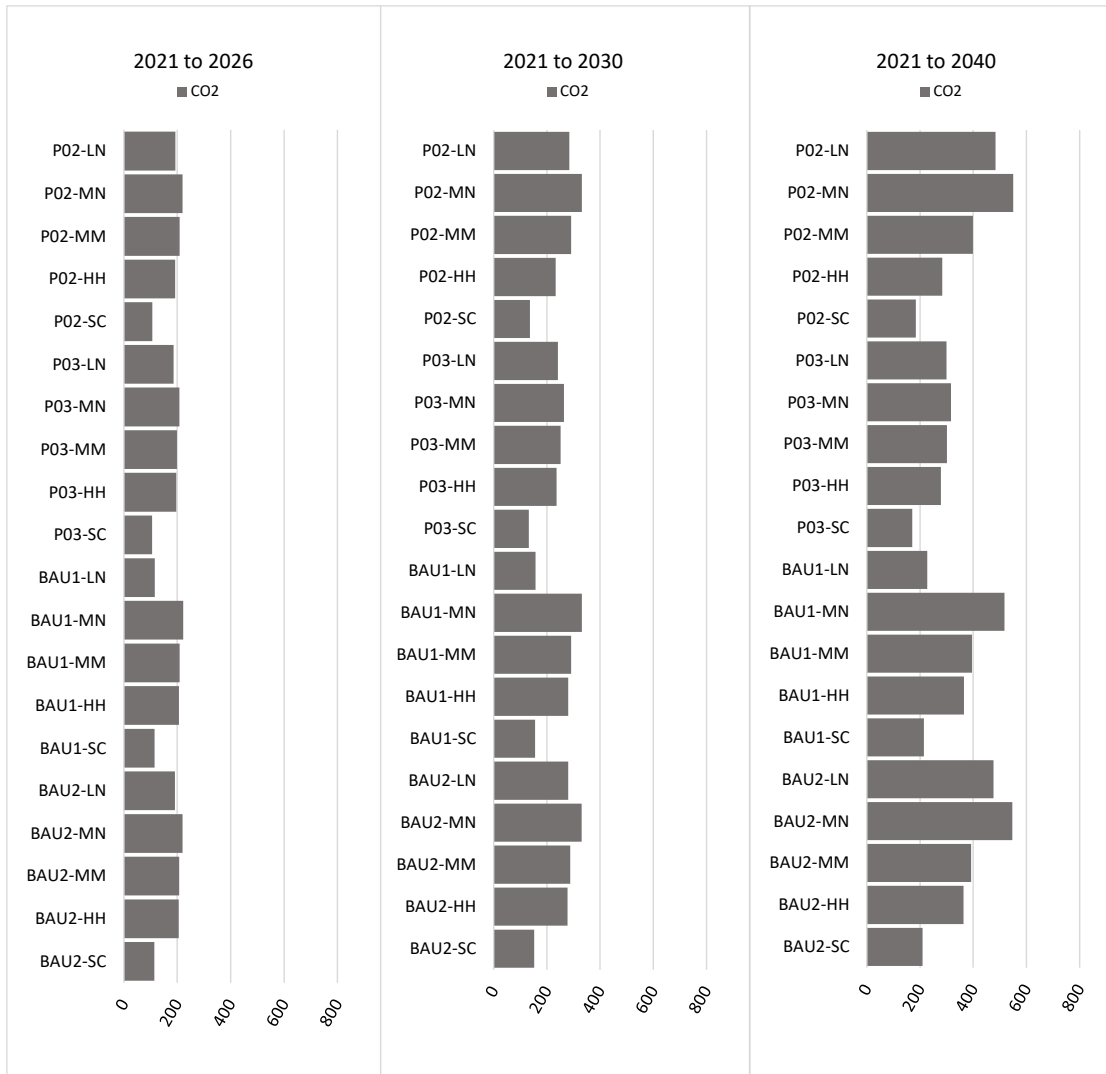


Thermal Retirements (MW)



- Through 2040, coal retirements are similar among nearly all cases with exception of P03 that includes the Hunter 1-3 units under the planning assumption that all coal retires by 2030.
- Gas retirements are the same among all cases and include 840 MW of gas retirement including 247 MW for the Naughton 3 gas converted unit in 2029.
- Cases P02 and P03 across all price-policy scenarios include gas conversion of Jim Bridger Units 1 and 2 in 2024 whereas, cases BAU 1 and BAU 2 do not as a result of built-in unit retirement dates in the planning assumptions.

CO₂ Emissions (million tons)



- Cumulative CO2 emissions across the cases are very stable under the medium gas, medium CO2 (MM) price policy conditions, averaging 372 million tons.
- Emissions are generally higher in cases with no CO2 price, averaging 427 million tons in low gas, no CO2 (LN) and medium gas, no CO2 (MM) price-policy conditions.
- Under high gas, high CO2 (HH) price environments, emissions average 323 millions tons.
- The lowest emissions are reported under the social cost of carbon (SC) cases, averaging 195 million tons.
- Emissions across all cases range from 171 million tons (P03-SC) and 550 million tons (P02-MN).

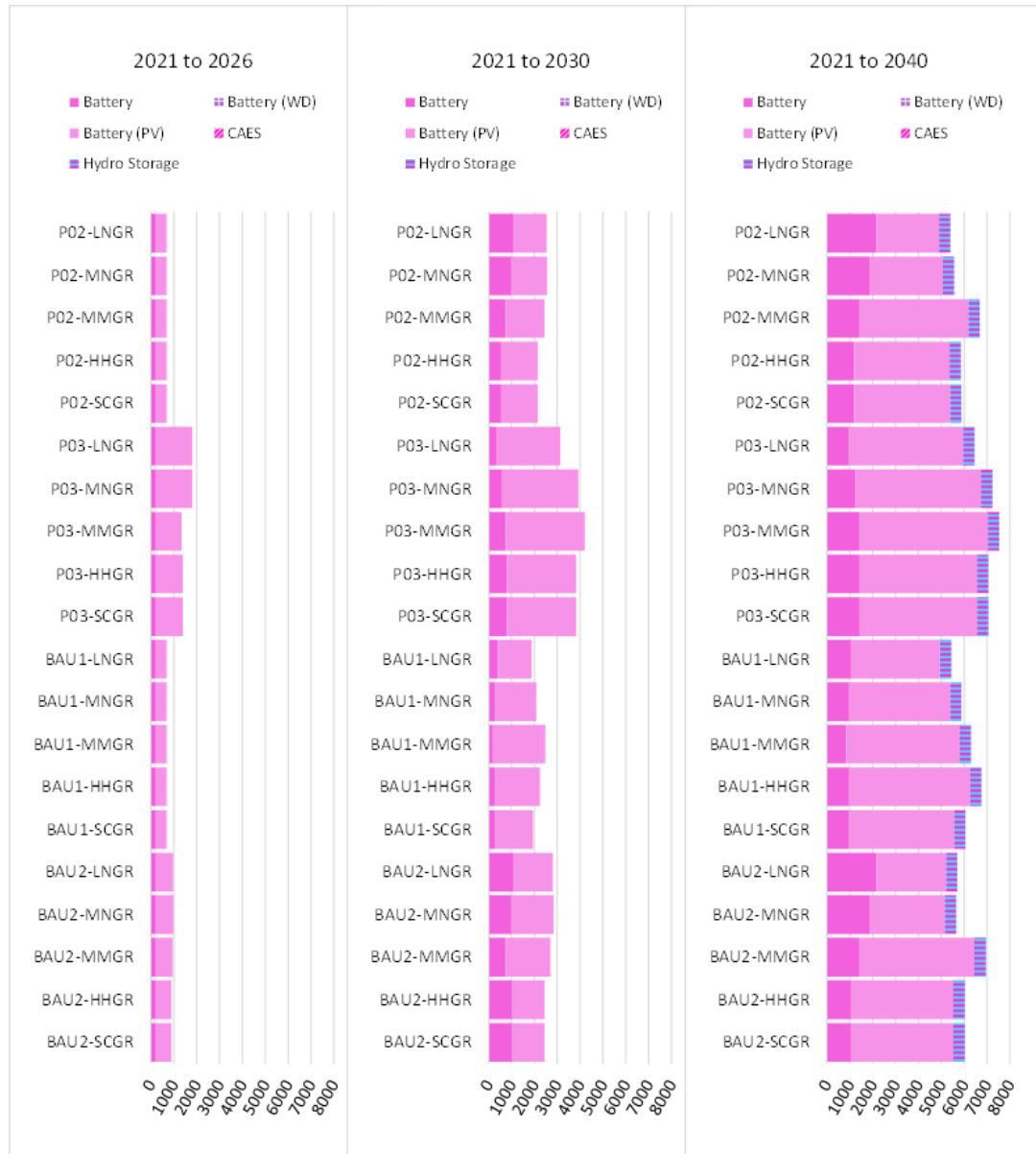
Renewables and Non-Emitting Resources (MW)



- Through 2025, all cases include the 2020 All-Source RFP final shortlist resources including 1,792 MW of wind, 1,302 MW of solar additions, and 697 MW of battery storage capacity – 497 MW paired with solar and a 200 MW standalone battery (shown on the storage slide). They also include the acquisition and repowering of Rock River 1 (49MW) and Foote Creek II-IV (43 MW) wind projects.
- In 2026, all cases include an additional 745 MW of wind and additional solar and storage ranging from 600 MW up to 1,090 MW.
- All cases select Energy Gateway South in 2024 along with 1,641 MW of new wind in eastern Wyoming.
- All cases select Boardman-to-Hemingway in 2026 along with 600 MW of new co-located solar and storage.
- All cases include the 500 MW Natrium™ demonstration project in 2028.
- Through 2040, total new renewable capacity ranges between 6,794 MW of new wind, 10,306 MW of new solar and battery.
- Through 2040, total new nuclear capacity ranges between 500 MW and 1,500 MW and total non-emitting peaking capacity ranges between 1,010 MW and 3,483 MW.

