

PacifiCorp - Stakeholder Feedback Form

2021 Integrated Resource Plan

PacifiCorp (the Company) requests that stakeholders provide feedback to the Company upon the conclusion of each public input meeting and/or stakeholder conference calls, as scheduled. PacifiCorp values the input of its active and engaged stakeholder group, and stakeholder feedback is critical to the IRP public input process. PacifiCorp requests that stakeholders provide comments using this form, which will allow the Company to more easily review and summarize comments by topic and to readily identify specific recommendations, if any, being provided. Information collected will be used to better inform issues included in the 2021 IRP, including, but not limited to the process, assumptions, and analysis. In order to maintain open communication and provide the broader Stakeholder community with useful information, the Company will generally post all appropriate feedback on the IRP website unless you request otherwise, below.

Date of Submittal 6/26/2020

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Public Meeting Date comments address: **6/19/2020**

☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

Nikita Bankoti

***IRP Topic(s) and/or Agenda Items:** List the specific topics that are being addressed in your comments.

IRP modeling process, resource adequacy, load forecast, distributed energy resources, RFP, project delivery plan

☐ Check here if any of the following information being submitted is copyrighted or confidential.

☐ Check here if you do **not** want your Stakeholder feedback and accompanying materials posted to the IRP website.

***Respondent Comment:** Please provide your feedback for each IRP topic listed above.

Please see accompanying WA-UTC staff feedback & questions document.

Data Support: If applicable, provide any documents, hyper-links, etc. in support of comments. (i.e. gas forecast is too high - this forecast from EIA is more appropriate). If electronic attachments are provided with your comments, please list those attachment names here.

Draft WA electric IRP compliance template.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.

Please see accompanying WA-UTC staff feedback & questions document.

Please submit your completed Stakeholder Feedback Form via email to IRP@PacifiCorp.com

Thank you for participating.

Commission Staff Feedback for PacifiCorp 2021 IRP: Webinar # 1 Process Overview (June 18-19, 2020)

* Required fields

This feedback, dated June 26, 2020, states the informal comments, questions, and recommendations of Washington Utilities and Transportation Commission Staff, Jim Woodward. Staff appreciates the continued work of PacifiCorp's IRP Team and the opportunity to participate. Timely feedback is offered as technical assistance and is not intended as legal advice. Staff reserves the right to amend these opinions should circumstances change or additional information be brought to our attention. Staff opinions are not binding on the commission.

Company response by **July 13, 2020**, is appreciated for select questions and requests in **BOLD** found below.

Status update re: 2019 IRP items of interest

WA-UTC made the following inquiries / requests about the **Colstrip** and **Jim Bridger coal plants** via an [updated acknowledge letter](#) to Pac's 2017 IRP and ahead of the company's 2019 IRP progress reports on 7/3/2019:

*Note: Appendix R – Coal Studies found within PacifiCorp's 2019 IRP progress report Vol. 2 (pp. 591-613) discusses the three-phase modeling approach used to determine the 23 coal retirement cases. However, to answer the below questions, Pac may need to adjust its modeling runs to **incorporate a low gas price condition with Social Cost of Carbon (SCC) CO2 price assumptions** (see Appendix R, p. 597).*

Colstrip

1. Regarding fuel source cost and risk:

- a. **What is the cost and physical supply risk of coal from the Rosebud mine due to the Westmoreland bankruptcy?**

PacifiCorp Response:

Supply risk, except as represented by fuel cost and perhaps unit availability, is not an explicit consideration in Integrated Resource Plan (IRP) modeling. However, Westmoreland completed its bankruptcy in 2019. There is no new added risk to either cost or supply associated with the coal deliveries from the Rosebud mine to the Colstrip plant. A new coal supply agreement was executed after the Westmoreland Bankruptcy was completed. The new coal supply agreement has prescribed pricing and a sufficient tonnage volume range from which the plant's fueling needs are met.

- b. As the need for fuel for Colstrip declines, **how does the increased cost per unit of coal effect the economic dispatch of Colstrip? This should be explicitly modeled in Pacific Power's IRP portfolio dispatch model.**

PacifiCorp Response:

IRP modeling explicitly considers fuel price in dispatch decisions for Colstrip units 3 & 4. Higher coal fuel prices will generally cause coal to generate at lower levels, while still allowing the carrying of reserves and ancillary services as determined by unit commitment. IRP modeling also considers operational characteristics for heat rates, minimum up, maximum down times, ramp rates, and minimum capacity for dispatch decisions. Coal contracts have requirements for minimum tons delivered that would be used to generate electricity, which are also a factor in unit commitment and dispatch.

- c. **How does fuel supply risk from Colstrip compare to that of natural gas?**

PacifiCorp Response:

Supply risk, except as represented by cost and perhaps unit availability, is not an explicit consideration in IRP modeling. Please see response to 1a with regards to coal fuel supply risk. No natural gas conversion has been considered for Colstrip units 3 and 4. PacifiCorp is a minority owner of the two respective Colstrip units thus cannot effectuate a natural gas conversion requirement without support from other

owners of the units. As such, PacifiCorp is not able to comment regarding natural gas fuel supply risk at Colstrip as it has never been put forth for consideration to the joint owners by the operator and majority owners of the Colstrip units 3 and 4.

