2019 Integrated Resource Plan (IRP) Public Input Meeting October 3-4, 2019




PACIFICORP
POWERING YOUR GREATNESS

Agenda

October 3 – Day One

- 9:00am-11:15am pacific – Preferred Portfolio and Action Plan
- 11:15am-12:00pm pacific – Lunch Break
- 12:00pm-2:00pm pacific – Preferred Portfolio and Action Plan
- 2:00pm-2:15pm – Break
- 2:15pm-4:00pm pacific – Portfolio Development and Selection

October 4 – Day Two

- 8:30am-11:15am pacific – Portfolio Development and Selection
- 11:15am-12:00pm pacific – Lunch Break
- 12:00pm-2:00pm pacific – Sensitivities
- 2:00 pm-2:20pm pacific – Stakeholder Feedback Form Recap
- 2:20pm-2:30pm pacific – Wrap-Up / Next Steps

Overview

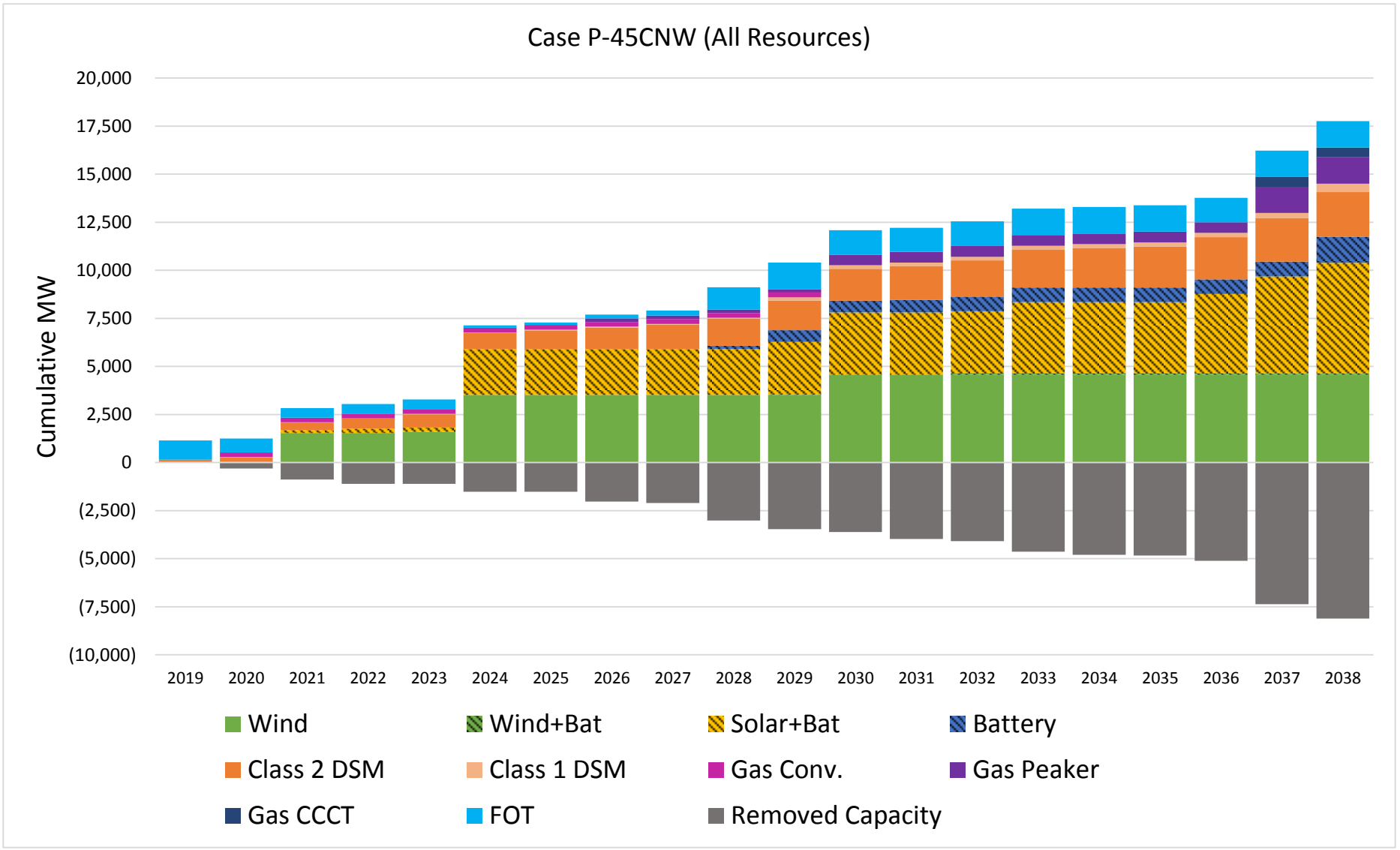
- Supported by comprehensive data analysis and a robust stakeholder input-process, PacifiCorp has identified case P-45CNW as the 2019 IRP preferred portfolio. This plan continues investments in new wind and transmission, while adding significant new solar and battery resources.
- Through the end of 2023 (the action plan window), the preferred portfolio includes 1,821 MW of new solar and 1,989 MW of new wind (not contracted or under construction). Through 2038, the preferred portfolio includes 5,186 MW of new solar and 3,110 MW of new wind (not contracted or under construction).
- The preferred portfolio includes battery storage resources for the first time. Through the end of 2023, the preferred portfolio include 595 MW of battery storage capacity—all of this capacity is combined with new solar resources. Through 2038, the preferred portfolio includes 2,821 MW of battery storage capacity—1,456 MW is combined with new solar.
- The preferred portfolio includes continued investment in demand-side management, with energy efficiency savings outpacing levels identified in the 2017 IRP preferred portfolio.
- Reliance on market purchases during summer peak periods averages 366 MW per year over the 2020-2027 timeframe—down 60 percent from market purchases identified in the 2017 IRP preferred portfolio. The reduction in market purchases coincides with the period over which there are resource adequacy concerns in the region.
- Naughton Unit 3 will be converted to natural gas in 2020. New natural gas peaking resources first appear in the portfolio in 2026, which provides sufficient time to continue to evaluate whether non-emitting capacity resources can be added to provide incremental generating capacity to the system.
- Coal unit retirements exceed 1,457 MW by the end of 2025, 2,874 MW by the end of 2030, and 4,485 MW by the end of 2038. Coal resources have been an important resource in PacifiCorp's portfolio and will continue to play an important role as units approach retirement dates.
- To facilitate the delivery of new energy resources, the preferred portfolio calls for construction of Energy Gateway South by the end of 2023 along with several other transmission upgrades across PacifiCorp's system that enable new renewables and increase supply reliability and resilience.

2019 IRP
Preferred Portfolio



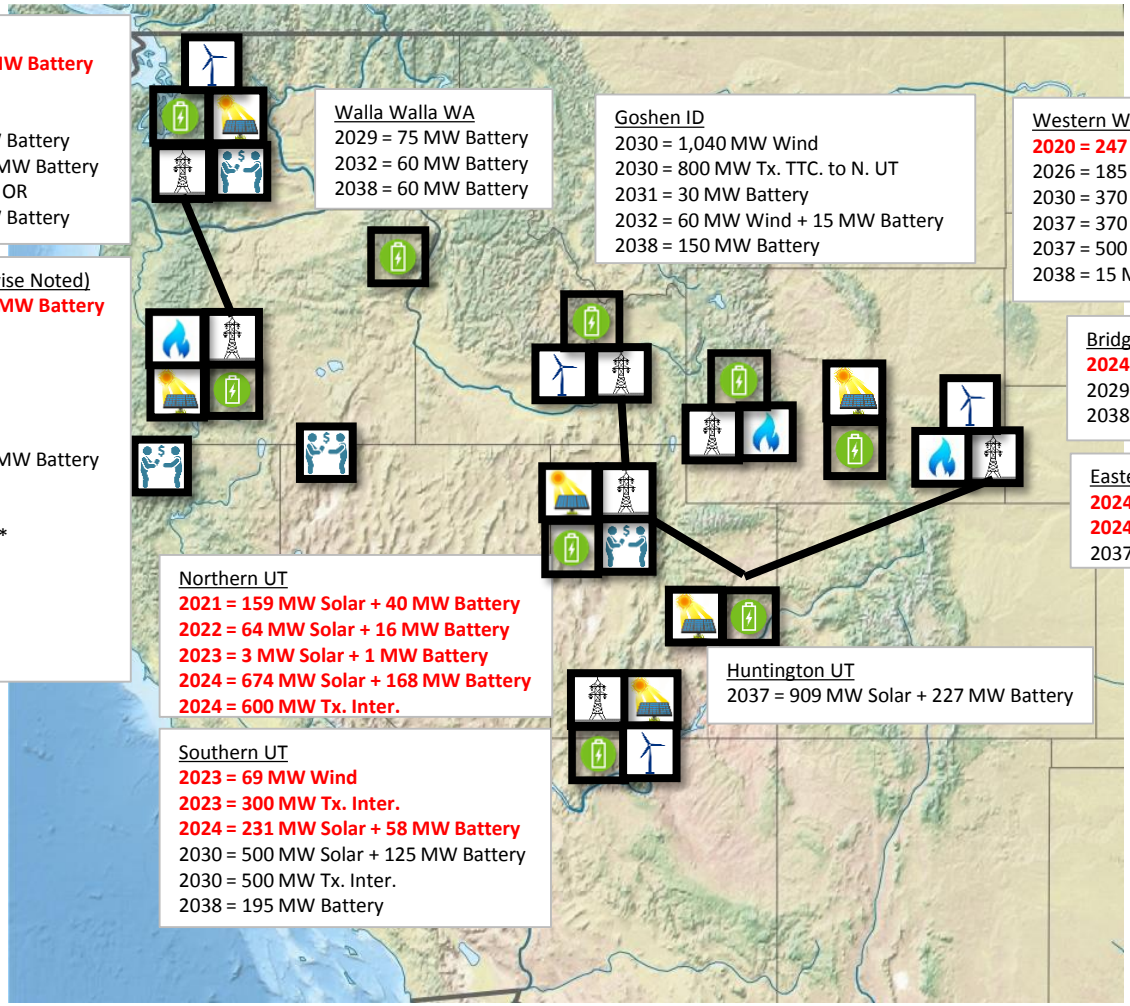

PACIFICORP
POWERING YOUR GREATNESS

Preferred Portfolio Resources



*Note: Solar+battery and wind+battery resources reflect the capacity of the renewable resource. Batteries are assumed to be sized at 25% of the renewable resource capacity.

Preferred Portfolio Generating Resources (Case P-45CNW)



Yakima WA
2024 = 395 MW Solar + 99 MW Battery
2024 = 405 MW Tx. Up.
2028 = 105 MW Battery
2029 = 10 MW Wind + 3 MW Battery
2036 = 419 MW Solar + 105 MW Battery
2036 = 450 MW Tx. TTC to S. OR
2037 = 10 MW Wind + 3 MW Battery

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2028 = 75 MW Battery*
2029 = 210 MW Battery
2029 = 105 MW Battery**
2029 = 45 MW Battery*
2032 = 60 MW Battery
2033 = 475 MW Solar + 119 MW Battery
2033 = 120 MW Battery
2033 = 475 MW Tx. Inter.
2037 = 443 MW Gas Peaking*
2037 = 615 MW Tx. Inter.*
2038 = 180 MW Battery

*Willamette Valley
**Portland North Coast

Walla Walla WA
2029 = 75 MW Battery
2032 = 60 MW Battery
2038 = 60 MW Battery

Goshen ID
2030 = 1,040 MW Wind
2030 = 800 MW Tx. TTC. to N. UT
2031 = 30 MW Battery
2032 = 60 MW Wind + 15 MW Battery
2038 = 150 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2030 = 370 MW Gas
2037 = 370 MW Gas
2037 = 500 MW Tx. Inter.
2038 = 15 MW Battery

Bridger WY
2024 = 354 MW Solar + 89 MW Battery
2029 = 359 MW Solar + 90 MW Battery
2038 = 702 MW Solar + 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2037 = 505 MW Gas CCCT

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2023 = 3 MW Solar + 1 MW Battery
2024 = 674 MW Solar + 168 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2023 = 69 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 231 MW Solar + 58 MW Battery
2030 = 500 MW Solar + 125 MW Battery
2030 = 500 MW Tx. Inter.
2038 = 195 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Coal/Early Gas Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023– JB1 (351 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (755 MW)
2028 = JB2 (356 MW)
2030 = HY1-2 (77 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Pumped Hydro
- Gas
- Market
- Transmission

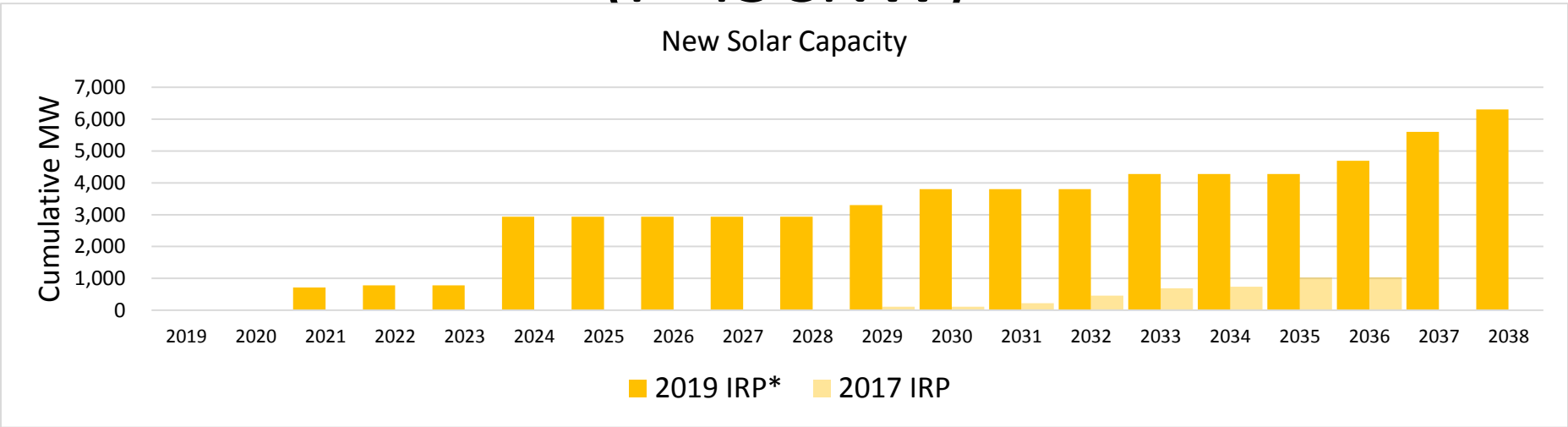
Note: Resources highlighted in red text trigger an action item in the 2019 IRP action plan.

New Transmission (P-45CNW)

Year	Preferred Portfolio Resource(s)	From	To	Nominal Capital ($m)*	Description*
2023	69 MW Wind (2023) 231 MW Solar (2024)	Within Southern UT Transmission Area		$8.4	Enables 300 MW of interconnection: UT Valley 345 kV-138 kV + 138kV reinforcement.
2024	354 MW Solar (2024)	Within Bridger WY Transmission Area		$0.0	Reclaimed transmission upon retirement of Jim Bridger 1.
2024	674 MW Solar (2024)	Within Northern UT Transmission Area		$29.5	Enables 600 MW of interconnection: Northern UT 345 kV reinforcement.
2024	1,920 MW Wind (2024)	Aeolus WY	UT South	$1,752.3	Enables 1,920 MW of interconnection with 1,700 MW of TTC: Energy Gateway South.
2024	395 MW Solar (2024) 10 MW Wind (2029)	Within Yakima WA Transmission Area		$3.0	Enables 405 MW of interconnection: local reinforcement.
2029	359 MW Solar (2024)	Within Bridger WY Transmission Area		$0.0	Reclaimed transmission upon retirement of Jim Bridger 2.
2030	1,040 MW Wind (2030) 60 MW Wind (2032)	Goshen ID	UT North	$253.7	Enables 1,100 MW of interconnection with 800 MW of TTC.
2030	500 MW Solar (2030)	Within Southern UT Transmission Area		$205.7	Enables 500 MW of interconnection: UT Valley local area reinforcement.
2033	475 MW Solar (2033)	Within Southern OR Transmission Area		$102.0	Enables 475 MW of interconnection: Medford area 500 kV-230 kV reinforcement.
2036	419 MW Solar (2036)	Yakima WA	Southern OR	$254.9	Enables 430 MW of interconnection with 450 MW of TTC: Yakima to Bend 230 kV.
2037	909 MW Solar (2037)	Southern UT	Northern UT	$0.0	Reclaimed transmission upon retirement of Huntington 1-2.
2037	443 MW Gas (2037)	Within Willamette Valley OR Transmission Area		$40.3	Enables 615 MW of interconnection: Albany area reinforcement.
2037	370 MW Gas (2037)	Within Southwest WY Transmission Area		$38.8	Enables 500 MW of interconnection: separation of double circuit 230 kV lines.
2038	702 MW Solar (2038)	Within Bridger WY Transmission Area		$0.0	Reclaimed transmission upon retirement of Jim Bridger 3-4.

*Note: 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 project and the type of equipment proposed for any given project.

Solar Resources (P-45CNW)

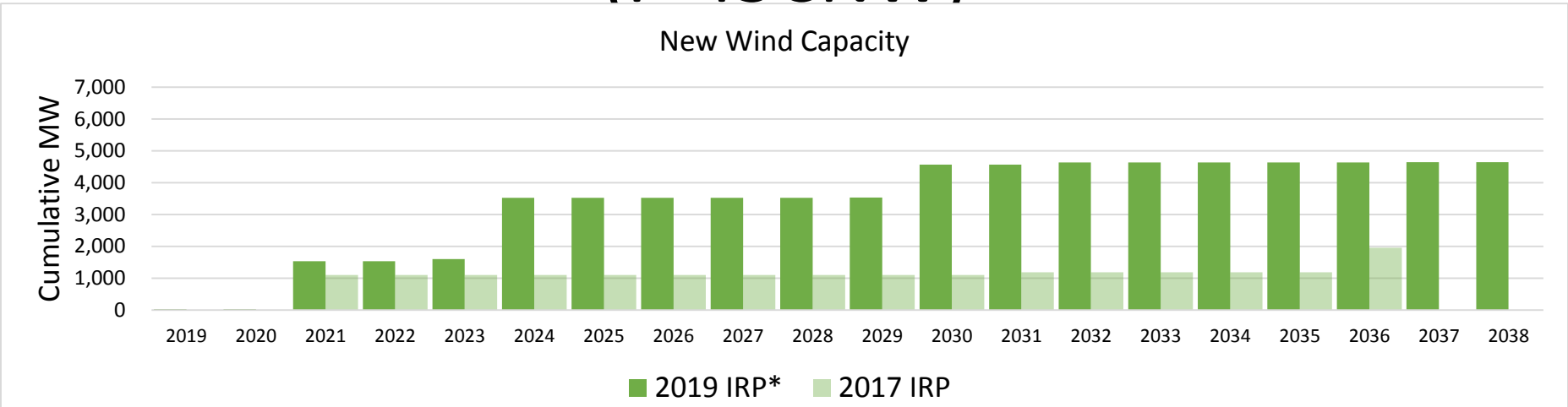


State	2019 IRP Preferred Portfolio Solar (2019-2024)	2019 IRP Preferred Portfolio Solar (2025-2038)
Utah	2021 = 337 MW + **122 MW** (contracted) 2021 = **159 MW** (with 40 MW battery) 2022 = **64 MW** (with 16 MW battery) 2023 = **3 MW** (with 1 MW battery) 2024 = 904 MW (with 226 MW battery); **331 MW** of the 904 MW is customer preference	2030 = 500 MW (with 125 MW battery) 2037 = 909 MW (with 227 MW battery)
Wyoming	2024 = 354 MW (with 89 MW battery)	2029 = 359 MW (with 90 MW battery) 2038 = 702 MW (with 175 MW battery)
Oregon	2021 = 100 MW (contracted) 2024 = 500 MW (with 125 MW battery)	2033 = 475 MW (with 119 MW battery)
Washington	2024 = 395 MW (with 99 MW battery)	2036 = 419 MW (with 105 MW battery)

- Resources highlighted **blue** in the table represent resources that meet assumed customer preference targets.

*Note: 2019 IRP solar shown in the graph includes 559 MW of contracted new solar (all power-purchase agreements) that was not identified in the 2017 IRP and that is treated as existing resources in the 2019 IRP preferred portfolio. These resources will be online by the end of 2020 and are shown in the first full year of operation (the year after year-end online dates).

Wind Resources (P-45CNW)

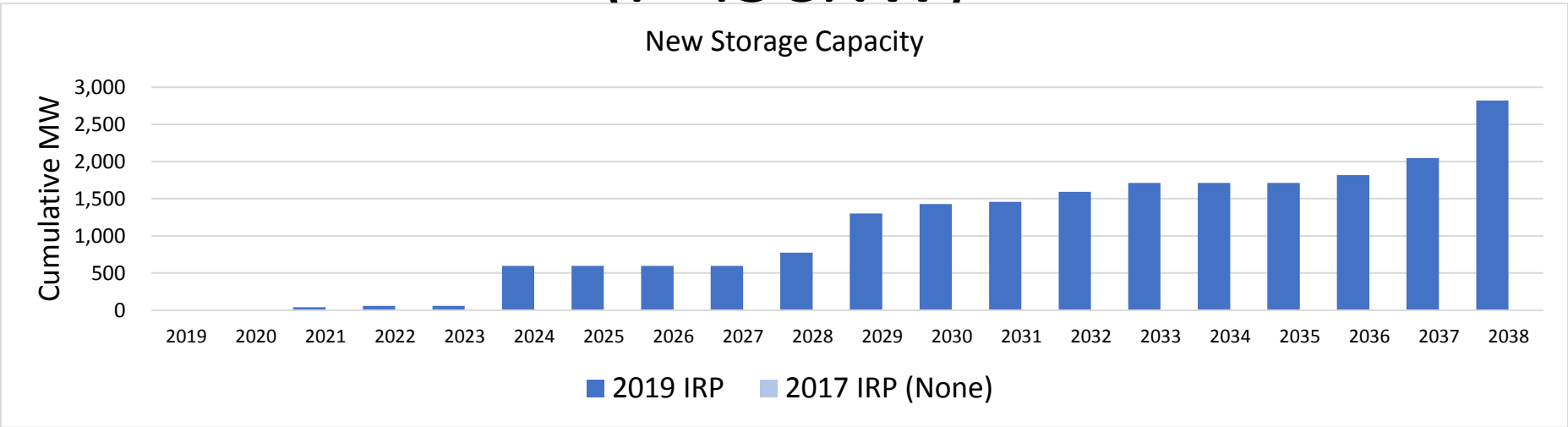


State	2019 IRP Preferred Portfolio Wind (2019-2024)	2019 IRP Preferred Portfolio Wind (2025-2038)
Wyoming	2020 = 23 MW (repowering) 2021 = 1,510 MW (under construction) 2024 = 1,920 MW	n/a
Idaho	n/a	2030 = 1,040 MW 2032 = 60 MW (with 15 MW battery)
Utah	2023 = **69 MW**	n/a
Washington	n/a	2029 = 10 MW (with 3 MW battery) 2037 = 11 MW (with 3 MW battery)

- Resources highlighted **blue** in the table represent resources that meet assumed customer preference targets.

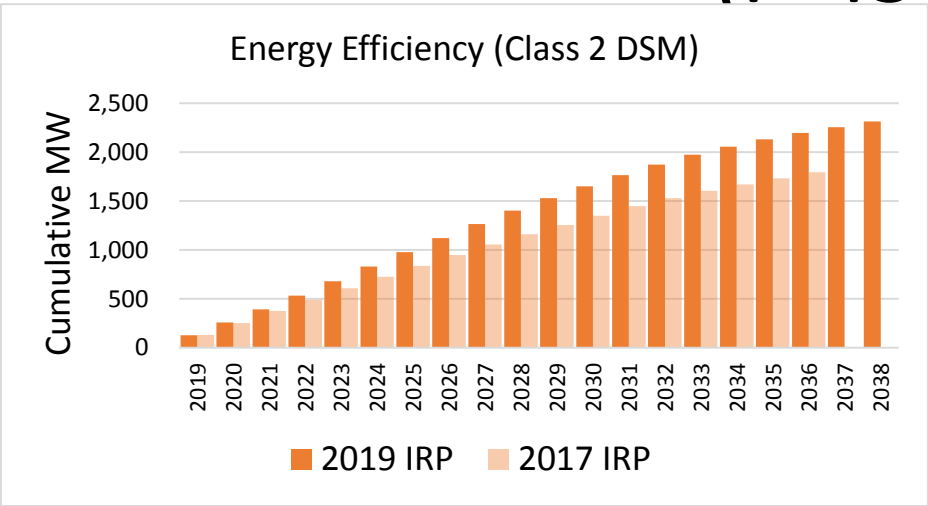
*Note: 2019 IRP wind shown in the graph includes 1,533 MW of contracted new wind (21% power-purchase agreements) that was either identified in the 2017 IRP and is under construction or that was not identified in the 2017 IRP and is under contract. These resources are treated as existing resources in the 2019 IRP preferred portfolio and will come on-line by the end of 2020. These resources are shown in the first full year of operation (the year after year-end online dates).

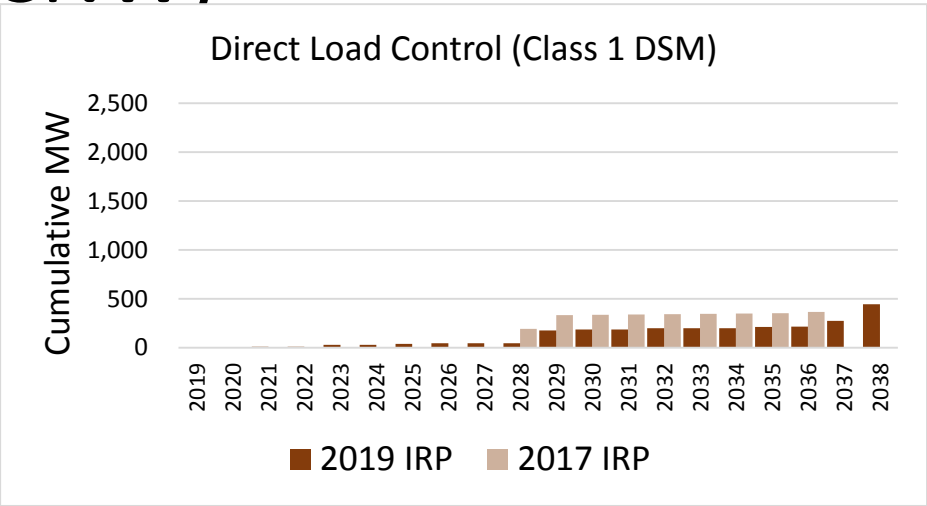
Storage Resources (P-45CNW)



State	2019 IRP Preferred Portfolio Storage (2019-2024)	2019 IRP Preferred Portfolio Storage (2025-2038)
Utah	2021 = 40 MW (with 159 MW solar) 2022 = 16 MW (with 64 MW solar) 2023 = 1 MW (with 3 MW solar) 2024 = 226 MW (with 904 MW solar)	2030 = 125 MW (with 500 MW solar) 2037 = 227 MW (with 909 MW solar) 2038 = 195 MW
Wyoming	2024 = 89 MW (with 354 MW solar)	2029 = 90 MW (with 359 MW solar) 2038 = 175 MW (with 702 MW solar), +15 MW
Oregon	2024 = 125 MW (with 500 MW solar)	2028 = 75 MW 2029 = 360 MW 2032 = 60 MW 2033 = 119 MW (with 475 MW solar) 2038 = 180 MW
Washington	2024 = 99 MW (with 395 MW solar)	2028 = 105 MW 2029 = 3 MW (with 10 MW wind), +75 MW 2032 = 60 MW 2036 = 105 MW (with 419 MW solar) 2037 = 3 MW (with 11 MW wind) 2038 = 60 MW
Idaho	n/a	2031 = 30 MW 2032 = 15 MW (with 60 MW wind) 2038 = 150 MW

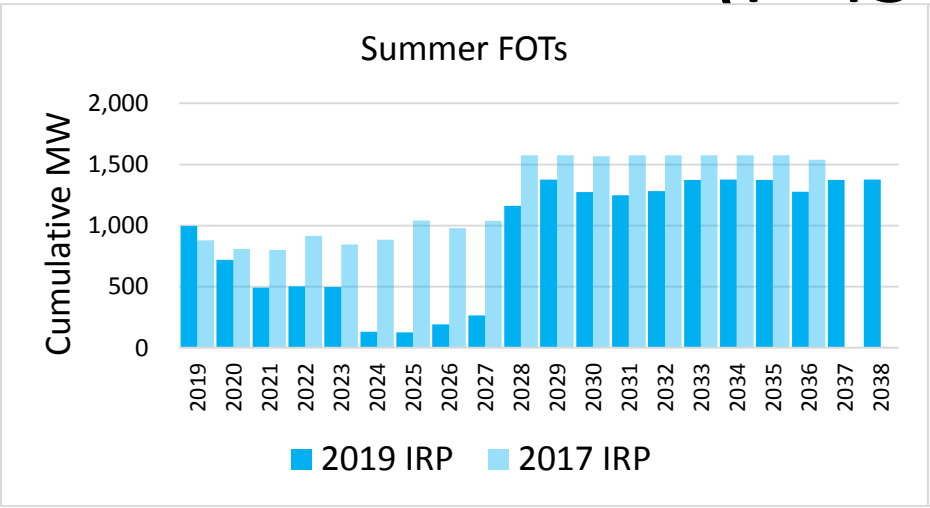
Demand-Side Management Resources (P-45CNW)

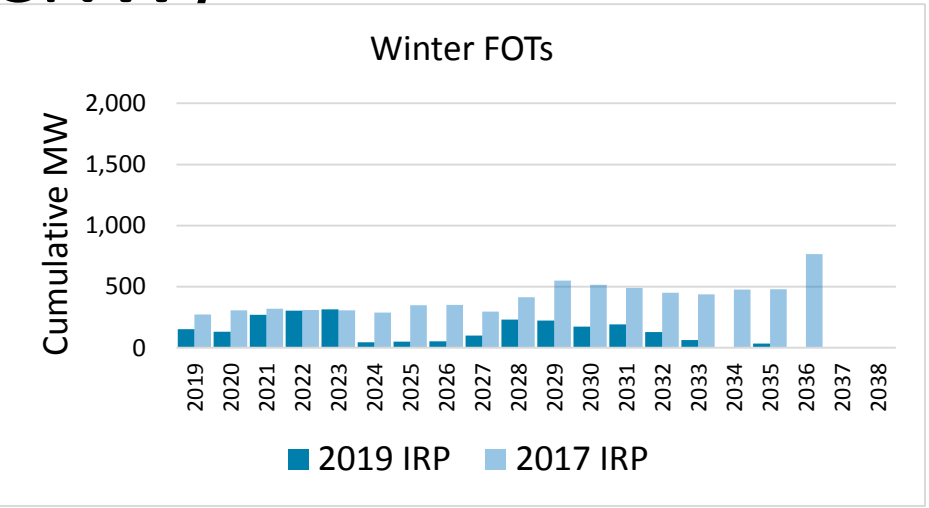




State	2019 IRP Preferred Portfolio DSM (2019-2024)	2019 IRP Preferred Portfolio DSM (2025-2038)
Utah	2019-2024 = 397 MW EE 2019-2024 = 29 MW DLC	2025-2038 = 662 MW EE 2025-2038 = 260 MW DLC
Wyoming	2019-2024 = 77 MW EE	2025-2038 = 171 MW EE 2025-2038 = 54 MW DLC
Oregon	2019-2024 = 242 MW EE	2025-2038 = 438 MW EE 2029-2038 = 32 MW DLC
Washington	2019-2024 = 66 MW EE	2025-2038 = 113 MW EE 2029-2038 = 45 MW DLC
Idaho	2019-2024 = 40 MW EE	2025-2038 = 77 MW EE 2032-2038 = 11 MW DLC
California	2019-2024 = 9 MW EE	2025-2038 = 23 MW EE 2037-2038 = 13 MW DLC

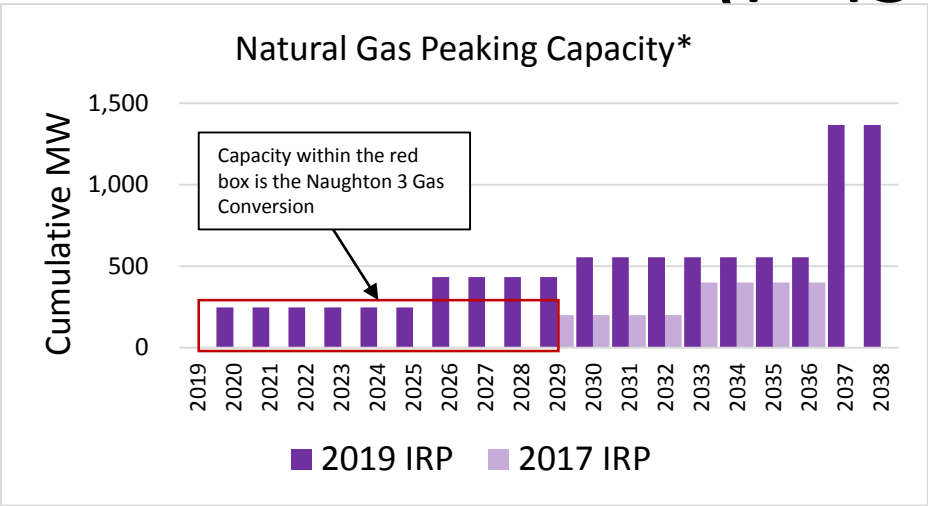
Front Office Transactions (FOTs) (P-45CNW)

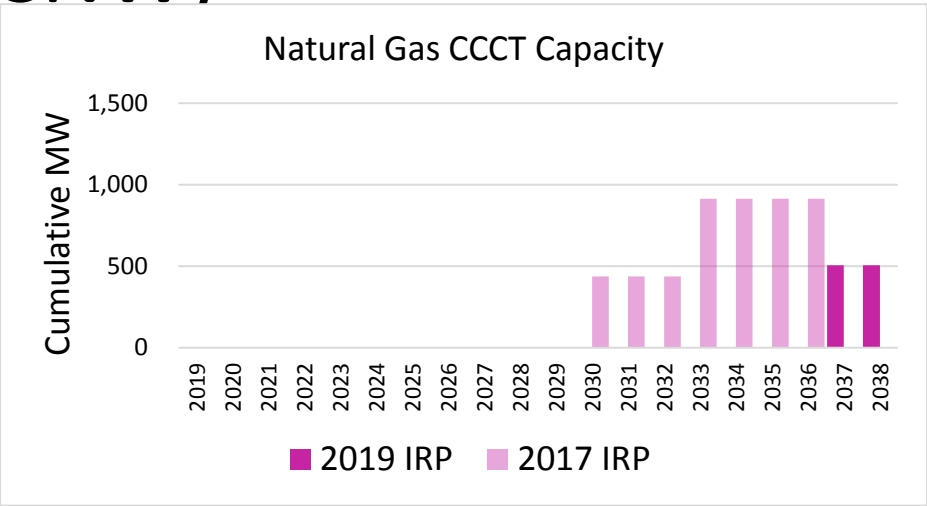




Location	2019 IRP Preferred Portfolio FOTs (2019-2024)	2019 IRP Preferred Portfolio FOTs (2025-2027)	2019 IRP Preferred Portfolio FOTs (2028-2038)
West	2019-2024 Avg. = 557 MW Summer 2019-2024 Avg. = 202 MW Winter	2025-2027 Avg. = 194 MW Summer 2025-2027 Avg. = 68 MW Winter	2028-2038 Avg. = 1,066 MW Summer 2028-2038 Avg. = 95 MW Winter
East	No Summer FOTs No Winter FOTs	No Summer FOTs No Winter FOTs	2028-2038 Avg. = 251 MW Summer No Winter FOTs

Natural Gas Resources (P-45CNW)

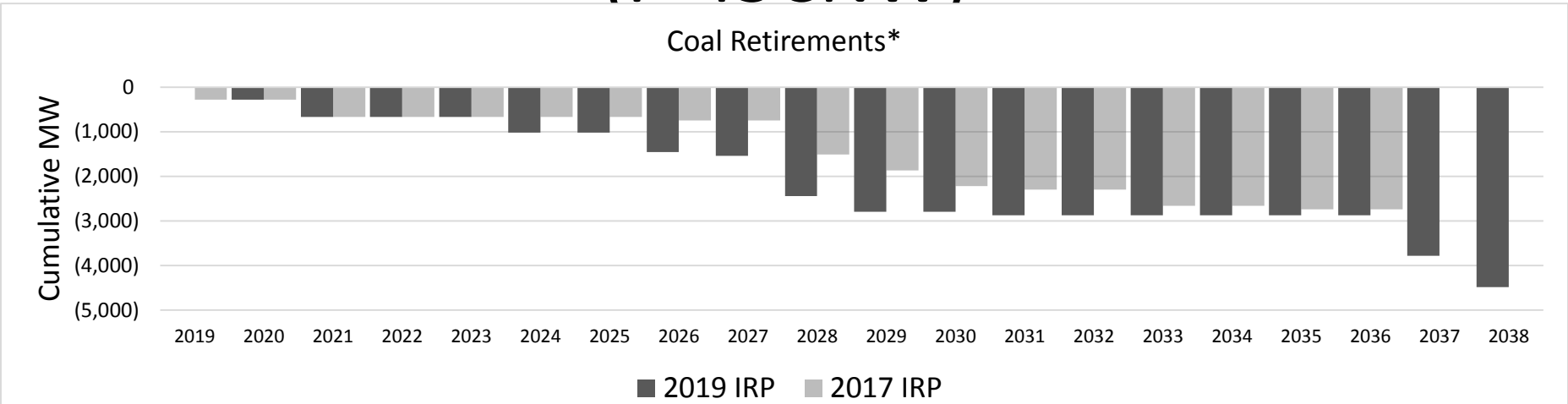




State	2019 IRP Preferred Portfolio Gas (2019-2024)	2019 IRP Preferred Portfolio Gas (2025-2038)
Wyoming	2020 = 247 MW (Naughton Unit 3 Conversion)	2026 = 185 MW peaking 2030 = 370 MW peaking 2037 = 370 MW peaking 2037 = 505 MW CCCT
Oregon	n/a	2037 = 443 MW peaking

*Note: 2019 IRP gas peaking capacity includes the conversion of Naughton Unit 3 to natural gas in 2020 (247 MW).

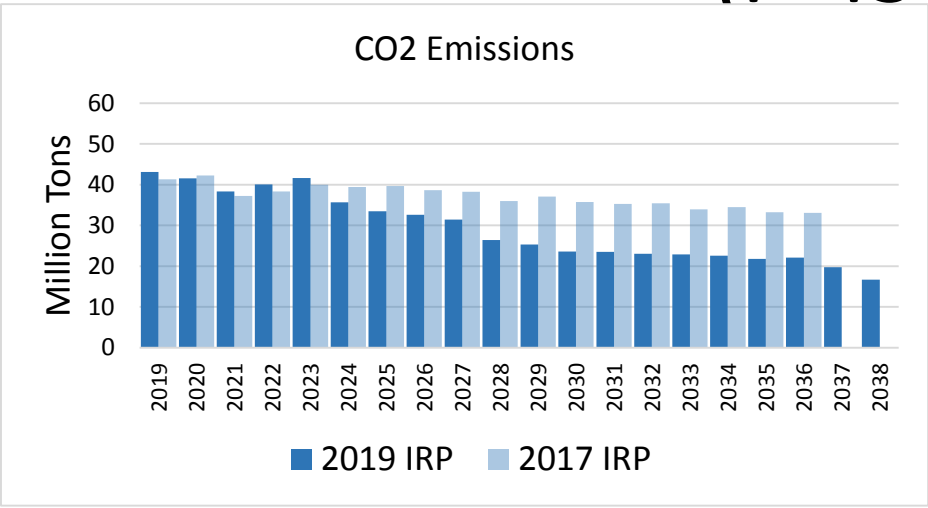
Coal Retirements (P-45CNW)

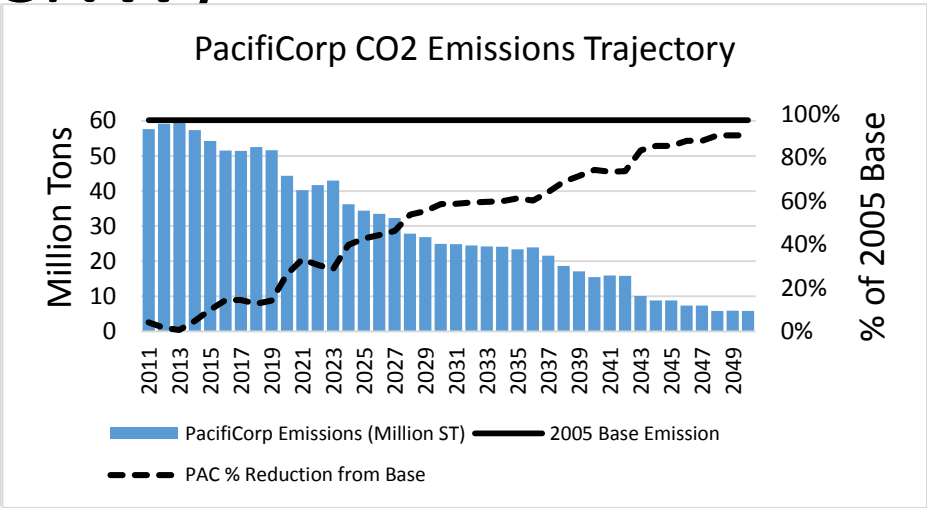


Location	2019 IRP Preferred Portfolio Coal Retirements (2019-2025)	2019 IRP Preferred Portfolio Coal Retirements (2026-2030)	2019 IRP Preferred Portfolio Coal Retirements (2031-2038)
Wyoming	2019 = 280 MW (Naughton 3) 2023 = 351 MW (J. Bridger 1) 2025 = 357 MW (Naughton 1-2)	2027 = 755 MW (D. Johnston 1-4) 2028 = 356 MW (J. Bridger 2)	2037 = 702 MW (J. Bridger 3-4)
Arizona	2020 = 387 MW (Cholla 4)	n/a	n/a
Colorado	2025 = 82 MW (Craig 1)	2026 = 82 MW (Craig 2) 2030 = 77 MW (Hayden 1-2)	n/a
Montana	n/a	2027 = 148 MW (Colstrip 3-4)	n/a
Utah	n/a	n/a	2036 = 909 MW (Huntington 1-2)

*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.

CO_2 Emissions (P-45CNW)





- The chart on the left reflects stack emissions over the IRP planning period for the 2019 IRP and 2017 IRP preferred portfolio.
  - There is no assignment of emissions to specified or unspecified purchases.
  - Relative to the 2017 IRP, emissions are down 16 percent in 2025, 34 percent in 2030, and 35 percent in 2035.
- The chart on the right reflects:
  - Actual emissions through 2018 from owned facilities, specified sources, and unspecified sources.
  - From 2019-2038, emissions reflect those from the 2019 IRP preferred portfolio (stack emissions) with market purchases assigned the CARB default emissions factor (0.4708 tons/MWh)—emissions from sales are not removed.
  - Beyond 2038, emissions reflect the rolling average emissions of each resource from the preferred portfolio through the life of the resource.
  - Relative to a 2005 baseline, emissions are down 43 percent in 2025, 59 percent in 2030, 61 percent in 2035, 74 percent in 2040, 85 percent in 2045, and 90 percent in 2050.

2019 IRP
Action Plan




PACIFICORP
POWERING YOUR GREATNESS

2019 IRP Action Plan

Existing Resource Actions

- Naughton Unit 3: PacifiCorp will complete the gas conversion of Naughton Unit 3, including completion of all required regulatory notices and filings, in 2020.
  - Initiate procurement of materials in Q4 2019.
  - Conversion completed in 2020.

- Cholla Unit 4: PacifiCorp will initiate the process of retiring Cholla Unit 4 no later than January 2023, including completion of all required regulatory notices and filings.
  - PacifiCorp will complete multi-state process negotiations to establish a common exit date and cost responsibility for all states as part of the 2020 Protocol allocation agreement. This timing will allow PacifiCorp to take the necessary steps to coordinate with plant operator on transition of employees, complete required regulatory notices and filings; administer termination, amendment, or close-out of existing permits, contracts and other agreements; and coordinate with state/local stakeholders as appropriate.
  - By the end of Q4 2019, file 2020 Protocol with state regulatory commissions.
  - By the end of Q2 2020, the plant operator will be requested to file required transmission interconnection and transmission services unit retirement notices/request for study to support 2020 Protocol timeline as addressed in state commission orders on 2020 Protocol.
  - By the end of Q2 2021, PacifiCorp will finalize an employee transition agreement with plant operator to support 2020 Protocol timeline as addressed in state commission orders on 2020 Protocol.
  - The plant operator will be requested to administer termination, amendment, or close-out of existing permits, contracts, and other agreements to support 2020 Protocol timeline as addressed in state commission orders on 2020 Protocol.

2019 IRP Action Plan

Existing Resource Actions

- Jim Bridger Unit 1: PacifiCorp will initiate the process of retiring Jim Bridger Unit 1 by the end of December 2023, including completion of all required regulatory notices and filings.
  - By the end of Q2 2020, file a request with PacifiCorp transmission to study the year-end 2023 retirement of Jim Bridger Unit 1.
  - By the end of Q2 2021, confirm transmission system reliability assessment and year-end 2023 retirement economics in 2021 IRP filing.
  - By the end of Q2 2021, finalize an employee transition plan.
  - By the end of Q2 2021, develop a community action plan in coordination with community leaders.
  - By the end of Q4 2021, initiate the process with the Wyoming Public Service Commission for approval of a reverse request for proposals for a potential sale of Jim Bridger Unit 1.
  - By the end of Q4 2023, administer termination, amendment, or close-out of existing permits, contracts, and other agreements.

- Naughton Units 1-2: 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 2022, file a request with PacifiCorp transmission to study the year-end 2025 retirement of Naughton Units 1 and 2.
  - By the end of Q2 2022, finalize an employee transition plan.
  - By the end of Q2 2022, develop a community action plan in coordination with community leaders.
  - By the end of Q2 2023, confirm transmission system reliability assessment and year-end 2025 retirement economics in 2023 IRP filing.
  - By the end of Q4 2023, 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, administer termination, amendment, or close-out of existing permits, contracts, and other agreements.

- Craig Unit 1: The plant operator will be requested to administer termination, amendment, or close-out of existing permits, contracts, and other agreements to support retiring Craig Unit 1, including completion of all required regulatory notices and filings, by the end of December 2025.

2019 IRP Action Plan

New Resource Actions

- Customer Preference Request for Proposals: PacifiCorp will work with customers to achieve their respective resource preference requirements.
  - By the end of Q4 2019, sign fifteen year 80 MW Power Purchase Agreement (PPA) for Utah solar for six Schedule 34 customers.
  - By the end of Q4 2019, sign two 20-year PPAs of approximately 80 MW for a large Utah Schedule 34 customer.
  - Monitor the finalization of rules by the Utah Public Service Commission for HB 411 (anticipated by the end of Q1 2020), that provides a path forward for development of a program for participating communities to begin procuring renewable resources.

- 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 2023.
  - By the end of Q4 2019, file a request for interconnection queue reform with the Federal Energy Regulatory Commission (FERC).
  - In Q2 2020, receive approval from FERC to reform the interconnection queue and file a draft all-source RFP with the Public Utility Commission of Oregon, the Utah Public Service Commission, and the Washington Utilities and Transportation Commission.
  - In Q3 2020, receive approval of the all-source RFP from applicable state regulatory commissions and issue the RFP to the market.
  - In Q1 2021, identify a preliminary final shortlist from the all-source RFP and initiate transmission interconnection studies consistent with queue reform as approved by FERC.
  - In Q3 2021, identify a final shortlist from the all-source RFP, and file for approval of the final shortlist in Oregon.
  - In Q4 2021, file pre-approvals and/or certificates for public convenience and necessity (CPCNs) with state regulatory commissions, as applicable.
  - In Q2 2022, receive CPCN approvals, as applicable, and execute definitive agreements with winning bids from the all-source RFP.
  - By Q4 2023, winning bids from the all-source RFP achieve commercial operation.

2019 IRP Action Plan

Transmission Actions

- Energy Gateway South: By December 31, 2023, PacifiCorp will seek to build the approximately 400-mile, 500-kV transmission line from the Aeolus substation near Medicine Bow, Wyoming to the Clover substation near Mona, Utah.
  - In Q2 2020, file certificates for public convenience and necessity (CPCN) in Wyoming and Utah.
  - In Q3 2020, receive conditional CPCN from the Wyoming Public Service Commission and a final CPCN from the Utah Public Service Commission.
  - In Q2 2021, receive the final CPCN from the Wyoming Public Service Commission.
  - By the end of Q4 2021, issue full notice to proceed to construct Energy Gateway South.
  - In Q4 2023, construction of Energy Gateway South is completed and placed in service.

- Utah Valley Reinforcements: As necessary to facilitate interconnection of customer-preference resources, PacifiCorp will proceed with system reinforcements in the Utah Valley.
  - In Q2 2020, complete the Spanish Fork 345 kV/138 kV transformer upgrade.
  - In Q4 2020, complete rebuild of approximately five miles of the Spanish Fork-Timp 138 kV line in the Utah Valley.

- Northern Utah Reinforcements:
  - Rebuild two miles of the Morton Court – Fifth West 138 kV line
  - Loop existing Populus – Terminal 345 kV line into both Bridgerland and Ben Lomond; build 345 kV yard with 345/138 transformer and 138 kV yard buildout at Bridger plus ancillary 345 kV and 230 kV circuit breakers at Ben Lomond
  - Complete identified plan of service in support of 2019 IRP preferred portfolio for resource additions in the northern Utah.

2019 IRP Action Plan

Transmission Actions

- Utah South Reinforcements:
  - Develop plan of service in support of 2019 IRP preferred portfolio for resource additions in the southern Utah.
  - Complete rebuild of the Mona – Clover #1 & #2 345 kV lines.
  - Identify route and terminals for new approximately 70-mile 345 kV line in southern/central Utah.

- Yakima Washington Reinforcements: To facilitate interconnection of preferred portfolio resources in the Yakima area, PacifiCorp will proceed with protection system and remedial action scheme upgrades to local 230 kV and 115 kV substations not otherwise included in network upgrade requirements for generator interconnection requests.
  - In Q2 2020, complete the Vantage-Pomona Heights 230 kV line (in process).
  - By Q2 2022, establish the type and location of new resources and finalize project scope, as necessary.

- Boardman to Hemmingway:
  - Continue to support the project under the conditions of the Boardman to Hemingway Transmission Project Joint Permit Funding Agreement.
  - Continued participation in the development and negotiations of the construction agreement.
  - Continued analysis in efforts to identify customer benefits that may include contributions to reliability, interconnection of additional resources, geographical diversity of intermittent resources, Energy Imbalance Market, and resource adequacy.
  - Continued negotiations for plan of service post B2H for parties to the permitting agreement.

- Gateway West:
  - Energy Gateway West Segment D.2, continue construction with target in-service date of 12/31/2020.
  - Continue permitting for the Energy Gateway transmission plan, with near term targets as follows:
  - For Segments D3, and E, continue funding of the required federal agency permitting environmental consultant actions required as part of the federal permits. Also, continue to support the projects by providing information and participating in public outreach.

2019 IRP Action Plan

Demand-Side Management 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 will be provided in Appendix D in Volume II of the 2019 IRP.

Year	Annual Incremental Energy (GWh)	Annual Incremental Capacity (MW)
2019	562	126
2020	536	132
2021	538	133
2022	571	143

- *Note, Class 2 DSM capacity figures reflect projected maximum annual hourly energy savings, which is similar to a nameplate rating for a supply-side resource.

- Energy Efficiency Bundling: PacifiCorp will continue to evaluate alternate bundling methodologies of Class 2 DSM in the 2019 IRP.

- Direct-Load Control: PacifiCorp will acquire cost-effective Class 1 DSM (i.e., demand response) in Utah targeting approximately 29 MW of incremental capacity from 2020 through 2023.

2019 IRP Action Plan

Front-Office Transactions

- Market Purchases: Acquire short-term firm market purchases for on-peak delivers from 2019-2021 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.
  - Prompt-month, balance-of-month, day-ahead, and hour-ahead non-brokered bi-lateral transactions.

2019 IRP Action Plan

Renewable Energy Credit Actions

- Renewable Portfolio Standards: PacifiCorp will pursue unbundled request for proposals (RFPs) to meet its state renewable portfolio standard (RPS) compliance requirements.
  - As needed, issue RFPs seeking then current-year vintage unbundled RECs that will qualify in meeting California RPS targets through 2020.
  - As needed, issue RFPs seeking then current-year or forward-year vintage unbundled RECs that will qualify in meeting Washington RPS targets.

- Renewable Energy Credit Sales: Renewable Energy Credit Optimization
  - Maximize the sale of RECs that are not required to meet state RPS compliance obligations.

2019 IRP
Portfolio Development and Selection Process




PACIFICORP
POWERING YOUR GREATNESS

Portfolio Development Process

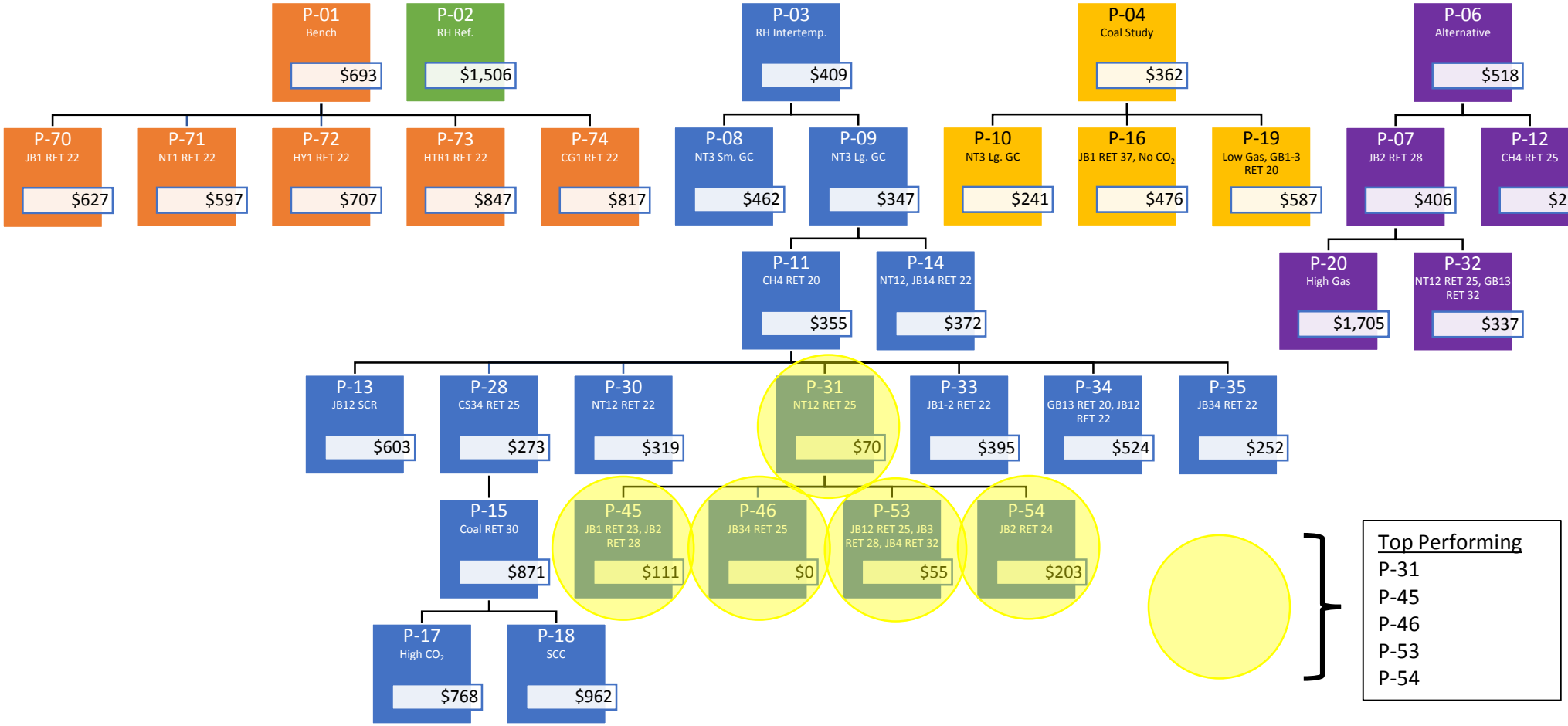
40 Portfolios (Dec '18) + 11 Portfolios (Apr '19)	Coal Studies	•Unit-by-unit cases and stacked cases, prescriptive timing assumed 2022. •Limited scope on planning uncertainties other than the potential timing of coal retirements (i.e., Regional Haze, gas conversions, Energy Gateway transmission. •Identified Naughton and Jim Bridger units as primary candidates for potential early closure as soon as 2022.
35 Portfolios	Initial Port. Dev. Cases	•Considers additional planning uncertainties. •Considers alternative early retirement dates and combinations inclusive of potential dates for "partner plants". •Unit-by-unit retirement test cases reaffirm Naughton and Jim Bridger units most likely to generate customer benefits from early closure outcomes. •More than half of the cases evaluate varying combinations of retirement dates for Naughton 1-2 and Jim Bridger 3-4, consistent with coal study findings.
10 Portfolios	"C" Cases	•Refined solar+battery modeling. •Nine years of deterministic reliability runs per portfolio. •All cases evaluate alternative retirement dates for Jim Bridger 1-4.
5 Portfolios	"CP" Cases	•Refined solar+battery modeling. •16 years of deterministic reliability runs per portfolio. •Price-policy scenarios. •All cases evaluate alternative retirement dates for Jim Bridger 1-4.
5 Portfolios	FOT Risk Assessment	•Tests and quantifies risk of higher FOT prices, with price spikes based on historical pricing information. •All cases evaluate alternative retirement dates for Jim Bridger 1-4.
1 Portfolio	2028-2029 WY Wind	•Eliminates Wyoming coming online in 2028-2029 due to large amount of projected curtailments.
6 Portfolios	Gateway & No Gas	•Tests top-performing portfolio in alternative Energy Gateway cases. •Tests top-performing portfolio assuming no new natural gas can be added.

2019 IRP
Initial Portfolio-Development Cases



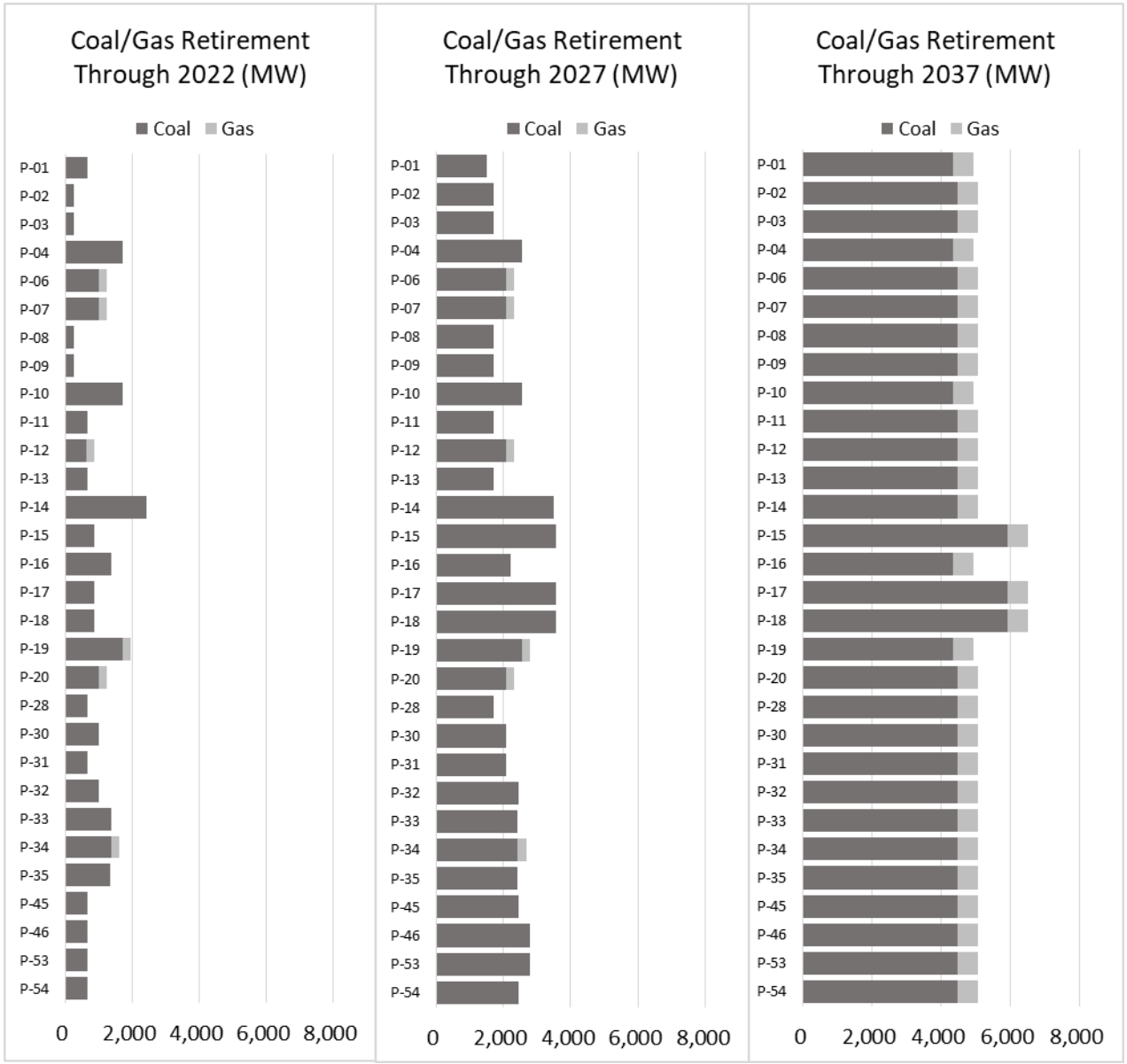

PACIFICORP
POWERING YOUR GREATNESS

Portfolio Development Case Family Tree



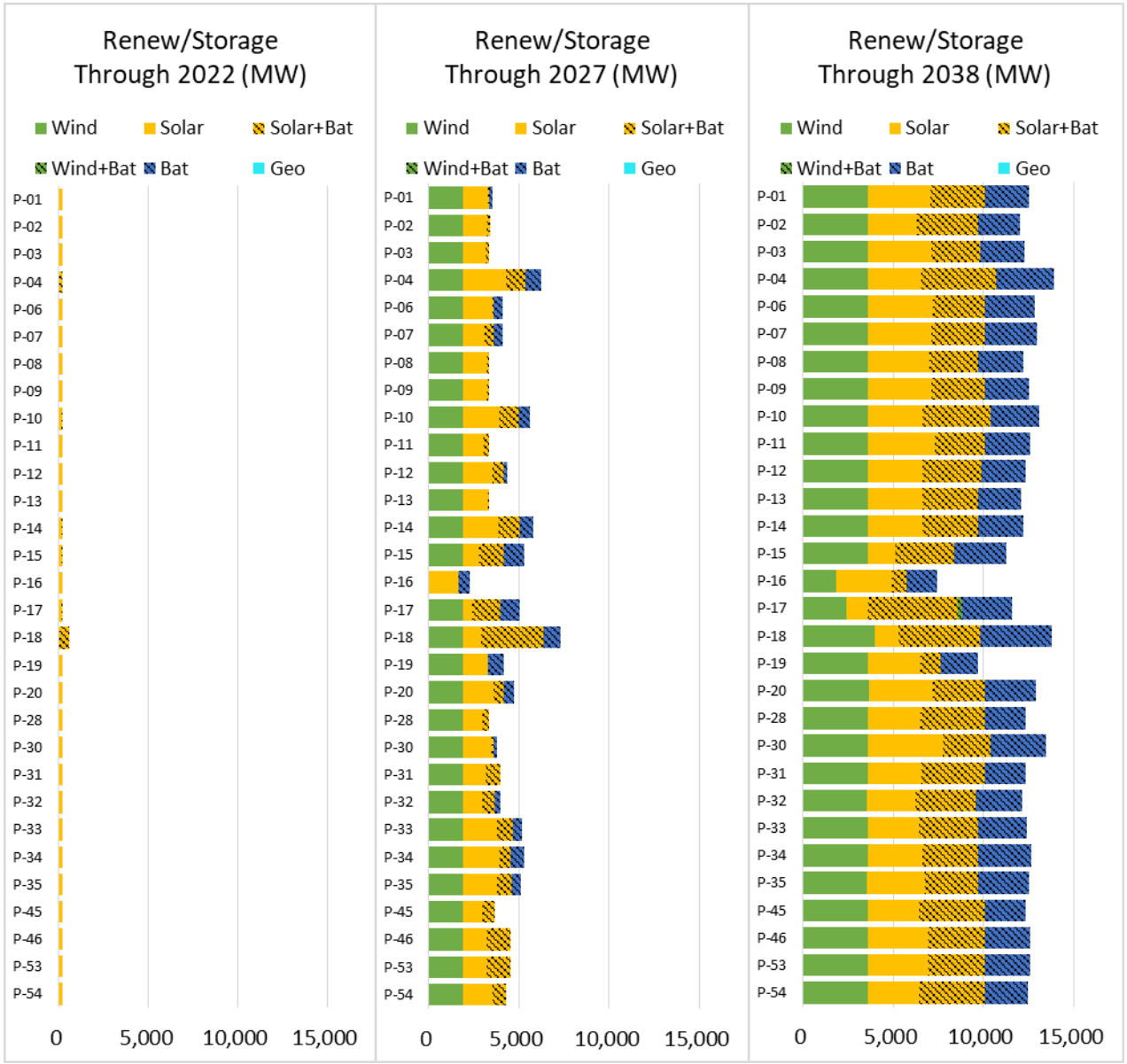
- The dollar values for each case represent the increase in system PVRR relative to the lowest cost case (Case P-46) with medium gas, medium CO_2 price-policy assumptions.
- Cases P-70 through P-74 reaffirm broad conclusions from the coal studies—that potential early coal unit retirements should be focused on Naughton and Jim Bridger units.
- Early coal retirement assumptions for each of these cases is set forth in Appendix A to this presentation.

Coal/Gas Resource Retirements



- By the end of the study period, coal retirements are similar among nearly all cases (P-15, P-17 and P-18 are exceptions), with slight variations dependent upon timing for Colstrip 3-4.
- Cases P-15, P-17, and P-18 assume all coal is retired by the end of 2030.
- By the end of the study period, gas retirements are the same among all cases. Cases P-06, P-17, P-12, P-19, P-20 and P-34 assume Gadsby 1-3 retire at the end of 2020.
- Among the five cases with the lowest PVRR (P-31, P-45, P-46, P-53, and P-54), coal unit retirements total 667 MW through 2022 and range between 2,091 MW and 2,797 MW through the end of 2027.

