2023 Integrated Resource Plan Sensitivity Modeling Results

PacifiCorp

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Additional Sensitivity Analysis

In addition to the studies developed as part of the 2023 Integrated Resource Plan (IRP) portfolio-development process supporting selection of the preferred portfolio, additional sensitivity cases were conducted to better understand how certain modeling assumptions influence the resource mix and timing of future resource additions. These sensitivity cases are useful in understanding how PacifiCorp's resource plan would be affected by changes to uncertain planning assumptions and to address how alternative resources and planning paradigms affect system costs and risk.

To isolate the impact of a given planning assumption, the present value revenue requirement (PVRR) of the sensitivity cases is compared to the PVRR of the 2023 IRP preferred portfolio, identified as case P-MM portfolio (medium gas / medium CO_2).

P-MM Sensitivity Cases

Table S.1 describes the sensitivity studies conducted under the P-MM case definitions with full optimization of coal retirement options.

Table S.1 – Summary of P-MM Sensitivity Cases[1]

Case	Description	Load Forecast	Private Generation	Resources	CO_2 Policy
S-01	High Load	High	Low	Optimized	Medium gas / Medium CO_2
S-02	Low Load	Low	High	Optimized	Medium gas / Medium CO_2
S-03	1 in 20 Load Growth	1 in 20	Base	Optimized	Medium gas / Medium CO_2
S-04	High Private Generation	Base	High	Optimized	Medium gas / Medium CO_2
S-05	Low Private Generation	Base	Low	Optimized	Medium gas / Medium CO_2
S-06	Business Plan	Base	Base	Align first three years	Medium gas / Medium CO_2

High Load Growth Sensitivity (S-01)

Table S.2 shows the PVRR impacts of the S-01 sensitivity relative to P-MM. Higher loads result in increased resource requirements which translate into higher system costs. Figure S.1 summarizes the portfolio impacts. The higher loads resulted in an additional 200 MW of wind and battery resources on the east side of the system, and an additional 50 MW of solar and battery

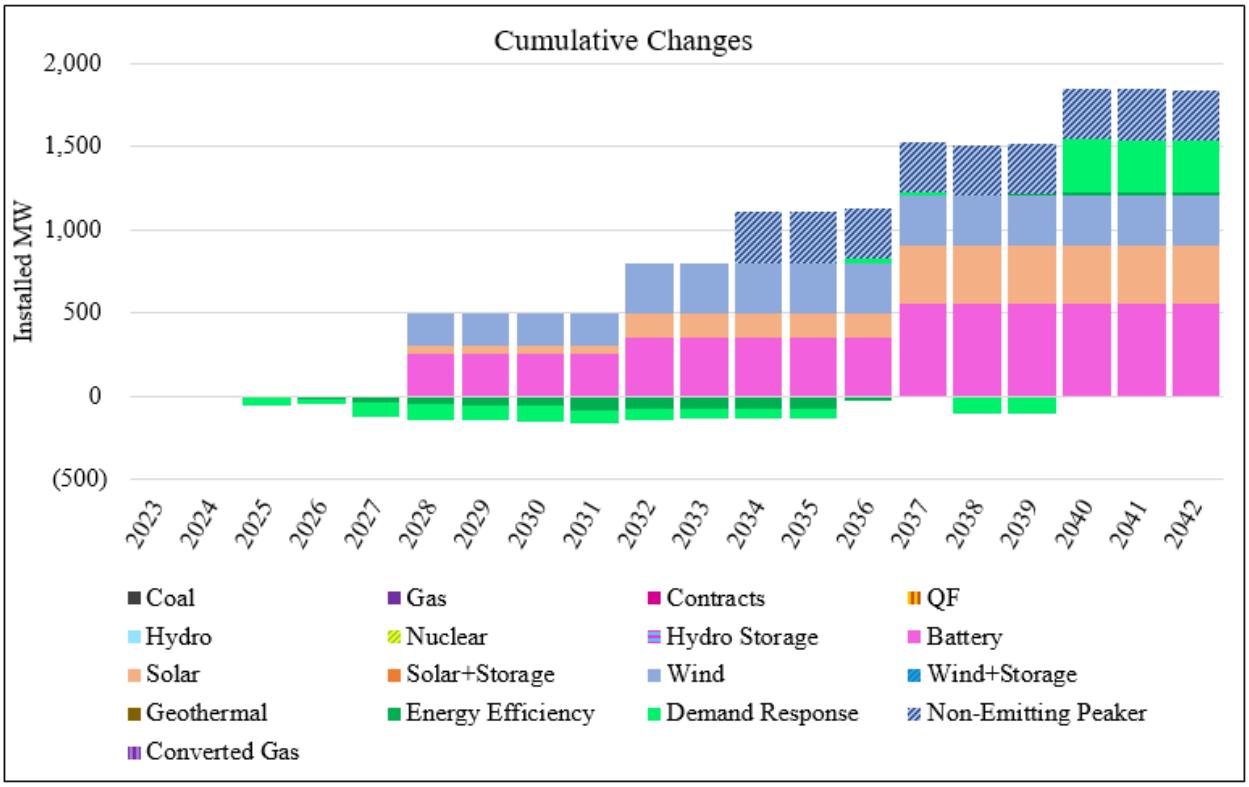
[1] The numbering sensitivities has been changed from the 2023 IRP filed March 31, 2023. As there will be another filing on May 31, 2023, inclusive of stakeholder feedback gathered during the 2023 IRP extended comment period, the 2023 IRP currently filed has not been updated to reflect this. Specifically, the "S-04 20-year Normal" sensitivity has been removed from Table S.1 this supplement because it was already provided as case "W-11 Climate Change counterfactual" in the 2023 IRP, Chapter 9 – Modeling and Portfolio Selection Results. Also, Sensitivity "S-08 New Load" is not included in this supplement as it was also provided in the same chapter.