- d. How are the economics of Colstrip Units 3 & 4 affected if natural gas prices continue to remain relatively flat?**

PacifiCorp Response:

Assuming stable gas prices, Colstrip units 3 and 4 are expected to continue to respond to market signals in IRP modeling as they have done, delivering energy to east and west control areas, carrying reserves, and contributing to sales as appropriate.

- 2. Has PacifiCorp quantified capacity replacement costs for Colstrip Units 3 & 4 that it could use as a basis of seeking replacement capacity as an alternative to any large capital investments it faces at Colstrip?** This question should be answered in the context of WA's Clean Energy Transformation Act (CETA) requirements.

PacifiCorp Response:

In IRP modeling, "replacement cost" would be an endogenous consideration in the model, dependent upon the most cost-effective combination of resources needed to provide a least cost least risk portfolio. Supply side resources in the 2021 IRP will include cost and performance data for proxy resources including wind, wind plus storage, solar plus storage, and batteries, available to meet Clean Energy Transformation Act (CETA) requirements. Demand side management programs such as conservation, and demand response programs also qualify to meet CETA requirements. Supply side resource cost and performance data is used by the model to determine relative value as compared to the possible benefits of unit commitment, dispatch, and expansion plan resource selections, as well as the possible benefits of early retirement.

Jim Bridger

Note: Action item 1c of Table 9.1 within the [2019 IRP progress report Action Plan Vol. 1](#) (pp. 275-76) provides a high-level description of the retirement process for Jim Bridger Unit 1 by 12/31/2023. However, this description consists of anticipated actions, not the underlying economics and risk drivers for why such actions are necessary.

- 3. What are the market alternatives to continued operation of the Jim Bridger mine?**

PacifiCorp Response:

Coal market alternatives available to PacifiCorp outside the Bridger mine are limited to two coal mining operations in Southwest Wyoming. In addition to the two Southwest Wyoming coal alternatives, limited tonnage volumes of coal from Wyoming's Powder River Basin (PRB) can be received and consumed at the plant. In order to increase the tonnage volumes from the PRB, significant capital would be required to make the necessary modifications to the plant in order to safely receive and consume higher volumes of PRB coal.

- 4. Using the price of coal from the Jim Bridger mine, how does the economic dispatch of Jim Bridger compare to market prices for electricity in the Western Interconnection?**

PacifiCorp Response:

As noted above, IRP modeling considers fuel price in dispatch decisions. In making the decision to sell energy into the market, Jim Bridger dispatch cost would be compared to the sales market price to determine whether the sale was economic and provides a net benefit. Included in this decision are operational constraints, the value of holding reserves, unit commitment derived from economic impacts of surrounding time periods, and other factors. If the sale is not a benefit, the sale is not enacted by the model.

- 5. What is the cost and physical supply risk of coal from the Jim Bridger mine?**

* Required fields

PacifiCorp Response:

Supply risk, except as represented by cost and perhaps unit availability, is not an explicit consideration in IRP modeling. However, as part of the surface mining process, coal is available for delivery in active pit areas and is also stored at truck dump stations to ensure coal delivery quantities are available to meet Jim Bridger plant requirements. Coal is delivered from Bridger Coal Company to the Jim Bridger plant via conveyor. Therefore, coal supply risk from Bridger Coal to the Jim Bridger plant is considered minimal. As with any mining operation, there are inherent risks that could impact coal production quantities and costs. Inherent risks include unforeseen geologic issues or major equipment failures. Bridger Coal conducts drilling programs to accurately project mineable coal quantities and quality and has an extensive preventative maintenance program to ensure equipment is available to meet or exceed operational requirements.

6. As the need for fuel for Jim Bridger mine declines, **how does the increased cost per unit of coal effect the economic dispatch of Jim Bridger mine? This should be explicitly modeled in Pacific Power's IRP portfolio dispatch model.**

PacifiCorp Response:

Increasing the coal price cost per unit would not affect the economic dispatch of Jim Bridger mine, but would affect the economic dispatch of the Jim Bridger plant. As noted in previous responses, IRP models endogenously consider fuel cost.

In the IRP, higher coal fuel prices will generally cause coal to generate at lower levels in the model. Jim Bridger units 1-4 provide the benefits of serving retail load, carrying reserves and ancillary services, and providing energy sales into the market. IRP modeling also considers operational characteristics for heat rates, minimum up, maximum down times, ramp rates, and minimum capacity for dispatch decisions. Coal contracts have requirements for minimum tons delivered that would be used to generate electricity, which are also a factor in unit commitment and dispatch.

7. **How does fuel supply risk for the Jim Bridger Coal plant compare to that of natural gas?**

PacifiCorp Response:

Supply risk, except as represented by cost and perhaps unit availability, is not an explicit consideration in IRP modeling. However, currently the Jim Bridger plant is fueled from three separate coal mines: Bridger Coal Company surface and underground, and Black Butte mine. There is also an opportunity to procure coal from the Powder River Basin coal region. There is very little coal fuel supply risk for Jim Bridger plant. To fuel Jim Bridger plant with natural gas, a new natural gas pipeline will need to be constructed to provide fuel to the power plant where there is currently no infrastructure to support natural gas fueling.