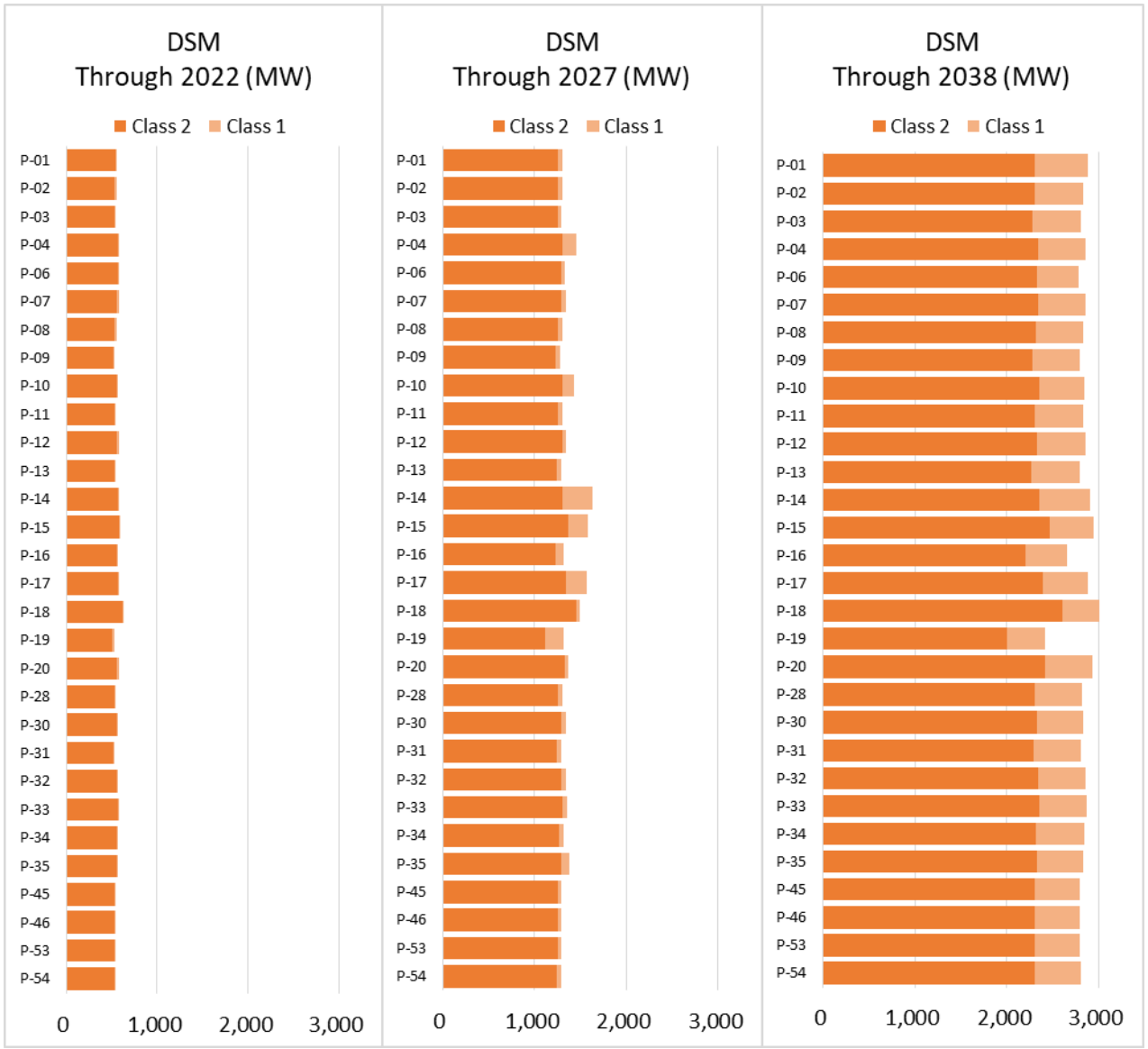
New Renewable and Storage Resources



- The addition of new renewable resources picks up beyond 2022.
- All cases select Gateway South in 2024 along with 1,920 MW of new wind in eastern Wyoming, except P-16, which assumes no CO_2 cost through the 20-year study period.
- Through 2027, solar resource additions range between 1,370 MW and 4,452 MW—cases with more early coal retirements end up with more solar.
- Through 2038, total new renewable capacity ranges between 5,574 MW and 10,711 MW and new battery capacity ranges between 1,903 MW and 4,558 MW.*
- Among the five cases with the lowest PVRR (P-31, P-45, P-46, P-53, and P-54), total new renewable capacity ranges between 3,674 MW and 4,536 MW through 2027 and over 10,000 MW through 2038.

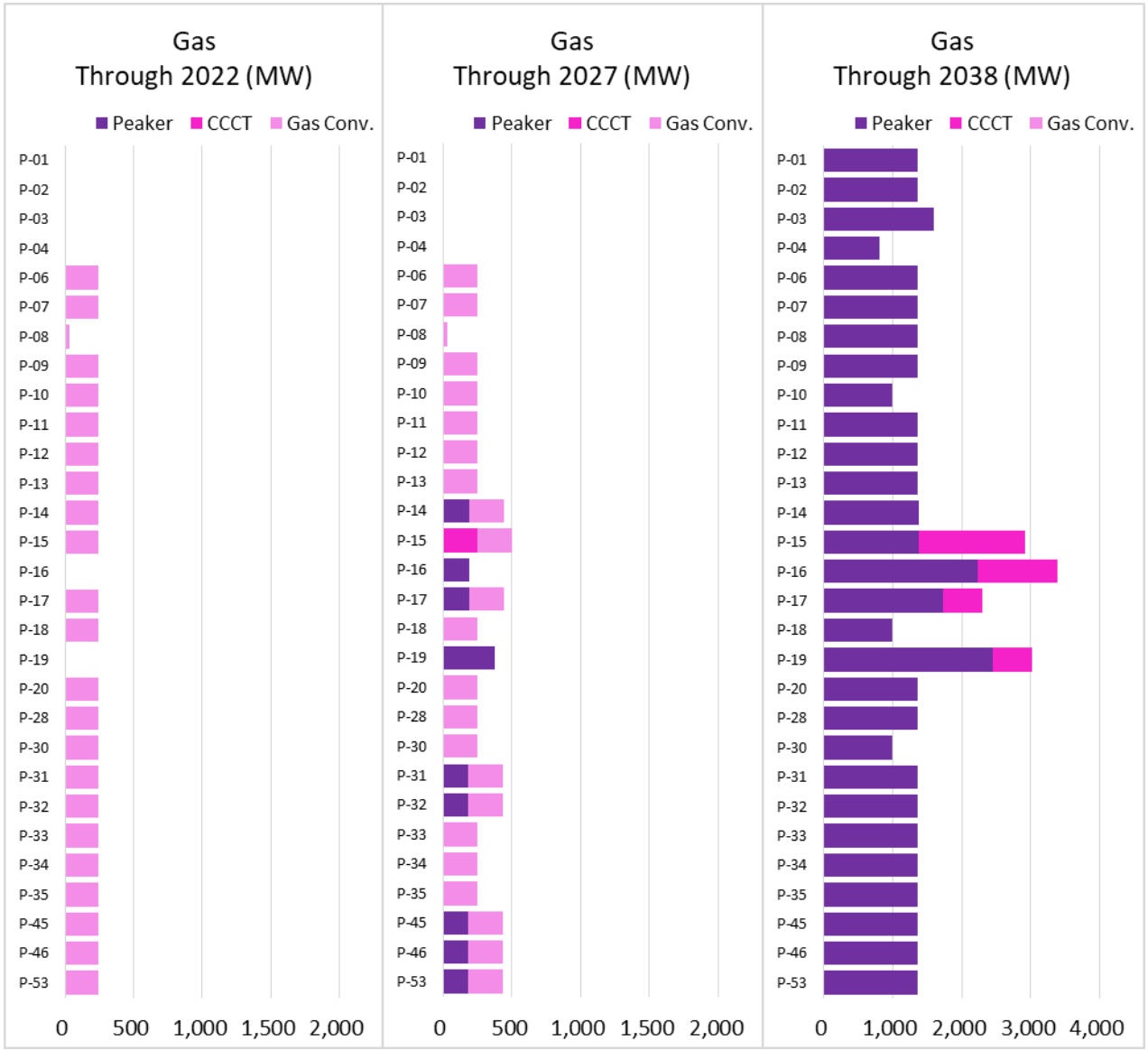
*Note: For wind or renewable resources paired with battery, the capacity for the renewable resource is shown in the graph. The battery capacity paired with these resources is 25% of the renewable resource capacity.

Incremental Demand-Side Management



- Demand-side management (DSM) selections continue to be relatively stable among all cases.
- Through 2022, Class 2 DSM selections range between 509 MW (Case P-19) and 620 MW (Case P-18); Class 1 DSM ranges between 11 MW and 19 MW.
- Through 2027, Class 2 DSM selections range between 1,116 MW (Case P-19) and 1,455 MW (Case P-18); Class 1 DSM ranges between 45 MW and 322 MW.
- More Class 1 DSM resources are accelerated into the mid term among those cases that have higher levels of accelerated coal and gas retirements (Cases P-04, P-10, P-14, P-15, P-16, P-17 and P-19).
- Through 2038, Class 2 DSM selections range between 2,005 MW (Case P-19) and 2,603 MW (Case P-18); Class 1 DSM ranges between 417 MW and 583 MW.

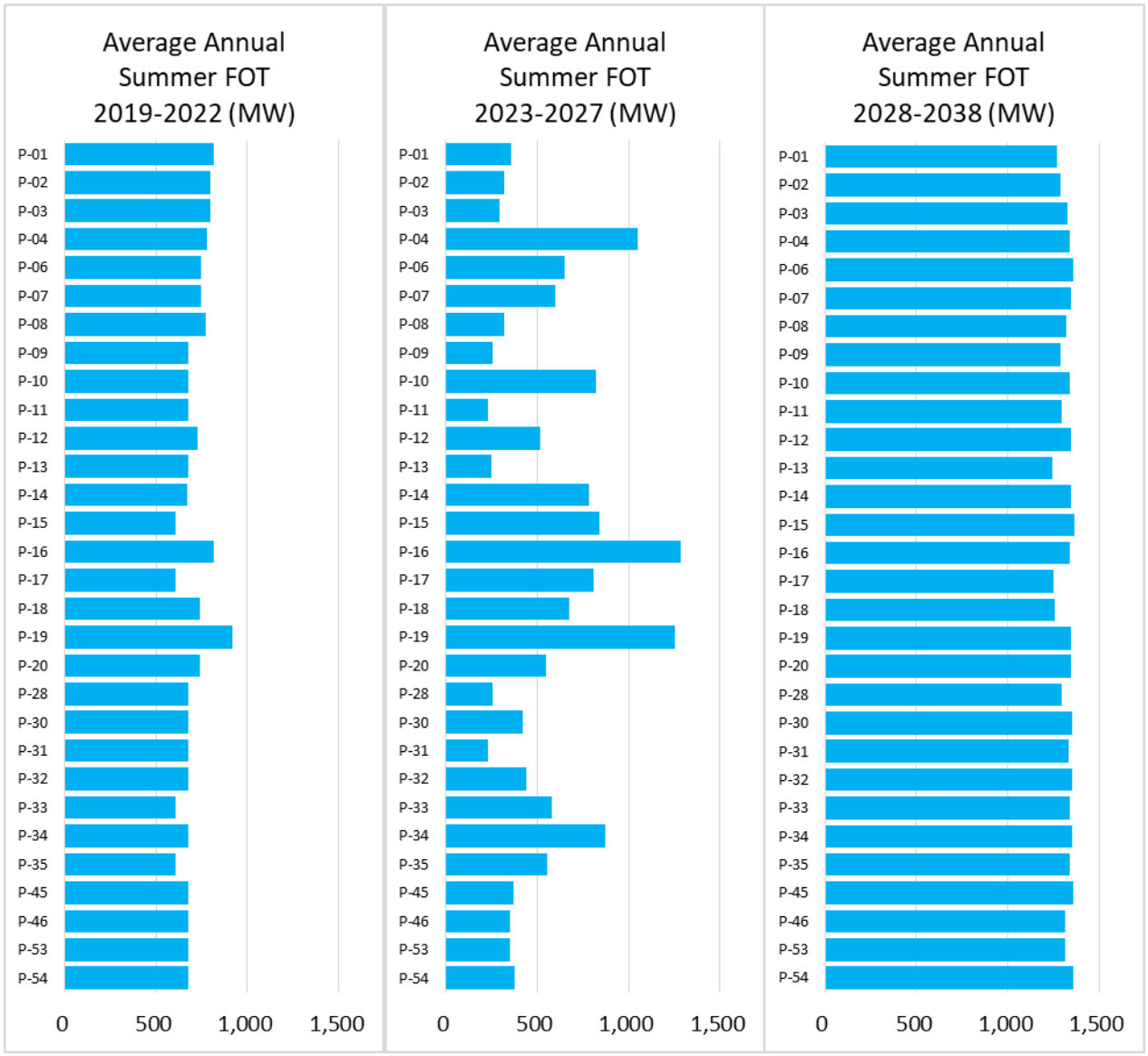
New Natural Gas Resources



- In cases where Naughton 3 converts to natural gas, it is assumed to retire at the end of 2029, so it does not show up in the results through 2038.
- Four cases (P-14, P-16, P-17, and P-19) include new gas peaking capacity in 2023.
- Through 2038, new peaking gas capacity ranges between 813 MW and 2,458 MW.
- P-15 includes new CCCT gas capacity beginning 2027—through 2038, new CCCT capacity in this case totals 1,541 MW. Three additional cases show smaller increase in CCCT gas capacity, P-16, P-17 and P-19.
- Among the five cases with the lowest PVRR (P-31, P-45, P-46, P-53, and P-54), new peaking gas capacity is added in 2026 (185 MW)—by 2038, new gas peaking capacity totals 1,367 MW.

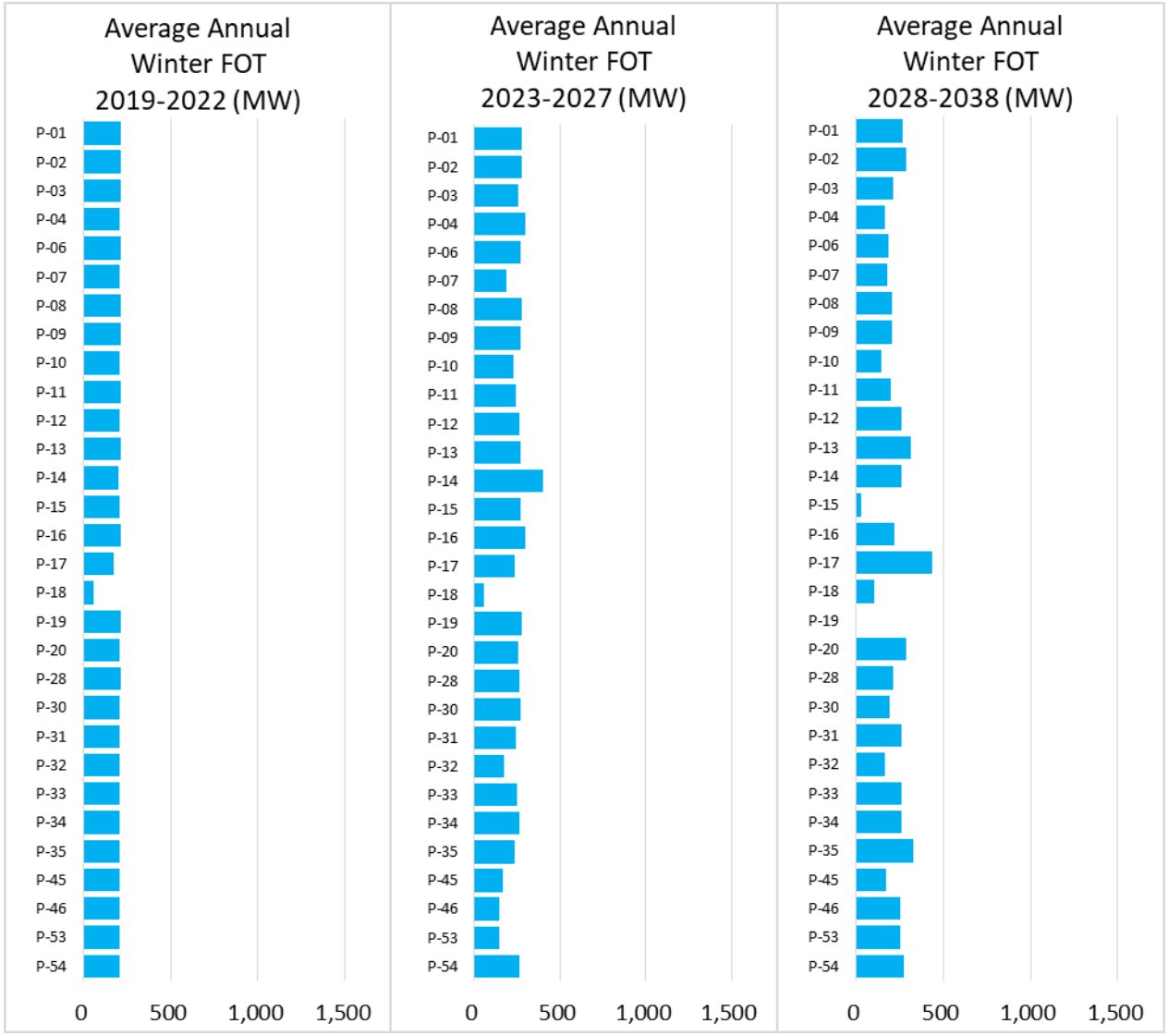
Note: Scale change in the 'through 2038' column due to P15's addition of CCCT resources.

Summer Front Office Transactions



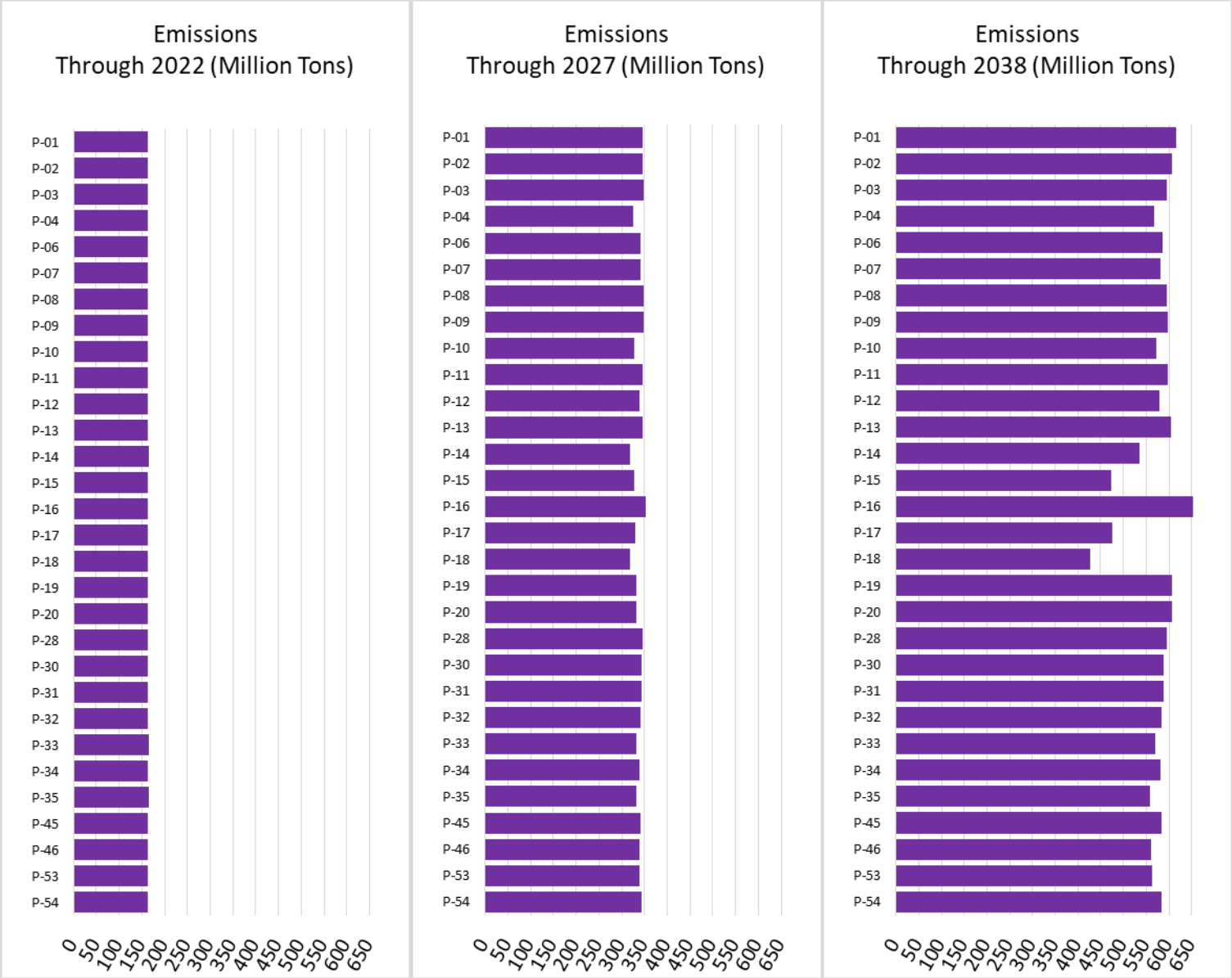
- The summer FOT limit assumed for the 2019 IRP is 1,425 MW.
- Through the near term, average annual summer FOT purchases range between 608 MW (Case P-15) and 916 MW (Case P-19).
- In the 2023-2027 timeframe, a period where there are resource-adequacy concerns in the region, summer average annual FOT purchases range between 231 MW (Case P-31) and 1,285 MW (Case P-16)—reliance on the market grows in cases with more accelerated coal retirements.
- Over the long term, the level of summer FOTs is relatively stable among all cases, ranging between 1,241 MW (Case P-13) and 1,362 MW (Case P-15).

Winter Front Office Transactions



- Relative to the summer period, winter FOTs are much smaller among all cases and timeframes.
- Winter FOT purchases are relatively stable among most cases through both the short and mid term.
- Over the long term, winter FOT purchases are reduced when incremental capacity is added to the system—CCCT additions in P-15 and P-19 reduce winter FOT purchases.

CO_2 Emissions



- Total CO_2 emissions through 2022 are very stable, ranging between 162 and 164 million tons.
- Through 2027, total CO_2 emissions range between 318 and 353 million tons.
- Through 2038, total CO_2 emissions range between 427 and 670 million tons.
- Among the five cases with the lowest PVRR (P-31, P-45, P-46, P-53, and P-54), total CO_2 emissions through 2038 range between 560 and 588 million tons.

Portfolio Cost and Risk Summary
Initial Cases

Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P46	**23,413**	**0**	**1**	**24,605**	**0**	**1**	**0.012%**	**0.006%**	**26**	**560,199**	**133,090**	**6**
P53	**23,468**	**55**	**2**	**24,662**	**57**	**2**	**0.012%**	**0.006%**	**27**	**562,025**	**134,915**	**7**
P31	**23,484**	**70**	**3**	**24,678**	**72**	**3**	**0.009%**	**0.002%**	**19**	**588,421**	**161,312**	**19**
P45	**23,525**	**111**	**4**	**24,722**	**116**	**4**	**0.008%**	**0.001%**	**10**	**583,981**	**156,872**	**15**
P54	**23,616**	**203**	**5**	**24,819**	**213**	**5**	**0.009%**	**0.002%**	**17**	**584,377**	**157,267**	**16**
P10	23,655	241	6	24,864	259	6	0.009%	0.003%	21	571,707	144,597	11
P35	23,666	252	7	24,871	266	7	0.010%	0.004%	23	557,489	130,379	5
P28	23,686	273	9	24,888	283	9	0.008%	0.002%	14	594,322	167,212	20
P30	23,733	319	10	24,941	336	10	0.010%	0.003%	22	587,905	160,795	18
P11	23,768	355	13	24,976	370	13	0.008%	0.001%	9	596,911	169,801	23
P12	23,678	264	8	24,886	281	8	0.008%	0.002%	13	579,167	152,057	12
P13	24,016	603	24	25,234	629	24	0.008%	0.001%	11	604,396	177,286	25
P14	23,786	372	15	25,000	394	15	0.015%	0.009%	28	535,774	108,664	4
P32	23,750	337	11	24,959	354	11	0.008%	0.002%	15	583,565	156,455	14
P09	23,760	347	12	24,970	365	12	0.009%	0.002%	20	597,855	170,745	24
P04	23,775	362	14	24,993	387	14	0.011%	0.004%	24	567,901	140,792	8
P33	23,809	395	16	25,024	419	16	0.007%	0.001%	7	569,586	142,476	10
P07	23,819	406	17	25,033	427	18	0.007%	0.000%	5	581,583	154,474	13
P03	23,822	409	18	25,033	427	17	0.008%	0.002%	12	595,728	168,619	21
P08	23,875	462	19	25,092	486	19	0.009%	0.002%	18	595,956	168,846	22
P16	23,889	476	20	25,097	491	20	0.007%	0.000%	2	669,944	242,834	30
P06	23,932	518	21	25,151	546	21	0.007%	0.001%	6	585,907	158,798	17
P34	23,938	524	22	25,157	551	22	0.008%	0.001%	8	568,422	141,312	9
P19	24,000	587	23	25,211	606	23	0.007%	0.000%	3	607,157	180,047	27
P01	24,106	693	25	25,327	721	25	0.006%	0.000%	1	616,896	189,786	29
P17	24,182	768	26	25,400	795	26	0.057%	0.051%	29	475,390	48,281	3
P15	24,285	871	27	25,516	911	27	0.012%	0.005%	25	472,569	45,459	2
P18	24,376	962	28	25,602	997	28	0.111%	0.104%	30	427,110	0	1
P02	24,919	1,506	29	26,183	1,577	29	0.009%	0.002%	16	605,872	178,763	26
P20	25,118	1,705	30	26,385	1,780	30	0.007%	0.000%	3	607,157	180,047	27

- PacifiCorp identified the first five cases in the table (**in bold**) as top-performing cases selected for more refined analysis, along with other cases developed after stakeholder discussion at the September 2019 public-input meeting.

2019 IRP
“C” Cases




PACIFICORP
POWERING YOUR GREATNESS

Additional Reliability Modeling

- Incremental reliability resources have been added to each portfolio based on deterministic hourly studies in three test years (2023, 2030, and 2038).
- Incremental reliability requirements derived from these studies have been applied to other years as follows:
  - 2023 – applied to 2023-2027
  - 2030 – applied to 2028-2036
  - 2038 – applied to 2037-2038
- The timing of assumed coal unit retirements varies among the top-performing cases from the initial step in the portfolio-development process and varies among additional cases requested by stakeholders.
- Consequently, the above mapping has the potential to overstate or understate reliability requirements for specific years within the range of years over which those requirements have been applied.
- For the five cases with the lowest system PVRR from the initial step in the portfolio-development process, and for the additional cases developed after stakeholder discussion at the September public-input meeting, PacifiCorp produced six additional deterministic hourly studies to ensure that each year is analyzed through 2030 (i.e., adding test years for 2024-2029).
- This improves the granularity at which reliability resources are applied and provides for a better comparison of cost and risk metrics between these cases.

Solar+Battery Modeling

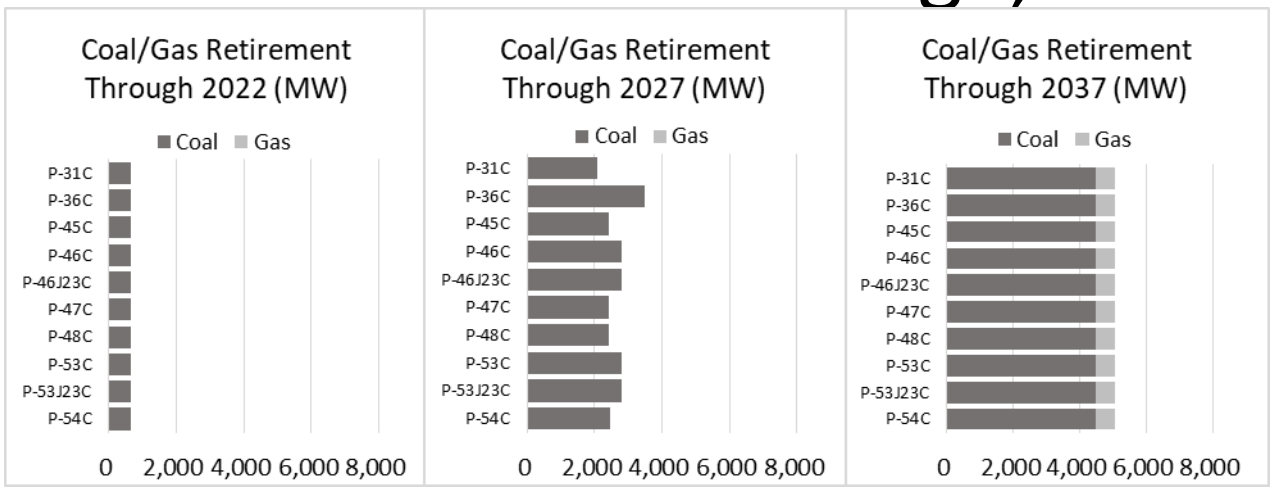
- When reliability resources are added in the two-step portfolio development process adopted for this IRP cycle, incremental battery resources are routinely added to remedy initial reliability shortfalls in each case.
- This indicates that if the SO model were able to assess the incremental reliability requirement in its *initial* resource portfolio, it would likely pair batteries with any of the new solar resources it initially added to take advantage of cost savings for this combined resource alternative.
- Test runs performed by the IRP modeling team confirmed that if stand alone solar resources were not allowed in the initial portfolio development case, that the SO model selected solar+battery resource options, and that when these portfolios were analyzed for reliability (using the additional test years as described in the previous slides) and run through PaR, that the overall system PVRR was lower.
- Consequently, for the five cases with the lowest system PVRR from the initial step of the portfolio-development process and for additional cases developed after stakeholder discussion at the September public-input meeting, PacifiCorp disabled stand alone solar resources—in each case, solar+battery was added to the portfolio and system costs were reduced.
- Cases developed with the additional front-end reliability modeling described on the previous slide and with the additional solar+battery modeling described above are referred to herein as the “C” series of cases.

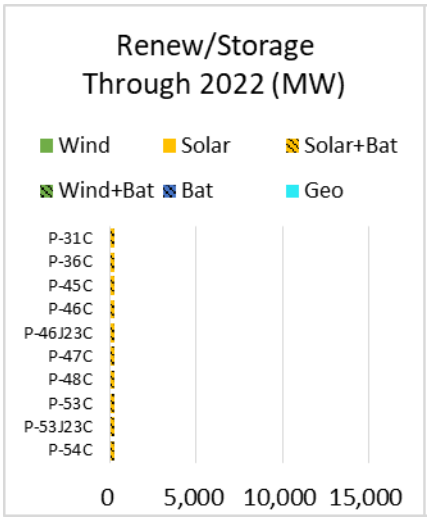
"C" Cases Developed after Stakeholder Discussion at the September Public-Input Meeting

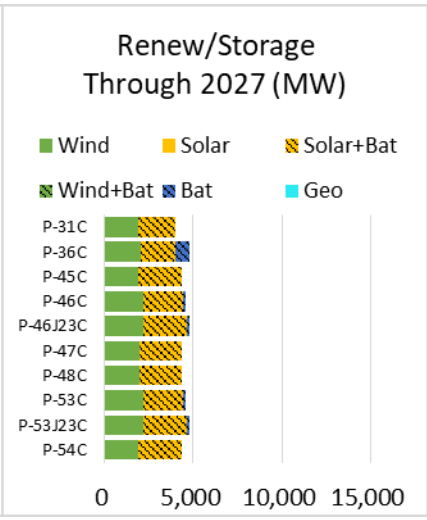
Case	Description
P-36C	A variant of Case P-46 with Jim Bridger 1-2 and Naughton 1-2 retired at the end of 2025.
P-46J23C	A variant of Case P-46 with Jim Bridger 3-4 retired at the end of 2023.
P-47C	A variant of Case P-45 with Jim Bridger 3-4 retired at the end of 2035.
P-48C	A variant of Case P-45 with Jim Bridger 3-4 retired at the end of 2033.
P-53J23C	A variant of Case P-53 with Jim Bridger 1-2 retired at the end of 2023.

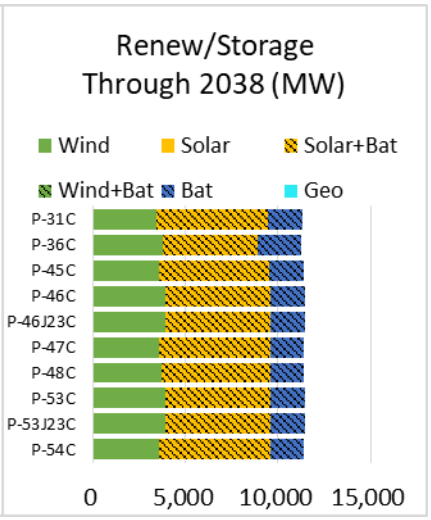
- Top performing cases from the initial phase of the portfolio-development process were also analyzed with additional reliability granularity and with solar+battery resources and are labeled in the following slides as P-31C, P-45C, P-46C, P-53C, and P-54C.

Retirements, New Renewable and Storage, “C” Cases





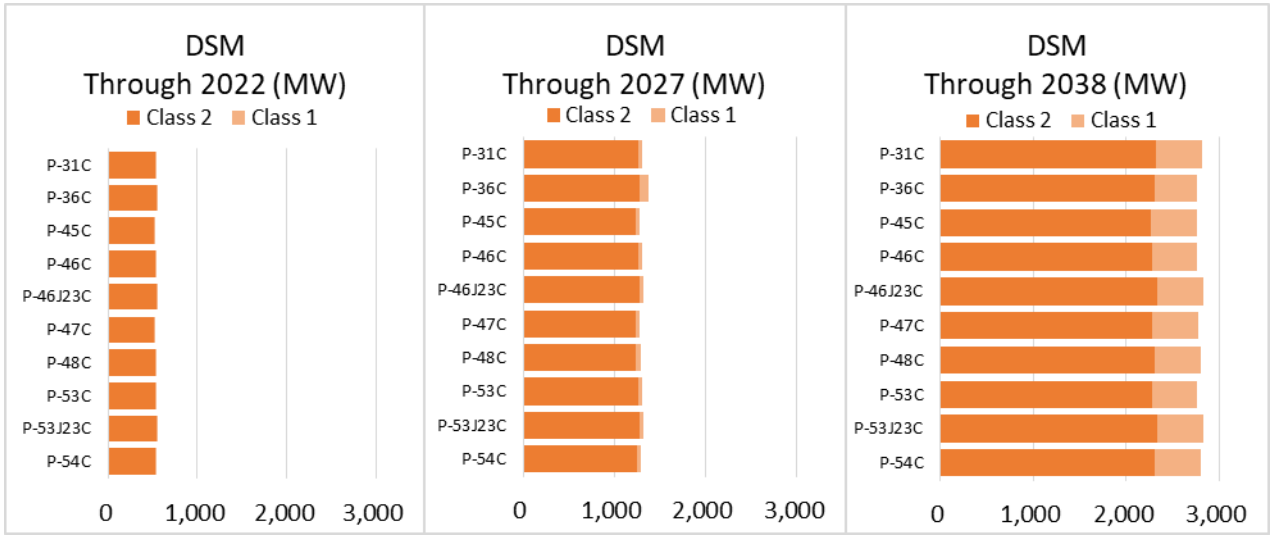


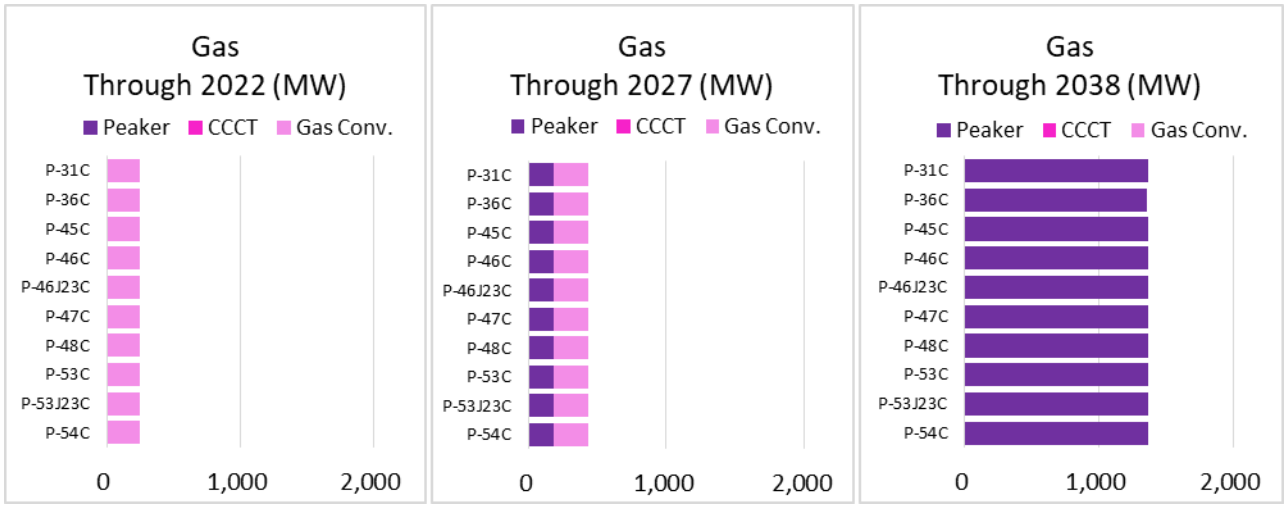


- Through 2027, total coal retirements range between 2,091 MW (Case P-31C) and 3,499 MW (Case P-36C).
- Through the end of 2037, total coal retirements approach 4,500 MW in each case.
- Through 2027, new renewable capacity ranges between 3,992 MW (Case P-31C) and 4,645 MW (Cases P-46J23C and P-53J23C)—all cases included Gateway South and 1,920 MW of eastern Wyoming wind in 2024 (as a proxy for year-end 2023).
- By the end of 2038, new renewable capacity ranges between 8,905 MW (Case P-36C) and 9,574 MW (Cases P-46C, P-47C, P-48C, P-53C, P-53J23C and P-54C).
- New battery capacity ranges between 518 MW and 729 MW through 2027 and over 3,300 MW by the end of 2038.*

*Note: For wind or renewable resources paired with battery, the capacity for the renewable resource is shown in the graph. The battery capacity paired with these resources is 25% of the renewable resource capacity.

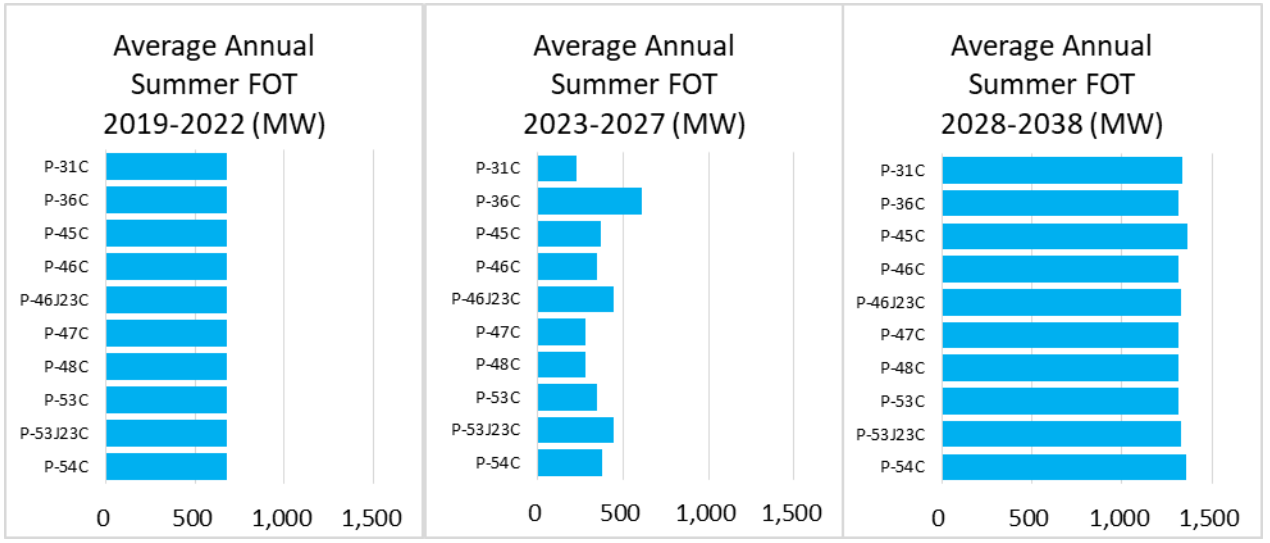
Incremental Demand-Side Management and New Natural Gas Resources, “C” Cases

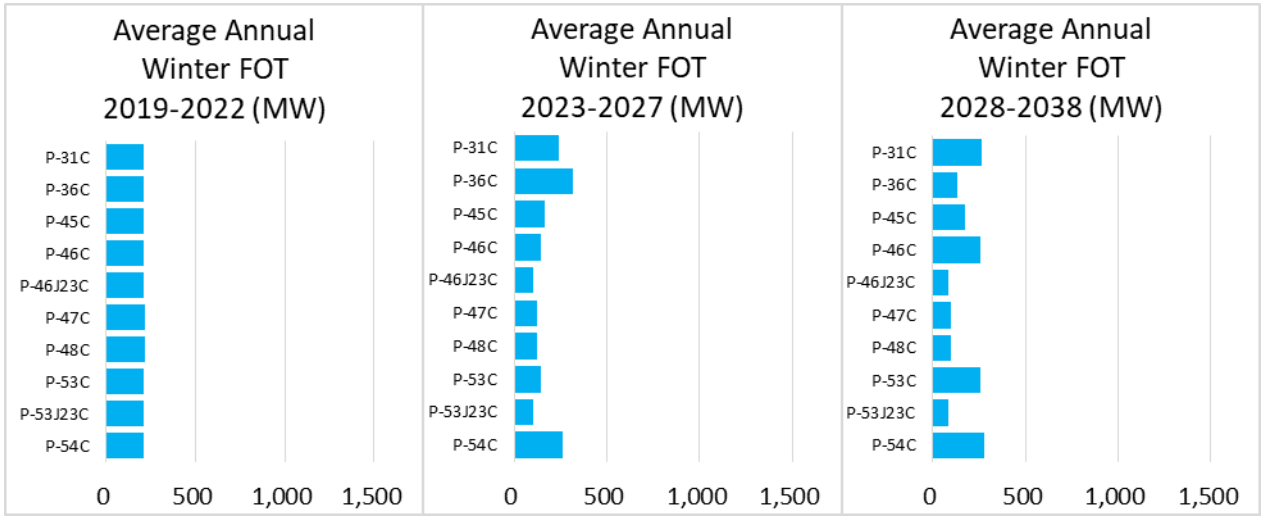




- Demand-side management (DSM) selections continue to be relatively stable among each of these cases.
- On average, Class 2 DSM capacity totals 531 MW through 2022, 1,257 MW through 2027, and 2,303 MW through 2038.
- On average, Class 1 DSM capacity totals 11 MW through 2022, 49 MW through 2027, and 490 MW through 2038.
- Each case includes the large gas conversion of Naughton 3 in 2020, and includes 185 MW of new peaking gas capacity in 2026.
- P-36C includes 1,356 MW of new peaking gas through the end of 2038; all other “C” cases include 1,367 MW of new gas peaking gas capacity through the end of 2038.
- None of these cases include new gas CCCT capacity.

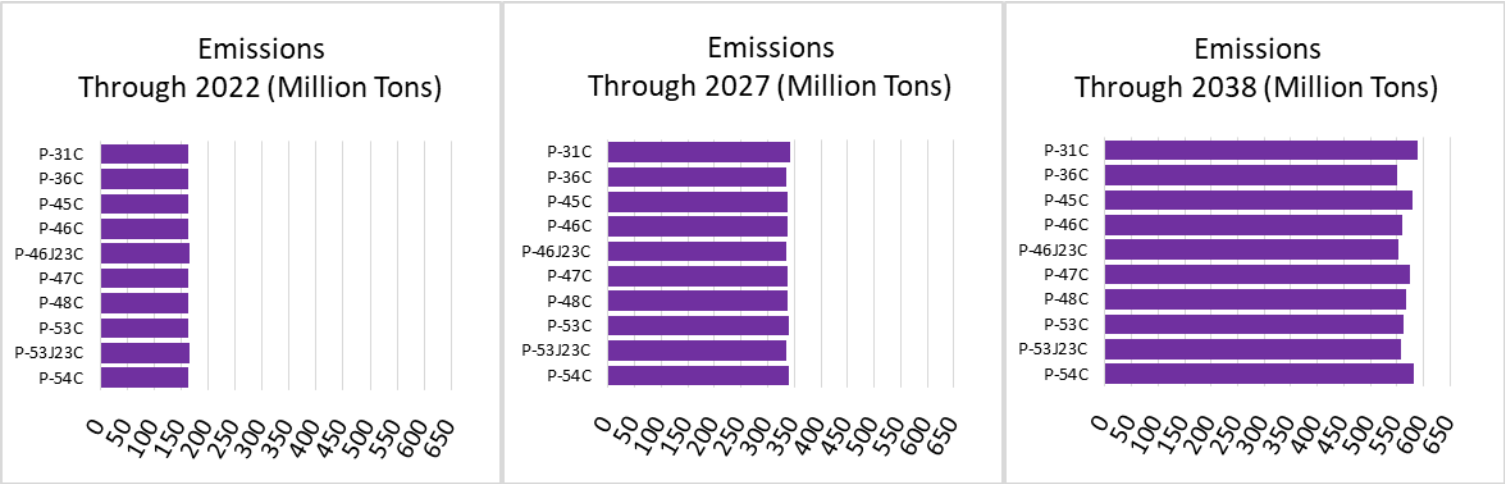
Summer and Winter Front Office Transactions, "C" Cases





- The summer FOT limit assumed for the 2019 IRP is 1,425 MW.
- Market reliance is reduced in the 2023 to 2027 timeframe, coinciding with the addition of new transmission, new wind, and new solar+battery resources—on average, summer FOT purchases are 373 MW per year over this period.
- Longer-term, summer FOTs increase similarly among these cases, on average ranging between 1,310 MW and 1,361 MW each year from 2028-2038.

Emissions, “C” Cases



- Total CO_2 emissions is similar among these cases through 2027.
- Through 2038, total CO_2 emissions range between 550 million tons (Case P-36C) and 588 million tons (Case P-31C).

Portfolio Cost and Risk Summary
"C" Cases

Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P47C	**23,198**	**$0**	**1**	**24,367**	**$0**	**1**	**0.012%**	**0.002%**	**7**	**573,088**	**22,855**	**7**
P48C	**23,221**	**$23**	**2**	**24,391**	**$24**	**2**	**0.011%**	**0.001%**	**5**	**567,025**	**16,792**	**6**
P46C	**23,278**	**$80**	**3**	**24,462**	**$95**	**3**	**0.011%**	**0.001%**	**3**	**560,210**	**9,977**	**4**
P45C	**23,283**	**$85**	**4**	**24,468**	**$101**	**4**	**0.010%**	**0.000%**	**1**	**578,607**	**28,374**	**8**
P46J23C	23,312	$114	5	24,488	$121	5	0.013%	0.002%	9	553,673	3,440	2
P53C	**23,340**	**$142**	**6**	**24,528**	**$161**	**6**	**0.011%**	**0.001%**	**4**	**562,972**	**12,739**	**5**
P31C	23,374	$176	7	24,562	$195	7	0.010%	0.000%	2	588,334	38,101	10
P54C	23,381	$183	8	24,570	$204	9	0.012%	0.002%	6	581,465	31,232	9
P53J23C	23,391	$193	9	24,570	$203	8	0.012%	0.002%	8	556,990	6,757	3
P36C	23,430	$231	10	24,614	$247	10	0.013%	0.003%	10	550,233	0	1

- PacifiCorp identified the cases **in bold** as top-performing cases selected for more refined analysis in the next step of the portfolio-development process (P-47C, P-48C, P-46C, P-45C, and P53C).
- Case P-46J23C was developed in response to stakeholder requests to test whether accelerating retirement of Jim Bridger 3-4 from 2025 (P-46C) to 2023 would improve portfolio performance. Based on the results above, this was not the case. Considering that Case P-46C outperforms Case P-46J23C, Case P-46J23C was not analyzed further.

2019 IRP
“CP” Cases

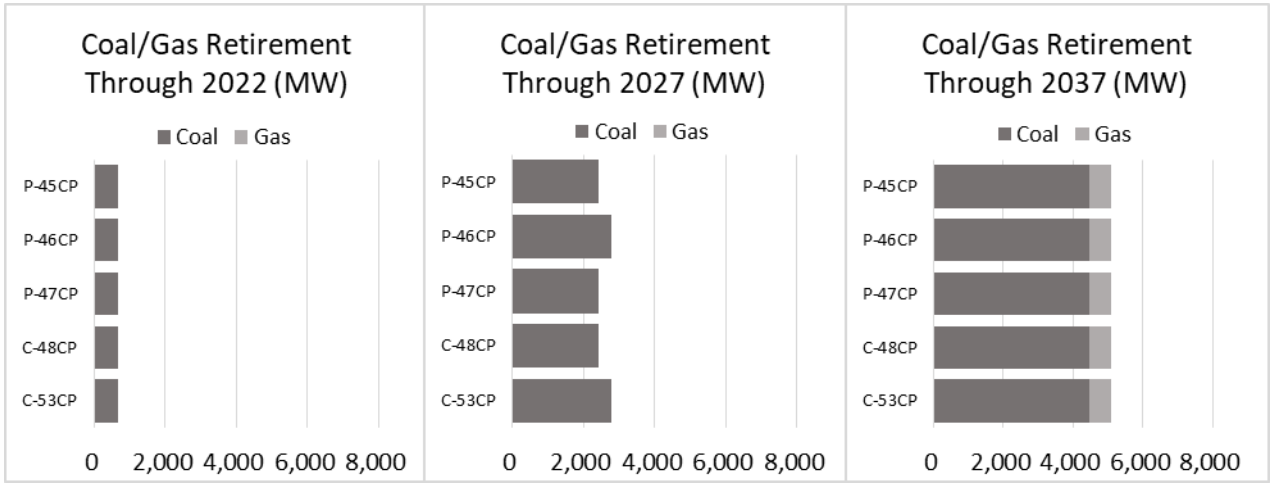


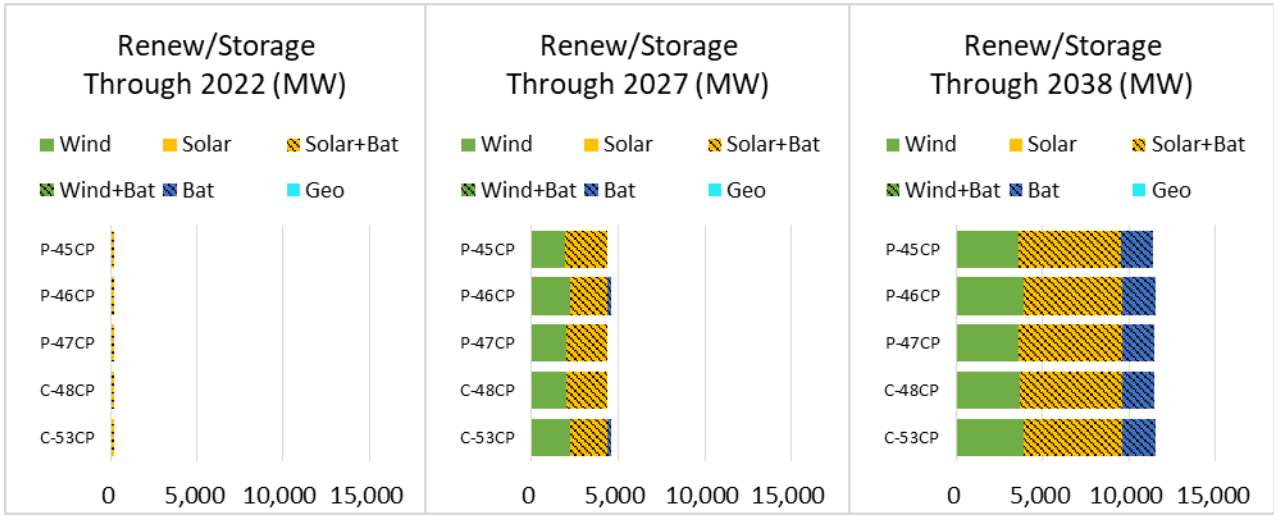

PACIFICORP
POWERING YOUR GREATNESS

Description of “CP” Cases

- As was discussed previously, PacifiCorp identified that additional granularity in the deterministic hourly runs used to establish incremental reliability requirements provides for a better comparison of cost and risk metrics between cases. Top-performing portfolios from the “C” series of cases that were conducted with additional front-end reliability analysis and with the additional solar+battery analysis were further refined.
- To ensure that there is no potential for an inconsistent application of annual reliability requirements beyond 2030, PacifiCorp produced additional deterministic hourly studies for the top-performing cases (*i.e.*, adding hourly deterministic test years for 2031-2037 for a total of 16 deterministic studies covering the period 2023-2038).
- This further improves the granularity at which reliability resources are applied and provides for an even better comparison of cost and risk metrics between the top-performing cases identified in the previous step of the portfolio-development process.
- Cases studies with this additional back-end reliability analysis, which retain the solar+battery modeling approach applied in the “C” cases, are referred to herein as the “CP” series of cases.
- The resulting portfolios were also evaluated among a range of price-policy scenarios.

Retirements, New Renewable and Storage, "CP" Cases

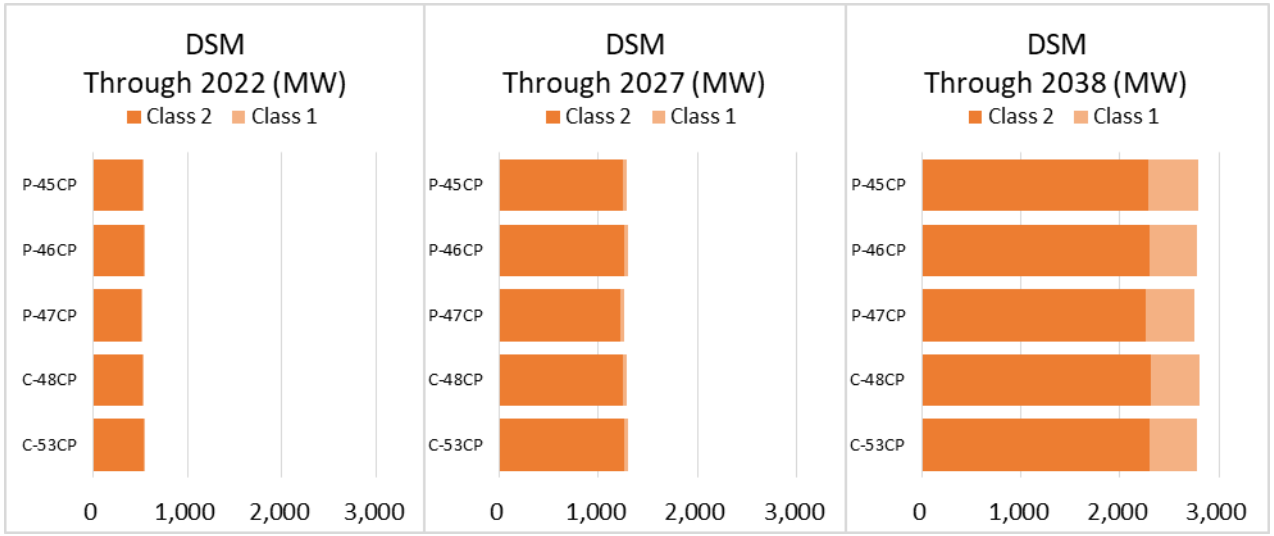


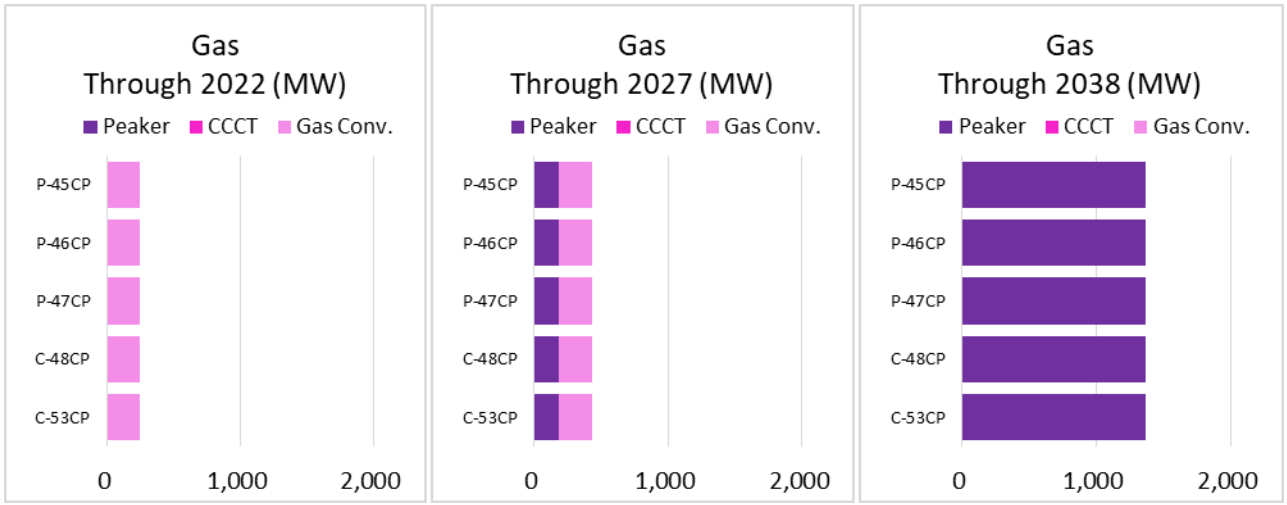


- Through 2027, total coal retirements range between 2,441 MW (Case P-45CP, P-47CP, P-48CP) and 2,797 MW (Case P-53CP).
- Through the end of 2037, total coal retirements approach 4,500 MW in each case.
- Through 2027, new renewable capacity ranges between 3,339 MW (Case P-47CP) and 4,409 MW (Cases P-46CP and P-53CP)—all cases included Gateway South and 1,920 MW of eastern Wyoming wind in 2024 (as a proxy for year-end 2023).
- By the end of 2038, new renewable capacity ranges between 9,512 MW (Case P-45CP) and 9,574 MW in the other four cases.
- New battery capacity ranges between 587 MW and 729 MW through 2027 and over 3,300 MW by the end of 2038.*

*Note: For wind or renewable resources paired with battery, the capacity for the renewable resource is shown in the graph. The battery capacity paired with these resources is 25% of the renewable resource capacity.

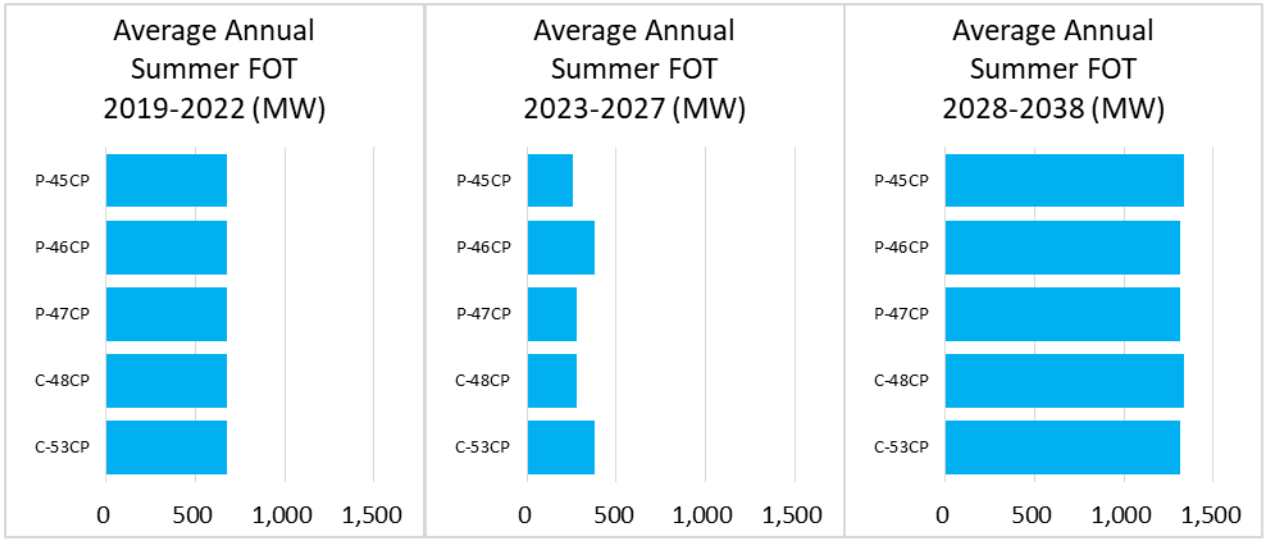
Incremental Demand-Side Management and New Natural Gas Resources, “CP” Cases

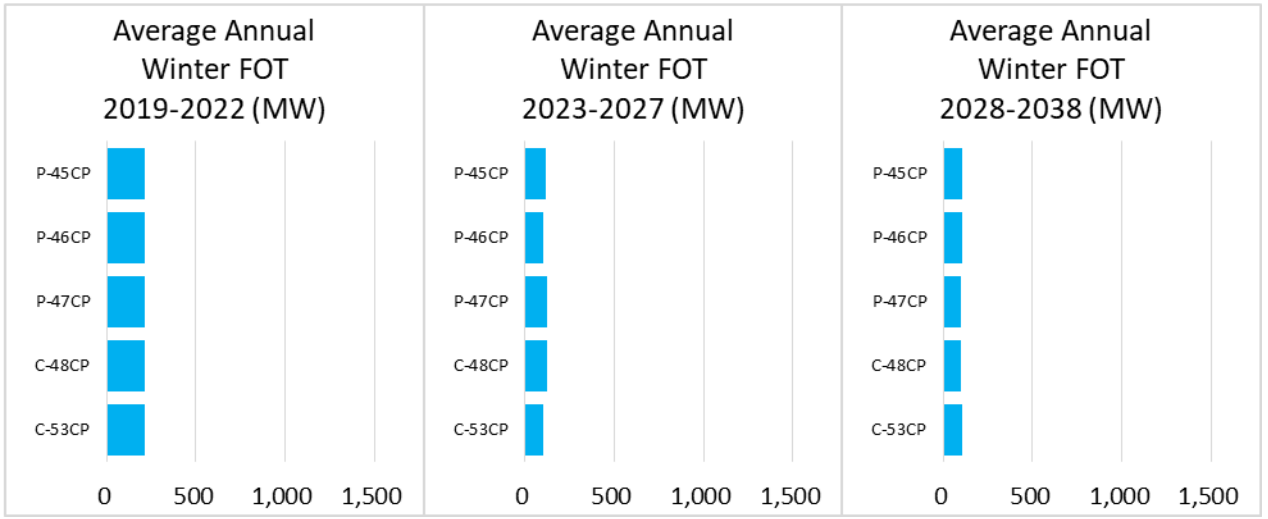




- Demand-side management (DSM) selections continue to be relatively stable among each of these cases.
- On average, Class 2 DSM capacity totals 529 MW through 2022, 1,243 MW through 2027, and 2,255 MW through 2038.
- On average, Class 1 DSM capacity totals 11 MW through 2022, 45 MW through 2027, and 493 MW through 2038.
- Each case includes the large gas conversion of Naughton 3 in 2020, includes 185 MW of new peaking gas capacity in 2026 and 1,367 MW of new gas peaking gas capacity through the end of 2038.

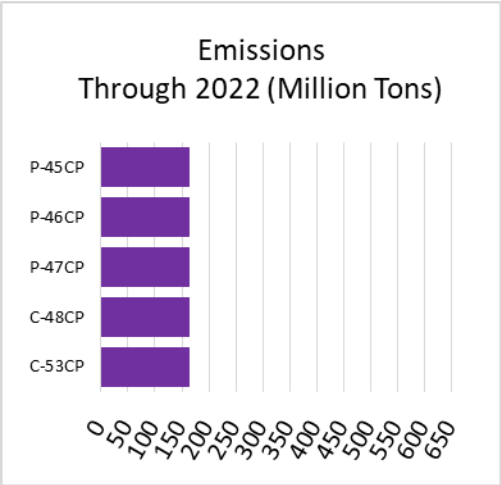
Summer and Winter Front Office Transactions, "CP" Cases

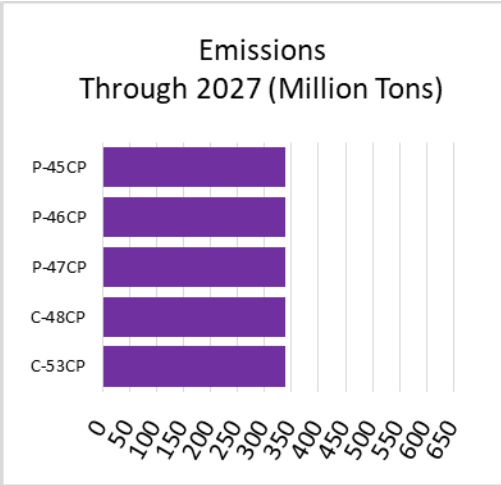


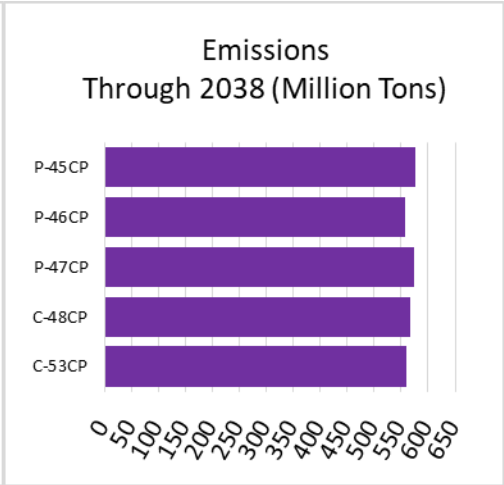


- The summer FOT limit assumed for the 2019 IRP is 1,425 MW.
- Market reliance is reduced in the 2023 to 2027 timeframe, coinciding with the addition of new transmission, new wind, and new solar+battery resources—on average, summer FOT purchases are 316 MW per year over this period.
- Longer-term, summer FOTs increase similarly among these cases, on average ranging between 1,315 MW and 1,334 MW each year from 2028-2038.

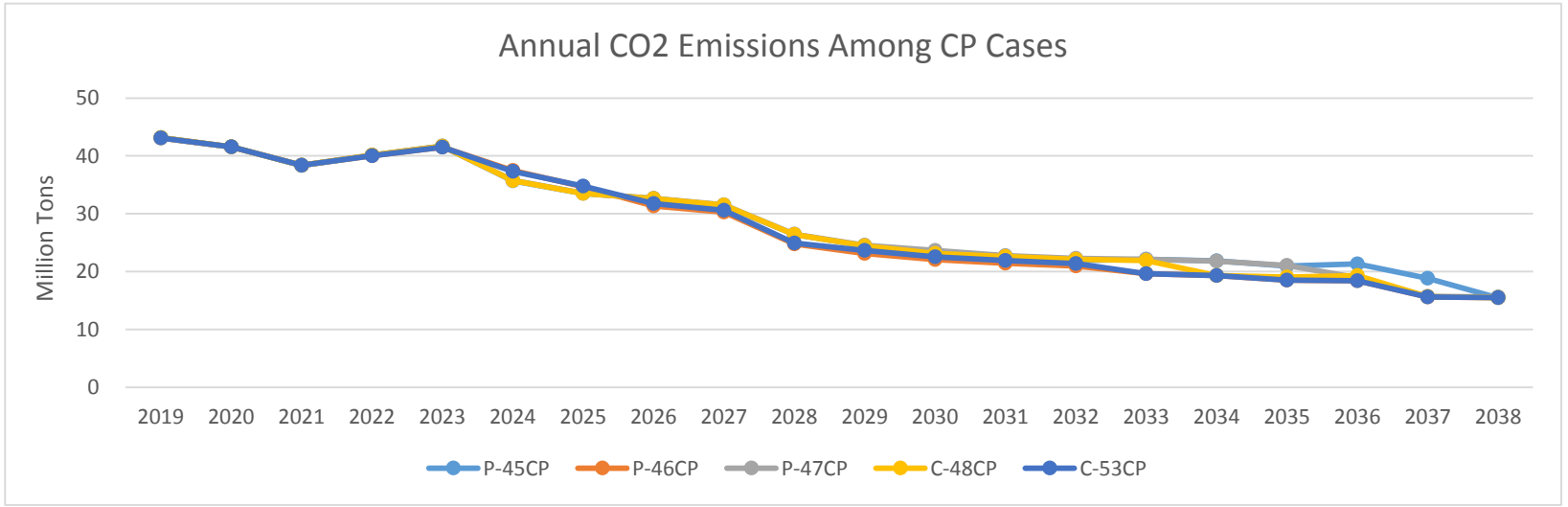
Emissions, “CP” Cases





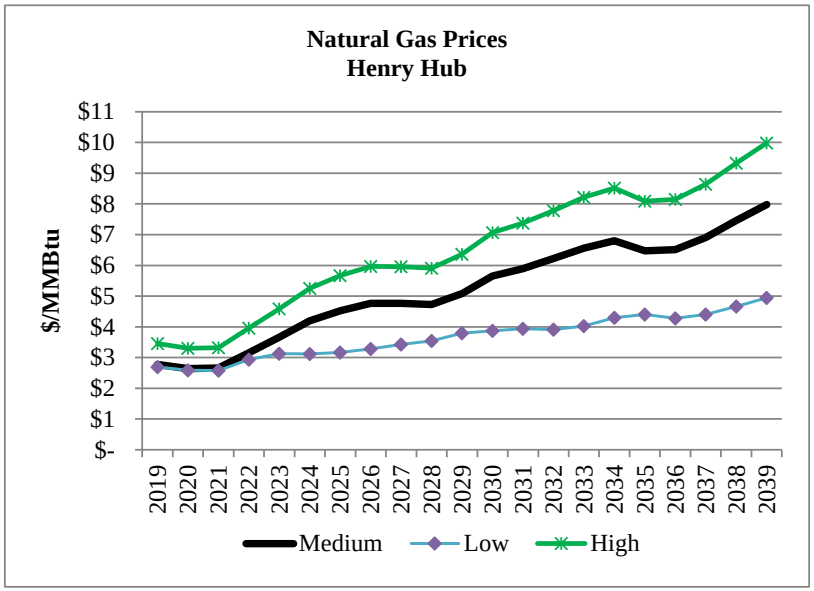


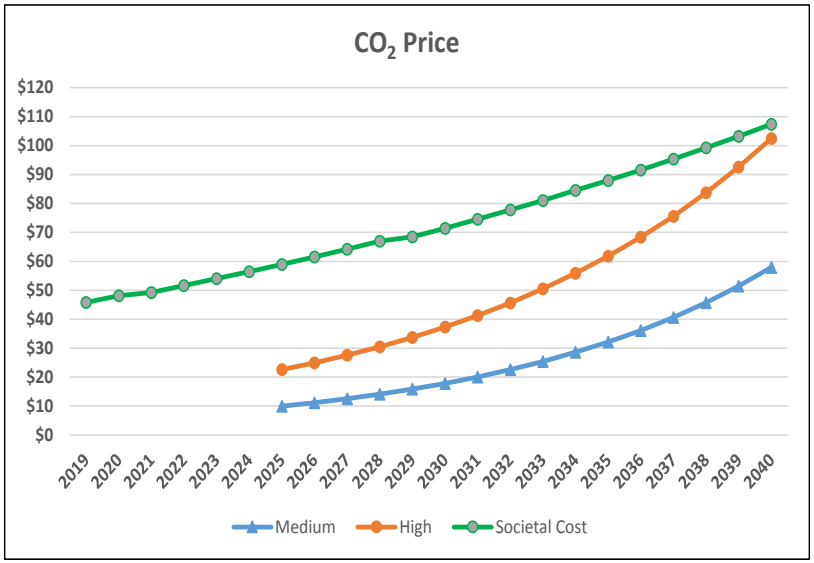
- Total CO_2 emissions is similar among these cases through 2027.
- Through 2038, total CO_2 emissions range between 558 million tons (Case P-46CP) and 577 million tons (Case P-45CP).