resources in the west in 2028. In 2032, an additional 100 MW of wind, solar and battery were included in the west. In 2034, a Non-Emitting Peaker was added to the east, and in 2037, an additional 200 MW of solar and battery resources are added to the east. Energy efficiency and demand response selections increased throughout the study period as well. The higher loads are also met by increased thermal output and market purchases, and lower sales. CO_2 emissions over the study period increased by 9 million tons.

Table S.2 – Risk-Adjusted PVRR (Benefit)/Cost of S-01 vs. P-MM

(Benefit) / Cost ($ Million)
$1,692

Figure S.1 – Increase/(Decrease) in Nameplate Capacity of S-01 Relative to Case P-MM



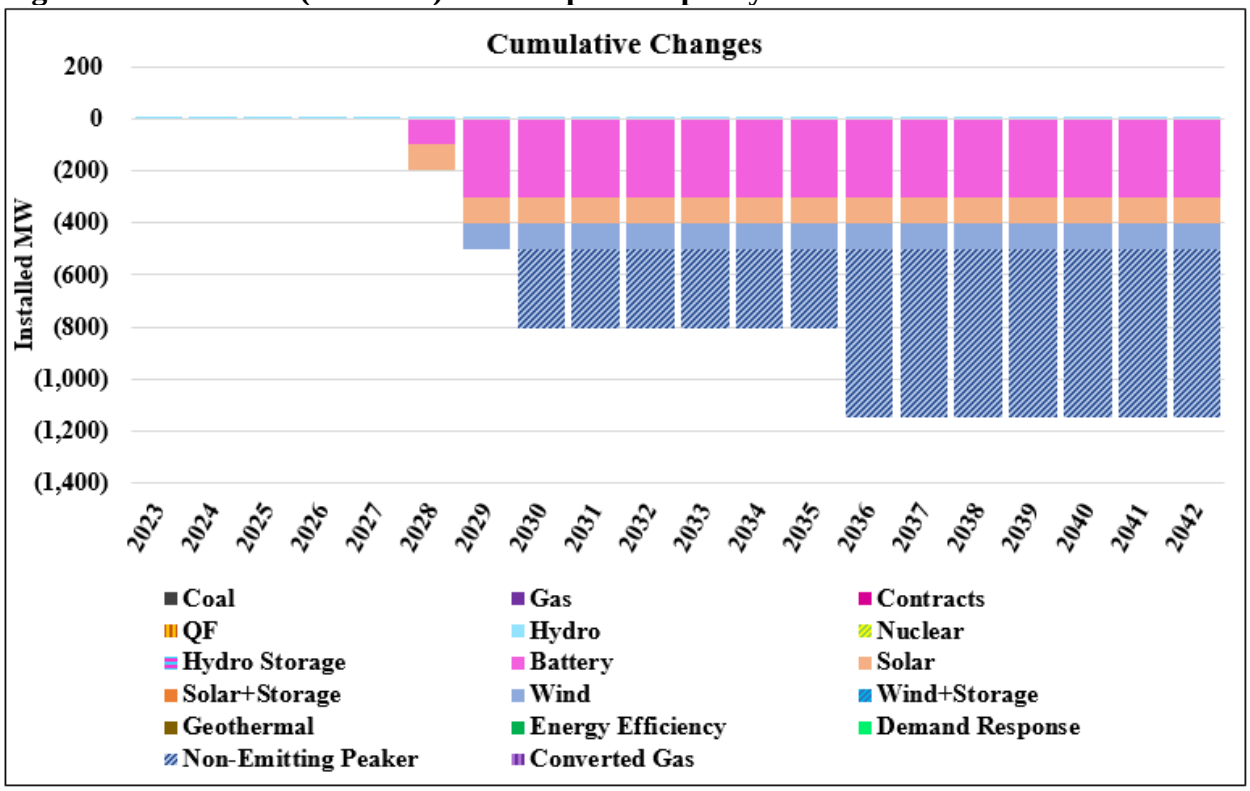
Low Load Growth Sensitivity (S-02)