8. **How are the economics of the Jim Bridger Coal plant affected if natural gas prices continue to remain relatively flat?**

PacifiCorp Response:

Assuming stable gas prices, Jim Bridger units are expected to continue to respond to market signals in IRP modeling as they have done, delivering energy to east and west control areas, carrying reserves, and contributing to sales as appropriate. Jim Bridger units will also provide energy when renewables are not generating, and carry needed reserves during other periods.

Treatment of coal retirements under CETA

9. Based upon Pac's preferred portfolio discussed in the 2019 IRP progress report, the company is targeting the following retirement dates for coal plants that have traditionally served WA load (see [2019 IRP progress report Vol 1](#), p. 13):
- 2023 – Jim Bridger Unit 1

* Required fields

PacifiCorp Response:

Confirmed, this is an assumption of PacifiCorp's 2019 IRP preferred portfolio.

b. 2027 – Colstrip Units 3&4

PacifiCorp Response:

Confirmed, this is an assumption of PacifiCorp's 2019 IRP preferred portfolio.

c. 2028 – Jim Bridger Unit 2

PacifiCorp Response:

Confirmed, this is an assumption of PacifiCorp's 2019 IRP preferred portfolio.

- d. The anticipated retirements of Colstrip Units 3&4 and Jim Bridger Unit 2 are scheduled to occur after 12/31/2025 when "each electric utility must eliminate coal-fired resources from its allocation of electricity" pursuant to [RCW 19.405.030\(1\)\(a\)](#). Accordingly, beginning in 2026, **how will Pac attest it has not used any coal-fired resource (as defined in [RCW 19.405.020\(7\)](#)) to serve WA retail electric customer load?**

PacifiCorp Response:

PacifiCorp reaffirms its commitment to comply with all directives under the Clean Energy Transformation Act, including removing coal-fired resources from allocation of electricity pursuant to RCW 19.405.030. PacifiCorp anticipates showing compliance as directed under the WAC 480-100-665 rules once they have been adopted by the Commission. As part of the rulemaking process, PacifiCorp continues to recommend that compliance should be shown through attestation of an officer of the company, as part of a ratemaking proceeding (such as a general rate case). The use of a ratemaking proceeding is most appropriate to demonstrate that there is no "allocation" of coal-fired resources to Washington customers.

Public Interest Meeting #1 (6/18 – 19) – Presentation questions

10. CPA modeling in Plexos (slide 11) – As asked by NWECC, staff would like to know:

- a. What are the conservation modeling capabilities and limitations using the Plexos platform?**

PacifiCorp Response:

Plexos modeling capabilities are currently being benchmarked and prepared for production usage. Performance requirements and therefore modeling enhancements will not be known until those efforts are complete.

- b. Can AEG's CPA work be fully integrated within Plexos to allow for an endogenous feedback process?**

PacifiCorp Response:

Plexos modeling capabilities are currently being benchmarked and prepared for production usage. Performance requirements and therefore modeling enhancements will not be known until those efforts are complete.

- c. If CPA development remains outside / external to capacity expansion modeling, how will Pac ensure iterative feedback between the CPA and broader IRP modeling efforts?**

PacifiCorp Response:

The Conservation Potential Assessment (CPA) development is not and never has been external to capacity expansion modeling. In fact, the CPA development of the Energy Efficiency potential is an

integral input used in the capacity expansion modeling. PacifiCorp continues to engage stakeholders in the development of the CPA in order to improve the IRP modeling efforts.

11. Modeling demand response (DR) in CPA / IRP —Beyond slides 11-13, staff would like answers to the following questions:

- a. **What energy values of DR are included in the DR potential assessment** required as part of the 2021 IRP pursuant to [RCW 19.405.050\(3\)\(a\)](#)?

PacifiCorp Response:

The potential assessment characterizes the cost, availability, ramp rate, notification requirements, and number of events and magnitude of demand reduction for the demand response resource. Impacts to system energy needs from dispatch of the demand response resource are modeled within the IRP which considers how the resource provides value to the system. Those aspects are addressed in responses below.

- b. **What non-energy values of DR are included in the potential assessment?** Pac should consider non-energy impacts (NEI) and equitable distribution pursuant to [RCW 19.280.030\(1\)\(k\)](#).

PacifiCorp Response:

Currently, non-energy values are not assigned to demand response resources in the potential assessment. As demand response is a system resource, participant non energy values may be costs that a program incentive could offset. Societal values may include environmental benefits of reduced emissions and other non-energy impacts (NEIs) may apply. PacifiCorp is currently working to consider how to further incorporate NEIs in planning for demand response (DR).

- c. **What energy values are determined in the IRP modeling?**

PacifiCorp Response:

Capacity and energy profiles are inputs into IRP modeling. The model determines the relative value of these benefits compared to other resource alternatives.

- d. **Does the model picking DR resources run hourly and chronologically?**

PacifiCorp Response:

No. The capacity expansion model selects the optimal portfolio for the entire 20 year reporting period simultaneously, and at the designated granularity. Granularity has yet to be determined for the 2021 IRP. (In the 2019 IRP, granularity was limited to 4-hour blocks in the Planning and Risk model). DR resources compete with all other resources with the goal of producing the least-cost portfolio while meeting all system requirements.

- e. **Are hydro resources and weather evaluated stochastically?** Deterministic models will not reveal the need and potential value for DR.