Price-Policy Scenarios, "CP" Cases

- The following slides show portfolio cost and risk summary date for the "CP" series of cases.
- In the medium gas/medium CO_2 scenario, Case P-45CP outperforms other cases on stochastic mean costs, risk-adjusted costs, and energy not served (ENS). While P-45CP has higher cumulative CO_2 emissions, it is just 3.5 percent higher than cumulative emissions in highest ranking case (Case P-46CP), which has a risk-adjusted cost that is $191m higher than P-45CP.
- In the low gas/zero CO_2 scenario, Case P-45CP outperforms other cases on stochastic mean costs, risk-adjusted costs, and energy not served (ENS). While P-45CP has higher cumulative CO_2 emissions, it is just 4.0 percent higher than cumulative emissions in the highest ranking case (Case P-46CP), which has a risk-adjusted cost that is $201m higher than P-45CP.
- In the high gas/high CO_2 scenario, Case P-48CP outperforms other cases on stochastic mean costs and risk-adjusted costs. Case P-45CP ranks second in stochastic mean and risk-adjusted cost and first in energy not served (ENS). While P-45CP has higher cumulative CO_2 emissions, it is just 3.3 percent higher than cumulative emissions in highest ranking case (Case P-46CP), which has a risk-adjusted cost that is $82m higher than P-48CP and $29m higher than P-45CP.
- In the social cost of carbon scenario, Case P-46CP outperforms other cases on stochastic mean costs, risk-adjusted costs, and emissions. Case P-45CP ranks fourth in stochastic mean and risk-adjusted cost and first in energy not served (ENS). While P-45CP has higher cumulative CO_2 emissions, it is just 4.3 percent higher than cumulative emissions in the highest ranking case (Case P-46CP). Case C-45CP has a risk-adjusted cost that is $242m higher than P-46CP.
- Based on these findings, PacifiCorp has identified Case P-45CP as the top-performing case at this stage of the portfolio-development process. All CP cases are further analyzed for FOT risk, as described in the next section of this presentation.





Portfolio Cost and Risk Summary "CP" Cases (Med Gas/Med CO_2)

CP Cases

Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P45CP	**23,192**	**$0**	**1**	**24,352**	**$0**	**1**	**0.010%**	**0.000%**	**1**	**577,439**	**19,615**	**5**
P48CP	23,205	$13	2	24,374	$22	2	0.013%	0.003%	2	567,889	10,065	3
P47CP	23,219	$27	3	24,388	$37	3	0.013%	0.004%	5	573,649	15,825	4
P46CP	23,292	$100	4	24,465	$114	4	0.013%	0.003%	4	557,824	0	1
P53CP	23,348	$156	5	24,524	$173	5	0.013%	0.003%	3	560,553	2,730	2

- Case P-45CP outperforms other cases on stochastic mean costs, risk-adjusted costs, and energy not served (ENS). While P-45CP has higher cumulative CO_2 emissions, it is just 3.5 percent higher than cumulative emissions in Case P-46CP, which has a risk-adjusted cost that is $191m higher than P-45CP.

Price-Policy Cases

Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P16	23,889	$0	1	25,097	$0	1	0.007%	0.000%	1	669,944	242,834	5
P19	24,000	$111	2	25,211	$115	2	0.007%	0.000%	2	607,157	180,047	3
P17	24,182	$292	3	25,400	$303	3	0.057%	0.051%	4	475,390	48,281	2
P18	24,376	$487	4	25,602	$506	4	0.111%	0.104%	5	427,110	0	1
P20	25,118	$1,229	5	26,385	$1,289	5	0.007%	0.000%	2	607,157	180,047	3

Portfolio Cost and Risk Summary "CP" Cases (Low Gas/No CO_2)

CP Cases

Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P45CP	**20,094**	**$0**	**1**	**21,105**	**$0**	**1**	**0.010%**	**0.000%**	**1**	**577,806**	**22,484**	**5**
P47CP	20,130	$36	2	21,143	$38	2	0.013%	0.004%	5	572,966	17,644	4
P48CP	20,173	$79	3	21,187	$83	3	0.013%	0.003%	2	567,163	11,841	3
P46CP	20,285	$191	4	21,305	$201	4	0.013%	0.003%	4	555,322	0	1
P53CP	20,327	$233	5	21,349	$245	5	0.013%	0.003%	3	558,186	2,864	2

- Case P-45CP outperforms other cases on stochastic mean costs, risk-adjusted costs, and energy not served (ENS). While P-45CP has higher cumulative CO_2 emissions, it is just 4.0 percent higher than cumulative emissions in Case P-46CP, which has a risk-adjusted cost that is $201m higher than P-45CP.

Price-Policy Cases

Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P16	19,448	$0	1	20,427	$0	1	0.007%	0.000%	1	674,184	255,509	5
P19	20,194	$746	2	21,209	$782	2	0.007%	0.000%	2	607,941	189,266	4
P20	20,833	$1,386	3	21,881	$1,453	3	0.007%	0.000%	3	579,150	160,476	3
P17	21,013	$1,565	4	22,071	$1,643	4	0.057%	0.051%	4	465,998	47,324	2
P18	22,456	$3,008	5	23,587	$3,160	5	0.111%	0.105%	5	418,674	0	1

Portfolio Cost and Risk Summary "CP" Cases (High Gas/High CO_2)

CP Cases

Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P48CP	27,736	$0	1	29,135	$0	1	0.013%	0.003%	2	562,313	8,983	3
P45CP	**27,786**	**$51**	**2**	**29,188**	**$53**	**2**	**0.010%**	**0.000%**	**1**	**571,643**	**18,312**	**5**
P47CP	27,805	$69	3	29,208	$72	3	0.013%	0.004%	5	568,183	14,852	4
P46CP	27,814	$78	4	29,217	$82	4	0.013%	0.003%	4	553,331	0	1
P53CP	27,889	$153	5	29,296	$161	5	0.013%	0.003%	3	556,201	2,870	2

- Case P-48CP outperforms other cases on stochastic mean costs and risk-adjusted costs.
- Case P-45CP ranks second in stochastic mean and risk-adjusted cost and first in energy not served (ENS). While P-45CP has higher cumulative CO_2 emissions, it is just 3.3 percent higher than cumulative emissions in Case P-46CP, which has a risk-adjusted cost that is $82m higher than P-48CP and $29m higher than P-45CP.

Price-Policy Cases

Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P18	27,785	$0	1	29,187	$0	1	0.112%	0.105%	5	431,628	0	1
P20	28,397	$612	2	29,832	$646	2	0.007%	0.000%	3	572,793	141,165	3
P17	28,858	$1,073	3	30,312	$1,125	3	0.057%	0.051%	4	478,795	47,167	2
P19	29,224	$1,439	4	30,701	$1,514	4	0.007%	0.000%	2	598,587	166,960	4
P16	29,847	$2,062	5	31,357	$2,170	5	0.007%	0.000%	1	653,963	222,335	5

Portfolio Cost and Risk Summary "CP" Cases (Social Cost of Carbon)

CP Cases

Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P46CP	36,703	$0	1	38,550	$0	1	0.013%	0.003%	4	414,320	0	1
P48CP	36,798	$94	2	38,649	$99	2	0.013%	0.003%	2	424,073	9,753	3
P53CP	36,829	$125	3	38,681	$131	3	0.013%	0.003%	3	418,116	3,796	2
P45CP	**36,934**	**$231**	**4**	**38,791**	**$242**	**4**	**0.010%**	**0.000%**	**1**	**432,168**	**17,848**	**5**
P47CP	36,936	$233	5	38,794	$244	5	0.013%	0.004%	5	429,251	14,931	4

- Case P-46CP outperforms other cases on stochastic mean costs, risk-adjusted costs, and emissions.
- Case P-45CP ranks fourth in stochastic mean and risk-adjusted cost and first in energy not served (ENS). While P-45CP has higher cumulative CO_2 emissions, it is just 4.3 percent higher than cumulative emissions in Case P-46CP. Case C-45CP has a risk-adjusted cost that is $242m higher than P-46CP.

Price-Policy Cases

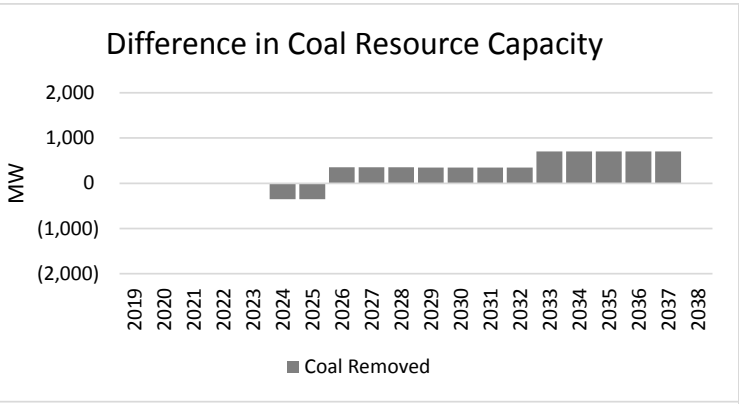
Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P18	35,276	$0	1	37,051	$0	1	0.112%	0.105%	5	321,000	0	1
P17	36,415	$1,139	2	38,247	$1,197	2	0.057%	0.051%	4	366,220	45,221	2
P20	37,527	$2,251	3	39,421	$2,370	3	0.007%	0.000%	3	437,132	116,133	3
P19	38,396	$3,120	4	40,334	$3,283	4	0.007%	0.000%	2	459,469	138,469	4
P16	39,712	$4,436	5	41,717	$4,666	5	0.007%	0.000%	1	496,702	175,703	5

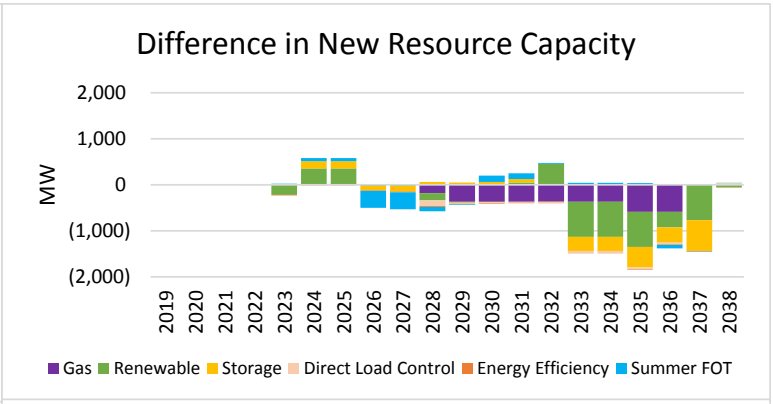
- Case P-18 reflects a portfolio developed with social cost of carbon assumptions, and it yields lower costs than any of the CP cases when those assumptions are applied in the Planning and Risk model. While P-18 produces a stochastic mean PVRR that is lower cost than the CP cases, when medium gas and medium CO_2 price-policy assumptions are applied, Case P-18 has a risk-adjusted PVRR that is approximately $1.3b higher cost than lowest cost CP case (Case P-45CP). Similarly, while P-46CP is the lowest cost CP case in this scenario, when medium gas and medium CO_2 price-policy assumptions, P-46CP has a risk adjusted PVRR that is $114m higher cost than P-45CP.

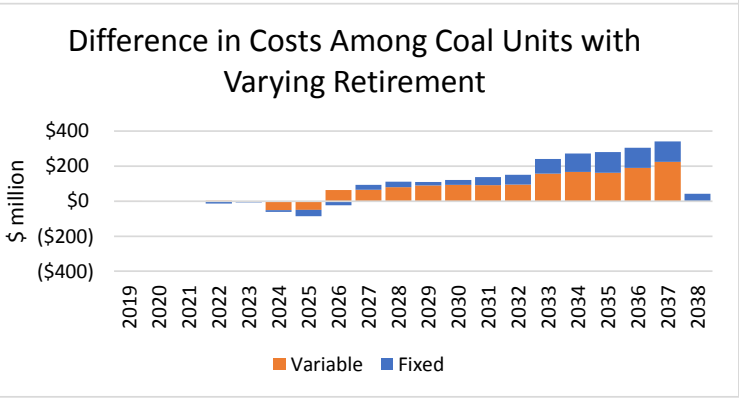
Drivers Among “CP” Cases

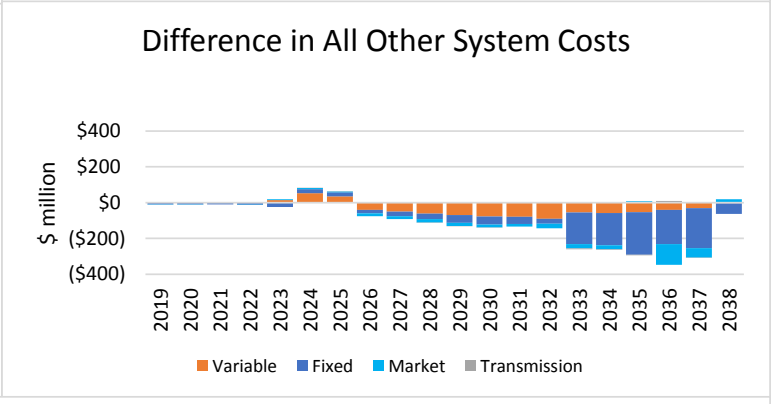
- At the September 2019 public-input meeting, there was a stakeholder request to provide a description of the key drivers among top performing cases.
- The request was rooted in the desire to have a better understanding of the key drivers causing one portfolio to outperform other top-performing portfolios.
- In response, PacifiCorp developed the materials in the following slides to highlight portfolio changes and system cost changes for the “CP” Cases relative to Case P-45CP (the top-performing case among the “CP” series of cases).
- Each comparison shows changes in the resource portfolio, differences in costs (by category and over time) among coal units that have varying retirement dates, and differences in all other system costs (by category and over time).

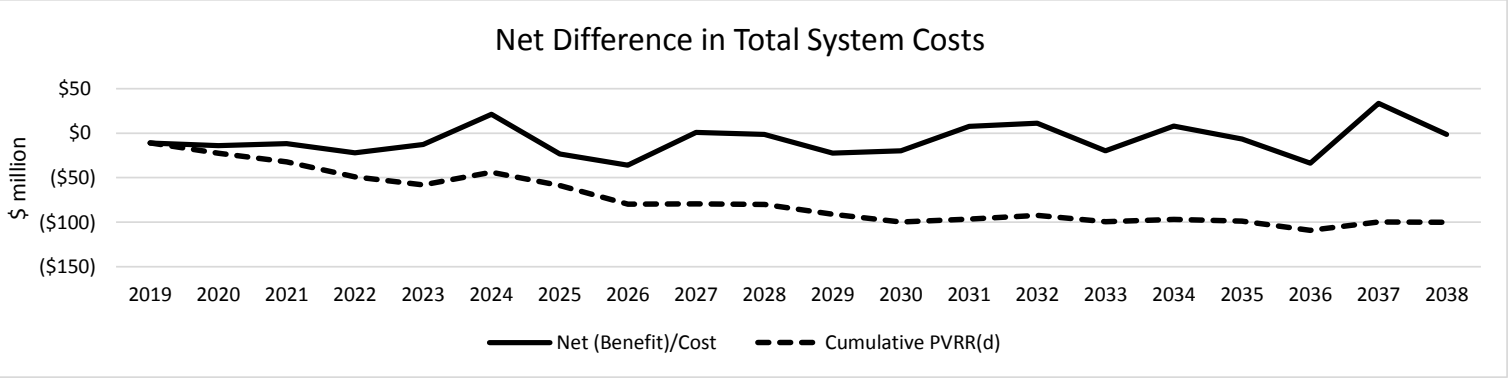
P-46CP vs. P-45CP





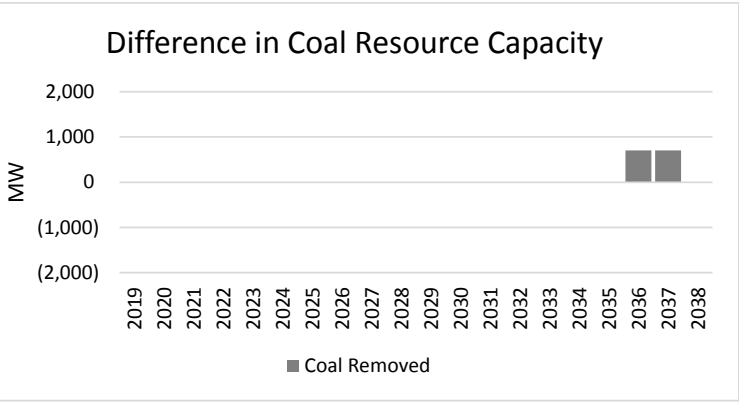


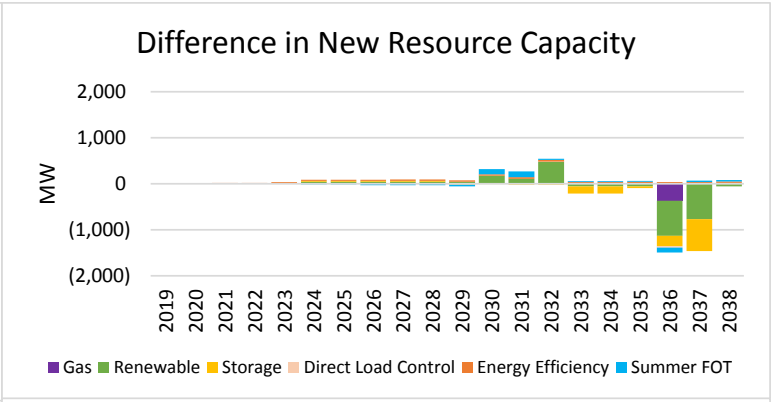


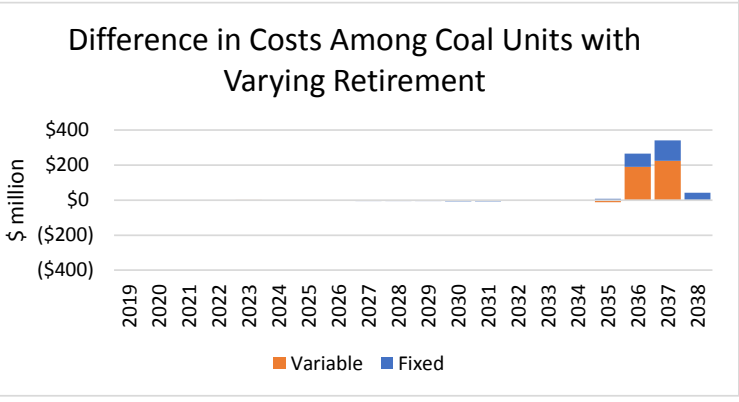


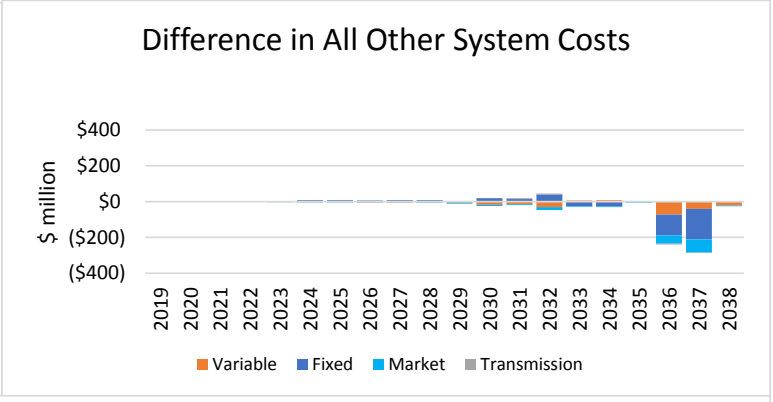
- P-45CP achieves $100m higher benefits compared to P-46CP by retiring Jim Bridger 1-2 earlier in 2023 and 2028, while operating the Jim Bridger 3-4 through 2037.
- Higher coal costs are offset by savings through reduced reliance on new gas in years 2028 through 2036, and reduced renewables and storage in years 2033 through 2037.
- By 2038, the P-45CP portfolio acquires 261 MW more incremental solar, 20 MW more battery and 322 MW less wind.

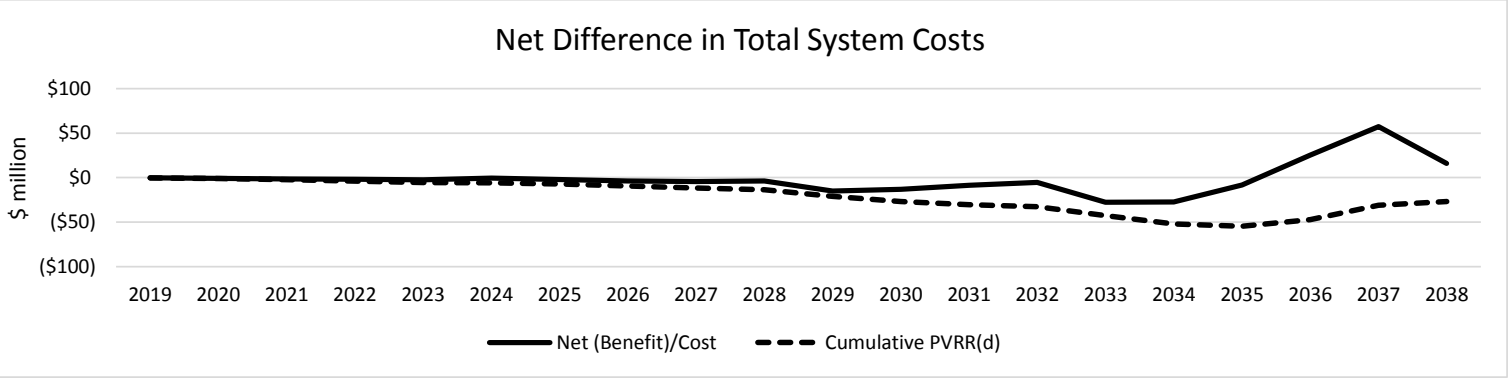
P-47CP vs. P-45CP





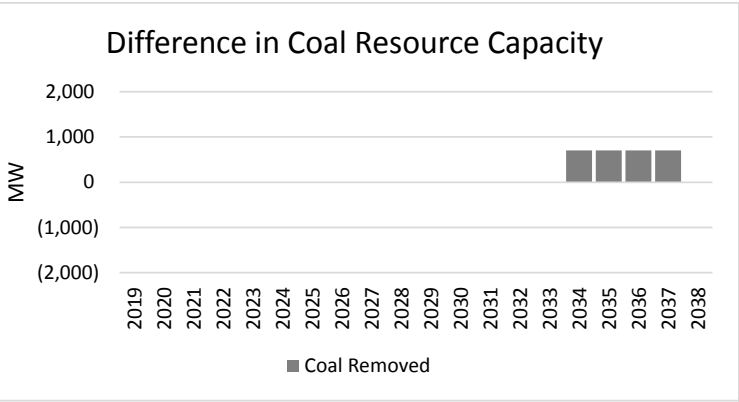


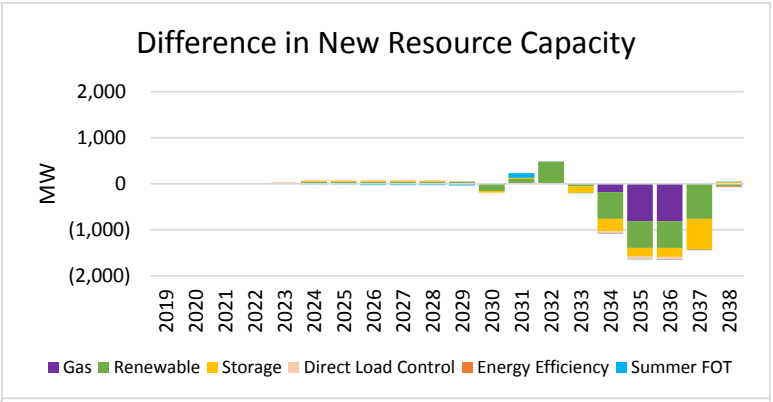


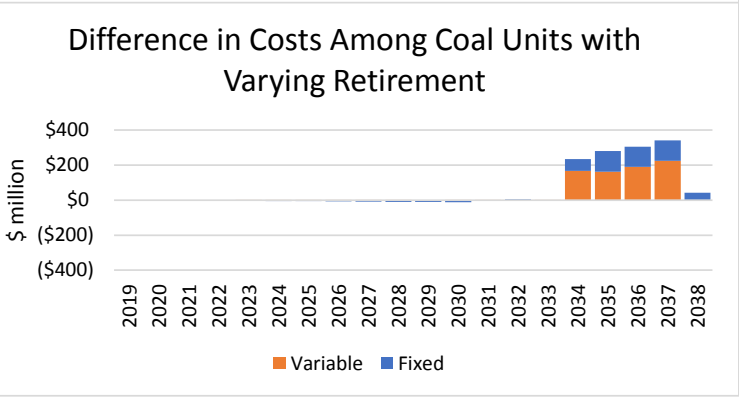


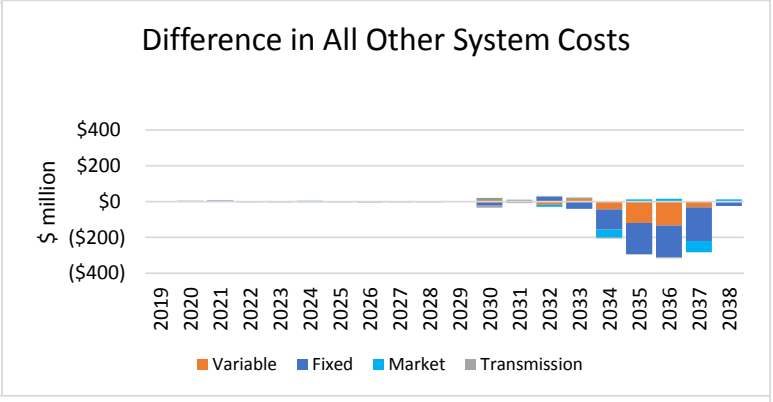
- P-47CP accelerates the back-end retirement of Jim Bridger 3-4 by two years, testing whether accelerations in this direction would provide added benefits.
- P-45CP achieves $27m higher benefits compared to P-47CP by maintaining the 2037 retirements of Jim Bridger 3-4.
- Cost savings are achieved through reduced reliance on new gas in 2036, and reduced renewables and storage in years 2036 through 2037.
- By 2038, the P-45CP portfolio acquires 84 MW less solar, 9 MW more battery and 23 MW more wind.

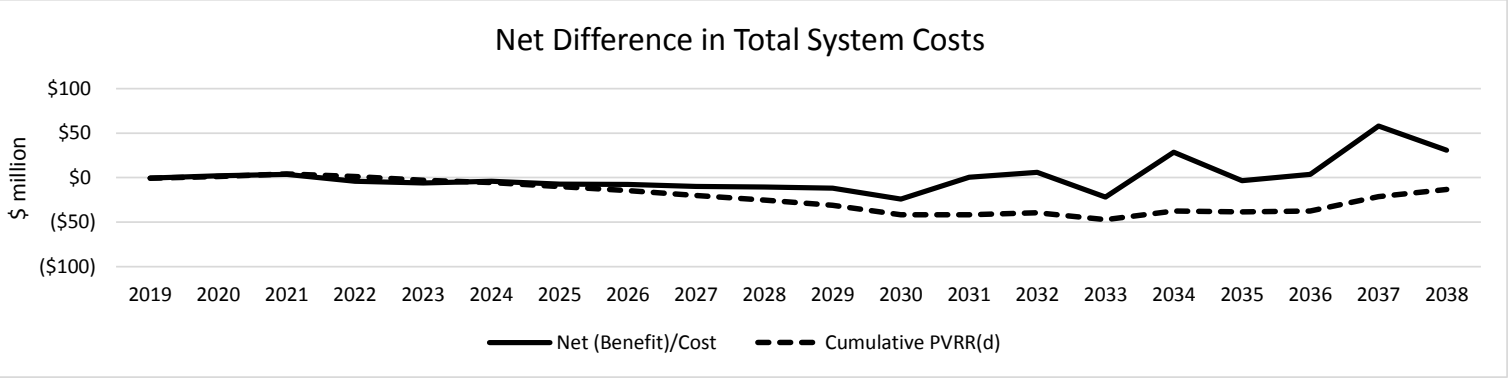
P-48CP vs. P-45CP





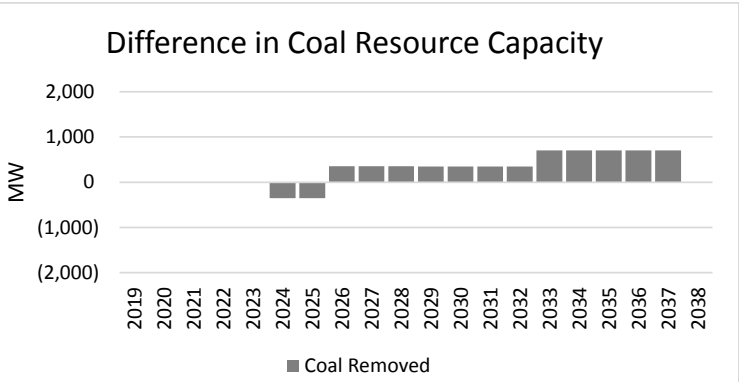


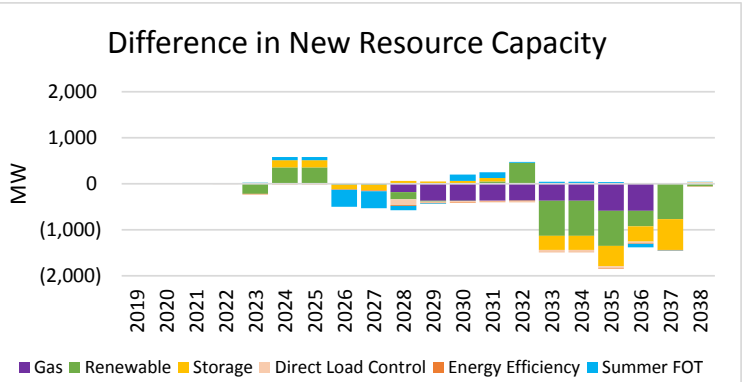


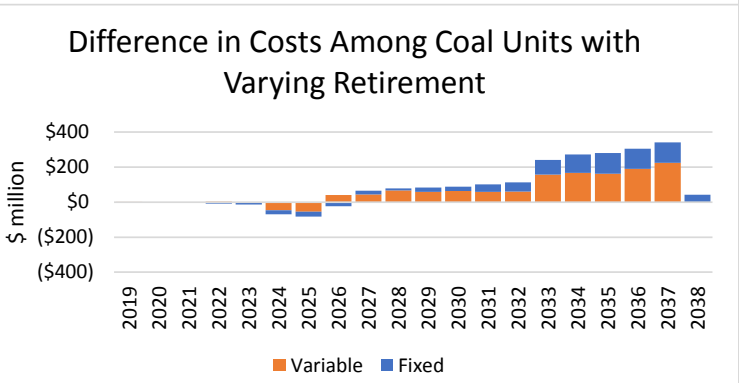


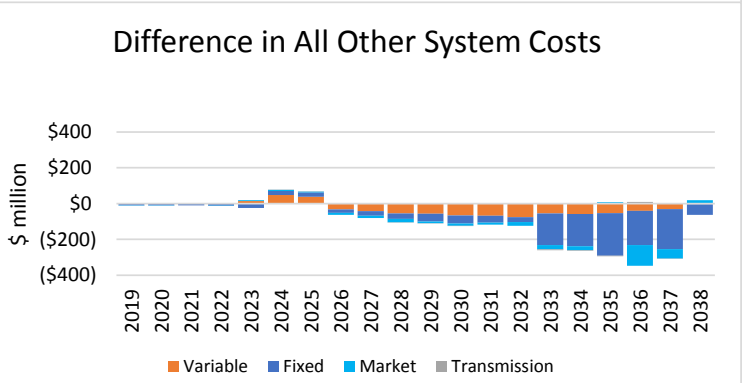
- P-48CP, run contemporaneously with P-47CP, accelerates the back-end retirement of Jim Bridger 3-4 by four years.
- P-45CP achieves $13m higher benefits compared to P-48CP by maintaining the 2037 retirements of Jim Bridger 3-4.
- Cost savings are achieved through reduced reliance on new gas in 2034-36, and reduced renewables and storage in the same years.
- By 2038, the P-45CP portfolio acquires 48 MW more solar, 42 MW more battery and 110 MW less wind.

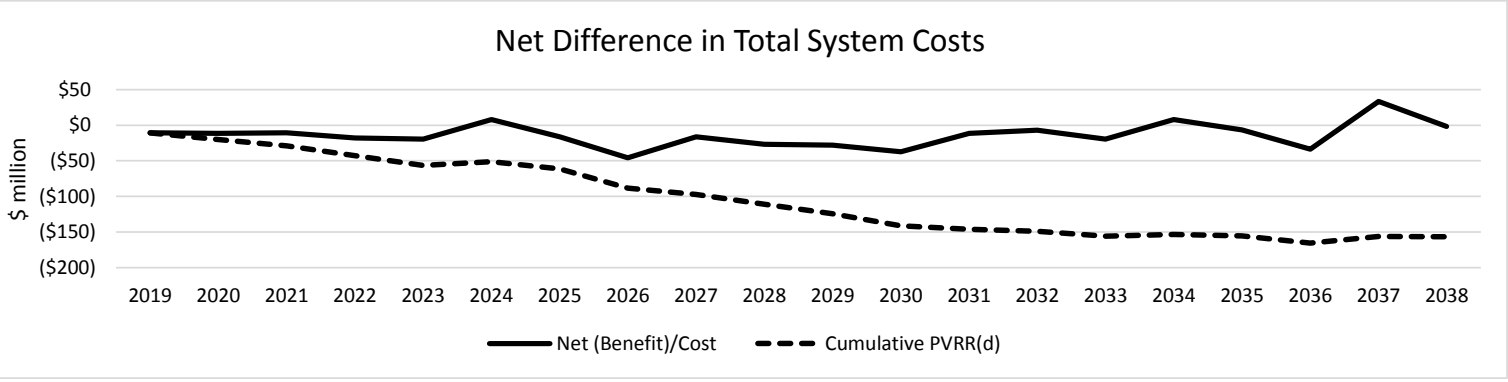
P-53CP vs. P-45CP











- P-45CP achieves $156m higher benefits compared to P-53CP by transitioning the retirements of Jim Bridger 1-2 in 2023 and 2028 rather than retiring both in 2025, and by continuing the operation of Jim Bridger 3-4 through 2037.
- Higher coal costs are offset by savings through reduced reliance on new gas in years 2028 through 2036, and reduced renewables and storage in years 2033 through 2037.
- By 2038, the P-45CP portfolio acquires 261 MW more incremental solar, 20 MW more battery and 322 MW less wind.

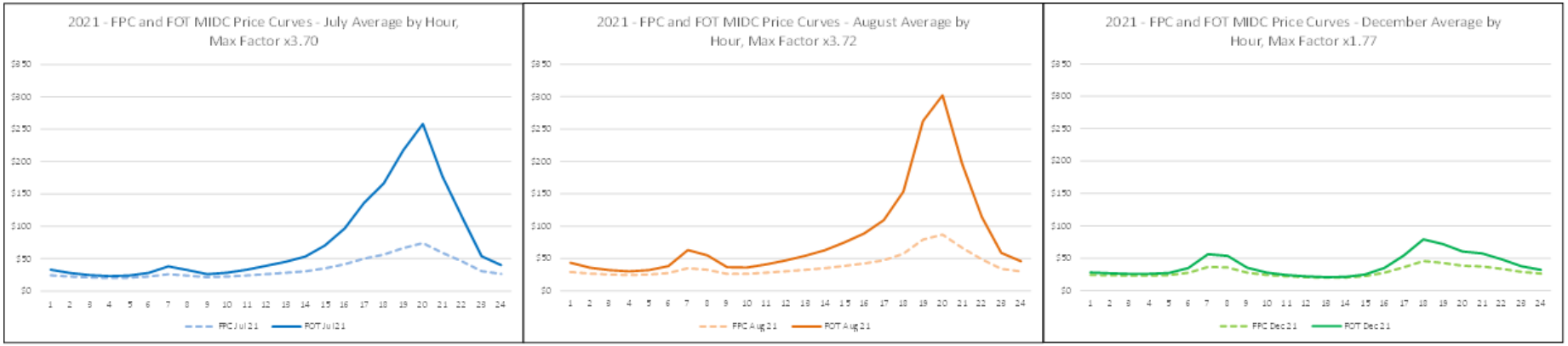
2019 IRP
FOT Risk Analysis




PACIFICORP
POWERING YOUR GREATNESS

Description of FOT Cases

- PacifiCorp ran a series of FOT studies designed to quantify the impact and risk of market reliance for a given portfolio.
- FOT studies use an escalating scalar to elevate market prices during the peak months of July, August and December of every study year.
- FOT prices are calculated as market price plus a premium; thus FOT prices are elevated with the market.
- The scalar targets a maximum escalation based on the largest difference between each month's highest Mid-C forward price and the highest Mid-C historical price in the sample year of 2018.
- This yields a maximum peak scalar of 3.72 times higher than the forward price curve in the month of August; 3.70 times higher in the month of July; and 1.77 times higher in the month of December.
- The higher the original forward price in a given hour, the higher the scalar.
- This increases the severity and number of high-price hours (increases upward volatility) while respecting the shape of the underlying price curve.



Portfolio Cost and Risk Summary
FOT Cases

Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P47CP	24,001	$0	1	25,209	$0	1	0.010%	0.000%	2	535,827	13,317	4
P45CP	24,024	$23	2	25,233	$25	2	0.009%	0.000%	1	540,134	17,623	5
P48CP	24,098	$97	3	25,312	$104	3	0.012%	0.002%	3	533,930	11,419	3
P46CP	24,099	$98	4	25,314	$105	4	0.013%	0.004%	5	522,510	0	1
P53CP	24,164	$163	5	25,382	$173	5	0.013%	0.003%	4	525,364	2,854	2

Case	Stochastic Mean		
	PVRR ($m)	Change from CP Portfolio ($m)	Rank
P47CP	24,001	$782	1
P45CP	24,024	$832	4
P48CP	24,098	$892	5
P46CP	24,099	$807	2
P53CP	24,164	$815	3

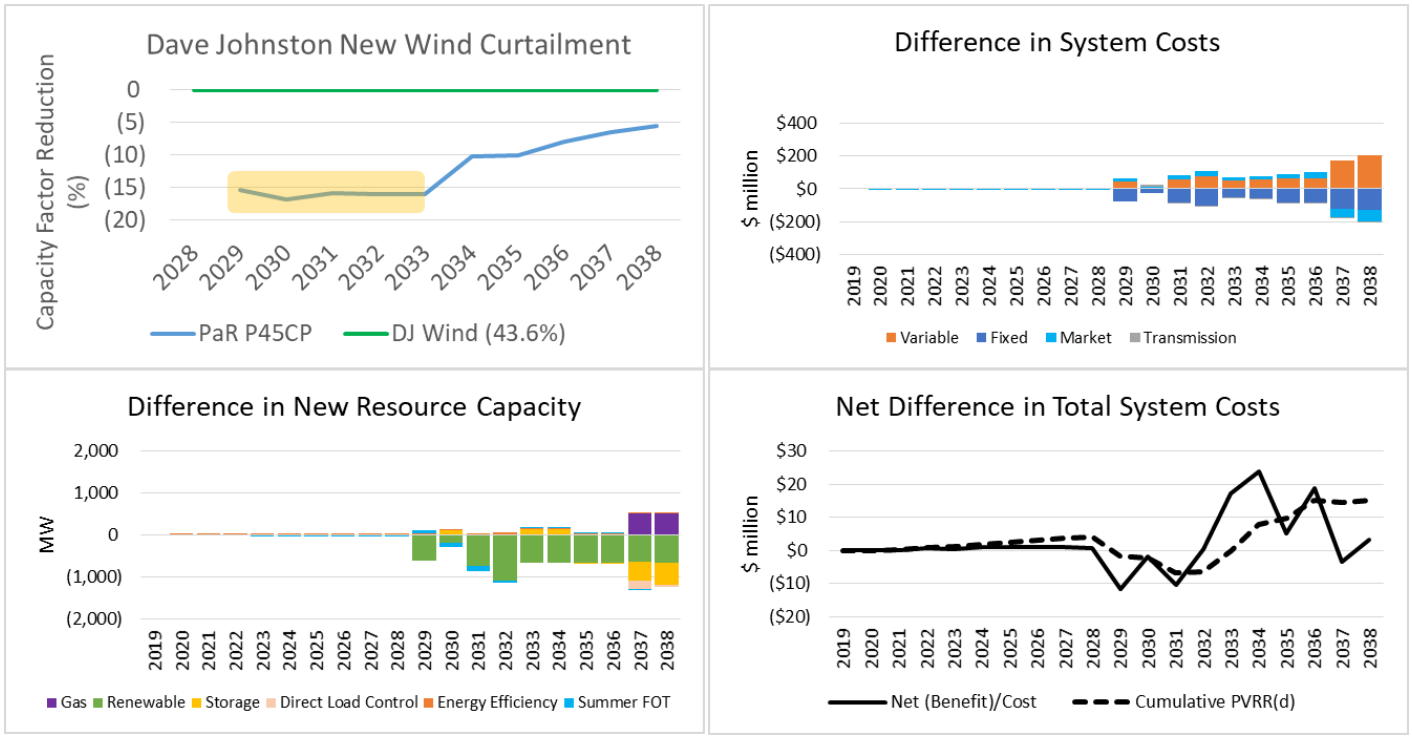
- Higher FOT costs from market risk increased the PVRR by similar amounts among the cases—$820 million (3.6%), on average.
- Case P-45CP has a risk-adjusted PVRR that is $25m higher than Case P-47CP, which has the lowest PVRR when higher FOT costs are applied.
- These results suggest that the risk of higher FOT costs is not materially different between Cases P-45CP and P-47CP, and do not justify a shift in the top-performing portfolio among “CP” cases when this risk is evaluated.

2019 IRP
2028-2029 Wyoming Wind




PACIFICORP
POWERING YOUR GREATNESS

Wyoming Wind Additions in 2029



- All of the CP cases include 620 MW of wind in eastern Wyoming that is added in the 2028-2029 timeframe, which coincides with the retirement of Dave Johnston (Dave Johnston wind).
- Upon reviewing model outputs for these top performing cases, PacifiCorp had identified that PaR was significantly reducing the dispatch of these wind resources—on average by 12% (from 43.6% to 32%) through 2038.
- From 2029 through 2033 the level of curtailment exceeds 16% on a capacity factor basis, yielding an effective capacity factor below 30% for these four years.
- It is not reasonable to include new wind facilities expected to exhibit this level of curtailment, and consequently, PacifiCorp developed Case P-45CNW, a variant of P-45CP (the top performing "CP" case) that excludes the addition of the Dave Johnston wind.
- While the PVRR of P-45CNW is $15m higher than the PVRR of P-45CP, PacifiCorp advanced Case P-45CNW as the baseline for evaluating additional Energy Gateway cases on the bases that it is not reasonable to include heavily curtailed wind resources in the leading case for the preferred portfolio.
- Further, the shifts in system costs contributing to the $15m increase in system PVRR are all beyond the action plan window, which will allow PacifiCorp to continue to evaluate potential incremental wind additions in eastern Wyoming when Dave Johnston retires in future IRPs.

2019 IRP
No Gas and Energy Gateway Transmission Cases



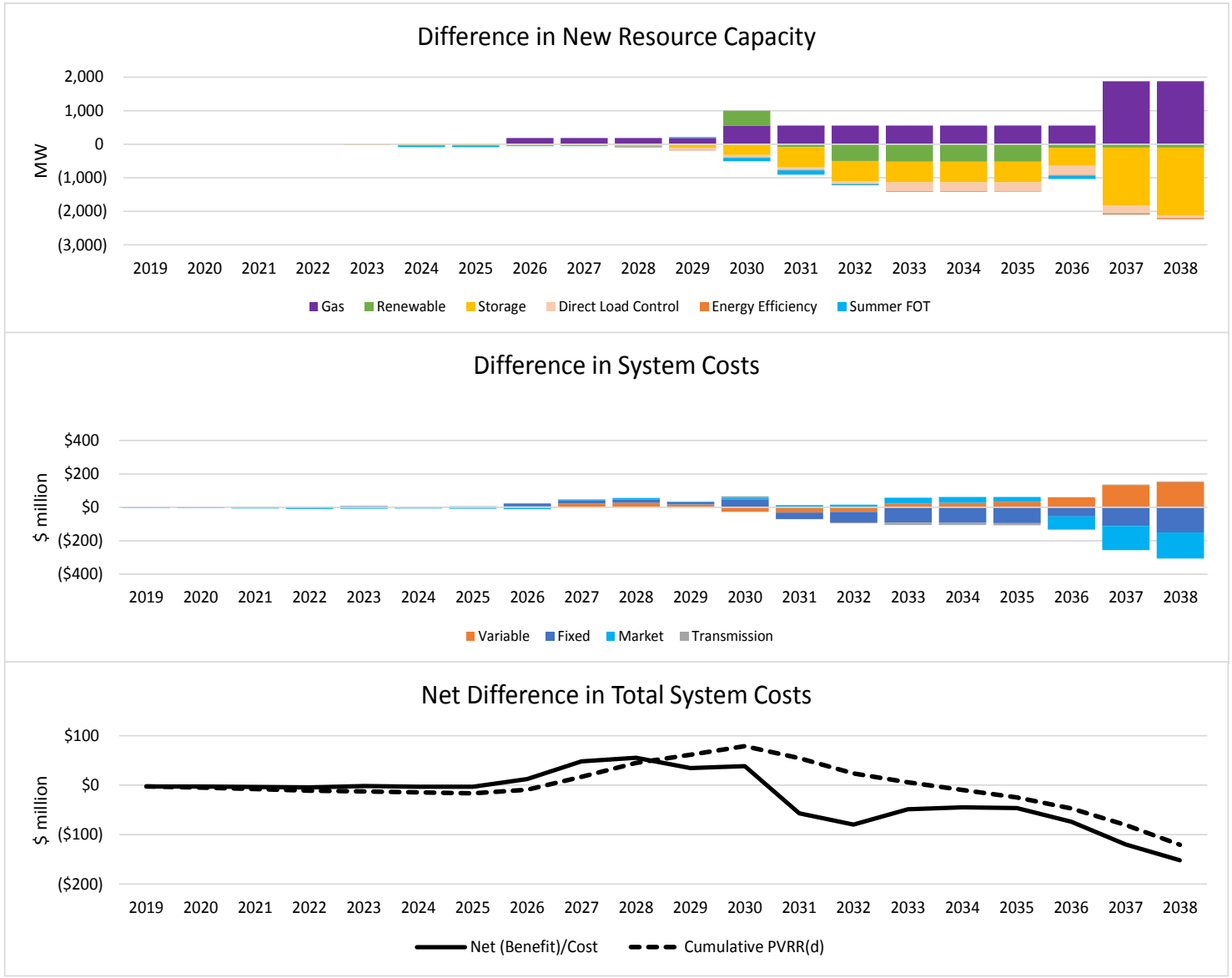

PACIFICORP
POWERING YOUR GREATNESS

No Natural Gas Cases

- PacifiCorp ran two cases as variants of P-45CNW to evaluate portfolio impacts of excluding new natural gas capacity from the portfolio.
- The first case, P-29 does not allow the model to select new natural gas resources (excluding Naughton 3 gas conversion).
- The second case, P-29PS is a variant of P-29 with the addition of a 400 MW pumped storage project located in northeast Wyoming that comes online in 2028 following retirement of the Dave Johnston plant.
- Both cases result in higher costs than P-45CNW as described on the following slides.
- Neither case justifies alternating selection of Case P-45CNW as the preferred portfolio.

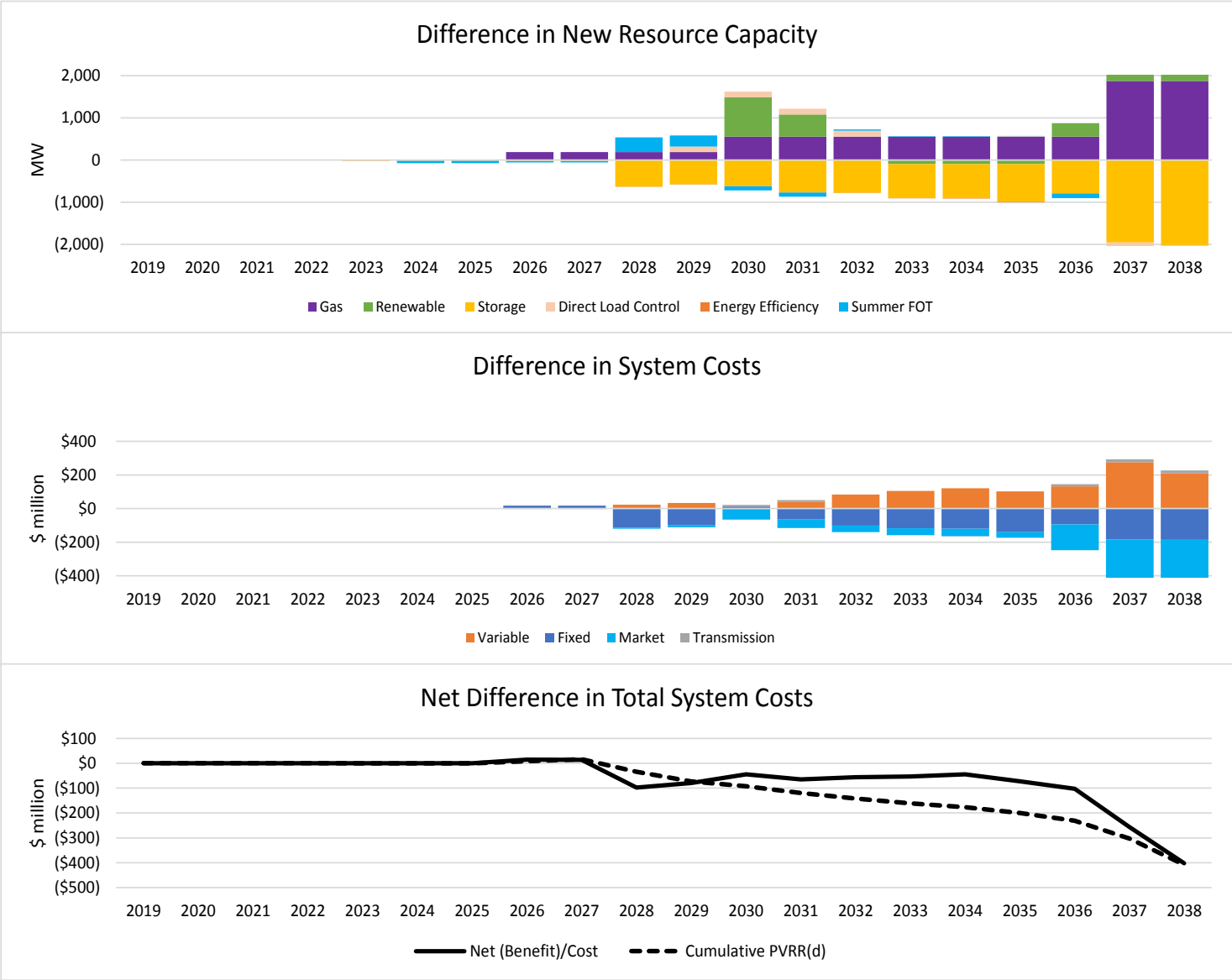
	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
Case	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P45CNW	**23,207**	**$0**	**1**	**24,376**	**$0**	**1**	**0.008%**	**0.002%**	**2**	**585,641**	**8,835**	**3**
P29	23,328	$121	2	24,503	$127	2	0.006%	0.000%	1	580,126	3,320	2
P29PS	23,616	$409	3	24,806	$430	3	0.047%	0.040%	3	576,806	0	1

P-29 vs. P-45CNW



- With gas eliminated, Case P-29 accelerates renewable resources from 2036 to 2032 and adds incremental battery storage resources beginning 2030.
- Under P-29, system costs begin to decrease in 2027, however over the long term, incremental costs for new battery storage resources and market purchases reverse the trend.

P-29PS vs. P-45CNW



- With gas eliminated, Case P-29PS adds pumped storage (400 MW) and battery storage (227 MW) in 2028.
- By the end of the study period, Case P-29S adds an additional 1,575 MW of battery storage.
- System costs increase beginning 2028 with incremental fixed cost for the storage resources, and added market purchases costs increasingly contribute to the added system costs in the 2036-2038 timeframe.

Additional Energy Gateway Cases

- Gateway South (segment F) is modeled as an option using the PacifiCorp's enhanced transmission modeling capability introduced in the 2019 IRP, and it has been selected in all but one of the cases produced throughout the 2019 IRP portfolio-development process.
- As planned, three additional Energy Gateway segments have been examined in four distinct cases, as summarized in the table below.
- The full build-out of all Energy Gateway segments was performed in two cases (P-23 and P-25) to assess the potential value in two different coal retirement scenarios.

Case	P-22	P-23	P-25	P-26
Base Case	P-45CNW	P-36CNW	P-45CNW	P-45CNW
Segments*	(D3), (F)	(D3), (E), (F), (H)	(D3), (E), (F), (H)	(F), (H)

Gateway Segment Summary

Segment	Description	Incremental Capacity	Approximate Mileage	Build Year
(D3) Bridger/Anticline - Populus	500 kV single circuit	1700 MW + PathC 1000 MW	200 mi	2025
(E) Populus - Hemingway	500 kV single circuit	1260 MW	500 mi	2025
(F)* Aeolus - Clover	500 kV single circuit	1700 MW	400 mi	2023
(H) Boardman - Hemingway	500 kV single circuit	600 MW	290 mi	2026

* Gateway South Segment F is modeled as an option, and is selected in each gateway study

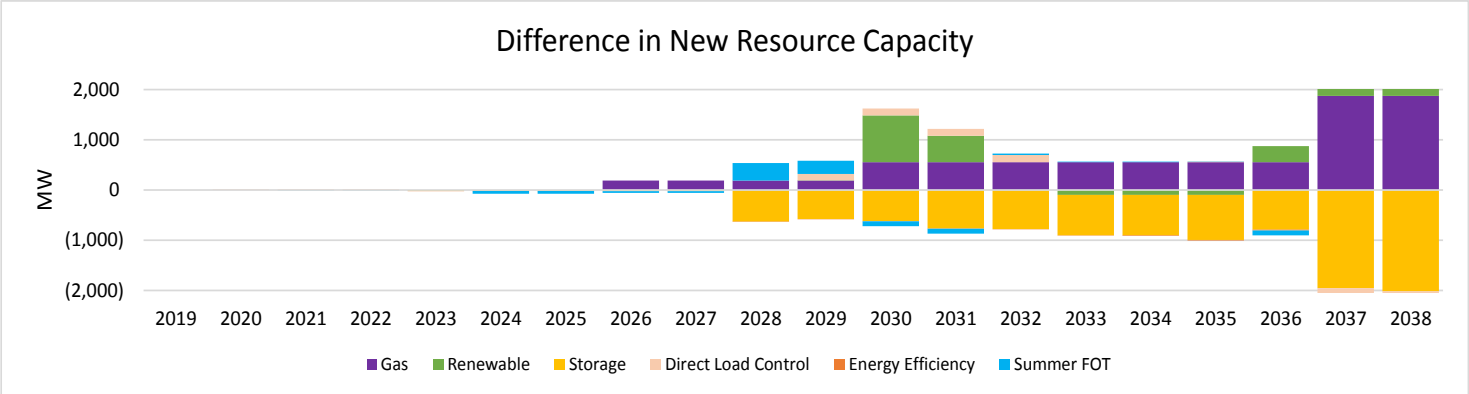
* Gateway South Segment F is modeled as an option, and is selected in each gateway study

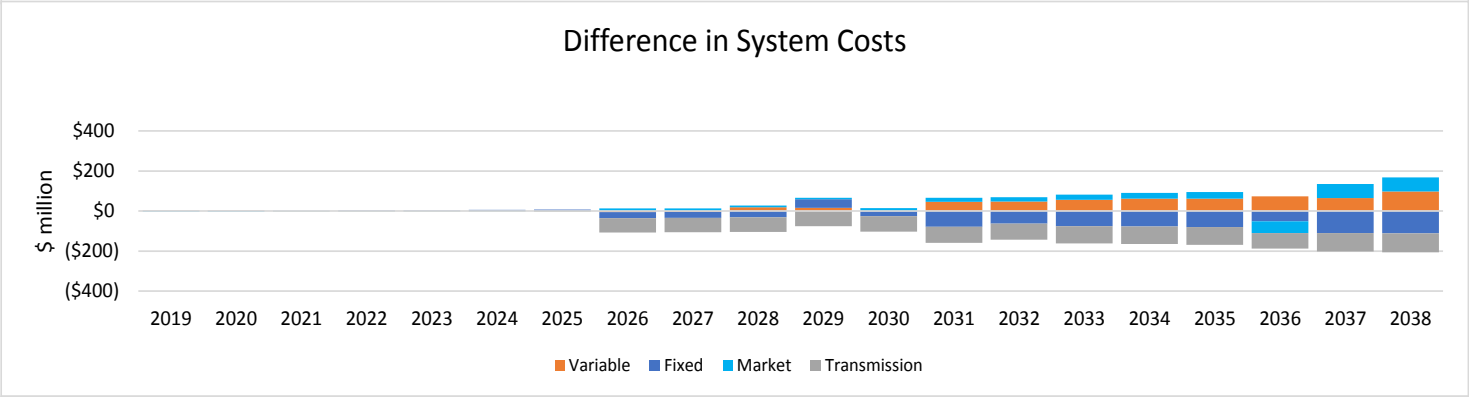
Portfolio Cost and Risk Summary Gateway Cases

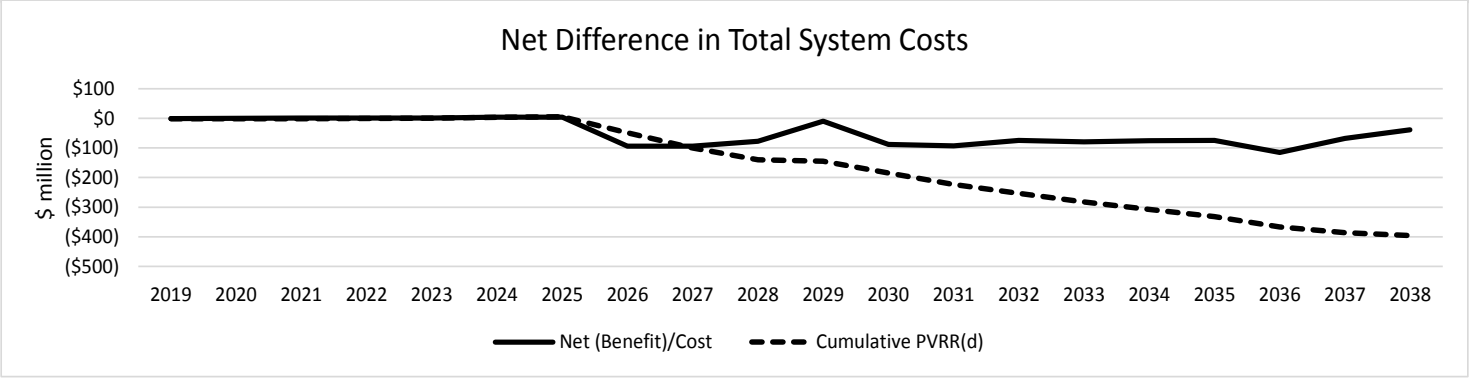
Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	PVRR ($m)	Change from Lowest Cost Portfolio ($m)	Rank	Average Annual ENS, 2019-2038 % of Average Load	Change from Lowest ENS Portfolio	Rank	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Lowest Emission Portfolio	Rank
P45CNW	**23,207**	$0	1	**24,376**	$0	1	**0.008%**	0.002%	5	**585,641**	40,831	5
P-26	23,305	$98	2	24,479	$104	2	0.006%	0.000%	2	580,126	35,315	3
P-22	23,603	$396	3	24,792	$416	3	0.007%	0.001%	4	581,028	36,217	4
P-23	24,184	$977	4	25,402	$1,026	4	0.007%	0.001%	3	544,811	0	1
P-25	24,239	$1,032	5	25,460	$1,084	5	0.006%	0.000%	1	580,014	35,204	2

- While the results above did not compel PacifiCorp to alter its selection of Case P-45CNW as the top-performing portfolio, the company remains confident that additional Energy Gateway segments will provide incremental regional and customer benefits with an ongoing transition to the regional resource mix and as new markets develop.
- Case P-26, which includes Boardman-to-Hemingway, shows significant potential for producing customer benefits. This project has motivated partners and is expected to provide incremental benefits not captured in the current analysis that can be further explored in future IRPs and IRP Updates. Consequently, PacifiCorp will remain an active participate in the ongoing development of this project and has included an action item in its action plan to continue its partnership in this project. Some of the incremental benefits of Boardman-to-Hemmingway not captured in the analysis above include:
  - Connecting geographical diversity to help balance the intermittency of resources like wind and solar, to help meet clean-energy standards and bolsters resource adequacy.
  - Decreasing market reliance by providing incremental infrastructure that can connect additional resources to load.
  - Improved reliability by increasing ability to share operating reserves among utilities and providing additional source for energy to flow.
  - Help alleviate transmission congestion.
  - Improved access to participate in the Energy Imbalance Market and generate customers benefits.
- PacifiCorp has also included an action item to continue permitting the Energy Gateway transmission plan, as it is anticipated these additional segments will also provide incremental value that can continue to be evaluated in future IRPs and IRP Updates.

P-22 vs. P-45CNW

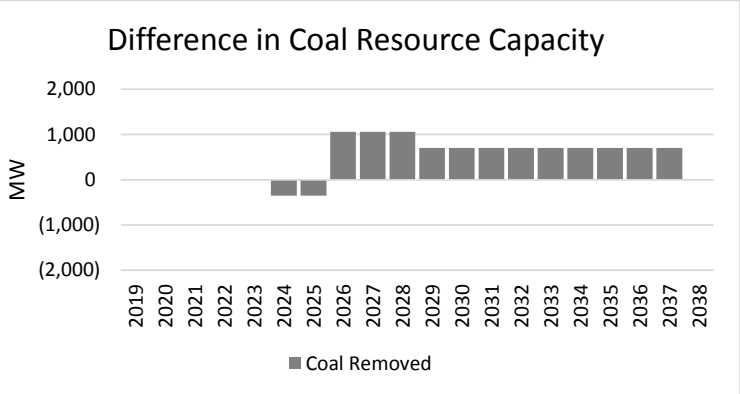


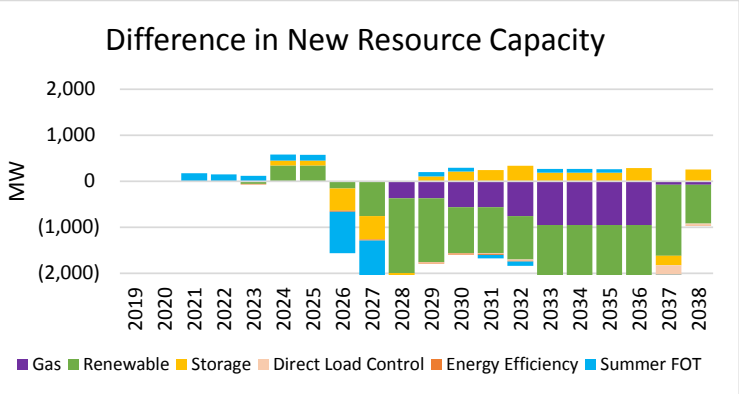


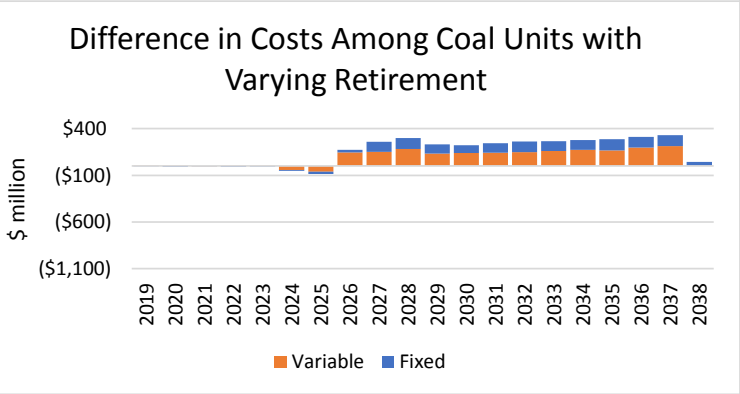


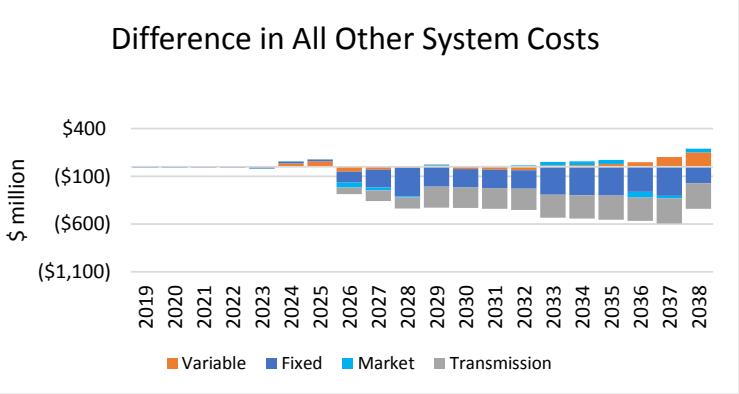
- Case P-22 includes the approximately 200 mile Bridger/Anticline to Populus transmission segment (D3).
- The stochastic mean PVRR of the preferred portfolio is $396m lower cost than Case P-22, driven primarily by D3 transmission project costs where the net portfolio cost impacts are largely offsetting.
- The preferred portfolio sees higher market, emissions and DSM costs, but reduced capital and fixed O&M costs aligned with the increased proportion of generating as opposed to storage resources.