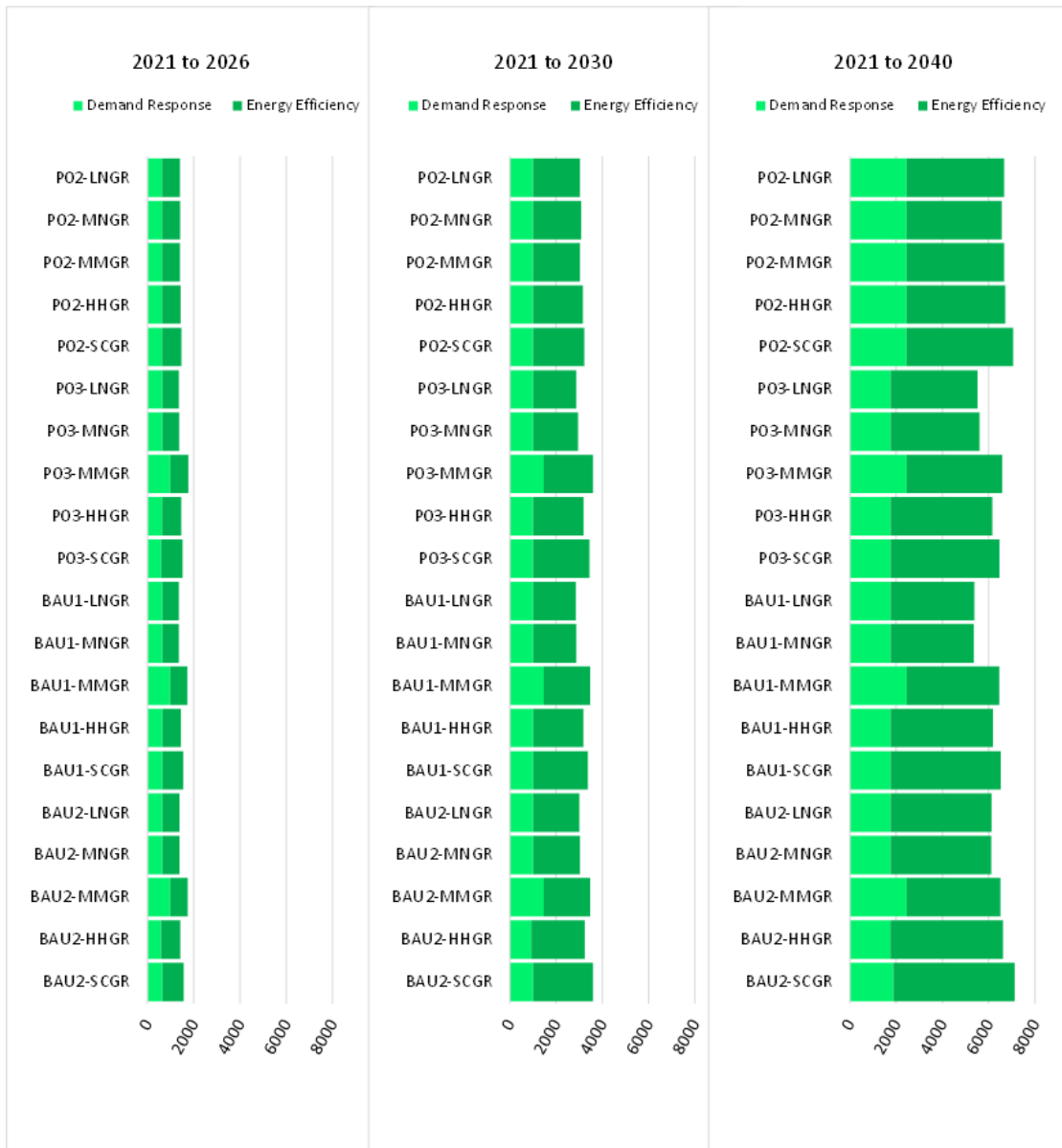


Storage (MW)



- Through 2025, all cases include the 2020 All-Source RFP final shortlist resources including 697 MW of battery storage capacity – 497 MW paired with solar and a 200 MW standalone battery.
- More storage resources are accelerated into the mid-term among those cases that have higher levels of accelerated coal and gas retirements.
- Through 2040, storage selections range between 2,734 MW (Case P02-LN) and 5,631 MW (Case P03-MM) for storage co-located with solar and between 850 MW and 2,170 MW for standalone battery.
- All cases include a 500 MW pumped storage project in 2040.

Demand Side Management (MW)

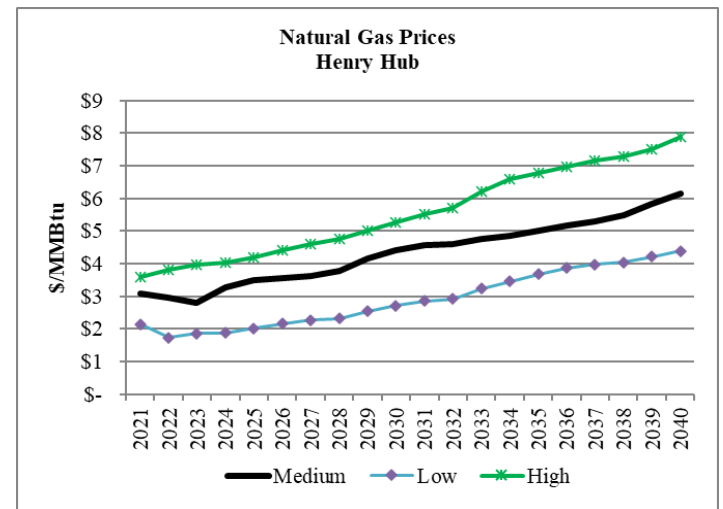
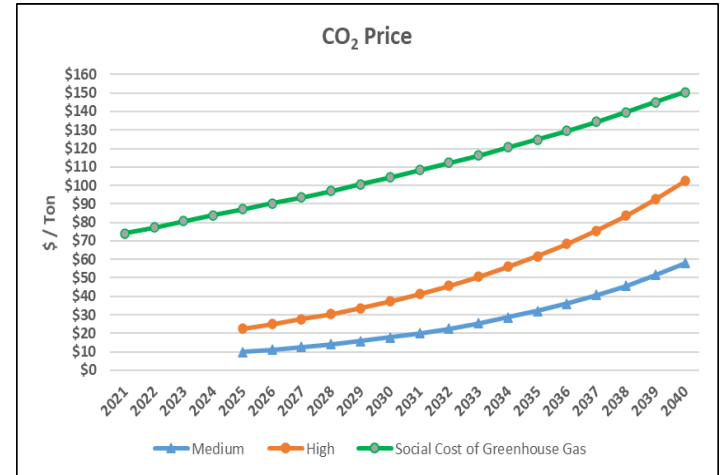


- Demand-side management selections continue to be relatively stable among all cases however, variations do occur among price-policy assumptions relative to CO₂.
- Through 2030, energy efficiency selections range between 1,845 MW (Case BAU1-LN) and 2,589 MW (Case BAU2-SC); demand response selections range between 918 MW (Case BAU2-HH) and 1,469 MW (Cases BAU-1 MM, BAU-2 MM, P-03 MM).
- More demand response resources are accelerated into the mid-term among those cases that have higher levels of accelerated coal and gas retirements.
- Through 2040, energy efficiency selections range between 3,605 MW (Case BAU1-MN) and 5,249 MW (Case BAU2-SC); demand response selections range between 1,752 MW (Case BAU2-HH) and 2,458 MW (Case BAU2-MM).