PacifiCorp Response:

Price and load forecasts consider weather inherently, however, “weather” is also implicit in the stochastic variations of hydro availability, gas and electricity prices and weather-driven load and forced-outage events.

- f. **What DR products are being considered?**

- i. Technology types?
- ii. Timing (day-ahead, hour-ahead, real-time)?

PacifiCorp Response:

Please see the list of proposed DR measures posted to the website:

https://www.pacifiCorp.com/content/dam/pcorp/documents/en/pacifiCorp/energy/integrated-resource-plan/2021-irp/2021-irp-support-and-studies/PacifiCorp_2021_CPA_DR_Measure_List_Draft_Final.xlsx.

- g. **How is Pac / AEG accounting for the interactive effects of DR and energy efficiency (EE) potential?**

PacifiCorp Response:

The potential study is considering demand response opportunities presented by certain grid-interactive energy efficient technologies. For example, the adoption of connected thermostats creates opportunities for bring-your-own thermostat demand response programs. Similarly, the adoption of grid-interactive heat pump water heaters creates opportunities for bring-your-own water heat demand response programs. In these instances, the equipment costs are included in the energy efficiency analysis, reducing the cost of demand response as the enabling equipment is assumed to already be in place.

- h. **How is Pac / AEG accounting for potential locational values / differences?**

PacifiCorp Response:

Similar to energy efficiency, differences in value by location for demand response are accounted for in two ways. 1) Avoided transmission and distribution capital cost credits vary by state, and 2) demand potential differs by climate zone and market characteristics which characterize energy end uses, availability, ramp rates and costs by state. See examples in slides from January and February 2020 workshops here <https://www.pacifiCorp.com/energy/integrated-resource-plan/support.html>.

12. Proposed demand response RFP (slide 15) –

- a. **Given DR RFP not anticipated for release until 2020 Q4, staff encourage Pac to build in CETA requirements (e.g., equity considerations, stakeholder engagement) as company develops DR RFP.** Pac is encouraged to consult the WA-UTC's [draft Purchase of Electricity \(PoE\) rules](#) (UE-190837) for more guidance as to what a CETA-compliant RFP should contain.

PacifiCorp Response:

Thank you for the comment, we will take this request into consideration.

- b. **Staff request the opportunity to review Pac's draft DR RFP ahead of planned release.**

PacifiCorp Response:

Thank you for your comment, we will take this request into consideration.

13. Optimization modeling granularity & transparency (slides 17, 27-31) –

- a. **What is Pac's approach to reconciling different modeling timescales to provide whole system analyses?** For example, during the IRP modeling optimization discussion, Pac team indicated they would likely not consider sub-hourly granularity within Plexos for the 2021 IRP cycle given the recent platform change from System Optimizer to Plexos. If the Pac team forgoes modeling intra-hour dispatch, **how can Pac incorporate sub-hourly (e.g., 5-, 10-minute ahead) DER flexibility and frequency benefits as part of its scenario results?**

PacifiCorp Response:

Sub-hourly analysis would be conducted independently of IRP cases, and the results used to inform model drivers applicable to all cases. Plexos may be used to perform or support such analysis. This is conceptually similar to the independent analysis that establishes capacity contribution, wind shapes, or any other driver value that is not re-assessed endogenously in every IRP case.

- b. **Is there a correlation among data inputs used for modeling different objectives** (e.g., capacity expansion – Plexos, reliability – Planning & Risk) **at the sub-hourly level?** If so, **how is Pac preserving this correlation among inputs across scenarios?**

PacifiCorp Response:

Once inputs are developed, all relationships are preserved across all cases because all inputs are static - except where isolated variations are introduced specific to the portfolio being analyzed. For example, all capacity expansion plans rely on the same supply side resource pool and resource characteristics, as well as the same price and cost-driver assumptions for the price-policy scenario being examined. To the extent inputs are correlated, such as with wind shapes based on location, this same correlation is present in every case.

- c. **How is IRP modeling reflecting and/or considering climate change (CC)?** For example, is Pac:
- i. **Modeling scenarios that look at heating degree days (HDD) in winter/spring current normal and projections?**

PacifiCorp Response:

PacifiCorp uses heating degree days and cooling degree day variables within its energy and peak modeling. To the extent that observed climate change-related variations affect peak-producing weather, load-based impacts of climate change are captured in the load forecast. While a 20-year historical time period is used to establish the baseline forecast, PacifiCorp also conducts a 1-in-20 peak scenario, by selecting the most extreme peak producing weather year in that 20-year history as its 1-in-20 weather year. As such, under the 1-in-20 scenario, extreme peak producing weather is used to estimate extreme weather over the forecast period.

- ii. **Weighting recent years of actual data more heavily than historic data?**

PacifiCorp Response:

PacifiCorp does not weight recent years of actual data more heavily than historical data. As previously described, the base case relies on 20-year normal weather, whereas the 1-in-20 peak scenario relies on the most extreme peak producing weather over the 20-year history. For the 2021 IRP, the 1-in-20 peak scenario will rely on the year with the most extreme peak producing temperatures over the 2000-2019 timeframe.

- iii. **Intending to use projected temperatures (HDD, CDD peak demand inputs) and unregulated streamflow distribution rather than historic distributions?**

PacifiCorp Response:

Absent a broadly-accepted and specific quantification of potential climate change on PacifiCorp's hydro basins run-off, median water year planning relies on the hydrological record of experienced stream flows.