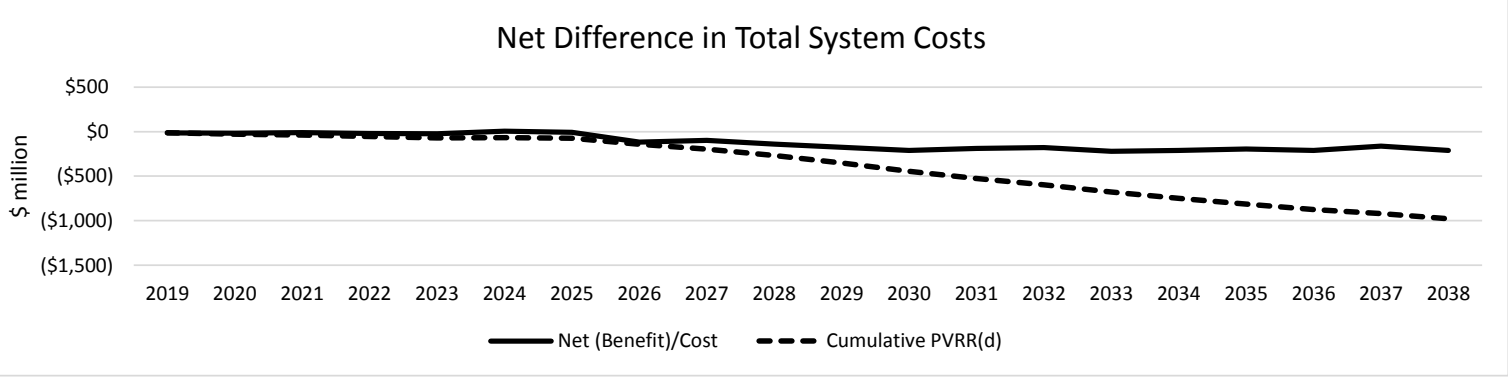
P-23 vs. P-45CNW





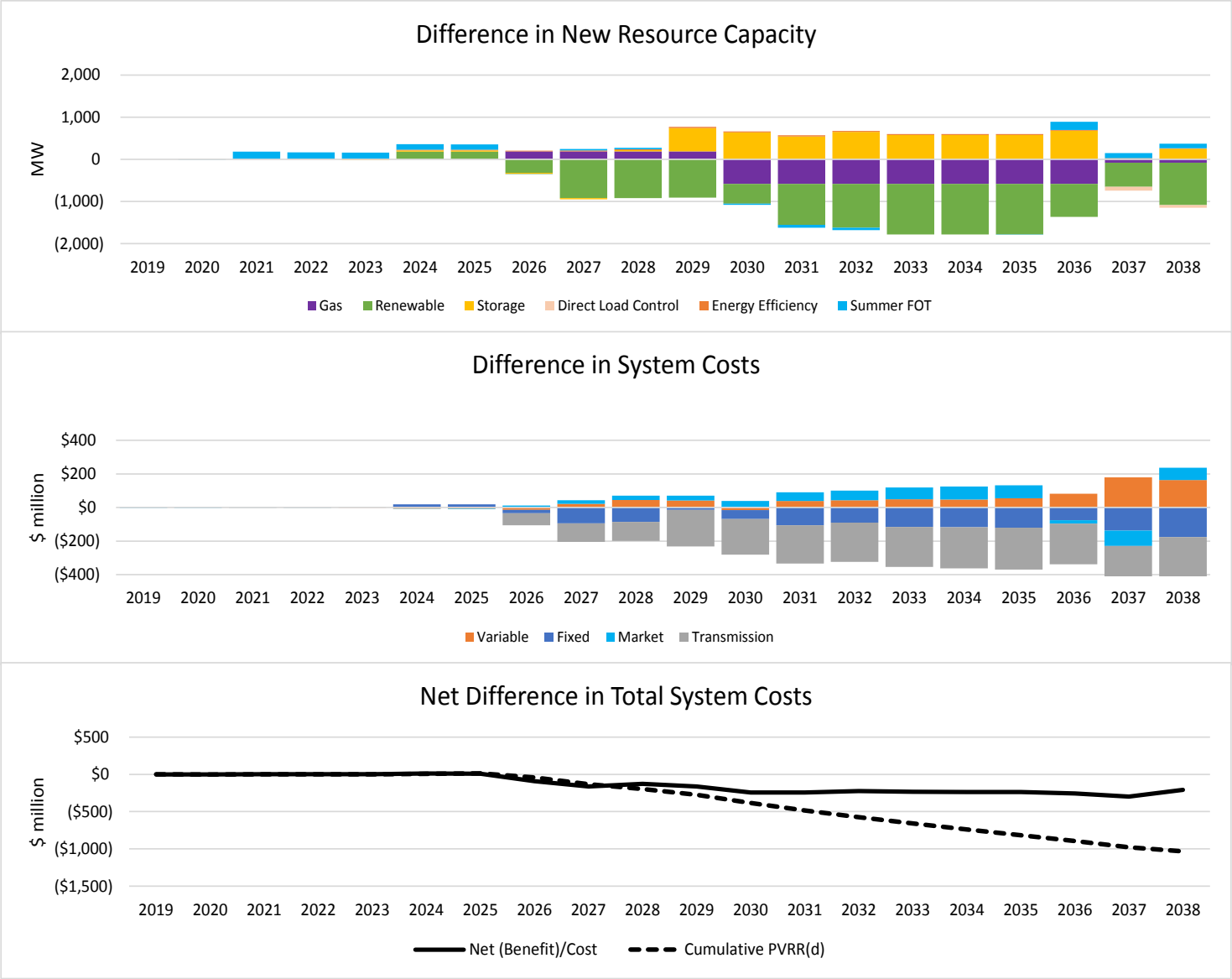






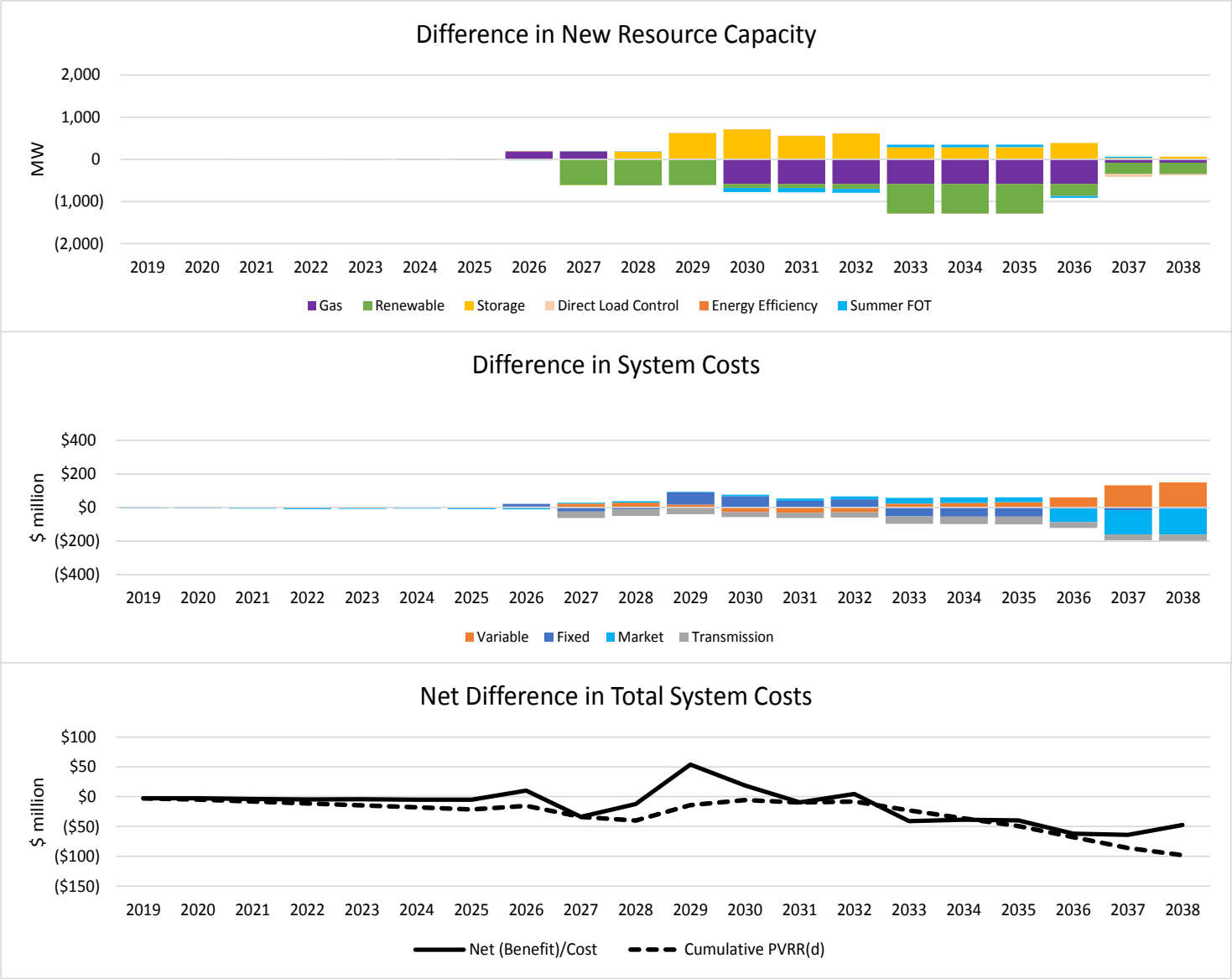
- Case P-23 includes the approximately 200 mile Bridger/Anticline to Populus transmission segment (D3), the approximately 500 mile Populus to Hemingway transmission segment (E), and the approximately 290 mile Boardman to Hemingway segment (H).
- A variant of stakeholder requested P-36CNW, P-23 features early retirement of the entire Bridger plant in 2025, and also Naughton 1 & 2 units in 2025.
- The stochastic mean PVRR of the preferred portfolio is $977m lower cost than Case P-23, driven primarily by transmission project costs where the net portfolio variable and fixed cost impacts are largely offsetting.
- The reduction of thermal resources due to highly accelerated retirements causes P-23 to accelerate significant thermal and renewable additions into 2028.

P-25 vs. P-45CNW



- Case P-25 includes the approximately 200 mile Bridger/Anticline to Populus transmission segment (D3), the approximately 500 mile Populus to Hemingway transmission segment (E), and the approximately 290 mile Boardman to Hemingway segment (H).
- Although the gateway additions match case P-23 (prior slide), P-25 is a variant of P-45CNW.
- The stochastic mean PVRR of the P-45CNW is $1.0B lower cost than Case P-25, driven primarily by transmission project costs where the net portfolio variable and fixed cost impacts are largely offsetting.
- Gas capacity is accelerated approximately 6 years (~500 MW) into 2030.

P-26 vs. P-45CNW



- Case P-26 the approximately 500 mile Populus to Hemingway transmission segment (E).
- The stochastic mean PVRR of the preferred portfolio is $98m. P-26 ranks second among gateway cases in 3 of 4 categories after the preferred portfolio, including stochastic mean, risk-adjusted PVRR and low energy-not-served (ENS).
- Continued analysis is warranted to account for customer benefits that may include improved reliability, valuable interconnection, geographical diversity, EIM participation and resource adequacy.
- Gas capacity is accelerated approximately 6 years (~500 MW) into 2030.

2019 IRP
Alternative DSM Bundling Analysis



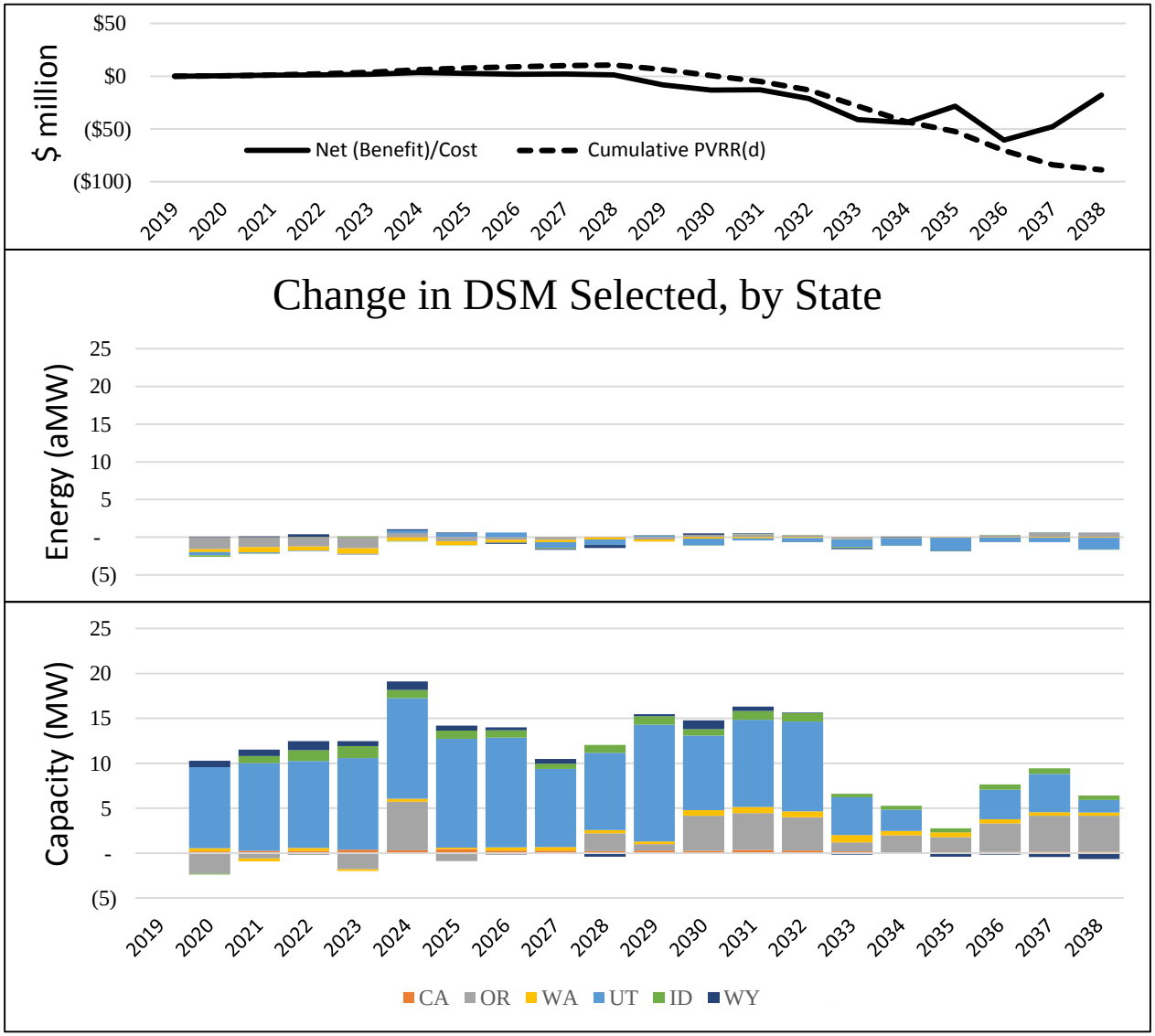

PACIFICORP
POWERING YOUR GREATNESS

Alternative DSM Bundling Methodology

- For modeling purposes, DSM measures are grouped into 27 bundles for each state.
- In the September 27-28, 2018 public-input meeting PacifiCorp identified “DSM bundling” as a case to be considered in its portfolio development process and presented details on its approach to this bundling methodology at the May 20-21, 2019 public-input meeting.
- The current methodology groups measures that have a similar levelized cost of energy (LCOE) on a $ per MWh basis. PacifiCorp analyzed an alternative bundling methodology based on the net cost of capacity ($/kw-yr).
- The bundling method accounts for hourly load shape, capacity contribution, and seasonal differences among measures while retaining 27 bundles for each state.
- Cost inputs for each measure are unchanged and adjustments for stochastic risk reduction, the Northwest Power Act, and T&D deferral continue to apply. These inputs are updated consistent with the measures in each proposed bundle.
- The goal of this alternative bundling analysis was to see how a portfolio with this method performs relative to the current methodology.

Analysis and Findings of Alternative DSM Bundling Methodology for P-45DP vs. P-45CP

- The resource portfolio for P-45DP with Class 2 DSM (energy efficiency) bundled by capacity produces a PVRR that is $89m higher cost than P-45CP. The cost differences are driven by differences in the portfolios from 2029 through 2038.
- Through 2038, Case P-45DP Class 2 DSM selections have:
  - 2% less energy (162 GWh/19 aMW)
  - 9% higher capacity (208 MW)
  - 2% lower DSM cost ($17M NPV)
- The higher cost of P-45DP portfolio is driven by delays to solar+storage additions and acceleration of stand-alone storage.



PACIFICORP
POWERING YOUR GREATNESS

Portfolio Cost and Risk Summary DSM Bundling Methodology Cases and Takeaways

Case	Stochastic Mean			Risk Adjusted			ENS Average Percent of Load			CO2 Emissions		
	PVRR ($m)	Change from Equivalent CP Portfolio ($m)	Rank vs CP	PVRR ($m)	Change from Equivalent CP Portfolio ($m)	Rank vs CP	Average Annual ENS, 2019-2038 % of Average Load	Change from Equivalent CP Portfolio	Rank vs CP	Total CO2 Emissions, 2019-2038 (Thousand Tons)	Change from Equivalent CP Portfolio	Rank vs CP
P45DP	23,281	$89	2	24,444	$93	2	0.010%	0.000%	2	578,417	978	2
P46DP	23,350	$58	2	24,517	$52	2	0.013%	0.000%	2	556,742	-1,082	1
P53DP	23,409	$60	2	24,579	$54	2	0.013%	0.000%	2	559,529	-1,025	1

- While rebundling results in SO relying more on capacity from DSM, that did not translate into cost savings in PaR.
- PacifiCorp believes there is value in further exploration of ways to identify DSM measures that provide the greatest benefits, and will continue to explore alternative evaluation methods in future IRPs.

2019 IRP
Sensitivity Cases



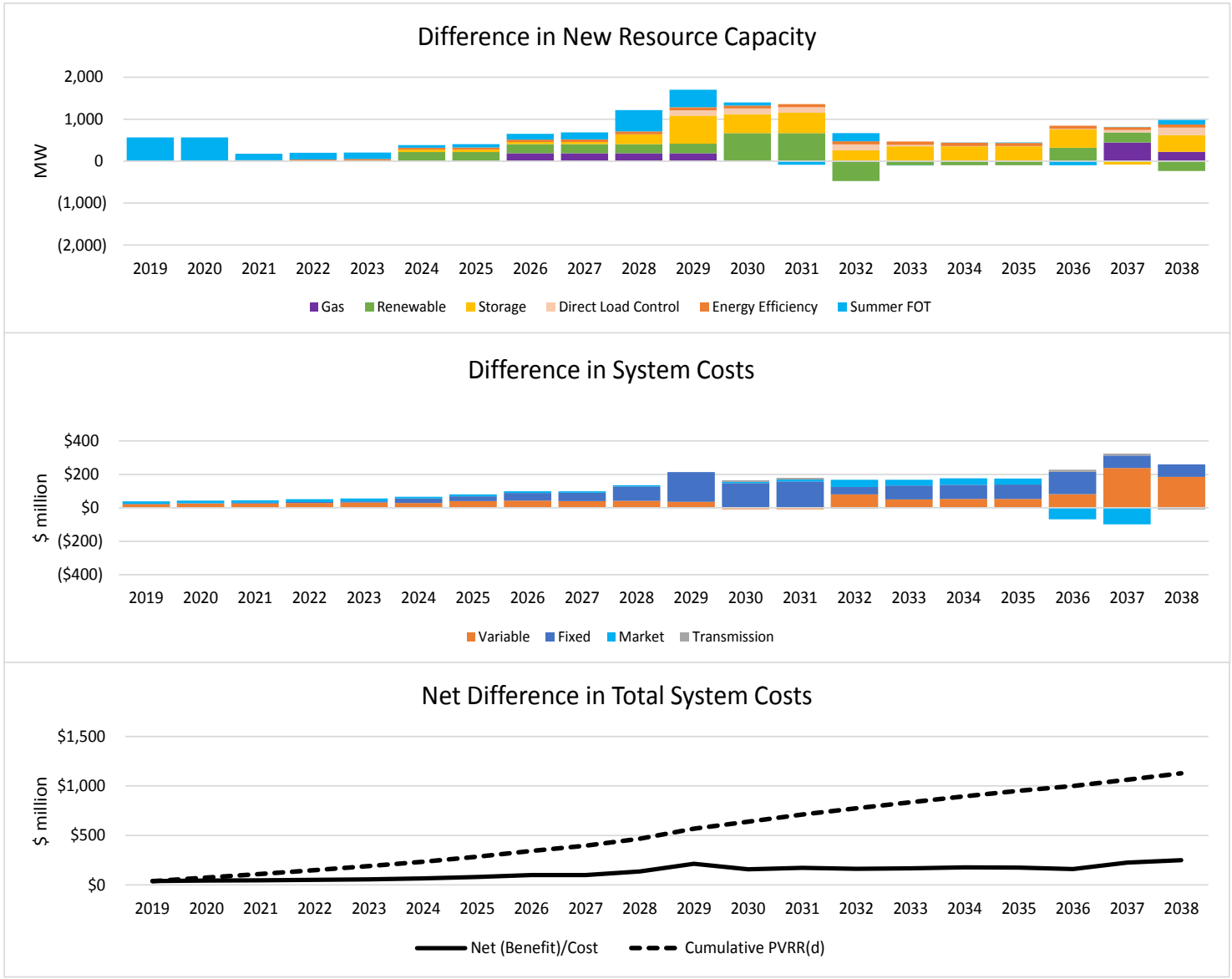

PACIFICORP
POWERING YOUR GREATNESS

Sensitivity Cases

- S-01 = low load
- S-02 = high load
- S-03 = 1-in-20 peak
- S-04 = low private generation
- S-05 = high private generation
- S-06 = business plan *(to be included in October 18, 2019 filing)*
- S-07 = no customer preference resources
- S-08 = high customer preference resources *(to be included in October 18, 2019 filing)*

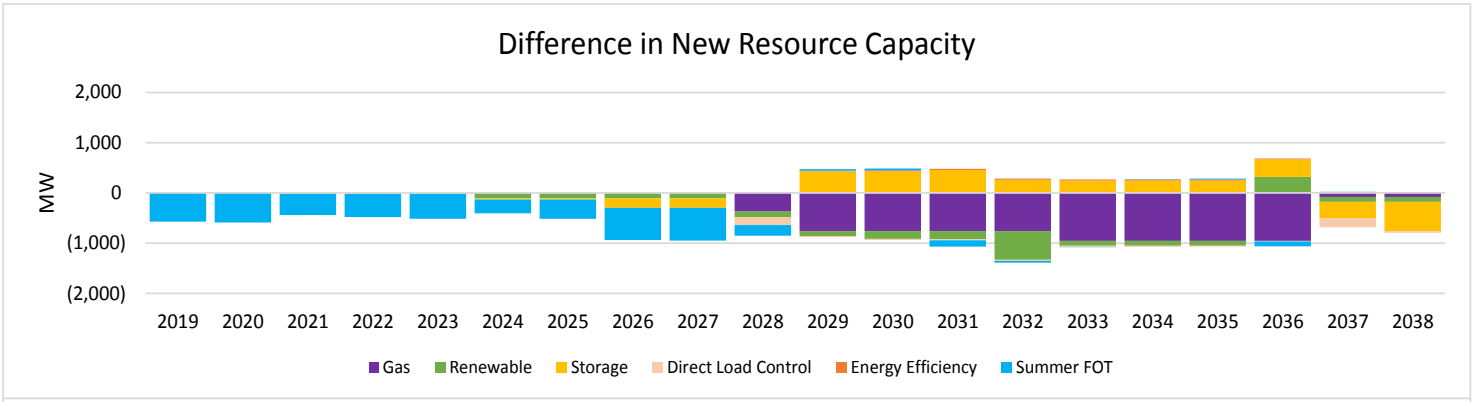
Note: a western control area sensitivity will be included in the 2019 IRP Update.

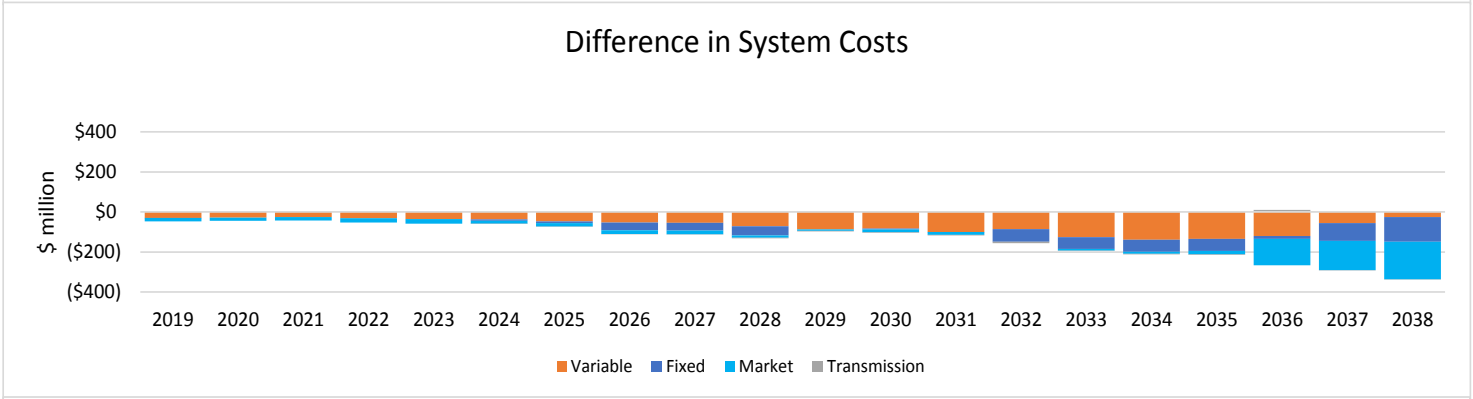
S-01 (Low Load) vs. P-45CNW

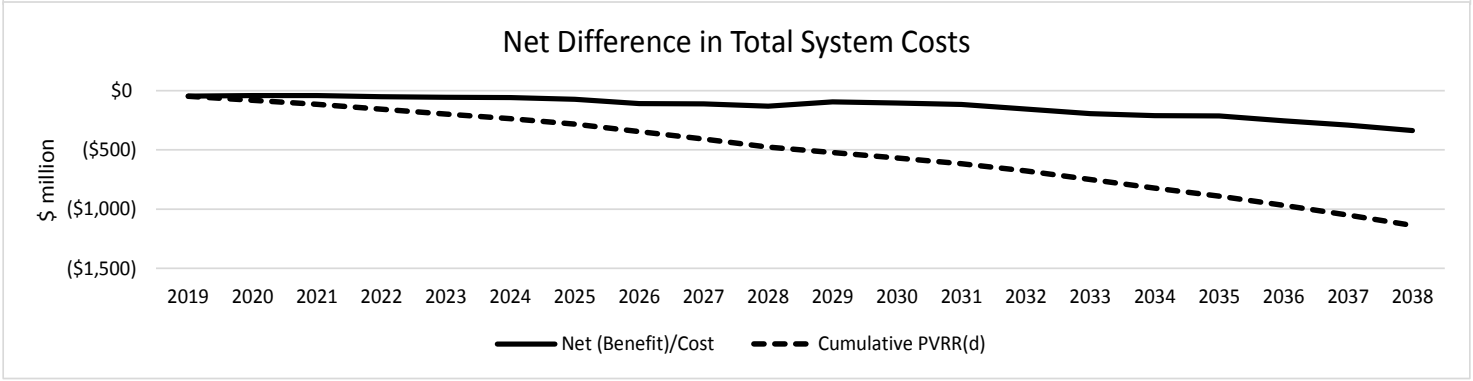


- Case S-01 is a low load sensitivity.
- The stochastic mean PVRR of the preferred portfolio is $1.13b higher cost than Case S-01, largely driven by higher fixed and variable resource costs in the portfolio.
- The preferred portfolio has more FOTs, primarily through 2029, and beginning 2024, more renewable and battery storage capacity.
- The preferred portfolio also has gas peaking capacity from 2026-2029 and in 2037-2038.

S-02 (High Load) vs. P-45CNW

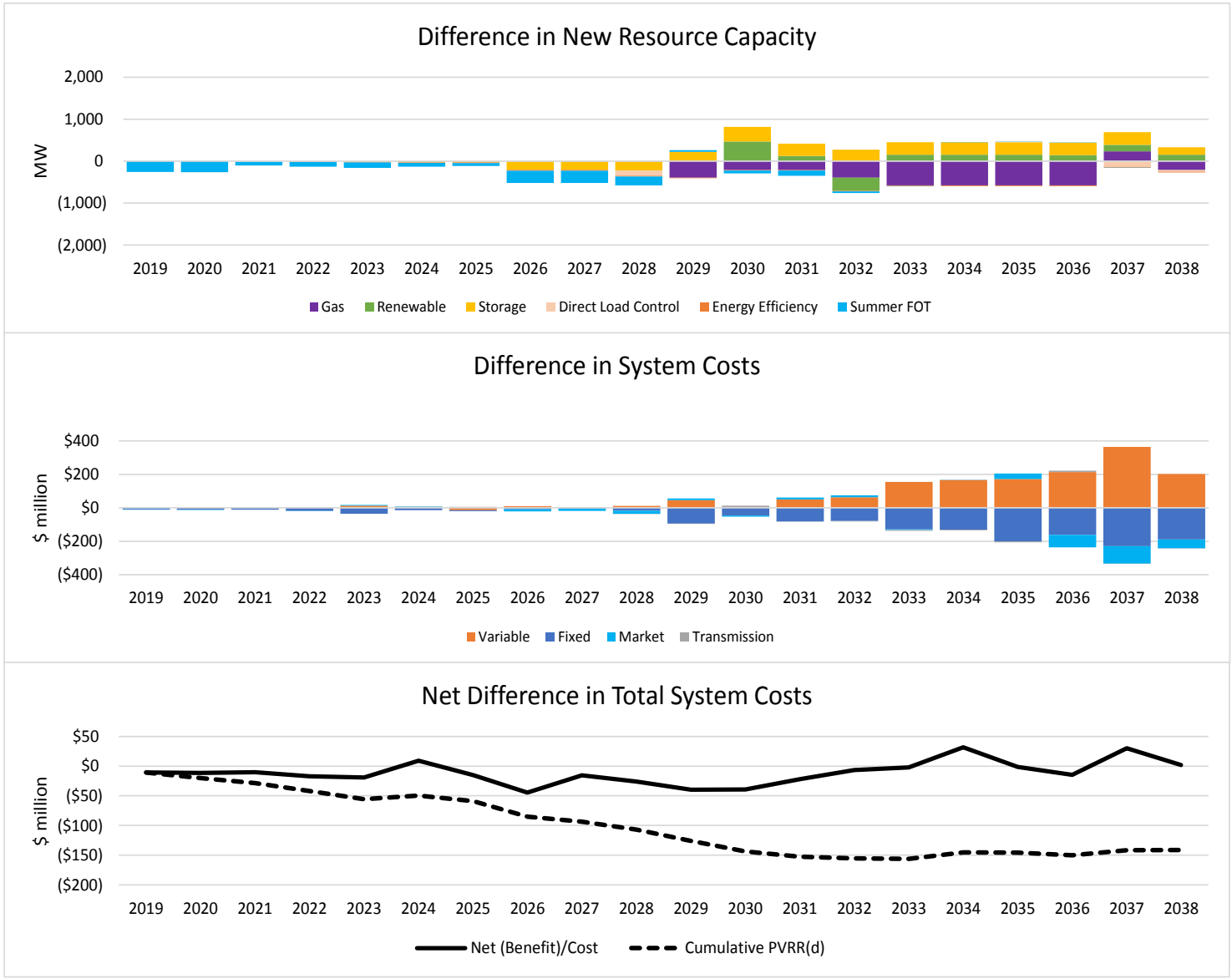






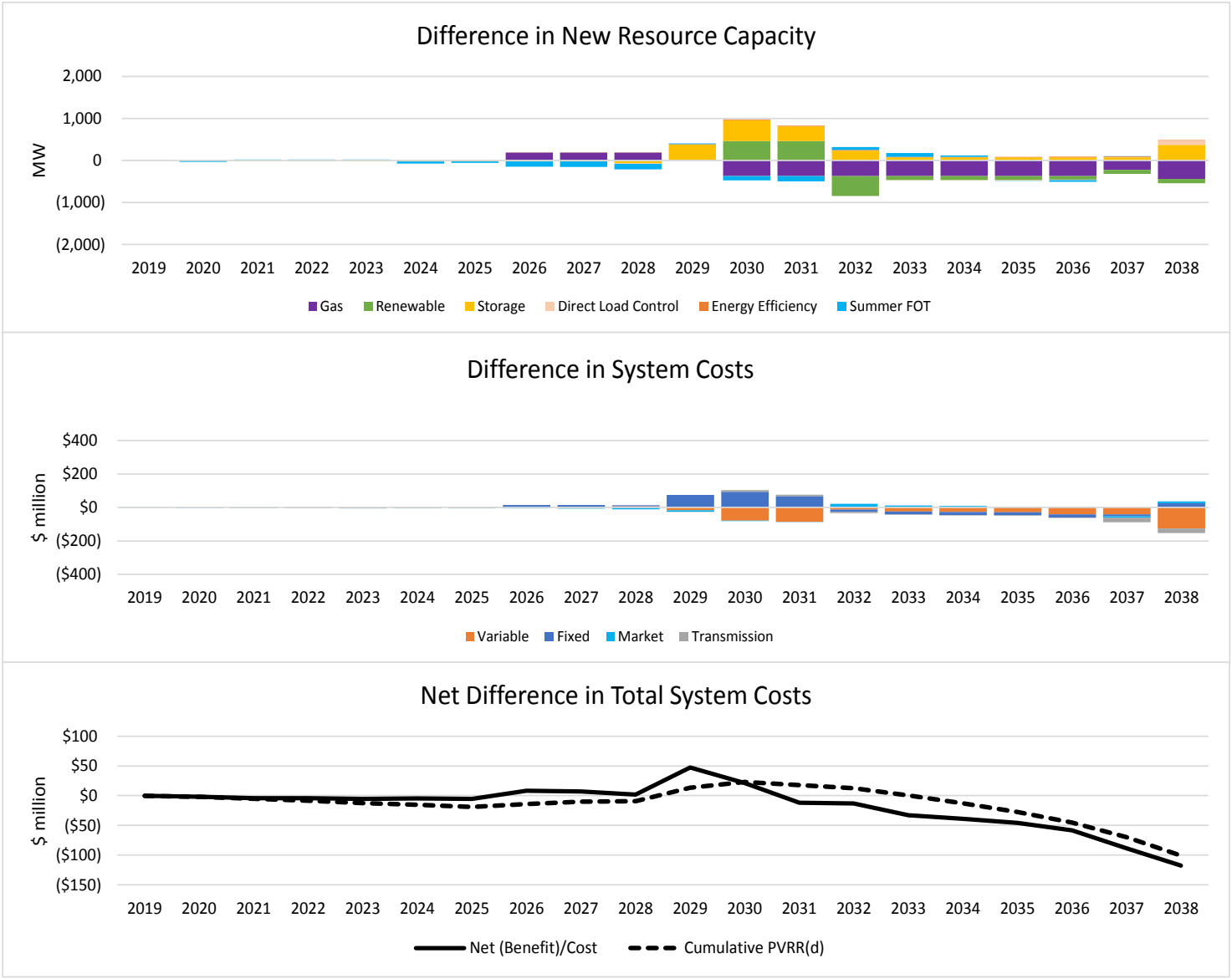
- Case S-02 is a high load sensitivity.
- The stochastic mean PVRR of the preferred portfolio is $1.14b lower cost than Case S-02, largely driven by reduced fixed and variable resource costs in the portfolio.
- The preferred portfolio has fewer FOTs, primarily through 2028.
- The preferred portfolio has less gas peaking capacity and more battery storage capacity in the 2028-2036 timeframe.

S-03 (1-in-20 Peak) vs. P-45CNW



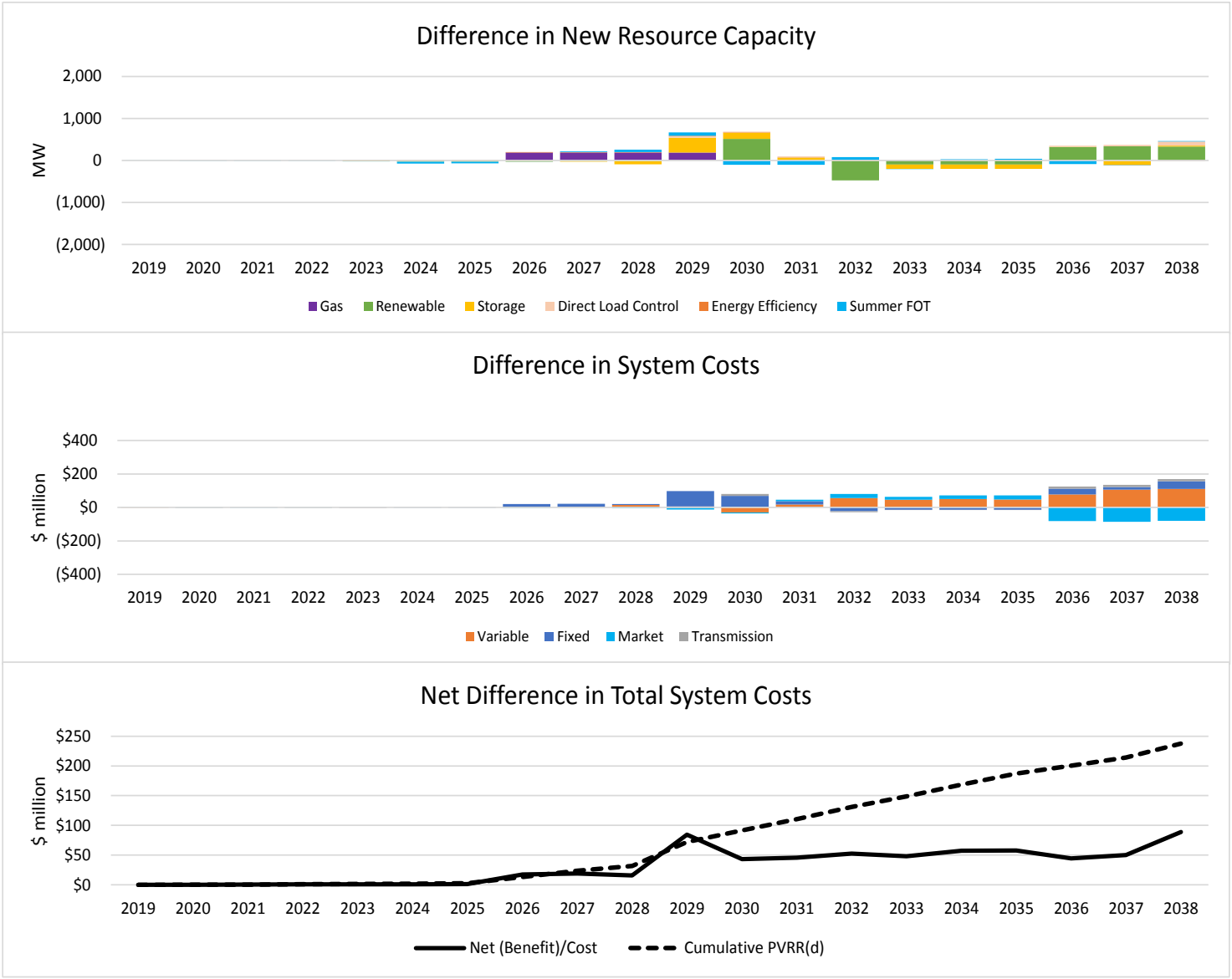
- Case S-03 is a 1-in-20 peak load sensitivity.
- The stochastic mean PVRR of the preferred portfolio is $141m lower cost than Case S-03, largely driven by reduced variable resource costs partially offset by higher fixed resource costs, particularly from 2029 and beyond.
- The preferred portfolio has fewer FOTs, primarily through 2028, and less battery storage from 2026-2028.
- The preferred portfolio has less gas peaking capacity in the 2029-2036 timeframe and more battery storage capacity in the 2029-2038 timeframe.

S-04 (Low Private Gen.) vs. P-45CNW



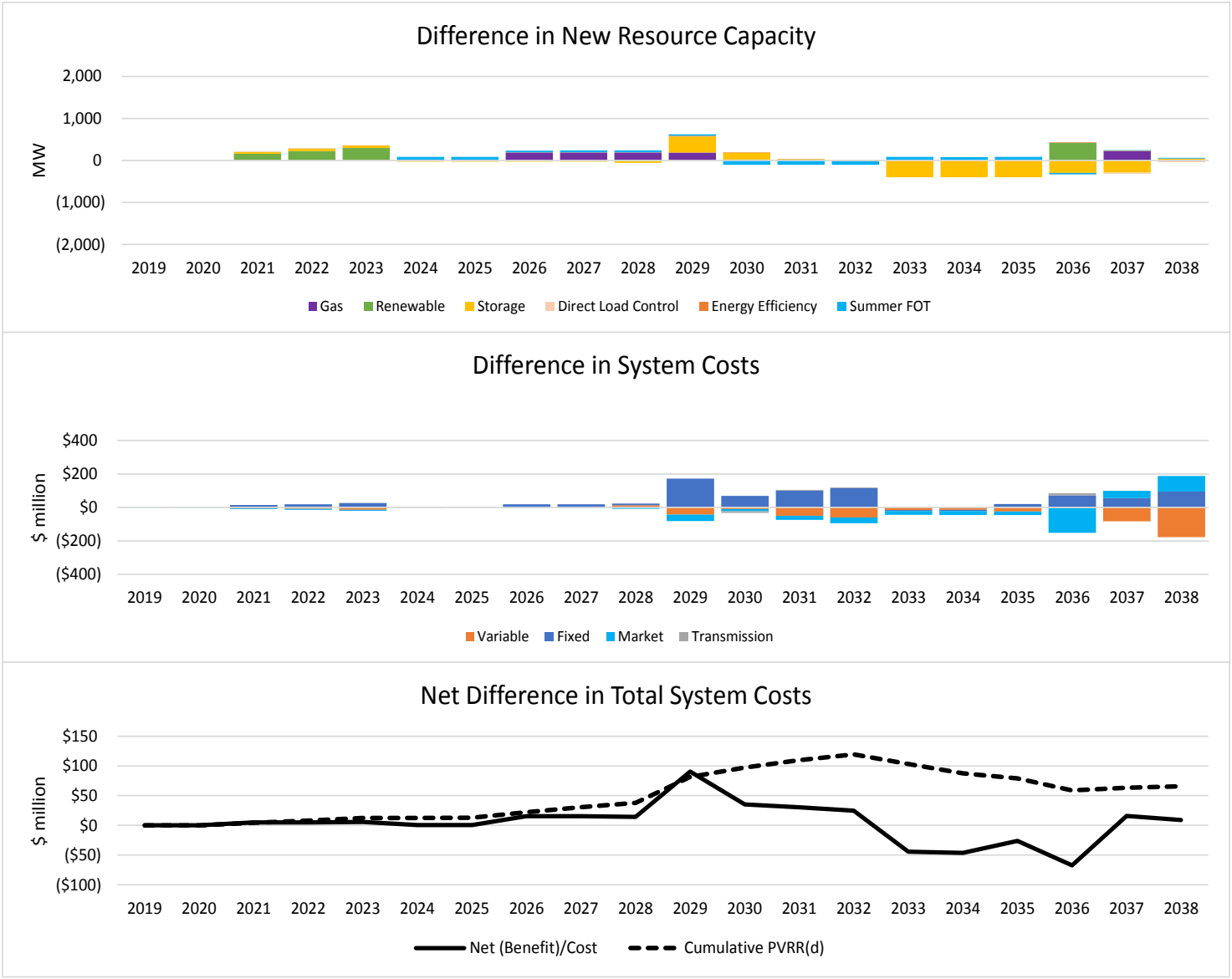
- Case S-04 is a low private generation sensitivity.
- The stochastic mean PVRR of the preferred portfolio is $101m lower cost than Case S-04, largely driven by reduced variable resource costs partially offset by higher fixed resource costs, particularly from 2029 and beyond.
- The preferred portfolio has more renewable and battery storage capacity in the 2029-2031 timeframe, and less natural gas capacity beginning 2030.

S-05 (High Private Gen) vs. P-45CNW



- Case S-05 is a high private generation sensitivity.
- The stochastic mean PVRR of the preferred portfolio is $238m higher cost than Case S-05, largely driven by higher variable and fixed resource costs, partially offset by reduced market purchases from 2036-2038.
- The preferred portfolio has more gas in the 2026-2029, more battery storage and renewable capacity in the 2029-2030 timeframe, and more renewable capacity in the 2036-2038 timeframe.

S-07 (No Customer Pref.) vs. P-45CNW



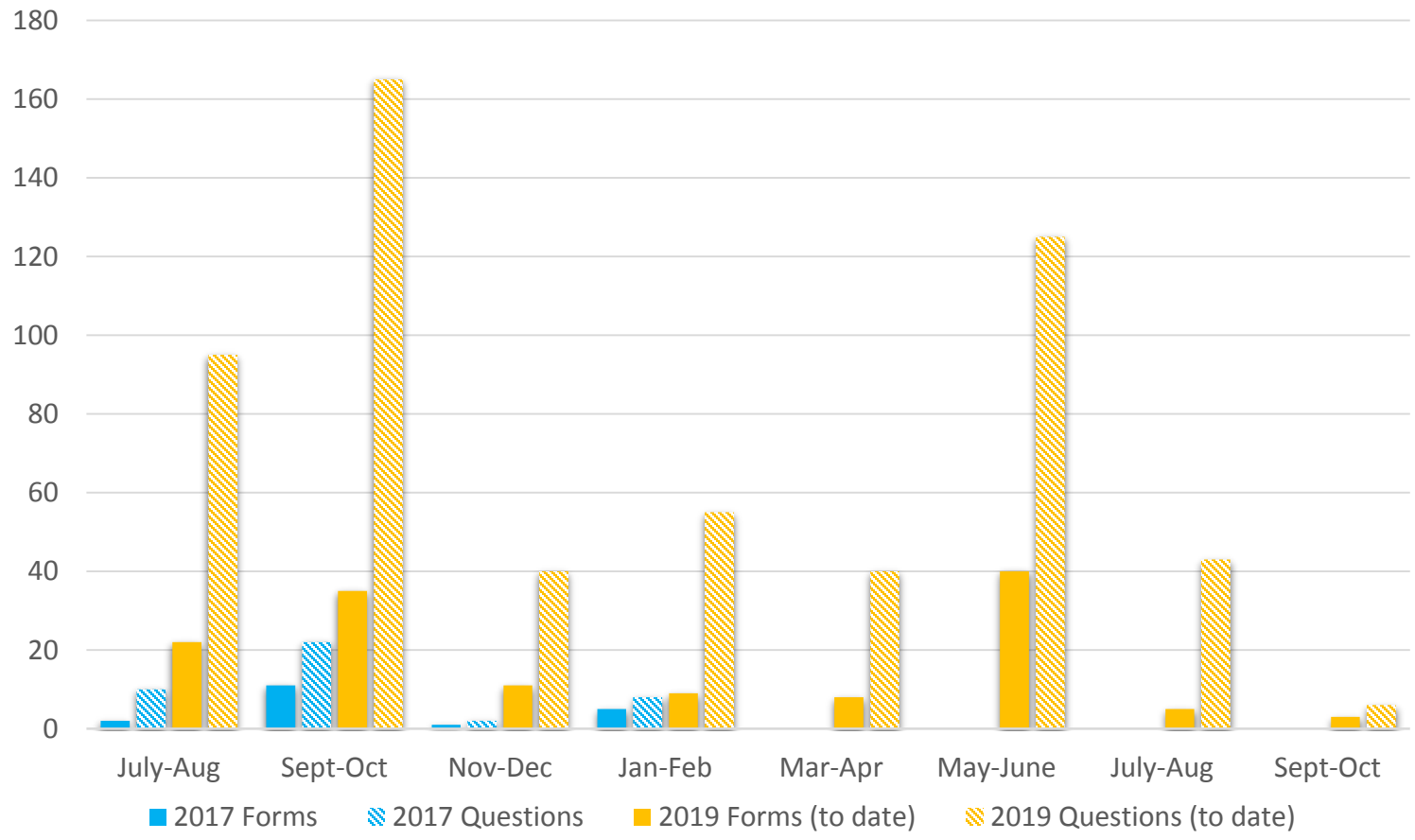
- Case S-07 is a no customer preference sensitivity.
- The stochastic mean PVRR of the preferred portfolio is $66m higher cost than Case S-07, largely driven by higher resource fixed resource costs, partially offset by reduced variable costs beginning 2029 (cost changes in the near-term when customer preference resources are added to the system are small).
- The preferred portfolio has more renewable capacity in the 2021-2023 timeframe, more gas from 2026-2029, more battery storage from 2029-2030, and less storage from 2033-2037.

Stakeholder Feedback Form Recap




PACIFICORP
POWERING YOUR GREATNESS

2019 IRP vs. 2017 IRP Stakeholder Feedback Form Activity to Date



Stakeholder Feedback Forms

- 133 stakeholder feedback forms submitted to date.
- Stakeholder feedback forms and responses can be located at www.pacificorp.com/energy/integrated-resource-plan/comments.html
- 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 following the most recent public input meeting is summarized on the following slides for reference.

Summary - Recent Stakeholder Feedback Forms

Stakeholder	Date	Topic	Brief Summary (complete form available online)	Response (posted online when available)
Western Resource Advocates, Utah Clean Energy, Utah Association of Energy Users, Powder River Basin Resource Council, Idaho Conservation League, Renewable Northwest, Sierra Club	Sept 10	Portfolio Analysis	Request for an additional portfolio to be modeled as a variant of the P-46 portfolio, with the addition of Jim Bridger Units 1&2 to be retired in 2025.	PacifiCorp ran this request as case P-36C.
Oregon Public Utility Commission Staff	Sept 26	Transmission Analysis	OPUC Staff submitted questions related to transmission modeling and requested a transmission focused workshop be provided in the future.	Response to be provided by October 11, 2019.

Additional Information and Next Steps




PACIFICORP
POWERING YOUR GREATNESS

Additional Information and Next Steps

- Public Input Meeting Presentation and Materials:
  - www.pacificorp.com/energy/integrated-resource-plan/public-input-process.html
- 2019 IRP Stakeholder Feedback Forms:
  - www.pacificorp.com/energy/integrated-resource-plan/comments.html
- IRP Email / Distribution List Contact Information:
  - IRP@PacifiCorp.com
- 2019 IRP File Date – October 18, 2019
- Stakeholder discussion around a potential November 7, 2019 post-filing public-input meeting.

Appendix A
Portfolio-Specific
Coal Retirement Assumptions




PACIFICORP
POWERING YOUR GREATNESS

Early Retirement Assumptions

Coal Unit (PAC Share MW)	P-01 (Benchmark)	P-02 (Reg. Haze Ref.)	P-03 (Reg. Haze. Intertemp.)	P-04 (Coal Study)	P-06 (Alternative)
Cholla 4 (387)	**RET 2020**	**RET 2025**	**RET 2025**	**RET 2020**	**RET 2020**
Colstrip 3 (74)	RET 2046	**RET 2027**	**RET 2027**	RET 2046	**RET 2027**
Colstrip 4 (74)	RET 2046	**RET 2027**	**RET 2027**	RET 2046	**RET 2027**
Craig 1 (82)	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**
Craig 2 (82)	RET 2034	**RET 2026**	**RET 2026**	RET 2034	**RET 2025**
Dave Johnston 1 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 2 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 3 (220)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 4 (330)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Hayden 1 (44)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hayden 2 (33)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hunter 1 (418)	RET 2042	SCR 2022 RET 2042	RET 2042	RET 2042	RET 2042
Hunter 2 (269)	RET 2042	SCR 2023 RET 2042	RET 2042	RET 2042	RET 2042
Hunter 3 (471)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Huntington 1 (459)	RET 2036	SCR 2022 RET 2036	RET 2036	RET 2036	RET 2036
Huntington 2 (450)	RET 2036	SCR 2023 RET 2036	RET 2036	RET 2036	RET 2036
Jim Bridger 1 (354)	SCR 2022 RET 2037	SCR 2022 RET 2037	**No SCR RET 2028**	**No SCR RET 2022**	**No SCR RET 2022**
Jim Bridger 2 (359)	SCR 2021 RET 2037	SCR 2021 RET 2037	**No SCR RET 2032**	**No SCR RET 2022**	**No SCR RET 2032**
Jim Bridger 3 (349)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Jim Bridger 4 (353)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Naughton 1 (156)	RET 2029	RET 2029	RET 2029	**RET 2022**	RET 2029
Naughton 2 (201)	RET 2029	RET 2029	RET 2029	**RET 2022**	RET 2029
Naughton 3 (280)	**RET 2019**	**RET 2019**	**RET 2019**	**RET 2019**	**Lg. GC 2020 RET 2029**
Wyodak (268)	RET 2039	SCR 2024 RET 2039	RET 2039	RET 2039	RET 2039
Gadsby 1-3 Gas (238)	RET 2032	RET 2032	RET 2032	RET 2032	**RET 2020**

Red text identifies early retirement relative to current non-Oregon depreciable lives.

Early Retirement Assumptions

Coal Unit (PAC Share MW)	P-07 (P-06, JB2 RET 28)	P-08 (P-03, NT3 Small GC)	P-09 (P-03, NT3 Large GC)	P-10 (P-04, NT3 Large GC)	P-11 (P-09, CH4 RET 2020)
Cholla 4 (387)	RET 2020	RET 2025	RET 2025	RET 2020	RET 2020
Colstrip 3 (74)	RET 2027	RET 2027	RET 2027	RET 2046	RET 2027
Colstrip 4 (74)	RET 2027	RET 2027	RET 2027	RET 2046	RET 2027
Craig 1 (82)	RET 2025	RET 2025	RET 2025	RET 2025	RET 2025
Craig 2 (82)	RET 2025	RET 2026	RET 2026	RET 2034	RET 2026
Dave Johnston 1 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 2 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 3 (220)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 4 (330)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Hayden 1 (44)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hayden 2 (33)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hunter 1 (418)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 2 (269)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 3 (471)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Huntington 1 (459)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Huntington 2 (450)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Jim Bridger 1 (354)	No SCR RET 2022	No SCR RET 2028	No SCR RET 2028	No SCR RET 2022	No SCR RET 2028
Jim Bridger 2 (359)	No SCR RET 2028	No SCR RET 2032	No SCR RET 2032	No SCR RET 2022	No SCR RET 2032
Jim Bridger 3 (349)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Jim Bridger 4 (353)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Naughton 1 (156)	RET 2029	RET 2029	RET 2029	RET 2022	RET 2029
Naughton 2 (201)	RET 2029	RET 2029	RET 2029	RET 2022	RET 2029
Naughton 3 (280)	Lg. GC 2020 RET 2029	Sm. GC 2020 RET 2029	Lg. GC 2020 RET 2029	Lg. GC 2020 RET 2029	Lg. GC 2020 RET 2029
Wyodak (268)	RET 2039	RET 2039	RET 2039	RET 2039	RET 2039
Gadsby 1-3 Gas (238)	RET 2020	RET 2032	RET 2032	RET 2032	RET 2032

Red text identifies early retirement relative to current non-Oregon depreciable lives.

Early Retirement Assumptions

Coal Unit (PAC Share MW)	P-12 (P-06, CH4 RET 25)	P-13 (P-11, JB12 SCRs)	P-14 (P-09, NT12, JB14 RET 22)	P-15 (P-28, Coal RET 30)	P-16 (P-04, JB1-2 RET, No CO_2)
Cholla 4 (387)	**RET 2025**	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**
Colstrip 3 (74)	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2026**	RET 2046
Colstrip 4 (74)	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2026**	RET 2046
Craig 1 (82)	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2023**	**RET 2025**
Craig 2 (82)	**RET 2025**	**RET 2026**	**RET 2026**	**RET 2023**	RET 2034
Dave Johnston 1 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 2 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 3 (220)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 4 (330)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Hayden 1 (44)	RET 2030	RET 2030	RET 2030	**RET 2025**	RET 2030
Hayden 2 (33)	RET 2030	RET 2030	RET 2030	**RET 2024**	RET 2030
Hunter 1 (418)	RET 2042	RET 2042	RET 2042	**RET 2028**	RET 2042
Hunter 2 (269)	RET 2042	RET 2042	RET 2042	**RET 2029**	RET 2042
Hunter 3 (471)	RET 2042	RET 2042	RET 2042	**RET 2030**	RET 2042
Huntington 1 (459)	RET 2036	RET 2036	RET 2036	**RET 2028**	RET 2036
Huntington 2 (450)	RET 2036	RET 2036	RET 2036	**RET 2029**	RET 2036
Jim Bridger 1 (354)	**No SCR RET 2022**	**SCR RET 2037**	**No SCR RET 2022**	**No SCR RET 2026**	**No SCR RET 2022**
Jim Bridger 2 (359)	**No SCR RET 2032**	**SCR RET 2037**	**No SCR RET 2022**	**No SCR RET 2025**	**No SCR RET 2022**
Jim Bridger 3 (349)	RET 2037	RET 2037	**RET 2022**	**RET 2023**	RET 2037
Jim Bridger 4 (353)	RET 2037	RET 2037	**RET 2022**	**RET 2024**	RET 2037
Naughton 1 (156)	RET 2029	RET 2029	**RET 2022**	**RET 2023**	**RET 2022**
Naughton 2 (201)	RET 2029	RET 2029	**RET 2022**	**RET 2022**	**RET 2022**
Naughton 3 (280)	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**RET 2019**
Wyodak (268)	RET 2039	RET 2039	RET 2039	**RET 2030**	RET 2039
Gadsby 1-3 Gas (238)	**RET 2020**	RET 2032	RET 2032	RET 2032	RET 2032

Red text identifies early retirement relative to current non-Oregon depreciable lives.

Early Retirement Assumptions

Coal Unit (PAC Share MW)	P-17 (P-15, High CO_2)	P-18 (P-15, Social Cost of Carbon)	P-19 (P-05, Low Gas)	P-20 (P-07, High Gas)	P-22 (P-45CNW, EG D.3)
Cholla 4 (387)	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**
Colstrip 3 (74)	**RET 2026**	**RET 2026**	RET 2046	RET 2027	**RET 2027**
Colstrip 4 (74)	**RET 2026**	**RET 2026**	RET 2046	RET 2027	**RET 2027**
Craig 1 (82)	**RET 2023**	**RET 2023**	**RET 2025**	**RET 2025**	**RET 2025**
Craig 2 (82)	**RET 2023**	**RET 2023**	RET 2034	**RET 2025**	**RET 2026**
Dave Johnston 1 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 2 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 3 (220)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 4 (330)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Hayden 1 (44)	**RET 2025**	**RET 2025**	RET 2030	RET 2030	RET 2030
Hayden 2 (33)	**RET 2024**	**RET 2024**	RET 2030	RET 2030	RET 2030
Hunter 1 (418)	**RET 2028**	**RET 2028**	RET 2042	RET 2042	RET 2042
Hunter 2 (269)	**RET 2029**	**RET 2029**	RET 2042	RET 2042	RET 2042
Hunter 3 (471)	**RET 2030**	**RET 2030**	RET 2042	RET 2042	RET 2042
Huntington 1 (459)	**RET 2028**	**RET 2028**	RET 2036	RET 2036	RET 2036
Huntington 2 (450)	**RET 2029**	**RET 2029**	RET 2036	RET 2036	RET 2036
Jim Bridger 1 (354)	**No SCR RET 2026**	**No SCR RET 2026**	**No SCR RET 2022**	**No SCR RET 2022**	**No SCR RET 2023**
Jim Bridger 2 (359)	**No SCR RET 2025**	**N0 SCR RET 2025**	**No SCR RET 2022**	**No SCR RET 2028**	**No SCR RET 2028**
Jim Bridger 3 (349)	**RET 2023**	**RET 2023**	RET 2037	RET 2037	RET 2037
Jim Bridger 4 (353)	**RET 2024**	**RET 2024**	RET 2037	RET 2037	RET 2037
Naughton 1 (156)	**RET 2023**	**RET 2023**	**RET 2022**	RET 2029	**RET 2025**
Naughton 2 (201)	**RET 2022**	**RET 2022**	**RET 2022**	RET 2029	**RET 2025**
Naughton 3 (280)	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**RET 2019**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**
Wyodak (268)	**RET 2030**	**RET 2030**	RET 2039	RET 2039	RET 2039
Gadsby 1-3 Gas (238)	RET 2032	RET 2032	**RET 2020**	**RET 2020**	RET 2032

Red text identifies early retirement relative to current non-Oregon depreciable lives.

Early Retirement Assumptions

Coal Unit (PAC Share MW)	P-23 (P-36, EG D.3, E and H)	P-25 (P-45CNW, EG D.3, E and H)	P-26 (P-45CNW, EG H)	P-28 (P-11, CS34 RET 2025)	P-29 (P-45CNW, No Gas)
Cholla 4 (387)	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**
Colstrip 3 (74)	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2025**	**RET 2027**
Colstrip 4 (74)	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2025**	**RET 2027**
Craig 1 (82)	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**
Craig 2 (82)	**RET 2026**	**RET 2026**	**RET 2026**	**RET 2026**	**RET 2026**
Dave Johnston 1 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 2 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 3 (220)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 4 (330)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Hayden 1 (44)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hayden 2 (33)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hunter 1 (418)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 2 (269)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 3 (471)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Huntington 1 (459)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Huntington 2 (450)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Jim Bridger 1 (354)	**No SCR RET 2023**	**No SCR RET 2023**	**No SCR RET 2023**	**No SCR RET 2028**	**No SCR RET 2023**
Jim Bridger 2 (359)	**No SCR RET 2028**	**No SCR RET 2028**	**No SCR RET 2028**	**No SCR RET 2032**	**No SCR RET 2028**
Jim Bridger 3 (349)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Jim Bridger 4 (353)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Naughton 1 (156)	**RET 2025**	**RET 2025**	**RET 2025**	RET 2029	**RET 2025**
Naughton 2 (201)	**RET 2025**	**RET 2025**	**RET 2025**	RET 2029	**RET 2025**
Naughton 3 (280)	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**
Wyodak (268)	RET 2039	RET 2039	RET 2039	RET 2039	RET 2039
Gadsby 1-3 Gas (238)	RET 2032	RET 2032	RET 2032	RET 2032	RET 2032

Red text identifies early retirement relative to current non-Oregon depreciable lives.

Early Retirement Assumptions

Coal Unit (PAC Share MW)	P-30 (P-11, NT12 RET 22)	P-31 (P-11, NT12 RET 25)	P-32 (P-07, NT12 RET 25, GB 32)	P-33 (P-11, JB12 RET 22)	P-34 (P-11, GB RET 20, JB12 RET 22)
Cholla 4 (387)	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**
Colstrip 3 (74)	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**
Colstrip 4 (74)	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**
Craig 1 (82)	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**
Craig 2 (82)	**RET 2026**	**RET 2026**	**RET 2025**	**RET 2026**	**RET 2026**
Dave Johnston 1 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 2 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 3 (220)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 4 (330)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Hayden 1 (44)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hayden 2 (33)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hunter 1 (418)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 2 (269)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 3 (471)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Huntington 1 (459)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Huntington 2 (450)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Jim Bridger 1 (354)	**No SCR RET 2028**	**No SCR RET 2028**	**No SCR RET 2022**	**No SCR RET 2022**	**No SCR RET 2022**
Jim Bridger 2 (359)	**No SCR RET 2032**	**No SCR RET 2032**	**No SCR RET 2028**	**No SCR RET 2022**	**No SCR RET 2022**
Jim Bridger 3 (349)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Jim Bridger 4 (353)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Naughton 1 (156)	**RET 2022**	**RET 2025**	**RET 2025**	RET 2029	RET 2029
Naughton 2 (201)	**RET 2022**	**RET 2025**	**RET 2025**	RET 2029	RET 2029
Naughton 3 (280)	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**
Wyodak (268)	RET 2039	RET 2039	RET 2039	RET 2039	RET 2039
Gadsby 1-3 Gas (238)	RET 2032	RET 2032	RET 2032	RET 2032	**RET 2020**

Red text identifies early retirement relative to current non-Oregon depreciable lives.

Early Retirement Assumptions

Coal Unit (PAC Share MW)	P-35 (P-11, JB34 RET 22)	P-36C (P-46, JB1-2 RET 25)	P-45 (P-31, JB12 RET 23, 28)	P-46 (P-31, JB34 RET 25)	P-47 (P-45, JB34 RET 35)
Cholla 4 (387)	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**
Colstrip 3 (74)	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**
Colstrip 4 (74)	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**
Craig 1 (82)	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**
Craig 2 (82)	**RET 2026**	**RET 2026**	**RET 2026**	**RET 2026**	**RET 2026**
Dave Johnston 1 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 2 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 3 (220)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 4 (330)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Hayden 1 (44)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hayden 2 (33)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hunter 1 (418)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 2 (269)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 3 (471)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Huntington 1 (459)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Huntington 2 (450)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Jim Bridger 1 (354)	**No SCR RET 2028**	**No SCR RET 2025**	**No SCR RET 2023**	**No SCR RET 2028**	**No SCR RET 2023**
Jim Bridger 2 (359)	**No SCR RET 2032**	**No SCR RET 2025**	**No SCR RET 2028**	**No SCR RET 2032**	**No SCR RET 2028**
Jim Bridger 3 (349)	**RET 2022**	**RET 2025**	RET 2037	**RET 2025**	**RET 2035**
Jim Bridger 4 (353)	**RET 2022**	**RET 2025**	RET 2037	**RET 2025**	**RET 2035**
Naughton 1 (156)	RET 2029	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**
Naughton 2 (201)	RET 2029	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**
Naughton 3 (280)	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**
Wyodak (268)	RET 2039	RET 2039	RET 2039	RET 2039	RET 2039
Gadsby 1-3 Gas (238)	RET 2032	RET 2032	RET 2032	RET 2032	RET 2032

Red text identifies early retirement relative to current non-Oregon depreciable lives.

Early Retirement Assumptions

Coal Unit (PAC Share MW)	P-48 (P-45, JB34 RET 33)	P-53 (P-31, JB12 RET 25, JB3 RET 28, JB4 RET 32)	P-54 (P-31, JB2 RET 24)	P-70 (P-01, JB1 RET 22)	P-71 (P-01, NT1 RET 22)
Cholla 4 (387)	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**
Colstrip 3 (74)	**RET 2027**	**RET 2027**	**RET 2027**	RET 2046	RET 2046
Colstrip 4 (74)	**RET 2027**	**RET 2027**	**RET 2027**	RET 2046	RET 2046
Craig 1 (82)	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**
Craig 2 (82)	**RET 2026**	**RET 2026**	**RET 2026**	RET 2034	RET 2034
Dave Johnston 1 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 2 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 3 (220)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 4 (330)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Hayden 1 (44)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hayden 2 (33)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hunter 1 (418)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 2 (269)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 3 (471)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Huntington 1 (459)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Huntington 2 (450)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Jim Bridger 1 (354)	**No SCR RET 2028**	**No SCR RET 2025**	**No SCR RET 2028**	**No SCR 2022 RET 2022**	SCR 2022 RET 2037
Jim Bridger 2 (359)	**No SCR RET 2032**	**No SCR RET 2025**	**No SCR RET 2024**	SCR 2021 RET 2037	SCR 2021 RET 2037
Jim Bridger 3 (349)	**RET 2033**	**RET 2028**	RET 2037	RET 2037	RET 2037
Jim Bridger 4 (353)	**RET 2033**	**RET 2032**	RET 2037	RET 2037	RET 2037
Naughton 1 (156)	RET 2029	**RET 2025**	RET 2029	RET 2029	**RET 2022**
Naughton 2 (201)	RET 2029	**RET 2025**	RET 2029	RET 2029	RET 2029
Naughton 3 (280)	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**RET 2019**	**RET 2019**
Wyodak (268)	RET 2039	RET 2039	RET 2039	RET 2039	RET 2039
Gadsby 1-3 Gas (238)	RET 2032	RET 2032	RET 2032	RET 2032	RET 2032

Red text identifies early retirement relative to current non-Oregon depreciable lives.

Early Retirement Assumptions

Coal Unit (PAC Share MW)	P-72 (P-01, HY1 RET 22)	P-73 (P-01, HTR1 RET 22)	P-74 (P-01, CG1 RET 22)	S-01 (Low Load)	S-02 (High Load)
Cholla 4 (387)	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2020**
Colstrip 3 (74)	RET 2046	RET 2046	RET 2046	**RET 2027**	**RET 2027**
Colstrip 4 (74)	RET 2046	RET 2046	RET 2046	**RET 2027**	**RET 2027**
Craig 1 (82)	**RET 2025**	**RET 2025**	**RET 2022**	**RET 2025**	**RET 2025**
Craig 2 (82)	RET 2034	RET 2034	RET 2034	**RET 2026**	**RET 2026**
Dave Johnston 1 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 2 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 3 (220)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 4 (330)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Hayden 1 (44)	**RET 2022**	RET 2030	RET 2030	RET 2030	RET 2030
Hayden 2 (33)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hunter 1 (418)	RET 2042	**RET 2022**	RET 2042	RET 2042	RET 2042
Hunter 2 (269)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 3 (471)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Huntington 1 (459)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Huntington 2 (450)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Jim Bridger 1 (354)	SCR 2022 RET 2037	SCR 2022 RET 2037	SCR 2022 RET 2037	**No SCR RET 2023**	**No SCR RET 2023**
Jim Bridger 2 (359)	SCR 2021 RET 2037	SCR 2021 RET 2037	SCR 2021 RET 2037	**No SCR RET 2028**	**No SCR RET 2028**
Jim Bridger 3 (349)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Jim Bridger 4 (353)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Naughton 1 (156)	RET 2029	RET 2029	RET 2029	**RET 2025**	**RET 2025**
Naughton 2 (201)	RET 2029	RET 2029	RET 2029	**RET 2025**	**RET 2025**
Naughton 3 (280)	**RET 2019**	**RET 2019**	**RET 2019**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**
Wyodak (268)	RET 2039	RET 2039	RET 2039	RET 2039	RET 2039
Gadsby 1-3 Gas (238)	RET 2032	RET 2032	RET 2032	RET 2032	RET 2032

Red text identifies early retirement relative to current non-Oregon depreciable lives.

