Attachment B

Stakeholder Feedback Forms and PacifiCorp's Responses throughout the 2021 IRP Development Cycle (as of December 31, 2020)

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 2019 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 1/3/2020

*Name: Justin Brant Title: Senior Associate

*E-mail: jbrant@swenergy.org Phone: 303-447-0078x2

*Organization: SWEEP/Utah Clean Energy

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: Click here to enter date. ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

Thank you for the opportunity to comment on the PacifiCorp 2021 Conservation Potential Assessment Draft Final Work Plan ("CPA"). SWEEP and Utah Clean Energy ("UCE") look forward to continuing to work with PacifiCorp and AEG to develop a realistic and transparent CPA to be used as an input for the 2021 PacifiCorp Integrated Resource Plan.

SWEEP and UCE appreciate the inclusion of stakeholder input so early in the CPA development process; however, PacifiCorp provided a very short timeframe to provide written comments over the period between Christmas and New Year's. In the future, SWEEP and UCE ask that stakeholders be provided with ample time to review and comment on all inputs, assumptions, and draft reports. In addition, SWEEP and UCE request that all inputs, assumptions, and draft output tables (including report appendices) be provided to stakeholders as working Excel spreadsheets broken down by year to ease the review process.

Given the limited review time, SWEEP and UCE have not had the opportunity to review the CPA Work Plan in detail. However, following a high-level review, SWEEP and UCE provide the following comments and suggestions. SWEEP and UCE are happy to discuss its suggested changes in more detail with PacifiCorp and AEG.

Demand Response Potential Comments

* Required fields

1. SWEEP and UCE appreciate that the CPA will examine demand response ("DR") potential outside of the system-wide summer and winter peak periods to include the local distribution system and new technologies such as energy storage. However, SWEEP and UCE do not believe this analysis goes far enough to assess the potential of DR to provide services to the electric grid beyond capacity. The CPA must also look at potential for DR to offer services such as frequency regulation and contingency reserves. Rocky Mountain Power is already utilizing its Cool Keeper program to provide these services to the bulk electric system, and the CPA must fully assess the potential of DR to provide a range of grid services over multiple timescales. In addition, estimates of the levelized costs of DR should include the full range of grid benefits by providing multiple services, similar to how Rocky Mountain Power quantifies the benefits of the Cool Keeper program.

   PacifiCorp Response:

   At the 2021 Integrated Resource Plan (IRP) public-input meeting on February 18, 2020 discussed grid services as they relate to specific demand response (DR) measures including applicability of grid services such as frequency regulation and contingency reserve. Please note that in the 2019 IRP, PacifiCorp did apply a credit for operating reserves for DR and also tried to capture additional grid service benefits through ancillary services.

2. Similarly, the CPA should assess the potential for DR to shift load on a daily basis to help with renewable energy integration and provide similar functionality as battery energy storage. Investments in DR can help with the integration of variable renewable resources by shifting load, similar to the analysis proposed in the CPA around battery energy storage.

   PacifiCorp Response:

   PacifiCorp agrees that certain DR programs have the ability to shift load in a manner that is similar to battery energy storage. To the extent PacifiCorp can control both incremental and decremental dispatch, without time or duration constraints, DR could be very similar to battery storage in this regard. In general, DR tends to result in a combination of load shift and load reduction. While load shift may be predictable, it is often not controllable like battery energy storage. PacifiCorp is open to exploring ways of adapting modeling tools applicable to battery resources to DR programs that provide similar or related functionality. PacifiCorp would note that most DR programs have limited annual interruptions that are more restrictive than a battery - incorporating this and other program parameters that are unique to DR will be important. The February 18, 2020, 2021 IRP public-input meeting discussed grid services as they relate to specific DR measures including applicability of grid services such as load shifting and interruptible load. in the 2019 Conservation Potential Assessment (CPA), the levelized costs for DR programs was adjusted to conform to the California Public Utility Commission's (CPUC) cost-benefit analysis protocols for California, Oregon, Washington, and Wyoming. Utah and Idaho use traditional methods for levelized cost using the state-specific cost-benefit analysis methodology.

3. As opposed to the methodology in the 2019 CPA, the 2021 CPA should not assign the full cost of DR enabling technologies to the levelized cost for DR. Similar to energy efficiency resources, utilities will often only pay a portion of the cost of enabling technologies or leverage technologies that the customer has already invested in for DR, such as Bring Your Own Thermostat programs or programs utilizing smart EV charging infrastructure. Therefore, the levelized costs of DR programs should be based on realistic program and equipment cost assumptions, instead of assigning the full cost of enabling technologies to DR programs.

   PacifiCorp Response:

   For the 2021 CPA, PacifiCorp will revisit the costs for all measures and will consider cost assumptions through its CPA stakeholder engagement process. This could include expanding the application of the "bring your own" concept where feasible. At a minimum, this is relevant to Electric Vehicle Supply Equipment, Smart Appliances, and Grid-Interactive Water Heaters.

* Required fields

4. In the 2019 CPA, PacifiCorp did not look at cost savings from the interaction between technologies that can provide both energy efficiency and DR capabilities, such as smart thermostats or grid-connected heat pump water heaters. The CPA should consider the impacts of interactive effects between energy efficiency and DR in all states, including those that use the Utility Cost Test. This could be through an adjustment to the levelized costs of the DR resources as customers will likely pay a higher percentage of costs if a technology will save them money through both energy savings and DR program payments.

   PacifiCorp Response:

   In the 2019 CPA, PacifiCorp did discount participant costs by 25 percent in California, Oregon, Washington, and Wyoming to account for DR and energy efficiency interactions. For the 2021 CPA, we will investigate the treatment of cost proxies in all states.

5. SWEEP and UCE request more information on the methodology used to treat interactive effects between DR and pricing and rates ("P&R") measures. As P&R potential is not included in the IRP modeling process, at a high-level it does not appear appropriate to limit DR potential based on P&R interactive effects.

   PacifiCorp Response:

   Since DR is considered a "firm" resource and pricing and rates (P&R) is a responsive resource, the 2019 CPA did not include interactive effects from DR and P&R. DR is including in the IRP model and P&R are assumed to be accounted for in the IRP load forecast.

Energy Efficiency Potential Comments

1. SWEEP and UCE request that as part of the CPA, AEG develops a Low, Medium, and High Case for Technically Achievable Potential. The cases could be developed by adjusting Market Adoption Rates and levelized cost assumptions, as costs for certain emerging and existing technologies are likely to decline over the CPA period. Distinct cases and multiple DSM supply curves will allow PacifiCorp and stakeholders to test the sensitivity of the IRP modeling process to assumptions about energy efficiency Market Adoption Rates and cost. SWEEP and UCE believe that such an analysis will help PacifiCorp and other stakeholders assess the trade-offs between investments in energy efficiency versus other resources as part of the IRP process. SWEEP and UCE suggest that the High Case should be at or close to the full technical potential of energy efficiency in the CPA, given that the technical potential in the 2019 CPA was very conservative when compared with historical PacifiCorp DSM performance and DSM achievements in other jurisdictions.

   PacifiCorp Response:

   PacifiCorp will consider this request as the 2021 CPA process progresses.

2. SWEEP and UCE appreciate the use of customized Market Adoption Rates for each jurisdiction. SWEEP and UCE request that PacifiCorp provide assumptions around Market Adoption Rates to stakeholders in a transparent and easily understood manner.

   PacifiCorp Response:

   PacifiCorp will provide stakeholders an opportunity to review the measure adoption rates during the CPA development process.

3. SWEEP and UCE request that PacifiCorp provide stakeholders with all corrections made to treat resource interactions in a transparent manner, so stakeholder can review these assumptions.

PacifiCorp Response:

PacifiCorp will provide transparency for corrections and "outside" of the model changes that affect the technical potential during the IRP public-input meetings.

4. SWEEP and UCE request an analysis as part of the CPA comparing measure-level levelized cost and supply assumptions from the 2019, 2017, and 2015 CPAs with historical measure-level cost and program achievements in each PacifiCorp jurisdiction. Given that PacifiCorp develops a CPA every two years, SWEEP and UCE believe it would be prudent to compare CPA estimates with actual program performance to identify any potential errors or systematic bias in the CPA. Such an analysis would allow PacifiCorp to ground-truth its CPA supply curves with real program data and will likely provide valuable information to PacifiCorp and the AEG team. In addition, this analysis could be used to modify cost assumptions or market adoption rates to develop alternative energy efficiency cases, as requested above.

   PacifiCorp Response:

   PacifiCorp will be conducting a subset of this analysis as part of the 2021 CPA. Comparison with historical programs will be performed at the measure level for "Major Measures", which was defined at the 2021 IRP public-input meeting on February 18, 20202. Comparison with prior CPAs will be made when possible, however due to changing baselines, updated sources, periods of analysis, and available measures will limit the comparison in some situations to a higher level.

Thank you again for allowing SWEEP and UCE to opportunity comment on the PacifiCorp CPA Work Plan. SWEEP and UCE will participate in the January 21 stakeholder meeting to discuss the CPA and are happy to have further discussions with PacifiCorp about any of our comments or suggestions.

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.
Click here to enter text.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

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 2/4/2020

*Name: Ernie Rogers Title: **Residential Measure List Draft Response**

*E-mail: ernie.e.rogers@gmail.com Phone: 801-899-5867

*Organization: Utah Valley Earth Forum, UVEF.org

Address: 1735 Cherokee Dr.

City: **Pleasant Grove** State: **UT** Zip: **84062**

Public Meeting Date comments address: Click here to enter date. ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Possible additions to the 2021 Residential Measure list

☐ 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.
The following items are ones that may not be on the list, and that I thought are important aspects of residential energy savings.

How does the Soleil-Lofts project in Herriman, Utah, fit in? Where is residential solar?

PacifiCorp Response:

- Residential solar is modeled within the separate Private Generation study.
- Applied Energy Group (AEG) and PacifiCorp will identify ways that non-solar aspects of Soleil are incorporated into other energy efficiency (EE) and demand response (DR) measures within the Conservation Potential Assessment (CPA). For example, customer sited storage measures will be informed by the characteristics of this project.

Residential energy storage and control, residential load management

PacifiCorp Response:

- Please see the DR measure list presentation uploaded to the Integrated Resource Plan (IRP)'s public input process webpage, particularly slides three and four, here www.pacificorp.com/energy/integrated-resource-plan/support.

Residential cogeneration

PacifiCorp Response:

* Required fields

- Throughout their research, AEG has not identified any technologically mature residential-scale cogeneration systems. If Utah Valley Earth Forum (UVEF) has access to a peer-reviewed source that provides details on cost, lifetime, and real-world equipment performance, they will consider adding this to the Waste Heat to Power and Regenerative Technologies task within the CPA.

Rezoning to multiple family, encouraging small and affordable housing developments

PacifiCorp Response:

- The analysis of a measure of this scale would be outside the scope of the CPA. However, advanced new construction designs are being modeled by AEG, including zero-net-energy ready homes.
- The modeling of the electrification of transportation itself is not within the CPA scope.

Electric cars and charging stations

PacifiCorp Response:

- Please see residential EE measure "RE30", "Electric Vehicle Supply Equipment" and the previously mentioned DR slides (particularly slide three) for the locations where electric vehicle measures are identified.
- The modeling of the electrification of transportation itself is not within the CPA scope.

Home heat loss surveys and weatherization programs

PacifiCorp Response:

- Heat loss surveys do not save energy on their own, but instead lead to the implementation of efficiency measures identified within this list. Therefore, including them would be double-counting.
- The role of the CPA is to assess measure-level potential. Please see residential EE measures "RM001" through "RM022" for a list of weatherization measures that could be implemented within a demand-side management program.

Low transmission roof coatings

PacifiCorp Response:

- AEG will consider adding this, or a similar measure, to the CPA.

Exterior shutters and shading

PacifiCorp Response:

- AEG has not identified a credible source for this measure. However, AEG began modeling cellular window shades within the 2019 CPA, which would have a similar effect.
- Please see residential EE measure, "RM021", "Windows – Cellular Shades".
- Also see residential EE measure, "RM034", "HVAC – Plant Shade Trees" which can provide exterior shading.

Fresh air heat exchangers

PacifiCorp Response:

- Please see residential EE measure, "RM025", "Space Heating - Heat Recovery Ventilator".

Passive solar retrofits and attached greenhouses

PacifiCorp Response:

- Passive solar is modeled for nonresidential buildings but is not modeled for homes. Due to residential occupancy patterns (particularly work schedules), most residential lighting energy is consumed during the evening where passive solar would have no impact.

* Required fields

- There is insufficient market data to support development of a greenhouse measure which would likely have limited applicability.

Phaseout of gas furnaces and water heaters

PacifiCorp Response:

- This is electrification, not EE or DR as they are defined within the CPA.

Residential storage of heat and cold

PacifiCorp Response:

- For cooling, please see the "Thermal Energy Storage" measure on slide four of the DR measure list presentation.
- AEG has not identified a residential space heating energy storage measure that has seen success in utility programs and instead recommends considering electrochemical battery energy storage which has a higher likelihood of being adopted.

Landscaping for energy and water conservation

PacifiCorp Response:

- This measure was excluded from the CPA as it primarily saves water and would be adopted for non-energy reasons.

Rooftop solar, electric vehicles, and load management as a system

PacifiCorp Response:

- The modeling of rooftop solar is outside the scope of the CPA. However, the impacts that solar-tied storage may have on the grid as part of the DR analysis will be considered. This topic was addressed during the February 18, 2020 public input meeting, technical workshop.

Resilience strategies at the residential level. Distributed generation and microgrids

PacifiCorp Response:

- This analysis is outside the scope of the CPA; however, the additional grid services that behind-the-meter DR programs could provide, which might be an important piece of any grid transformation efforts, are being considered.

Combined solar PV and heat

PacifiCorp Response:

- The modeling of rooftop solar is outside the scope of the CPA. It is addressed in the Private Generation study.

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 2/10/2020

*Name:	Nikita Bankoti	Title:	**Regulatory Analyst**
*E-mail:	Nikita.bankoti@utc.wa.gov	Phone:	360-664-1251
*Organization:	Washington Utilities and Transportation Commission		
Address:	621 Woodland Square Loop S.E.		
City:	**Lacey**	State: **WA**	Zip: **98503**

Public Meeting Date comments address: Click here to enter date. ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

***IRP Topic(s) and/or Agenda Items:** List the specific topics that are being addressed in your comments.
PacifiCorp 2021 Conservation Potential Assessment Draft Work 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 the attached comments on Page 2

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.
Click here to enter text.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

- No master crosswalk provided that would otherwise enable the following review approaches to residential and/or non-residential measures lists:
    - **Total consolidated residential and commercial / industrial measure lists**. Measures within workbook tabs remain separated by source (e.g., NWPCC's Power Plan, RTF).
        - *Are all of these measures actively being considered?*
        - *Or is AEG / Pac simply illustrating the sources from which they are pulling measures?*

      PacifiCorp Response:

      The intent of these "crosswalk" spreadsheets is to confirm that measures from jurisdictionally relevant Northwest Power and Conservation Council analyses are properly incorporated into the Conservation Potential Assessment (CPA) and that the Washington biennium energy efficiency (EE) target is in alignment as appropriate. The source measures are presented on the left half of these tables and the corresponding CPA measures on the right. Any row on these "crosswalks" that includes a Measure Code (*e.g.*, "RM039") is being recommended for inclusion within the CPA.

    - **Measures grouped by Pac program option**. "PacifiCorp_2021_Draft_Measure_List_for_Review" PPT would provide a good approach for prioritizing review of measures that are either new for Pac's 2021 CPA or significantly revised from Pac's 2019 CPA. However, this "program" schema is not carried through either the residential nor non-residential measure Excel workbooks. The best attempt to indicate whether or not measures are new / significantly different is found within the "ET Tables" tab of the Non-residential draft measure list. However, Pac / AEG provides no indication as to whether this list is comprehensive (i.e., are all measures being considered for 2021 included within this tab?).
        - *Please add crosswalk tabs to both Excel workbooks that would enable stakeholders to review measures by Pac Power program option.*

      PacifiCorp Response:

      Applied Energy Group (AEG) will conduct this analysis during the measure characterization process. However, AEG reviewed PacifiCorp programs as part of past CPA efforts and ensured that existing measures are represented within the list. The list of measures considered for inclusion is housed in the "SECTOR-Equip" and "SECTOR-Meas" spreadsheets within each workbook. The other spreadsheets were included to provide context surrounding this list.

- **Measure workbooks are password protected**. The inability to save a local copy of the Excel measure workbooks limits stakeholders' abilities to perform independent QA/QC, the results of which could help Pac / AEG with their subsequent measure list revisions.
    - *Please provide Excel file passwords enabling greater stakeholder QA/QC ability*

      PacifiCorp Response:

      PacifiCorp has removed the password protection on the measure list Excel file.

- **Lack of quantitative savings reported by measure**. Existing workbooks provide only qualitative measure descriptions. Onus is on stakeholder to crosswalk Pac workbooks against independent organizations' data files (if they exist).
    - *Please provide summary quantitative savings values by measure (e.g., annual UES in kWh) to provide stakeholders a better sense of the rough order of magnitude (ROM) savings by measure.*

      PacifiCorp Response:

      The intent of the measure list review is to provide stakeholders with an opportunity early in the process to provide input on the list of demand-side management measures that will ultimately be considered in the CPA. Since this is presented before measure characterization work has been conducted, AEG is unable to provide quantitative values. These assumptions will be shared with stakeholders during the June 18-19,

2020 public input meeting. Providing quantitative impacts would require researching and characterizing the measures, which would delay delivery of this document to a point where stakeholder feedback could not be incorporated without jeopardizing timeline for the integrated resource plan.