- iv. **Applying CC to its base case or specific scenarios?**

PacifiCorp Response:

Please refer to PacifiCorp's response to 13.c.i above.

- d. **How, and to what granularity is Pac modeling renewable energy during the hour and day intervals prior to high load periods?** For example, while the highest coincidental system peak and the second highest might occur in different winters, the highest and 10th highest could occur in the same 24 or 36 hour time window with many very heavy load hours in between.

PacifiCorp Response:

Plexos modeling capabilities are currently being benchmarked and prepared for production usage. Performance requirements and therefore modeling enhancements, including optimal achievable granularity, will not be known until those efforts are complete.

- e. **Within the 2021 IRP, is Pac undertaking an explicit analysis and discussion of how the resources in the preferred portfolio meet such high demand periods examined in part d?** One approach to this analysis and discussion could be to take actual wind data (or anemometer data or synthetic data for a wind zone) for a cold weather period (e.g., ten days) and map that to Pac's load during the same time period.

PacifiCorp Response:

Actual wind data is included in the development of wind profiles. The model is required to meet demand in all modeled periods, and is therefore sensitive to high-demand.

- f. **Increasing modeling plan time horizon from 20 to 25 years – Staff encourage Pac to examine a planning horizon that reaches to 2045. At minimum, the 2021 IRP should discuss how resources purchased as a result of the 2021 IRP would contribute to achieving the 100% WA clean standard in 2045.** Applying a 20-year horizon would extend analyses out to 2042. Staff expect Pac to examine how resources would contribute to meeting the 100% clean goal, especially during the 10-year lead up to 2045.

PacifiCorp Response:

An extended modeling period is untenable and not required of Integrated Resource Planning for the foreseeable future. However, PacifiCorp considers, and has in the past performed, particular analysis projecting trends beyond 20 years when appropriate. Two key considerations are the lack of data forecasting beyond 20 years and the predictive value of such data where it exists. Also, experience has shown that capacity expansion model run times increase exponentially as the number of years is increased.

- g. **Increasing Transparency in IRP Modeling** (slide 31) — Staff appreciates the modeling overview provided by the Pac team. However, **as required by [RCW 19.280.030\(10\)\(a\)](#), staff request Pac share the data input files and tables used in both their Plexos and Planning & Risk platforms to increase transparency and understanding of the modeling process.**

PacifiCorp Response:

For the past several IRP cycles, PacifiCorp has shared the inputs and outputs for all of its cases in meticulous detail in its confidential data disc, provided at the conclusion of each IRP. PacifiCorp intends to do the same with Plexos data in the 2021 IRP.

14. IRP modeling and ability to provide draft IRP by 1/4/21 (slide 31) –

- a. Under Reliability challenges addressed, Pac team indicates “zero extra steps, gaining months back in the IRP process.” If IRP team anticipates “gaining months back,” **does team have more flexibility to wrap up modeling and arrive at a draft preferred portfolio by the WA-UTC's draft IRP 1/4/21 deadline per [Order 03](#) (paragraph 26)?**

PacifiCorp Response:

As described at the June 10-11, 2020 public input meeting, the months to be regained would be those months that caused the 2019 IRP to be published on October 18, 2019 rather than April 1, 2019. There is no acceleration of the IRP timeline except to enable PacifiCorp to potentially file its 2021 IRP without an extension. PacifiCorp will remain extremely challenged in providing a draft IRP, and is making best efforts to provide the best available response on January 4, 2021.

15. Energy (battery) storage (slides 33 – 44) —

- a. Slide 35 appears to list relevant state regulation in UT & OR that will govern how Pac considers storage in its IRP planning. Within WA, energy storage is a key enabling technology for utilities to accomplish the goals of the state’s clean energy transformation. In 2017, the **Commission issued a report and policy statement on the treatment of energy storage technologies in the integrated resource planning process** (see [Docket U-161024](#), Service Date 10/11/17), **which staff strongly encourages Pac revisit.**

PacifiCorp Response:

PacifiCorp has reviewed the Washington Utilities and Transportation Commission’s policy statement on energy storage from docket U-161024, and would direct interested stakeholders to Appendix Q, Energy Storage Potential Evaluation, in the 2019 IRP. This Appendix steps through the grid services that could be provided by distributed energy resources, the operating parameters of energy storage that impact the provision of those services, and ways to maximize the cost-effectiveness of energy storage.

- b. Further, because Pac appears to be relying on / emphasizing Li-ion, 4-hour battery technology, **staff recommends Pac compare data for storage alternatives, including PNNL’s Energy Storage Technology and Cost Characterization Report (July 2019):**
https://www.energy.gov/sites/prod/files/2019/07/f65/Storage%20Cost%20and%20Performance%20Characterization%20Report_Final.pdf.

This report defines and evaluates cost and performance parameters of six battery energy storage technologies (BESS) (lithium-ion batteries, lead-acid batteries, redox flow batteries, sodium-sulfur batteries, sodium metal halide batteries, and zinc-hybrid cathode batteries) and four non-BESS storage technologies (pumped storage hydropower, flywheels, compressed air energy storage, and ultracapacitors). Data for combustion turbines are also presented. Detailed cost and performance estimates were presented for 2018 and projected out to 2025.