Table S.3 shows the PVRR impacts of the S-02 sensitivity relative to P-MM . The reduced loads lower system costs over the 20-year study period. Figure S.2 summarizes portfolio impacts. In the low load sensitivity, 100 MW less of solar and battery were selected in 2028. A further reduction of 200 MW of battery occurred in 2029 along with 100 MW of wind. Additionally, replacement resource requirements decreased, reducing the need for 648 MW of non-emitting peaker resources split between years 2030 and 2036. These changes resulted in lower fuel costs, lower emission costs, and lower market purchases. CO_2 emissions over the study period decreased by 7 million tons.

Table S.3 – Risk-Adjusted PVRR (Benefit)/Cost of S-02 vs. P-MM

(Benefit) / Cost ($ Million)
($1,867)

Figure S.2 – Increase/(Decrease) in Nameplate Capacity of S-02 Relative to Case P-MM



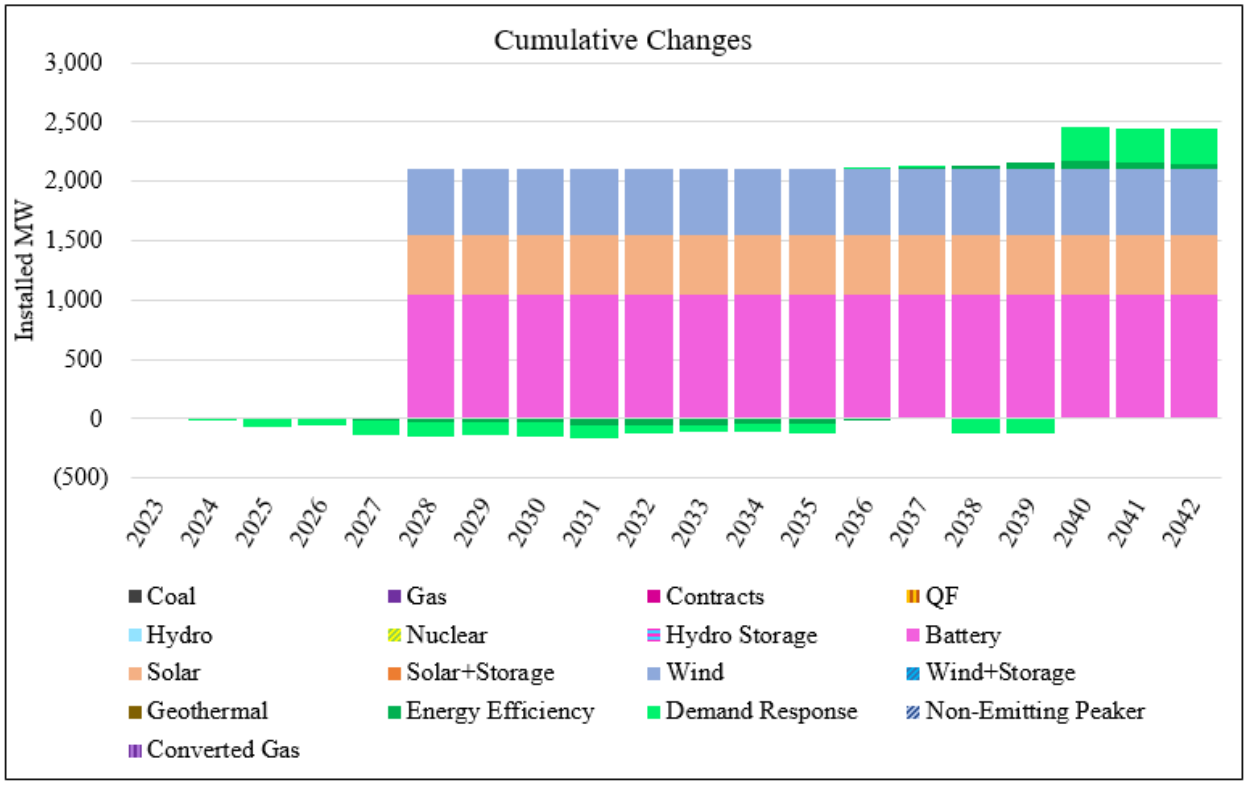
1-in-20 Load Growth Sensitivity (S-03)