Price-Policy Scenarios

- The following slides show portfolio cost and risk summary information for the P02, P03, BAU 1 and BAU 2 set of cases across different price-policy scenarios.
- In the medium gas / medium CO₂ scenario, P02 outperforms other cases on a present value revenue requirement (PVRR) basis, risk-adjusted PVRR, and energy not served (ENS). While P02 has higher cumulative CO₂ emissions, it is 32 percent higher than P03 which has a risk-adjusted cost that is \$2.3b higher than P02.
- In the low gas / no CO₂ and medium gas / no CO₂, P02 outperforms other cases on costs and energy not served (ENS) and has comparable emissions to BAU1 and BAU2. P02 cumulative CO₂ emissions are 58 percent higher than in P03, driven by P03 retirement assumptions of retiring all coal by 2030 which has a risk-adjusted cost that is \$3.3b higher than P02.
- In the medium gas / no CO₂ outcomes with P02 remaining the top-performing portfolio. P02 cumulative CO₂ emissions are 71 percent higher than in P03, driven by P03 retirement assumptions of retiring all coal by 2030 which has a risk-adjusted cost that is \$4.4b higher than P02.
- In the high gas / high CO₂ price-policy scenario P02 outperforms other cases on costs and energy not served (ENS) and has comparable emissions to P03, the case with lowest emissions, which has a risk-adjusted cost that is \$1.6b higher than P02.
- In the medium gas / social cost of greenhouse gas scenario, P02 outperforms other cases on costs and energy not served (ENS) and has comparable emissions to P03, the case with lowest emissions. P03 retirement assumptions of retiring all coal by 2030 has a risk-adjusted cost that is \$2.1b higher than P02.
- Based on these findings, PacifiCorp identified P02-MM as the top-performing case at this stage of the portfolio-development process. PacifiCorp developed and analyzed additional portfolios as variants of P02-MM, as described in the following section of this presentation.



Portfolio Cost and Risk Summary (Medium Gas / Medium CO₂)



Case - MM	ST Value			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	ST PVRR plus 5% of 95th Stochastic (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	Average Annual ENS, 2021-2040 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2021-2040 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P02	26,500	\$0	1	27,249	\$0	1	0.0049%	0.00000%	1	398,953	97,568	4
P03	28,705	\$2,205	4	29,553	\$2,304	4	0.0051%	0.00021%	2	301,385	0	1
BAU1	27,906	\$1,406	3	28,665	\$1,415	3	0.0051%	0.00021%	3	395,123	93,738	3
BAU2	27,517	\$1,017	2	28,275	\$1,026	2	0.0053%	0.00037%	4	391,900	90,515	2

- P02 outperforms other cases on costs and energy not served (ENS) and has comparable emissions to BAU1 and BAU2. P02 cumulative CO₂ emissions are 32 percent higher than in P03, driven by P03 retirement assumptions of retiring all coal by 2030 which has a risk-adjusted cost that is \$2.3b higher than P02.
- While the results above did not compel PacifiCorp to alter its selection of P02 as the top-performing portfolio, additional variants were developed and analyzed to identify the impacts on portfolio resource mix and cost and risk of key resource decisions particularly those affecting the action plan.
- These P02 variants show changes in the resource portfolio, differences in system costs over time relative to the P02 portfolio (the top-performing portfolio) discussed on the following slides.

Portfolio Cost and Risk Summary (Low Gas / No CO₂)



Case - LN	ST Value			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	ST PVRR plus 5% of 95th Stochastic (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	Average Annual ENS, 2021-2040 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2021-2040 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P02	22,416	\$0	1	22,997	\$0	1	0.0053%	\$0	1	472,867	172,908	4
P03	25,589	\$3,173	4	26,289	\$3,292	4	0.0055%	\$0	2	299,959	0	1
BAU1	22,988	\$572	2	23,557	\$560	2	0.0058%	\$0	4	447,378	147,419	2
BAU2	23,014	\$598	3	23,627	\$630	3	0.0057%	\$0	3	466,064	166,105	3

- P02 outperforms other cases on costs and energy not served (ENS) and has comparable emissions to BAU1 and BAU2. P02 cumulative CO₂ emissions are 58 percent higher than in P03, driven by P03 retirement assumptions of retiring all coal by 2030 which has a risk-adjusted cost that is \$3.3b higher than P02.
- Benefits to system cost and reliability, along with P03's relatively poor performance on other metrics suggest maintaining P02-MM as the top-performing portfolio.
- P02 variants show changes in the resource portfolio, differences in system costs over time relative to the P02 portfolio (the top-performing portfolio), discussed on the following slides.

Portfolio Cost and Risk Summary (Medium Gas / No CO₂)



Case - MN	ST Value			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	ST PVRR plus 5% of 95th Stochastic (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	Average Annual ENS, 2021-2040 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2021-2040 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P02	22,468	\$0	1	23,037	\$0	1	0.0049%	\$0	1	540,688	224,270	4
P03	26,743	\$4,275	4	27,483	\$4,446	4	0.0053%	\$0	3	316,418	0	1
BAU1	23,151	\$683	3	23,713	\$676	3	0.0052%	\$0	2	517,882	201,464	2
BAU2	23,026	\$558	2	23,630	\$593	2	0.0055%	\$0	4	537,670	221,252	3

- P02 outperforms other cases on costs and energy not served (ENS) and has comparable emissions to BAU1 and BAU2. P02 cumulative CO₂ emissions are 71 percent higher than in P03, driven by P03 retirement assumptions of retiring all coal by 2030 which has a risk-adjusted cost that is \$4.4b higher than P02.
- Benefits to system cost and reliability, along with P03's relatively poor performance on other metrics suggest maintaining P-02 MM as the top-performing portfolio.
- P02 variants show changes in the resource portfolio, differences in system costs over time relative to the P02 portfolio (the top-performing portfolio), discussed on the following slides.

Portfolio Cost and Risk Summary (High Gas / High CO₂)



Case - HH	ST Value			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	ST PVRR plus 5% of 95th Stochastic (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	Average Annual ENS, 2021-2040 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2021-2040 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P02	28,131	\$0	1	29,006	\$0	1	0.0056%	\$0	1	283,845	5,527	2
P03	29,683	\$1,552	3	30,613	\$1,607	3	0.0059%	\$0	3	278,317	0	1
BAU1	30,043	\$1,911	4	30,935	\$1,929	4	0.0056%	\$0	2	365,205	86,888	4
BAU2	29,546	\$1,415	2	30,441	\$1,435	2	0.0060%	\$0	4	363,367	85,050	3

- P02 outperforms other cases on costs and energy not served (ENS) and has comparable emissions to P03, the case with lowest emissions.
- P03 retirement assumptions of retiring all coal by 2030 has a risk-adjusted cost that is \$1.6b higher than P02.
- Benefits to system cost, reliability and emissions, along with P03's relatively poor performance on other metrics suggest maintaining P-02 MM as the preferred portfolio.
- P02 variants show changes in the resource portfolio, differences in system costs over time relative to the P02 portfolio (the top-performing portfolio), discussed on the following slides.

Portfolio Cost and Risk Summary (Med Gas / Social Cost of Greenhouse Gas)



Case - SCGHG	ST Value			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	ST PVRR plus 5% of 95th Stochastic (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	Average Annual ENS, 2021-2040 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2021-2040 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P02	37,225	\$0	1	38,633	\$0	1	0.0068%	\$0	1	184,124	13,421	2
P03	39,331	\$2,106	2	40,723	\$2,090	2	0.0110%	\$0	3	170,704	0	1
BAU1	41,043	\$3,818	4	42,466	\$3,833	4	0.0102%	\$0	2	214,365	43,662	4
BAU2	40,845	\$3,620	3	42,280	\$3,647	3	0.0137%	\$0	4	209,299	38,595	3

- P02 outperforms other cases on costs and energy not served (ENS) and has comparable emissions to P03, the case with lowest emissions.
- P03 retirement assumptions of retiring all coal by 2030 has a risk-adjusted cost that is \$2.1b higher than P02.
- Top performance in system cost and reliability, and good performance in emissions suggest maintaining P-02 MM as the top-performing portfolio.
- P02 variants show changes in the resource portfolio, differences in system costs over time relative to the P02 portfolio (the top-performing portfolio), discussed on the following slides.

P02-MM Variant Portfolios



- PacifiCorp ran eight variants of P02-MM (the top-performing portfolio among the initial portfolio-development cases) to evaluate portfolio impacts, cost and risk of key resource action items.