PacifiCorp Response:

PacifiCorp’s 2019 IRP focused on a 4 hour lithium ion battery because it is a common configuration with relatively high cost-effectiveness at the time cost and performance assumptions were developed for the 2019 IRP. Due to modeling limitations, the 2019 IRP focused on a single proxy battery technology and configuration, and emphasized other variations in resource options and portfolio performance instead. This should not be viewed as an exclusion of alternative technologies or configurations. In an RFP, all technologies and configurations that were offered would be considered.

- c. Additionally, per public meeting discussion associated with slide 38, battery disposal costs are not insignificant. During the call the Pac IRP team indicated they would re-examine battery cost assumptions, including end-of life costs. **What storage specifications and/or attributes is the Pac team planning to revisit? How would corresponding changes in parameters affect the modeling of storage in the Plexos runs?**

PacifiCorp Response:

PacifiCorp has not yet finalized its energy storage modeling for inclusion in Plexos. The scope of work for the Renewable Resources Study for the 2021 IRP includes a requirement not required in previous studies: “Consultant shall provide a demolition cost estimate, including current capabilities for disposing and/or recycling [solar panels, wind turbine components, or batteries].”

16. 2021 IRP topics & timelines (slide 47) – Timeline lists “state-specific meetings” during Jul 20. During Thu, 6/18, discussion R. Baker indicated Pac would be contacting state PUC POCs ASAP re: scheduling such meetings. However, a week after the 6/18-19 Public Meeting #1 such state meetings have not been arranged per Pac’s

[2021 IRP work plan](#) (p. 6). Should I expect meeting invites or does this statement refer to “ad hoc” meetings arranged among WA staff and select Pac POCs (e.g., Ariel Son, Randy Baker)?

PacifiCorp Response:

Meeting schedules have been arranged with the assistance of state managers. The Washington state meeting has concluded in advance of receiving this response.

17. 2021 IRP supplemental studies (slide 49) – re: **Resource adequacy (RA)**

- a. For the 2021 IRP, **staff strongly encourage Pac to adopt a regional approach to assessing RA, specifically considering how state clean energy policies (e.g., WA’s CETA) will likely impact available resources over the next decade or more.** On Thu, 6/18, Pac modeling POC Randy Baker indicated the company largely covered RA in the 2019 IRP progress report via Appendix J. However, Appendix J is largely a landscape survey of two assessments: the broader NERC 2018 Long Term Reliability Assessment and the more regional Pacific NW Resource Adequacy Forum’s 2016 Adequacy Assessment. Pac’s 19 IRP progress report emphasizes RA on a system-wide vs. more granular, regional basis. The 19 deliverable frames the Northwest as just one Western Electricity Coordinating Council (WECC) region (i.e., the NW Power Pool, NWPP). Given its expansive geographic position, Pac maintains it can leverage the Pacific NW’s current winter peaking position to satisfy regional demand by drawing from the IOU’s resources in other summer-peaking regions and/or front office transaction (FOT) market purchases. Pac appears to avoid entirely discussing the NW’s potential evolution from a winter peaking to summer peaking region over the next decade due to factor’s such as climate change (and associated reduced summer hydro generation).

PacifiCorp Response:

Please reference PacifiCorp’s other responses to this stakeholder feedback request in regards to incorporation of climate forecasts.

PacifiCorp confirms its service territory covers parts of Western Electricity Coordinating Council (WECC)’s Northwest, Rocky Mountain (soon to be incorporated as part of the Northwest region at WECC), CAMX and parts of the Southwest regions and that this geographic diversity provides resource adequacy value. PacifiCorp continues to analyze the designed topology for its models and will be assessing any potential modifications, which if deemed necessary, will also be presented and discussed with stakeholders.

- b. **Is Pac modeling RA similar to the NW Power & Conservation Council (NWPCC) methodology?** For example, NWPCC is modeling the probabilistic metric Loss of Load Probability (LOLP) to assess the adequacy of the NW power supply and has adopted a standard of 5%. For the 2021 Power Plan, NWPCC is also measuring the number of days per year in which peak load exceeds generation capacity at least once per day, or Loss of Load Expectation (LOLE), and the Loss of Load Hours (LOLH). **Pac should be undertaking similar analyses.**

PacifiCorp Response:

PacifiCorp notes that in the 2019 IRP, "LOLE" is discussed as a measure of loss of load "events" (also called “LOLEV”), and not loss of load "expectation", and further notes that the two are conceptually similar. Please refer to the 2019 IRP, Appendix I – Planning Reserve Margin for a discussion of related metrics.

- c. **How is the RA study reflecting climate change (CC)?** If Pac chooses not to undertake such a study for the 2021 IRP, **staff strongly encourage Pac to provide detailed explanations for why the company would not perform a RA study that reflects CC.**

PacifiCorp Response:

Climate forecasts are incorporated into other areas of the inputs (please see responses to other questions on climate in this stakeholder feedback form request). Climate impacts are reflected in resource adequacy through the integration of varying inputs' effects on the results.