- **Expanding the abbreviations such as XCEL, IL TRM.**

  PacifiCorp Response:

  These are detailed on the "Introduction" spreadsheet within each list. Xcel Energy is a large utility with service territory in Colorado, among other states. IL stands for Illinois, whose technical reference manual development process involves robust stakeholder engagement and is being considered as a source in the Utah and Wyoming analysis.

* Required fields

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 2/14/2020

*Name: Kevin Emerson Title: **Energy Efficiency Program Director**

*E-mail: kevin@utahcleanenergy.org Phone: 801-363-4046

*Organization: Utah Clean Energy

Address: 1014 2nd Ave

City: **Salt Lake City** State: **Utah** Zip: **84103**

Public Meeting Date comments address: **2/18/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: **Southwest Energy Efficiency Project**

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
2021 IRP Conversation Potential Assessment measure list

☐ 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.

Emerging Technology Question:

In the CPA, how are DSM measures listed as "emerging" treated differently from standard (non-emerging) DSM measures? Does the CPA assume different levels of costs, technical potential, etc. as for emerging measures as compared to standard DSM measures? In addition, what assumptions are made about cost reductions and technological breakthroughs around emerging technologies. Over the twenty year modeling period one would expect emerging technologies to move towards commercialization.

PacifiCorp Response:

The current Conservation Potential Assessment (CPA) methodology does not inherently treat emerging technology differently than a mature measure or an emerging technology that has become a mature measure. In some cases, participation may ramp up faster as the measure matures through utility programs and/or changes in measure costs over time. Measure costs are considered only when a well-vetted source can be referenced (e.g., the Department of Energy's Solid-State Lighting Projections which forecast increased light emitting diode efficiency and decreased cost throughout the study period).

However, based on stakeholder feedback (e.g., Utah Clean Energy and Southwest Energy Efficiency Project), PacifiCorp is considering an updated approach to emerging technology. If feasible, PacifiCorp will explore the possibility of modeling declining cost within the 2021 Integrated Resource Plan for emerging technologies.

* Required fields

Emerging Technology Feedback and Recommendations:

In the DSM measure lists, AEG defines "emerging technology" as equipment and measures that are "…in the pilot stage with expected near-term commercialization…" or equipment and measures that are "…commercially available but with low market penetration". We have concerns about grouping these two different categories of measures under one definition. DSM program strategies to deploy measures that are commercially available differ fundamentally from DSM program strategies to help measures that are not commercially available and require additional pilot testing and R&D.

UCE and SWEEP believe that measures that are commercially available and are cost-effective should not be considered "emerging" in the same category as measures that are not yet commercially available. We are concerned that including commercially available measures in the "emerging" list has the potential to omit measures from thorough DSM analysis just because the measures have (or are assumed to have) low market penetration. Arguably, DSM measures with low market penetration should receive additional evaluation to help such measures become more widespread. **UCE and SWEEP recommend excluding measures from the "emerging technologies" measure category that are commercially available, even if they have low market penetration. These measures should be considered with all other commercially available measures.**

PacifiCorp Response:

PacifiCorp will update the definition of emerging technology and its treatment in the 2021 CPA. Please see the response to the preceding question for more details.

Residential Measure List:

We believe that at least two residential measures, "ENERGY STAR Home Design" and "Advanced New Construction Design - Zero Net Energy", which are included in the emerging technology list are proven practices and shouldn't be considered "emerging". Instead, UCE and SWEEP recommend that these two measures be included in the standard DSM measure list.

PacifiCorp Response:

PacifiCorp will remove the "emerging" distinction from these measures in the final list.

Please provide further details about the "Water Heating – Solar System" measure listed as "emerging" in the Res – Meas tab. For example, does this measure include on-site/rooftop solar PV paired with a heat pump water heater? Are there any other technologies that are involved in this type of combined measure?

PacifiCorp Response:

This measure refers to the installation of a solar thermal system and not solar photovoltaic. Since this is a mature technology in other parts of the country, PacifiCorp will remove the "emerging" distinction from this measure in the final list.

Do the Air-Source Heat Pump measures include models that operate in cold climates?

PacifiCorp Response:

Yes, PacifiCorp will clarify this in the final measure list of the 2021 CPA.

Non-Residential Measure List:

The ET Tables tab in the Non-Residential measure list includes "Strategic Energy Management" in its list of "emerging" technologies, whereas in the COM-Meas tab SEM is not listed as emerging. **UCE and SWEEP recommend removing the Strategic Energy Management (SEM) measure from the ET Tables tab as an emerging measure. UCE doesn't consider SEM to be an emerging technology as this program has been in place for multiple years and is a proven DSM strategy.**

PacifiCorp Response:

PacifiCorp will remove the "emerging" distinction from these measures in the final list.

While the Non-Residential Measure list includes an "Advanced New Construction Designs" measure, it doesn't specify the level of energy performance, like the two residential measures do (i.e., "ENERGY STAR Home Design" and "Advanced New Construction Design - Zero Net Energy"). More specifically, it doesn't specify that this is a "net zero

energy" measure. We believe this is a major oversight. UCE and SWEEP recommend updating the Non-Residential Advanced New Construction Designs measure as a specific Net Zero Energy measure given that net zero energy buildings are attainable for most building types in the residential and non-residential sectors.

PacifiCorp Response:

PacifiCorp will add the "Zero Net Energy" suffix to the nonresidential version of this measure in the final list.

Residential and Non-Residential Air Infiltration, Building Shell, and Insulation Measures:

In the measure list there are no details about what type of heating systems are assumed for the following measures: air infiltration, building shell, ducting measures, insulation, and windows measures in both the residential and non- residential measure lists. Given the growing interest in efficient all-electric buildings, **UCE and SWEEP recommend that measures related to building envelope, insulation, and air infiltration should include the measures installed in all-electric buildings in addition to the same measures installed in standard buildings that use natural gas for space heating.**

PacifiCorp Response:

PacifiCorp will consider creating two separate measures for building envelope, insulation and air filtration.

* Required fields

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 2/20/2020

*Name: Sudeshna Pal Title: Click here to enter text.

*E-mail: sudeshna@oregoncub.org Phone: Click here to enter text.

*Organization: Oregon Citizens' Utility Board

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: Click here to enter date. ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

A. Demand Response in CPA PAC 2021 IRP

B. Pricing and Rates resources

☐ 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.

1. Does DLC of Smart thermostats (currently offered for Residential customers) come with any low-income assistance? CUB supports this program but believes there should be some provision for low-income customers.

PacifiCorp Response:

PacifiCorp does not currently offer direct-load control of smart thermostats but may consider adding this program when economic to do so. PacifiCorp appreciates the suggestion for considering a low-income design for this program type.

2. Irrigation Load Control –We recommend that PacifiCorp should consider moving beyond the pilot program for Oregon.

PacifiCorp Response:

The Public Utilities Commission of Oregon recently approved a three-year extension of this pilot. Although still considered a pilot, the focus over the next three years will be significantly increasing enrollment from one megawatt (MW) to a five MW program.

3. We are supportive of Third Party Contracts for demand response. This has been PGE's one of the most successful demand response programs

PacifiCorp Response:

Thank you for this feedback. As PacifiCorp considers the scope for any request for proposal for demand-response programs, commercial and industrial third-party options will be considered.

* Required fields

4. Under Pricing and rates we recommend extending the TOU demand rate for electric vehicle users to Oregon. Xcel Energy in Minnesota is using this pricing mechanism for EVs without requiring a separate meter.

PacifiCorp Response:

PacifiCorp believes that the most appropriate forum for such retail pricing issues to be explored is in PacifiCorp's general rate case filing that is currently underway. PacifiCorp is seeking to redesign residential customer rates to more fairly reflect costs across difference usage levels, and remove disincentives for customers who make the choice to get an electric vehicle.

5. We support using Time of Use demand rates for residential application. This is a better alternative to putting demand charges.

PacifiCorp Response:

PacifiCorp encourages Oregon Citizen's Utility Board to engage this retail rate-related issue in the currently underway general rate case filing.

6. We think that CPP rate impacts should be estimate

PacifiCorp Response:

Since critical peak pricing (CPP) is not a firm resource option that PacifiCorp may rely upon to serve load, it believes that CPP, while potentially a valuable option for customers, is best explored in forums outside the integrated resource planning process.

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.
Click here to enter text.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.
Peak time rebates can be offered to all on an opt-in opt-out basis.

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

Thank you for participating.

* Required fields

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 4/2/2020

*Name: Kevin Emerson Title: **Energy Efficiency Program Director**

*E-mail: kevin@utahcleanenergy.org Phone: 801-363-4046

*Organization: Utah Clean Energy

Address: 1014 2nd Ave

City: **Salt Lake City** State: **Utah** Zip: **84103**

Public Meeting Date comments address: **2/18/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: **Justin Brant, Southwest Energy Efficiency Project**

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

DSM and DR measure lists, major measures list

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

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

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

Click here to enter text.

Major Measures List

UCE/SWEEP support the proposal to develop a list of "major measures". This is a reasonable approach to capture a list of high-impact and readily available DSM measures in the upcoming CPA. UCE/SWEEP request that PacifiCorp send the current draft of the major measure list prior to the next CPA stakeholder meeting.

PacifiCorp Response:

PacifiCorp posted the energy efficiency and demand response measure lists with major measures indicated for stakeholder review on April 15, 2020. It can be found here pacificorp.com/energy/integrated-resource-plan/support.

UCE/SWEEP recommend that AEG evaluates Rocky Mountain Power's 2018 annual DSM report to identify measures that had high realization rate, high net to gross ratio, and high cost effectiveness (or marginal cost effectiveness where justified to serve hard to reach customers) and include these measures in the proposed major measures list, and share these measures with stakeholders.

* Required fields

PacifiCorp Response:

As part of the 2021 Conservation Potential Assessment (CPA), PacifiCorp did conduct a review of PacifiCorp's energy efficiency programs. All measures currently offered in PacifiCorp programs are part of the CPA.

UCE/SWEEP also recommend adding the following DSM measures to the "major measures" list:

- **Net Zero Building Design Assistance incentive program:** Net zero buildings are buildings that have maximized energy efficiency and also generate all energy needed from on-site renewable energy sources. Net zero buildings have been and continue to be designed and constructed all over the United States and should not be considered "emerging." According to New Buildings Institute, there are over 121 "verified" net zero buildings with another 527 "emerging" net zero buildings across the U.S. and Canada.[1] There are likely many more buildings that are not part of the NBI dataset. Incentive programs to support the design and construction of net zero buildings also exist. For example, the Energy Trust of Oregon offers a Path to Net Zero/Net Zero Early Design Assistance program.[2] UCE/SWEEP recommend adding a net zero building design assistance program to the major measures list evaluated by AEG for the 2021 CPA. Such a program could be modeled on the Energy Trust of Oregon's Path to Net Zero/Net Zero Early Design Assistance program.

  PacifiCorp Response:

  PacifiCorp's 2021 CPA does have a net zero building measure named 'Advanced New Construction Designs' measure code CM0084.

- **Joint delivery of DSM measures/programs:** Another addition that UCE/SWEEP recommends be added to the major measure list is any program/measure that can be implemented through joint delivery (and cost-sharing) with other utilities or other partners. For example, Rocky Mountain Power is currently pursuing joint delivery of a pilot residential direct install program in partnership with Dominion Energy Utah. Joint delivery of DSM measures/programs provides a huge opportunity to reduce administrative costs and improve cost-effectiveness of DSM program delivery and should be considered a major measure.

  PacifiCorp Response:

  Joint delivery is a specific opportunistic program design variation that could be represented with reduced administrative costs, however the example noted here has not materialized due to recent events and therefore proxy cost impacts are not available. If PacifiCorp pursues future joint delivery opportunities, any opportunity to deliver programs at a lower cost would increase the cost effectiveness of programs.

New DSM Measure for DSM measure list

Recommendation for standard DSM measure list (not "major measure" or "emerging measure" list):

- **Building envelope and air sealing in all-electric buildings:** Building envelope technologies account for 30% of the primary energy use in buildings.[2] Given the large potential for increased electrification of space heating in buildings,[3] improved insulation and air sealing in all-electric buildings has the potential to be a highly impactful energy efficiency measure that should be evaluated in the 2021 CPA. UCE/SWEEP recommend adding a building

[1] See New Buildings Institute's Getting to Zero Buildings Database: https://newbuildings.org/resource/getting-to-zero-database/ [2] See Energy Trust of Oregon's Path to Net Zero Program: https://www.energytrust.org/commercial/new-buildings-path-to-netzero/

[2] See United States Department of Energy Better Building Solutions Center, Building Envelope: https://betterbuildingssolutioncenter.energy.gov/alliance/technology-solution/building-envelope

[3] See NREL Electrification Futures Study: https://www.nrel.gov/analysis/electrification-futures.html

* Required fields

envelope and air sealing measure specifically for all-electric buildings using highly efficient heat pump technologies.

PacifiCorp Response:

PacifiCorp's CPA already accounts for additional energy efficiency potential as a result of naturally-occurring electrification. The 2021 CPA's technical potential is created using PacifiCorp's load forecast and any electrification that is accounted for in the load forecast is used in the CPA to develop potential. For example, the increase in electric heating in Utah would be accounted for in the CPA through additional potential for weatherization including air sealing and duct sealing.

Emerging Measures

We also wish to reiterate our previous recommendation that the "emerging measures" category should exclude commercially available technologies that currently have a low market-penetration. The goal of the ratepayer-funded DSM programs is to transform the market and accelerate the adoption of efficient technologies, *especially those with low market penetration*. We are concerned that if commercially available DSM measures with low market penetration are included in the emerging measures list, their assessed potential in the 2021 CPA may be artificially constrained.

PacifiCorp Response:

Applied Energy Group (AEG) has removed this from the definition of emerging technologies for the 2021 CPA. This updated definition also resolved several other comments that certain measures should not be "emerging".

Emerging Measures and Market Availability

When reviewing the DSM measure list, we noted that several HVAC or appliance measures were considered emerging measures when they are commercially available today or were not assumed to be on the market when there are models at that level of efficiency available. As discussed above, UCE/SWEEP believe that products that are available in the market today should not be considered emerging. In addition, it is important to consider the availability of all measures that are currently available in the market. We recommend using sources like the ENERGY STAR Most Efficient list and the CEE Energy Efficiency Program Library to ensure that the SEER, EF and other efficiency ratings are up to date. We provide some specific examples of these issues and recommendations below:

- **Central air conditioner and air source heat pumps with a SEER of 21** are available in the market and should not be classified as "emerging".[4]
- **Clothes dryers with a CEF over 9** are already available in the market, yet according to AEG's measure list, these technologies are assumed not be available until 2024.[5] Clothes dryers with a CEF over 9 should be included in the standard DSM measure list. In addition, while heat pump dryers are still relatively new they are available in the market and should not be considered "emerging".
- **Refrigerators in the CEE Tier 3 class** are available in the market and should not be considered emerging.[7]

PacifiCorp Response:

AEG reviewed these lists and all the measures mentioned have already been moved from the emerging technology list to conventional technologies.

---

[4] See ENERGY STAR Most Efficient 2020 — Central Air Conditioners and Air Source Heat Pumps: https://www.energystar.gov/products/most_efficient/central_air_conditioners_and_air_source_heat_pumps

[5] See ENERGY STAR Certified Clothes Dryers: https://www.energystar.gov/productfinder/product/certified-clothes-dryers/results [7] See Consortium for Energy Efficiency Residential Refrigerator Qualifying Product List: https://library.cee1.org/content/qualifyingproduct-lists-residential-refrigerators

Demand Response

UCE/SWEEP have additional recommendations about the demand response measure list:

- **Demand response/load control for pool pumps:** Consider adding direct load control of pool pumps to demand response measure list.

- **Leverage BEMS and HEMS for control of individual end uses:** Investigate how to utilize commercial Building Energy Management Systems and Home Energy Management Systems as direct load control programs for commercial and residential sectors, respectively. While the potential for these systems may be captured in the potential for the individual end-uses they control (HVAC systems, lighting/daylighting,) BEMS have the capability to control multiple building end-uses and may provide additional DR capabilities over and above looking at the end-uses individually. Similarly, Home Energy Management Systems on the market can manage HVAC systems, lighting, ceiling fans, and other smart devices.[6] UCE/SWEEP recommends that AEG investigate the potential of controlling multiple demand response end-uses with BEMS and HEMS measures.

  PacifiCorp Response:

  Demand response for pool pumps, Home Energy Management Systems and Building Energy Management Systems (HEMs and BEMs) are included in the measure lists as potential enabling technologies. HEMs controlled end uses include: cooling, space heating, interior lighting, appliances, and electronics. BEMs controlled end uses include: cooling, space heating, interior lighting, and refrigeration.

- **Demand response for low-income customers:** Evaluate new and expanded DR programs and incentives with consideration of controllable technologies that are commonly used by low-income customers and customers in multi-family housing.
  - Prioritize expansion of direct load control to include room A/C units, similar to Cool Keeper, in order to expand access to DR programs to additional customers.
  - Development of direct load control incentives and programs should consider the equity of the range of incentives offered to customers (in addition to efficacy and energy savings) and ensure that programs and incentives are available to benefit low-income customers. For example, an incentive for a new electric heat pump water heater with DR capabilities is likely to be purchased by middle- and higher income customers, but these same technologies could be leveraged by low-income customers by being paired with low-income weatherization programs or by adding higher incentive for qualified low-income customers.

  PacifiCorp Response:

  The potential assessment is based on customer sector usage which does not differentiate savings between income levels but does include room air conditioning, Smart Thermostats, and water heater controls.

- **Customer-sited battery storage:** As PacifiCorp explores incentives for customer-sited battery storage, the company should avoid restrictions that limit the types of batteries that customers choose to adopt. There are variety of battery brands and chemistries available on the market, and to the greatest extent possible customers should be free to choose the batteries that best fit their needs. Programs and evaluations should focus on the type(s) of services that batteries can provide or offer a list of eligible batteries that customers may choose to adopt, rather than restricting the incentive to a single brand or battery chemistry.