Portfolio	Description
P02a –JB 1-2 No GC	Excludes gas conversion of Jim Bridger Units 1 and 2
P02b – No B2H	Excludes Boardman-to-Hemingway transmission segment
P02c – No GWS	Excludes the Energy Gateway South transmission segment
P02d – No RFP GWS	Excludes 2020 All-Source Request for Proposals Final Shortlist and the Energy Gateway South transmission segment
P02e – No Nuc	Excludes the Natrium™ advanced nuclear demonstration project
P02f – No Nau 25	Excludes the early retirement of Naughton Units 1 and 2
P02g - CCUS	Includes Carbon Capture Utilization and Sequestration (CCUS) retrofit of Dave Johnston Unit 4 in response to Wyoming House Bill 200
P02h – JB 3-4 Retire	Includes early retirement of Jim Bridger Units 3 and 4 in response to stakeholder feedback

- The P02-MM variant portfolios were developed under the MM - medium gas / medium CO₂ price-policy assumptions. Cost and risk for each portfolio was assessed under five price-policy scenarios: LN - low gas / no CO₂, MN - medium gas / no CO₂, MM – medium gas / medium CO₂, HH - high gas / high CO₂, SCGHG – medium gas / SCGHG. The following slides highlight portfolio and cost and risk differences among the P02-MM portfolio variants relative to P02-MM.

P02-MM Variant Portfolios Cost and Risk Summary (Med Gas / Med CO₂)



Case - MM	ST Value			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	ST PVRR plus 5% of 95th Stochastic (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	Average Annual ENS, 2021-2040 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2021-2040 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P02-MM	26,500	\$0	1	27,249	\$0	1	0.0049%	0.00008%	2	398,953	29,460	4
P02a- JB 1-2 No GC	27,214	\$714	8	28,002	\$753	7	0.0049%	0.00012%	4	390,206	20,713	2
P02b- No B2H	26,812	\$312	7	27,579	\$330	6	0.0050%	0.00022%	7	418,015	48,522	7
P02c- No GWS	26,633	\$133	3	27,487	\$238	5	0.0052%	0.00032%	8	445,607	76,114	8
P02d- NoRFP GWS	27,646	\$1,146	9	28,594	\$1,345	9	0.0208%	0.01597%	9	476,318	106,824	9
P02e- No Nuc	26,706	\$206	5	28,168	\$919	8	0.0049%	0.00011%	3	408,473	38,980	6
P02f- No Nau 25	26,566	\$66	2	27,314	\$65	2	0.0050%	0.00015%	5	405,395	35,902	5
P02g- CCUS	26,753	\$253	6	27,451	\$201	4	0.0048%	0.00000%	1	394,448	24,954	3
P02h- JB 3-4 Retire	26,669	\$169	4	27,427	\$178	3	0.0050%	0.00016%	6	369,493	0	1

- All P02-MM variant cases result in combination of higher costs and risk than P02-MM.
- In the medium gas / medium CO₂ scenario, P02-MM outperforms other cases on a present value revenue requirement (PVRR) basis, risk-adjusted PVRR, and energy not served (ENS). While P02-MM has higher cumulative CO₂ emissions, it is just 8 percent higher than P02-h (the top performing portfolio on cumulative emissions) which has a risk-adjusted cost that is \$178m higher than P02-MM.
- P02-MM remains the top performing portfolio among the variants and was further assessed relative to Washington Clean Energy Transformation Act (CETA) requirements, described further in a later section.

Portfolio Cost and Risk Summary (Low Gas / No CO₂)



Case - LN	ST Value			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	ST PVRR plus 5% of 95th Stochastic (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	Average Annual ENS, 2021-2040 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2021-2040 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P02-LN	23,298	\$0	6	23,891	\$0	5	0.0054%	0.00000%	2	436,134	0	4
P02a- JB 1-2 No GC	24,069	\$771	9	24,704	\$833	9	0.0051%	0.00000%	1	427,277	(8,857)	2
P02b- No B2H	23,179	(\$119)	3	23,774	(\$116)	2	0.0054%	0.00036%	6	456,553	20,419	7
P02c- No GWS	22,548	(\$750)	1	23,199	(\$692)	1	0.0056%	0.00053%	8	484,784	48,650	8
P02d- NoRFP GWS	23,109	(\$189)	2	23,828	(\$63)	4	0.0265%	0.0214%	9	515,934	79,800	9
P02e- No Nuc	23,289	(\$9)	5	23,896	\$5	6	0.0054%	0.00030%	4	446,547	10,413	6
P02f- No Nau 25	23,221	(\$77)	4	23,807	(\$84)	3	0.0054%	0.00037%	7	442,821	6,687	5
P02g- CCUS	23,549	\$251	7	24,089	\$198	7	0.0054%	0.00029%	3	431,634	(4,500)	3
P02h- JB 3-4 Retire	23,752	\$454	8	24,358	\$467	8	0.0054%	0.00033%	5	405,192	(30,942)	1

- Under a low gas, no CO₂ price-policy environment, several cases outperform P02-MM-LN on a PVRR(d) basis (P02-No B2H, P02-No GWS, P02-No RFPGWS, P02-No Nuc and P02-No Nau25).
- Each of these portfolios include three distinct risks mitigated by the P02-MM portfolio:
 - Higher CO₂ emissions
 - Potential of federal CO₂ policy action
 - Lost opportunity in a tightly constrained system
- Each of the five cases with favorable PVRR(d) increases CO₂ emissions
- The cases with the highest benefits also have the highest emissions differential:
 - Compared to the P02-MM-LN case, P02-No GWS-LN reports an 11 percent increase in emissions over the 20-year study period, equivalent to 49 million tons.
 - Emissions in case P02-RFPGWS-LN increase by 18 percent, equivalent to 80 million tons.

Portfolio Cost and Risk Summary (Medium Gas / No CO₂)



Case - MN	ST Value			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	ST PVRR plus 5% of 95th Stochastic (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	Average Annual ENS, 2021-2040 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2021-2040 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P02-MN	23,127	\$0	3	23,707	\$0	3	0.0049%	0.00000%	4	511,369	0	4
P02a- JB 1-2 No GC	23,860	\$732	9	24,477	\$770	9	0.0049%	0.00006%	2	504,386	(6,982)	2
P02b- No B2H	23,132	\$5	4	23,722	\$15	4	0.0050%	0.00013%	6	527,710	16,342	7
P02c- No GWS	22,740	(\$387)	1	23,397	(\$310)	1	0.0051%	0.00028%	8	554,193	42,825	8
P02d- No RFP GWS	23,518	\$391	7	24,259	\$552	8	0.0208%	0.01597%	9	575,308	63,939	9
P02e- No Nuc	23,183	\$56	5	23,782	\$74	5	0.0049%	0.00008%	5	521,098	9,730	6
P02f- No Nau 25	23,090	(\$37)	2	23,662	(\$45)	2	0.0049%	0.00008%	3	518,642	7,274	5
P02g- CCUS	23,430	\$303	6	23,958	\$251	6	0.0048%	0.00000%	1	506,715	(4,654)	3
P02h- JB 3-4 Retire	23,654	\$526	8	24,251	\$543	7	0.0050%	0.00018%	7	472,422	(38,947)	1

- Under a medium gas, no CO₂ price-policy environment, two cases outperform P02-MM-MN on a PVRR(d) basis (P02c-No GWS, P02f-No Nau25).
- These two portfolios include three distinct risks mitigated by the P02-MM portfolio:
 - Higher CO₂ emissions
 - Potential of federal CO₂ policy action
 - Lost opportunity in a tightly constrained system
- Notably, P02c-No GWS and P02d-No RFPGWS rank 8th and 9th out of 9 in ENS under every price-policy scenario, indicating consistently reduced reliability.
- P02c-No GWS and 8th out of 9 in emission levels.

Portfolio Cost and Risk Summary (High Gas / High CO₂)



Case - HH	ST Value			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	ST PVRR plus 5% of 95th Stochastic (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	Average Annual ENS, 2021-2040 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2021-2040 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P02-HH	29,485	\$0	2	30,378	\$0	2	0.0049%	0.00000%	3	368,551	0	4
P02a- JB 1-2 No GC	30,141	\$655	7	31,066	\$688	7	0.0050%	0.00010%	6	360,636	(7,915)	2
P02b- No B2H	30,078	\$593	6	31,003	\$625	6	0.0050%	0.00010%	5	387,960	19,408	7
P02c- No GWS	30,423	\$937	8	31,441	\$1,063	8	0.0051%	0.00025%	8	413,739	45,187	8
P02d- NoRFP GWS	32,041	\$2,556	9	33,197	\$2,819	9	0.0206%	0.01568%	9	445,220	76,669	9
P02e- No Nuc	29,892	\$406	5	30,817	\$439	5	0.0049%	0.00001%	2	377,010	8,459	6
P02f- No Nau 25	29,686	\$201	4	30,581	\$203	4	0.0049%	0.00003%	4	374,781	6,230	5
P02g- CCUS	29,620	\$135	3	30,453	\$75	3	0.0049%	0.00000%	1	364,436	(4,115)	3
P02h- JB 3-4 Retire	29,384	(\$101)	1	30,263	(\$115)	1	0.0051%	0.00020%	7	341,025	(27,527)	1

- Under a high gas, high CO₂ price-policy environment, one case outperforms P02-MM-HH on a PVRR(d) basis (P02-JB 3-4Retire).
- On average, portfolios run under the HH price-policy scenario incur \$3.3b of additional costs above portfolio run under the MM price-policy assumption.
- Among the P02 variant portfolios, P02-HH is least-cost with exception of P02h-JB 3-4 Retire. Driven by the relatively high-cost of emissions, the additional early retirement of two Jim Bridger coal plants provides \$115m in risk-adjusted net system benefits and reports the lowest emissions.
- The P02h-JB 3-4 Retire case also ranks 7th out of 9th for ENS indicating reduced reliability and ranks in the bottom half of ENS rankings in all price-policy scenarios.