- d. It is important to know the assumptions for the MW capacity of imports on the “interties,” British Columbia to Pacific NW, MT to PNW, SW (CA+ AZ effect) to PNW. **Given the degree Pac relies on front office transactions (FOT), how is Pac modeling these imports?**

PacifiCorp Response:

In a 20-year aggregated topology that assumes an evolving transmission system and increasing interrelationship among entities on the grid, front office transactions (FOTs) are modeled as proxy resources, with limits considered conservative and reasonable based on past experience and future projection. The 2019 IRP described FOT assumptions in Volume I, Chapter 6 (Resource Options), and includes a sensitivity regarding FOT pricing assuming limited availability described in Chapter 8 (Modeling and Portfolio Selection Results).

18. 2021 IRP supplemental studies (slide 49) – re: **Equity considerations**

- a. Given its important role in CETA, **staff strongly encourage Pac to address equity as a supplemental study to the 2021 IRP.**

PacifiCorp Response:

Thank you for your comment, we will take this request into consideration.

- b. **How will the Pac team “optimize” equity considerations during the modeling process? Is the Pac team considering any draft equity “metrics” to inform scenario modeling?**

PacifiCorp Response:

The IRP topology includes a limited number of “bubbles” representing Washington State. IRP optimization modeling is not granular enough to be effective in assessing the distribution of equity, which is interpreted at this time as requiring a significantly different and nuanced approach than can be accommodated in a 20-year aggregated topology employing proxy resources. However, PacifiCorp is open to considering all appropriate model drivers that align with the reality of long-term integrated resource plan capabilities.

- c. Following IRP Public Meeting #1, Pac provided staff a draft IRP project delivery plan for review (*please see 2nd email attachment*). Within the 2021 pre-IRP studies tab of this Excel workbook, Pac suggests undertaking a “CEIP Equity Analysis” during the Nov – Dec 20 timeframe. **Staff encourage Pac to consider the following questions during this CEIP Equity Analysis:**
 - i. **How will the assessment described in [RCW 19.280.030\(1\)\(k\)](#) inform the upcoming IRP?**
 - ii. **Do metrics used for interim CETA targets (both before and after 2030) also consider equity?**

PacifiCorp Response:

Thank you for your comment. Consideration will be given to these questions in ongoing development of Clean Energy Implementation Plan (CEIP) analysis.

19. **Load forecast** to be considered at Jul 30-31 public meeting (slide 51) –

- a. **Climate change (CC) – How does Pac intend to assess the climate sensitivity of the utility’s load-resource balance and potential effects from changes in temperature and hydro resource streamflow?**
The Northwest Power and Conservation Council (NWPCC) is likely incorporating the impact of CC in its next Power Plan. UTC staff requests additional information on how Pac intends to assess the climate

sensitivity in future years of the utility's load-resource balance and potential effects from changes in temperature/streamflow. **Does Pac intend to use projected temperatures or streamflow distribution rather than historic distributions? Further, will Pac model unplanned outages linked to CC (e.g., wildfires, floods, snow pack shortage, or concurrent weather-related events) in its IRP analysis?**

- i. *Note: Question aligns with OR PUC Order 20-186 p. 24 associated with Pac's 2019 IRP (see slide 58 2nd entry).*

PacifiCorp Response:

As described in 13.c.iii, PacifiCorp intends to develop the 1-in-20 peak sensitivity to estimate the impacts of extreme weather on peak projections. Projected temperatures informing the forecast will rely on the year with the most extreme peak producing temperatures over the 2000-2019 timeframe. Absent a broadly-accepted and specific quantification of potential climate change on PacifiCorp's hydro basins run-off, median water year planning relies on the hydrological record of experienced stream flows.

- b. **How is Pac modeling electric vehicle (EV) penetration growth within its service area(s) over time? Similar to other DERs, how does this growth impact both resources required to serve load and the distribution system?**

PacifiCorp Response:

PacifiCorp uses a state-specific approach in forecasting electric vehicle (EV) penetration within its service territory. Projections relied on first evaluating historical EV penetration within PacifiCorp's service territory and then applying third-party EV growth projections and adjustments for factors unique to each state.

At this time, it is unclear as to how EV growth will impact the resources required to serve load. The load forecast will serve an input to IRP modeling and analysis, which will be used to prudently plan for cost-effective resources.

Relative to distribution system impacts, a distribution system impact study conducted as part of the Pacific Power Transportation Electrification Plan found that in some locations, normal load growth will cause isolated system component overloading issues, which may be compounded by additional EV load. The study also found that most overload conditions created by the installation of residential EV charging are capable of being mitigated in most instances by an overhead transformer upgrade, line fuse replacement, or phase balancing. In rare instances a small reconductor of the existing overhead or underground conductor would be required.

- c. **How does the distributed energy resource (DER) forecast required by CETA interact with the load forecast? I.e., how do behind-the-meter DERs (rooftop solar, storage, etc.) get incorporated into the load forecast? Is it a straight decrement from load that would otherwise need to be served?**

PacifiCorp Response:

Rooftop solar is a straight decrement from load that would otherwise be served by PacifiCorp. PacifiCorp also continues to treat systems that contain both rooftop solar and storage the same as rooftop solar given the limited number of behind-the-meter storage systems currently installed in PacifiCorp's service territory.

- d. **What parts of the load forecast may be impacted by the current economic downturn? Please describe the sensitivities Pac is building into the short-term portion of its forecast to account for the Coronavirus pandemic.**

PacifiCorp Response:

Stay-at-home impacts due to the Coronavirus were assumed to last over the March 2020 through June 2020 timeframe. Stay-at-home period impacts were based on observed class level load impacts over the March 2020 through April 2020 timeframe. The commercial and industrial classes are expected to be adversely affected by the stay-at-home order, while residential loads are expected to be higher.