[6] See NEEP Home Energy Management System Product List: https://neep.org/initiatives/integrated-advanced-efficiencysolutions/home-energy-management-systems#HEMS%20Product%20List

PacifiCorp Response:

Measure characterization does not assume a specific brand or chemistry but does define basic performance parameters. Customers would be able to choose what works for them within program performance requirements to justify any compensation the program would offer to control or partially control that customer sited resource.

- **Alternative DR programs for customer-sited batteries:** UCE/SWEEP further recommend that AEG evaluates not only direct utility control of batteries, but also:
  - limited utility control during critical peak times and
  - voluntary customer dispatch of batteries.

  An example of limited utility control during critical peak periods is the Green Mountain Power "Bring Your Own Device" program, which provides customers with an incentive in exchange for allowing utility control of the battery during Peak Events, estimated to occur 5 – 8 times a month for 3 – 6 hours at a time.[7] Customers can be incented to dispatch their batteries in a certain way or respond to TOU rates without requiring direct utility control. For example, Salt River Project provides an incentive of up to $3,600 for customer-sited batteries that are controlled by the customer, and allows customers to export power to the grid in exchange for a credit.[10] The California Self-Generation Incentive Program provides a residential storage incentive of $0.25/Wh for batteries that are programmed to dispatch to the utility at least once per day.[8] Evaluation of an incentive for battery storage should include consideration of the benefits of incenting limited utility control and customer-control of batteries, in addition to full utility control.

  PacifiCorp Response:

  These recommendations were included within the measure definition for customer-sited batteries.

- **TOU program for battery storage plus solar:** UCE/SWEEP also recommend that AEG evaluates a TOU rate for battery storage plus solar, similar to Rocky Mountain Power's current EV TOU rate.

  PacifiCorp Response:

  An export credit proceeding is currently underway (Docket No. 17-035-61) in the state of Utah. PacifiCorp believes program-specific and other appropriate ratemaking proceedings are the proper venue for time varying rates to be developed and vetted, including those that may apply to customers with onsite solar and batteries, rather than in a demand-side management potential study for integrated resource planning.

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. Click here to enter text.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated. Click here to enter text.

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

---

[7] See Green Mountain Power Battery Systems: https://greenmountainpower.com/bring-your-own-device/battery-systems/ [10] See Salt River Project Battery Storage Incentive Frequently Asked Questions: https://www.srpnet.com/electric/home/batterystorage/faq.aspx

[8] See California Self-Generation Incentive Program 2020 SGIP Handbook: https://www.selfgenca.com/

* Required fields

Thank you for participating.

* Required fields

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: Click here to enter date.

*Name: Ernie Rogers | Title: Vice Chairman

*E-mail: ernie.e.rogers@gmail.com | Phone: 801-899-5867

*Organization: Utah Valley Earth Forum

Address: 2608 E Canyon Crest Drive

City: Spanish Fork | State: Utah | Zip: 84660

Public Meeting Date comments address: 4/16/2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

Click here to enter text.

Impact of electric vehicles was underestimated in a table provided for the April 16, 2020 Workshop

☐ 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.

There appears to be an error in the "Single Family Market Profile - Utah" table on page 19 of the 2021 IRP DSM Technical Workshop document, dated April 16, 2020. The percent penetration for electric vehicles should be 0.2%. (There are two vehicles per average Utah household. The average mileage per vehicle is 15,000 miles per year, consuming 4,000 kWh with current technology.)

PacifiCorp Response:

The values represented under the "saturation" column of the table on page 19 are calculated on a per household basis for all measures listed. The result is that although there may be, on average, two vehicles per household, the metric was only calculated based on total households, not total vehicles. This calculation was consistent for all measures, even those that may have more than one instance typically per home. If it were calculated based on total vehicle market the value would be much closer to 0.2% as noted.

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.

Click here to enter text.

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

* Required fields

Click here to enter text.

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

Thank you for participating.

* Required fields

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 4/30/2020

*Name: Kevin Emerson | Title: **Energy Efficiency Program Director**

*E-mail: kevin@utahcleanenergy.org | Phone: (801) 363-4046

*Organization: Utah Clean Energy

Address: 1014 2nd Avenue

City: **Salt Lake City** State: **Utah** Zip: **84103**

Public Meeting Date comments address: **4/16/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: **Justin Brant, Southwest Energy Efficiency Project**

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments. DSM and DR measure lists

☐ 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. DSM Measures

As previously stated, Utah Clean Energy supports the inclusion of the "Water Heater – Solar System" and the "Pool Heater – Solar Water Heating System" measures in the file "PacifiCorp 2021 CPA Res Measure List Draft Final". We are commenting again here to direct AEG to a similar incentive currently being offered in Utah by Dominion Energy through their ThermWise program. Dominion Energy currently offers a $750 incentive for a "solar assisted gas water heating" for both domestic hot water and pools: https://www.thermwise.com/wp-content/uploads/2020-Appliance-Rebates.pdf

We recommend adding a high-SEER heat pump water heater (HPWH) that uses an outdoor compressor unit to your DSM measure list. A standard HPWH captures heat from indoor air from within the space/room in which the HPWH and compressor unit is located. This can lower indoor temperatures in the room where the water heater is located and may pose challenges to the operation and long-term adoption of HPWHs in Utah's climate, which is heating dominated. The HPWH could cannibalize the indoor heat needed to keep occupants warm in colder months. To address this issue, HPWHs with outdoor compressor units should be evaluated for inclusion in the DSM measure list. It is unclear how widespread this type of system is available yet in the Utah market, but these types of HPWHs are commercially available. For example, the "SAN CO2" system is a HPWH that uses an outdoor compressor unit manufactured by Sanden: https://www.sandenwaterheater.com/

PacifiCorp Response:

Thank you for the resource suggestion.

Demand Response/Grid Services Measures

In addition to the Grid-Interactive Water Heater (GIWH) DR measure that is included in the file "PacifiCorp 2021 CPA DR Measure List Draft Final", Utah Clean Energy recommends including a second GIWH DR measure that also includes solar PV. A solar PV assisted Grid-Interactive Water Heater DR measure would integrate on-site solar electricity generation with a heat pump water heater, creating an opportunity to "super heat" hot water to higher-than-usual temperatures when electricity is cost-effectively generated through on-site solar PV, therefore enabling the hot water tank to be used as thermal energy storage to provide hot water when needed (with mixing valves to temper the very hot water temperatures).

PacifiCorp Response:

Thank you for the references. This measure is currently included under the Tier 4 emerging tech HPWH.

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.

Current solar assisted water heater incentives in Utah: https://www.thermwise.com/wp-content/uploads/2020-ApplianceRebates.pdf

Sanden SAN CO2 heat pump water heater with outdoor unit: https://www.sandenwaterheater.com/

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated. Click here to enter text.

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

Thank you for participating.

* Required fields

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 5/4/2020

*Name: Nick Sayen Title: **Senior Utility Analyst**

*E-mail: nick.sayen@state.or.us Phone: 503-378-6355

*Organization: Oregon Public Utility Commission

Address: 201 High St. SE Suite 100

City: **Salem** State: **OR** Zip: **97301**

Public Meeting Date comments address: Click here to enter date. ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

Demand response

☐ 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.

At the August 16, 2016 OPUC Public Meeting PacifiCorp presented on the potential for demand response pilots. This presentation was a condition of Order 16-071. The link to this presentation is provided below. Slide 8 of the presentation notes that, with respect to residential smart thermostat control, a pilot/program of this type may require interval meters to measure baselines and savings; costs may be significantly lower after AMI is in deployed. AMI deployment in Oregon is now complete or nearly complete.

Have the costs for a residential smart thermostat control program been updated with AMI deployment complete?

PacifiCorp Response:

Some of the barriers to participation have been removed through advanced metering infrastructure (AMI) deployment. Rather than looking at program costs with and without AMI, for those conservation potential assessment (CPA) options that rely on (or are significantly enhanced by) AMI, those options were only analyzed after AMI is assumed to be deployed and so does not include any costs associated with the AMI rollout. A description of how AMI deployment was considered in the 2019 CPA starts on the bottom of page 18 in Volume 2 of that study.

For measures like a Bring Your Own Thermostat program where units are already communicating over Wi-Fi, AMI deployment would not impact the cost. In this case, AMI would primarily improve the accuracy of evaluation efforts but any cost implications of improved evaluation efforts have not been considered in measure costs.

* Required fields

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.
https://oregonpuc.granicus.com/MediaPlayer.php?view_id=2&clip_id=116

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

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 5/4/2020

*Name: Nick Sayen Title: **Senior Utility Analyst**

*E-mail: nick.sayen@state.or.us Phone: 503-378-6355

*Organization: Oregon Public Utility Commission

Address: 201 High St. SE Suite 100

City: **Salem** State: **OR** Zip: **97301**

Public Meeting Date comments address: Click here to enter date. ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

Demand response

☐ 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.

At the August 16, 2016 OPUC Public Meeting PacifiCorp presented on the potential for demand response pilots. This presentation was a condition of Order 16-071. The link to this presentation is provided below. Slide 13 of the presentation notes that, with respect to a peak-time rebate pilot/program, in looking for opportunities to leverage the deployment of AMI to implement low-cost Class 1 and 3 DSM programs with verifiable impacts, the Company would develop more detailed estimates of the IT-related cost to implement a peak-time rebate program.

1. Have more detailed estimates of the IT-related costs for implementing a PTR program been developed?

PacifiCorp Response:

No, more detailed estimates of these costs have not been developed.

2. Have they been updated recently?

PacifiCorp Response:

No, they have not been updated recently.

3. Have other costs for a PTR program been updated with AMI deployment complete?

PacifiCorp Response:

No, other costs for a peak-time rebate program have not been updated.

* Required fields

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.
https://oregonpuc.granicus.com/MediaPlayer.php?view_id=2&clip_id=116

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

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 5/4/2020

*Name: Nick Sayen Title: **Senior Utility Analyst**

*E-mail: nick.sayen@state.or.us Phone: 503-378-6355

*Organization: Oregon Public Utility Commission

Address: 201 High St. SE Suite 100

City: **Salem** State: **OR** Zip: **97301**

Public Meeting Date comments address: Click here to enter date. ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

Demand response

☐ 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.

At the August 16, 2016 OPUC Public Meeting PacifiCorp presented on the potential for demand response pilots. This presentation was a condition of Order 16-071. The link to this presentation is provided below. Slide 6 notes that AMI… will enable establishment of baseline and actual consumption for estimation of Class 1 and 3 DSM program impacts without additional metering equipment. Slide 12 notes that by 2020, AMI will enable determination of baselines and verification of savings at lower cost.

Have the costs of any/all DR pilot/program opportunities (besides residential smart thermostat control and PTR) been updated to reflect the benefits of the AMI deployment?

PacifiCorp Response:

All the costs of demand response options are in the process of being updated this summer. Where advanced metering infrastructure (AMI) capabilities are assumed, the year in which those options are available will vary by state as AMI is not yet implemented in all six states. Estimates for when AMI will be implemented will be updated as a part of the 2021 conservation potential assessment (CPA) process.

AMI would primarily improve the accuracy of evaluation efforts but any cost implications of improved evaluation efforts are not considered in measure costs used in the CPA.

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.

* Required fields

https://oregonpuc.granicus.com/MediaPlayer.php?view_id=2&clip_id=116

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

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

*Name:	Jim Woodward	Title:	**Regulatory Analyst**
*E-mail:	Jim.Woodward@utc.wa.gov	Phone:	(360) 664-1302
*Organization:	WA Utilities & Transportation Commission (WA-UTC)		
Address:	Click here to enter text.		
City:	Click here to enter text.	State:	Click here to enter text. Zip: Click here to enter text.

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):
    a. 2023 – Jim Bridger Unit 1

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 NWEC, 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)?

* Required fields

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.

* Required fields

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.

* Required fields

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 in 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.

* Required fields

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.**

* Required fields

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 is 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.

* Required fields

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.

* Required fields

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.

* Required fields

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: Click here to enter date.

*Name: Ernest Rogers | Title: **Vice chair**

*E-mail: ernie.e.rogers@gmail.com | Phone: 801-899-5867

*Organization: Utah Valley Earth Forum

Address: 2608 E Canyon Crest

City: **Spanish Fork** | State: **Utah** | Zip: **84660**

Public Meeting Date comments address: **6/18/2020** ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Modeling of energy storage

☐ 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.
Recommend avoidance of lithium battery storage

Lithium battery storage was developed for mobile applications where weight is critical. Lithium batteries are an essential component of electric vehicles, and supplies of the battery components (lithium and cobalt) are limited. Demand for lithium batteries for transportation, both automobiles and trucking, is expected to remain high. In contrast, PacifiCorp's battery storage is stationary. Cost, lifetime, and safety are the main drivers in utility applications. Therefore, IRP modeling should be focused on battery technologies better suited to PacifiCorp's need. One such battery is the Znyth battery, made by EOS Energy Storage,

PacifiCorp's highest purpose is to serve its customers. Charging of electric vehicles is rapidly becoming an important service. PacifiCorp can facilitate development of this market by avoiding use of lithium battery storage. One medium utility-size lithium battery storage unit supplying 200 MW for four hours contains enough battery material for construction of 50,000 electric cars. Indeed, with proper planning, these electric cars can represent a manageable load for PacifiCorp.

The company and its customers will benefit by PacifiCorp's avoidance of lithium batteries for energy storage, in favor of equally good non-lithium alternatives.

PacifiCorp Response:

In the 2019 Integrated Resource Plan (IRP), lithium-ion batteries were the most competitive energy storage technology identified in PacifiCorp's Renewable Resources Assessment, provided as Appendix P in the 2019 IRP. As a result, the costs and operational characteristics of lithium-ion batteries were the primary energy storage resources modeled in the 2019 IRP. However, specific chemistries are not relevant to the IRP results, which are instead driven by costs and operational characteristics. During procurement, costs and operational characteristics are again the key factors, rather than specific chemistries. The presence of specific energy storage types in the IRP preferred portfolio only indicates configurations that are expected to be competitive and does not preclude other options. PacifiCorp has commissioned a study of the cost and performance characteristics of renewable resources as well as energy storage. PacifiCorp will share the results of that study at a future public meeting and will also discuss its proposed plan to model an array of options that reasonably capture the range of benefits energy storage is projected to be able to provide.

https://eosenergystorage.com

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.

Click here to enter text.

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

Click here to enter text.

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

Thank you for participating.

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 6/29/2020

*Name: Sashwat Roy Title: Technology and Policy Analyst

*E-mail: sashwat@renewablenw.org Phone: 972-408-7813

*Organization: Renewable Northwest

Address: 421 SW 6th Ave

City: Portland State: OR Zip: 97214

Public Meeting Date comments address: **6/18/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Battery Storage Modeling in PLEXOS, T&D Capacity Deferral Benefits of Storage resources

☐ 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.

Renewable Northwest appreciates the opportunity to provide inputs to PacifiCorp's 2021 IRP process. Overall, we identify several opportunities for clarification and further refinement of the modeling efforts that PacifiCorp will be conducting through PLEXOS. Firstly, in PacifiCorp's 2021 IRP Kick-off meeting, it was stated that PacifiCorp is considering analysis of co-located solar/wind resources paired with batteries in addition to standalone batteries located separately from the generation sources. Renewable NW would like to emphasize the fact that co-located resources provide flexibility, avoid curtailment of renewable energy resources, and provide essential grid benefits such as energy arbitrage, capacity value, and ancillary services such as frequency regulation[1] to LSEs. Co-locating resources also ensures availability of the Federal ITC (when battery is charged with renewables) thereby providing encouragement to future deployments. While standalone batteries are essential to provide key grid services, co-location of energy generation and battery storage should be encouraged in the IRP modeling efforts and in the upcoming RFPs.

Secondly, another statement mentioned by the IRP staff pertaining to the modeling of different battery storage charge/discharge durations in hybrid resources was partially unclear as to the specifics of the inputs for the PLEXOS model. Specifically, the PacifiCorp staff said that in addition to 4-hour storage, they would also be considering 3- and 5-hour durations. Based on recent market research, Renewable NW believes that it would be prudent to include 6-hour storage in addition to selected durations for the optimization modeling to reflect and analyze the wide-varying battery chemistries like Zinc-Carbon and Vanadium flow, which are available in the market currently. These new chemistries differ from Lithium-ion in characteristics such as battery lifetime, charge/discharge duration and round-trip efficiency due to their typical operational characteristics. NREL published a report [2] highlighting the peaking capacity benefits of long-duration storage and it would be beneficial for PAC to include 6-hour storage in their PLEXOS model in addition to the 5-hour storage option. While we understand the complexity and long-run times for optimization modeling in PLEXOS, a 6-hour storage option could provide essential peaking capacity benefits for PAC's BA going forward. Modeling 6-hour storage instead of the 5-hour option may free up computational complexity, reduce run-times and cover the benefits of up and coming resource options.

* Required fields

Finally, Renewable NW believes that battery storage resources can provide a sizable benefit to transmission & distribution (T&D) system planning efforts by reducing the peak load and extending the life of ageing T&D lines and substations. Battery storage systems, being modular and flexible in nature, can provide sizable financial incentives and customer savings when operated downstream from substations to reduce peak load and reduce strain at the distribution level. The concept of "storage as a transmission asset" has been a hot topic of discussion in CAISO, MISO and SPP over the past couple of years. We urge PacifiCorp to conduct independent analysis at a local level in their BA to evaluate whether battery storage systems can provide benefits for the few peak load hours in a year. Future IRP modeling efforts and RFPs can be formulated based on this distribution-level analysis. In the future, we hope that a methodology would emanate from this process which could be integrated into the IRP modeling efforts to showcase the value of battery storage in PacifiCorp's BA.