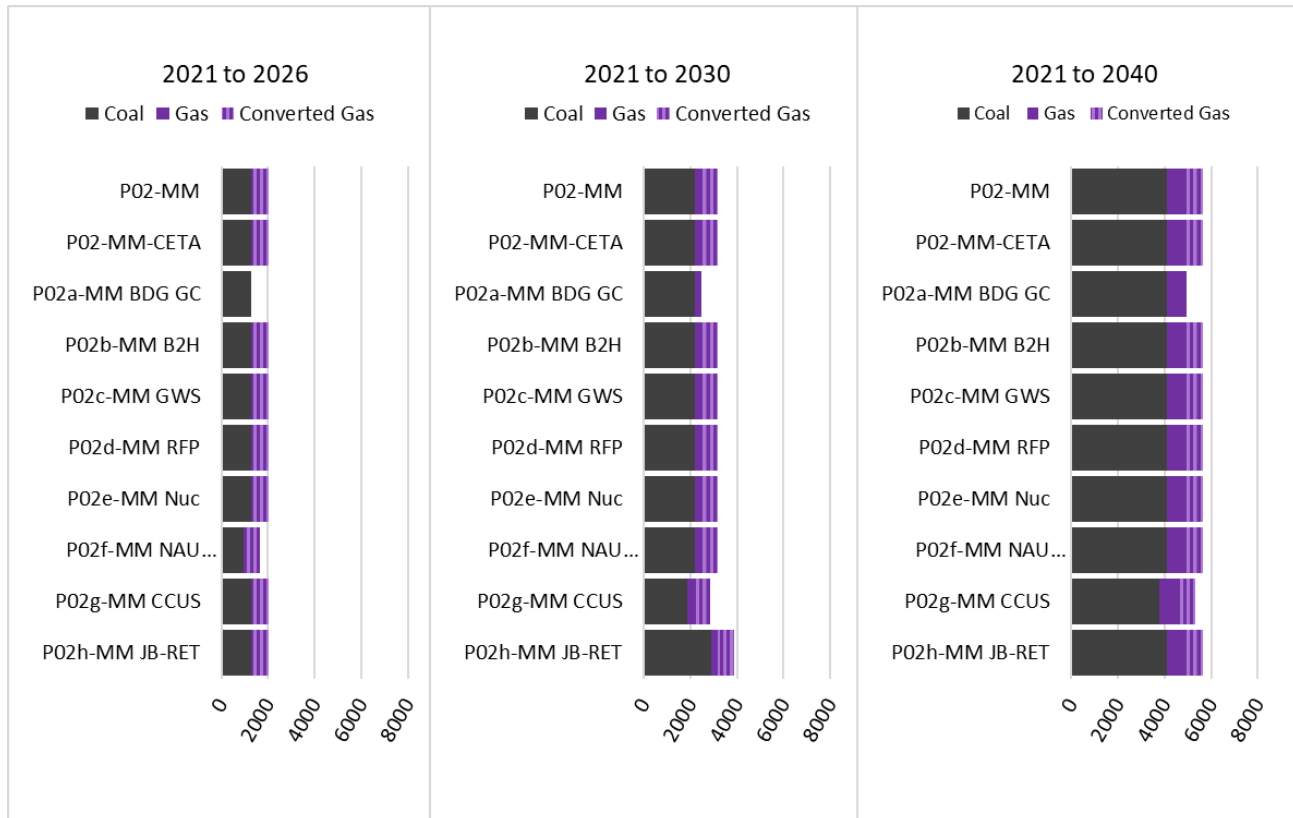
Portfolio Cost and Risk Summary (Med Gas / Social Cost of Greenhouse Gas)



Case - SCGHG	ST Value			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	ST PVRR plus 5% of 95th Stochastic (\$m)	Change from Lowest Cost Portfolio (\$m)	Rank	Average Annual ENS, 2021-2040 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2021-2040 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P02-SCGHG	40,345	\$0	2	41,763	\$0	2	0.0094%	0.00000%	3	208,650	0	4
P02a- JB 1-2 No GC	40,935	\$590	6	42,382	\$618	6	0.0097%	0.00073%	4	206,732	(1918)	2
P02b- No B2H	41,646	\$1,301	7	43,123	\$1,360	7	0.0117%	0.00273%	7	228,728	20,078	7
P02c- No GWS	42,918	\$2,573	8	44,546	\$2,782	8	0.0157%	0.00674%	8	245,883	37,233	8
P02d- NoRFP GWS	46,633	\$6,288	9	48,452	\$6,688	9	0.0537%	0.04472%	9	281,014	72,364	9
P02e- No Nuc	40,919	\$574	5	42,375	\$612	5	0.0090%	0.00000%	1	215,640	6,990	6
P02f- No Nau 25	40,735	\$390	4	42,165	\$402	4	0.0098%	0.00079%	5	213,910	5,260	5
P02g- CCUS	40,451	\$106	3	41,808	\$45	3	0.0091%	0.00013%	2	207,527	(1,122)	3
P02h- JB 3-4 Retire	40,157	(\$188)	1	41,555	(\$208)	1	0.0103%	0.00133%	6	201,974	(6,676)	1

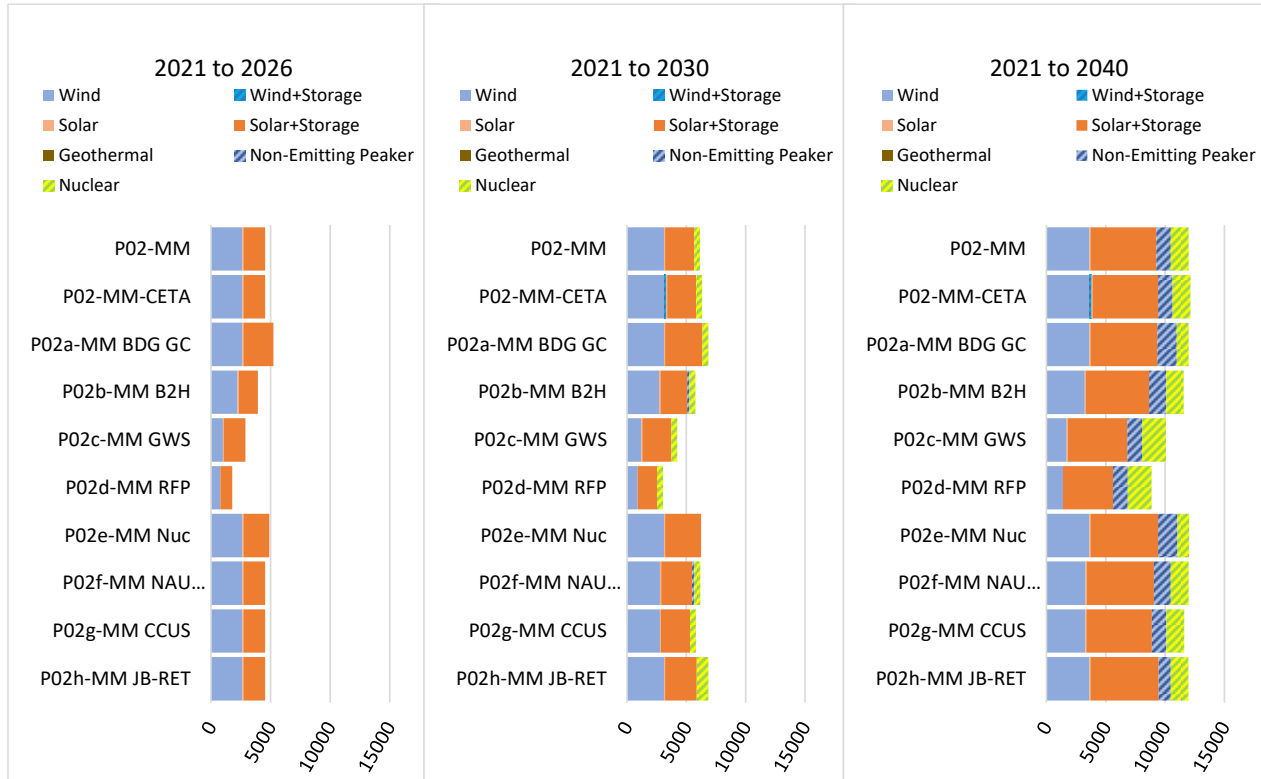
- Among the P02 variant portfolios, P02-MM-SCGHG is least-cost with exception of P02h-JB 3-4 Retire. Driven by the high-cost of emissions, the additional early retirement of two Jim Bridger coal plants provides \$208m in risk-adjusted net system benefits.
- The social cost of greenhouse gas price-policy scenario assumes emissions pricing as specified in Table 2 of the Interagency Working Group on social cost of greenhouse gas produced by the United States Government.
- One significant change from the 2019 IRP's social cost of carbon (SCC) case is the required shift from the 3.0% "average" discount rate to the 2.5% "low" discount rate. This change increases the SC-GHG base pricing by an average of 49 percent in the 5-year intervals specified by the table.
- On average, portfolios run under the SCGHG price-policy scenario incur \$13b of additional costs above portfolio run under the MM price-policy assumption.