Table S.4 shows the PVRR impacts of the S-03 sensitivity relative to P-MM. This sensitivity assumes 1-in-20 extreme weather conditions during the summer (July) for each state. System costs are approximately $1.3 billion higher due to requirements to meet additional peak load. Figure S.3 summarizes portfolio impacts. In 2028, an additional 550 MW of wind and 500 MW of solar are selected and matched by an incremental 1,050 MW of battery storage. An additional 342 MW of demand response and 42 MW of energy efficiency are selected by the end of the study period. 412 MW of non-emitting peaker resources in 2030 replaced the need for 50 MW of wind and 400 MW of stand-alone battery resources in 2029 and 2030, respectively. A net increase of 1,326 MW of incremental transmission is selected to support portfolio changes. The high early influx of renewables and battery storage in 2028 reduces emissions by approximately 13 million tons over the study period.

Table S.4 – Risk-Adjusted PVRR (Benefit)/Cost of S-03 vs. P-MM

(Benefit) / Cost ($ Million)
$1,347

Figure S.3 – Increase/(Decrease) in Nameplate Capacity of S-03 Relative to Case P-MM



High Private Generation Sensitivity (S-04)

The High Private Generation sensitivity in the 2023 IRP is substantially similar to the preferred portfolio. This is driven by the influence of the Inflation Reduction Act, which enacted most of the drivers previously explaining the circumstances which might lead to higher private generation. In this sense, the 2023 IRP preferred portfolio already realizes the much of the narrative justifying a higher private generation future.[2] Combined with the high level of overlap between private generation and solar saturation, no material portfolio changes were indicted in S-04 relative to the preferred portfolio.

[2] See the report accompanying the 2023 IRP, Appendix L – Private Generation, report entitled *Private Generation Forecast, Behind-The-Meter Resource Assessment, page 11,*

> *"The Inflation Reduction Act of 2022 (IRA) extends tax credits for private generation that create very favorable economics for adoption, and those are embedded in the base case. We therefore limited our upper bound forecast to lower technology costs and higher retail electricity rates, and these produced only a small boost to adoption for technologies that were already cost effective under the IRA."*

Table S.5 shows the PVRR impacts of the High Private S-04 sensitivity relative to P-MM. Higher private generation assumptions decrease net load, which in turn decreases system costs. The CO_2 emissions over the study period decreased by 1 million tons.

Table S.5 -- Risk-Adjusted PVRR (Benefit)/Cost of S-04 vs. P-MM

(Benefit) / Cost ($ Million)
($24)