PacifiCorp Response:

PacifiCorp agrees that there are benefits from co-locating energy storage and renewable resources, relative to stand-alone resources and intends to continue modeling co-located storage and renewables in the 2021 Integrated Resource Plan (IRP).

PacifiCorp agrees that modeling a range of energy storage options can identify opportunities to capture the unique benefits of different configurations. PacifiCorp has commissioned a study of the cost and performance characteristics of renewable resources as well as energy storage. PacifiCorp will share the results of that study at a future public meeting and will also discuss its proposed plan to model an array of options that reasonably capture the range of benefits energy storage is projected to be able to provide.

PacifiCorp currently evaluates alternative solutions to planned transmission and distribution (T&D) upgrades, and considers solar, battery, and demand-side measures as potential alternatives. The location-specific nature of most T&D requirements exceeds the granularity of the transmission system modeled in the IRP. In addition, energy storage resources that are providing support for the T&D system can be restricted based on local conditions in a manner that is difficult to account for when such constraints are not recognized in the IRP model. As a result, incorporating specific T&D-related inputs in IRP modeling is difficult. PacifiCorp recognizes that T&D related opportunities exist, and would direct stakeholders to the analysis in Appendix Q of the 2019 IRP (Energy Storage Potential Evaluation) for its most recent long-term assessment of T&D interactions with energy storage resources in the IRP.

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.
[1] Co-Located Hybrid Resources: https://www.publicpower.org/periodical/article/number-large-battery-systems-co-located-with-renewables-continues-grow

[2] The Potential for Battery Energy Storage to Provide Peaking Capacity in the United States: https://www.nrel.gov/docs/fy19osti/74184.pdf

---

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

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: 2020-07-23

*Name: Sarah Rowe | Title:

*E-mail: sarah.rowe@state.or.us | Phone: (503) 378 - 6106

*Organization: Oregon Public Utilities Commission - Administrative Hearings Division

Address: 201 High Street SE, Suite 100

City: Salem | State: OR | Zip: 97308

Public Meeting Date comments address: 06-18-2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Optimization Modeling; 2021 IRP Topics and Timeline; Transmission Overview and Update

☐ 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.

Optimization Modeling:

Slide 20 (Stepwise approach) and Slide 22 (Optimization modeling) both describe that PacifiCorp must input the production costs of its generating units. P. 20 “Rank order your units by energy production cost, low to high; generate from each unit, in order, until all loads are met; calculate remaining generating capability; sell excess energy at market when economic”. P.31 suggests the inputs are the same with the new Plexos optimization model (“The optimization math remains the same”).

PacifiCorp Optimization Modeling Response:

Production costs are an input regardless of the type of calculation performed to determine system dispatch. However, the key point of slides 20-22 is that a linear optimization does not take ordered steps. Taking ordered steps embeds incremental assumptions at each step, inherently preventing an optimal solution. The steps described on slide 20 do not apply to Plexos (and also do not apply to the models used in the 2019 Integrated Resource Plan).

* Required fields

Questions:

1. Can PacifiCorp provide the production costs that it inputs into the IRP for its existing generators?

   PacifiCorp Response:

   Inputs for the 2021 Integrated Resource Plan (IRP) remain under development, and are expected to be provided in the confidential data disc assembled to support the published document.

2. Please describe the production costs used for new units such as Naughton 3 gas conversion and the Energy Vision 2020 new wind, by explaining where these units fit into the dispatch stack and how they are altering the dispatch of other existing units.

   PacifiCorp Response:

   There is no dispatch stack. Please refer to the "Optimization Modeling Response" above. Detailed inputs are provided in the confidential data disc, per response to question one, above.

3. Does the economic dispatch part of modeling include proxy available front office transactions? If so, please explain the approximate costs of front office transactions input into this step of modeling, and provide an example of how the market price forecast is likely to vary over a given day and a given year. Please also explain how the front office transactions fit within the dispatch stack, such as whether they are in economic merit order or whether they are only used if there is a shortfall after using PacifiCorp's units.

   PacifiCorp Response:

   All options and inputs are considered simultaneously, resulting in optimal economic dispatch. Front office transactions (FOTs) are valued at a premium to market in order to avoid non-material arbitrage in the model. FOTs compete with all other supply-side resources based on the cost and value they bring to the system. Myriad short- and long-term costs and benefits are considered in optimization modeling. For example, while an FOT purchase may appear superficially more expensive than another resource on a dollars per megawatt hour ($/MWh) basis, FOTs have the flexibility to defer or avoid a more expensive unit startup cost, reducing system costs over a longer time period. Limits for FOTs, market purchases and sales are currently under development in the 2021 IRP along with all other supply-side resources.

4. Does the economic dispatch part of modeling also compare the costs of available resources from the supply side table? Or does that only occur in the model after a shortfall is identified?

   PacifiCorp Response:

   Economic dispatch is a consequence of the simultaneous consideration of all system inputs, including supply-side resource costs and benefits. Please refer to the "Optimization Modeling Response", and other discussion, above.

5. Please explain if economic dispatch is used to develop the load/resource balance that shows the capacity position, or whether the load/resource balance is irrespective of economics?

   PacifiCorp Response:

   In the 2019 IRP, the initial load and resource balance report does not reflect economic dispatch. Economic dispatch influences the initial energy balance.

6. **Comments/Recommendations:**

Economic dispatch seems to be a foundation of IRP modeling, yet it is not explicitly discussed in the IRP. It seems that it would be particularly helpful to understand which units are marginal and highest cost. That background would provide context for new resource selections in the IRP, by explaining that particular units are $X/MWh and new resources are

$Y/MWh. More explanation on the dispatch stack could provide more transparency into why new resources are displacing FOTs, or why additional energy is selected in a portfolio.

If not explained in PacifiCorp's response to this feedback form, I recommend that we cover PacifiCorp's modeling of economic dispatch in a public input meeting.

PacifiCorp Response:

Economic dispatch is a fundamental element of system operations that drive net power costs, and should therefore be a fundamental element of any electric utility IRP. The identification of a marginal unit varies by hour and can be influenced by a wide range of system conditions (i.e., load, transmission limits, market prices for power and natural gas, wind generation levels, solar generation levels, need for operating reserves, etc.). As noted earlier, a dispatch stack is not used as an input to the modeling process. Rather dispatch is an outcome of optimization, accounting for all simultaneous considerations.

2021 IRP Topics and Timeline:

Slide 49 lists the 2021 IRP Supplemental Studies, with Resource Adequacy/Market Reliance Assessment as the last bullet.

7. **Question**: Will the study that discusses market purchases (Market Reliance Assessment or Western Resource Adequacy Evaluation) be released before the 2021 IRP is filed?

   Comment/Recommendation: We did not have the chance to discuss this study during 2019 IRP development. It would be helpful to understand more detail about the study for the 2021 IRP.

   PacifiCorp Response:

   Market reliance and resource adequacy are discussed in the public input meetings. The discussion and analysis conducted to support the public presentations are the basis for the chapter that will appear in the published 2021 IRP. Please refer to the Market Reliance Assessment discussion from the 2019 IRP, August 30-31 public input meeting. Discussions regarding market reliance include resource adequacy, FOT limits, and the status and availability of updated studies. An initial discussion on market reliance is anticipated for the September 17-18, 2020 public input meeting for the 2021 IRP cycle.

8. Below is an example of how Puget Sound Energy displays market transaction information in its IRP. "Available Mid-C Transmission" is shown as a firm resource in the load and resource balance with a set MW amount. Does PacifiCorp base its market availability assumption on the transmission rights/paths available from a given market?

   PacifiCorp Response:

   As with past IRPs, the 2021 IRP is expected to include both hard maximum FOT limits and also transmission constraints. PacifiCorp does not assume purchases equal to limits or constraints; rather the selection of FOTs is optimized within these constraints with amounts selected so as to minimize overall system costs.

9. I recommend that PacifiCorp explain the connection between the transmission rights it holds for market transactions/FOTs, and the amount of market transactions/FOTs that are assumed to be available to meet PacifiCorp's load (shown in Table 6.12 below).

   PacifiCorp Response:

   Any competing resource can use transmission, so there is no necessary connection between the transmission rights PacifiCorp holds, and the amount of market transactions/FOTs that are assumed to be available to meet PacifiCorp's load. However, a hard limit constraint will be applied separately from transmission, as described in the response to question eight, above. The hard limit in PacifiCorp's 2019 IRP is given in Table 6.12, below.

* Required fields

Existing Resources

Figure 6-5 summarizes the winter peak capacity values for PSE's existing supply-side resources.

Figure 6-5: Existing Supply-side Resources
Nameplate Capacity and Winter Peak Capacity for December 2018

Type of Generation	Nameplate Capacity (MW)	Winter Peak Capacity (MW)
Hydro	973	853
Colstrip	677	658
Natural Gas	1,905[1]	2,061
Renewable Resources	956[2]	143
Contracts	614	695
Available Mid-C Transmission	2,331	1,722
Total Supply-side Resources	**7,456**	**6,132**

NOTES
1. The nameplate capacity for the natural gas units is based on the net maximum capacity that a unit can sustain over 60 minutes when not restricted to ambient conditions. Natural gas plants are more efficient in colder weather, so the winter peak capacity at 23 degrees F is higher than the nameplate capacity.
2. Includes Klondike III (50 MW) and Skookumchuck (131 MW) as a wind resource.

Table 6.12 - Maximum Available Front Office Transaction Quantity by Market Hub

Market Hub/Proxy FOT Product Type Available over Study Period	Megawatt Limit and Availability (MW)	
	Summer (July)	Winter (December)
Mid-Columbia (Mid-C)		
Flat Annual ("7x24") or	400	400
Heavy Load Hour ("6X16")		
Heavy Load Hour ("6X16")	375	375
California Oregon Border (COB)		
Flat Annual ("7x24") or	250	250
Heavy Load Hour ("6X16")		
Nevada Oregon Border (NOB)		
Heavy Load Hour ("6X16")	100	100
Mona		
Heavy Load Hour ("6X16")	300	300

Transmission Overview and Update:

Slide 80 shows target in-service dates for Energy Gateway segments. PacifiCorp's graphic shows a 2023 target in-service date for segment D1, Windstar to Aeolus. Slide 94 states that PacifiCorp's interconnection queue reform will not impact projects with signed large generator interconnection agreements and thus no impact to the 1,920 MWs of projects in the queue behind Gateway South Segment F (Aeolus to Mona) and Gateway West Segment D.1 (Windstar to Aeolus).

* Required fields

Questions: The 2019 IRP action plan and preferred portfolio does not specifically list Segment D.1. It may be in the details but I cannot find a target in-service date for Segment D1 listed in the 2019 IRP, Volume 1, or on the data disk "Portfolio Sum" tab as suggested on Slide 92 of PacifiCorp's June 18 presentation. With that caveat:

10. Please explain the target in-service assumptions for Segment D1 used in the 2019 IRP.

PacifiCorp Response:

Gateway West Segment D.1 was not modeled in the 2019 IRP. As the 2019 IRP was under development, the Company anticipated seeking approval from the Federal Energy Regulatory Commission (FERC) to reform its interconnection queue process. The Company anticipated it would seek to move away from serial queue processing that did not test the "readiness" of any generator (i.e., FERC's long-standing first-come, first-served process) to a first-*ready*, first-served cluster study process that requires large, FERC-jurisdictional generators to demonstrate readiness as a prerequisite to receiving an interconnection study. When modeling assumptions were established, the Company anticipated seeking FERC permission to apply this new readiness test to all generators in the existing queue, including those that had executed interconnection agreements, in order to be most responsive to the Public Utility Commission of Oregon's feedback in the Energy Vision 2020 proceeding. In response, however, to significant development community stakeholder opposition and FERC staff resistance to a proposal that would abrogate executed interconnection agreements, the Company modified its proposal to, among other things, allow projects to retain their interconnection rights as outlined in an executed interconnection agreement. FERC approved this approach,[1] which means PacifiCorp must preserve the serial-queue priorities and contractual rights of generators with executed contracts. There are a number of projects with serially processed executed interconnection agreements located in northeast Wyoming that identify Gateway West Segment D.1 as a contingent facility. As such, to both comply with FERC's order and achieve the level of new resources in eastern Wyoming included in the preferred portfolio at the end of 2023, which contribute to meeting resource needs in 2024 and beyond, will require construction of Gateway West Segment D.1 and Gateway South.

11. Please explain why Segment D1 now has a target in-service date of 2023.

PacifiCorp Response:

Please see the response to question 10, above.

12. Please explain what (if any) significance the signed interconnection agreements on Segment D1 may have in 2021 IRP modeling.

PacifiCorp Response:

Please see the response to question 10, above. PacifiCorp is currently implementing its 2020 All Source (2020 AS) RFP process, which includes bids with signed interconnection agreements that identify Gateway West Segment D.1 as a contingent facility. The Company anticipates that information from the RFP process, as it progresses, will inform model assumptions in the 2021 IRP cycle.

13. Please provide the current expected cost of Segment D1 as provided in the interconnection agreements.

PacifiCorp Response:

$284.3 million with a target in-service date of December 31, 2023.

[1] *PacifiCorp*, 171 FERC ¶ 61,112 at P 144 (2020) ("PacifiCorp's Transition Process appropriately protects interconnection customers that are in the late stages of interconnection ***by not disrupting already signed interconnection agreements*** and continuing to process late stage interconnection request under the currently effective serial process, provided they meet the commercial readiness criteria.") (emphasis added).

* Required fields

14. Please provide the resource types and sizes that have singed interconnection agreements on Segment D1, if relevant for IRP modeling or assumptions.

PacifiCorp Response:

In direct response to the question, there are no interconnection customers connecting directly to Segment D1. There are several signed interconnection agreements where the Gateway West Segment D.1 is identified as a contingent facility:

Q0713 – Wind – 350 MW

Q0719 – Wind – 280 MW

Q0783 – Solar – 30 MW

Q0784 – Solar - 80 MW

Q0785 – Wind – 100 MW

Q0789 – Solar – 74.9 MW

Q0801 – Solar – 80 MW

Q0802 – Solar – 50 MW

Q0807 – Wind – 75.9 MW

Q835 – Wind – 190 MW

Q0836 – Wind – 400 MW

15. Please explain whether you expect Segment D1 will be relevant for the 2020 AS RFP, because the in-service date is within the window for that RFP but D1 is not shown in the RFP interconnection bubbles on Slide 71.

PacifiCorp Response:

Yes, Gateway West Segment D.1 will be relevant in the 2020AS RFP. As noted above, it will be required to achieve the level of resources identified in the 2019 IRP preferred portfolio that are added to the system to meet resource needs from 2024 and beyond. The results of the 2020AS RFP will ultimately determine whether Gateway West Segment D.1 along with the resources dependent upon this investment, are part of the least-cost combination of bids being evaluated.

16. **Recommendation:** It was difficult to notice this change from the 2019 IRP to the 2021 IRP. It is helpful if PacifiCorp can flag and explain changes to target in-service dates. I am working to understand the implications of Segment D1's new target in-service date.

PacifiCorp Response:

PacifiCorp accepts this recommendation and will both flag and explain changes to assumed in-service dates for transmission projects going forward.

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.

---

* Required fields

I am sending a MS Word attachment separately titled "7-21 feedback form questions" it contains 2 graphics as well as my full set of questions and recommendations that are pasted in above

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

Recommendations for each topic are included in the above (pasted in and sent as a MS Word document)

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

Thank you for participating.

* Required fields

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 2020-07-25

*Name: Ernie Rogers Title:

*E-mail: ernie.e.rogers@gmail.com Phone: 8018995867

*Organization: Utah Valley Earth Forum

Address: 2608 E Canyon Crest Drive

City: Spanish Fork State: UT Zip: 84660

Public Meeting Date comments address: ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Compare Horizontal Tracking Solar Panels Versus Fixed Solar Panels

☐ 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.

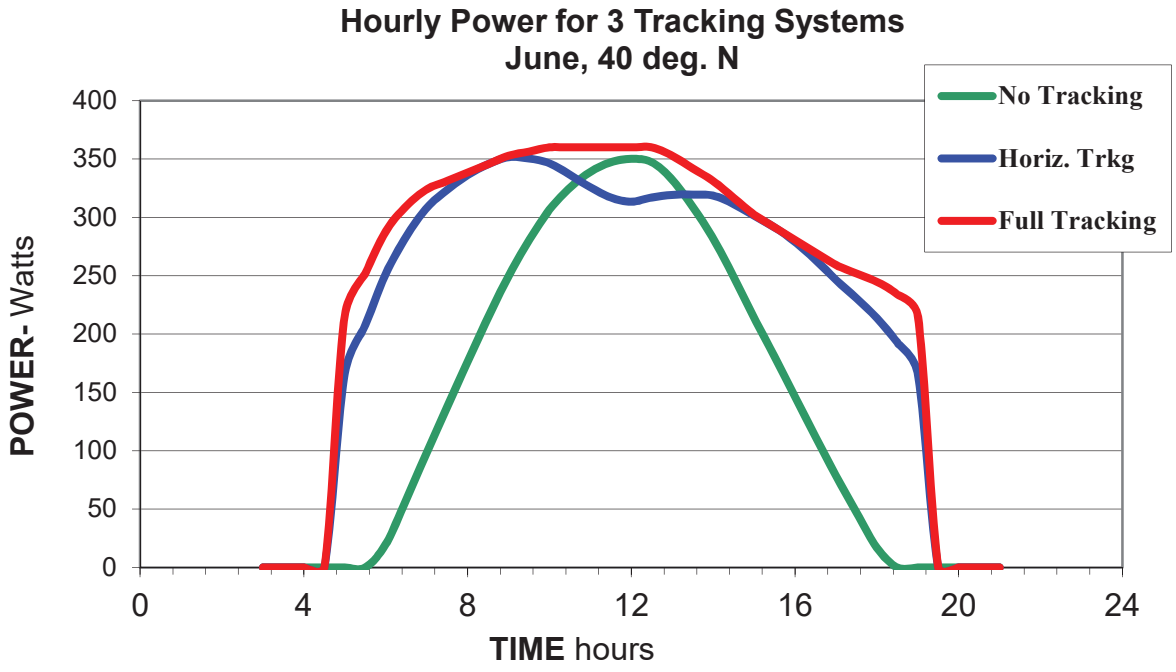
*__Respondent Comment:__ Please provide your feedback for each IRP topic listed above.