P-02 and Variant Portfolios Thermal Retirements (MW)



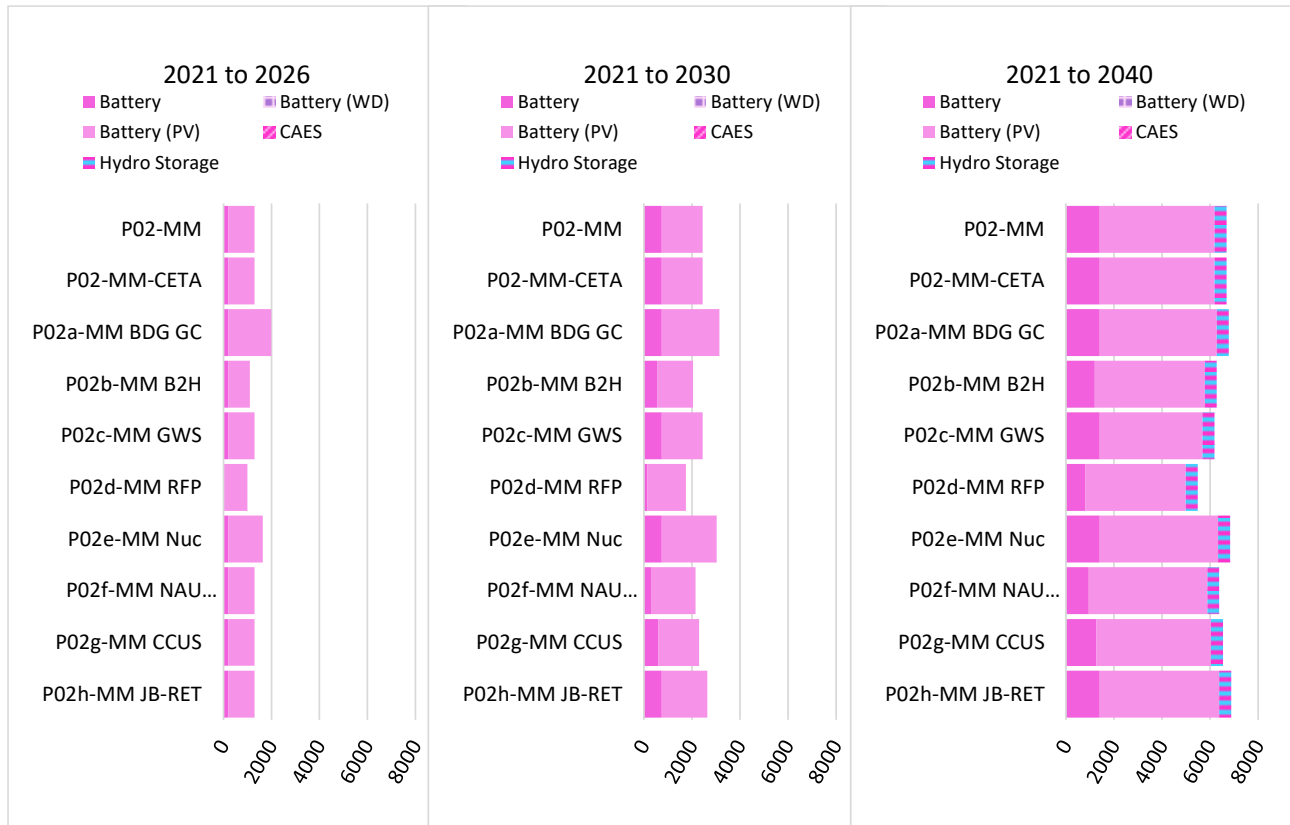
- Through 2040, coal retirements are similar among nearly all cases except those with specified retirement changes (P02a and P02g).
- P02a removes 713 MW of Jim Bridger Units 1 and 2 gas conversion, delaying the cessation of coal operations until 2038.
- P02g installs carbon capture on Dave Johnston unit 4, extending coal operations. Continue operation displaces 149 MW of Wyoming battery in 2029 and displaces 359 MW of Wyoming wind in 2030.

P-02 and Variant Portfolios Renewables and Non-Emitting Resources (MW)



- P02-MM-CETA includes the highest addition of renewable capacity, 160 MW of wind higher than the P02 MM portfolio.
- P02b excludes Boardman-to-Hemingway in 2026 along with 600 MW of new co-located solar and storage.
- P02c (no Energy Gateway South) excludes 1,641 MW of new wind in eastern Wyoming.
- P02d (no RFP bids or Energy Gateway South) results in the lowest new renewable additions, excluding 1,792 MW of wind, 1,302 MW of solar additions, and 697 MW of battery storage capacity.
- P02e excludes the 500 MW Natrium™ demonstration project in 2028, resulting in the lowest nuclear resource additions across the horizon at 1,000 MW in 2038; P02e also has the highest non-emitting peaking additions, at 1,638 MW.

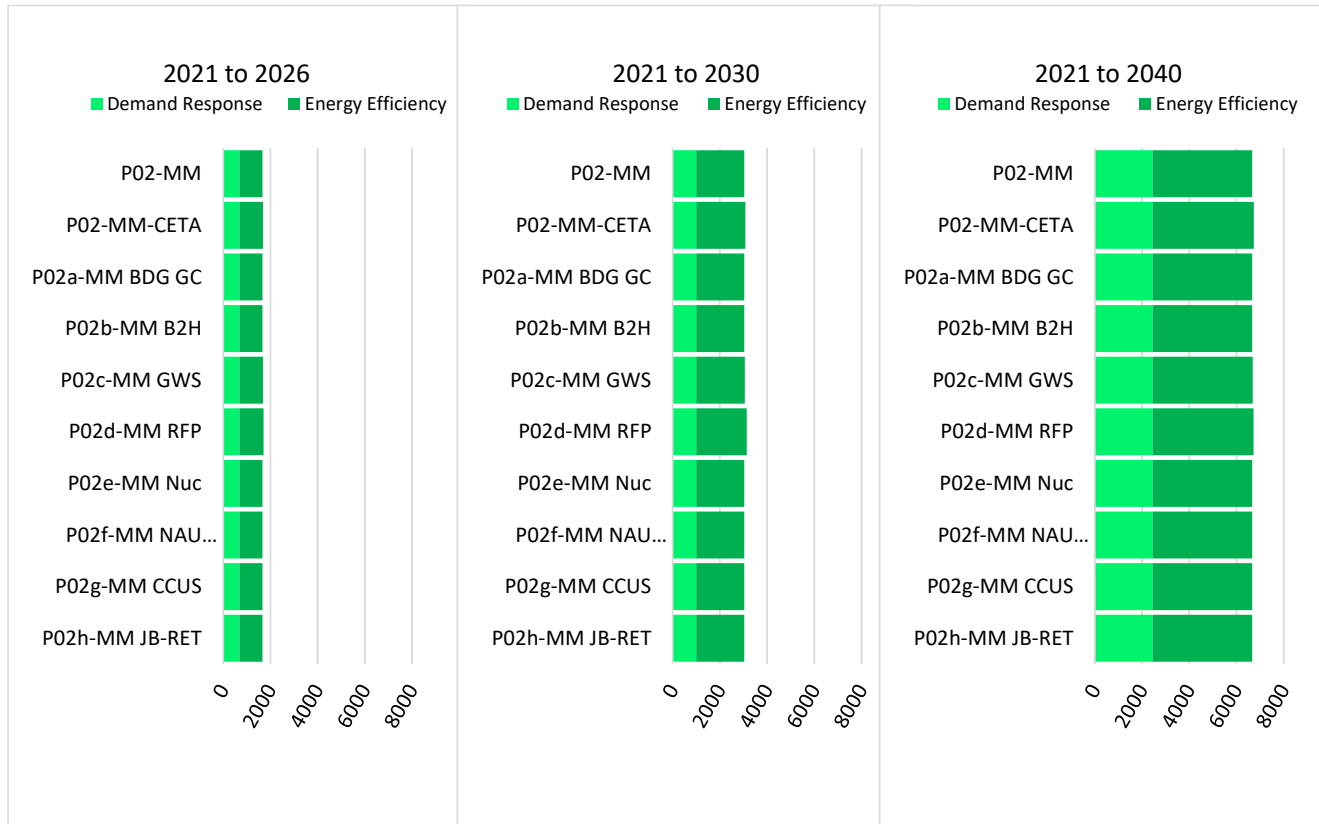
P-02 and Variant Portfolios Storage (MW)



- In each interval, P02d adds the least total battery resource in the absence of final shortlist bids and Energy Gateway South. This is due to larger additions of advance nuclear and non-emitting peaking units need to meet system requirements.
- With the removal of large capacity dispatchable resources, such as the Natrium demonstration project (P02e) or the Jim Bridger plant (P02h), additional battery is added to maximize the capabilities of renewable additions.