Early Retirement Assumptions

Coal Unit (PAC Share MW)	S-03 (1 in 20 Load)	S-04 (Low Private Generation)	S-05 (High Private Generation)	S-06 (Business Plan)	S-07 (No Customer Preference)
Cholla 4 (387)	**RET 2020**	**RET 2020**	**RET 2020**	**RET 2025**	**RET 2020**
Colstrip 3 (74)	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**
Colstrip 4 (74)	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**	**RET 2027**
Craig 1 (82)	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**
Craig 2 (82)	**RET 2026**	**RET 2026**	**RET 2026**	**RET 2026**	**RET 2026**
Dave Johnston 1 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 2 (106)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 3 (220)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Dave Johnston 4 (330)	RET 2027	RET 2027	RET 2027	RET 2027	RET 2027
Hayden 1 (44)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hayden 2 (33)	RET 2030	RET 2030	RET 2030	RET 2030	RET 2030
Hunter 1 (418)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 2 (269)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Hunter 3 (471)	RET 2042	RET 2042	RET 2042	RET 2042	RET 2042
Huntington 1 (459)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Huntington 2 (450)	RET 2036	RET 2036	RET 2036	RET 2036	RET 2036
Jim Bridger 1 (354)	**No SCR RET 2023**	**No SCR RET 2023**	**No SCR RET 2023**	**No SCR RET 2023**	**No SCR RET 2023**
Jim Bridger 2 (359)	**No SCR RET 2028**	**No SCR RET 2028**	**No SCR RET 2028**	**No SCR RET 2028**	**No SCR RET 2028**
Jim Bridger 3 (349)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Jim Bridger 4 (353)	RET 2037	RET 2037	RET 2037	RET 2037	RET 2037
Naughton 1 (156)	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**
Naughton 2 (201)	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**	**RET 2025**
Naughton 3 (280)	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**Lg. GC 2020 RET 2029**	**RET 2019**	**Lg. GC 2020 RET 2029**
Wyodak (268)	RET 2039	RET 2039	RET 2039	RET 2039	RET 2039
Gadsby 1-3 Gas (238)	RET 2032	RET 2032	RET 2032	RET 2032	RET 2032

Red text identifies early retirement relative to current non-Oregon depreciable lives.

Early Retirement Assumptions

Coal Unit (PAC Share MW)	S-08 (High Customer Preference)
Cholla 4 (387)	**RET 2020**
Colstrip 3 (74)	**RET 2027**
Colstrip 4 (74)	**RET 2027**
Craig 1 (82)	**RET 2025**
Craig 2 (82)	**RET 2026**
Dave Johnston 1 (106)	RET 2027
Dave Johnston 2 (106)	RET 2027
Dave Johnston 3 (220)	RET 2027
Dave Johnston 4 (330)	RET 2027
Hayden 1 (44)	RET 2030
Hayden 2 (33)	RET 2030
Hunter 1 (418)	RET 2042
Hunter 2 (269)	RET 2042
Hunter 3 (471)	RET 2042
Huntington 1 (459)	RET 2036
Huntington 2 (450)	RET 2036
Jim Bridger 1 (354)	**No SCR RET 2023**
Jim Bridger 2 (359)	**No SCR RET 2028**
Jim Bridger 3 (349)	RET 2037
Jim Bridger 4 (353)	RET 2037
Naughton 1 (156)	**RET 2025**
Naughton 2 (201)	**RET 2025**
Naughton 3 (280)	**Lg. GC 2020 RET 2029**
Wyodak (268)	RET 2039
Gadsby 1-3 Gas (238)	RET 2032

Red text identifies early retirement relative to current non-Oregon depreciable lives.

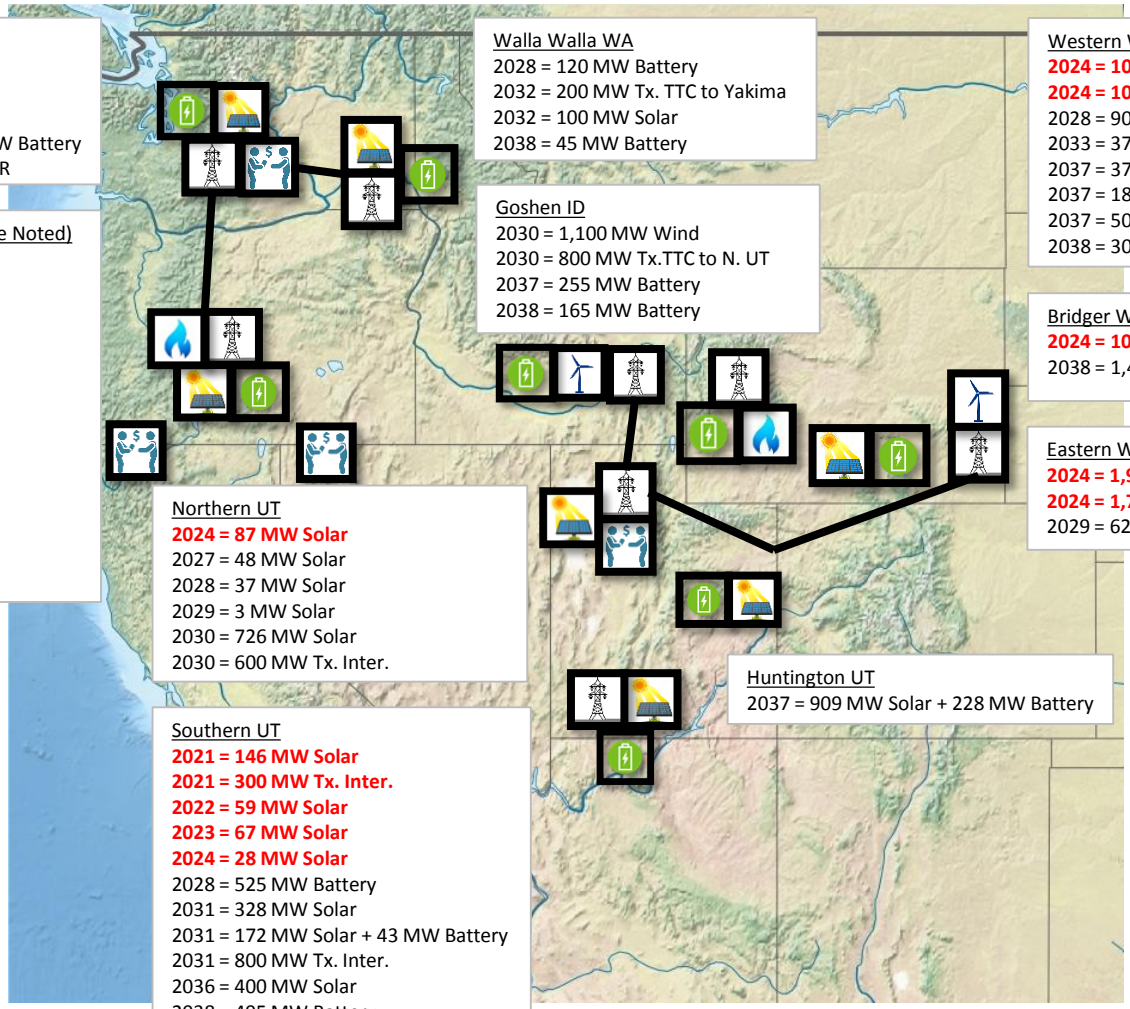
Appendix B
Additional Resource Portfolio Maps




PACIFICORP
POWERING YOUR GREATNESS

Case P-01

(Coal Study Benchmark)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2023 = 15 MW Battery
2023 = 75 MW Battery*
2024 = 500 MW Solar
2028 = 135 MW Battery
2028 = 15 MW Battery*
2028 = 60 MW Battery**
2032 = 475 MW Solar
2032 = 475 MW Tx. Inter.
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*
2038 = 90 MW Battery

*Willamette Valley
**Portland North Coast

Walla Walla WA
2028 = 120 MW Battery
2032 = 200 MW Tx. TTC to Yakima
2032 = 100 MW Solar
2038 = 45 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx.TTC to N. UT
2037 = 255 MW Battery
2038 = 165 MW Battery

Western WY/Naughton
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 90 MW Battery
2033 = 370 MW Gas
2037 = 370 MW Gas
2037 = 185 MW Gas
2037 = 500 MW Tx. Inter.
2038 = 300 MW Battery

Bridger WY
2024 = 100 MW Solar
2038 = 1,408 MW Solar + 352 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2024 = 87 MW Solar
2027 = 48 MW Solar
2028 = 37 MW Solar
2029 = 3 MW Solar
2030 = 726 MW Solar
2030 = 600 MW Tx. Inter.

Huntington UT
2037 = 909 MW Solar + 228 MW Battery

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 28 MW Solar
2028 = 525 MW Battery
2031 = 328 MW Solar
2031 = 172 MW Solar + 43 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2038 = 495 MW Battery

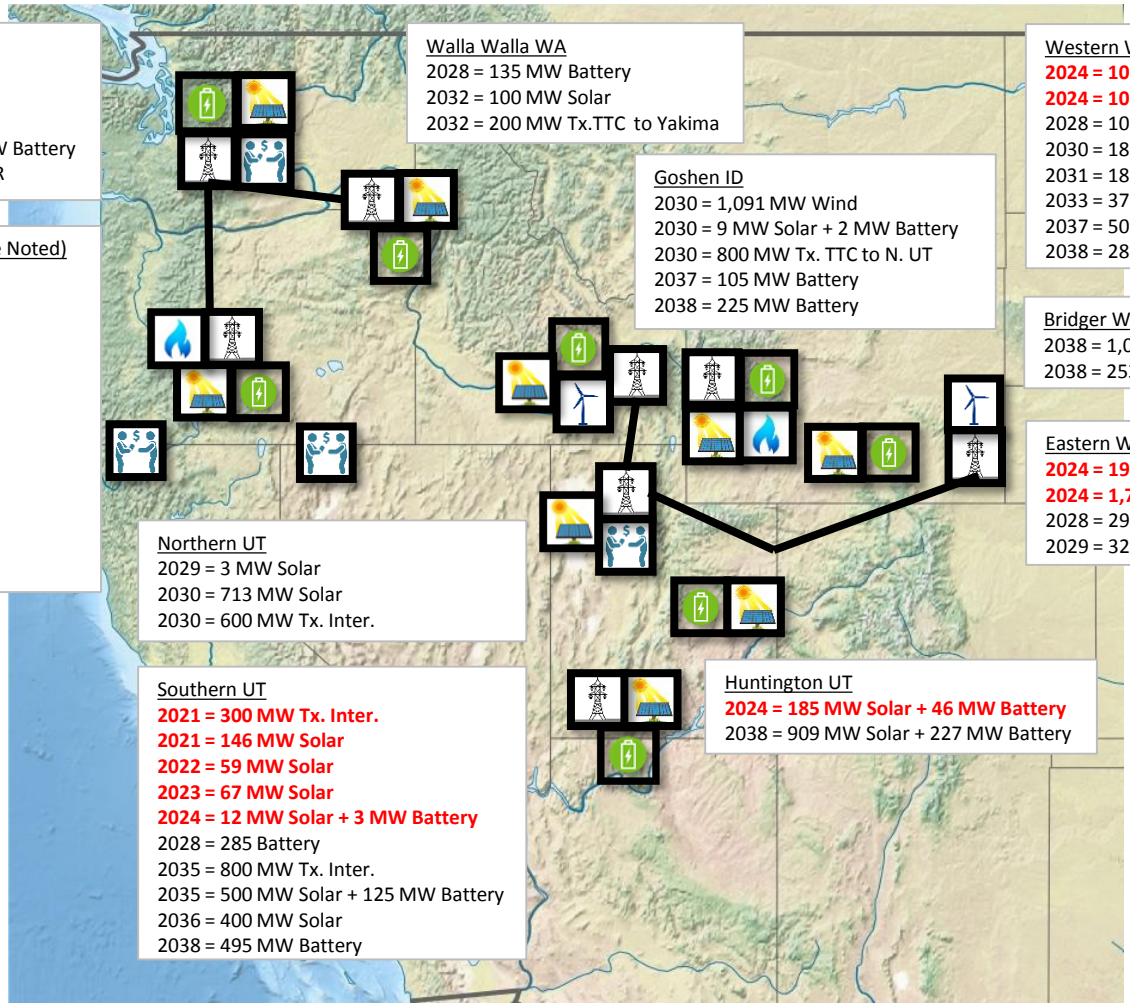
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2027 = DJ1-4 (762 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2034 = CG2 (82 MW)
2036 = HTG1-2 (909 MW)
2037 = JB1-4 (1,415 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-02

(Regional Haze Reference)



Yakima WA
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx.TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar
2028 = 345 MW Battery
2028 = 135 MW Battery*
2028 = 105 MW Battery**
2031 = 182 MW Solar
2031 = 475 MW Tx. Inter.
2032 = 293 MW Solar
2032 = 73 MW Battery
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*

*Willamette Valley
**Portland North Coast

Walla Walla WA
2028 = 135 MW Battery
2032 = 100 MW Solar
2032 = 200 MW Tx.TTC to Yakima

Goshen ID
2030 = 1,091 MW Wind
2030 = 9 MW Solar + 2 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2037 = 105 MW Battery
2038 = 225 MW Battery

Western WY/Naughton
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 105 MW Battery
2030 = 185 MW Gas NTN
2031 = 185 MW Gas
2033 = 370 MW Gas
2037 = 500 MW Tx. Inter.
2038 = 285 MW Gas

Bridger WY
2038 = 1,056 MW Solar + 264 MW Battery
2038 = 253 MW Battery

Eastern WY
2024 = 1920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 295 MW Wind
2029 = 326 MW Wind

Northern UT
2029 = 3 MW Solar
2030 = 713 MW Solar
2030 = 600 MW Tx. Inter.

Southern UT
2021 = 300 MW Tx. Inter.
2021 = 146 MW Solar
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 12 MW Solar + 3 MW Battery
2028 = 285 Battery
2035 = 800 MW Tx. Inter.
2035 = 500 MW Solar + 125 MW Battery
2036 = 400 MW Solar
2038 = 495 MW Battery

Huntington UT
2024 = 185 MW Solar + 46 MW Battery
2038 = 909 MW Solar + 227 MW Battery

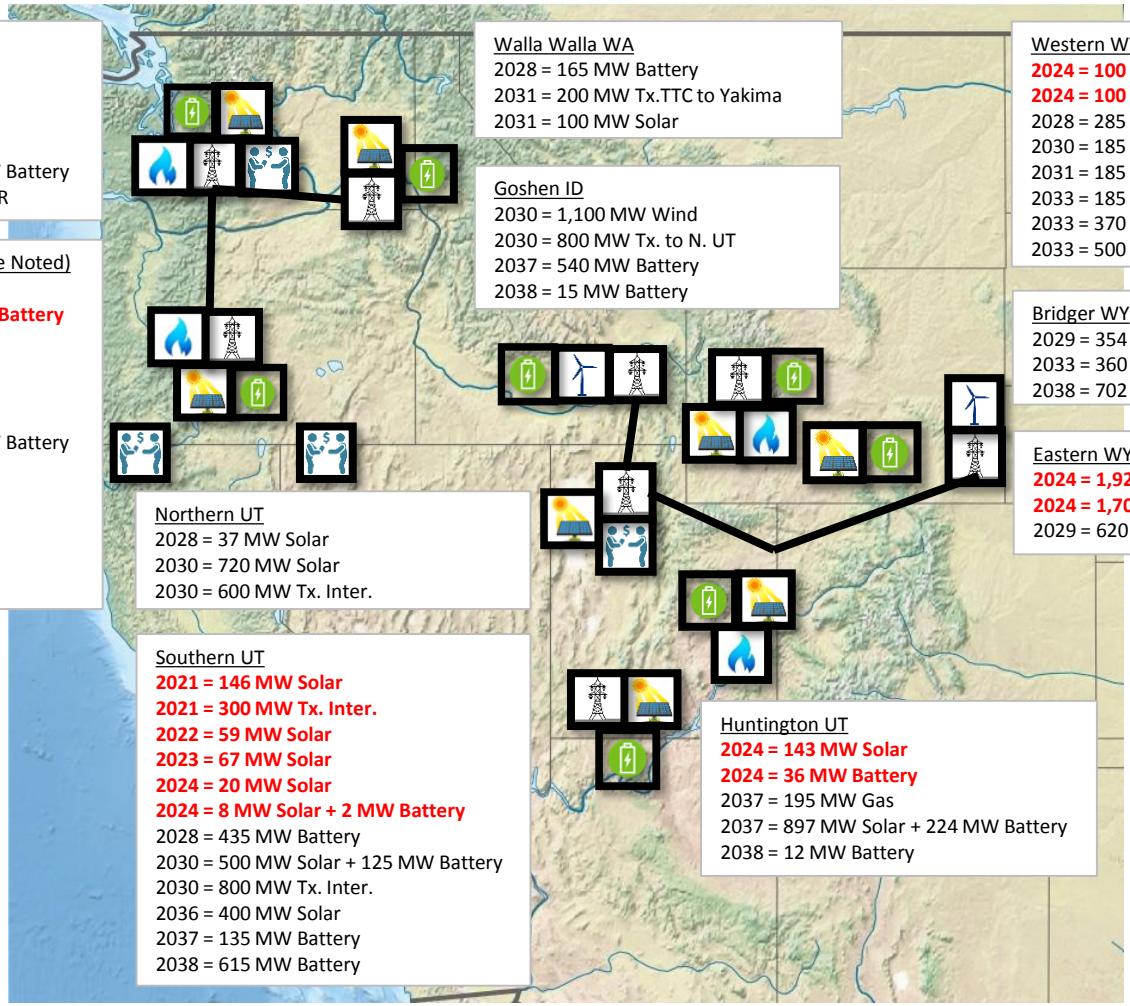
Coal Retirements
2019 = NT3 (280 MW)
2025 = CH4 (387 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB1-4 (1,415 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-03

(Regional Haze Intertemporal)



Yakima WA
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2037 = 233 MW Gas
2037 = 197 MW Solar + 49 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 421 MW Solar
2024 = 79 MW Solar + 20 MW Battery
2028 = 120 MW Battery*
2028 = 15 MW Battery**
2032 = 475 MW Tx. Inter.
2032 = 375 MW Solar
2032 = 100 MW Solar + 25 MW Battery
2033 = 221 MW Gas*
2033 = 615 MW Tx. Inter*
2037 = 221 MW Gas*

*Willamette Valley
**Portland North Coast

Walla Walla WA
2028 = 165 MW Battery
2031 = 200 MW Tx.TTC to Yakima
2031 = 100 MW Solar

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. to N. UT
2037 = 540 MW Battery
2038 = 15 MW Battery

Western WY/Naughton
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 285 MW Battery
2030 = 185 MW Gas
2031 = 185 MW Gas
2033 = 185 MW Gas
2033 = 370 MW Gas
2033 = 500 MW Tx. Inter.

Bridger WY
2029 = 354 MW Solar
2033 = 360 MW Solar
2038 = 702 MW Solar + 176 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2028 = 37 MW Solar
2030 = 720 MW Solar
2030 = 600 MW Tx. Inter.

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 20 MW Solar
2024 = 8 MW Solar + 2 MW Battery
2028 = 435 MW Battery
2030 = 500 MW Solar + 125 MW Battery
2030 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 135 MW Battery
2038 = 615 MW Battery

Huntington UT
2024 = 143 MW Solar
2024 = 36 MW Battery
2037 = 195 MW Gas
2037 = 897 MW Solar + 224 MW Battery
2038 = 12 MW Battery

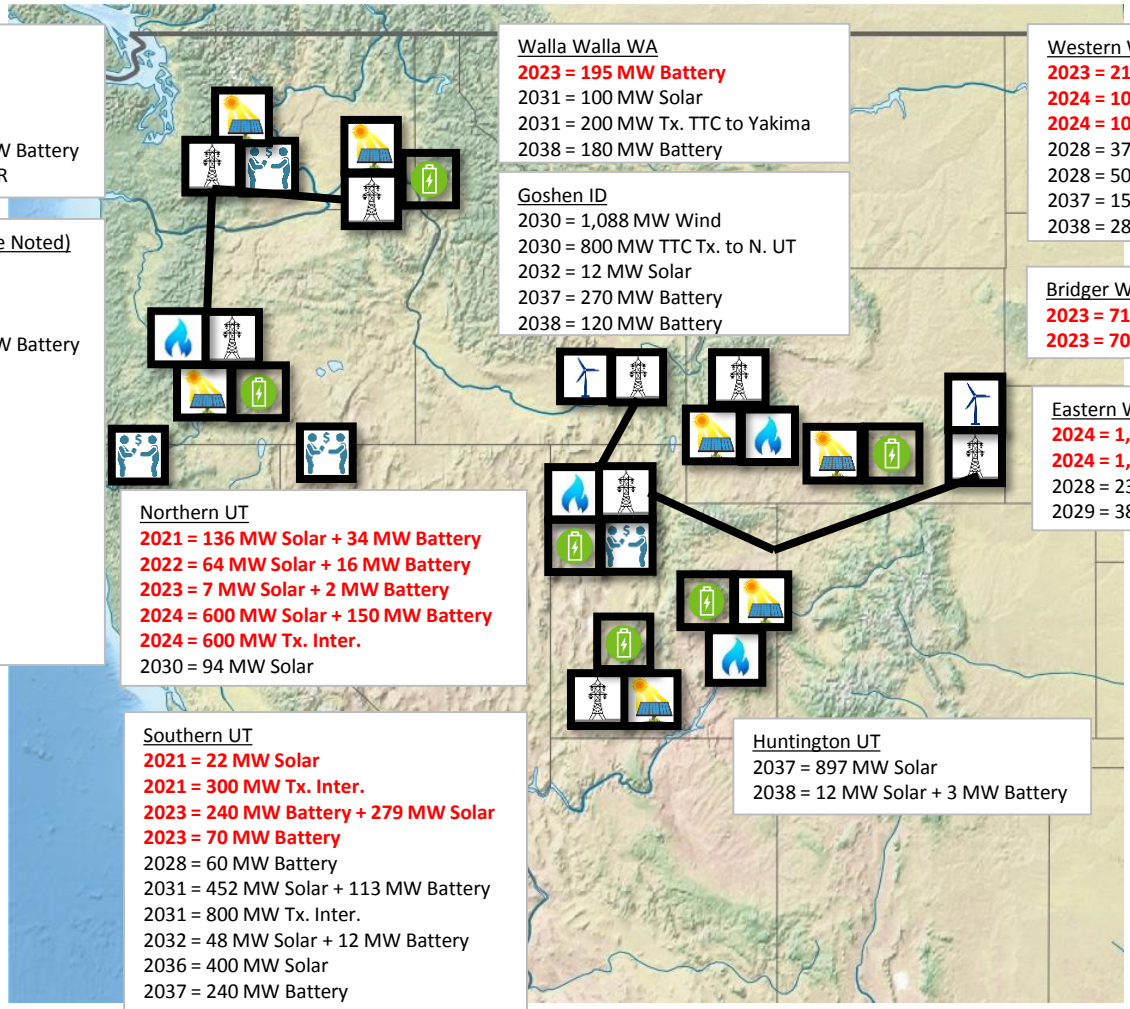
Coal Retirements
2019 = NT3 (280 MW)
2025 = CH4 (387 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2032 = JB2 (359 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

Solar
Wind
Battery
Geothermal
Pumped Hydro
Gas
Market
Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-04

(Coal Study Stacked Case C-42)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Tx. Inter.
2024 = 405 MW Solar
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2023 = 60 MW Battery*
2023 = 30 MW Battery**
2024 = 500 MW Solar
2033 = 475 MW Solar + 119 MW Battery
2033 = 221 MW Gas*
2033 = 615 MW Tx. Inter.*
2033 = 475 MW Tx. Inter.
2035 = 221 MW Gas*
2037 = 450 MW Battery
2037 = 105 MW Battery**
2038 = 60 MW Battery
2038 = 60 MW Battery*
2038 = 75 MW Battery**

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2023 = 195 MW Battery
2031 = 100 MW Solar
2031 = 200 MW Tx. TTC to Yakima
2038 = 180 MW Battery

Goshen ID
2030 = 1,088 MW Wind
2030 = 800 MW TTC Tx. to N. UT
2032 = 12 MW Solar
2037 = 270 MW Battery
2038 = 120 MW Battery

Western WY/Naughton
2023 = 210 MW Battery
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 370 MW Gas
2028 = 500 MW Tx. Inter.
2037 = 15 MW Battery
2038 = 285 MW Battery

Bridger WY
2023 = 713 MW Solar
2023 = 702 MW Solar + 176 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 232 MW Wind
2029 = 388 MW Wind

Northern UT
2021 = 136 MW Solar + 34 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2023 = 7 MW Solar + 2 MW Battery
2024 = 600 MW Solar + 150 MW Battery
2024 = 600 MW Tx. Inter.
2030 = 94 MW Solar

Southern UT
2021 = 22 MW Solar
2021 = 300 MW Tx. Inter.
2023 = 240 MW Battery + 279 MW Solar
2023 = 70 MW Battery
2028 = 60 MW Battery
2031 = 452 MW Solar + 113 MW Battery
2031 = 800 MW Tx. Inter.
2032 = 48 MW Solar + 12 MW Battery
2036 = 400 MW Solar
2037 = 240 MW Battery
2038 = 675 MW Battery

Huntington UT
2037 = 897 MW Solar
2038 = 12 MW Solar + 3 MW Battery

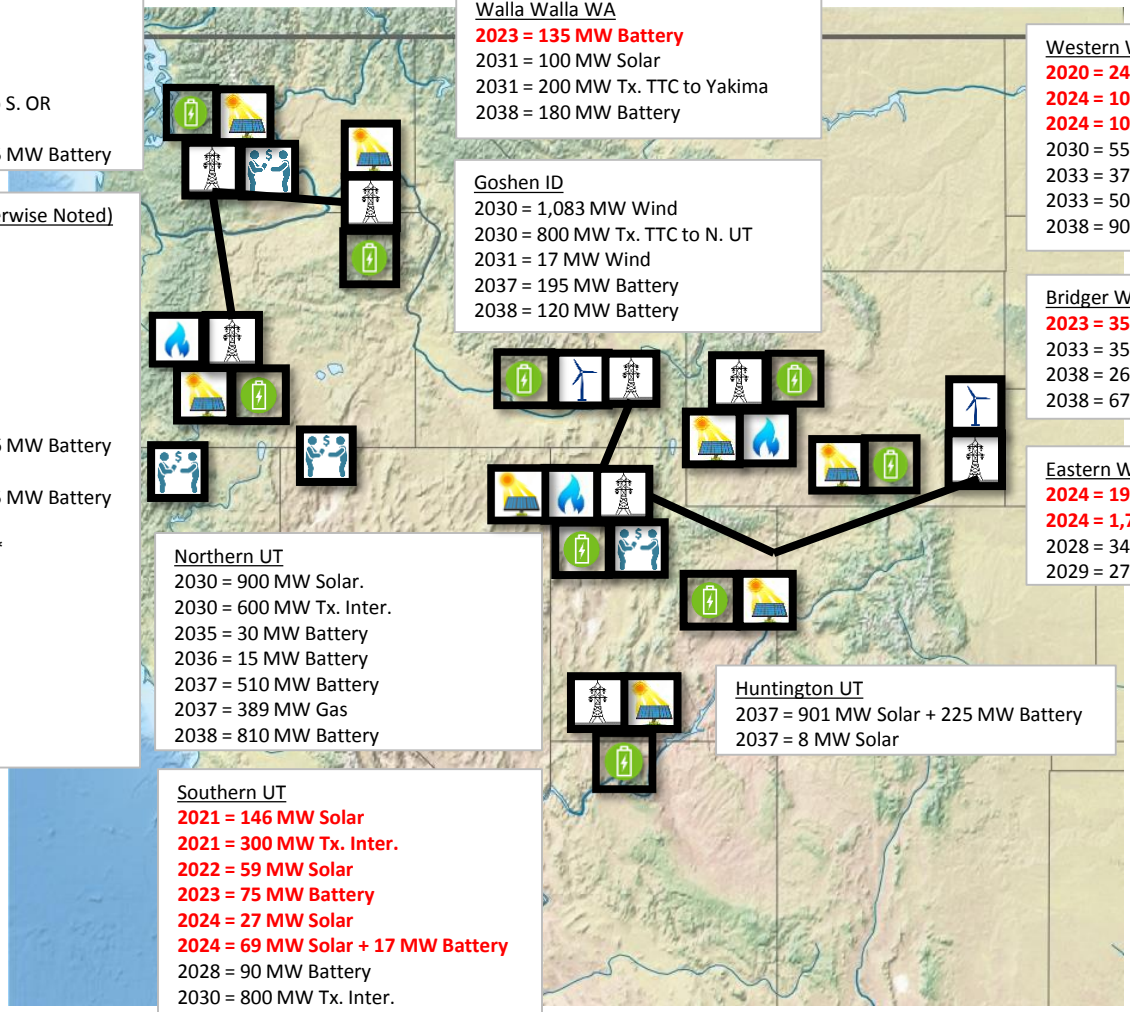
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2022 = NT1-2 (357 MW)
2022 = JB1-2 (713 MW)
2025 = CG1 (82 MW)
2027 = DJ1-4 (762 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2034 = CG2 (82 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-06

(Alternative Retirements/Transition Case C-44a)



Yakima WA
2023 = 105 MW Battery
2024 = 430 MW Solar
2024 = 405 MW Tx. Inter.
2038 = 450 MW Tx. TTC to S. OR
2038 = 50 MW Solar
2038 = 381 MW Solar + 95 MW Battery

Southern OR (Unless Otherwise Noted)
2023 = 120 MW Battery
2023 = 60 MW Battery*
2023 = 15 MW Battery**
2024 = 500 MW Solar
2028 = 90 MW Battery
2028 = 45 MW Battery*
2028 = 60 MW Battery**
2031 = 33 MW Solar
2031 = 224 MW Solar + 56 MW Battery
2031 = 475 MW Tx. Inter.
2032 = 218 MW Solar + 55 MW Battery
2033 = 221 MW Gas*
2033 = 615 MW Tx. Inter.*
2037 = 315 MW Battery
2037 = 221 MW Gas*
2037 = 60 MW Battery**
2038 = 45 MW Battery
2038 = 60 MW Battery*

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2023 = 135 MW Battery
2031 = 100 MW Solar
2031 = 200 MW Tx. TTC to Yakima
2038 = 180 MW Battery

Goshen ID
2030 = 1,083 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 17 MW Wind
2037 = 195 MW Battery
2038 = 120 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2030 = 555 MW Gas
2033 = 370 MW Gas
2033 = 500 MW Tx. Inter.
2038 = 90 MW Battery

Bridger WY
2023 = 354 MW Solar
2033 = 359 MW Solar
2038 = 26 MW Solar
2038 = 676 MW Solar + 169 MW Battery

Eastern WY
2024 = 1920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 345 MW Wind
2029 = 275 MW Wind

Northern UT
2030 = 900 MW Solar.
2030 = 600 MW Tx. Inter.
2035 = 30 MW Battery
2036 = 15 MW Battery
2037 = 510 MW Battery
2037 = 389 MW Gas
2038 = 810 MW Battery

Huntington UT
2037 = 901 MW Solar + 225 MW Battery
2037 = 8 MW Solar

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 75 MW Battery
2024 = 27 MW Solar
2024 = 69 MW Solar + 17 MW Battery
2028 = 90 MW Battery
2030 = 800 MW Tx. Inter.
2030 = 341 MW Solar + 85 MW Battery
2031 = 159 MW Solar
2036 = 400 MW Solar
2037 = 270 MW Battery
2038 = 510 MW Battery

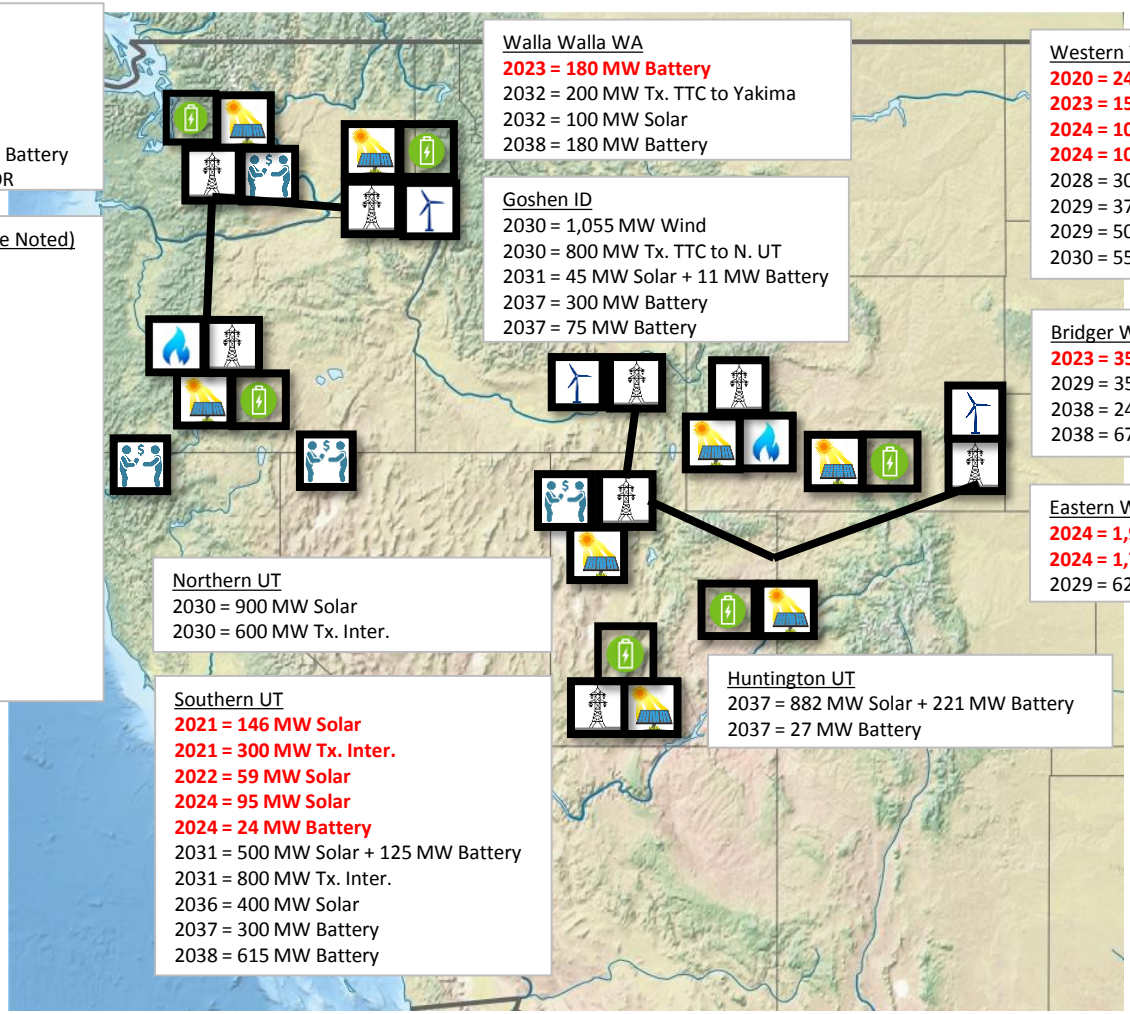
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2020 = GDB1-3 (238 MW)
2022 = JB1 (354 MW)
2025 = CG1-2 (164 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2032 = JB2 (359 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

Solar
Wind
Battery
Geothermal
Pumped Hydro
Gas
Market
Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-07

(P-06 with JB2 Retired 2028))



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2038 = 375 MW Solar
2038 = 58 MW Solar + 15 MW Battery
2038 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2023 = 75 MW Battery*
2024 = 89 MW Solar
2024 = 410 MW Solar
2024 = 103 MW Battery
2028 = 105 MW Battery
2028 = 30 MW Battery*
2028 = 60 MW Battery**
2032 = 475 MW Solar
2032 = 119 MW Battery
2032 = 475 MW Tx. Inter.
2037 = 225 MW Battery
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*
2038 = 105 MW Battery**

*Willamette Valley
**Portland North Coast

Walla Walla WA
2023 = 180 MW Battery
2032 = 200 MW Tx. TTC to Yakima
2032 = 100 MW Solar
2038 = 180 MW Battery

Goshen ID
2030 = 1,055 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 45 MW Solar + 11 MW Battery
2037 = 300 MW Battery
2037 = 75 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2023 = 150 MW Solar
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 300 MW Battery
2029 = 370 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 555 MW Gas

Bridger WY
2023 = 354 MW Solar
2029 = 359 MW Solar
2038 = 24 MW Solar
2038 = 678 MW Solar + 169 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2030 = 900 MW Solar
2030 = 600 MW Tx. Inter.

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2024 = 95 MW Solar
2024 = 24 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 300 MW Battery
2038 = 615 MW Battery

Huntington UT
2037 = 882 MW Solar + 221 MW Battery
2037 = 27 MW Battery

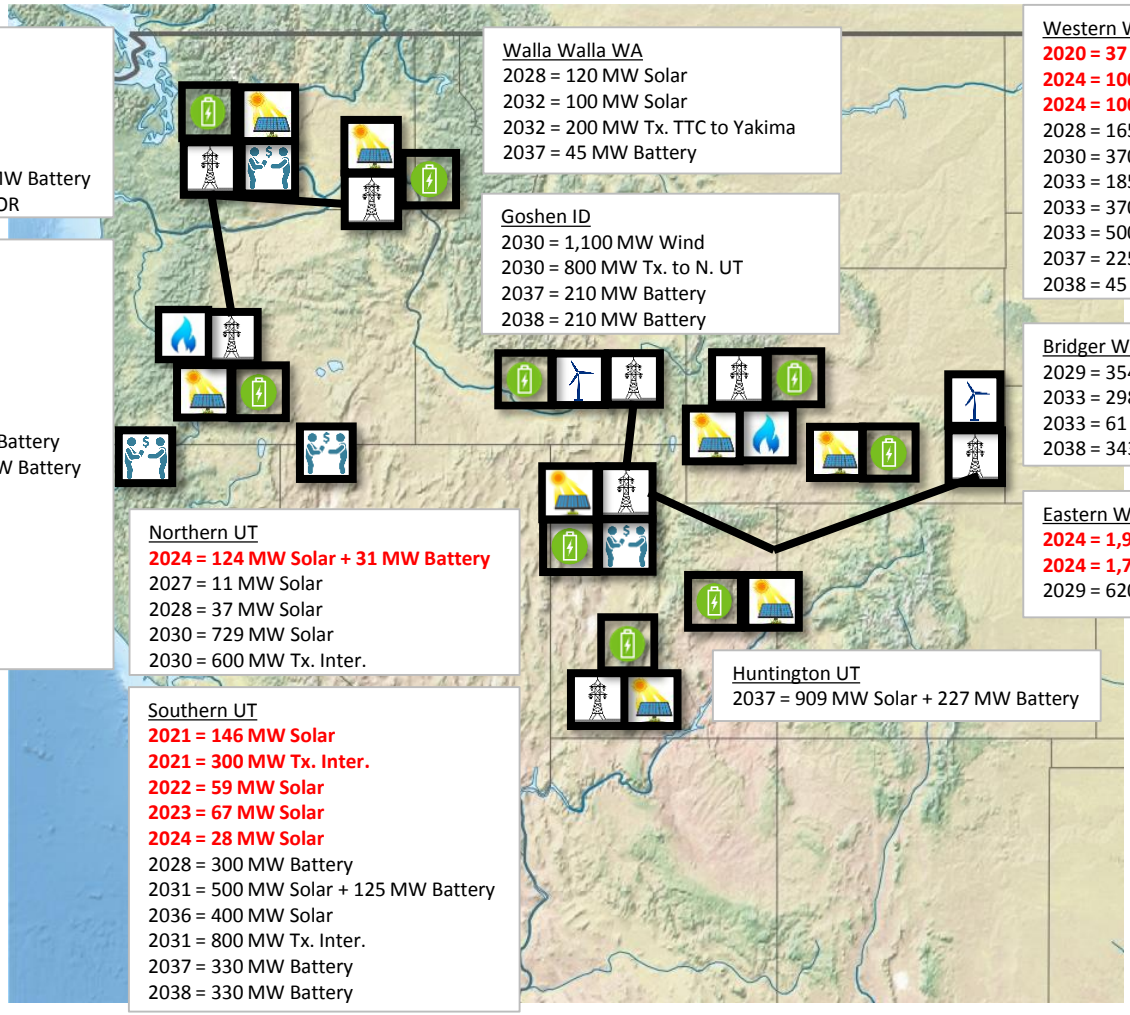
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2020 = GDB1-3 (238 MW)
2022 = JB1 (354 MW)
2025 = CG1-2 (164 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

Solar
Wind
Battery
Geothermal
Pumped Hydro
Gas
Market
Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-08

(P-03 with Naughton 3 Small Gas Conversion)



Yakima WA
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2038 = 31 MW Solar
2038 = 399 MW Solar + 100 MW Battery
2038 = 450 MW Tx. TTC to S. OR

Southern OR
2024 = 500 MW Solar
2028 = 210 MW Battery
2028 = 120 MW Battery*
2028 = 75 MW Battery**
2030 = 115 MW Solar
2030 = 475 MW Tx. Inter.
2031 = 14 MW Solar + 4 MW Battery
2032 = 346 MW Solar + 87 MW Battery
2033 = 221 MW Gas*
2033 = 615 MW Tx. Inter.*
2037 = 30 MW Battery
2037 = 221 MW Gas*

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2028 = 120 MW Solar
2032 = 100 MW Solar
2032 = 200 MW Tx. TTC to Yakima
2037 = 45 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. to N. UT
2037 = 210 MW Battery
2038 = 210 MW Battery

Western WY/Naughton
2020 = 37 MW Gas Conv.
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 165 MW Battery
2030 = 370 MW Gas
2033 = 185 MW Gas
2033 = 370 MW Gas
2033 = 500 MW Tx. Inter.
2037 = 225 MW Battery
2038 = 45 MW Battery

Bridger WY
2029 = 354 MW Solar
2033 = 298 MW Solar
2033 = 61 MW Solar + 15 MW Battery
2038 = 343 MW Solar + 86 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2024 = 124 MW Solar + 31 MW Battery
2027 = 11 MW Solar
2028 = 37 MW Solar
2030 = 729 MW Solar
2030 = 600 MW Tx. Inter.

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 28 MW Solar
2028 = 300 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2036 = 400 MW Solar
2031 = 800 MW Tx. Inter.
2037 = 330 MW Battery
2038 = 330 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

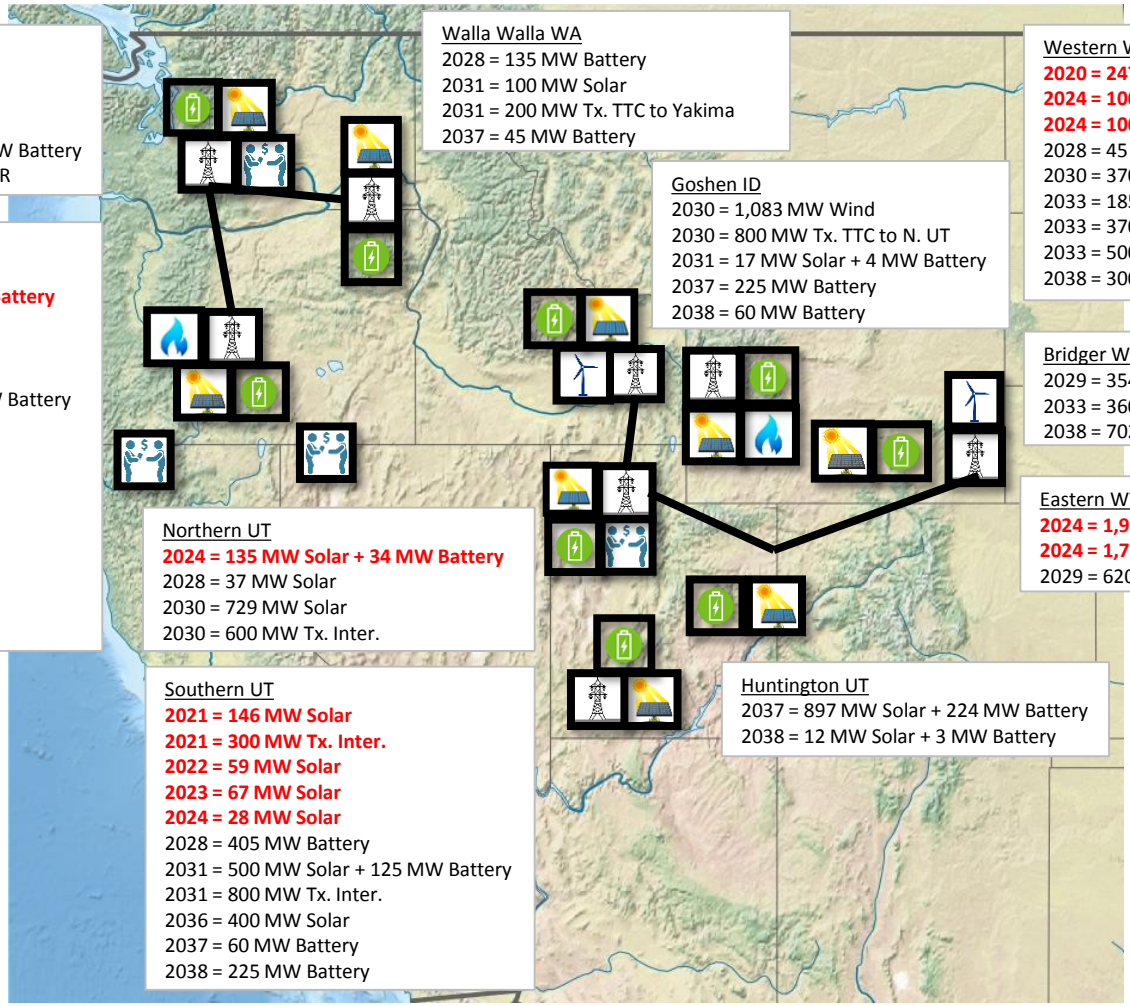
Coal Retirements
2019 = NT3 (280 MW)
2025 = CH4 (387 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2032 = JB2 (359 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-09

(P-03 with Naughton 3 Large Gas Conversion)



Yakima WA
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2036 = 430 MW Solar + 108 MW Battery
2036 = 450 MW Tx. TTC to S. OR

Southern OR
2024 = 482 MW Solar
2024 = 18 MW Solar + 5 MW Battery
2028 = 210 MW Battery
2028 = 227 MW Battery**
2032 = 276 MW Solar
2032 = 199 MW Solar + 50 MW Battery
2032 = 475 MW Tx. Inter.
2033 = 221 MW Gas*
2033 = 615 MW Tx. Inter.*
2037 = 435 MW Battery
2037 = 221 MW Gas*
2037 = 15 MW Battery**

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2028 = 135 MW Battery
2031 = 100 MW Solar
2031 = 200 MW Tx. TTC to Yakima
2037 = 45 MW Battery

Goshen ID
2030 = 1,083 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 17 MW Solar + 4 MW Battery
2037 = 225 MW Battery
2038 = 60 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 45 MW Battery
2030 = 370 MW Gas
2033 = 185 MW Gas
2033 = 370 MW Gas
2033 = 500 MW Tx. Inter.
2038 = 300 MW Battery

Bridger WY
2029 = 354 MW Solar
2033 = 360 MW Solar
2038 = 702 MW Solar + 176 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2024 = 135 MW Solar + 34 MW Battery
2028 = 37 MW Solar
2030 = 729 MW Solar
2030 = 600 MW Tx. Inter.

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 28 MW Solar
2028 = 405 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 60 MW Battery
2038 = 225 MW Battery

Huntington UT
2037 = 897 MW Solar + 224 MW Battery
2038 = 12 MW Solar + 3 MW Battery

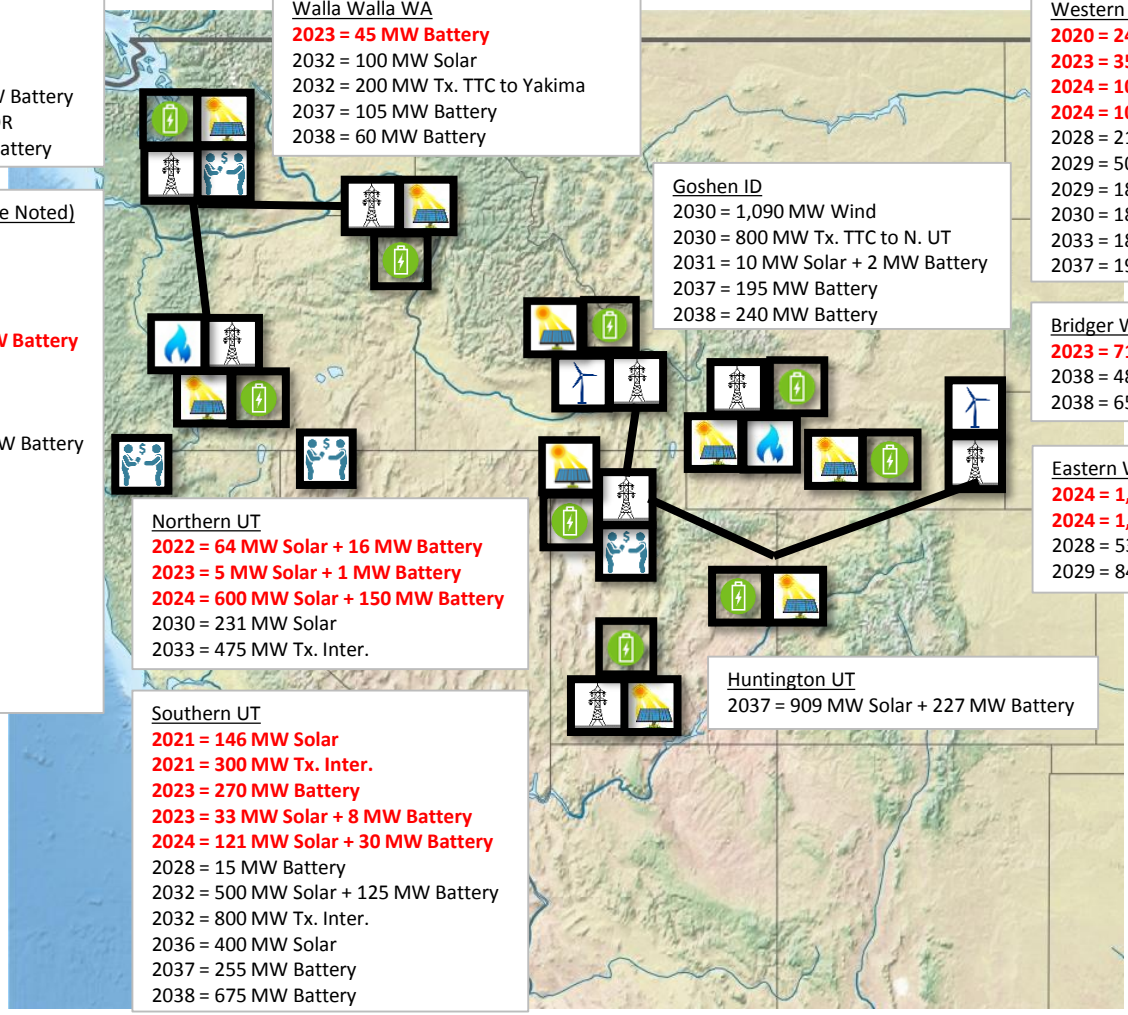
Coal Retirements
2019 = NT3 (280 MW)
2025 = CH4 (387 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2032 = JB2 (359 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-10

(P-04 with Naughton 3 Large Gas Conversion)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2035 = 141 MW Solar
2035 = 267 MW Solar + 67 MW Battery
2035 = 450 MW Tx. TTC to S. OR
2036 = 22 MW Solar + 5 MW Battery

Southern OR (Unless Otherwise Noted)
2023 = 165 MW Battery
2023 = 30 MW Battery*
2023 = 45 MW Battery**
2024 = 288 MW Solar
2024 = 212 MW Solar + 53 MW Battery
2025 = 975 MW Tx. Inter.
2028 = 45 MW Battery
2033 = 62 MW Solar
2033 = 413 MW Solar + 103 MW Battery
2037 = 105 MW Battery
2037 = 443 MW Gas*
2037 = 60 MW Battery**
2037 = 615 MW Tx. Inter.*
2038 = 180 MW Battery
2038 = 30 MW Battery
2038 = 105 MW Battery

*Willamette Valley
**Portland North Coast

Walla Walla WA
2023 = 45 MW Battery
2032 = 100 MW Solar
2032 = 200 MW Tx. TTC to Yakima
2037 = 105 MW Battery
2038 = 60 MW Battery

Goshen ID
2030 = 1,090 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 10 MW Solar + 2 MW Battery
2037 = 195 MW Battery
2038 = 240 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2023 = 357 MW Solar
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 210 MW Battery
2029 = 500 MW Tx. Inter.
2029 = 185 MW Gas
2030 = 185 MW Gas
2033 = 185 MW Gas
2037 = 195 MW Battery

Bridger WY
2023 = 713 MW Solar
2038 = 48 MW Solar
2038 = 654 MW Solar + 164 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 536 MW Wind
2029 = 84 MW Wind

Northern UT
2022 = 64 MW Solar + 16 MW Battery
2023 = 5 MW Solar + 1 MW Battery
2024 = 600 MW Solar + 150 MW Battery
2030 = 231 MW Solar
2033 = 475 MW Tx. Inter.

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2023 = 270 MW Battery
2023 = 33 MW Solar + 8 MW Battery
2024 = 121 MW Solar + 30 MW Battery
2028 = 15 MW Battery
2032 = 500 MW Solar + 125 MW Battery
2032 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 255 MW Battery
2038 = 675 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

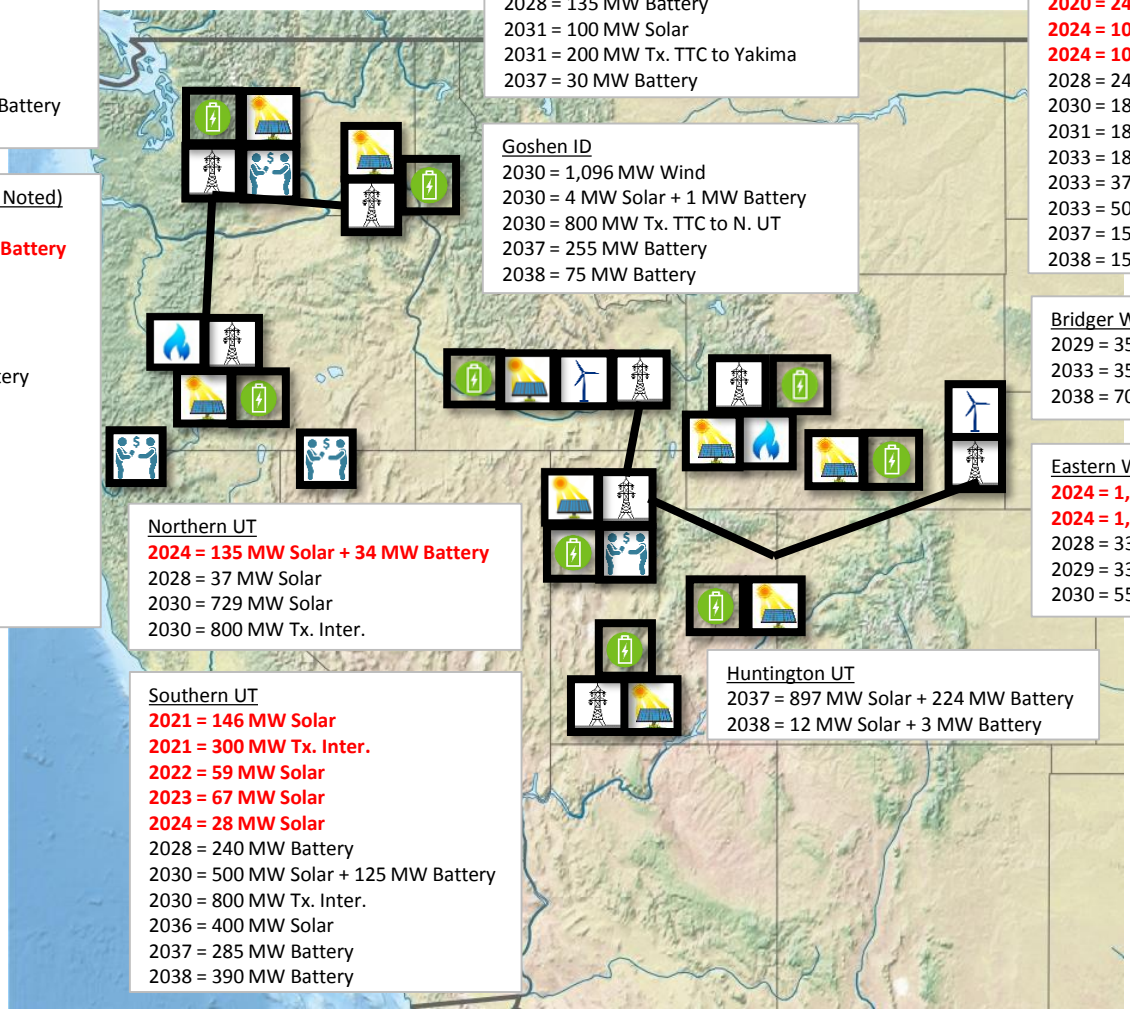
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2022 = NT1-2 (357 MW)
2022 = JB1-2 (713 MW)
2025 = CG1 (82 MW)
2027 = DJ1-4 (762 MW)
2030 = HY1-2 (77 MW)
2032 = GDB (238 MW)
2034 = CG2 (82 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-11

(P-09 with Cholla 4 Accelerated to 2020)



Yakima WA
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2036 = 81 MW Solar
2036 = 349 MW Solar + 87 MW Battery
2036 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 325 MW Solar
2024 = 175 MW Solar + 44 MW Battery
2028 = 210 MW Battery
2028 = 120 MW Battery*
2028 = 75 MW Battery**
2032 = 469 MW Solar
2032 = 6 MW Solar + 2 MW Battery
2032 = 475 MW Tx. Inter.
2033 = 221 MW Gas*
2033 = 615 MW Tx. Inter.*
2037 = 165 MW Battery
2037 = 221 MW Gas*
2037 = 15 MW Battery**

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2028 = 135 MW Battery
2031 = 100 MW Solar
2031 = 200 MW Tx. TTC to Yakima
2037 = 30 MW Battery

Goshen ID
2030 = 1,096 MW Wind
2030 = 4 MW Solar + 1 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2037 = 255 MW Battery
2038 = 75 MW Battery

Northern UT
2024 = 135 MW Solar + 34 MW Battery
2028 = 37 MW Solar
2030 = 729 MW Solar
2030 = 800 MW Tx. Inter.

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 28 MW Solar
2028 = 240 MW Battery
2030 = 500 MW Solar + 125 MW Battery
2030 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 285 MW Battery
2038 = 390 MW Battery

Huntington UT
2037 = 897 MW Solar + 224 MW Battery
2038 = 12 MW Solar + 3 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 240 MW Battery
2030 = 185 MW Gas
2031 = 185 MW Gas
2033 = 185 MW Gas
2033 = 370 MW Gas
2033 = 500 MW Tx. Inter.
2037 = 15 MW Battery
2038 = 150 MW Battery

Bridger WY
2029 = 354 MW Solar
2033 = 359 MW Solar
2038 = 702 MW Solar + 176 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 33 MW Wind
2029 = 33 MW Wind
2030 = 554 MW Wind

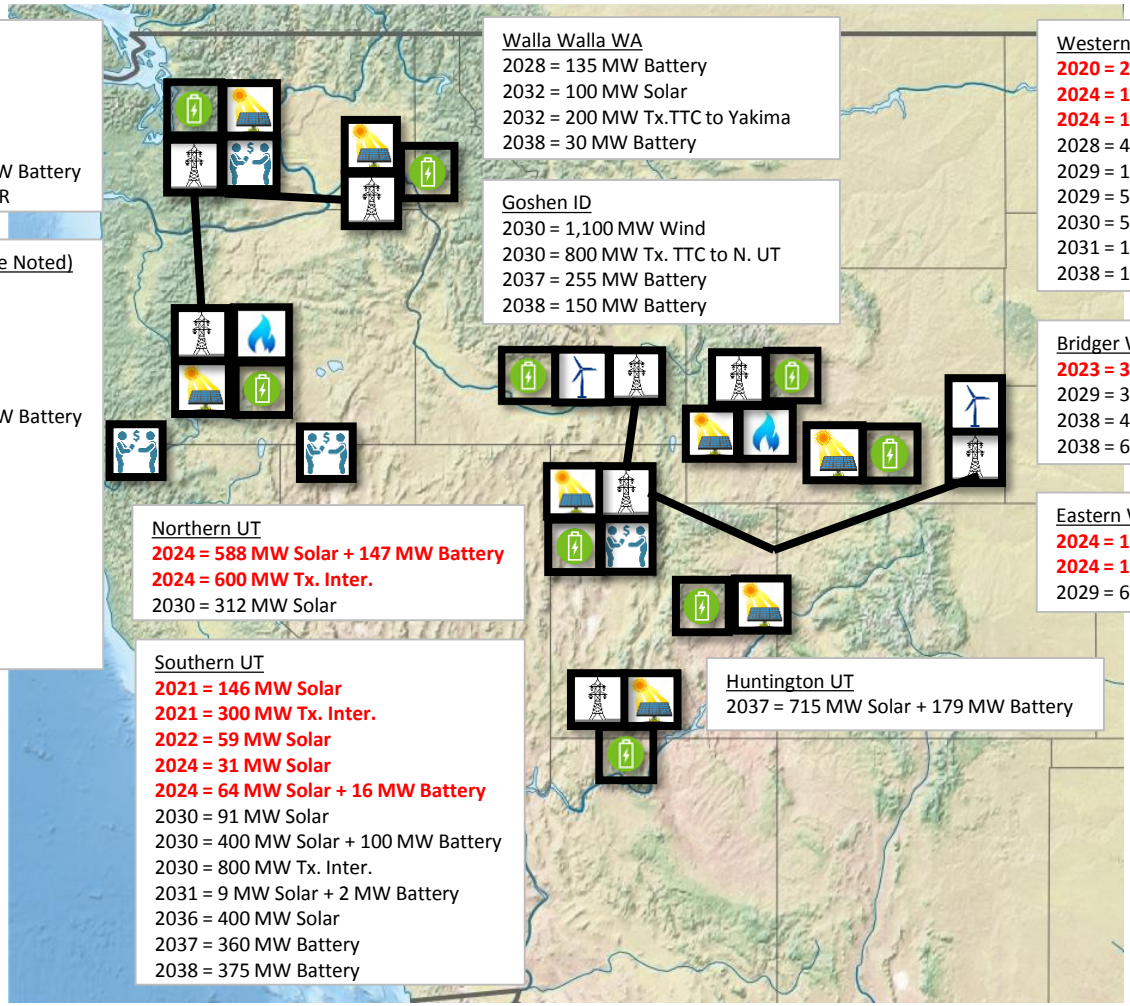
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2032 = JB2 (359 MW)
2032 = GDB (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (708 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-12

(P-06 with Cholla 4 Retired 2025)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2037 = 10 MW Solar
2037 = 420 MW Solar + 105 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2023 = 45 MW Battery
2024 = 500 MW Solar
2028 = 105 MW Battery
2028 = 180 MW Battery**
2032 = 10 MW Solar
2032 = 465 MW Solar + 116 MW Battery
2032 = 475 MW Tx. Inter.
2037 = 120 MW Battery
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*
2038 = 90 MW Battery
2038 = 15 MW Battery**

*Willamette Valley
**Portland North Coast

Walla Walla WA
2028 = 135 MW Battery
2032 = 100 MW Solar
2032 = 200 MW Tx.TTC to Yakima
2038 = 30 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2037 = 255 MW Battery
2038 = 150 MW Battery

Northern UT
2024 = 588 MW Solar + 147 MW Battery
2024 = 600 MW Tx. Inter.
2030 = 312 MW Solar

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2024 = 31 MW Solar
2024 = 64 MW Solar + 16 MW Battery
2030 = 91 MW Solar
2030 = 400 MW Solar + 100 MW Battery
2030 = 800 MW Tx. Inter.
2031 = 9 MW Solar + 2 MW Battery
2036 = 400 MW Solar
2037 = 360 MW Battery
2038 = 375 MW Battery

Huntington UT
2037 = 715 MW Solar + 179 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 420 MW Battery
2029 = 185 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 555 MW Gas
2031 = 185 MW Gas
2038 = 120 MW Battery

Bridger WY
2023 = 354 MW Solar
2029 = 359 MW Solar
2038 = 48 MW Solar
2038 = 654 MW Solar + 164 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

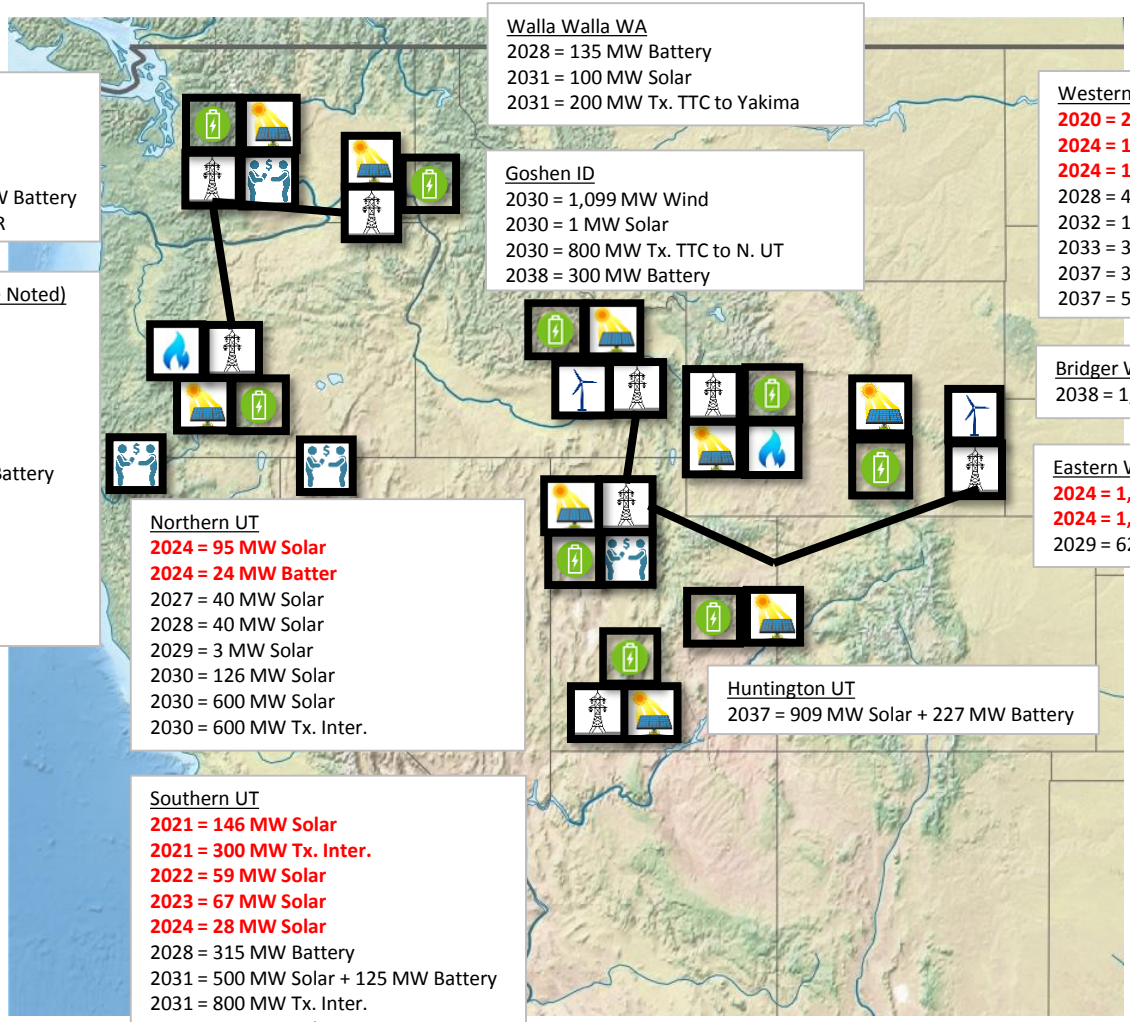
Coal Retirements
2019 = NT3 (280 MW)
2020 = GDB1-3 (238 MW)
2022 = JB1 (354 MW)
2025 = CH4 (387 MW)
2025 = CG1-2 (164 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (356 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

Solar
Wind
Battery
Geothermal
Pumped Hydro
Gas
Market
Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-13

(P-11 with Jim Bridger 1-2 SCRs)



Yakima WA
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar
2028 = 15 MW Battery
2028 = 120 MW Battery*
2028 = 135 MW Battery**
2031 = 403 MW Solar
2031 = 475 MW Tx. Inter.
2032 = 72 MW Solar + 18 MW Battery
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*
2038 = 345 MW Battery

*Willamette Valley
**Portland North Coast

Walla Walla WA
2028 = 135 MW Battery
2031 = 100 MW Solar
2031 = 200 MW Tx. TTC to Yakima

Goshen ID
2030 = 1,099 MW Wind
2030 = 1 MW Solar
2030 = 800 MW Tx. TTC to N. UT
2038 = 300 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 405 MW Battery
2032 = 185 MW Gas
2033 = 370 MW Gas
2037 = 370 MW Gas
2037 = 500 MW Tx. Inter.