Suggestion for PacifiCorp 2021 System Modeling
Compare Horizontal Tracking Solar Panels Versus Fixed Solar Panels

Is it planned in the 2021 IRP modeling to only consider solar PV installations having fixed panel arrays? We recommend that analysts also consider arrays having horizontal turning panels, by each panel (or group of panels) pivoting about a vertical axis. Energy production is greatly increased with horizontal tracking but its cost is substantially less than for two-axis tracking. To illustrate the benefit of horizontal tracking, a single case was evaluated—energy output for one-axis (horizontal) tracking and two-axis tracking were compared against a panel with no tracking in mid-June, for a sunny day at 40 degrees north latitude. The attached graph shows the results. A panel with horizontal tracking produces 60% more energy than a fixed panel, but only 7% less energy than a panel with full two-axis tracking.

One can see from the graph that a large part of the additional energy is produced in the early and late portions of the day. It is expected that the extra energy produced in late afternoon and evening will aid in reducing the amount of energy storage (or other renewable backup) that is needed to cover the afternoon-to-evening load peak.

* Required fields



Panels tilted at optimum angle for horizontal tracking (Blue line)

PacifiCorp Response:

For planning purposes, PacifiCorp used costs and generation profiles of single axis tracking solar photovoltaic (PV) systems in the 2019 Integrated Resource Plan (IRP) and plans to do so again in the 2021 IRP. A wide range of different technologies and configurations for solar and other supply-side resources can be offered into procurement process that follow the IRP, as applicable.

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.

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

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

Thank you for participating.

* Required fields

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 7/6/2020

*Name: Donald Hendrickson Title: **Sr. Consultant**

*E-mail: dhendrickson@energystrat.com Phone: 801-355-4365

*Organization: Utah Association of Energy Users

Address: 111 E. Broadway. Suite 1200

City: **SLC** State: **UT** Zip: **84111**

Public Meeting Date comments address: Click here to enter date. ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Natural Gas Pricing, Base Case and Low Case specifically

☐ 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.
Natural Gas Price forecasts in the IRP have been consistently higher than actual realized pricing since 2008. (See the Utah Division's Feb 4, 2019 comments from the 2019 IRP). PacifiCorp has relied on 3rd Party forecasts in IRP's, and these forecasts have been higher than actual realized pricing for a decade. These forecasts appear to show no consideration for history or of the current marketplace. PacifiCorp needs to take ownership of the Natural Gas forecasts and not rely on forecasts from a 3rd Party.

Natural Gas is a stochastic variable in the IRP modeling process, with a High and Low forecast in addition to the Base forecast. Even the Low forecasts over the years have had a increase in price. Actual prices have decreased the last 10 years, but none of the stochastic analysis over the last 5 IRP's has captured this because the Low price forecasts over time did not consider declining or even flat prices.

Modeling is only as valuable as the inputs to the modeling. PacifiCorp works hard to have accurate and informed modeling inputs. The Natural Gas forecasts, however, have not even been close to accurately representing realized pricing, and need to be addressed.

The Natural Gas forecasts for the 2021 IRP need to consider history and market projections beyond 5 years. Third Party forecasts have shown to be non-responsive to the Natural Gas marketplace. At the very least the Low price forecast needs to take into account the reality of a potential flat to declining Natural Gas price future.

PacifiCorp Response:

Forecasting natural gas prices has been challenging given the rapid pace of technological breakthroughs that have continuously been driving prices downwards, which is one reason that it is important to consider a range of potential outcomes.

* Required fields

The Company's position is that Natural Gas price forecasting is and will remain challenging, and that this function is best conducted by dedicated experts. If the Utah Association of Energy Users has a specific price forecast or methodology it recommends be considered for use in the 2021 Integrated Resource Plan, PacifiCorp will review that forecast and determine whether to include it as a scenario. Such a forecast or methodology would require calculating basis differentials among western market hubs to adequately capture price spreads across the Company's system.

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.

Click here to enter text.

See the Utah Division's Feb 04, 2019 comments in the 2019 IRP

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

Click here to enter text.

1. Take ownership of Natural Gas price forecasting
2. The Low price forecast of Natural Gas should represent the potential of a flat or declining price future

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

Thank you for participating.

* Required fields

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: 2020-08-06

*Name: Hunter Holman Title:

*E-mail: hunter@utahcleanenergy.org Phone: 8012449227

*Organization: Utah Clean Energy

Address: 1014 2nd Ave.

City: Salt Lake City State: UT Zip: 84103

Public Meeting Date comments address: 07-30-2020 ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Load Forecast; DER Impact Tool; Supply Side resources; Navigant's private generation analysis

☐ 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.

1. Please provide any and all information related to the EV forecast used to estimate increased energy sales from electric vehicles in the load forecast, including, but not limited to, any workpapers, analysis and reports.

   PacifiCorp Response:

   PacifiCorp uses a state specific approach in forecasting electric-vehicle (EV) penetration within its service territory. Projections first evaluate historical EV penetration within the Company's service territory and then apply third-party EV growth projections and adjustments for factors unique to each state. Please see Attachment UCE-1 for the transportation electrification projections used to adjust the sales forecast.

2. Please provide any and all information related to the building electrification forecast used to estimate increased sales as a result of building electrification in the load forecast, including, but not limited to, the technologies or measures included, rate schedules affected by the building electrification forecast, and any workpapers, analysis and reports.

   PacifiCorp Response:

   Given the outcome of House Bill 421 in Utah, the Company has incorporated its expectation for the incentivizing of future heat pump acquisition in the state. Please see Attachment UCE-2 for the transportation electrification projections used to adjust the sales forecast.

* Required fields

3. Did PacifiCorp create a forecast for air-source heat pumps for the 2021 IRP? If so, please provide any and all information related to such forecast, including, but not limited to, any workpapers, analysis and reports.

   PacifiCorp Response:

   Yes, air-source heat pumps are included as measures in the Conservation Potential Assessment (CPA) for the 2021 Integrated Resource Plan (IRP). This information will be provided with the CPA database of measures and results once complete.

4. Related to the DER Impact Tool, please describe in detail how Rocky Mountain Power implements this tool in Utah. Please include in your response answers to the following questions: If a DER is identified through the DER Impact Tool, how does RMP go about installing the resource/measure\u0014do you utilize existing DSM programs and tariffs or is this a separate process? How is the resource/measure paid for? How many projects have been identified and installed using the DER Impact Tool in Utah to date? How many non-wires solutions have been evaluated?

   PacifiCorp Response:

   The distributed energy resource (DER) Impact Tool is used to screen DER alternative solutions of solar, battery, battery plus solar and DSM direct load control. When evaluating solutions for an identified system issue, a transmission or distribution planning engineer utilizes the tool, providing inputs specific to the system issue at hand, to evaluate the feasibility of a DER alternative alongside a proposed traditional solution. If the DER alternative solution is evaluated as feasible and within 25 percent of the cost of the traditional solution, it is flagged for further study. Otherwise, it is included as an alternative evaluated in the traditional solution project justification documentation.

   One project has been identified and constructed as a result of the DER Impact tool in Utah. The Panguitch solar and battery project was developed after the DER alternative analysis indicated a battery solution would be a viable alternative to a transmission line rebuild. The project was funded utilizing the sustainable transportation and energy plan (STEP) and was recently placed in service.

   DSM related analyses with the DER Impact Tool have shown DSM to be an infeasible solution as it typically does not provide enough capacity to be effective in deferring traditional solutions.

   The number of system issues that have been evaluated utilizing the DER Impact tool is not readily available. Given the number of projects currently in the 10 year plan and those that have been completed since the tool's implementation in 2016, the number is likely more than 50.

5. Could you please confirm that by \u001Csolar\u001D on slide 27 of the July 30-31 meeting materials you mean PV solar, not Concentrated Solar Power. If this is correct, and you are not considering CSP, please explain why you are not considering CSP.

   PacifiCorp Response:

   Correct, the 2021 IRP only includes photovoltaic (PV) single-axis tracking solar as a representative solar resource. Previous IRP's considered concentrated solar power (CSP) as well as other solar options until it became apparent in the 2017 IRP that single-axis tracking PV was the most cost-competitive solar option.

6. If you are considering CSP, are you considering CSP with storage capabilities? If not, please explain why not.

   PacifiCorp Response:

   CSP is not included as a resource option in the 2021 IRP. See the response to question five.

7. Regarding Navigant\u0019s Private Generation analysis, how much electricity is assumed to be exported (versus consumed on site) for a rooftop solar installation in Utah? How this figure was determined, does it vary by customer class, and how is it used to determine of simple payback?

* Required fields

PacifiCorp Response:

Guidehouse determines the energy consumed onsite vs. energy that is exported to the grid by subtracting the hourly solar generation from the hourly building load. If the solar generation for a specific hour is greater than the building load for that hour the balance is assumed to be compensated at the export rate. In Utah that is calculated at 90% of the offset rate as provided by PacifiCorp. In Utah ~51% of the solar energy generated for residential customers is exported to the grid and valued at the 90% export rate. For industrial the value is ~0% and ~44% for commercial.

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.

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

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

Thank you for participating.

* Required fields

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 8/7/2020

*Name:	Jim Woodward	Title:	**Regulatory Analyst**
*E-mail:	Jim.Woodward@utc.wa.gov	Phone:	(360) 664-1302
*Organization:	WA Utilities & Transportation Commission (WA-UTC)		
Address:	Click here to enter text.		
City:	Click here to enter text.	State:	Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: **7/31/2020** ☐ 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.
Climate change and IRP modeling; distribution planning (EVs, DERs); GHG considerations; equity considerations for future PIMs.

☐ 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.

Commission Staff Feedback for PacifiCorp 2021 IRP: Public Interest Meeting #2 (July 30-31, 2020)

This feedback, dated August 7, 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.

This staff feedback document is divided into two parts: 1) questions & requests regarding PacifiCorp's July 30-31 PIM #2 presentation content and 2) additional feedback shared by staff to help the company track towards CETA compliance in its 2021 IRP.

Company response by **August 28, 2020**, is appreciated for select questions and requests in **BOLD** found within the PIM #2 feedback section. Staff hopes the Pac IRP team considers information found in section two as it progresses with IRP analyses and subsequent PIM preparation.

* Required fields

Public Interest Meeting #2 (7/30 – 31) – Presentation questions

1. Building climate change (CC) into load forecast (slide 4) – Pac states over the 2021 thru 2040 timeframe, "peaks continue to be driven by summer cooling load." However, follow-on discussion indicated the Pac team made this determination using 20-year weather, not considering how CC would impact (i.e., increase) cooling degree days (CDD).
    a. Staff acknowledge Pac team's claim of competing CC analyses efforts currently occurring in the Pacific NW region.

       PacifiCorp Response:

       Noted.

    b. However, **staff urge the Pac IRP team to review and consider incorporating aspects of Seattle City Light's (SCL) treatment of CC in that utility's planning efforts (***please see accompanying PPT SCL presented at NWPCC earlier in 2020***).**

       PacifiCorp Response:

       PacifiCorp is in the process of evaluating a possible climate change sensitivity to incorporate into the 2021 Integrated Resource Plan (IRP) and will consider this recommendation. Also, in accordance with the Public Utility Commission of Oregon's 2019 IRP acknowledgement order (Order No. 20-186), PacifiCorp will include a proposal for the scope of a potential climate adaptation study as part of the 2021 IRP.

    c. SCL's approach to CC applies principles the NWPCC is using in its 2021 Power Plan to an IRP environment, specifically detailing CC impacts to the regional hydropower system over the next 20 years.

       PacifiCorp Response:

       PacifiCorp is in the process of evaluating a possible climate change sensitivity to incorporate into the 2021 IRP.

    d. Note: Staff is suggesting Pac leverage a peer utility's approach to considering CC after reviewing Pac's PIM #1 responses (*please see answers to questions 13C, 17C, 19A attached*). **Staff believes Pac's 1-in-20 peak scenario approach, which focuses on the 2000-2019 time period, may not adequately foresee the likely weather variability expected in the 2020s and 2030s** (e.g., the 2020-40 twenty-year time period may be significantly warmer & drier than the preceding 2000-19 twenty-year period). Whether it's employing a similar approach taken by SCL or not, **staff strongly recommends the Pac IRP team acknowledge this apparent shortcoming of the current 1-in-20 peak scenario approach and consider options to better incorporate CC variability over the 2021 IRP planning horizon**.

       PacifiCorp Response:

       PacifiCorp is in the process of evaluating a possible climate change sensitivity to incorporate into the 2021 IRP.

2. Electric vehicles (EVs) as considered in the 2019 Residential Survey (slide 8) & Load forecast 2021 IRP sensitivities (slide 13) – Pac indicates "2.0 percent of customers report having electric vehicles." Upon further discussion, Pac also indicated EV forecasts are broken out by state. Staff would like to know whether:
    a. Pac is planning to run sensitivities around EV penetration? Perhaps a low, medium, and high penetration by state?

       PacifiCorp Response:

* Required fields

Higher or lower electric vehicle penetration is captured within bookend sensitivities for high load and low load for the 2021 IRP.

b. Pac has considered the WA-UTC's Regulation of Electric Vehicle Charging Services Policy and Interpretive Statement (UE-160799) when developing its EV forecast for Washington?

PacifiCorp Response:

The electric vehicle (EV) forecast relied on a variety of national 3rd party EV projections applied to state level adoption. This referenced policy and interpretive statement from WA-UTC was likely an example of state policies which contributed to the overall market factors that influenced the national electric vehicle forecast PacifiCorp used when developing the EV forecast for the Washington service territory.

3. Distribution planning studies (slide 19) – Pac indicates "distribution system planning studies are completed on a 5-year cycle." Class 1 studies, updated every year, refer to high-growth areas or market regions defined by high penetrations of distributed energy resources (DERs), etc. Class 5 studies, updated every 5 years, refer to more stable or static areas exhibiting little growth and/or DER penetration.
   a. How is Pac planning to classify its Washington service territories for purposes of the 2021 IRP (i.e., Class 1 thru 5)? What criteria associated with Pac's WA service territories currently justify such classification(s)?

   PacifiCorp Response:

   Planning studies for PacifiCorp's Washington service territory vary by class depending on the specific region, but all studies will be completed within a five year cycle. The criteria that dictates the study class is based on the load forecasting, load growth, reliability issues, current equipment loading, and economics of the specific region to be studied.

   b. **Is all of Pac's territory in WA within one category? Or are specific regions (e.g., Yakima, Walla Walla) categorized differently?**

   PacifiCorp Response:

   Specific regions in Pacific Power's service territory in Washington are categorized differently based on the criteria mentioned above.

4. Distributed energy resource planning studies & tools (slides 21 – 25) – Pursuant to RCW 19.280.030(1)(h) and RCW 19.280.100(2), **CETA RCW requires a new DER forecast as part of the 2021 IRPs**.
   a. Valuation of DERs and avoided cost calculations will be key, including *transmission and distribution avoided (or deferred), ancillary services, and other non-energy impact inputs*. Avoided or deferred transmission and distribution upgrades will be driven by the contribution of DERs to *meeting peak (of the distribution line) and the Effective Load Carrying Capacity (ELCC) of the DER*. **Staff recommends Pac IRP team investigate how each DER type & location considered in the 2021 IRP addresses the above *ITALICIZED* functions**. For example, staff understands that:
      i. Distributed solar and wind provide little ELCC in the winter. However,
      ii. Utility-scale eastern Montana/Wyoming and Offshore wind provide comparatively high levels of ELCC.
   b. Allowable levels of DERs. Given the above CETA requirements for the 2021 IRP, **how will the Pac IRP team be able to estimate the allowable level of DERs of different types on the various feeders or substations on Pac's system?**
   c. DER modeling. From a modeling perspective, **how will Pac be able to integrate various levels and types of DERs, which generally require sub-hourly modeling to characterize, at the IRP level of analysis?**

* Required fields

d. DER valuation. **How will Pac be able to value different levels of DERs of different types on the various feeders or substations on Pac's system?** Consideration should include not only energy and capacity contributions, but also avoided costs, transmission line loss benefits, ancillary services, demand response, and quantifiable or monetary non-energy impacts.
e. DER complementarity to supply-side resources. **Within the 2021 IRP, does Pac plan to include an explanation of how DERs complement the company's utility-scale generating resources?**
f. DER equity considerations. **Is Pac planning to investigate providing grants or discounted cost DERs of certain types to low-income or vulnerable customers?**
    i. If not, **staff strongly recommends the Pac IRP team consider undertaking similar studies to better address CETA's IRP equity objectives pursuant to RCW 19.405.040(8)**.

PacifiCorp Response:

PacifiCorp will follow up by phone to address this question.

5. DER impact tool (slide 23) – Pac IRP team acknowledged focus to date when evaluating DERs has been on capacity reduction. **Staff recommends Pac**:
    a. **Consider added value demand side management (DSM) resources offer (e.g., ancillary services, ramping flexibility)**.
    b. **Review WA-UTC demand response (DR) staff workshop Jun 20 presentation** (IRP rulemaking docket UE-190698) for additional guidance & suggestions on how to holistically consider DERs in 2020 IRP.