P-02 and Variant Portfolios

Demand-Side Management (MW)



- Demand-side management selections remain relatively consistent among P02 variants and range between 6,664 MW and 6,738 MW (P02-MM-CETA).
- Through 2040, energy efficiency selections range from 4,216 MW and 4,290 MW (P02-MM-CETA); P02-MM-GWS and P02-MM-RFP have intermediate levels of energy efficiency at 4,246 MW and 4,278 MW respectively.



Washington Clean Energy Transformation Act (CETA) Scenarios



Washington CETA Scenarios

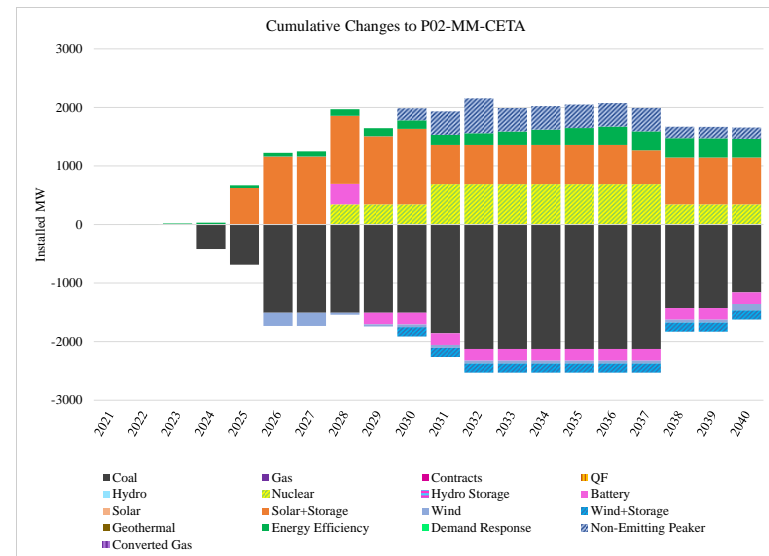
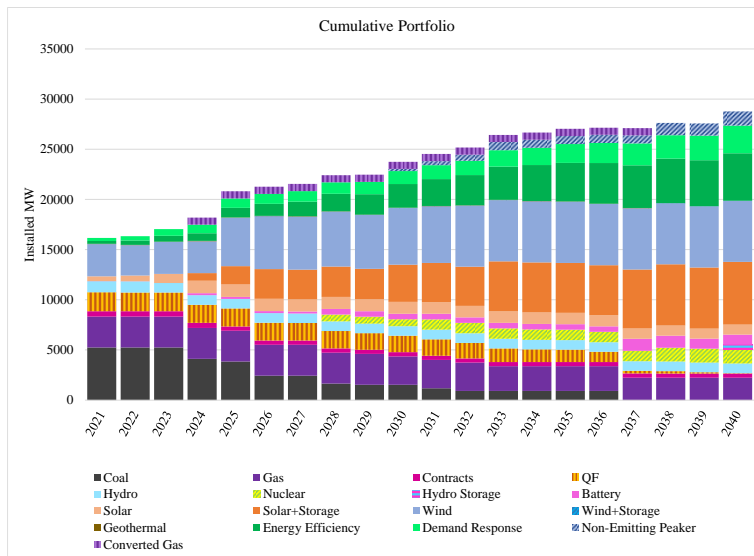


- Washington’s CETA legislation requires utilities to conduct three scenarios:
 - **Alternative Lowest Reasonable Cost** - WAC 480-100-620(10)(a) instructs utilities to “describe the alternative lowest reasonable cost and reasonably available portfolio that the utility would have implemented if not for the requirement to comply” with CETA’s Clean Energy Transformation Standards.
 - **Climate Change** - WAC 480-100-620(10)(b) instructs utilities to “incorporate the best science available to analyze impacts including, but not limited to, changes in snowpack, streamflow, rainfall, heating and cooling degree days, and load changes resulting from climate change.”
 - **Maximum Customer Benefit** - WAC 480-100-620(10)(c) instructs utilities to “model the maximum amount of customer benefits described in RCW 19.405.040(8) prior to balancing against other goals.”
- PacifiCorp discusses each of these portfolio outcomes on the following slides relative to the preferred portfolio P02-MM-CETA with exception of the Alternative Lowest Reasonable Cost scenario which is also discussed relative to P02-MM and P02-SCGHG-MM.

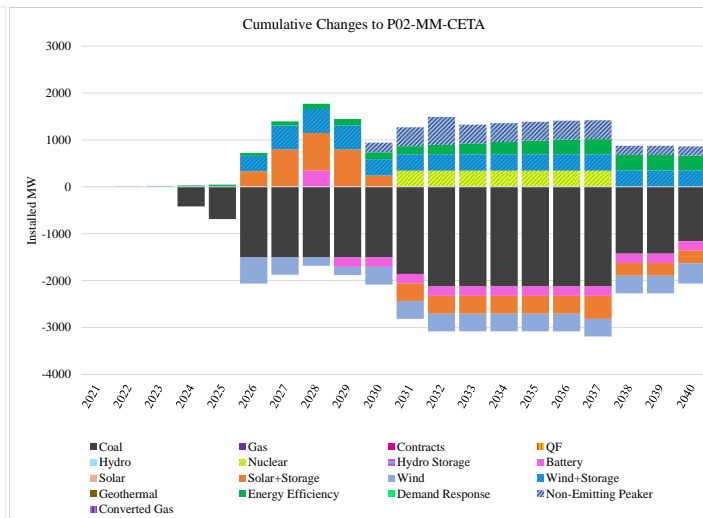
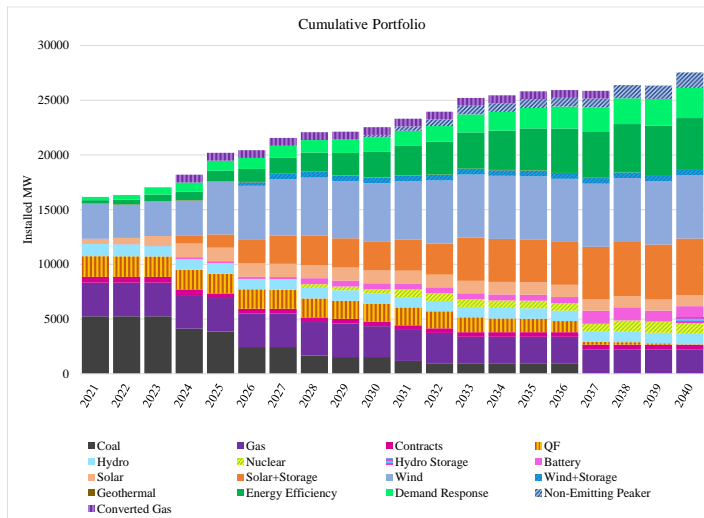
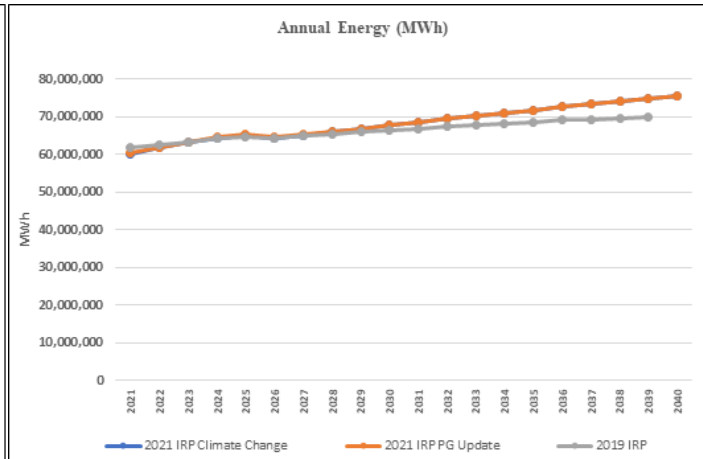
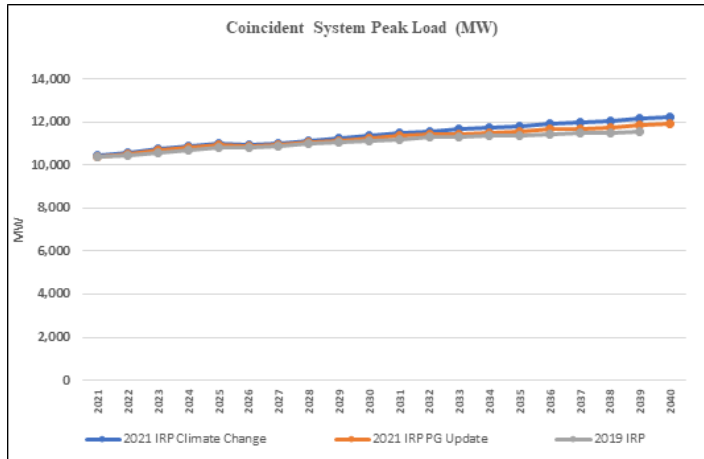
Alternative Lowest Reasonable Cost