Bridger WY
2038 = 1,056 MW Solar + 264 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2024 = 95 MW Solar
2024 = 24 MW Batter
2027 = 40 MW Solar
2028 = 40 MW Solar
2029 = 3 MW Solar
2030 = 126 MW Solar
2030 = 600 MW Solar
2030 = 600 MW Tx. Inter.

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 28 MW Solar
2028 = 315 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2038 = 525 MW Battery

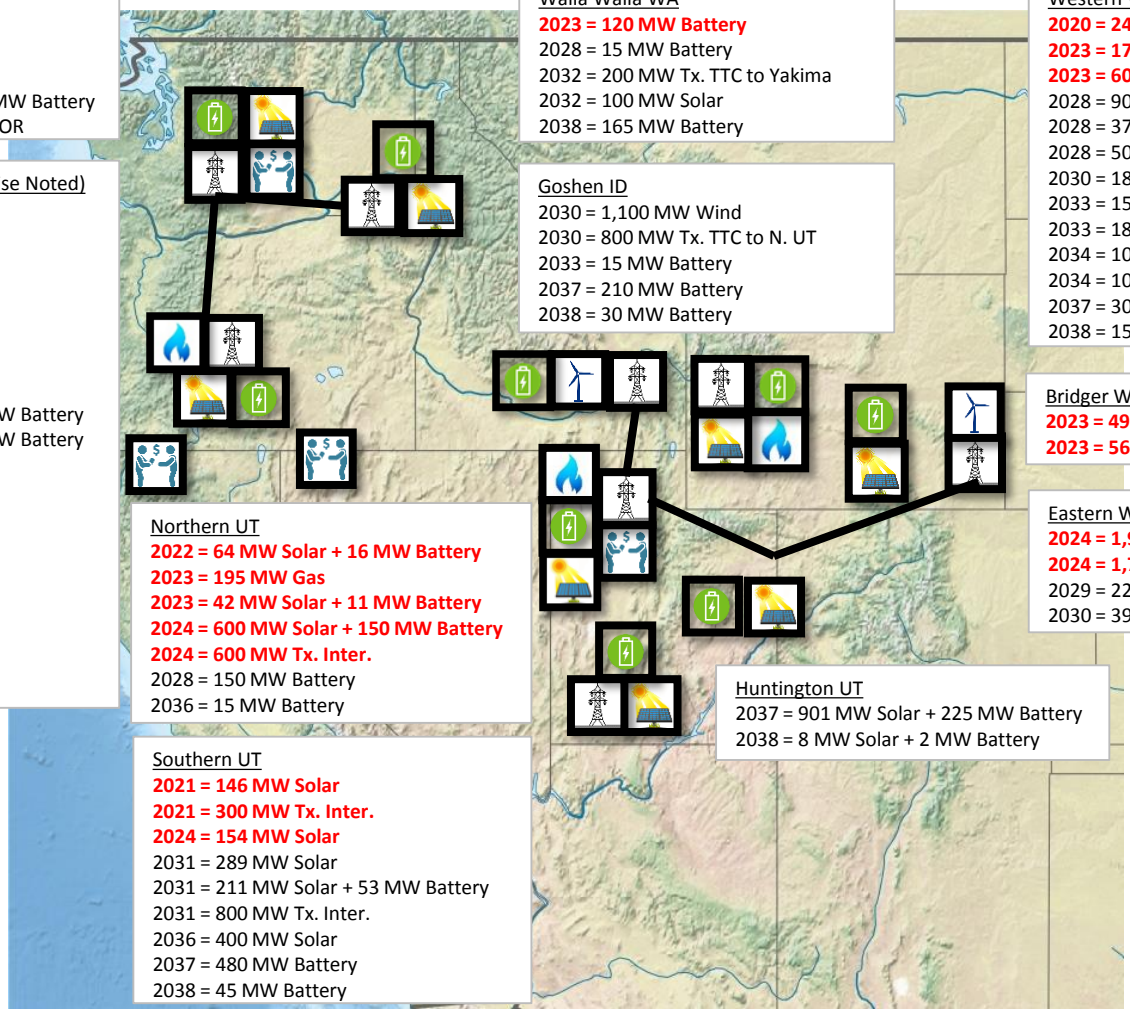
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2029 = NT1-2 (357 MW)
2032 = GDB1-3 (2032 MW)
2030 = HY1-2 (77 MW)
2036 = HTG1-2 (909 MW)
2037 = JB1-4 (1,415 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-14

(P-09 with Naughton 1-2 and Jim Bridger 1-4 Retired 2022)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2038 = 430 MW Solar + 108 MW Battery
2038 = 450 MW Tx.TTC to S. OR

Southern OR (Unless Otherwise Noted)
2023 = 300 MW Battery
2023 = 45 MW Battery*
2023 = 75 MW Battery**
2024 = 500 MW Solar
2028 = 180 MW Battery
2028 = 60 MW Battery*
2031 = 185 MW Solar
2031 = 475 MW Tx. Inter.
2031 = 145 MW Solar + 36 MW Battery
2032 = 145 MW Solar + 36 MW Battery
2033 = 221 MW Gas*
2033 = 615 MW Tx. Inter.*
2037 = 15 MW Battery*
2037 = 221 MW Gas*
2037 = 15 MW Battery**
2038 = 225 MW Battery
2038 = 120 MW Battery**

*Willamette Valley
**Portland North Coast

Walla Walla WA
2023 = 120 MW Battery
2028 = 15 MW Battery
2032 = 200 MW Tx. TTC to Yakima
2032 = 100 MW Solar
2038 = 165 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2033 = 15 MW Battery
2037 = 210 MW Battery
2038 = 30 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2023 = 172 MW Solar
2023 = 60 MW Battery
2028 = 90 MW Battery
2028 = 370 MW Gas
2028 = 500 MW Tx. Inter.
2030 = 185 MW Gas
2033 = 15 MW Battery
2033 = 185 MW Gas
2034 = 100 MW Solar
2034 = 100 MW Tx. Inter.
2037 = 300 MW Battery
2038 = 15 MW Battery

Bridger WY
2023 = 495 MW Solar + 124 MW Battery
2023 = 561 MW Solar

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 222 MW Wind
2030 = 398 MW Wind

Northern UT
2022 = 64 MW Solar + 16 MW Battery
2023 = 195 MW Gas
2023 = 42 MW Solar + 11 MW Battery
2024 = 600 MW Solar + 150 MW Battery
2024 = 600 MW Tx. Inter.
2028 = 150 MW Battery
2036 = 15 MW Battery

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2024 = 154 MW Solar
2031 = 289 MW Solar
2031 = 211 MW Solar + 53 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 480 MW Battery
2038 = 45 MW Battery

Huntington UT
2037 = 901 MW Solar + 225 MW Battery
2038 = 8 MW Solar + 2 MW Battery

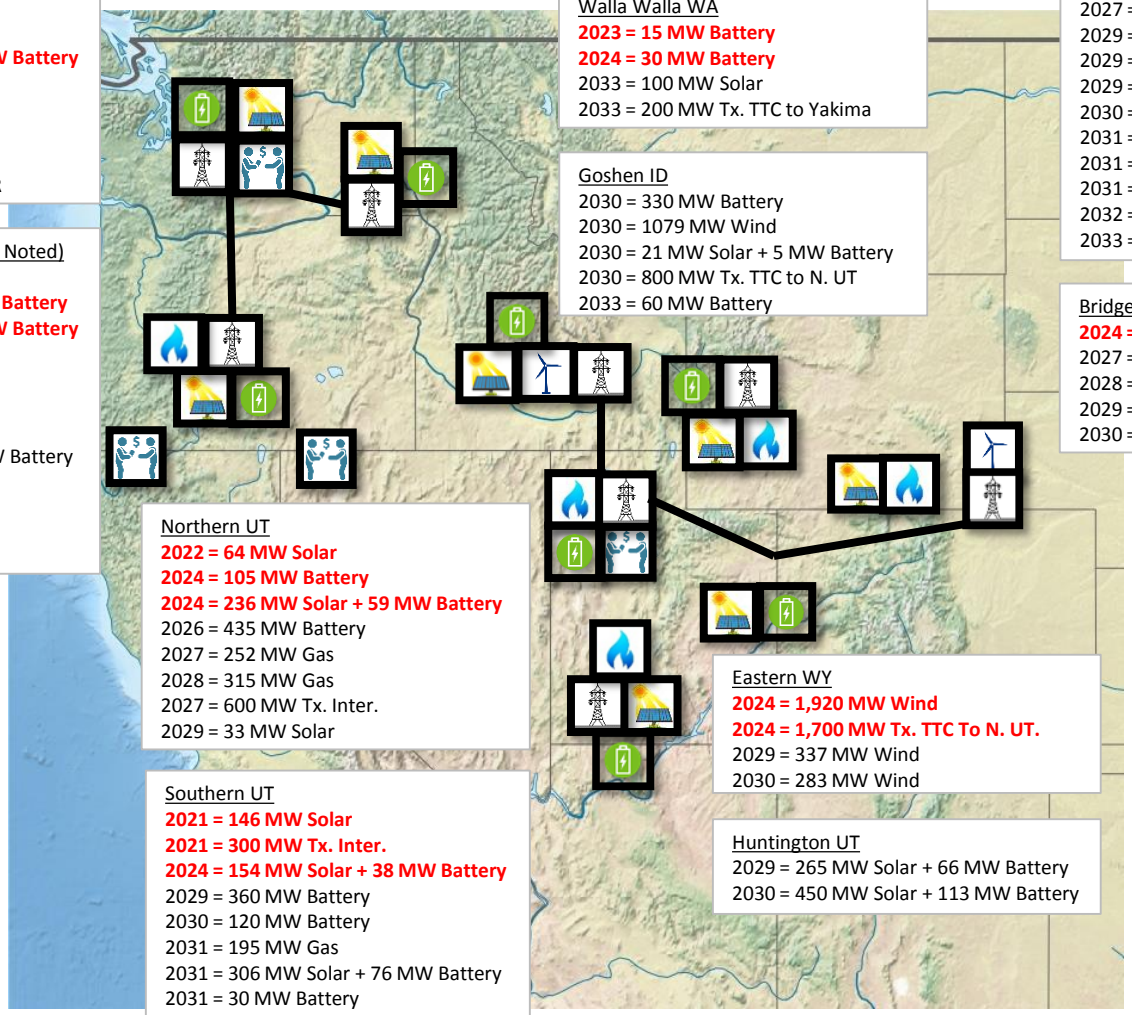
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2022 = JB1-4 (1,415 MW)
2022 = NT1-2 (357 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2032 = GDB1-3 (2032 MW)
2030 = HY1-2 (77 MW)
2036 = HTG1-2 (909 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-15

(P-28 with All Coal Retired by 2030)



Yakima WA
2024 = 105 MW Battery
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2033 = 107 MW Battery
2037 = 2 MW Solar
2037 = 428 MW Solar
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2023 = 45 MW Battery
2024 = 500 MW Solar + 75 MW Battery
2024 = 500 MW Solar + 125 MW Battery
2024 = 45 MW Battery*
2024 = 120 MW Battery**
2029 = 443 MW Gas*
2029 = 615 MW Tx. Inter.*
2031 = 474 MW Solar + 119 MW Battery
2031 = 475 MW Tx. Inter.

*Willamette Valley
**Portland North Coast

Walla Walla WA
2023 = 15 MW Battery
2024 = 30 MW Battery
2033 = 100 MW Solar
2033 = 200 MW Tx. TTC to Yakima

Goshen ID
2030 = 330 MW Battery
2030 = 1079 MW Wind
2030 = 21 MW Solar + 5 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2033 = 60 MW Battery

Western WY/Naughton
2023 = 112 MW Solar
2024 = 156 MW Solar
2027 = 180 MW Battery
2029 = 150 MW Battery
2029 = 370 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 370 MW Gas
2031 = 285 MW Battery
2031 = 100 MW Solar
2031 = 100 MW Tx. Inter.
2032 = 60 MW Battery
2033 = 30 MW Battery

Bridger WY
2024 = 349 MW Solar
2027 = 87 MW Solar
2028 = 487 MW Gas
2029 = 6 MW Solar
2030 = 487 MW Gas

Northern UT
2022 = 64 MW Solar
2024 = 105 MW Battery
2024 = 236 MW Solar + 59 MW Battery
2026 = 435 MW Battery
2027 = 252 MW Gas
2028 = 315 MW Gas
2027 = 600 MW Tx. Inter.
2029 = 33 MW Solar

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC To N. UT.
2029 = 337 MW Wind
2030 = 283 MW Wind

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2024 = 154 MW Solar + 38 MW Battery
2029 = 360 MW Battery
2030 = 120 MW Battery
2031 = 195 MW Gas
2031 = 306 MW Solar + 76 MW Battery
2031 = 30 MW Battery
2031 = 800 MW Tx. Inter.
2033 = 330 MW Battery
2033 = 330 MW Battery
2036 = 400 MW Solar

Huntington UT
2029 = 265 MW Solar + 66 MW Battery
2030 = 450 MW Solar + 113 MW Battery

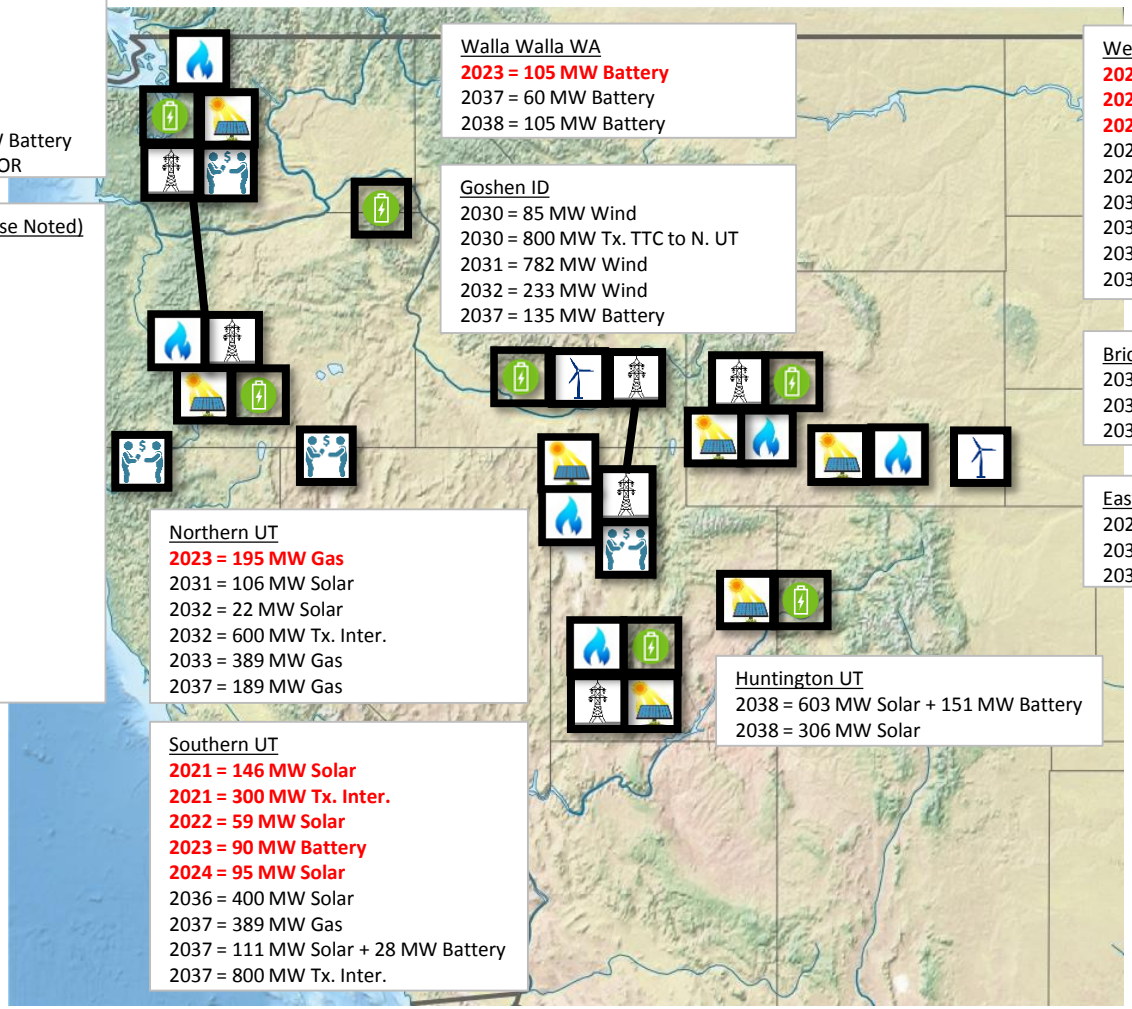
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2022 = NT2 (201 MW)
2023 = CG1-2 (164 MW)
2023 = JB3 (349 MW)
2023 = NT1 (159 MW)
2024 = HY2 (33 MW)
2024 = JB4 (353 MW)
2025 = HY1 (44 MW)
2025 = JB2 (359 MW)
2026 = CS3-4 (148 MW)
2026 = JB1 (354 MW)
2027 = DJ1-4 (762 MW)
2028 = HNT1 (418 MW)
2028 = HTG1 (459 MW)
2029 = HTG2 (450 MW)
2029 = HNT2 (269 MW)
2030 = HNT3 (471 MW)
2032 = GDB1-3 (238 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-16

(P04 with JB2 RET 2037, No CO_2)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2037 = 233 MW Gas
2037 = 120 MW Wind
2037 = 77 MW Solar + 19 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2023 = 135 MW Battery
2023 = 45 MW Battery*
2023 = 45 MW Battery**
2024 = 290 MW Solar
2028 = 210 MW Gas
2035 = 433 MW Solar
2035 = 42 MW Solar
2035 = 11 MW Battery
2035 = 475 MW Tx. Inter.
2037 = 150 MW Battery
2037 = 443 MW Gas*
2037 = 45 MW Battery**
2037 = 615 MW Tx. Inter.*
2038 = 225 MW Battery
2038 = 60 MW Battery**

*Willamette Valley
**Portland North Coast

Walla Walla WA
2023 = 105 MW Battery
2037 = 60 MW Battery
2038 = 105 MW Battery

Goshen ID
2030 = 85 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 782 MW Wind
2032 = 233 MW Wind
2037 = 135 MW Battery

Northern UT
2023 = 195 MW Gas
2031 = 106 MW Solar
2032 = 22 MW Solar
2032 = 600 MW Tx. Inter.
2033 = 389 MW Gas
2037 = 189 MW Gas

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 90 MW Battery
2024 = 95 MW Solar
2036 = 400 MW Solar
2037 = 389 MW Gas
2037 = 111 MW Solar + 28 MW Battery
2037 = 800 MW Tx. Inter.

Huntington UT
2038 = 603 MW Solar + 151 MW Battery
2038 = 306 MW Solar

Western WY/Naughton
2023 = 73 MW Solar
2023 = 135 MW Battery
2024 = 564 MW Solar
2028 = 370 MW Gas
2028 = 500 MW Tx. Inter.
2037 = 210 MW Battery
2037 = 100 MW Solar
2037 = 100 MW Tx. Inter.
2038 = 270 MW Battery

Bridger WY
2038 = 848 MW Gas
2038 = 126 MW Gas
2038 = 82 MW Solar

Eastern WY
2029 = 157 MW Wind
2030 = 436 MW Wind
2031 = 27 MW Wind

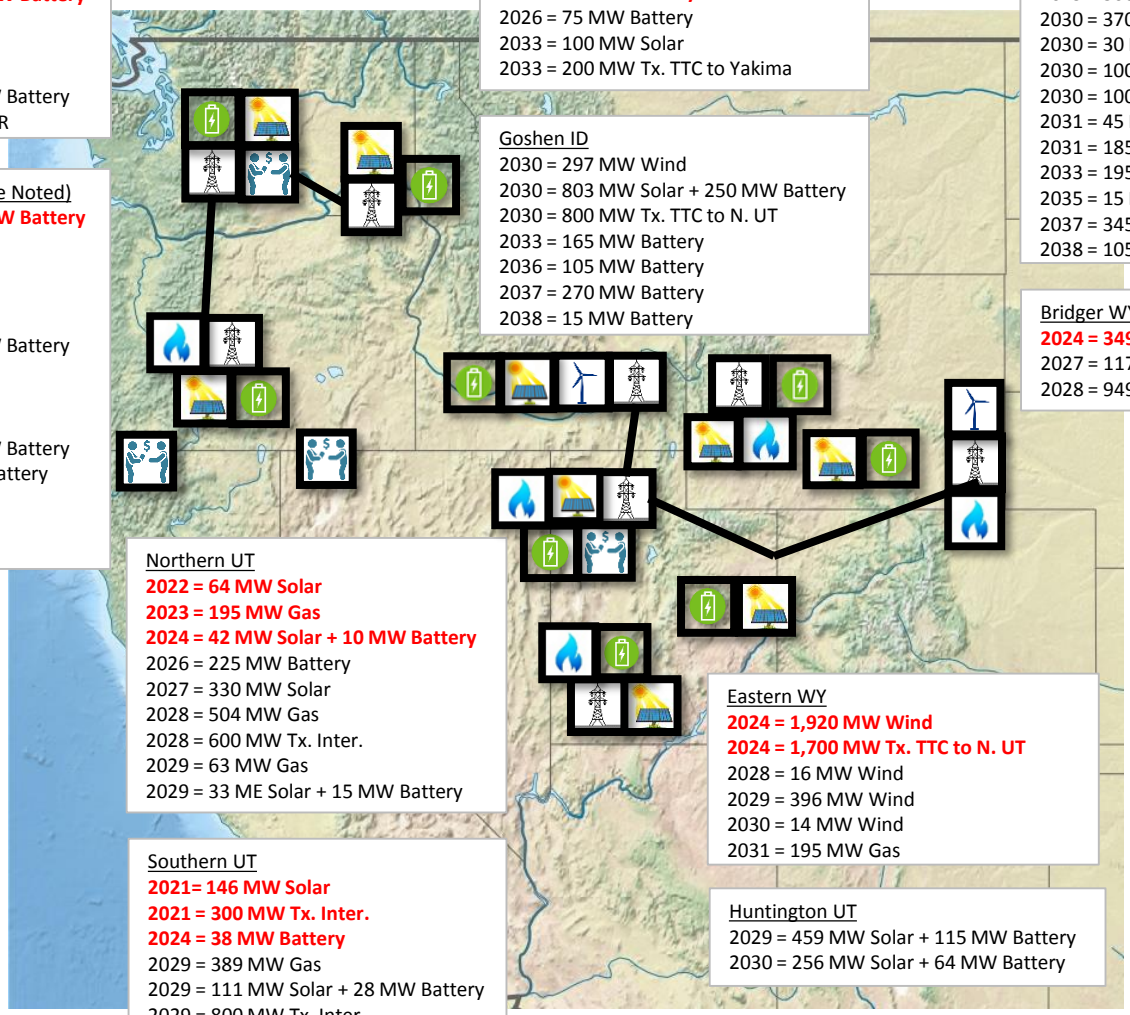
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2022 = NT1-2 (357 MW)
2022 = JB1-2 (713 MW)
2025 = CG1 (82 MW)
2027 = DJ1-4 (762 MW)
2030 = HY1-2 (77 MW)
2032 = GDB (238 MW)
2034 = CG2 (82 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-17

(P-15 with High CO_2)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2026 = 105 MW Battery
2037 = 42 MW Solar
2037 = 388 MW Solar + 97 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2025 = 75 MW Battery
2025 = 30 MW Battery*
2026 = 90 MW Battery
2026 = 45 MW Battery*
2030 = 206 MW Solar + 52 MW Battery
2030 = 475 MW Tx. Inter.
2031 = 221 MW Gas*
2031 = 615 MW Tx. Inter.*
2031 = 248 MW Solar + 62 MW Battery
2032 = 21 MW Solar + 5 MW Battery

*Willamette Valley
**Portland North Coast

Walla Walla WA
2025 = 90 MW Battery
2026 = 75 MW Battery
2033 = 100 MW Solar
2033 = 200 MW Tx. TTC to Yakima

Goshen ID
2030 = 297 MW Wind
2030 = 803 MW Solar + 250 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2033 = 165 MW Battery
2036 = 105 MW Battery
2037 = 270 MW Battery
2038 = 15 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2023 = 112 MW Solar
2024 = 156 MW Solar
2029 = 185 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 370 MW Gas
2030 = 30 MW Battery
2030 = 100 MW Solar
2030 = 100 MW Tx. Inter.
2031 = 45 MW Battery
2031 = 185 MW Gas
2033 = 195 MW Battery
2035 = 15 MW Battery
2037 = 345 MW Battery
2038 = 105 MW Battery

Bridger WY
2024 = 349 MW Solar + 87 MW Battery
2027 = 117 MW Solar + 13 MW Battery
2028 = 949 MW Solar + 237 MW Battery

Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2022 = NT2 (201 MW)
2023 = CG1-2 (164 MW)
2023 = JB3 (349 MW)
2023 = NT1 (156 MW)
2024 = HY2 (33 MW)
2024 = JB4 (353 MW)
2025 = HY1 (44 MW)
2025 = JB2 (359 MW)
2026 = CG2 (82 MW)
2026 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2026 = JB1 (354 MW)
2028 = HNT1 (418 MW)
2028 = HTG1 (459 MW)
2029 = HTG2 (450 MW)
2029 = HNT2 (269 MW)
2030 = HNT3 (471 MW)
2032 = GDB1-3 (238 MW)

Northern UT
2022 = 64 MW Solar
2023 = 195 MW Gas
2024 = 42 MW Solar + 10 MW Battery
2026 = 225 MW Battery
2027 = 330 MW Solar
2028 = 504 MW Gas
2028 = 600 MW Tx. Inter.
2029 = 63 MW Gas
2029 = 33 ME Solar + 15 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 16 MW Wind
2029 = 396 MW Wind
2030 = 14 MW Wind
2031 = 195 MW Gas

Huntington UT
2029 = 459 MW Solar + 115 MW Battery
2030 = 256 MW Solar + 64 MW Battery

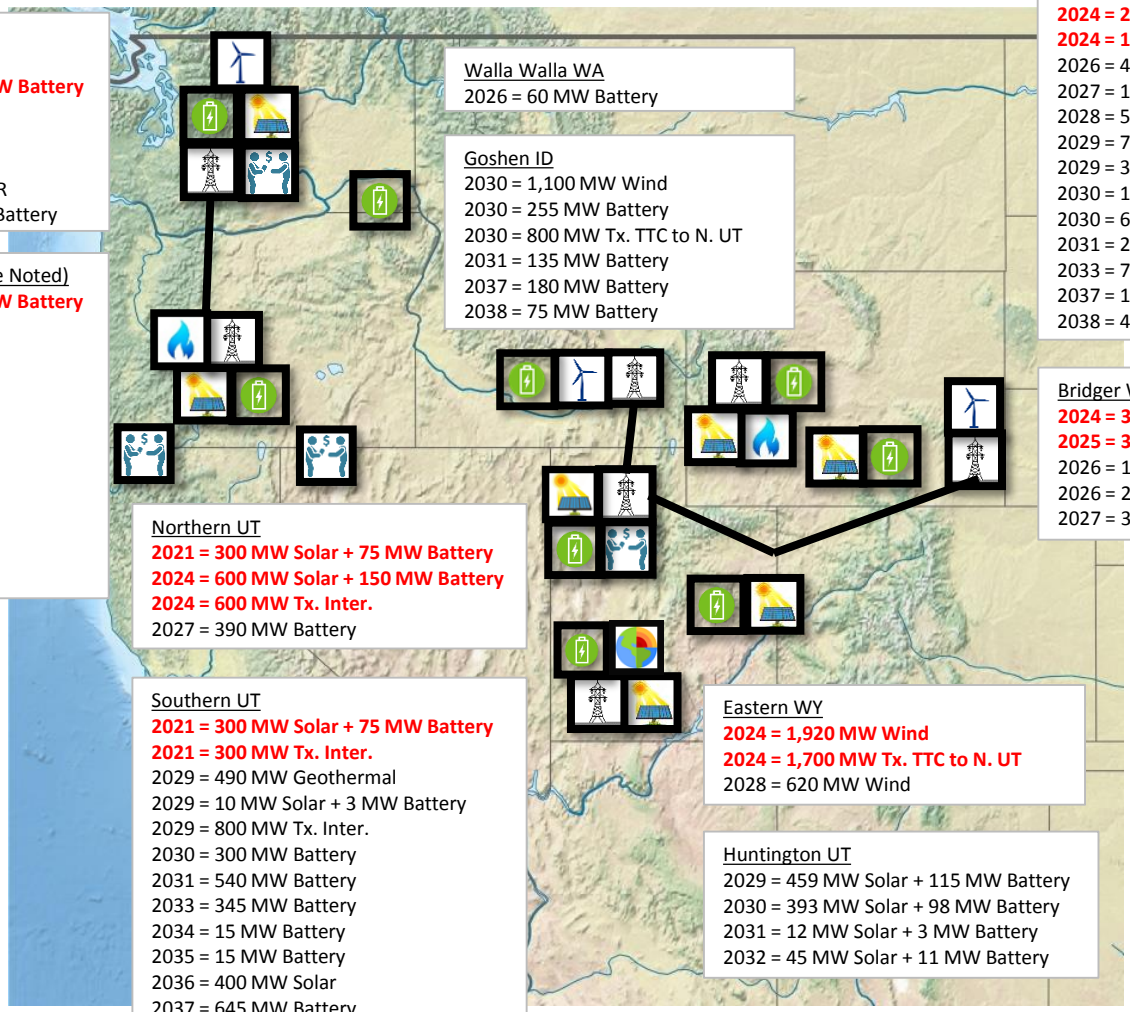
Southern UT
2021= 146 MW Solar
2021 = 300 MW Tx. Inter.
2024 = 38 MW Battery
2029 = 389 MW Gas
2029 = 111 MW Solar + 28 MW Battery
2029 = 800 MW Tx. Inter.
2033 = 15 MW Battery
2036 = 400 MW Solar
2037 = 405 MW Battery

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-18

(P-15, Social Cost of Carbon)



Yakima WA
2024 = 60 MW Battery
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2026 = 45 MW Battery
2030 = 333 MW Wind
2030 = 450 MW Tx. TTC to S. OR
2031 = 97 MW Solar + 24 MW Battery

Southern OR (Unless Otherwise Noted)
2024 = 975 MW Solar + 244 MW Battery
2024 = 15 MW Battery*
2025 = 475 MW Tx. Inter.
2026 = 180 MW Battery
2026 = 45 MW Battery*
2026 = 60 MW Battery**
2028 = 221 MW Gas*
2028 = 615 MW Tx. Inter.*
2037 = 221 MW Gas*

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2026 = 60 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 255 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2031 = 135 MW Battery
2037 = 180 MW Battery
2038 = 75 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2023 = 201 MW Solar
2024 = 256 MW Solar
2024 = 100 MW Tx. Inter.
2026 = 45 MW Battery
2027 = 15 MW Battery
2028 = 500 MW Tx. Inter.
2029 = 75 MW Battery
2029 = 370 MW Gas
2030 = 185 MW Gas
2030 = 60 MW Battery
2031 = 255 MW Battery
2033 = 75 MW Battery
2037 = 120 MW Battery
2038 = 45 MW Battery

Bridger WY
2024 = 349 MW Solar + 87 MW Battery
2025 = 353 MW Solar
2026 = 147 MW Solar
2026 = 212 MW Solar + 53 MW Battery
2027 = 354 MW Solar + 88 MW Battery

Northern UT
2021 = 300 MW Solar + 75 MW Battery
2024 = 600 MW Solar + 150 MW Battery
2024 = 600 MW Tx. Inter.
2027 = 390 MW Battery

Southern UT
2021 = 300 MW Solar + 75 MW Battery
2021 = 300 MW Tx. Inter.
2029 = 490 MW Geothermal
2029 = 10 MW Solar + 3 MW Battery
2029 = 800 MW Tx. Inter.
2030 = 300 MW Battery
2031 = 540 MW Battery
2033 = 345 MW Battery
2034 = 15 MW Battery
2035 = 15 MW Battery
2036 = 400 MW Solar
2037 = 645 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 620 MW Wind

Huntington UT
2029 = 459 MW Solar + 115 MW Battery
2030 = 393 MW Solar + 98 MW Battery
2031 = 12 MW Solar + 3 MW Battery
2032 = 45 MW Solar + 11 MW Battery

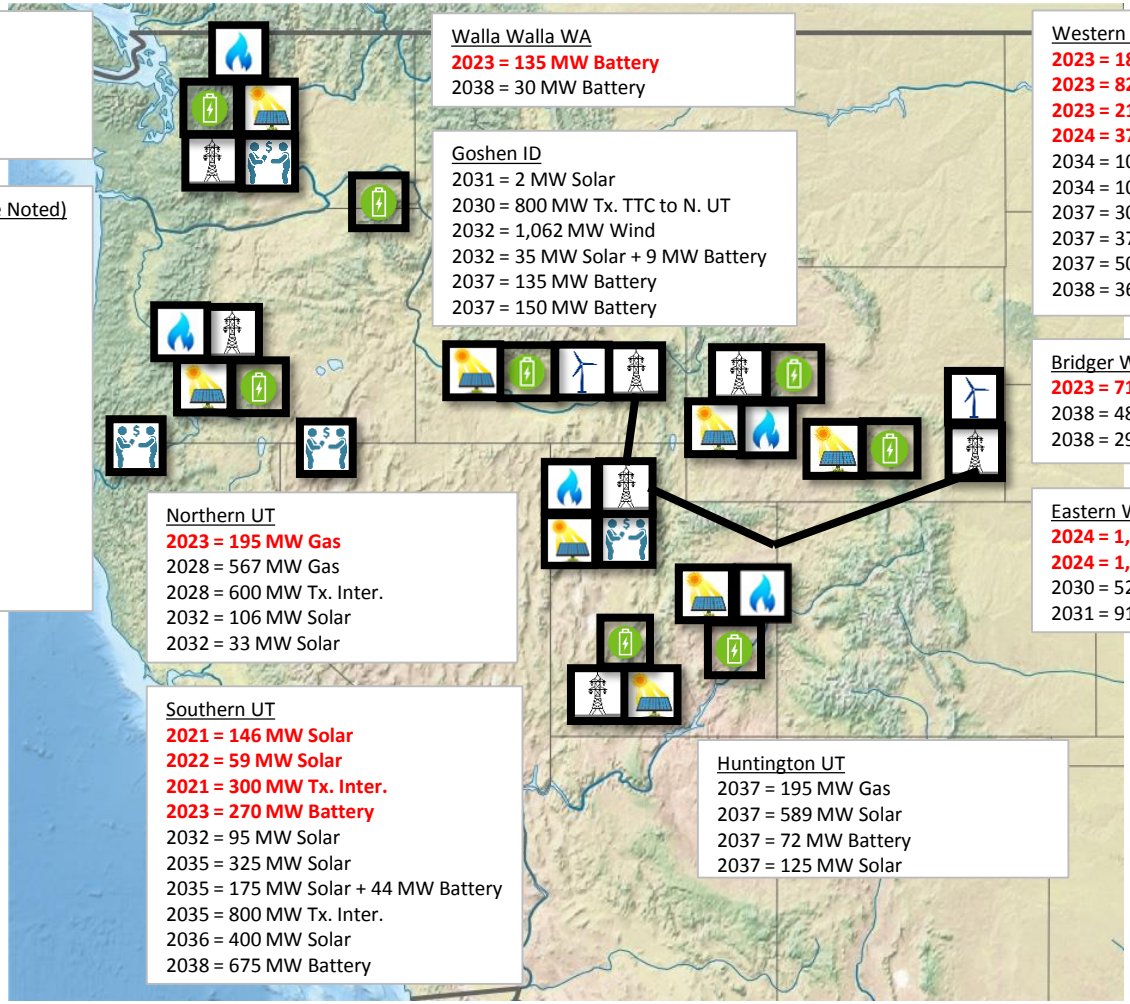
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2022 = NT2 (201 MW)
2023 = CG1-2 (164 MW)
2023 = JB3 (349 MW)
2023 = NT1 (156 MW)
2024 = HY2 (33 MW)
2024 = JB4 (353 MW)
2025 = HY1 (44 MW)
2025 = JB2 (359 MW)
2026 = CG2 (82 MW)
2026 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2026 = JB1 (354 MW)
2028 = HNT1 (418 MW)
2028 = HTG1 (459 MW)
2029 = HTG2 (450 MW)
2029 = HNT2 (269 MW)
2030 = HNT3 (471 MW)
2032 = GDB1-3 (238 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-19

(P-05, with Gadsby 1-3 Retired 2020, Low Gas)



Yakima WA
2023 = 90 MW Battery
2024 = 405 MW Tx. Inter.
2037 = 233 MW Gas
2038 = 172 MW Solar

Southern OR (Unless Otherwise Noted)
2023 = 15 MW Battery
2023 = 90 MW Battery*
2023 = 90 MW Battery**
2028 = 210 MW Gas
2033 = 210 MW Gas
2037 = 136 MW Solar
2037 = 221 MW Gas*
2037 = 419 MW Gas
2037 = 475 MW Tx. Inter.
2037 = 615 MW Tx. Inter.*
2038 = 221 MW Gas*
2038 = 135 MW Battery**

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2023 = 135 MW Battery
2038 = 30 MW Battery

Goshen ID
2031 = 2 MW Solar
2030 = 800 MW Tx. TTC to N. UT
2032 = 1,062 MW Wind
2032 = 35 MW Solar + 9 MW Battery
2037 = 135 MW Battery
2037 = 150 MW Battery

Northern UT
2023 = 195 MW Gas
2028 = 567 MW Gas
2028 = 600 MW Tx. Inter.
2032 = 106 MW Solar
2032 = 33 MW Solar

Southern UT
2021 = 146 MW Solar
2022 = 59 MW Solar
2021 = 300 MW Tx. Inter.
2023 = 270 MW Battery
2032 = 95 MW Solar
2035 = 325 MW Solar
2035 = 175 MW Solar + 44 MW Battery
2035 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2038 = 675 MW Battery

Huntington UT
2037 = 195 MW Gas
2037 = 589 MW Solar
2037 = 72 MW Battery
2037 = 125 MW Solar

Western WY/Naughton
2023 = 185 MW Gas Conv.
2023 = 82 MW Solar
2023 = 210 MW Battery
2024 = 370 MW Solar
2034 = 100 MW Solar
2034 = 100 MW Tx. Inter.
2037 = 30 MW Battery
2037 = 370 MW Gas
2037 = 500 MW Tx. Inter.
2038 = 360 MW Battery

Bridger WY
2023 = 713 MW Solar
2038 = 48 MW Solar
2038 = 295 MW Solar + 74 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2030 = 529 MW Wind
2031 = 91 MW Wind

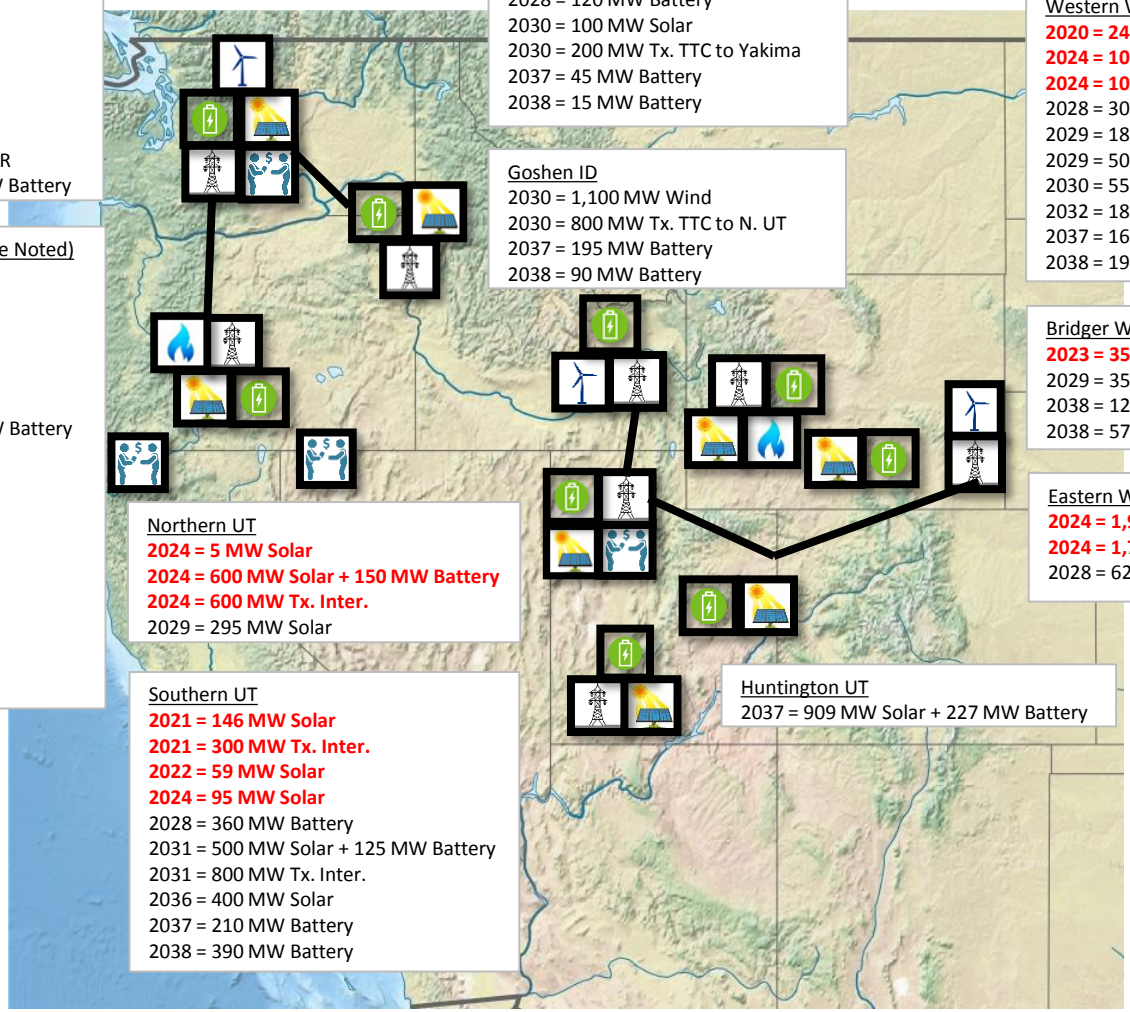
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2020 = GDB1-3 (238 MW)
2022 = JB1-2 (713 MW)
2022 = NT1-2 (357 MW)
2025 = CG1 (82 MW)
2027 = DJ1-4 (762 MW)
2030 = HY1-2 (77 MW)
2032 = JB2 (356 MW)
2034 = CG2 (82 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

Solar
Wind
Battery
Geothermal
Pumped Hydro
Gas
Market
Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-20

(P-07, High Gas)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2032 = 48 MW Wind
2032 = 282 MW Solar
2032 = 450 MW Tx.TTC to S. OR
2033 = 100 MW Solar + 25 MW Battery

Southern OR (Unless Otherwise Noted)
2023 = 225 MW Battery
2023 = 150 MW Battery*
2023 = 30 MW Battery**
2024 = 500 MW Solar
2028 = 15 MW Battery
2030 = 280 MW Solar
2030 = 195 MW Solar + 49 MW Battery
2030 = 475 MW Tx. Inter.
2037 = 443 MW Gas*
2037 = 150 MW Battery
2037 = 615 MW Tx. Inter.*
2038 = 360 MW Battery
2038 = 60 MW Battery*
2038 = 150 MW Battery**

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2028 = 120 MW Battery
2030 = 100 MW Solar
2030 = 200 MW Tx. TTC to Yakima
2037 = 45 MW Battery
2038 = 15 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2037 = 195 MW Battery
2038 = 90 MW Battery

Northern UT
2024 = 5 MW Solar
2024 = 600 MW Solar + 150 MW Battery
2024 = 600 MW Tx. Inter.
2029 = 295 MW Solar

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2024 = 95 MW Solar
2028 = 360 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 210 MW Battery
2038 = 390 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 30 MW Battery
2029 = 185 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 555 MW Gas
2032 = 185 MW Gas
2037 = 165 MW Battery
2038 = 195 MW Battery

Bridger WY
2023 = 354 MW Solar
2029 = 359 MW Solar
2038 = 122 MW Solar
2038 = 579 MW Solar + 145 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 620 MW Wind

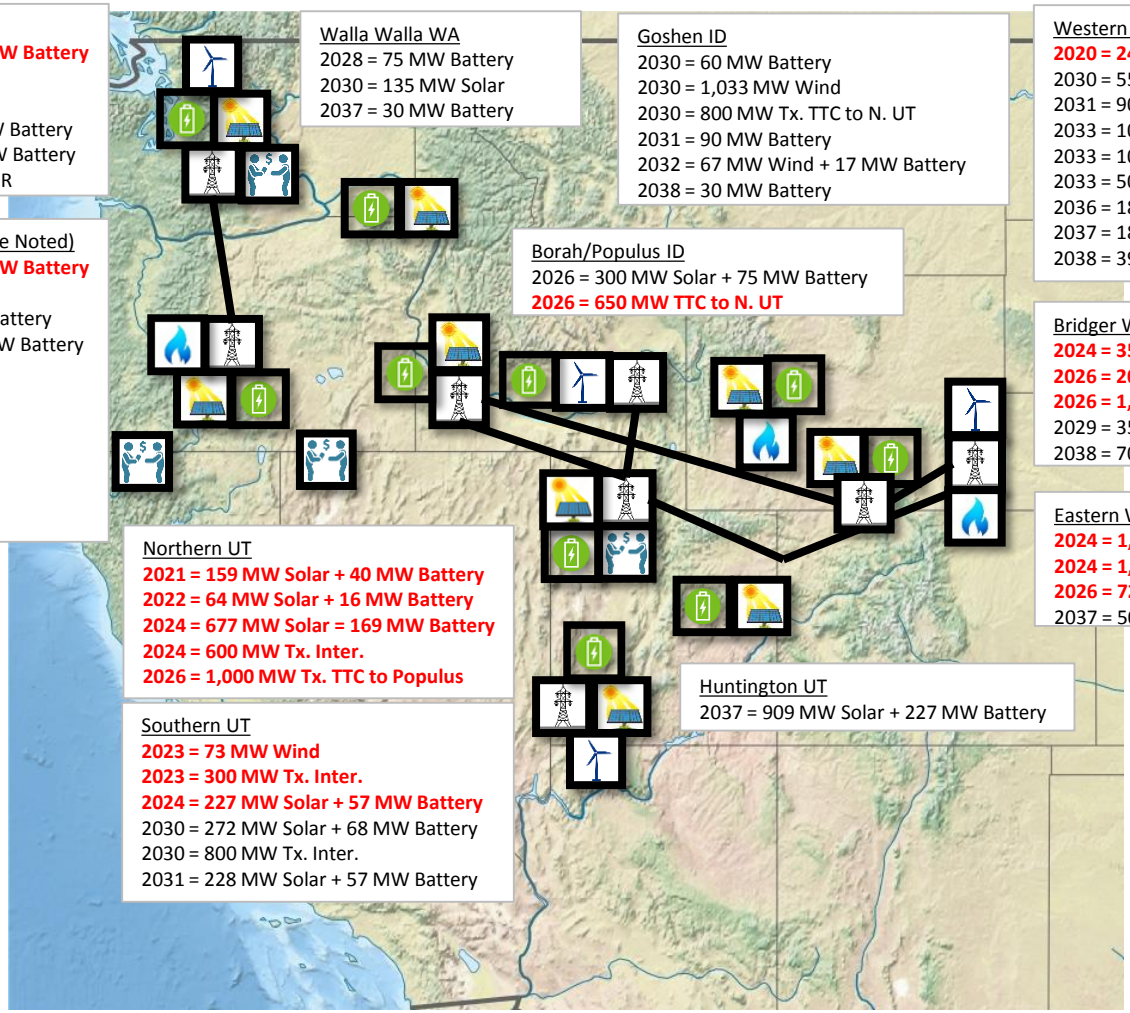
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2020 = GDB1-3 (238 MW)
2022 = JB1 (354 MW)
2025 = CG1-2 (164 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-22

(P-45CNW, Energy Gateway Segment D.3)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2037 = 132 MW Solar + 33 MW Battery
2037 = 298 MW Wind + 75 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 463 MW Solar + 116 MW Battery
2030 = 210 MW Battery**
2032 = 37 MW Solar + 9 MW Battery
2033 = 475 MW Solar + 119 MW Battery
2033 = 475 MW Tx. Inter.
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*
2038 = 165 MW Battery

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2028 = 75 MW Battery
2030 = 135 MW Solar
2037 = 30 MW Battery

Goshen ID
2030 = 60 MW Battery
2030 = 1,033 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 90 MW Battery
2032 = 67 MW Wind + 17 MW Battery
2038 = 30 MW Battery

Borah/Populus ID
2026 = 300 MW Solar + 75 MW Battery
2026 = 650 MW TTC to N. UT

Western WY/Naughton
2020 = 247 MW Gas Conv.
2030 = 555 MW Gas
2031 = 90 MW Battery
2033 = 100 MW Solar + 25 MW Battery
2033 = 100 MW Tx. Inter.
2033 = 500 MW Tx. Inter.
2036 = 185 MW Gas
2037 = 185 MW Gas
2038 = 390 MW Battery

Bridger WY
2024 = 354 MW Solar + 89 MW Battery
2026 = 200 MW Wind
2026 = 1,621 TTC to Populus
2029 = 359 MW Wind
2038 = 702 MW Solar + 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2026 = 728 MW Tx. TTC to Bridger
2037 = 505 MW Gas CCCT.

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar = 169 MW Battery
2024 = 600 MW Tx. Inter.
2026 = 1,000 MW Tx. TTC to Populus

Southern UT
2023 = 73 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 227 MW Solar + 57 MW Battery
2030 = 272 MW Solar + 68 MW Battery
2030 = 800 MW Tx. Inter.
2031 = 228 MW Solar + 57 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

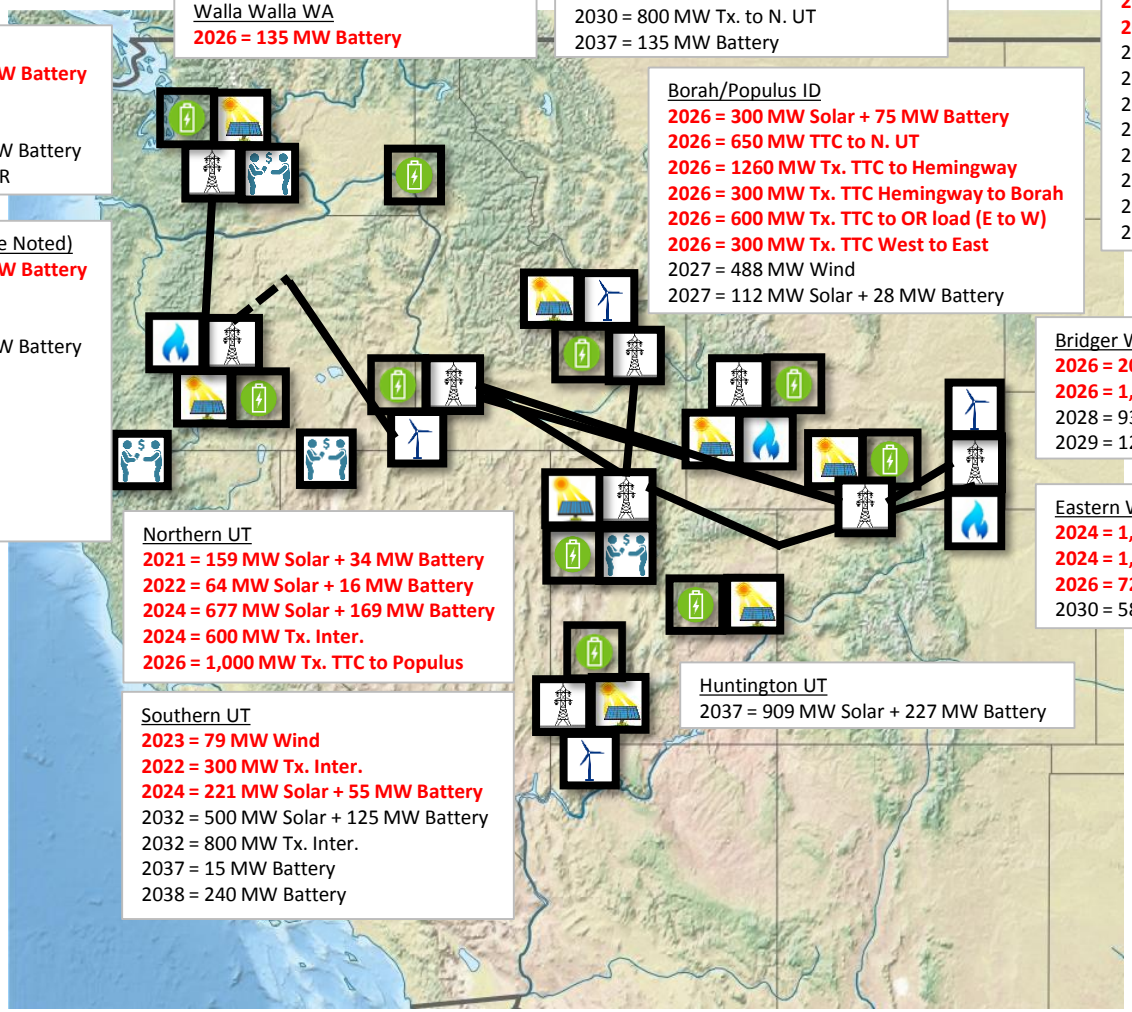
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-23

(P-45CNW, Energy Gateway Segments D.3, E and H)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2026 = 105 MW Battery
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Walla Walla WA
2026 = 135 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. to N. UT
2037 = 135 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2028 = 185 MW Gas
2028 = 500 MW Tx. Inter.
2029 = 185 MW Gas
2030 = 370 MW Gas
2031 = 68 MW Solar + 17 MW Battery
2031 = 100 MW Tx. Inter.
2033 = 32 MW Solar + 8 MW Battery
2038 = 15 MW Battery

Borah/Populus ID
2026 = 300 MW Solar + 75 MW Battery
2026 = 650 MW TTC to N. UT
2026 = 1260 MW Tx. TTC to Hemingway
2026 = 300 MW Tx. TTC Hemingway to Borah
2026 = 600 MW Tx. TTC to OR load (E to W)
2026 = 300 MW Tx. TTC West to East
2027 = 488 MW Wind
2027 = 112 MW Solar + 28 MW Battery

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2026 = 270 MW Battery
2026 = 120 MW Battery**
2032 = 475 MW Solar + 119 MW Battery
2032 = 475 MW Tx. Inter.
2037 = 165 MW Battery
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*

**Willamette Valley*
***Portland North Coast*

Bridger WY
2026 = 200 MW Solar + 50 MW Battery
2026 = 1,621 TTC to Populus
2028 = 931 MW Solar + 233 MW Battery
2029 = 125 MW Solar + 31 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. to N. UT
2026 = 728 MW TTC to Bridger
2030 = 584 MW Gas

Northern UT
2021 = 159 MW Solar + 34 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar + 169 MW Battery
2024 = 600 MW Tx. Inter.
2026 = 1,000 MW Tx. TTC to Populus

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Southern UT
2023 = 79 MW Wind
2022 = 300 MW Tx. Inter.
2024 = 221 MW Solar + 55 MW Battery
2032 = 500 MW Solar + 125 MW Battery
2032 = 800 MW Tx. Inter.
2037 = 15 MW Battery
2038 = 240 MW Battery

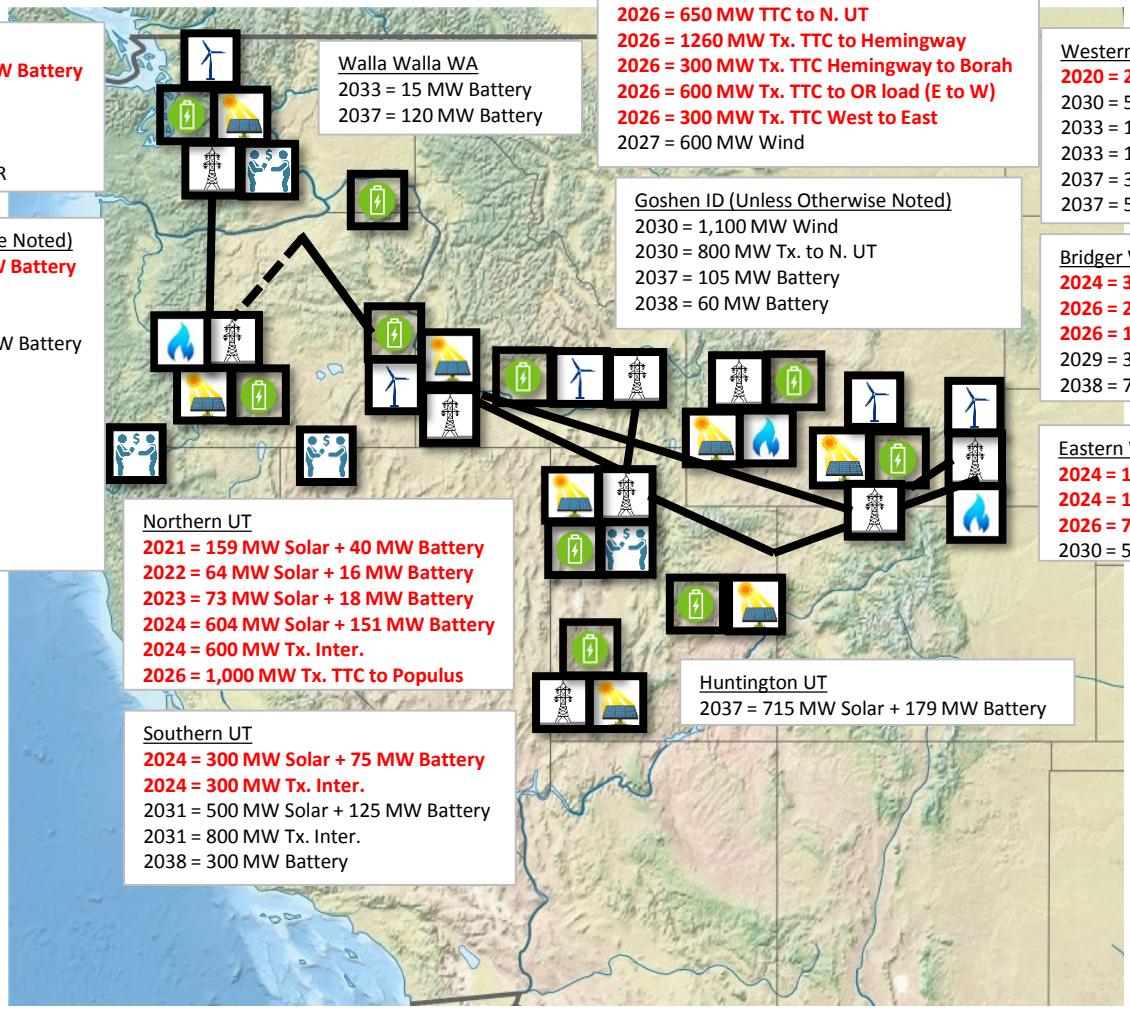
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-25

(P-45CNW, Energy Gateway Segments D.3, E and H)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2038 = 430 MW Wind
2038 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 309 MW Solar + 77 MW Battery
2028 = 15 MW Battery*
2030 = 45 MW Battery**
2032 = 538 MW Solar + 135 MW Battery
2033 = 15 MW Battery**
2033 = 475 MW Tx. Inter.
2037 = 443 MW Gas*
2037 = 30 MW Battery**
2037 = 615 MW Tx. Inter.*

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2033 = 15 MW Battery
2037 = 120 MW Battery

Borah/Populus ID
2026 = 76 MW Wind
2026 = 224 MW Solar = 56 MW Battery
2026 = 650 MW TTC to N. UT
2026 = 1260 MW Tx. TTC to Hemingway
2026 = 300 MW Tx. TTC Hemingway to Borah
2026 = 600 MW Tx. TTC to OR load (E to W)
2026 = 300 MW Tx. TTC West to East
2027 = 600 MW Wind

Goshen ID (Unless Otherwise Noted)
2030 = 1,100 MW Wind
2030 = 800 MW Tx. to N. UT
2037 = 105 MW Battery
2038 = 60 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv
2030 = 555 MW Gas
2033 = 100 MW Solar + 25 MW Battery
2033 = 100 MW Tx. Inter.
2037 = 370 MW Gas
2037 = 500 MW Tx. Inter.

Bridger WY
2024 = 354 MW Solar + 89 MW Battery
2026 = 200 MW Wind
2026 = 1,621 MW Tx. TTC to Populus
2029 = 359 MW Wind
2038 = 702 MW Solar + 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2026 = 728 MW Tx. TTC to Bridger
2030 = 584 MW Gas

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2023 = 73 MW Solar + 18 MW Battery
2024 = 604 MW Solar + 151 MW Battery
2024 = 600 MW Tx. Inter.
2026 = 1,000 MW Tx. TTC to Populus

Southern UT
2024 = 300 MW Solar + 75 MW Battery
2024 = 300 MW Tx. Inter.
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2038 = 300 MW Battery

Huntington UT
2037 = 715 MW Solar + 179 MW Battery

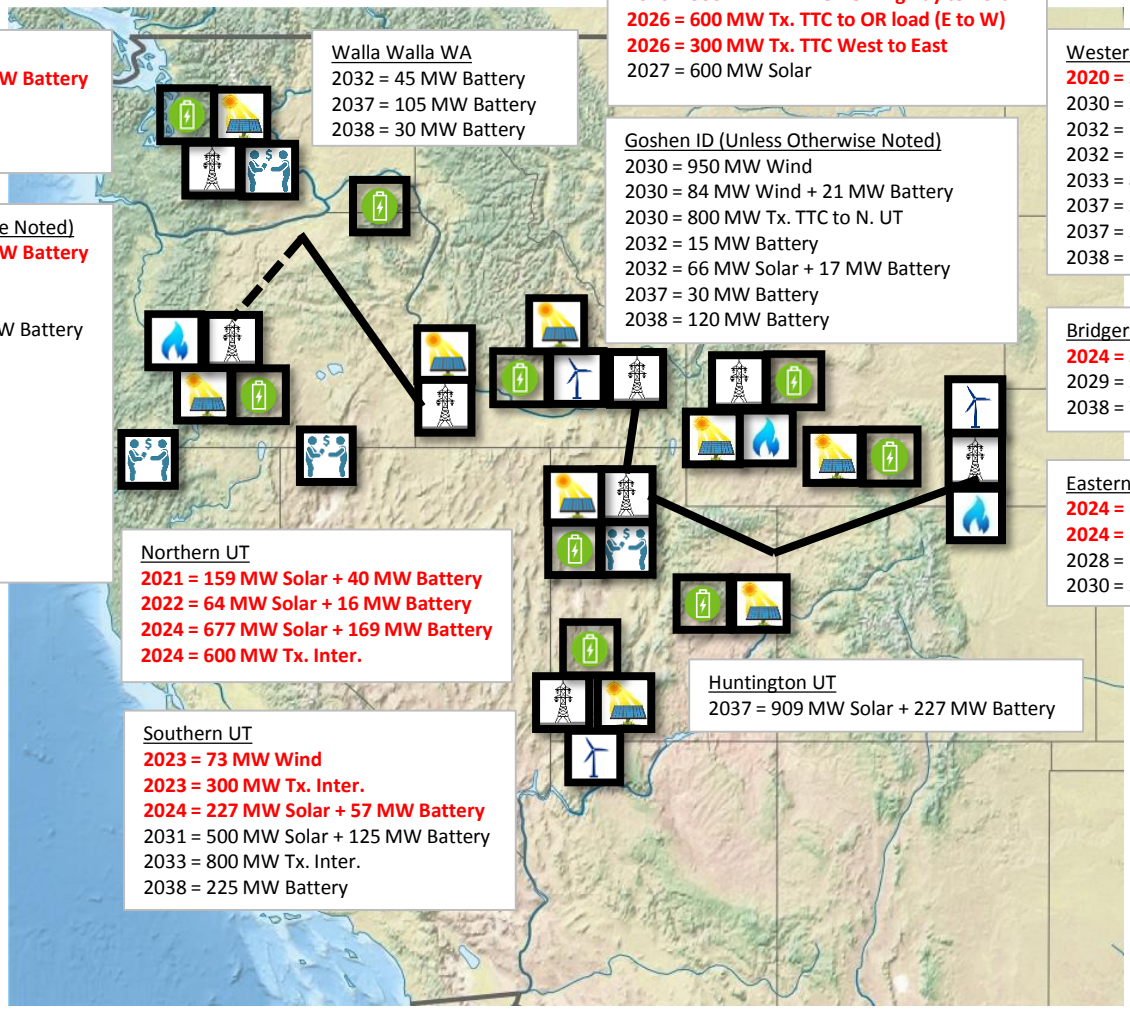
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-26

(P-45CNW, Energy Gateway Segment H)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2030 = 15 MW Battery
2031 = 90 MW Battery

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2031 = 90 MW Battery**
2033 = 180 MW Battery
2033 = 475 MW Solar + 119 MW Battery
2033 = 475 MW Tx. Inter.
2037 = 210 MW Battery
2037 = 443 MW Gas*
2037 = 15 MW Battery**
2037 = 615 MW Tx. Inter.*
2038 = 90 MW Battery

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2032 = 45 MW Battery
2037 = 105 MW Battery
2038 = 30 MW Battery

Borah/Populus ID
2026 = 1,260 MW Tx. TTC to Hemingway
2026 = 300 MW Tx. TTC Hemingway to Borah
2026 = 600 MW Tx. TTC to OR load (E to W)
2026 = 300 MW Tx. TTC West to East
2027 = 600 MW Solar

Goshen ID (Unless Otherwise Noted)
2030 = 950 MW Wind
2030 = 84 MW Wind + 21 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2032 = 15 MW Battery
2032 = 66 MW Solar + 17 MW Battery
2037 = 30 MW Battery
2038 = 120 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2030 = 555 MW Gas
2032 = 17 MW Solar = 4 MW Battery
2032 = 100 MW Tx. Inter.
2033 = 83 MW Solar + 21 MW Battery
2037 = 370 MW Gas
2037 = 500 MW Tx. Inter.
2038 = 105 MW Battery

Bridger WY
2024 = 354 MW Solar + 89 MW Battery
2029 = 359 MW Solar + 90 MW Battery
2038 = 702 MW Solar + 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 195 MW Gas
2030 = 389 MW Gas

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar + 169 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2023 = 73 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 227 MW Solar + 57 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2033 = 800 MW Tx. Inter.
2038 = 225 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

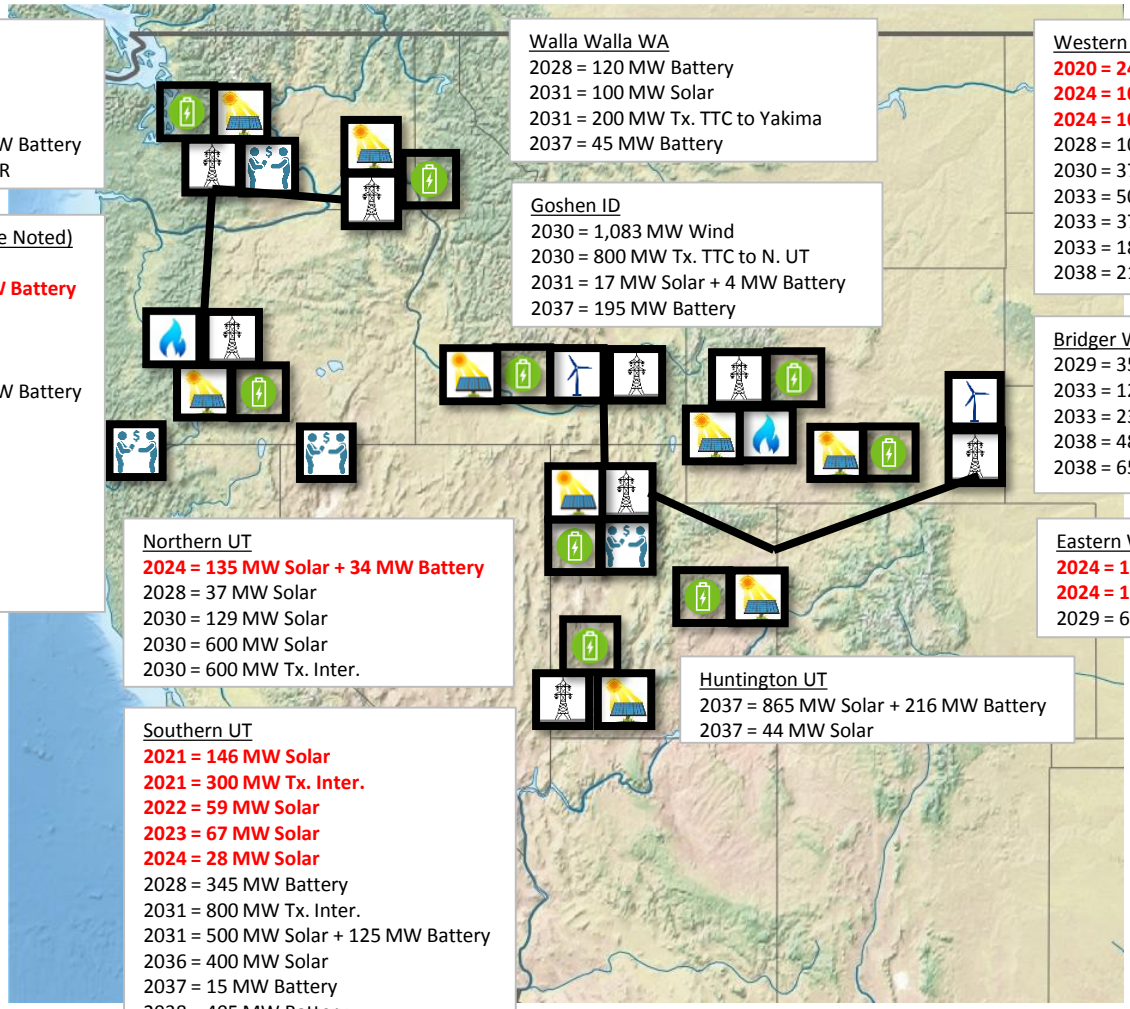
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-28

(P-11 with Colstrip 3-4 Accelerated to 2025)



Yakima WA
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 228 MW Solar
2024 = 272 MW Solar + 68 MW Battery
2028 = 120 MW Battery*
2028 = 165 MW Battery
2028 = 75 MW Battery**
2033 = 475 MW Solar + 119 MW Battery
2033 = 475 MW Tx. Inter.
2037 = 375 MW Battery
2037 = 443 MW Gas*
2037 = 30 MW Battery**
2037 = 615 MW Tx. Inter.*

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2028 = 120 MW Battery
2031 = 100 MW Solar
2031 = 200 MW Tx. TTC to Yakima
2037 = 45 MW Battery

Goshen ID
2030 = 1,083 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 17 MW Solar + 4 MW Battery
2037 = 195 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 105 MW Battery
2030 = 370 MW Gas
2033 = 500 MW Tx. Inter.
2033 = 370 MW Gas
2033 = 185 MW Gas
2038 = 210 MW Battery

Bridger WY
2029 = 354 MW Solar
2033 = 123 MW Solar
2033 = 236 MW Solar + 59 MW Battery
2038 = 48 MW Solar
2038 = 654 MW Solar + 164 MW Battery

Northern UT
2024 = 135 MW Solar + 34 MW Battery
2028 = 37 MW Solar
2030 = 129 MW Solar
2030 = 600 MW Solar
2030 = 600 MW Tx. Inter.