PacifiCorp Response:

The distributed energy resource (DER) impact tool is used as an initial screen of alternative approaches to address identified distribution system needs typically met with traditional system upgrades. If demand-side management (DSM) projects are within 125 percent of traditional solution projects, they advance to the next round of review where those additional values may be included as appropriate to that resource.

6. Pac response to staff question 11.b in PIM #1 feedback (demand response)
    a. Per Pac IRP team's follow up, "non-energy values are not assigned to demand response resources in the potential assessment," staff wishes to remind Pac:
    b. **Pursuant to RCW 19.280.030(1)(k), Pac needs to consider NEI and equitable distribution in its planning processes**, including consideration of DR pursuant to RCW 19.405.050(3)(a). **How does Pac plan to address these additional NEI and equitable distribution considerations with respect to DR as part of the 2021 IRP?**

PacifiCorp Response:

Non-energy values (NEIs) for demand response are not widely integrated into planning as the majority of non-energy impacts are noted as reduction in service. We will continue to review evaluation resources and best practices and incorporate NEIs as possible.

7. Grid modernization projects (slide 24) – Advanced metering infrastructure
    a. Staff's understanding is that Pac currently employs automatic meter reading (AMR) within its WA service territory and is not planning to roll out advanced metering infrastructure (AMI) to its WA customers for the foreseeable future.

PacifiCorp Response:

Yes.

    b. **Based on the 7/30 discussion around grid modernization projects, can the same level of insight (and thus ability) to undertake grid modernization projects be achieved via AMR vs. AMI?**

* Required fields

PacifiCorp Response:

No.

c. If not, **does Pac view AMR serving its WA customers as a hurdle to greater DER penetration within its WA service territory?**

PacifiCorp Response:

No, at current DER penetration levels the lack of advanced metering infrastructure (AMI) data does not create hurdles during the interconnection review process. At significantly higher DER penetration levels, the development of more complex interconnection review procedures may be justified. At that time, with significant system tool advancement, AMI data could be leveraged to provide a more nuanced picture of grid usage and potentially facilitate higher levels of penetration.

8. GHG considerations for WA (slide 72) –
   a. **Pursuant to RCW 80.28.395, how is the Pac IRP team planning to model / account for upstream emissions related to natural gas?**

PacifiCorp Response:

PacifiCorp is not a "gas company" as defined by RCW 80.04.010 and does not intend to model upstream emissions related to natural gas pursuant to RCW 80.28.395 in its IRP.

   b. As comparison, Puget Sound Energy (PSE) is relying on data used by the Puget Sound Clean Air Agency in their analysis of the Tacoma LNG project (slide 30). Stakeholder feedback to PSE's approach identified the following advantages & disadvantages:
      i. Advantage – PSE's proposal would rely on an independent source to quantify upstream gas emissions
      ii. Disadvantage – Underlying study, which references the IPCC 4th Assessment Report from 2007, may be outdated

PacifiCorp Response:

Please see PacifiCorp's response to 8a.

9. WA renewable portfolio standard (slide 83) – As mentioned on the 7/31 call, staff clarifies for Pac IRP team that "Banking provisions" **incremental hydro RECs** (i.e., RECs generated from freshwater) **can only be used for year in which they're generated**.

PacifiCorp Response:

PacifiCorp agrees.

10. WA Clean Energy Transformation Act (slide 85) – As staff mentioned on the 7/31 call:
    a. "2025 no-coal in rates" is incorrect. Pursuant to RCW 19.405.030(1)(a) – "On or before December 31, 2025, each electric utility must eliminate coal-fired resources from its allocation of electricity."

PacifiCorp Response:

PacifiCorp disagrees with Staff's legal interpretation. Please see RCW 19.405.020, Definitions.

(1) "Allocation of electricity" means, for the purposes of setting electricity rates, the costs and benefits associated with the resources used to provide electricity to an electric utility's retail electricity consumers that are located in this state.

* Required fields

b. "Multi-year compliance periods" needs clarification. Pursuant to RCW 19.405.060(1)(a)(ii) – "Proposed interim targets for meeting the [2030 GHG neutral] standard…during the years prior to 2030 and between 2030 and 2045."

PacifiCorp Response:

PacifiCorp agrees.

11. WA CETA Implementation (slide 87) – Staff wishes to remind Pac IRP team that until the WA-UTC and Commerce finalize IRP and CEIP rules (i.e., WAC), the **Pac team is strongly encouraged to consult following statute for guidance with respect to development of**:
    a. IRP – RCW 19.280.030 (*please also reference the electric IRP compliance template, sent as part of staff PIM #1 feedback on 6/26, for a more granular crosswalk of statute to specific 2021 IRP requirements*)
    b. CEIP – RCW 19.405.060

PacifiCorp Response:

PacifiCorp will follow up by phone to address this question.

Additional staff feedback & questions for Pac team to address later in 2021 IRP process (i.e., no expectation for Pac to address below items via feedback form reply by 8/28/20)

12. 2021 CPA next steps (slide 90) - **Can Pac team provide an update re: plans to move ahead with separate demand response (DR) RFP by Nov / Dec 20 timeframe?** Note:
    a. Similar question arose during 6/18-19 Public Meeting #1 discussion.
    b. Pac CPA team may address this item during August 20 CPA workshop

PacifiCorp Response:

PacifiCorp provided more information on the upcoming DR request for proposal (RFP) at the August 28, 2020 CPA workshop.

13. Commodity prices & carbon – **Staff suggests Pac IRP team consider the following for future scenario runs (i.e., model sensitivity analyses)**:
    a. Carbon prices – **Is company planning to model a HIGH carbon price w/ its gas and/or power price forecast(s)?**
        i. If not, **what sensitivity analyses is the Pac IRP team undertaking with respect to their commodity price forecast(s)?**

PacifiCorp Response:

Yes. Similar to the 2019 IRP, a High Gas, High carbon dioxide (CO_2) price sensitivity is expected to be modeled.

    b. WA CETA requires incorporation of the social cost of carbon (SCC) into IRP modeling and, ultimately, Pac's preferred portfolio (PP). However, is **Pac considering alternate GHG price escalations (lower and higher) as part of planned scenarios?**

PacifiCorp Response:

Yes, PacifiCorp expects to be using four levels of greenhouse gas (GHG) price escalations, similar to in the 2019 IRP. These include no CO_2 costs, Medium, High and Social Cost of Carbon, which also reflect differing timelines. Those are combined in different arrangements with Low, Medium and High gas price forecasts.

* Required fields

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.
PIM #1 Pac answers to staff feedback, Seattle City Light climate change IRP presentation

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.

* Required fields

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 2020-08-28

*Name: Brian Muir Title: City Administrator

*E-mail: bmuir@kemmerer.org Phone: (307) 466 - 3128

*Organization: City of Kemmerer

Address: City Hall

City: Kemmerer State: WY Zip: 83101

Public Meeting Date comments address: ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Energy Efficiency (supply side)

☐ 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.

Energy Efficiency--Can you have a technical conference discussing supply-side energy efficiency: The efficiency of coal vs gas vs hydro vs wind vs solar vs smaller nuclear reactors battery battery vs coal with gasification vs coal versus carbon capture. Would like to hear some analysis that compares all of these both with and with energy subsidies so that consumers can get a better idea of what really is more affordable, not only when it comes to their power bill but also when it comes to the national tax burden of these subsidies. IRP Resources: Wou

PacifiCorp Response:

It is not clear how the term "efficiency" is being contemplated in this comment. Efficiency is often used to refer to the conversion of fuel to the production of energy. For instance, the efficiency of a gas-fired facility and a coal-fired facility is captured in a heat rate, measured in Btu/kWh. The heat rate represents the level of fuel required (Btu) to generate a unit of electric output (kWh). A lower heat rate asset is more efficient at converting energy from a fuel source to electric output than a higher heat rate asset (i.e., it takes less fuel to produce a kWh of electric energy from an asset that has a 7,000 Btu/kWh heat rate than it does from an asset having a 10,000 Btu/kWh heat rate). This measure of efficiency is not directly transferable to other assets. For instance, a solar or wind facility does not consume fuel and so these asset types do not have a heat rate or a measure of efficiency that aligns with a heat rate for a fossil-fuel asset. Storage assets, such as pumped storage or battery energy storage systems measure efficiencies as a loss rate, which is a measure of the amount of energy required to charge a battery (or to pump water to a higher elevation for a pumped storage asset) relative to the

* Required fields

amount of energy that is ultimately produced when the battery is discharged (or when water is released from a pumped storage facility). A higher percentage generally represents a higher level of charge/discharge efficiency. However, this metric is also not directly comparable to the heat rate of a fossil-fuel asset or to a non-fuel asset that does not experience losses (i.e. storage). In this context, tax credits would have no impact on the efficiency of different assets.

Given the nature of the question and the discussion of tax credits, PacifiCorp assumes that the question may be referring to the levelized cost of energy (LCOE) associated with different types of assets (i.e., the cost per MWh of output represented as $/MWh). The levelized cost of energy is presented in the 2019 IRP (Volume I, Chapter 6, Table 6.2, specifically the column labeled "Total Cost and Credits $/MWh"). The information for different asset types is presented with and without production tax credits (PTCs) or investment tax credits (ITCs), as applicable. PacifiCorp has not yet performed these calculations for the 2021 IRP, but this information will be presented in the supply side resource table when the IRP is filed next year. PacifiCorp notes, that the LCOE only summarizes cost elements of different assets and is provided for informational purposes only. It does not provide any insight on value, which can vary considerably among different types of resources that have different attributes (i.e., generation profiles that vary over time). Moreover, to calculate an LCOE for a dispatchable resource, such as a coal-fired or gas-fired asset, one has to assume some level of generation (the denominator in the $/MWh LCOE figure). Projected dispatch from a dispatch model may vary considerably from the level of generation used to calculate the LCOE, making it difficult to compare LCOE figures from dispatchable resources to non-dispatchable resources.

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.

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

```
I recommend you put coal-fired power back into your long-term IRP given it's likely
superior efficiency vs other sources.
```

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

Thank you for participating.

* Required fields

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 2020-08-28

*Name: Brian Muir Title: City Administrator

*E-mail: bmuir@kemmerer.org Phone: (307) 466 - 3128

*Organization: City of Kemmerer

Address: City Hall

City: Kemmerer State: WY Zip: 83101

Public Meeting Date comments address: ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

IRP Resources

☐ 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.

IRP Resources: We request that in additional to your plan to put the smaller nuclear reactors into your IRP, that given the proven technology to make coal even cleaner (carbon capture and coal gasification) that you also put coal-fired power back into your IRP. We would like you to put a picture of the Petra Nova coal-fired power plant on the cover of your IRP documents in place of or into the picture of the thermostat to create a new image for coal-fired power so that it has a fair chance to compete with the other power resources.

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.

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

Rather then talking about speeding up the retirement of the coal-fired plants, instead study speeding up embracing the integration of proven technologies of carbon capture and coal gassiification to address your customers who are concerned about having more affordable, reliable, clean technology. Given the uncertainty and unproven technology of battery storage for baseload power, new proven clean coal technologies should be given a fair consideration with your data analysis.

* Required fields

PacifiCorp Response:

Thank you for your feedback. The Company will evaluate your suggestion as the supply side resource table and cases are developed and discussed as part of the 2021 Integrated Resource Plan public input meeting series.

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

Thank you for participating.

* Required fields

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: 2020-08-28

*Name: Brian Muir | Title: City Administrator

*E-mail: bmuir@kemmerer.org | Phone: (307) 466 - 3128

*Organization: City of Kemmerer

Address: City Hall

City: Kemmerer | State: WY | Zip: 83101

Public Meeting Date comments address: _____ ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: _____

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

Natural Gas Elevation Efficiency

☐ 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.

Natural Gas Elevation Efficiency Studies--You mentioned in your IRP meeting that you are studying the efficiency of natural gas at various elevations. Your maximum elevation you said you would study is 6500. Please note that the Naughton #1 and #2 and #3 plants are actually at 6950. We ask that you give these study these plants as well at this elevation, epecially given that you current have #3 running on natural gas.

PacifiCorp Response:

Thank you for your feedback. The Company will evaluate your suggestion as the supply side resource table and cases are developed and discussed as part of the 2021 Integrated Resource Plan (IRP) public input meeting series. The company's assessment of elevation is intended to capture a reasonable range across different parts of the system. It is not feasible to explicitly assess elevations for specific sites and locations when evaluating proxy resources in the IRP.

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.

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

* Required fields

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

Thank you for participating.

* Required fields

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 2020-08-28

*Name: Brian Muir Title: City Administrator

*E-mail: bmuir@kemmerer.org Phone: (307) 466 - 3128

*Organization: City of Kemmerer

Address: City Hall

City: Kemmerer State: WY Zip: 83101

Public Meeting Date comments address: ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

IRP and Wyoming Legislation

☐ 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.

Just as legislation on the West Coast and in Utah is being considered in the IRP 2021, we want Wyoming's Senate File 159 and House Bill 200 considered.

PacifiCorp Response:

Wyoming Senate File 159 and House Bill 200 are being considered in the 2021 Integrated Resource Plan, and were addressed at the September 17, 2020 public input meeting.

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.

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

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

Thank you for participating.

* Required fields

* Required fields

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: 2020-08-28

*Name: Brian Muir | Title: City Administrator

*E-mail: bmuir@kemmerer.org | Phone: (307) 466 - 3128

*Organization: City of Kemmerer

Address: City Hall

City: Kemmerer | State: WY | Zip: 83101

Public Meeting Date comments address: _____ ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: _____

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

Q45 Federal Carbon Capture Tax Credits

☐ 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.

Factor in what carbon capture and coal gassification can factor into the Pacificorp IRP, given that the IRS gules have now been established.

PacifiCorp Response:

Carbon capture and coal gasification are being considered in the 2021 Integrated Resource Plan, and were addressed in part at the September 17, 2020 public input meeting.

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.

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

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

* Required fields

Thank you for participating.

* Required fields

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: 2020-08-28

*Name: Brian Muir | Title: City Administrator

*E-mail: bmuir@kemmerer.org | Phone: (307) 466 - 3128

*Organization: City of Kemmerer

Address: City Hall

City: Kemmerer | State: WY | Zip: 83101

Public Meeting Date comments address: _____ ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: _____

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

HYDRO vs Coal-Fired Power and the Economic and Power Grid benefits

☐ 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.

Do a scenario eliminating HYDRO power from the grid and putting coal-fired coal plants back into it. Given the likelihood that no new HYDRO power plants will be built and that there are environment, business, and other concerns to your customers, run a scenario to take HYDRO power completely off and replace it with coal-fired power.

PacifiCorp Response:

Thank you for your feedback. The Company will evaluate your suggestion as the supply side resource table and cases are developed and discussed as part of the 2021 Integrated Resource Plan public input meeting series.

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.

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

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

* Required fields

Thank you for participating.

* Required fields

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: 2020-08-28

*Name: Brian Muir | Title: City Administrator

*E-mail: bmuir@kemmerer.org | Phone: (307) 466 - 3128

*Organization: City of Kemmerer

Address: City Hall

City: Kemmerer | State: WY | Zip: 83101

Public Meeting Date comments address: _____ ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: _____

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

No tax credits or subsidies

☐ 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.

Given the uncertainty in the economy and political climate and the chance that subsidies may be reduced or eliminated, and given that these subsidies are really hidden from the average consumer's understanding of how it is really being paid for directly by their federal taxes and indirectly from the budget deficit, and in the interest to full transparency to the customer, run scenarios where tax credits and subsidies are eliiminated and see what the ideal portfolio would be. Assume that coal-fired power and the smaller nuclear modular reactors are a part of the portfolio and not to be eliminated.

PacifiCorp Response:

Thank you for your feedback. The Company will evaluate your suggestion as the supply side resource table and cases are developed and discussed as part of the 2021 Integrated Resource Plan public input meeting series.

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.

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

* Required fields

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

Thank you for participating.

* Required fields

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 2020-08-28

*Name: Brian Muir Title: City Administrator

*E-mail: bmuir@kemmerer.org Phone: (307) 466 - 3128

*Organization: City of Kemmerer

Address: City Hall

City: Kemmerer State: WY Zip: 83101

Public Meeting Date comments address: ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Energy Poverty, Increased costs, and the social cost of Coal

☐ 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.

Research shows that wind, solar, and battery power, when exported to developing nations, does not take them out of poverty. Wind and solar and battery, because they are so heavily subsidized by federal taxes and adding to the deficit, are actually increasing costs to the consumer and our customers., and could lead our country to energy poverty if not checked. Hence, it is important to be transparent about what coal-fired and natural gas power actual do to both our wealth and the wealth of impoverished nations. Hence the importance of providing transparent analysis to the consumer showing what is really most affordable to the consumer by taking tax credits out of some of the scenarios for comparative purposes.

PacifiCorp Response:

Thank you for your feedback.

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.

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

* Required fields

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

Thank you for participating.

* Required fields

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: Click here to enter date.

*Name: Rose Anderson | Title: **Economist**

*E-mail: Rose.anderson@state.or.us | Phone: Click here to enter text.

*Organization: Oregon Public Utility Commission

Address: Click here to enter text.

City: Click here to enter text. | State: Click here to enter text. | Zip: Click here to enter text.

Public Meeting Date comments address: **6/19/2019** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
2019 IRP Action Item Updates, Transmission

☐ 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.

Topic: 2019 IRP action item updates

1. What will the retirement date for Cholla 4 be in the 2021 IRP modeling?

   PacifiCorp Response:

   PacifiCorp continues to fulfill 2019 Integrated Resource Plan (IRP) action plan items. The Company will assume Cholla 4 is retired by the end of 2020, and therefore, will not be included in the 2021 IRP (considering the first study year is projected to be 2021).