- WAC 480-100-620(10)(a) instructs utilities to “describe the alternative lowest reasonable cost and reasonably available portfolio that the utility would have implemented if not for the requirement to comply” with CETA’s Clean Energy Transformation Standards and must include the social cost of greenhouse gases (SCGHG) in the resource acquisition decision.
- In the absence of a requirement to assume SCGHG during portfolio development, the alternative lowest reasonable cost portfolio is P02-MM, and what we would have implemented but for CETA requirements.
- The preferred portfolio, P02-MM-CETA, adds a present value revenue requirement of \$177m compared to P02-MM to meet CETA requirements.
- Accounting for the requirement to include the SCGHG price-policy assumption in portfolio development, the alternate scenario becomes the same as case P02-SCGHG-MM – This is an SCGHG portfolio run under the medium gas, medium CO₂ price-policy scenario.
- Comparing the Alternative Lowest Reasonable Cost case (P02-SCGHG-MM) to the preferred portfolio (P-02-MM-CETA) yields a PVRR(d) system cost that is anticipated to be significantly higher.



Climate Change

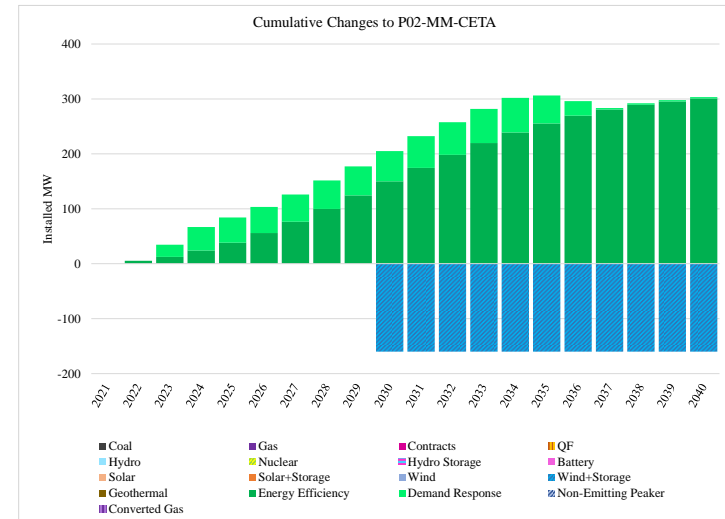
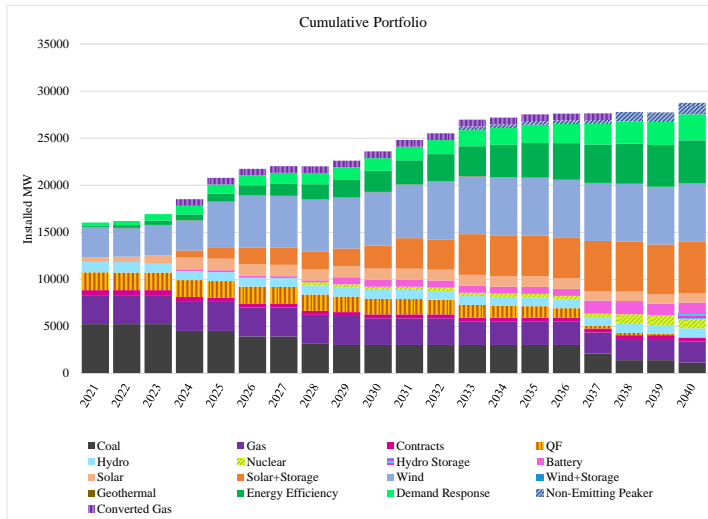


The Washington climate change scenario includes an updated load forecast to incorporate regional studies on potential temperature change (and associated impact to demand and energy). The scenario also includes analysis of impacts from climate change (precipitation, streamflow, etc.) on Lewis River hydroelectric generating facilities, resulting in an energy reduction of approximately 7 percent. Compared to the preferred portfolio, the climate change scenario increases system costs by \$14B, driven in large part by the SCGHG price-policy assumption.

Maximum Customer Benefit



- The maximum customer benefit scenario focuses on adding distributed generation, demand response, and energy efficiency in Washington, as well as avoiding high-voltage transmission upgrades in PacifiCorp's Yakima and Walla Walla communities to minimize burdens and maximize benefits to Washington customers.



- Washington load forecast reflects the high private generation forecast
- The portfolio assumes the social cost of greenhouse gas price-policy scenario
- Includes all available Washington energy efficiency and demand response
- 335 MW of needed Yakima resource is assumed to be small scale PVS, adjusting operating costs and mitigating transmission costs
- Due to higher DSM selections, it was not necessary to create a hybrid Yakima resource by adding 160 MW of co-located wind to the selected PVS resource in year 2030. As a result, a 160 MW reduction in wind capacity is visible in the Cumulative Changes graph beginning 2030 relative to the preferred portfolio
- The Maximum customer benefits sensitivity increases costs by \$16b relative to the preferred portfolio, driven primarily by the SCGHG price-policy assumption and the inclusion of all available DSM



Sensitivities



Sensitivities



- PacifiCorp plans to complete sensitivities on the preferred portfolio and include description and cost and risk analysis in its September 1, 2021, and if not available at that time, to supplement the filing with the sensitivity information.
- 2021 IRP sensitivities include the following:
 - High/low load, 1-in-20 load
 - High/low private generation
 - Business plan sensitivity
 - Alternate DSM bundling (levelized cost of energy)
 - Allow new proxy natural gas resources (per stakeholder request)
- A further discussion of the sensitivities included in the September 1 filing of the 2021 IRP is scheduled as part of the post-filing October 1, 2021, public-input meeting



Washington Clean Energy Implementation Plan Update



Washington Clean Energy Implementation Plan Update



Recent Updates

- Filed IRP-to-CEIP modeling workplan on August 16, 2021; explained the methodology for how the preferred portfolio will inform Washington-specific planning process.
- Held 4th Equity Advisory Group (EAG) meeting on August 17, 2021, to discuss Customer Benefit Indicators (CBIs) and development of metrics in support of CBIs.



Next Steps

- PacifiCorp's 2021 IRP filing on September 1 will include as an appendix the Clean Energy Action Plan – a 10-year view of Washington's allocation of the preferred portfolio.
- Following the 2021 IRP filing, additional technical discussion will occur to identify any additional Washington-specific modeling – downstream of the IRP and informed by the preferred portfolio – needed to support CEIP specific actions.
- PacifiCorp is in the process of scheduling a technical workshop for mid-September.



Project Deliverables

- PacifiCorp will hold additional public meetings in Washington including EAG, WA advisory groups and general public, throughout Q3 and Q4 to inform the CEIP, refine metrics and CBIs, determine additional modeling needs, etc.
- The draft CEIP will be filed in Washington on November 1, 2021
- The final CEIP will be filed in Washington no later than January 1, 2022



Stakeholder Feedback Form Update



Stakeholder Feedback Form Update



- 91 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 received 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
- Stakeholder feedback forms received following the previous public-input meeting is summarized on the following slide(s) for reference

Stakeholder Feedback Forms



Stakeholder	Date	Topic	Brief Summary (complete form available online)	Response (posted online when available)
Utah Office of Consumer Services (090)	August 6, 2021	Customer rate impact	Recommendation to include rate impact analysis for preferred portfolio and other top performing portfolios.	Anticipated response week of August 30, 2021.
Oregon Public Utility Commission Staff (091)	August 11, 2021	Supply-side resources, coal, renewables load correlation	Questions/recommendations on HB 2021, Natrium demonstration project, Plexos modeling, and emissions data.	Anticipated response week of August 30, 2021.



Additional Information/Next Steps



Additional Information



- Public Input Meeting and Workshop Presentation and Materials:
 - pacificorp.com/energy/integrated-resource-plan/public-input-process
- 2021 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
- Information on PacifiCorp's Washington-specific Clean Energy Implementation Plan:
 - pacificorp.com/energy/washington-clean-energy-transformation-act-equity.html

Next Steps



Upcoming Dates:

- September 1, 2021 – File 2021 IRP
- October 1, 2021* – Post-IRP Filing Public-Input Meeting

**meeting dates are subject to change*