- e. **How often is Pac updating the portions of its load forecast that have broader economic dependencies (e.g., jobs and job growth, industrial activity, housing starts, power/natural gas prices)?** E.g., how does Pac expect the economic downturn to impact its conservation achievement?

PacifiCorp Response:

Generally, PacifiCorp updates its load forecast annually each spring. Development of the forecast involves an update of the inputs informing the forecast, such as employment, population and large individual customer growth projections. The load forecast informing the 2021 IRP was completed in June 2020.

20. Public input meeting treatment of CETA (slide 52) – Currently WA’s Clean Energy Transformation Act (CETA) is listed as a topic of discussion during the Sep 17-18 meeting. However, CETA is cross-cutting and will impact the entirety of Pac’s IRP planning process. **How does Pac expect to address CETA related stakeholder input around resource adequacy, reliability, DERs, equity, etc. throughout the six-month monthly public meeting cycle?**

PacifiCorp Response:

The 2021 IRP public input process will include discussions of CETA developments where appropriate and relevant to the community of stakeholders, and balancing individual stakeholder interest. CETA discussion is planned for the July 30-31 public input meeting. Additional discussion will be dependent upon the evolution and interest in CETA topics, progress in rulemakings, and the extent to which CETA will be endogenous to all IRP cases as opposed to incorporated through sensitivities and post-model analysis and reporting.

21. 2019 IRP acknowledgement process & Order requirements (slides 55 – 58, 91) – Slide content does not address [Order 03](#) (paragraph 26) in Pac’s 2019 IRP progress report docket (UE-180259). Among other actions Order 03 requires Pac to file a draft 2021 IRP by **1/4/2021**. **What is the status of Pac’s plan to submit a draft IRP?**

PacifiCorp Response:

PacifiCorp plans to submit a draft IRP in accordance with final rules and the established timeline. The contents of the draft will be subject to the availability of data and analysis in the weeks leading up to January 4, 2021. An outline of the draft has been prepared and delivered, as requested by Washington Utilities and Transportation Commission staff.

22. 2019 IRP action item updates:

- a. Slide 62 – “In Q1 2020, file a draft all-source RFP with...WA UTC, as applicable.” Staff’s understanding is no such draft all-source RFP has been filed w/ WA-UTC, to date. **Please clarify action item as it pertains to WA.**

PacifiCorp Response:

Filing the 2020AS request for proposal (RFP) with the Washington Utilities and Transportation Commission is not required in rule. Please note that the 2020AS RFP was approved for release by the Utah Public Service Commission and Oregon Public Utility Commission on July 2, 2020 and was released to the marketplace on Tuesday, July 7, 2020.

- b. Slide 64 – Action items 3d and 3e discuss upgrades to 230 kV and 115 kV substations in the Yakima area. **Given the WA-UTC did not acknowledge Pac’s 2019 IRP progress report, will these WA specific action items be carried forward to the 2021 IRP?**

PacifiCorp Response:

The 2021 Action plan will note progress regarding the previous action plan for the 2019 IRP. The 2021 action plan will be updated for open items, either in process or planned.

23. PacifiCorp 2020 all-source RFP (slides 67 – 74) –

- a. As discussed during Fri, 6/5, conference call between Pac RFP team and WA staff, CETA acquisition requirements (incl. equity metrics) pursuant to [RCW 19.405](#) will apply to RFPs initiated in 2020. **Staff strongly encourage Pac to consult [draft Purchase of Electricity rules \(UE-190837\)](#) when developing scoring matrix for current and future RFPs.**

PacifiCorp Response:

PacifiCorp commits to complying with all approved RFP rules and guidelines the Washington Utilities and Transportation Commission adopts with regard to the CETA proceeding as part of any future PacifiCorp RFP. PacifiCorp will include additional CETA acquisition requirements – as directed – following the adoption of the draft rules to implement RCW 19.405.

- b. Joint evaluation of bids from both all-source RFP, proposed DR RFP (slides 73 & 74) – On Fri, 6/19, Pac RFP team indicated a joint consideration of the shortlisted candidates from both RFP processes (i.e., all-source, DR) would enable Pac to take a portfolio approach to determine how best to source both new renewables and DR resources. **Will the results from each RFP process compete on “equal footing?” Or is Pac envisioning a minimum acquisition target for DR resulting from the 2021 IRP’s DR potential assessment pursuant to [RCW 19.405.050\(3\)\(a\)](#)?**

PacifiCorp Response:

DR RFP bids and 2020 All-source RFP bids will compete in the final shortlist selection, with each bid assessed during optimization based upon its merits as described by cost and performance inputs.

24. Public Participation (general request) — Staff appreciates that Pac has posted the presentation for Public Meeting #1 (6/18-19) on the company’s IRP website. However, **staff request Pac make available on the same website an IRP public meeting [webinar web recording](#) for stakeholders and others who are not able to attend the webinar during work hours.** While presentation slides are helpful, the ability for stakeholders to go back and listen to meeting discussion topics will increase the transparency of the 2021 IRP process.

PacifiCorp Response:

Thank you for your comment, we will take this request into consideration.