Topic: Transmission

2. Please explain in detail how the B2H line will be modeled as connecting to PacifiCorp's system in Oregon in the 2021 IRP. Are additional upgrades assumed to be needed in order to connect the line? If so, approximately how much do these additional upgrades cost? Are they financed entirely by PacifiCorp?

   PacifiCorp Response:

   The B2H line will terminate at the Longhorn 500 kilovolt substation. PacifiCorp will utilize 600 megawatts (MW) of point to point service (a conversion of legacy transmission rights) across Bonneville Power Administration's system to PacifiCorp's load from Longhorn. In this way, PacifiCorp plans to utilize its 600MW east-to-west share of the B2H transmission line.

* Required fields

Furthermore, to establish connectivity to its eastern system (aka PACE), PacifiCorp will enter into an asset swap agreement with the Idaho Power Company (IPC). Under this asset swap, PacifiCorp will acquire from IPC transmission assets to provide 600MW east-to-west connectivity from Borah to Hemingway.

PacifiCorp has not yet determined the modeling approach for this line.

3. Please explain whether the Company will include the 500 kV planned Transcanyon transmission line from Utah to Nevada in Plexos modeling. If the line will be included, in what year will it be in service?

PacifiCorp Response:

PacifiCorp has not yet determined the modeling approach for this line. The target in-service date is 2026.

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.

June 19 OPUC Feedback.docx

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

Click here to enter text.

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

Thank you for participating.

* Required fields

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 9/4/2020

*Name:	Jim Woodward	Title:	**Regulatory Analyst**
*E-mail:	Jim.Woodward@utc.wa.gov	Phone:	(360) 664-1302
*Organization:	WA Utilities & Transportation Commission (WA-UTC)		
Address:	Click here to enter text.		
City:	Click here to enter text.	State:	Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: **8/28/2020** ☐ 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.
Conservation potential assessment (CPA) 8/28 workshop relevant topics.

☐ 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.

Commission Staff Feedback for PacifiCorp 2021 IRP: CPA Workshop (August 28, 2020)

This feedback, dated September 4, 2020, states the informal comments, questions, and recommendations of Washington Utilities and Transportation Commission Staff, Jim Woodward and Nikita Bankoti. Staff appreciates the continued work of PacifiCorp's IRP / CPA 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.

This staff feedback document is follow up to PacifiCorp's Conservation Potential Assessment (CPA) Workshop facilitated on August 28.

Company response by **September 25, 2020**, is appreciated for select questions and requests in **BOLD**.

* Required fields

CPA Workshop (8/28/20) – Presentation questions

1. Incorporating NWPCC 2021 Plan assumptions (slide 7) – Staff commend Pac & AEG team for aligning 2021 CPA ramp rates with draft 2021 Power Plan draft final supply curves.

2. Key changes relative to 2019 CPA (slide 9) – Forecasting methodology
    a. Re: lighting savings methods (EISA) – Staff indicated Market research conducted by NEEA suggested with rollback of EISA 2020 45 lumen/W backstop provision, select vendors were going to ignore higher efficiency state laws, if markets governed were relatively small (e.g., WA).
    b. **Staff propose Pac & AEG conduct a sensitivity analysis to consider potential impacts of vendors following the Federal rollback and ignoring more stringent state efficiency standards**.

    PacifiCorp Response:

    PacifiCorp has scoped this Conservation Potential Assessment (CPA) to follow best practices for consideration of codes and standards which is to assume compliance or market practice, whichever is most efficient, as baseline energy consumption. This is in line with how the Regional Technical Forum and Power Council incorporate impacts of new codes of standards to baseline calculations. A sensitivity analysis would be an expansion of the study, requiring additional time and budget to complete.

3. State specific adjustments (slide 10) – RTF UES measures consider climate change (CC) effects. During 8/28 workshop:
    a. Pac & AEG acknowledged CPA draft savings measures do not consider CC.
    b. NWPCC (POC: T. Jayaweera) offered to assist Pac & AEG team incorporate CC considerations into CPA.
    c. **Staff strongly encourage Pac & AEG to incorporate CC considerations into CPA savings estimates and encourage the company team to accept NWPCC's offer of assistance**. Staff are also happy to facilitate conversations between Pac / AEG and NWPCC staff re: this matter, if helpful.

    PacifiCorp Response:

    PacifiCorp is in the process of evaluating a possible climate change sensitivity to incorporate into the 2021 Integrated Resource Plan (IRP). Impacts to energy efficiency (EE) resources would be one of several planning factors considered. As encouraged, we are in coordination with Northwest Power and Conservation Council (NWPCC) regarding how weather dependent measure savings may be impacted by climate change.

4. Incentive cost analysis (slide 18) – Staff seek clarification whether this **analysis is being performed for the first time in the CPA process with respect to WA?** Second bullet point is confusing – "Affects UT and ID, which utilize the UCT as the primary cost-effectiveness criterion, rather than TRC."

    PacifiCorp Response:

    This incentive cost analysis is just informative for states where the Total Resource Cost Test (TRC) is the main cost effectiveness test and has not been provided in the past. For those states using the TRC, it is not utilized in the analysis. States which use the Utility Cost Test (UCT) as the primary test would look to this analysis being used to inform a large portion of the program cost assumption, in addition to program administration costs.

5. 2021 CPA draft results – Technical achievable potential comparison (slide 25)
    a. From 2021-2030, **what major factors are contributing to the increase in technical achievable potential, and what factors are contributing to decline post 2030?**

    PacifiCorp Response:

* Required fields

The increase in savings to 2030 is due to extended ramp rates pushing savings out into the future, the impact of which is exacerbated by the reduction in lighting savings in the near term compared to previous CPAs. This trend is similar to the NWPCC 2021 Power Plan inputs (Slide 26).

b. If the decrease in potential from year 2030 onwards is a result of measure "saturation" within the residential lighting space, **what are company's plans to diversify the energy-savings opportunities?**

PacifiCorp Response:

Non-lighting savings in the CPA will inform program planning to diversify programs which occurs outside of the CPA/IRP process in annual and biennial filings.

6. 2021 CPA draft results – Residential, commercial, industrial (slides 27 – 29)
   a. Staff asks for Pac & AEG to **develop stacked or side-by-side charts for easier comparison of savings across sectors (i.e., residential, commercial, industrial)**.

PacifiCorp Response:

Please see the file "2021 Conservation Potential Assessment Draft Energy Efficiency Measure Results", worksheet "Savings by sector and state" posted to the IRP website for additional plots displaying the results and the data used in plots. https://www.pacificorp.com/energy/integrated-resource-plan/support.html.

7. Transition to grid services view of DR (slide 43)
   a. Staff commend Pac & AEG assessing "DR's ability to provide value through events beyond peak shaving to align DR's capabilities with PacifiCorp's potential use cases."
   b. To further assist the company investigate secondary DR benefits (e.g., flexibility ramping, ancillary services), **staff once again urge company to review WA-UTC demand response (DR) staff workshop Jun 20 presentation** (IRP rulemaking docket UE-190698) for additional guidance & suggestions on how to holistically consider DERs in 2021 IRP / CPA.

PacifiCorp Response:

PacifiCorp attended the June 20 workshop and has reviewed the workshop materials. Exactly how the new IRP model considers and therefore values the range of demand response (DR) capabilities when dispatched within the system is currently in review.

8. Battery energy storage for demand response (slide 45)
   a. During 8/28 CPA workshop, Pac & AEG indicated battery storage assessments were new for the 2021 CPA and are seeking additional inputs, resources, and/or studies.
   b. As a resource, **staff call company's attention to DOE-PNNL storage study** that staff referenced as part of PIM #1 feedback (*reproduced below*):
   c. **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.

* Required fields

PacifiCorp Response:

Thank you for the resource suggestion.

9. Process for developing DR potential (slide 46) – **Does the model picking DR resources run hourly and chronologically?**

PacifiCorp Response:

Slide 46 shows how much energy consumption is occurring every hour of the year by end use. The capacity expansion component of the IRP model considers all time periods simultaneously, making intertemporal resource selections, and is therefore superior to a chronological consideration. While many IRP inputs are hourly and provide shapes with hourly considerations included, IRP modeling cannot efficiently resolve 20 years of hourly optimization; instead IRP modeling considers sample days or weeks and uses characteristic modeling. For the 2021 IRP, the expectations to use a representative selection of sample days, determined by the model, each of which will be hourly. The number of sample days has not yet been determined.

10. DR potential process cont. (slide 47) - Within Step 2, **how are Pac & AEG accounting for interactive effects between DR and energy efficiency (EE)?**

PacifiCorp Response:

The primary way the interaction between DR and EE is addressed is by first determining the energy efficiency forecast of potential and then using that forecast to forecast DR-enabled equipment.

11. Developing DR resource costs (slide 48)
    a. **Will non-energy values (i.e., quantification of impacts) of DR be included in the potential cost assessment?**

PacifiCorp Response:

Consistent with the NWPCC representation of DR for the 2021 IRP and input from the Brattle Group as noted from the June 20 workshop, participant value of service lost is included in the cost assessment.

    b. **As part of incremental cost, will the IRP have an**:
        i. Estimate of the **number of hours per season and time of day**,
        ii. Estimate of the **duration of need within the day**, and
        iii. Description of the set of conditions that create the given need?

PacifiCorp Response:

For representation of the levelized cost of DR resources, there are a number of approaches that can be applied, each will apply a different assumption for available demand (denominator) in the calculation depending on use case being characterized. The CPA is producing available demand for each measure by each hour of the year and the duration of availability when called. The model can represent the resource availability and operating constraints for all hours of the year.

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.

NA

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

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

* Required fields

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

Thank you for participating.

* Required fields

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 2020-09-09

*Name: Sudeshna Pal Title:

*E-mail: sudeshna.pal@gmail.com Phone: 2175525680

*Organization: Oregon CUB

Address: 9485 SW 151st Ave

City: Beaverton State: Zip: 97007

Public Meeting Date comments address: 08-28-2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Battery Storage and Demand Response

☐ 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.

1. Will PacifiCorp perform a battery storage assessment by State or is it only the system as a whole? Will the IRP account for interactive effects of Direct Load Control and Price-based Demand Response programs?

PacifiCorp Response:

With regards to an assessment of the potential for behind the meter battery storage demand response (DR) programs, the intent is to develop state specific estimates. To determine the potential, the assessment will consider existing and forecast levels of customer generation adoption and the structure of the customer generation tariffs in each state.

2. Will the IRP account for interactive effects of Direct Load Control and Price-based Demand Response programs?

PacifiCorp Response:

Unlike Direct Load Control proxy programs, Price-based demand response programs are not modeled as resource options which the Integrated Resource Plan (IRP) model can select. Customer participation in existing pricing programs is incorporated in the load forecast. Price based DR is dependent on the customer choosing to activate it based on the price and so it is not appropriate for the IRP to model it as a supply side resource because the capacity expansion model cannot determine whether customers would choose the product. Therefore it is more appropriate to include a forecast of these products in the load forecast. Since pricing program participation is included in the load forecast, direct load control programs are selected to operate with pricing programs. Future price based program designs are informed by the results of

the Conservation Potential Assessment, which includes energy efficiency, direct load control and price based demand response.

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.

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

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

Thank you for participating.

* Required fields

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: Click here to enter date.

*Name: Rose Anderson | Title: **Economist**

*E-mail: Rose.anderson@state.or.us | Phone: Click here to enter text.

*Organization: Oregon Public Utility Commission

Address: Click here to enter text.

City: Click here to enter text. | State: Click here to enter text. | Zip: Click here to enter text.

Public Meeting Date comments address: **6/18/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
CPA, Battery Storage

☐ 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 attached document with feedback.

June meeting feedback form:

Topic: Demand Response in the CPA and IRP

1. Please provide all details and parameters of how Demand Response (DR) resources will be modeled in Plexos in the 2019 IRP, and include information that answers the following questions:
   - Which types of DR will be modeled in Plexos?
   - Will the DR levelized costs from the CPA be input into Plexos directly? If not, please explain how DR cost inputs to Plexos will be developed. If it is still unknown how they will be developed, please explain how the inputs to System Optimizer were developed in the 2019 IRP.
   - In what ways will the Plexos modeling of a DR resource be similar to, and how will it differ from, the modeling of a typical supply-side resource?
   - Please list and briefly describe the Plexos inputs and constraints that will be necessary for the modeling of DR resources.

* Required fields

- Please explain how the Plexos model will be used to accurately consider the full capabilities of DR resources, including capacity and ancillary services.

PacifiCorp Response:
It is anticipated that all types of demand response (DR) resources provided in the Conservation Potential Assessment (CPA) will be modeled in Plexos. The levelized costs from the CPA will input directly into Plexos after adjusting for any applicable credits intended to capture value that the model cannot otherwise see; an example of such a credit is the Transmission & Distribution deferral credit. The Plexos modeling of DR is expected to be the same or similar to other supply-side resources other than for characteristics that are unique to DR. One example of a unique DR characteristic is the capability for return energy that requires unique modeling in Plexos. The Plexos modeling for the 2021 Integrated Resource Plan is currently under development.

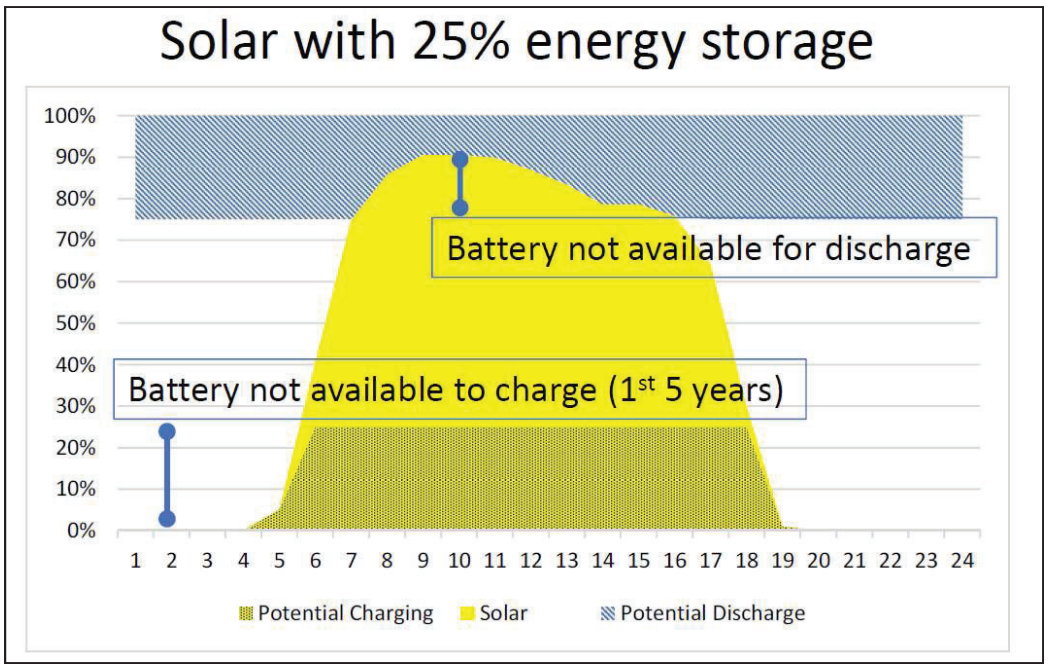
2. See page 30 of the DSM I and III CPA chapter from the 2019 IRP. What does it mean for a DR pricing program to have a useful life of ten years? What is the reasoning for using a ten year lifespan?

PacifiCorp Response:
Demand-side management (DSM) options are assumed to have both one-time startup costs and ongoing annual costs. Essentially, a "program life" assumption is used to amortize one-time costs over the period for which the pricing option might be offered. The 10-year assumption reflects that PacifiCorp would likely offer a new Class 3 DSM rate option for a number of years, but that over time, the rate may need to be redesigned or discontinued based on changes in enabling technology options and adoption, customer preferences, resource needs and value, or other considerations.

Topic: Modeling Energy Storage:

3. Please provide an explanation of how the solar plus storage constraints in the chart on slide 39 of the June IRP presentation will be implemented in Plexos.

PacifiCorp Response:
Plexos modeling includes definable constraints. For each co-located battery, a constraint will be constructed limiting the amount of battery charge in each period to the amount of generation of the collocated resource. An additional constraint will restrict battery storage discharge plus resource generation to the correct interconnection limit. As an example, if the interconnection limit is 500 megawatts, then the constraint will be built with a formula representing [Co-located Resource generation + Battery Discharge <= 500].



4. What PacifiCorp operational or regulatory constraints exist that would stop any new or existing VER projects from adding storage capacity at ~50% of VER nameplate? If there are any, what are they and how are these constraints captured/reflected in Plexos?

PacifiCorp Response:
Building a new storage capacity project at an existing VER facility would be very similar to building a new storage project anywhere on our transmission system. The storage project would need to secure all regulatory permitting requirements where it is built, as it is unlikely an existing VER would have included storage in its permits. Operationally, the storage project would need to have a land agreement and a suitable site for its construction. There would also likely be some upgrades required to existing substation and/or transmission infrastructure to accommodate the storage project.

Every existing VER project is metered where it connects to the grid. If the storage project is connected on the VER side of the meter, it could possibly be put in place with a modification of the VER project's interconnection agreement, but electric output to the grid at any single point in time would be limited by the MWs allowed in the VER's existing interconnection agreement. If the VER and storage project requested an increase in the nameplate capacity of the interconnection agreement for a combined project, it would likely qualify as a major change and may require the VER to abandon its existing interconnection agreement and apply for a new interconnection agreement with a large enough nameplate capacity to handle the full potential output of the VER and the storage project. If the storage project connects on the transmission grid side of the meter, it would need to have an independent interconnection agreement and its own meter.