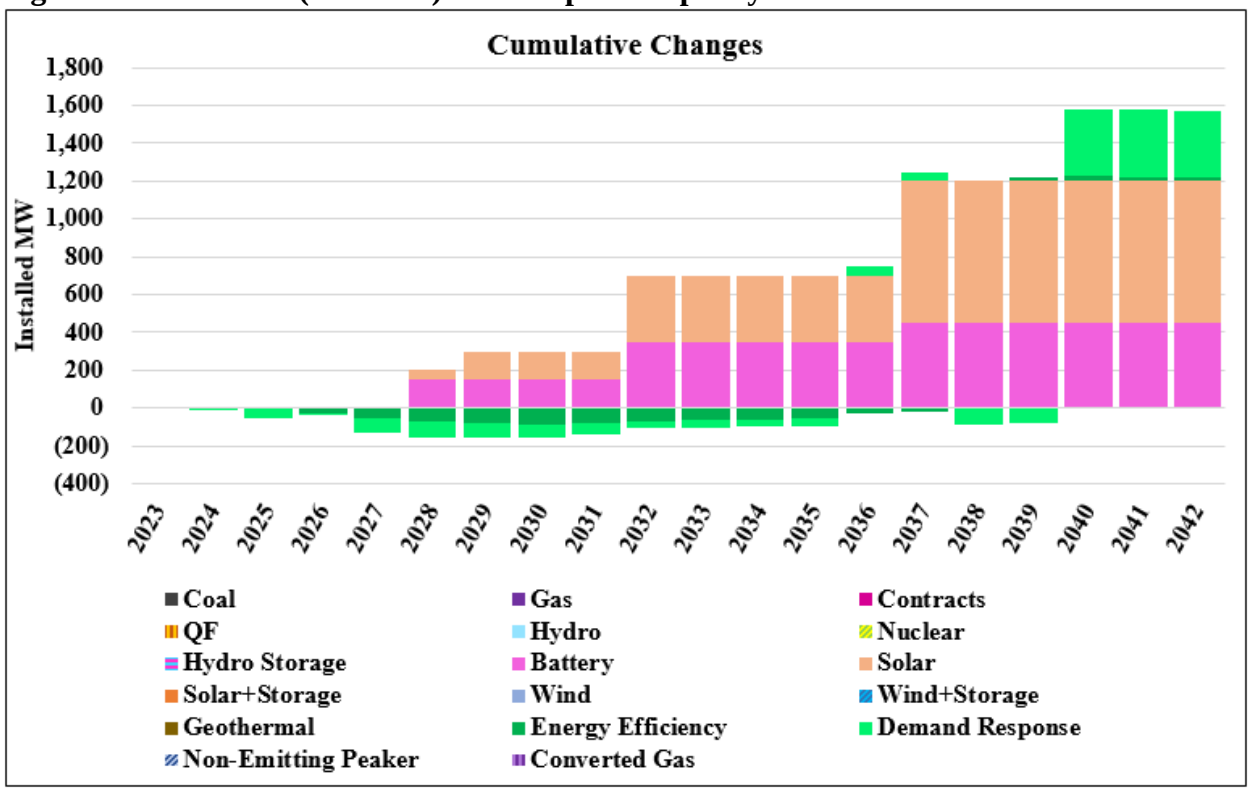
Low Private Generation Sensitivity (S-05)

Table S.6 shows the PVRR impacts of the S-05 sensitivity relative to P-MM. Lower private generation creates higher net loads and results in increased system costs, primarily due to increased proxy resources costs, partially offset by net market transaction benefits. Figure S.4 summarizes portfolio impacts. From 2028 to 2032, 350 MW of incremental solar and battery storage are added to the system, followed by an additional 400 MW of solar and 100 MW of battery in 2037. An additional 352 MW of demand response and 21 MW of energy efficiency are selected by the end of the study period. A net increase of 706 MW of incremental transmission is selected to support portfolio changes. CO_2 emissions over the study period decreased by 1 million tons.

Table S.6 -- Risk-Adjusted PVRR (Benefit)/Cost of S-05 vs. P-MM

(Benefit) / Cost ($ Million)
$382

Figure S.4 – Increase/(Decrease) in Nameplate Capacity of S-04 Relative to Case P-MM



Business Plan Sensitivity (S-06)

Table S.7 shows the PVRR impacts of the S-06 sensitivity relative to P-MM. System benefits increase by $614m. This sensitivity complies with Utah requirements to perform a business plan sensitivity consistent with the Public Service Commission of Utah's order in Docket No. 15-035-04, summarized as follows:

- Over the first three years, resources align with those assumed in PacifiCorp's December 2022 Business Plan.
- Beyond the first three years of the study period, unit retirement assumptions are aligned with the preferred portfolio.
- All other resources are optimized.

Figure S.5 reflects the difference between business plan project status as compared to preferred portfolio proxy resource options in the initial three years of the 20-year study period. This is observed as reductions or delays in 2020 All-Source Request for Proposals (RFP) wind, solar and battery storage resources in the business plan relative to the 2023 IRP, primarily in 2025. The

business plan also reflects increased market reliance and reduced sales. CO_2 emissions over the study period increased by 9 million tons relative to the preferred portfolio.

Table S.7 – Risk-Adjusted PVRR (Benefit)/Cost of S-06 vs. P-MM

(Benefit) / Cost ($ Million)
($614)

Figure S.5 – Increase/(Decrease) in Nameplate Capacity of S-06 Relative to Case P-MM