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Huntington UT
2037 = 865 MW Solar + 216 MW Battery
2037 = 44 MW Solar

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 28 MW Solar
2028 = 345 MW Battery
2031 = 800 MW Tx. Inter.
2031 = 500 MW Solar + 125 MW Battery
2036 = 400 MW Solar
2037 = 15 MW Battery
2038 = 405 MW Battery

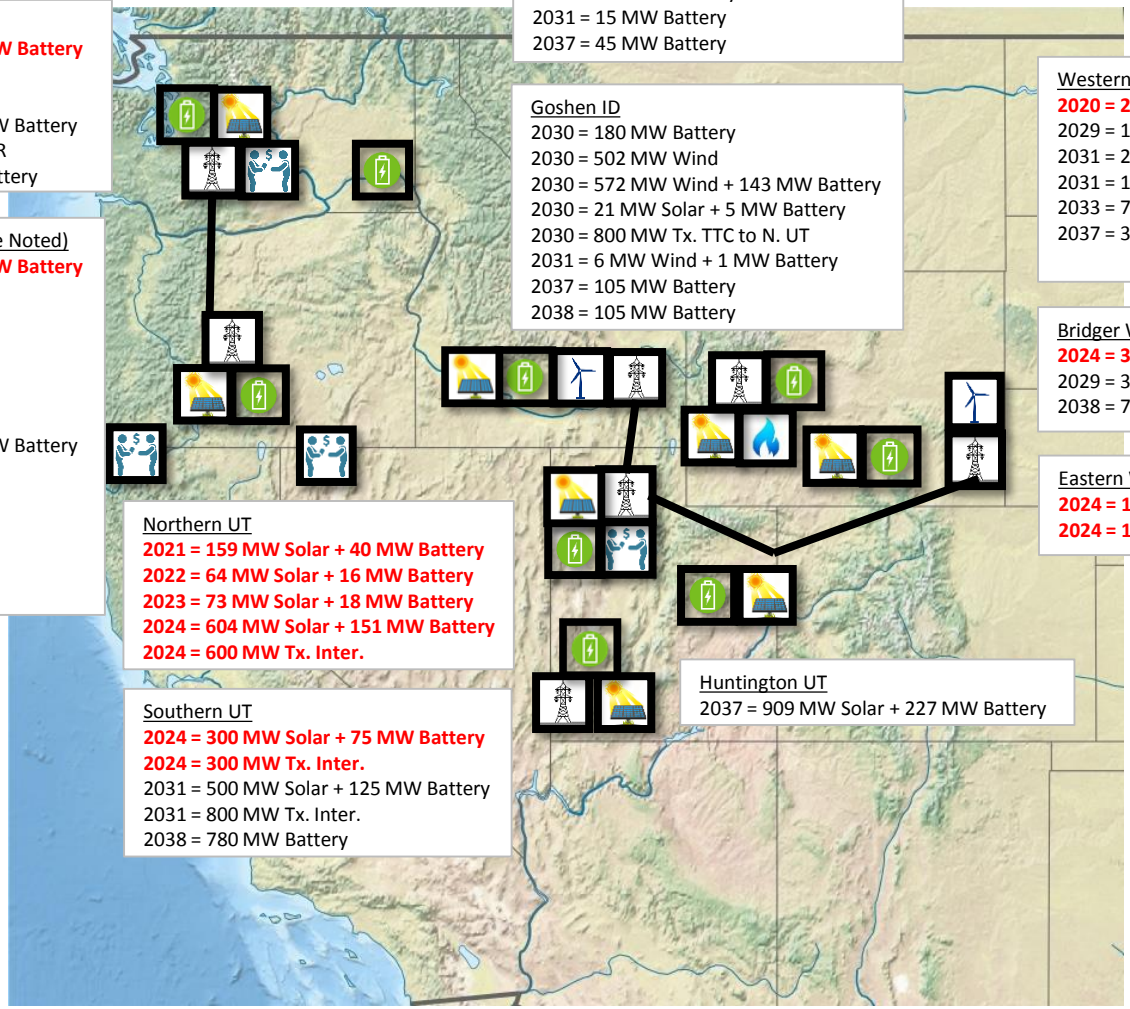
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CS3-4 (148 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2032 = JB2 (359 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-29

(P-45CNW, No New Gas Option)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2033 = 425 MW Solar + 106 MW Battery
2033 = 450 MW Tx. TTC to S. OR
2037 = 5 MW Wind + 1 MW Battery

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2029 = 165 MW Battery
2029 = 75 MW Battery**
2029 = 135 MW Battery*
2030 = 15 MW Battery
2031 = 165 MW Battery
2032 = 15 MW Battery
2032 = 475 MW Solar + 119 MW Battery
2032 = 475 MW Tx. Inter.
2037 = 30 MW Battery
2037 = 30 MW Battery**

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2028 = 105 MW Battery
2031 = 15 MW Battery
2037 = 45 MW Battery

Goshen ID
2030 = 180 MW Battery
2030 = 502 MW Wind
2030 = 572 MW Wind + 143 MW Battery
2030 = 21 MW Solar + 5 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2031 = 6 MW Wind + 1 MW Battery
2037 = 105 MW Battery
2038 = 105 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv*
2029 = 120 MW Battery*
2031 = 27 MW Solar + 7 MW Battery*
2031 = 100 MW Tx. Inter.
2033 = 73 MW Solar + 18 MW Battery*
2037 = 390 MW Battery

Bridger WY
2024 = 354 MW Solar + 89 MW Battery
2029 = 359 MW Solar + 89 MW Battery
2038 = 702 MW Solar + 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2023 = 73 MW Solar + 18 MW Battery
2024 = 604 MW Solar + 151 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2024 = 300 MW Solar + 75 MW Battery
2024 = 300 MW Tx. Inter.
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2038 = 780 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

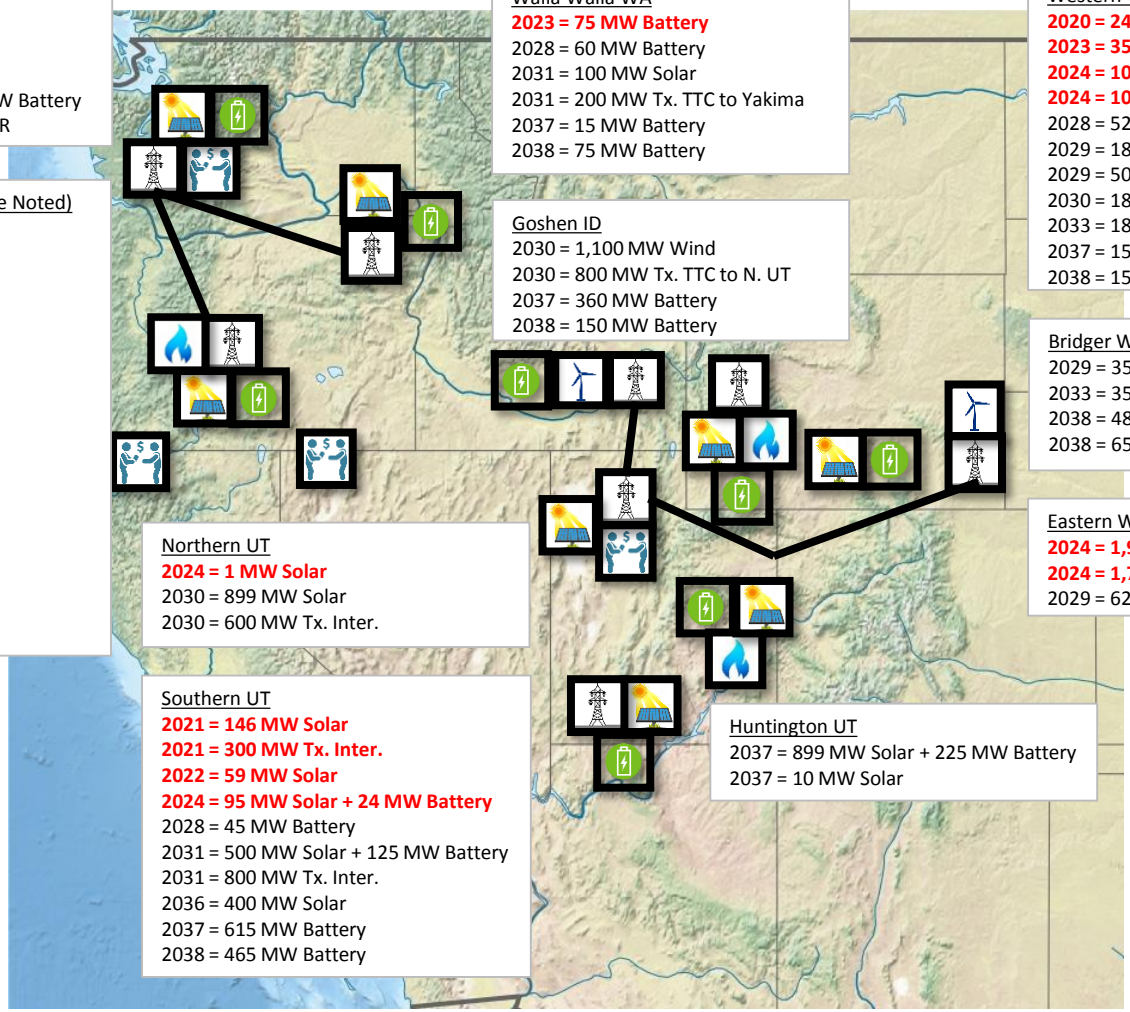
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (268 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-30

(P-11 with Naughton 1-2 Accelerated to 2022)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2023 = 15 MW Battery*
2024 = 500 MW Solar
2028 = 120 MW Battery
2028 = 75 MW Battery*
2028 = 75 MW Battery**
2032 = 405 MW Solar
2032 = 70 MW Solar
2032 = 475 MW Tx. Inter.
2033 = 443 MW Gas*
2033 = 615 MW Tx. Inter.*
2037 = 120 MW Battery
2037 = 45 MW Battery**
2038 = 75 MW Battery
2038 = 30 MW Battery**

*Willamette Valley
**Portland North Coast

Walla Walla WA
2023 = 75 MW Battery
2028 = 60 MW Battery
2031 = 100 MW Solar
2031 = 200 MW Tx. TTC to Yakima
2037 = 15 MW Battery
2038 = 75 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2037 = 360 MW Battery
2038 = 150 MW Battery

Northern UT
2024 = 1 MW Solar
2030 = 899 MW Solar
2030 = 600 MW Tx. Inter.

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2024 = 95 MW Solar + 24 MW Battery
2028 = 45 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 615 MW Battery
2038 = 465 MW Battery

Huntington UT
2037 = 899 MW Solar + 225 MW Battery
2037 = 10 MW Solar

Western WY/Naughton
2020 = 247 MW Gas Conv.
2023 = 357 MW Gas
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 525 MW Battery
2029 = 185 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 185 MW Gas
2033 = 185 MW Gas
2037 = 15 MW Battery
2038 = 15 MW Battery

Bridger WY
2029 = 354 MW Solar
2033 = 359 MW Solar
2038 = 48 MW Solar
2038 = 654 MW Solar = 164 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

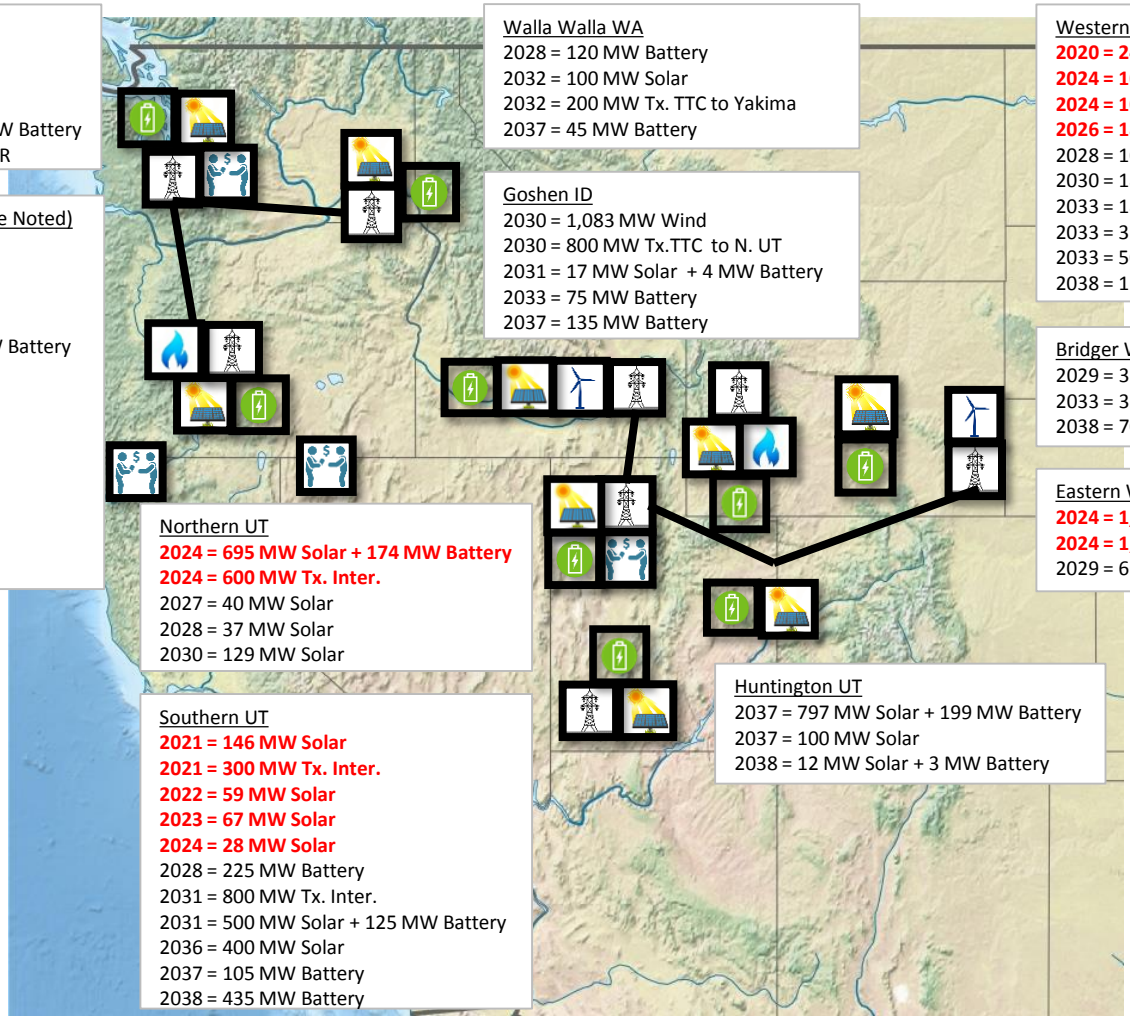
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2022 = NT1-2 (357 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (268 MW)
2032 = JB2 (359 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-31

(P-11 with Naughton 1-2 Accelerated to 2025)



Yakima WA
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar
2028 = 120 MW Battery
2028 = 150 MW Battery**
2032 = 239 MW Solar
2032 = 236 MW Solar + 59 MW Battery
2032 = 475 MW Tx. Inter.
2033 = 90 MW Battery
2033 = 15 MW Battery**
2037 = 360 MW Battery
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2028 = 120 MW Battery
2032 = 100 MW Solar
2032 = 200 MW Tx. TTC to Yakima
2037 = 45 MW Battery

Goshen ID
2030 = 1,083 MW Wind
2030 = 800 MW Tx.TTC to N. UT
2031 = 17 MW Solar + 4 MW Battery
2033 = 75 MW Battery
2037 = 135 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2026 = 185 MW Gas
2028 = 105 MW Battery
2030 = 185 MW Gas
2033 = 185 MW Gas
2033 = 370 MW Gas
2033 = 500 MW Tx. Inter.
2038 = 165 MW Battery

Bridger WY
2029 = 354 MW Solar
2033 = 359 MW Solar
2038 = 702 MW Solar + 176 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2024 = 695 MW Solar + 174 MW Battery
2024 = 600 MW Tx. Inter.
2027 = 40 MW Solar
2028 = 37 MW Solar
2030 = 129 MW Solar

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 28 MW Solar
2028 = 225 MW Battery
2031 = 800 MW Tx. Inter.
2031 = 500 MW Solar + 125 MW Battery
2036 = 400 MW Solar
2037 = 105 MW Battery
2038 = 435 MW Battery

Huntington UT
2037 = 797 MW Solar + 199 MW Battery
2037 = 100 MW Solar
2038 = 12 MW Solar + 3 MW Battery

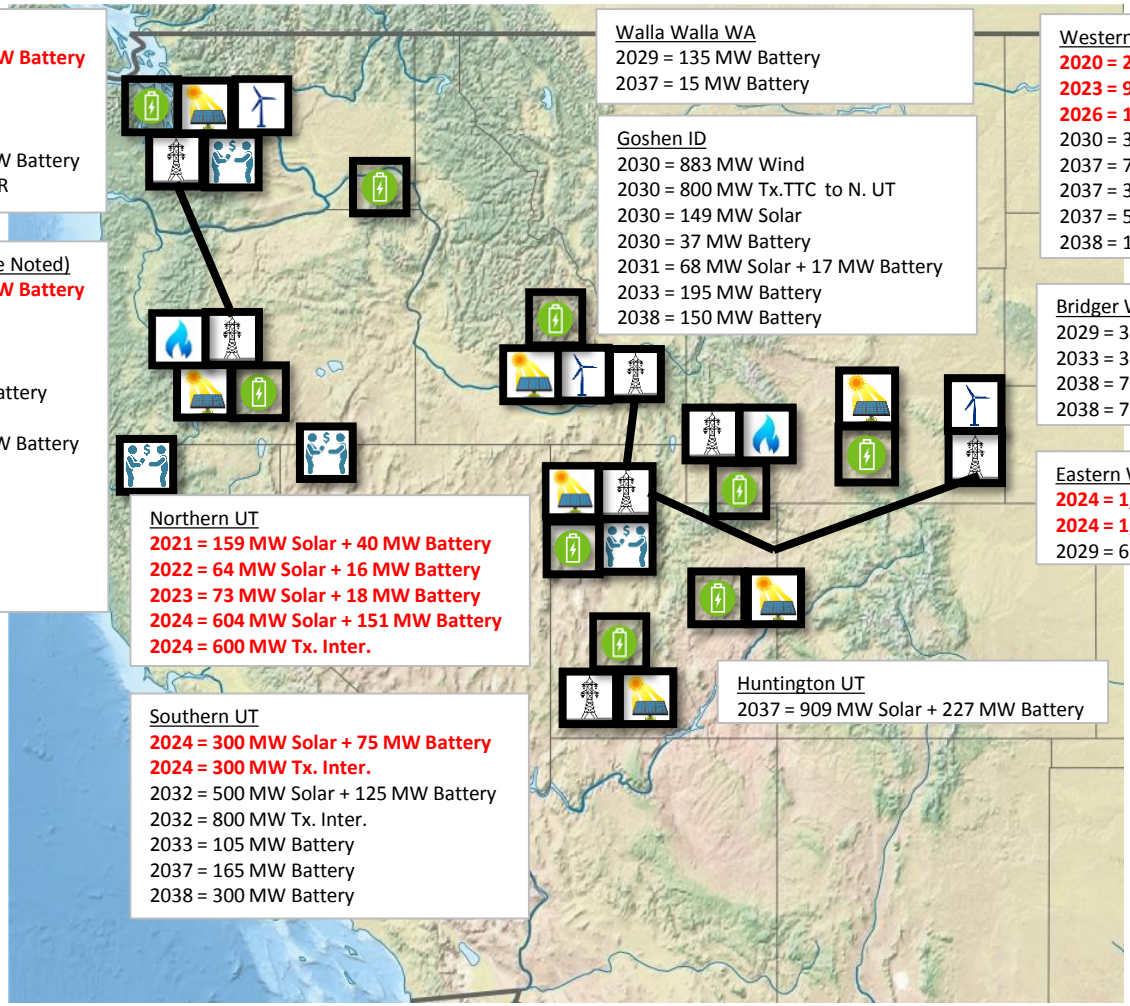
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (268 MW)
2032 = JB2 (359 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-31C

(P-11 with Naughton 1-2 Accelerated to 2025)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2029 = 105 MW Battery
2038 = 30 MW Wind
2038 = 400 MW Solar + 100 MW Battery
2038 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 467 MW Solar + 117 MW Battery
2028 = 45 MW Battery**
2029 = 195 MW Battery
2029 = 15 MW Battery**
2031 = 33 MW Solar + 8 MW Battery
2033 = 90 MW Battery
2033 = 475 MW Solar + 119 MW Battery
2033 = 475 MW Tx. Inter.
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2029 = 135 MW Battery
2037 = 15 MW Battery

Goshen ID
2030 = 883 MW Wind
2030 = 800 MW Tx.TTC to N. UT
2030 = 149 MW Solar
2030 = 37 MW Battery
2031 = 68 MW Solar + 17 MW Battery
2033 = 195 MW Battery
2038 = 150 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2023 = 90 MW Battery
2026 = 185 MW Gas
2030 = 370 MW Gas
2037 = 75 MW Battery
2037 = 370 MW Gas
2037 = 500 MW Tx. Inter.
2038 = 165 MW Battery

Bridger WY
2029 = 354 MW Solar + 88 MW Battery
2033 = 359 MW Solar + 90 MW Battery
2038 = 702 MW Solar
2038 = 715 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2023 = 73 MW Solar + 18 MW Battery
2024 = 604 MW Solar + 151 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2024 = 300 MW Solar + 75 MW Battery
2024 = 300 MW Tx. Inter.
2032 = 500 MW Solar + 125 MW Battery
2032 = 800 MW Tx. Inter.
2033 = 105 MW Battery
2037 = 165 MW Battery
2038 = 300 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

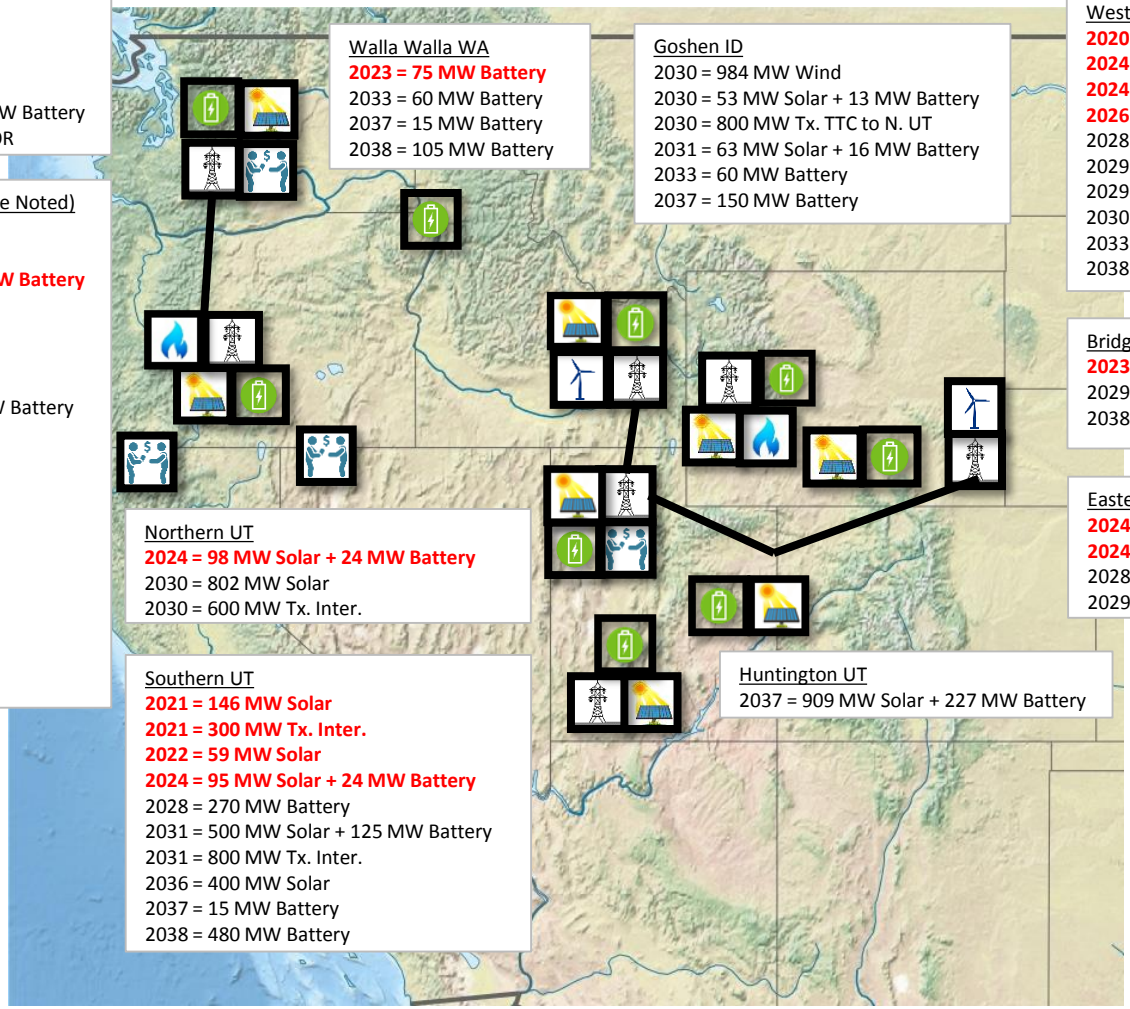
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (268 MW)
2032 = JB2 (359 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-32

(P-07 with Naughton 1-2 Accelerated to 2025 and Gadsby 1-3 Retired 2032)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2023 = 60 MW Battery
2023 = 30 MW Battery*
2024 = 500 MW Solar +125 MW Battery
2028 = 120 MW Battery
2028 = 75 MW Battery*
2028 = 60 MW Battery**
2032 = 92 MW Solar
2032 = 383 MW Solar + 96 MW Battery
2032 = 475 MW Tx. Inter.
2033 = 15 MW Battery
2033 = 45 MW Battery**
2037 = 315 MW Battery
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*
2038 = 105 MW Battery
2038 = 45 MW Battery**

*Willamette Valley
**Portland North Coast

Walla Walla WA
2023 = 75 MW Battery
2033 = 60 MW Battery
2037 = 15 MW Battery
2038 = 105 MW Battery

Goshen ID
2030 = 984 MW Wind
2030 = 53 MW Solar + 13 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2031 = 63 MW Solar + 16 MW Battery
2033 = 60 MW Battery
2037 = 150 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2026 = 185 MW Gas
2028 = 150 MW Battery
2029 = 370 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 185 MW Gas
2033 = 185 MW Gas
2038 = 240 MW Battery

Bridger WY
2023 = 354 MW Solar
2029 = 359 MW Solar
2038 = 343 MW Solar + 86 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 126 MW Wind
2029 = 494 MW Wind

Northern UT
2024 = 98 MW Solar + 24 MW Battery
2030 = 802 MW Solar
2030 = 600 MW Tx. Inter.

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2024 = 95 MW Solar + 24 MW Battery
2028 = 270 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 15 MW Battery
2038 = 480 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

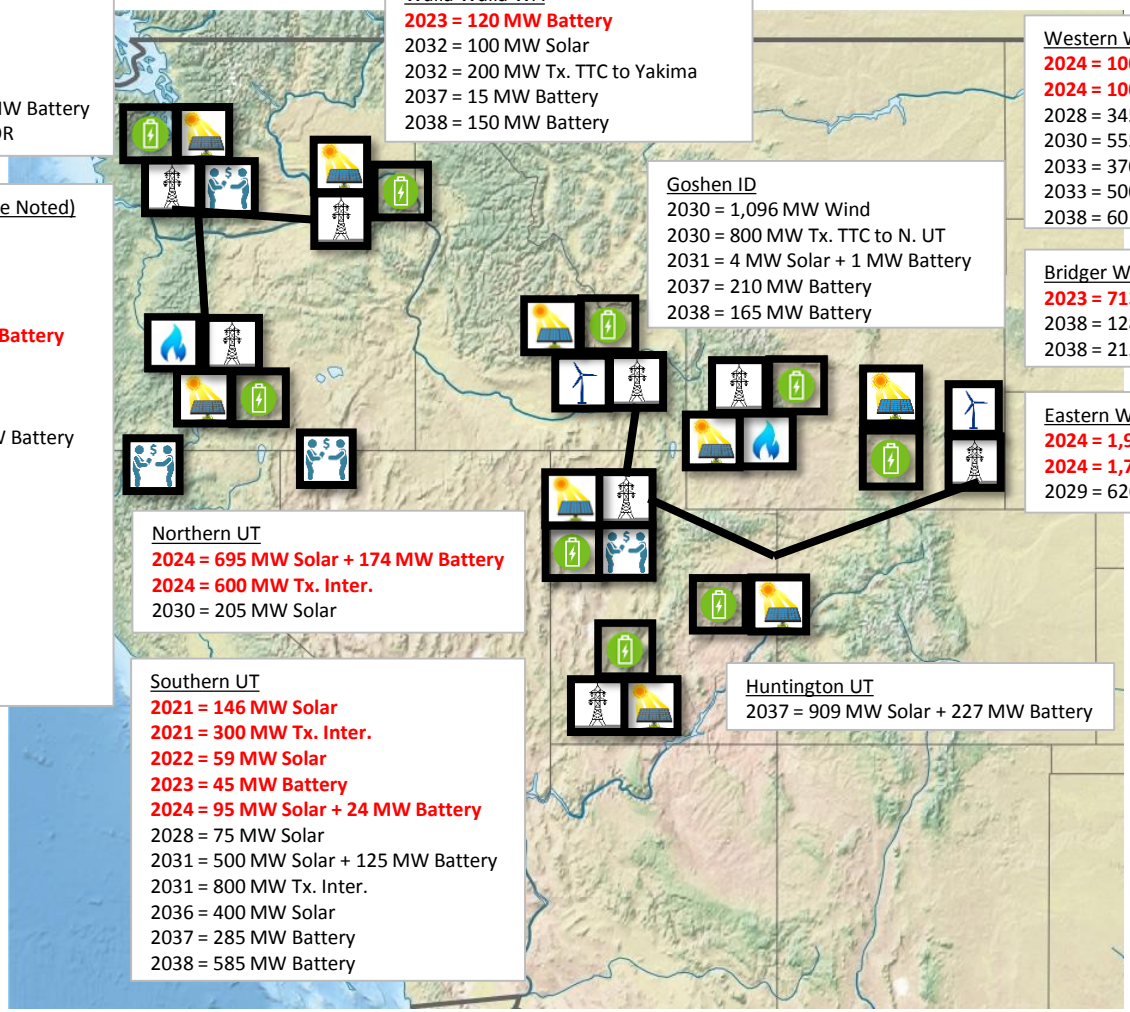
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2022 = JB1 (354 MW)
2025 = CG1-2 (164 MW)
2025 = NT1-2 (357 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (268 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-33

(P-11 with Jim Bridger 1-2 Accelerated to 2022)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Solar
2024 = 405 MW Tx. Inter.
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2023 = 105 MW Battery
2023 = 90 MW Battery*
2023 = 60 MW Battery**
2024 = 407 MW Solar
2024 = 93 MW Solar +23 MW Battery
2028 = 45 MW Battery
2028 = 30 MW Battery*
2032 = 165 MW Solar
2032 = 310 MW Solar + 77 MW Battery
2032 = 475 MW Tx. Inter.
2037 = 75 MW Battery
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*
2038 = 150 MW Battery
2038 = 15 MW Battery*
2038 = 135 MW Battery**

*Willamette Valley
**Portland North Coast

Walla Walla WA
2023 = 120 MW Battery
2032 = 100 MW Solar
2032 = 200 MW Tx. TTC to Yakima
2037 = 15 MW Battery
2038 = 150 MW Battery

Goshen ID
2030 = 1,096 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 4 MW Solar + 1 MW Battery
2037 = 210 MW Battery
2038 = 165 MW Battery

Western WY/Naughton
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 345 MW Battery
2030 = 555 MW Gas
2033 = 370 MW Gas
2033 = 500 MW Tx. Inter.
2038 = 60 MW Battery

Bridger WY
2023 = 713 MW Solar
2038 = 128 MW Solar
2038 = 215 MW Solar + 54 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2024 = 695 MW Solar + 174 MW Battery
2024 = 600 MW Tx. Inter.
2030 = 205 MW Solar

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 45 MW Battery
2024 = 95 MW Solar + 24 MW Battery
2028 = 75 MW Solar
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 285 MW Battery
2038 = 585 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

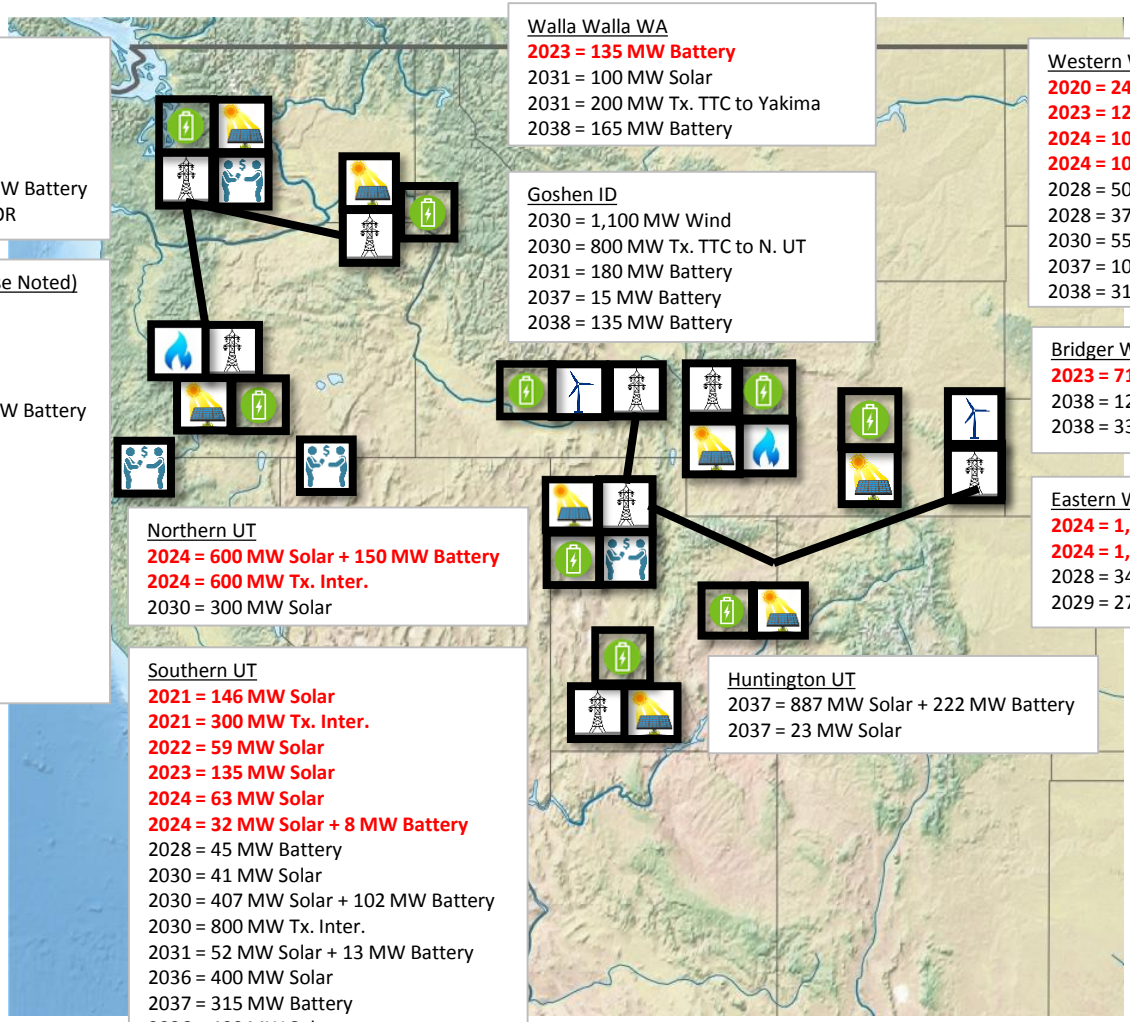
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2022 = JB1-2 (713 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (268 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-34

(P-11 with Gadsby 1-3 Accelerated to 2020 and
Jim Bridger 1-2 Accelerated to 2022)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Tx. Inter.
2024 = 405 MW Solar
2038 = 19 MW Solar
2038 = 411 MW Solar + 103 MW Battery
2038 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2023 = 120 MW Battery
2023 = 105 MW Battery*
2023 = 60 MW Battery**
2024 = 500 MW Solar
2032 = 475 MW Solar + 119 MW Battery
2032 = 475 MW Tx. Inter.
2037 = 300 MW Battery
2037 = 443 MW Gas*
2037 = 60 MW Battery**
2037 = 615 MW Tx. Inter.*
2038 = 45 MW Battery
2038 = 90 MW Battery*
2038 = 90 MW Battery**

*Willamette Valley
**Portland North Coast

Solar
Wind
Battery
Geothermal
Pumped Hydro
Gas
Market
Transmission

Walla Walla WA
2023 = 135 MW Battery
2031 = 100 MW Solar
2031 = 200 MW Tx. TTC to Yakima
2038 = 165 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 180 MW Battery
2037 = 15 MW Battery
2038 = 135 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv
2023 = 120 MW Battery
2024 = 100 MW Tx. Inter.
2024 = 100 MW Solar
2028 = 500 MW Tx. Inter.
2028 = 370 MW Gas
2030 = 555 MW Gas
2037 = 105 MW Battery
2038 = 315 MW Battery

Bridger WY
2023 = 713 MW Solar
2038 = 12 MW Solar
2038 = 331 MW Solar + 83 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 345 MW Wind
2029 = 275 MW Wind

Northern UT
2024 = 600 MW Solar + 150 MW Battery
2024 = 600 MW Tx. Inter.
2030 = 300 MW Solar

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 135 MW Solar
2024 = 63 MW Solar
2024 = 32 MW Solar + 8 MW Battery
2028 = 45 MW Battery
2030 = 41 MW Solar
2030 = 407 MW Solar + 102 MW Battery
2030 = 800 MW Tx. Inter.
2031 = 52 MW Solar + 13 MW Battery
2036 = 400 MW Solar
2037 = 315 MW Battery
2036 = 400 MW Solar
2038 = 540 MW Battery

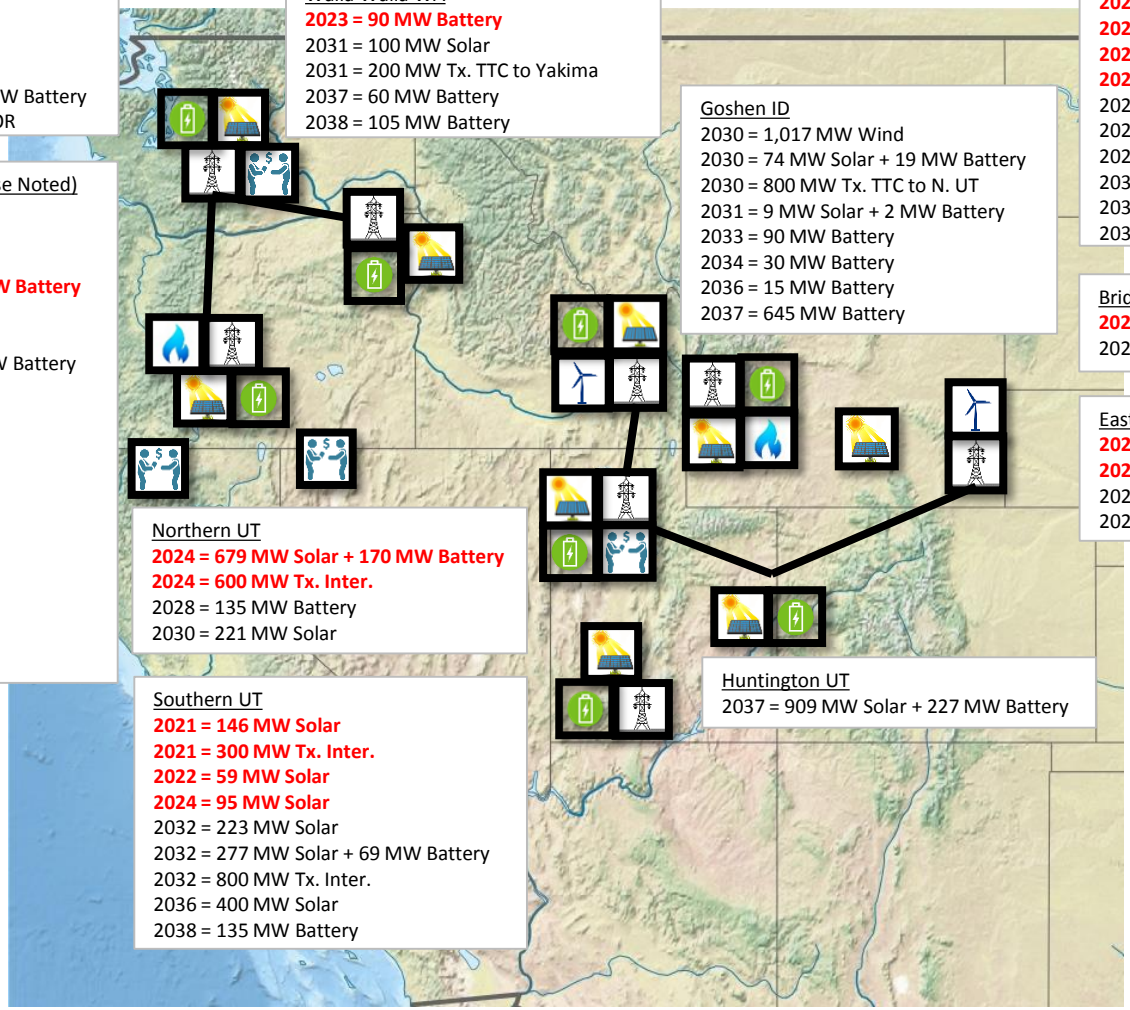
Huntington UT
2037 = 887 MW Solar + 222 MW Battery
2037 = 23 MW Solar

Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2020 = GDB1-3 (238 MW)
2022 = JB1-2 (713 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-35

(P-11 with Jim Bridger 3-4 Accelerated to 2022)



Yakima WA
2023 = 105 MW Battery
2024 = 405 MW Tx. Inter.
2024 = 405 MW Solar
2033 = 430 MW Solar + 108 MW Battery
2033 = 450 MW Tx. TTC to S. OR

Walla Walla WA
2023 = 90 MW Battery
2031 = 100 MW Solar
2031 = 200 MW Tx. TTC to Yakima
2037 = 60 MW Battery
2038 = 105 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2023 = 105 MW Battery
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2028 = 210 MW Battery
2029 = 370 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 555 MW Gas
2037 = 360 MW Battery
2038 = 30 MW Battery

Goshen ID
2030 = 1,017 MW Wind
2030 = 74 MW Solar + 19 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2031 = 9 MW Solar + 2 MW Battery
2033 = 90 MW Battery
2034 = 30 MW Battery
2036 = 15 MW Battery
2037 = 645 MW Battery

Bridger WY
2023 = 702 MW Solar
2029 = 354 MW solar

Eastern WY
2024 = 1.920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 141 MW Wind
2029 = 479 MW Wind

Southern OR (Unless Otherwise Noted)
2023 = 105 MW Battery
2023 = 75 = MW Battery*
2024 = 349 MW Solar
2024 = 151 MW Solar + 38 MW Battery
2028 = 30 MW Battery
2028 = 60 MW Battery**
2031 = 304 MW Solar + 76 MW Battery
2031 = 475 MW Tx. Inter.
2032 = 171 MW Solar
2032 = 43 MW Battery
2033 = 443 MW Gas*
2033 = 615 MW Tx. Inter.*
2037 = 255 MW Battery
2037 = 30 MW Battery**
2038 = 165 MW Battery
2038 = 75 MW Battery**

*Willamette Valley
**Portland North Coast

Northern UT
2024 = 679 MW Solar + 170 MW Battery
2024 = 600 MW Tx. Inter.
2028 = 135 MW Battery
2030 = 221 MW Solar

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2024 = 95 MW Solar
2032 = 223 MW Solar
2032 = 277 MW Solar + 69 MW Battery
2032 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2038 = 135 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

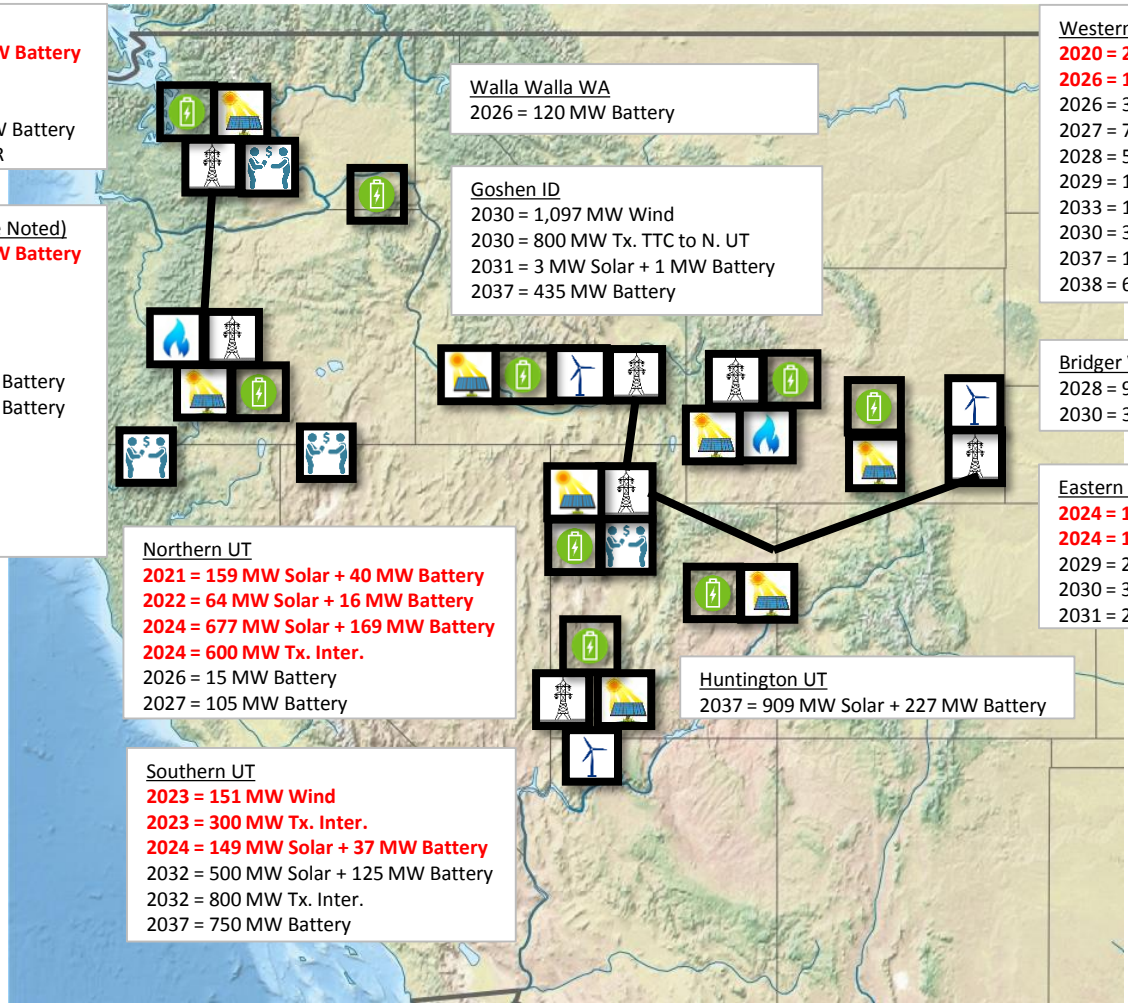
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2022 = JB3-4 (702 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2029 = NT1-2 (357 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2032 = JB2 (359 MW)
2036 = HTG1-2 (909 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-36C

(Jim Bridger and Naughton 1&2 Retiring 2025)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2026 = 105 MW Battery
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2026 = 195 MW Battery
2026 = 150 MW Battery**
2028 = 210 MW Gas
2028 = 475 MW Tx. Inter.
2031 = 116 MW Solar + 29 MW Battery
2032 = 150 MW Solar + 37 MW Battery
2033 = 221 MW Gas*
2033 = 615 MW Tx. Inter.*

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2026 = 120 MW Battery

Goshen ID
2030 = 1,097 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 3 MW Solar + 1 MW Battery
2037 = 435 MW Battery

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar + 169 MW Battery
2024 = 600 MW Tx. Inter.
2026 = 15 MW Battery
2027 = 105 MW Battery

Southern UT
2023 = 151 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 149 MW Solar + 37 MW Battery
2032 = 500 MW Solar + 125 MW Battery
2032 = 800 MW Tx. Inter.
2037 = 750 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2026 = 30 MW Battery
2027 = 75 MW Battery
2028 = 500 MW Tx. Inter.
2029 = 185 MW Gas
2033 = 185 MW Gas
2030 = 370 MW Gas
2037 = 100 MW Battery
2038 = 60 MW Battery

Bridger WY
2028 = 932 MW Solar + 233 MW Battery
2030 = 353 MW Solar + 31 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 280 MW Wind
2030 = 321 MW Wind
2031 = 20 MW Wind

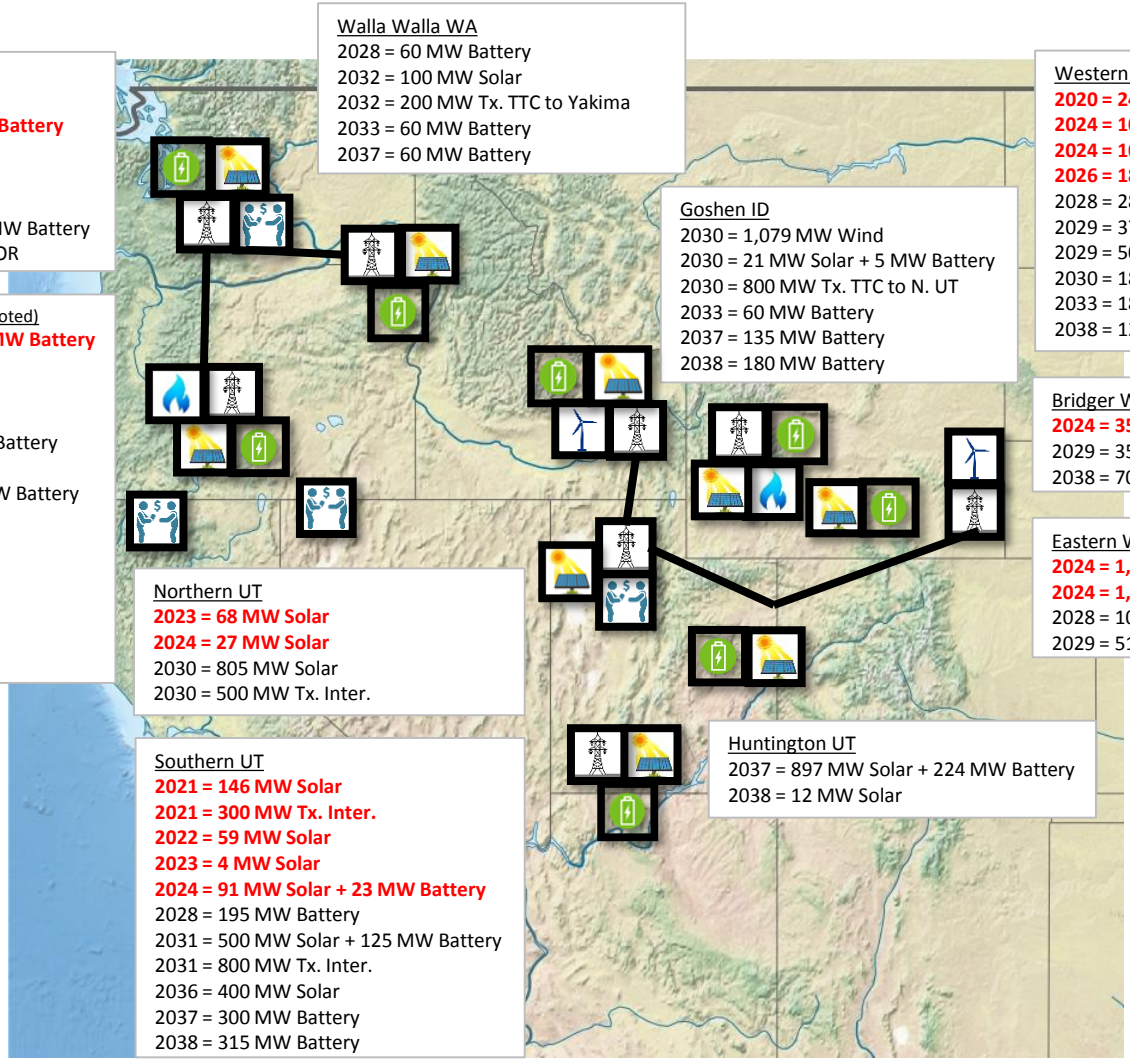
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2025 = JB1-4 (1,415 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-45

(P-31, with JB1 Retiring 2023, JB2 Retiring 2028)



Yakima WA
2024 = 376 MW Solar
2024 = 29 MW Solar + 7 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2037 = 7 MW Solar
2037 = 423 MW Solar + 106 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2028 = 150 MW Battery
2028 = 195 MW Battery**
2031 = 116 MW Solar
2031 = 36 MW Solar + 9 MW Battery
2031 = 475 MW Tx. Inter.
2032 = 323 MW Solar + 81 MW Battery
2033 = 60 MW Battery
2037 = 30 MW Battery
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2028 = 60 MW Battery
2032 = 100 MW Solar
2032 = 200 MW Tx. TTC to Yakima
2033 = 60 MW Battery
2037 = 60 MW Battery

Goshen ID
2030 = 1,079 MW Wind
2030 = 21 MW Solar + 5 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2033 = 60 MW Battery
2037 = 135 MW Battery
2038 = 180 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2026 = 185 MW Gas
2028 = 285 MW Battery
2029 = 370 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 185 MW Gas
2033 = 185 MW Gas
2038 = 120 MW Battery

Bridger WY
2024 = 354 MW Solar
2029 = 359 MW Solar
2038 = 702 MW Solar + 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 102 MW Wind
2029 = 518 MW Wind

Northern UT
2023 = 68 MW Solar
2024 = 27 MW Solar
2030 = 805 MW Solar
2030 = 500 MW Tx. Inter.

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 4 MW Solar
2024 = 91 MW Solar + 23 MW Battery
2028 = 195 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 300 MW Battery
2038 = 315 MW Battery

Huntington UT
2037 = 897 MW Solar + 224 MW Battery
2038 = 12 MW Solar

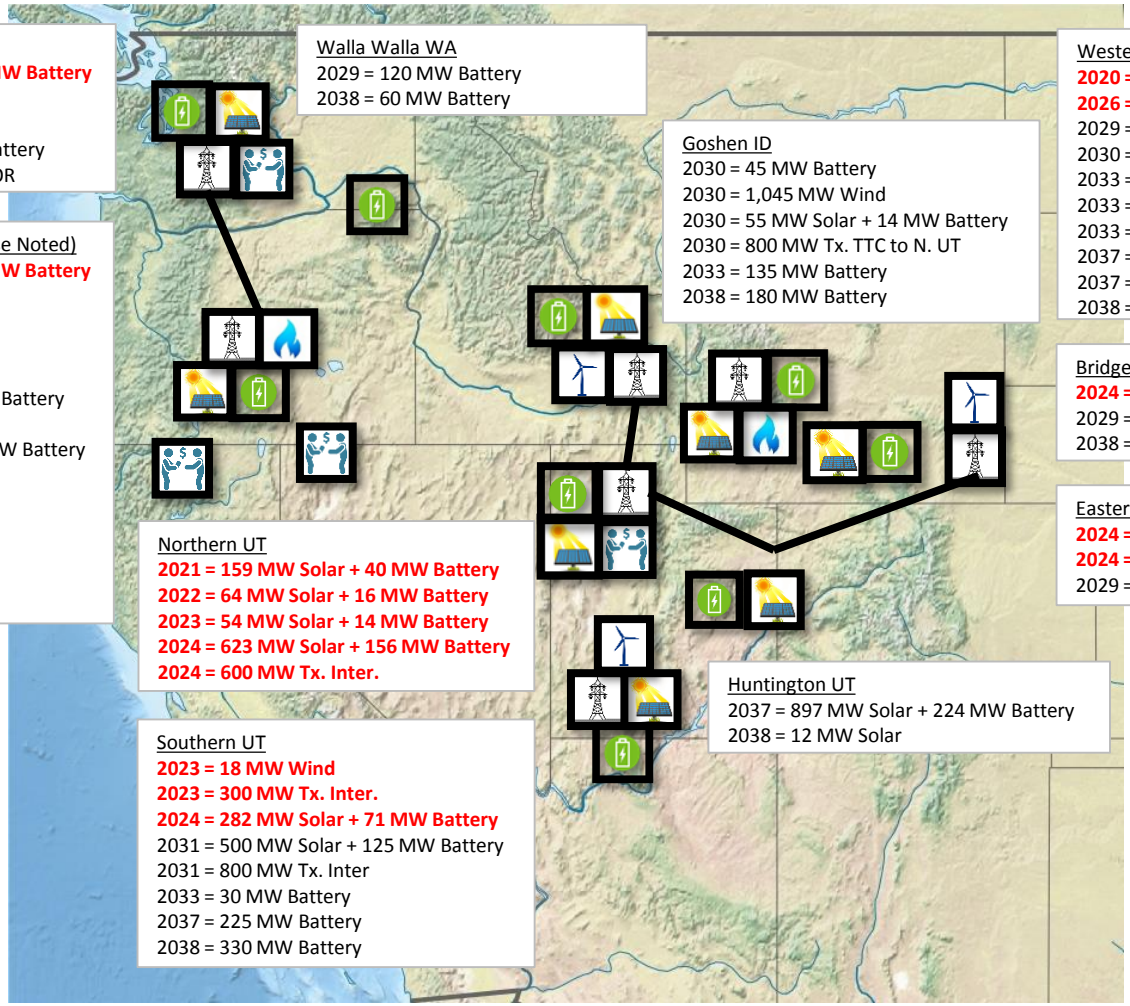
Coal/Early Gas Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-45C

(P-31, with JB1 Retiring 2023, JB2 Retiring 2028)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 90 MW Battery
2036 = 430 MW Solar + 108 Battery
2036 = 450 MW Tx. TTC to S. OR

Walla Walla WA
2029 = 120 MW Battery
2038 = 60 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2029 = 240 MW Battery
2030 = 185 MW Gas
2033 = 185 MW Gas
2033 = 38 MW Solar + 10 MW Battery
2033 = 100 MW Tx. Inter.
2037 = 370 MW Gas
2037 = 500 MW Tx. Inter.
2038 = 90 MW Battery

Goshen ID
2030 = 45 MW Battery
2030 = 1,045 MW Wind
2030 = 55 MW Solar + 14 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2033 = 135 MW Battery
2038 = 180 MW Battery

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2028 = 75 MW Battery
2028 = 15 MW Battery*
2029 = 30 MW Battery
2029 = 75 MW Battery*
2031 = 66 MW Solar + 17 MW Battery
2031 = 475 MW Tx. Inter.
2032 = 409 MW Solar + 102 MW Battery
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*
2038 = 45 MW Battery

*Willamette Valley
**Portland North Coast

Bridger WY
2024 = 354 MW Solar + 89 MW Battery
2029 = 359 MW Solar + 90 MW Battery
2038 = 702 MW Solar + 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 622 MW Wind

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2023 = 54 MW Solar + 14 MW Battery
2024 = 623 MW Solar + 156 MW Battery
2024 = 600 MW Tx. Inter.

Huntington UT
2037 = 897 MW Solar + 224 MW Battery
2038 = 12 MW Solar

Southern UT
2023 = 18 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 282 MW Solar + 71 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter
2033 = 30 MW Battery
2037 = 225 MW Battery
2038 = 330 MW Battery

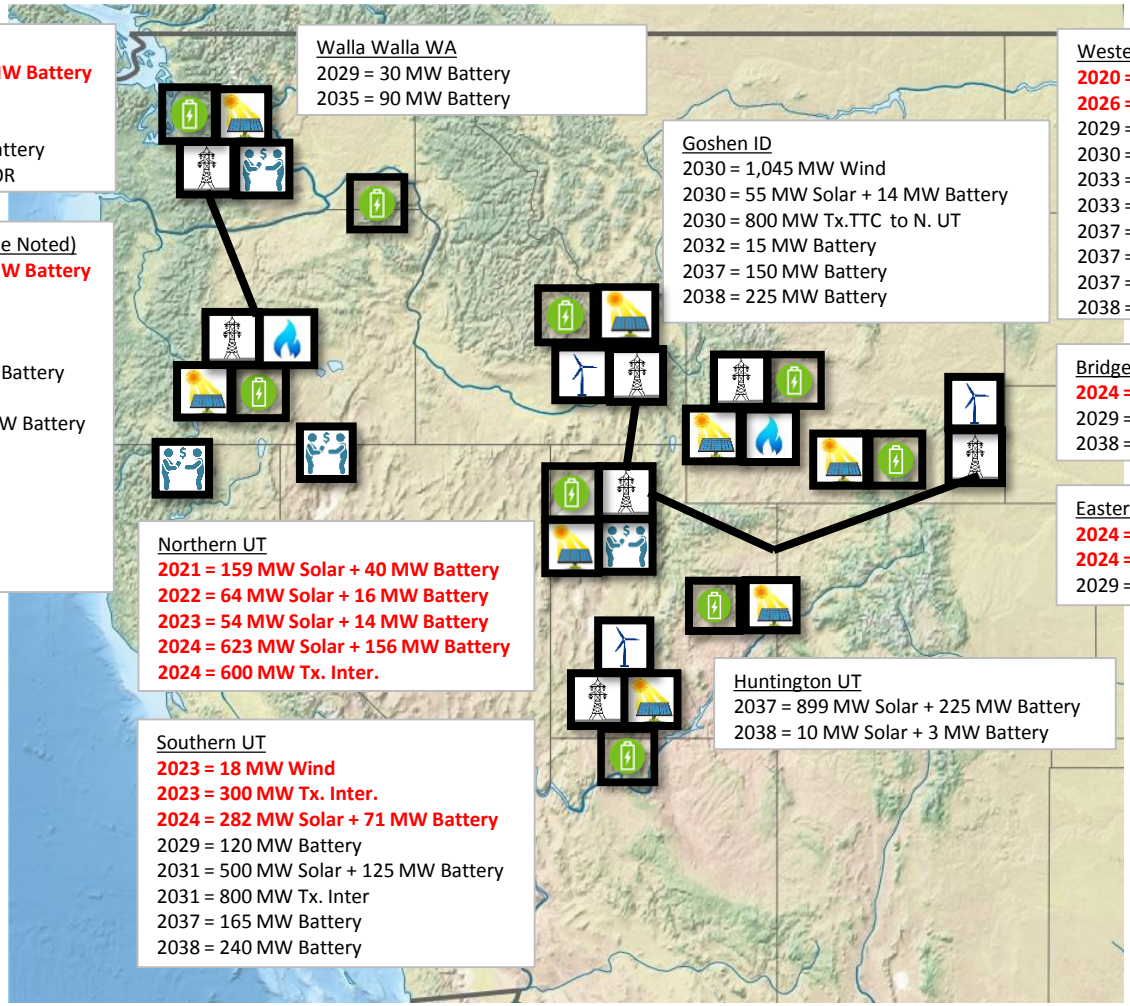
Coal/Early Gas Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-45CP

(P-31, with JB1 Retiring 2023, JB2 Retiring 2028)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2036 = 430 MW Solar + 108 Battery
2036 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2028 = 75 MW Battery
2029 = 105 MW Battery
2029 = 150 MW Battery**
2031 = 66 MW Solar + 17 MW Battery
2031 = 475 MW Tx. Inter.
2032 = 409 MW Solar + 102 MW Battery
2035 = 45 MW Battery**
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*

*Willamette Valley
**Portland North Coast

Walla Walla WA
2029 = 30 MW Battery
2035 = 90 MW Battery

Goshen ID
2030 = 1,045 MW Wind
2030 = 55 MW Solar + 14 MW Battery
2030 = 800 MW Tx.TTC to N. UT
2032 = 15 MW Battery
2037 = 150 MW Battery
2038 = 225 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.*
2026 = 185 MW Gas*
2029 = 15 MW Battery*
2030 = 370 MW Gas*
2033 = 38 MW Solar + 10 MW Battery*
2033 = 100 MW Tx. Inter.
2037 = 120 MW Battery*
2037 = 370 MW Gas*
2037 = 500 MW Tx. Inter.
2038 = 225 MW Battery

Bridger WY
2024 = 354 MW Solar + 89 MW Battery
2029 = 359 MW Solar + 90 MW Battery
2038 = 702 MW Solar + 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2023 = 54 MW Solar + 14 MW Battery
2024 = 623 MW Solar + 156 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2023 = 18 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 282 MW Solar + 71 MW Battery
2029 = 120 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter
2037 = 165 MW Battery
2038 = 240 MW Battery

Huntington UT
2037 = 899 MW Solar + 225 MW Battery
2038 = 10 MW Solar + 3 MW Battery

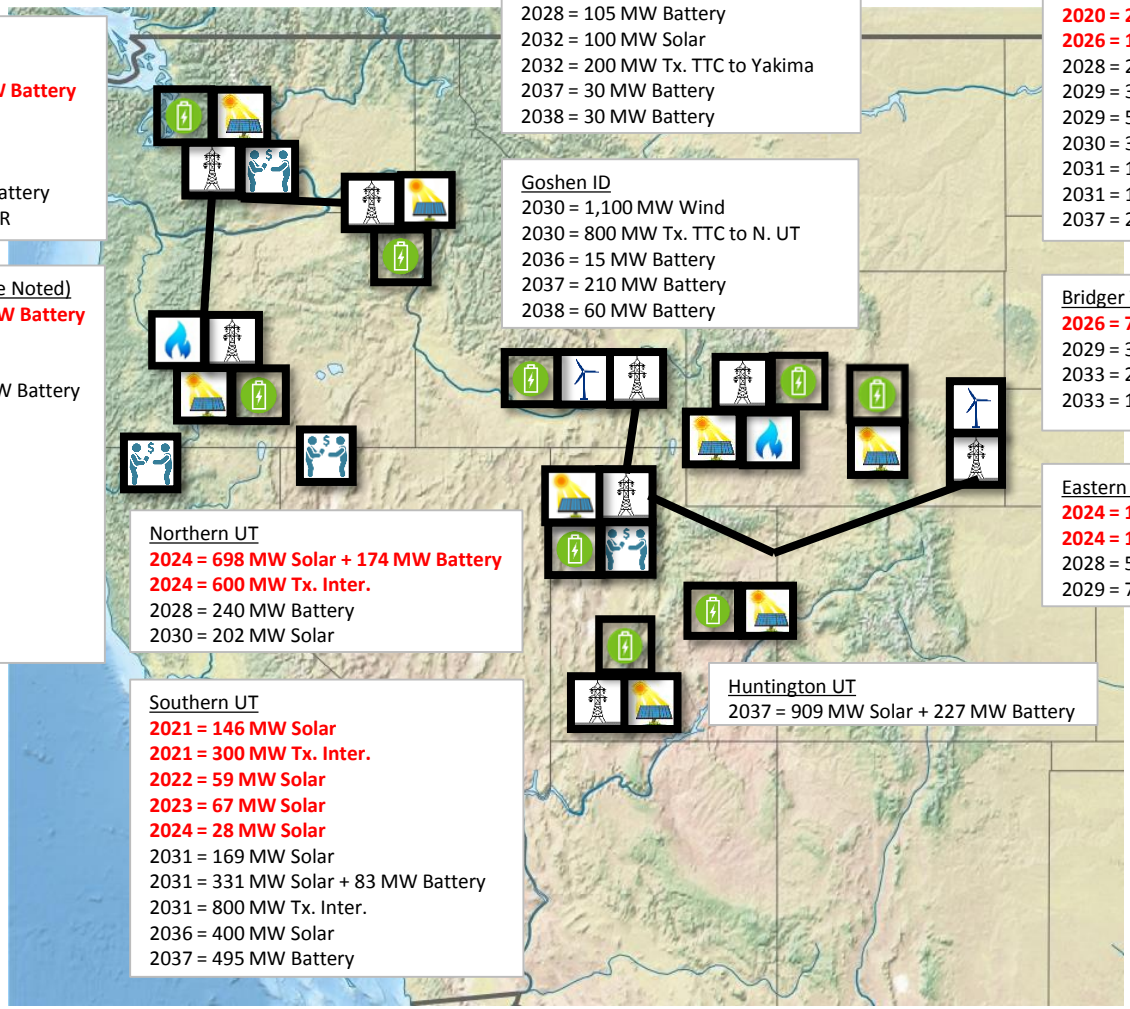
Coal/Early Gas Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)
2037 = JB3-4 (702 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-46

(P-31 with JB3-4 Retiring 2025)



Yakima WA
2024 = 289 MW Solar
2024 = 116 MW Solar + 29 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2038 = 407 MW Solar
2038 = 23 MW Solar + 6 MW Battery
2038 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2028 = 45 MW Battery
2028 = 120 MW Battery**
2032 = 475 MW Solar + 119 MW Battery
2032 = 475 MW Tx. Inter.
2033 = 443 MW Gas*
2037 = 555 MW Battery
2037 = 90 MW Battery*
2037 = 30 MW Battery**
2038 = 30 MW Battery
2033 = 615 MW Tx. Inter.*

**Willamette Valley*
***Portland North Coast*

Walla Walla WA
2028 = 105 MW Battery
2032 = 100 MW Solar
2032 = 200 MW Tx. TTC to Yakima
2037 = 30 MW Battery
2038 = 30 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2036 = 15 MW Battery
2037 = 210 MW Battery
2038 = 60 MW Battery

Northern UT
2024 = 698 MW Solar + 174 MW Battery
2024 = 600 MW Tx. Inter.
2028 = 240 MW Battery
2030 = 202 MW Solar

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 28 MW Solar
2031 = 169 MW Solar
2031 = 331 MW Solar + 83 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 495 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2028 = 240 MW Battery
2029 = 370 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 370 MW Gas
2031 = 100 MW Solar
2031 = 100 MW Tx. Inter.
2037 = 225 MW Battery

Bridger WY
2026 = 713 MW Solar
2029 = 349 MW Solar
2033 = 251 MW Solar
2033 = 102 MW Solar + 25 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 544 MW Wind
2029 = 76 MW Wind

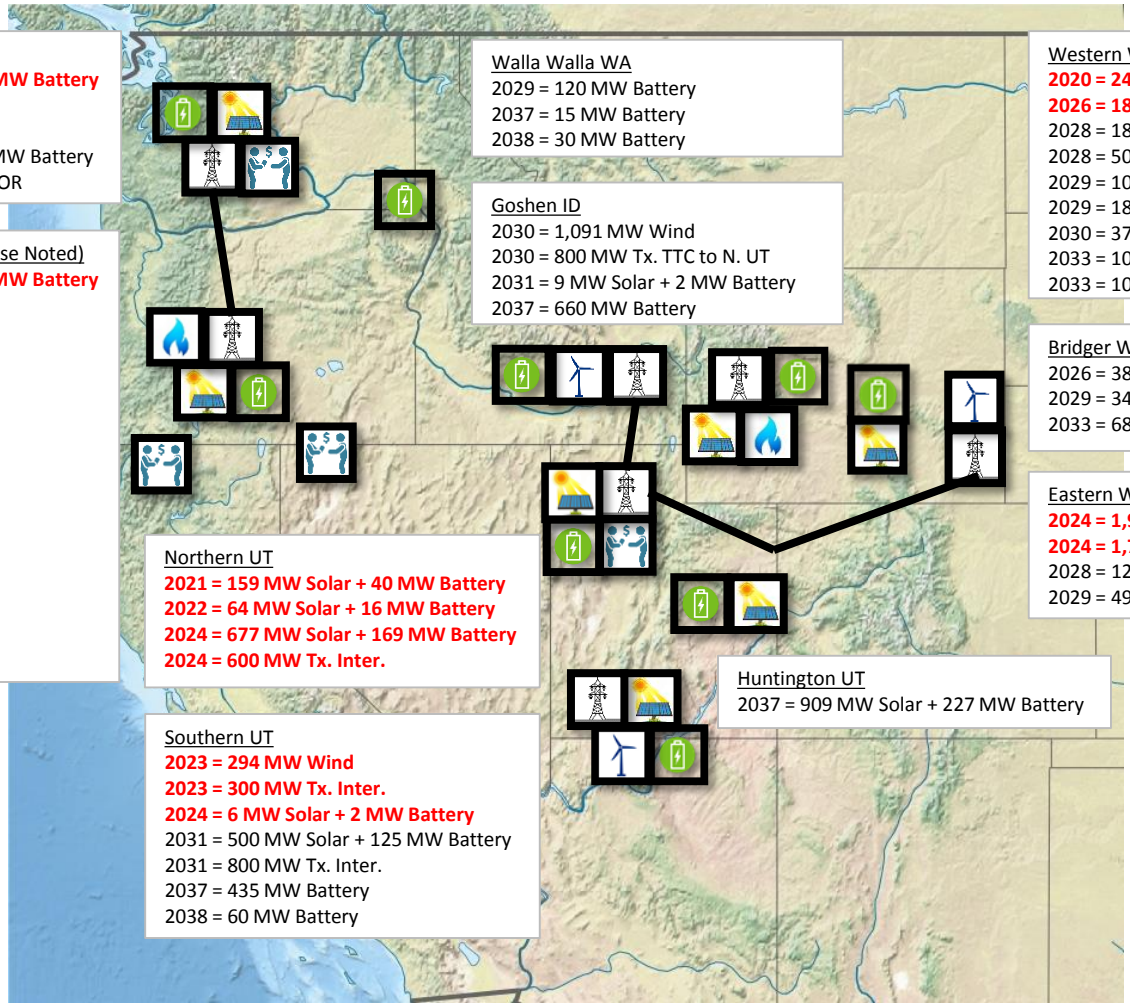
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2025 = JB3-4 (702 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2030 = HY1-2 (77 MW)
2032 = JB2 (359 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-46C

(P-31 with JB3-4 Retiring 2025)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2026 = 105 MW Battery
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2026 = 15 MW Battery
2026 = 30 MW Solar*
2027 = 30 MW Solar*
2029 = 150 MW Battery
2029 = 60 MW Battery**
2033 = 443 MW Gas*
2033 = 475 MW Solar
2033 = 119 MW Battery
2033 = 475 MW Tx. Inter.
2033 = 615 MW Tx. Inter.*
2037 = 45 MW Battery**
2038 = 60 MW Battery

*Willamette Valley
**Portland North Coast

Walla Walla WA
2029 = 120 MW Battery
2037 = 15 MW Battery
2038 = 30 MW Battery

Goshen ID
2030 = 1,091 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 9 MW Solar + 2 MW Battery
2037 = 660 MW Battery

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar + 169 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2023 = 294 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 6 MW Solar + 2 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2037 = 435 MW Battery
2038 = 60 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2028 = 185 MW Gas
2028 = 500 MW Tx. Inter.
2029 = 105 MW Battery
2029 = 185 MW Gas
2030 = 370 MW Gas
2033 = 100 MW Solar + 25 MW Battery
2033 = 100 MW Tx. Inter.

Bridger WY
2026 = 384 MW Solar = 96 MW Battery
2029 = 349 MW Solar = 87 MW Battery
2033 = 682 MW Solar = 171 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 127 MW Wind
2029 = 493 MW Wind

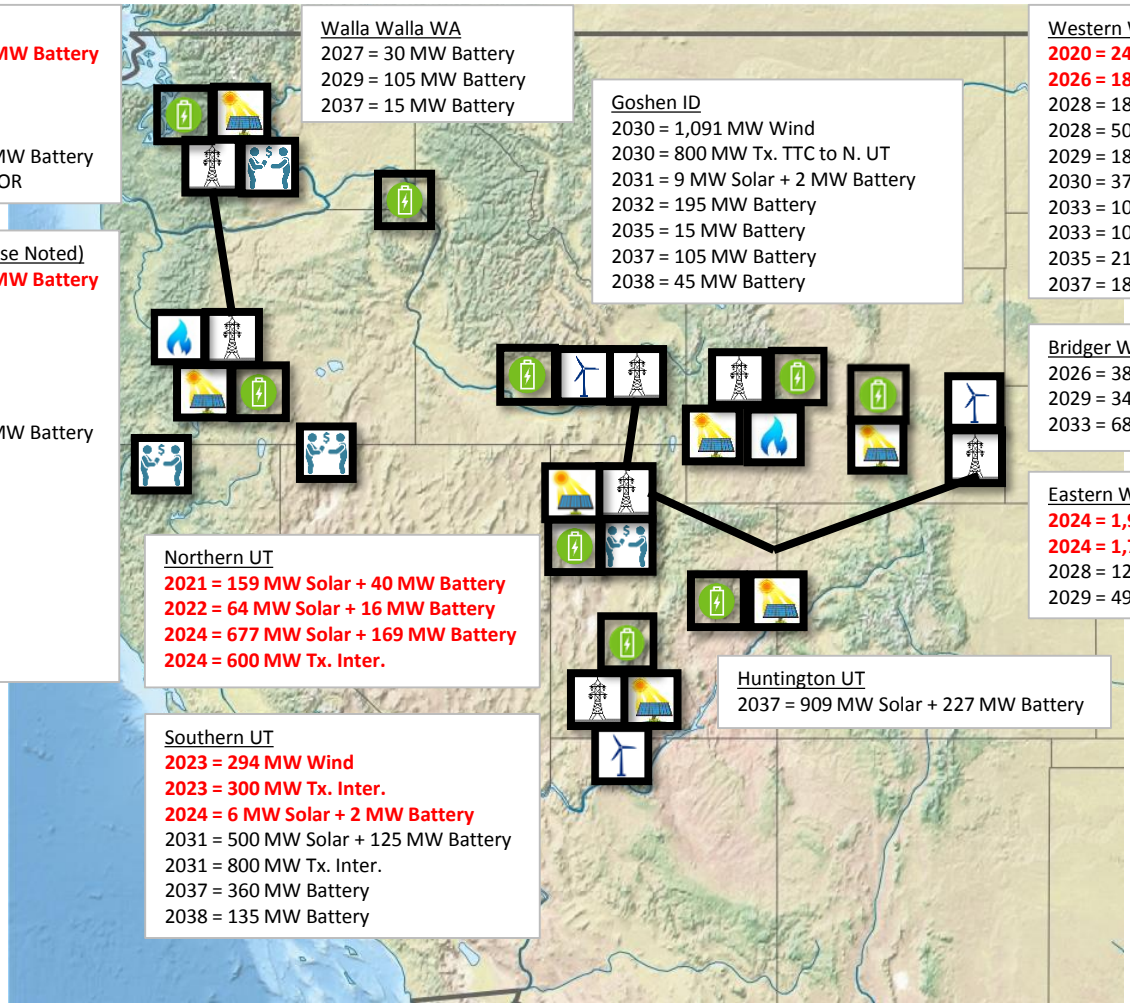
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2025 = JB3-4 (702 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2030 = HY1-2 (77 MW)
2032 = JB2 (359 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-46CP

(P-31 with JB3-4 Retiring 2025)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2026 = 90 MW Battery
2029 = 15 MW Battery
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2026 = 30 MW Battery
2026 = 30 MW Battery**
2029 = 210 MW Battery
2029 = 30 MW Battery**
2029 = 75 MW Battery*
2033 = 475 MW Solar + 119 MW Battery
2033 = 475 MW Tx. Inter.
2033 = 615 MW Tx. Inter.*
2035 = 15 MW Battery
2035 = 30 MW Battery**
2035 = 221 MW Gas*
2037 = 221 MW Gas*

*Willamette Valley
**Portland North Coast

Walla Walla WA
2027 = 30 MW Battery
2029 = 105 MW Battery
2037 = 15 MW Battery

Goshen ID
2030 = 1,091 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 9 MW Solar + 2 MW Battery
2032 = 195 MW Battery
2035 = 15 MW Battery
2037 = 105 MW Battery
2038 = 45 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2028 = 185 MW Gas
2028 = 500 MW Tx. Inter.
2029 = 185 MW Gas
2030 = 370 MW Gas
2033 = 100 MW Solar + 25 MW Battery
2033 = 100 MW Tx. Inter.
2035 = 210 MW Battery
2037 = 180 MW Battery

Bridger WY
2026 = 384 MW Solar = 96 MW Battery
2029 = 349 MW Solar = 87 MW Battery
2033 = 682 MW Solar = 171 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 127 MW Wind
2029 = 493 MW Wind

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar + 169 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2023 = 294 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 6 MW Solar + 2 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2037 = 360 MW Battery
2038 = 135 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

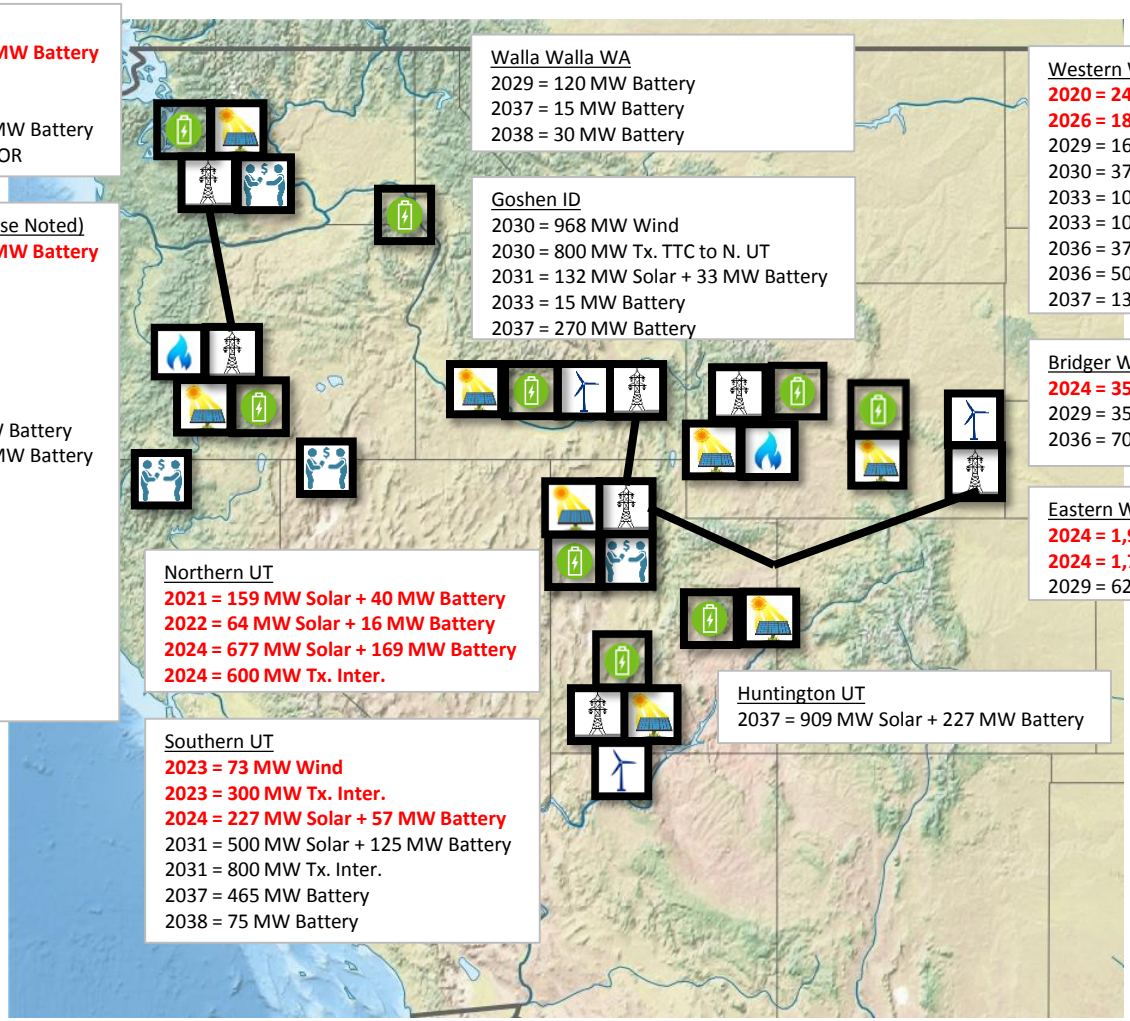
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2025 = JB3-4 (702 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2030 = HY1-2 (77 MW)
2032 = JB2 (359 MW)
2032 = GDB1-3 (238 MW)
2036 = HTG1-2 (909 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-47C

(P-45 with JB3-4 Retiring 2035)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2036 = 430 MW Solar + 108 MW Battery
2036 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 460 MW Solar + 115 MW Battery
2026 = 15 MW Battery
2028 = 60 MW Solar
2028 = 15 MW Solar*
2029 = 165 MW Battery
2029 = 60 MW Battery**
2029 = 45 MW Battery*
2032 = 40 MW Solar + 10 MW Battery
2033 = 475 MW Solar + 119 MW Battery
2033 = 475 MW Tx. Inter.
2036 = 221 MW Gas*
2036 = 615 MW Tx. Inter.*
2037 = 30 MW Battery
2037 = 221 MW Gas*
2038 = 30 MW Battery
2038 = 45 MW Battery**

*Willamette Valley
**Portland North Coast

Walla Walla WA
2029 = 120 MW Battery
2037 = 15 MW Battery
2038 = 30 MW Battery

Goshen ID
2030 = 968 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 132 MW Solar + 33 MW Battery
2033 = 15 MW Battery
2037 = 270 MW Battery

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar + 169 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2023 = 73 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 227 MW Solar + 57 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2037 = 465 MW Battery
2038 = 75 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2029 = 165 MW Battery
2030 = 370 MW Gas
2033 = 100 MW Solar + 25 MW Battery
2033 = 100 MW Tx. Inter.
2036 = 370 MW Gas
2036 = 500 MW Tx. Inter.
2037 = 135 MW Battery

Bridger WY
2024 = 354 MW Solar = 89 MW Battery
2029 = 359 MW Solar = 90 MW Battery
2036 = 702 MW Solar = 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

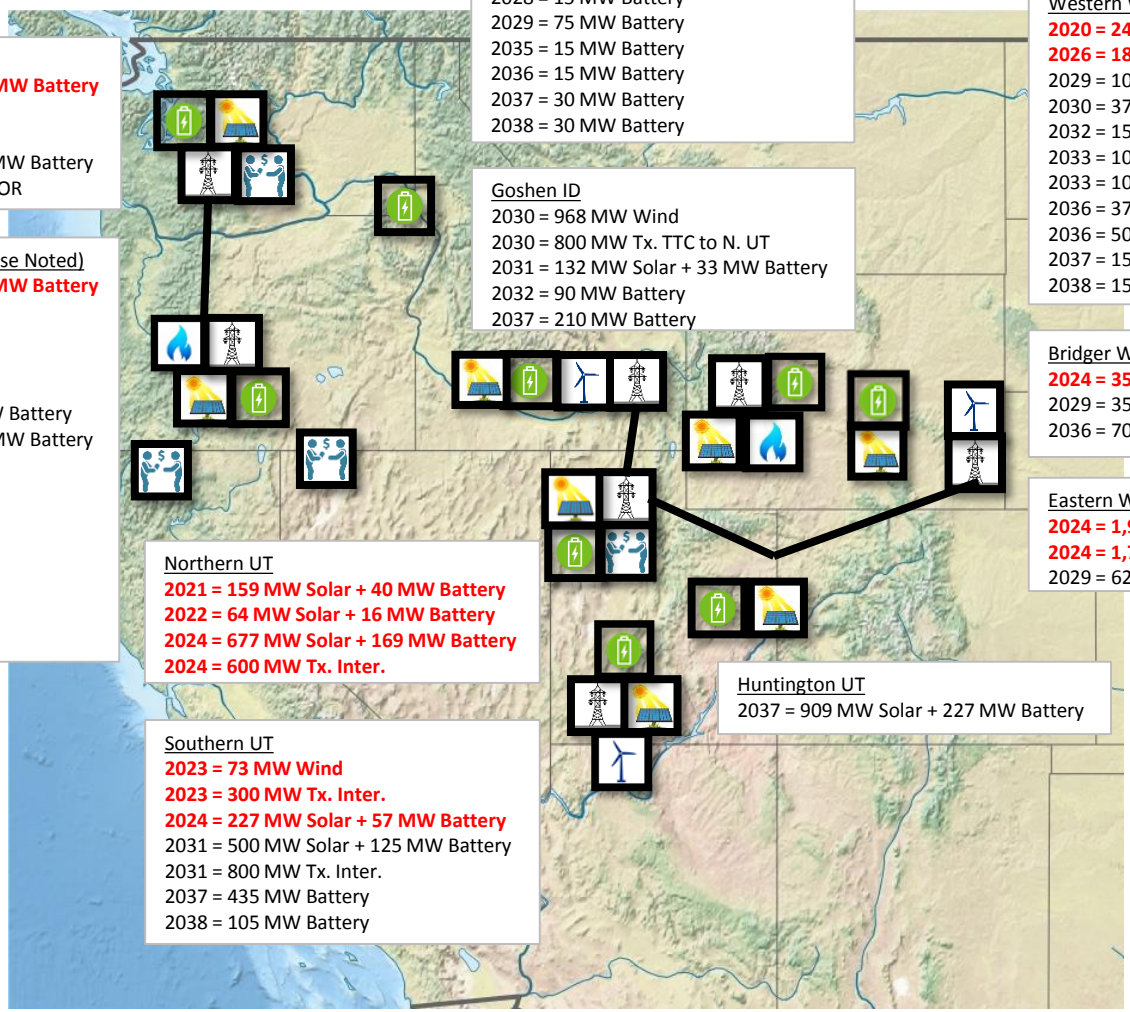
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2035 = JB3-4 (702 MW)
2036 = HTG1-2 (909 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-47CP

(P-45 with JB3-4 Retiring 2035)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2036 = 430 MW Solar + 108 MW Battery
2036 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 460 MW Solar + 115 MW Battery
2028 = 60 MW Solar
2029 = 105 MW Battery
2029 = 120 MW Battery**
2029 = 60 MW Battery*
2032 = 40 MW Solar + 10 MW Battery
2033 = 475 MW Solar + 119 MW Battery
2033 = 475 MW Tx. Inter.
2036 = 615 MW Tx. Inter.*
2037 = 75 MW Battery
2037 = 443 MW Gas*
2038 = 15 MW Battery

*Willamette Valley
**Portland North Coast

Walla Walla WA
2028 = 15 MW Battery
2029 = 75 MW Battery
2035 = 15 MW Battery
2036 = 15 MW Battery
2037 = 30 MW Battery
2038 = 30 MW Battery

Goshen ID
2030 = 968 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 132 MW Solar + 33 MW Battery
2032 = 90 MW Battery
2037 = 210 MW Battery

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar + 169 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2023 = 73 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 227 MW Solar + 57 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2037 = 435 MW Battery
2038 = 105 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2029 = 105 MW Battery
2030 = 370 MW Gas
2032 = 15 MW Battery
2033 = 100 MW Solar + 25 MW Battery
2033 = 100 MW Tx. Inter.
2036 = 370 MW Gas
2036 = 500 MW Tx. Inter.
2037 = 150 MW Battery
2038 = 15 MW Battery

Bridger WY
2024 = 354 MW Solar = 89 MW Battery
2029 = 359 MW Solar = 90 MW Battery
2036 = 702 MW Solar = 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

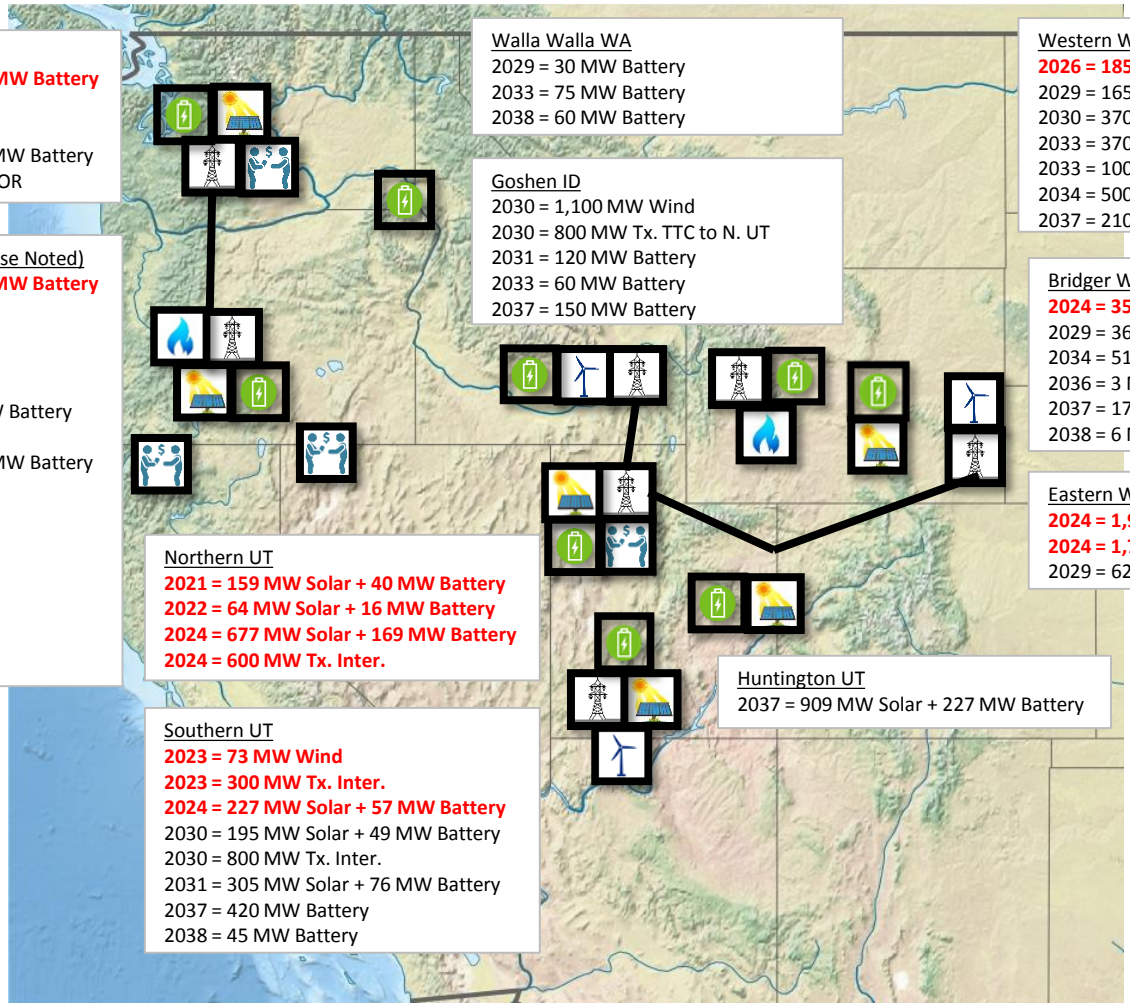
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = CG1 (82 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2035 = JB3-4 (702 MW)
2036 = HTG1-2 (909 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-48C

(P-45 with JB3-4 Retiring 2033)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2036 = 430 MW Solar + 108 MW Battery
2036 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 462 MW Solar + 115 MW Battery
2028 = 75 MW Battery
2028 = 15 MW Solar*
2029 = 165 MW Solar
2029 = 90 MW Battery**
2032 = 38 MW Solar + 10 MW Battery
2033 = 45 MW Battery
2033 = 475 MW Solar + 119 MW Battery
2034 = 221 MW Gas*
2037 = 221 MW Gas*
2033 = 475 MW Tx. Inter.
2034 = 615 MW Tx. Inter.*
2038 = 30 MW Battery

*Willamette Valley
**Portland North Coast

Walla Walla WA
2029 = 30 MW Battery
2033 = 75 MW Battery
2038 = 60 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 120 MW Battery
2033 = 60 MW Battery
2037 = 150 MW Battery

Western WY/Naughton
2026 = 185 MW Gas
2029 = 165 MW Battery
2030 = 370 MW Gas
2033 = 370 MW Gas
2033 = 100 MW Tx. Inter.
2034 = 500 MW Tx. Inter.
2037 = 210 MW Battery

Bridger WY
2024 = 354 MW Solar = 89 MW Battery
2029 = 360 MW Solar = 90 MW Battery
2034 = 519 MW Solar = 130 MW Battery
2036 = 3 MW Solar = 1 MW Battery
2037 = 174 MW Solar = 43 MW Battery
2038 = 6 MW Solar = 2 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar + 169 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2023 = 73 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 227 MW Solar + 57 MW Battery
2030 = 195 MW Solar + 49 MW Battery
2030 = 800 MW Tx. Inter.
2031 = 305 MW Solar + 76 MW Battery
2037 = 420 MW Battery
2038 = 45 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

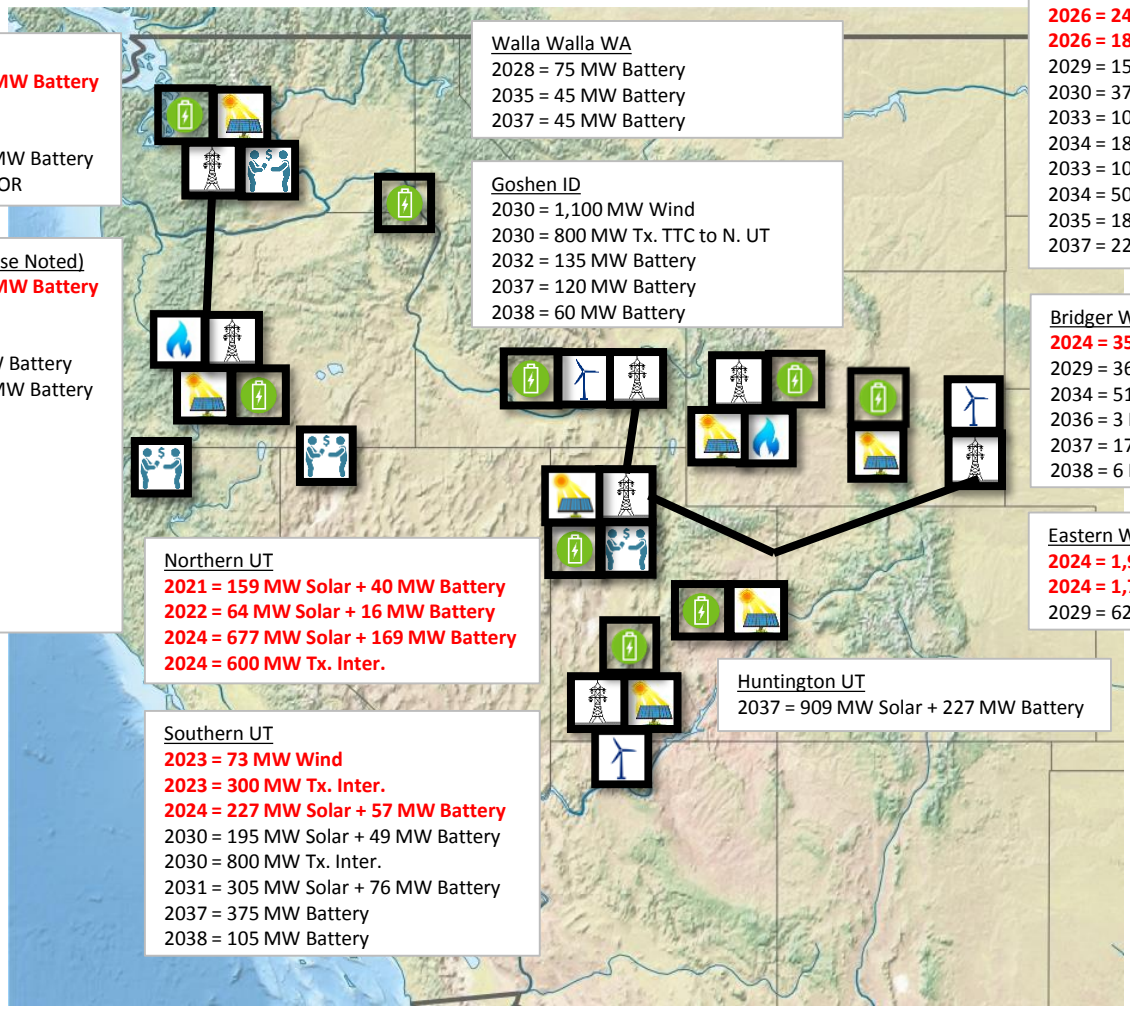
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = NT1-2 (357 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2032 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2033 = JB3-4 (702 MW)
2036 = HTG1-2 (909 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-48CP

(P-45 with JB3-4 Retiring 2033)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2036 = 430 MW Solar + 108 MW Battery
2036 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 462 MW Solar + 115 MW Battery
2029 = 165 MW Battery
2029 = 135 MW Solar**
2032 = 38 MW Solar + 10 MW Battery
2033 = 475 MW Solar + 119 MW Battery
2035 = 15 MW Battery**
2035 = 443 MW Gas*
2033 = 475 MW Tx. Inter.
2034 = 615 MW Tx. Inter.*
2037 = 75 MW Battery
2037 = 15 MW Battery**

*Willamette Valley
**Portland North Coast

Walla Walla WA
2028 = 75 MW Battery
2035 = 45 MW Battery
2037 = 45 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2032 = 135 MW Battery
2037 = 120 MW Battery
2038 = 60 MW Battery

Western WY/Naughton
2026 = 247 MW Gas Conv.*
2026 = 185 MW Gas*
2029 = 150 MW Battery*
2030 = 370 MW Gas*
2033 = 100 MW Solar + 25 MW Battery*
2034 = 185 MW Gas*
2033 = 100 MW Tx. Inter.
2034 = 500 MW Tx. Inter.
2035 = 185 MW Gas*
2037 = 225 MW Battery

Bridger WY
2024 = 354 MW Solar = 89 MW Battery
2029 = 360 MW Solar = 90 MW Battery
2034 = 519 MW Solar = 130 MW Battery
2036 = 3 MW Solar = 1 MW Battery
2037 = 174 MW Solar = 43 MW Battery
2038 = 6 MW Solar = 2 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar + 169 MW Battery
2024 = 600 MW Tx. Inter.

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Southern UT
2023 = 73 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 227 MW Solar + 57 MW Battery
2030 = 195 MW Solar + 49 MW Battery
2030 = 800 MW Tx. Inter.
2031 = 305 MW Solar + 76 MW Battery
2037 = 375 MW Battery
2038 = 105 MW Battery

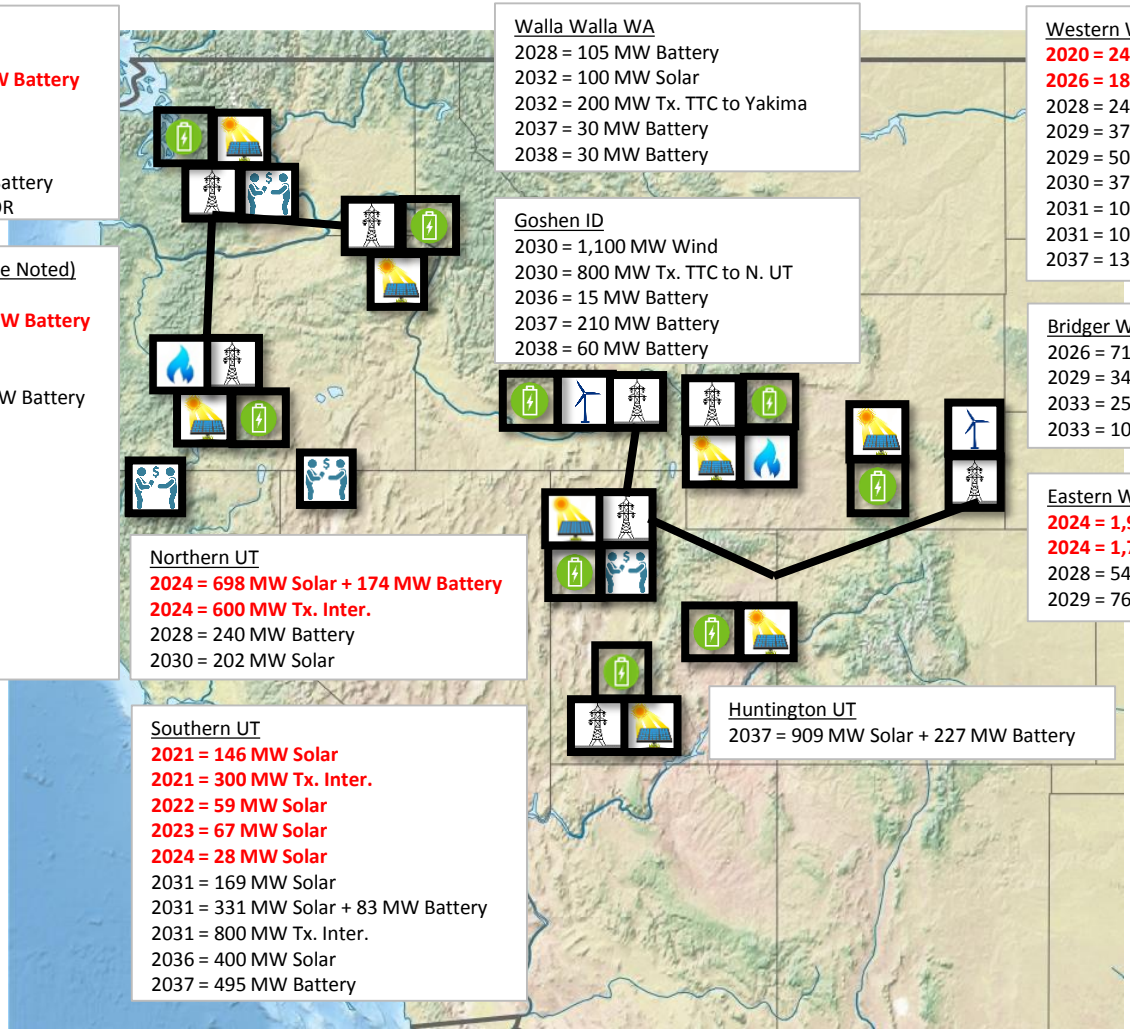
Coal Retirements
2020 = NT3 (280 MW)
2020 = CH4 (387 MW)
2023 = JB1 (354 MW)
2025 = NT1-2 (357 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2032 = JB2 (359 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2033 = JB3-4 (702 MW)
2036 = HTG1-2 (909 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-53

(P-31 with JB1-2 Retiring 2025, JB3 Retiring 2028, and JB4 Retiring 2032)



Yakima WA
2024 = 289 MW Solar
2024 = 116 MW Solar + 29 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2038 = 407 MW Solar
2038 = 23 MW Solar + 6 MW Battery
2038 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
Southern OR
2024 = 500 MW Solar + 125 MW Battery
2028 = 45 MW Battery
2028 = 120 MW Battery**
2032 = 475 MW Solar + 119 MW Battery
2032 = 475 MW Tx. Inter.
2033 = 443 MW Gas*
2033 = 615 MW Tx. Inter.*
2037 = 555 MW Battery
2037 = 90 MW Battery*
2037 = 30 MW Battery**
2038 = 30 MW Battery

*Willamette Valley
**Portland North Coast

Walla Walla WA
2028 = 105 MW Battery
2032 = 100 MW Solar
2032 = 200 MW Tx. TTC to Yakima
2037 = 30 MW Battery
2038 = 30 MW Battery

Goshen ID
2030 = 1,100 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2036 = 15 MW Battery
2037 = 210 MW Battery
2038 = 60 MW Battery

Northern UT
2024 = 698 MW Solar + 174 MW Battery
2024 = 600 MW Tx. Inter.
2028 = 240 MW Battery
2030 = 202 MW Solar

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 28 MW Solar
2031 = 169 MW Solar
2031 = 331 MW Solar + 83 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2037 = 495 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2028 = 240 MW Battery
2029 = 370 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 370 MW Gas
2031 = 100 MW Solar
2031 = 100 MW Tx. Inter.
2037 = 135 MW Battery

Bridger WY
2026 = 713 MW Solar
2029 = 349 MW Solar
2033 = 251 MW Solar
2033 = 102 MW Solar + 25 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 544 MW Wind
2029 = 76 MW Wind

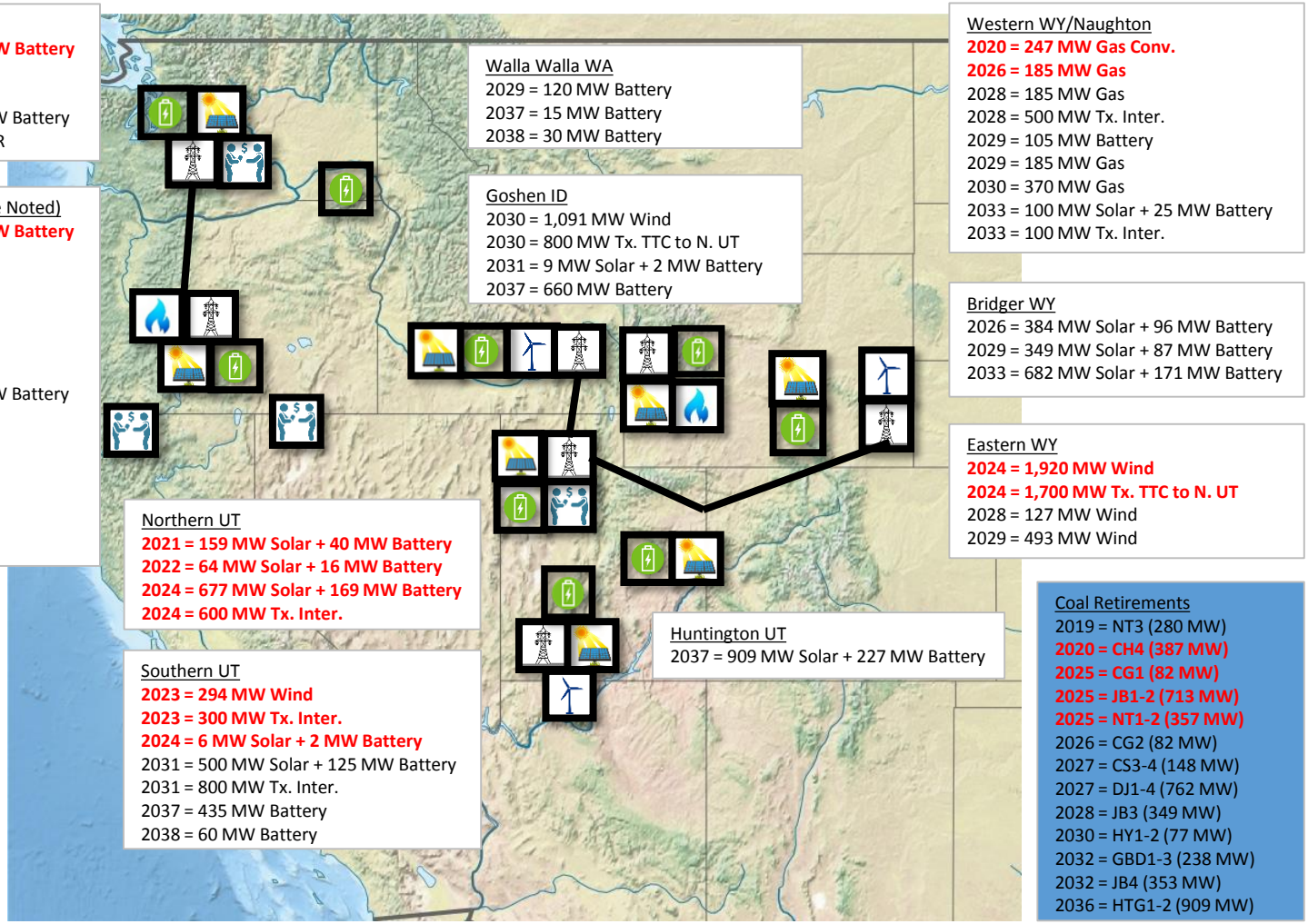
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2025 = JB1-2 (713 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB3 (349 MW)
2030 = HY1-2 (77 MW)
2032 = GBD1-3 (238 MW)
2032 = JB4 (353 MW)
2036 = HTG1-2 (909 MW)

Solar
Wind
Battery
Geothermal
Pumped Hydro
Gas
Market
Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-53C

(P-31 with JB1-2 Retiring 2025, JB3 Retiring 2028, and JB4 Retiring 2032)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2026 = 105 MW Battery
2024 = 405 MW Tx. Inter.
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2026 = 15 MW Battery
2026 = 30 MW Battery*
2027 = 30 MW Battery*
2029 = 150 MW Battery
2029 = 60 MW Battery**
2033 = 443 MW Gas*
2033 = 475 MW Solar + 119 MW Battery
2033 = 475 MW Tx. Inter.
2033 = 615 MW Tx. Inter.*
2037 = 45 MW Battery**
2038 = 60 MW Battery

*Willamette Valley
**Portland North Coast

Walla Walla WA
2029 = 120 MW Battery
2037 = 15 MW Battery
2038 = 30 MW Battery

Goshen ID
2030 = 1,091 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 9 MW Solar + 2 MW Battery
2037 = 660 MW Battery

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar + 169 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2023 = 294 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 6 MW Solar + 2 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2037 = 435 MW Battery
2038 = 60 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2028 = 185 MW Gas
2028 = 500 MW Tx. Inter.
2029 = 105 MW Battery
2029 = 185 MW Gas
2030 = 370 MW Gas
2033 = 100 MW Solar + 25 MW Battery
2033 = 100 MW Tx. Inter.

Bridger WY
2026 = 384 MW Solar + 96 MW Battery
2029 = 349 MW Solar + 87 MW Battery
2033 = 682 MW Solar + 171 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 127 MW Wind
2029 = 493 MW Wind

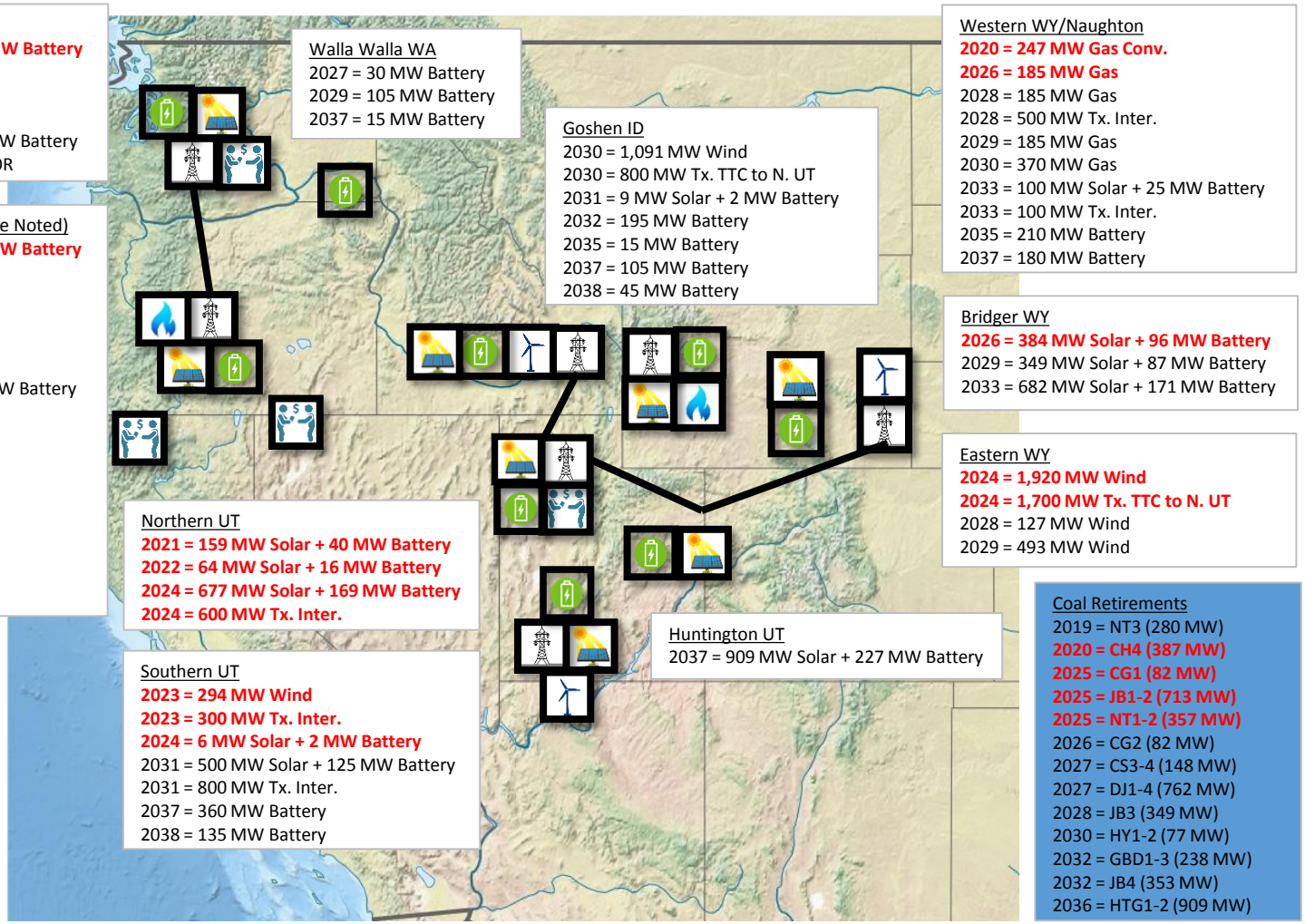
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2025 = JB1-2 (713 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB3 (349 MW)
2030 = HY1-2 (77 MW)
2032 = GBD1-3 (238 MW)
2032 = JB4 (353 MW)
2036 = HTG1-2 (909 MW)

Solar
Wind
Battery
Geothermal
Pumped Hydro
Gas
Market
Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-53CP

(P-31 with JB1-2 Retiring 2025, JB3 Retiring 2028, and JB4 Retiring 2032)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2026 = 90 MW Battery
2029 = 15 MW Battery
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar + 125 MW Battery
2026 = 30 MW Battery
2026 = 30 MW Battery**
2029 = 210 MW Battery
2029 = 30 MW Battery**
2029 = 75 MW Battery*
2033 = 475 MW Solar + 119 MW Battery
2033 = 475 MW Tx. Inter.
2033 = 615 MW Tx. Inter.*
2035 = 15 MW Battery
2035 = 30 MW Battery**
2035 = 221 MW Gas*
2037 = 221 MW Gas*

*Willamette Valley
**Portland North Coast

Walla Walla WA
2027 = 30 MW Battery
2029 = 105 MW Battery
2037 = 15 MW Battery

Goshen ID
2030 = 1,091 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 9 MW Solar + 2 MW Battery
2032 = 195 MW Battery
2035 = 15 MW Battery
2037 = 105 MW Battery
2038 = 45 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2028 = 185 MW Gas
2028 = 500 MW Tx. Inter.
2029 = 185 MW Gas
2030 = 370 MW Gas
2033 = 100 MW Solar + 25 MW Battery
2033 = 100 MW Tx. Inter.
2035 = 210 MW Battery
2037 = 180 MW Battery

Bridger WY
2026 = 384 MW Solar + 96 MW Battery
2029 = 349 MW Solar + 87 MW Battery
2033 = 682 MW Solar + 171 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2028 = 127 MW Wind
2029 = 493 MW Wind

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 MW Battery
2024 = 677 MW Solar + 169 MW Battery
2024 = 600 MW Tx. Inter.

Southern UT
2023 = 294 MW Wind
2023 = 300 MW Tx. Inter.
2024 = 6 MW Solar + 2 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2037 = 360 MW Battery
2038 = 135 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

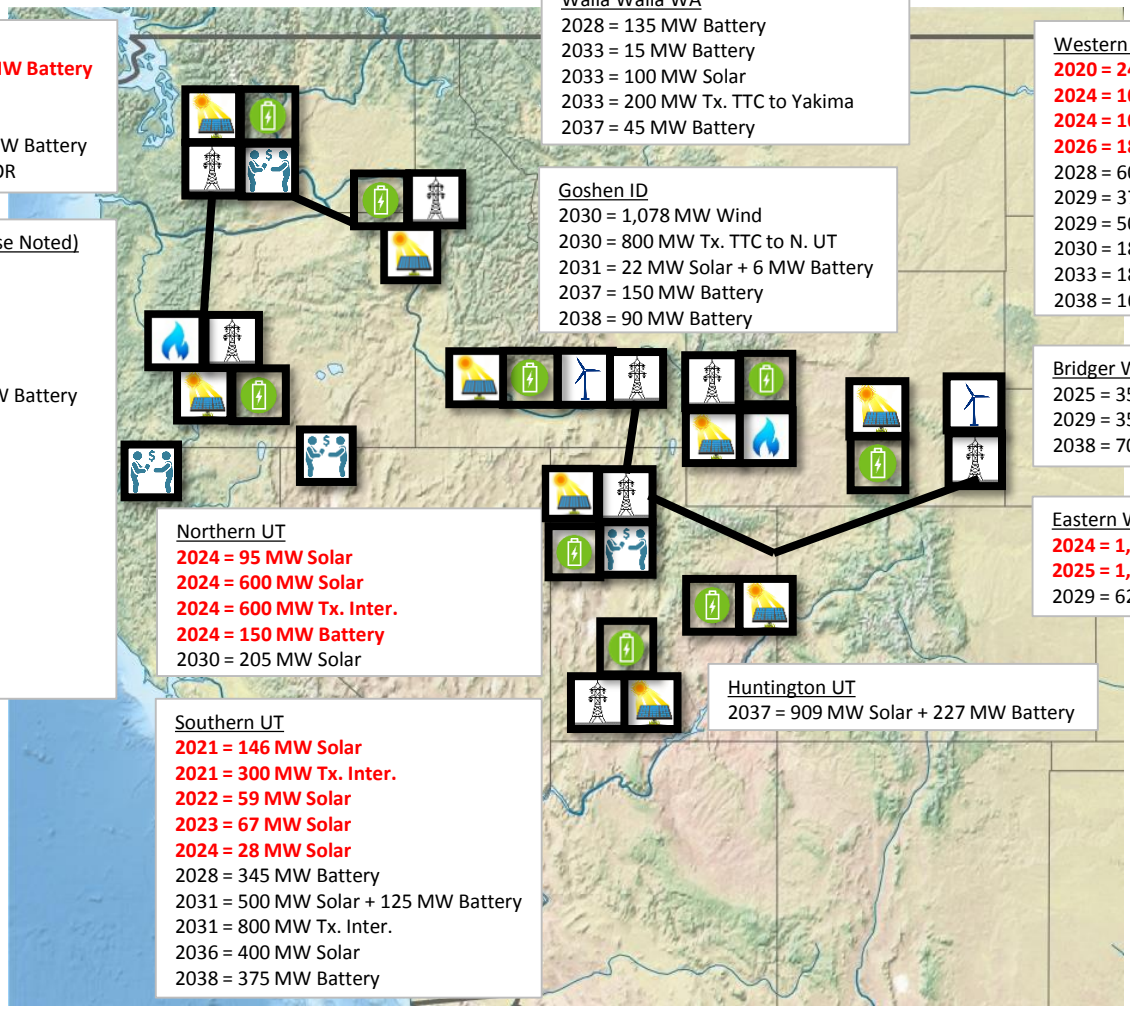
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2025 = CG1 (82 MW)
2025 = JB1-2 (713 MW)
2025 = NT1-2 (357 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB3 (349 MW)
2030 = HY1-2 (77 MW)
2032 = GBD1-3 (238 MW)
2032 = JB4 (353 MW)
2036 = HTG1-2 (909 MW)

Solar
Wind
Battery
Geothermal
Pumped Hydro
Gas
Market
Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-54

(P-31 with JB2 Retiring 2024)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2026 = 105 MW Battery
2024 = 405 MW Tx. Inter.
2037 = 430 MW Solar + 108 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Southern OR (Unless Otherwise Noted)
2024 = 500 MW Solar
2028 = 120 MW Battery
2028 = 15 MW Battery*
2028 = 135 MW Battery**
2032 = 142 MW Solar
2032 = 333 MW Solar + 83 MW Battery
2032 = 475 MW Tx. Inter.
2033 = 105 MW Battery
2033 = 30 MW Battery**
2037 = 420 MW Battery
2037 = 443 MW Gas*
2037 = 615 MW Tx. Inter.*
2038 = 45 MW Battery
2038 = 45 MW Battery**

*Willamette Valley
**Portland North Coast

Walla Walla WA
2028 = 135 MW Battery
2033 = 15 MW Battery
2033 = 100 MW Solar
2033 = 200 MW Tx. TTC to Yakima
2037 = 45 MW Battery

Goshen ID
2030 = 1,078 MW Wind
2030 = 800 MW Tx. TTC to N. UT
2031 = 22 MW Solar + 6 MW Battery
2037 = 150 MW Battery
2038 = 90 MW Battery

Northern UT
2024 = 95 MW Solar
2024 = 600 MW Solar
2024 = 600 MW Tx. Inter.
2024 = 150 MW Battery
2030 = 205 MW Solar

Southern UT
2021 = 146 MW Solar
2021 = 300 MW Tx. Inter.
2022 = 59 MW Solar
2023 = 67 MW Solar
2024 = 28 MW Solar
2028 = 345 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2036 = 400 MW Solar
2038 = 375 MW Battery

Huntington UT
2037 = 909 MW Solar + 227 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2024 = 100 MW Solar
2024 = 100 MW Tx. Inter.
2026 = 185 MW Gas
2028 = 60 MW Battery
2029 = 370 MW Gas
2029 = 500 MW Tx. Inter.
2030 = 185 MW Gas
2033 = 185 MW Gas
2038 = 165 MW Battery

Bridger WY
2025 = 359 MW Solar
2029 = 354 MW Solar
2038 = 702 MW Solar + 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2025 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

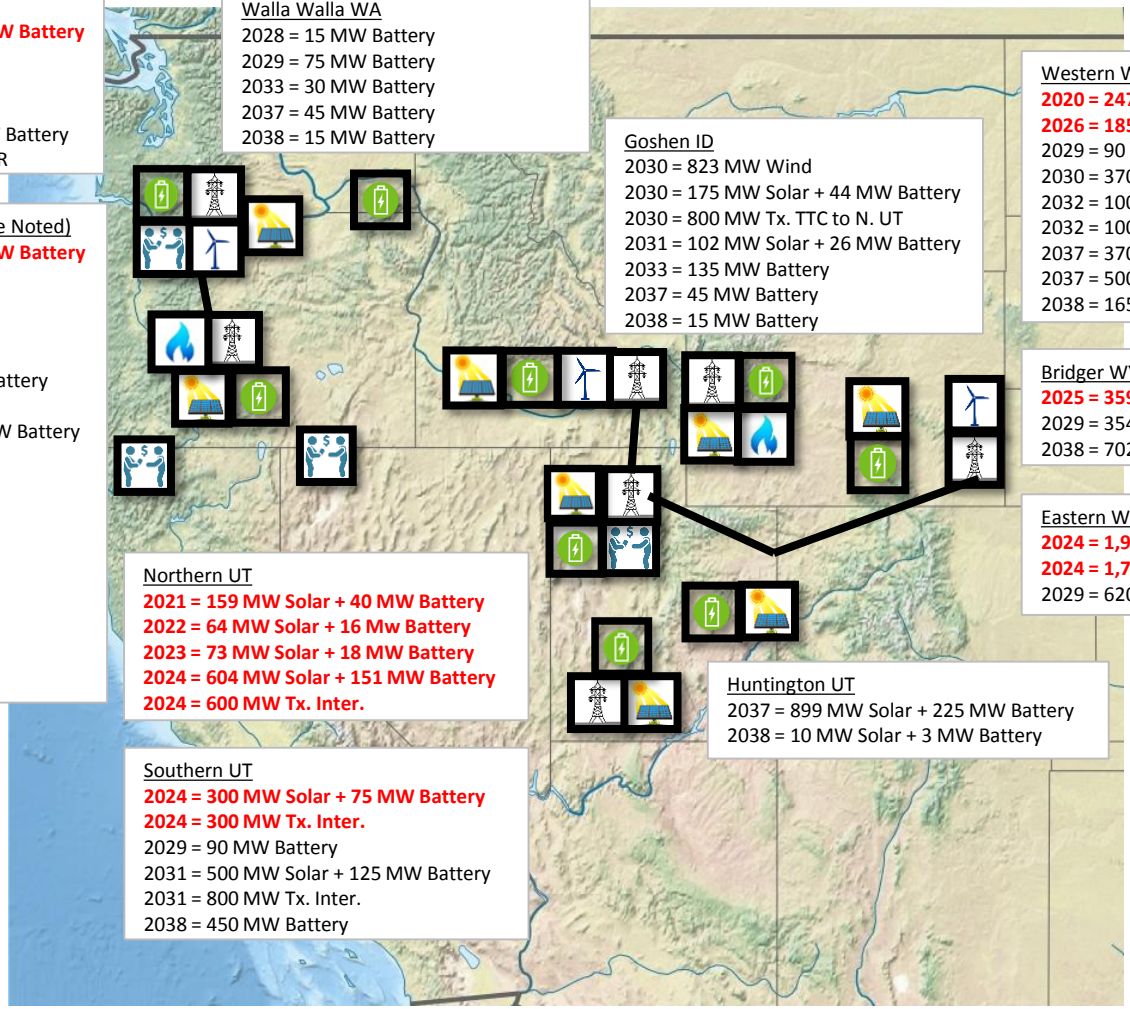
Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2024 = JB2 (359 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2029 = NT1-3 (637 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2037 = JB3-4 (702 MW)
2036 = HTG1-2 (909 MW)

Solar
Wind
Battery
Geothermal
Pumped Hydro
Gas
Market
Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.

Case P-54C

(P-31 with JB2 Retiring 2024)



Yakima WA
2024 = 405 MW Solar + 101 MW Battery
2024 = 405 MW Tx. Inter.
2028 = 105 MW Battery
2037 = 214 MW Wind
2037 = 216 MW Solar + 54 MW Battery
2037 = 450 MW Tx. TTC to S. OR

Walla Walla WA
2028 = 15 MW Battery
2029 = 75 MW Battery
2033 = 30 MW Battery
2037 = 45 MW Battery
2038 = 15 MW Battery

Goshen ID
2030 = 823 MW Wind
2030 = 175 MW Solar + 44 MW Battery
2030 = 800 MW Tx. TTC to N. UT
2031 = 102 MW Solar + 26 MW Battery
2033 = 135 MW Battery
2037 = 45 MW Battery
2038 = 15 MW Battery

Western WY/Naughton
2020 = 247 MW Gas Conv.
2026 = 185 MW Gas
2029 = 90 MW Battery
2030 = 370 MW Gas
2032 = 100 MW Solar + 25 MW Battery
2032 = 100 MW Tx. Inter.
2037 = 370 MW Gas
2037 = 500 MW Tx. Inter.
2038 = 165 MW Battery

Southern OR (Unless Otherwise Noted)
2024 = 467 MW Solar + 117 MW Battery
2028 = 60 MW Battery
2029 = 30 MW Battery
2029 = 75 MW Battery*
2029 = 60 MW Battery**
2032 = 33 MW Solar + 8 MW Battery
2033 = 105 MW Battery
2033 = 475 MW Solar + 119 MW Battery
2033 = 15 MW Battery**
2033 = 475 MW Tx. Inter.
2037 = 135 MW Battery
2037 = 443 MW Gas*
2037 = 15 MW Battery**
2037 = 615 MW Tx. Inter.*
2038 = 60 MW Battery

*Willamette Valley
**Portland North Coast

Bridger WY
2025 = 359 MW Solar + 90 MW Battery
2029 = 354 MW Solar + 89 MW Battery
2038 = 702 MW Solar + 175 MW Battery

Eastern WY
2024 = 1,920 MW Wind
2024 = 1,700 MW Tx. TTC to N. UT
2029 = 620 MW Wind

Northern UT
2021 = 159 MW Solar + 40 MW Battery
2022 = 64 MW Solar + 16 Mw Battery
2023 = 73 MW Solar + 18 MW Battery
2024 = 604 MW Solar + 151 MW Battery
2024 = 600 MW Tx. Inter.

Huntington UT
2037 = 899 MW Solar + 225 MW Battery
2038 = 10 MW Solar + 3 MW Battery

Southern UT
2024 = 300 MW Solar + 75 MW Battery
2024 = 300 MW Tx. Inter.
2029 = 90 MW Battery
2031 = 500 MW Solar + 125 MW Battery
2031 = 800 MW Tx. Inter.
2038 = 450 MW Battery

Coal Retirements
2019 = NT3 (280 MW)
2020 = CH4 (387 MW)
2024 = JB2 (359 MW)
2025 = CG1 (82 MW)
2026 = CG2 (82 MW)
2027 = CS3-4 (148 MW)
2027 = DJ1-4 (762 MW)
2028 = JB1 (354 MW)
2029 = NT1-3 (637 MW)
2030 = HY1-2 (77 MW)
2032 = GDB1-3 (238 MW)
2037 = JB3-4 (702 MW)
2036 = HTG1-2 (909 MW)

- Solar
- Wind
- Battery
- Geothermal
- Pumped Hydro
- Gas
- Market
- Transmission

Note: Resources highlighted in red text would trigger an action item in the 2019 IRP action plan if this case were selected as the preferred portfolio.