Given the IRP's aggregated topology and use of proxy resources, unless there is an economic incentive to co-locate storage and generation technologies (such as exists with solar storage benefits), there is no compelling reason to model co-location as a rigid assumption in Plexos for the 2021 IRP. This is because the co-location structure effectively constrains the model to building both resources together (likely at the same time as well as in the same place), which limits the model's options. If there is another type of benefit to co-location, such as proximity to load or markets, for example, the model can already realize this benefit by selecting the two proxy technologies (any VER or non-VER with storage) in the same IRP transmission bubble. Therefore, for the 2021

IRP the Company intends to model co-location of solar plus storage explicitly, but also allow to model to co-locate storage with other technologies on an optimized basis.

5. PacifiCorp's June presentation seems to indicate that the transmission capacity available to combined VER (Variable Energy Resource) + Storage resources will be limited to the VER nameplate capacity.

   PacifiCorp Response:
   That is correct.

   a. Are there perhaps some locations on PacifiCorp's system where combined VER + Storage resources could have access to the full transmission required to generate at their combined nameplate capacity, without requiring prohibitively expensive transmission upgrades?

      PacifiCorp Response:
      No. The VER + storage would be limited by the terms of the VER's interconnection agreement. The interconnection agreement establishes the VER's right to use the use the transmission system. If there is additional capacity available on the transmission system, that capacity is allotted through the interconnection queue and established interconnection agreement processes. Therefore, in the 2021 IRP, the maximum output of co-located solar plus storage resources is limited to the VER nameplate capacity in any given hour.

   b. Would PacifiCorp seek to identify a few of these locations and allow VER + storage resources to generate at their full, combined capacity at those locations in the 2021 IRP?

      PacifiCorp Response:
      One of the greatest potential benefits of co-locating VER + storage is the ability to add Storage within the existing VER interconnection agreements. This allows the Storage to function within the existing limits of the transmission system when the VER is not generating at full capacity.

      If there are areas of the transmission system that have excess capacity and would benefit from the addition of storage to the grid, this can be accomplished with an independent storage project. There is no great benefit to co-locating storage and existing VER if the storage project requires interconnection access at its full capacity, regardless of the generation taking place at other points along the interconnection system.

6. Is Plexos capable of modeling and selecting independent energy storage projects within PacifiCorp's identified load pockets?

   PacifiCorp Response:
   Yes. As in the 2019 IRP, independent or "stand-alone" storage options will be modeled at multiple locations with load and will be represented in the final 2021 IRP supply-side resource table.

Topic: 2019 IRP action item updates

7. What will the retirement date for Cholla 4 be in the 2021 IRP modeling?

   PacifiCorp Response:
   The 2021 IRP will reflect a December 31, 2020 closure date for Cholla Unit 4.

Topic: Transmission

8. Please explain in detail how the B2H line will be modeled as connecting to PacifiCorp's system in Oregon in the 2021 IRP. Are additional upgrades assumed to be needed in order to connect the line? If so, approximately how much do these additional upgrades cost? Are they financed entirely by PacifiCorp?

* Required fields

PacifiCorp Response:
The modeling of B2H in the 2021 IRP will include relevant projected costs (and therefore upgrades) necessary to enable the project.

9. Please explain whether the Company will include the 500 kV planned Transcanyon transmission line from Utah to Nevada in Plexos modeling. If the line will be included, in what year will it be in service?

PacifiCorp Response:

No, the Company is not planning to incorporate the Transcanyon transmission link in the 2021 IRP. The benefits to PacifiCorp from the Cross-Tie project appear to be access to high capacity factor solar resources in the Southwest. However, when the incremental cost of transmission is taken into consideration, solar resources within our service territory, e.g. central and southern Utah, that do not require a significant investment in transmission, appear to be more economic for our customers at this time. PacifiCorp is evaluating whether to incorporate a study of Cross-Tie in the 2023 IRP.

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.
June 18 OPUC Feedback.docx

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

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: Click here to enter date.

*Name: Rose Anderson | Title: **Economist**

*E-mail: Rose.anderson@state.or.us | Phone: Click here to enter text.

*Organization: Oregon Public Utility Commission

Address: Click here to enter text.

City: Click here to enter text. | State: Click here to enter text. | Zip: Click here to enter text.

Public Meeting Date comments address: **7/30/2019** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

☐ 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 attached document with feedback.

Topic: Load Forecast

1. OPUC Staff finds that an opportunity to review the company's load forecast methodology before IRP portfolio analysis begins is essential to our thorough review of the 2021 IRP.

   Would PacifiCorp please provide the most current data and equations used to forecast load for the 2021 IRP, including data and equations for both the peak demand forecast and the aggregate demand forecast?

   Staff requests preliminary data and equations to review now, as well as finalized data and equations once the load forecast is finalized.

   PacifiCorp Response:

   Please refer to 2019 IRP – Volume II, Appendix A for PacifiCorp's load forecast methodology. Changes to the load forecast methodology since the 2019 IRP include updates for incorporating the impacts of COVID-19 and

* Required fields

transportation electrification expectations on forecasted electricity demand. PacifiCorp will make the requested load forecast data and equations available as part of the data disc at the time of filing the 2021 IRP.

2. Staff is interested in seeing load forecast sensitivities for low and high private generation in the 2021 IRP. Does the Company plan to include these sensitivities in the 2021 IRP? If so, please describe the analysis and explain what assumptions will be used.

   PacifiCorp Response:

   Yes, PacifiCorp's 2021 Integrated Resource Plan (IRP) will include low and high private generation load forecast sensitivities. The methodology for producing the high and low private generation forecast is similar to the methodology for developing the base case private generation forecast. In general, the company relies on the three different estimates included within the Private Generation Forecast created by Guidehouse. This report estimates the amount and type of private generation to be interconnected during each year and the corresponding estimated megawatt hours (MWHs) to be generated from the anticipated interconnections. As the report findings are based on yearly totals, when calculating the cumulative MWH for inclusion in the load forecast, PacifiCorp assumes that one half of the anticipated annual MWH will impact during the year the facilities are interconnected, and then the full MWH impact of the generation is considered in all following years.

3. Staff is interested in seeing load forecast sensitivities for low and high customer preference participation in the 2021 IRP.

   PacifiCorp Response:

   Customer preference is a supply-side consideration that has no impact on the future customer demand or load. Given this understanding the Company responds as follows.

   a. Does the Company plan to include these sensitivities in the 2021 IRP? If so, please describe the analysis and explain the assumptions that will be used.

      PacifiCorp Response:

      PacifiCorp plans to produce high and a no customer preference sensitivities. This analysis is to be conducted by examining customer preference levels for renewable energy resources from communications with the Company and publicly-available documents. These documents are often renewable energy and climate commitments describing preference for renewable resource type, target year, and "additionality" to grid renewables, among other preferences. A high customer preference sensitivity will assume that all customer preference goals will be met with customer preference resources, while a no customer preference sensitivity will assume no customer load is addressed with customer preference resources. As part of the Oregon Public Utility Commission's (OPUC) acknowledgement of PacifiCorp 2019 IRP, the Company is required to quantify customer preference asks (Docket LC-70, Order No. 20-186). This analysis and underlying assumptions, which will be conducted based on the same methodology, was shared with the Commission in a workshop on October 30, 2020.

   b. Staff recommends that a high-customer-preference scenario should consider the possibility of multiple cities and counties joining customer preference programs. This analysis could be based on interest shown to PacifiCorp by cities and counties to-date. In this scenario, Staff suggests a reasonable assumption would be approximately 20% of PAC's residential and commercial load covered under the high-customer-preference scenario.

      PacifiCorp Response:

      Customers included in the high customer preference sensitivity described above include communities with renewable energy goals, in anticipation of the possibility of development of a community-wide

customer preference program. Community-wide renewable energy goals will be quantified according to the goal year, preferred resource characteristics, and forecasted load of residential and commercial customers within those communities. The share of Oregon load represented by these customers was presented at the October 30, 2020 workshop with staff of the OPUC.

4. How does the methodology of the 2021 IRP load forecast compare to the load forecast methodology in the UE 374 rate case? Please explain, including a comparison of the variables and equations used to create each forecast.

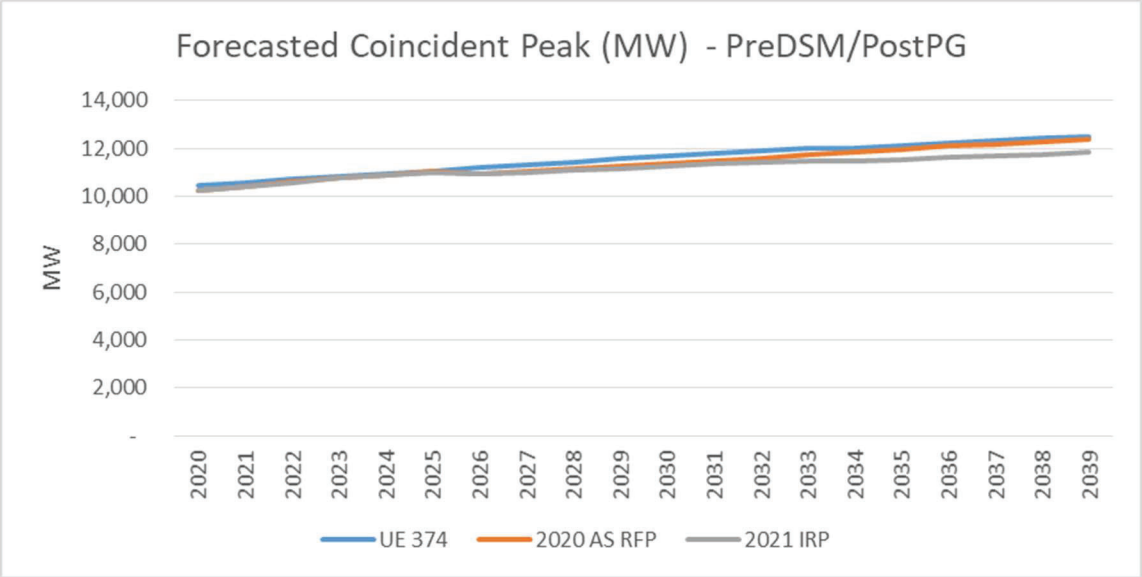
PacifiCorp Response:

PacifiCorp uses the same underlying methodology for both forecasts. The load forecast used in UE 374 was completed in June 2019 and updated in June 2020 for the 2021 IRP load forecast. The data disc with the load forecast variables and equations used in the 2021 IRP will be made available at the time of filing.

5. Please provide a chart showing a comparison of the load forecast in the UE 374 rate case, the updated load forecast used in the 2020AS RFP, and the current load forecast for the 2021 IRP.

PacifiCorp Response:

Please refer to the figure below, which compares the coincident peak forecasts used in the requested filings. Of note, the forecast results presented are representative of forecasted loads before accounting for the DSM program impacts and after accounting for private generation impacts.



6. The July IRP Public Input Meeting presentation explains that the load forecast increase in the 2021 IRP is driven by federal rollbacks, electric vehicles, and data centers. Please provide a description of the federal rollbacks considered, explain how they are included in the forecast, and provide more detail about how they are expected to increase load.

PacifiCorp Response:

The federal rollback of the 2007 Energy Independence and Security Act (EISA), originally set to take effect January 1, 2020, resulted in an exemption of specialty bulbs from the law. The exemption of these specialty bulbs from EISA standards resulted in the relative flattening of the lighting efficiency curve informing the load forecast. Conversely, the 2019 IRP load forecast had expected these expanded lighting standards to take effect and

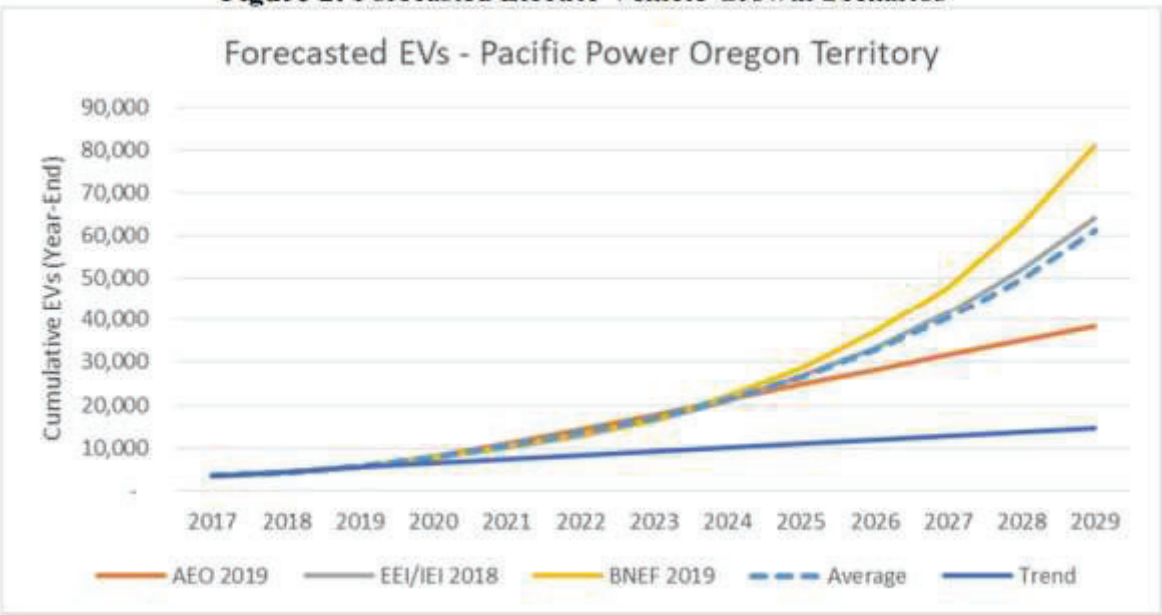
continue to improve lighting efficiency. Therefore, the exemption of specialty lamps from the EISA standards, as contemplated in the 2021 IRP, is contributing to a higher load forecast relative to the 2019 IRP.

7. In Figure 2 of PacifiCorp's UM 2056 reply comments, the sources averaged to produce an EV growth rate grew faster than the EV adoption 'trend' in PacifiCorp's Oregon service territory. What evidence suggests the EV growth rate in PacifiCorp's Oregon service territory will become as high as an average of the AEO, EEI, and BNEF forecasts?

PacifiCorp Response:

Figure 2 relates to how electric vehicles (EVs) were forecasted for the 2020 Transportation Electrification Plan in Oregon, but was not the source for forecasting EV load growth in the 2021 IRP load forecast. The EV projections used in the 2021 IRP load forecast were developed in April 2020 and were based on current and expected electric-vehicle adoption trends at that time. These projections were incorporated as a post-model adjustment to the residential and commercial sales forecasts.

Figure 2: Forecasted Electric Vehicle Growth Scenarios



Topic: Distribution System Planning

8. In distribution system planning, does PacifiCorp allocate forecast load among points on the distribution system in a top down manner, or forecast load at each individual point on the distribution system? Please provide a brief explanation of how the distribution system load forecast is performed.

PacifiCorp Response:

Load projections for distribution system planning are primarily developed in a bottom up manner, with individual projections provided for each distribution feeder and distribution substation transformer based on observed trends from the feeder and substation meters and specific local planning information. These distribution load projections are then coordinated with the system level forecasts used in the IRP process to ensure the aggregate of the bottom up load projections reasonably coincide with system-wide top down trends.

9. Does PacifiCorp plan to add additional SCADA technology to its distribution system? If so, please share an approximate timeline for these additions.

* Required fields

PacifiCorp Response:

The Company standard for new meter installations in distribution substations includes use of supervisory control and data acquisition (SCADA) technology where communications infrastructure, including multiple address system radio, microwave, fiber, leased line telephone and wireless, is available. The Company programmatically replaces existing non-SCADA meter installations at distribution substations when existing meter or relay equipment becomes obsolete or needs to be modified to support various system needs. In addition PacifiCorp's focus on its mitigation work related to the fire high consequence areas (FHCA) will result in an additional 100+ circuits being outfitted with SCADA to support situational awareness. Furthermore, the Company has developed a minimal data acquisition method as well, using Shark meters.

Topic: Supply Side Resources

10. Are any potential efficiencies of scale being missed by only looking at 100 MW and 200 MW solar installations? For example, has PacifiCorp considered to what extent a 400 MW solar installation would save on shared O&M or construction costs, as compared to building two separate 200 MW installations?

PacifiCorp Response:

PacifiCorp does not expect to see much more "economies of scale" savings beyond the 200 MW solar options. Going from 200MW to 400MW or more may show marginal savings on some of the fixed costs of construction and operations and maintenance (O&M) but that would be within the margin of accuracy without having specific installation sites at this level.

11. How will the operational and cost effects of the EIM be included in portfolio modeling? Please explain how the NPVRR and system operational benefits of participation in the EIM will be reflected in the 2021 IRP modeling. If the EIM will not be modeled, please explain why not.

PacifiCorp Response:

PacifiCorp does not anticipate including any modeling changes associated with the Energy Imbalance Market (EIM) in the 2021 IRP. First, EIM assists in the economic dispatch of PacifiCorp's own portfolio of resources. The Company's production cost models achieve comparable dispatch, so no adjustments are necessary for this aspect of EIM. Second, the current modeling of market transactions allows for purchase and sales transactions with hourly granularity in increments of fractions of a MW. In reality, most of PacifiCorp's purchase and sales transactions are currently for HLH or LLH blocks in 25 MW increments, particularly on a forward basis as the Company procures market products to meet short-term requirements. While EIM provides for more flexibility to match willing buyers and sellers, it is also subject to volume restrictions as all entities must submit balanced load and resource schedules and incremental economic supply is likely to drive down clearing prices. The Company does not anticipate developing a more nuanced relationship between price and volume as part of the 2021 IRP, and the existing modeling of hourly transactions reasonably accounts for the Company's ability to dispatch its fleet over the course of a day. Finally, while intra-hour volume and price movements do occur, they are not expected to have dramatic differences in system costs across portfolios. While credits to account for differences in intra-hour costs and benefits could be modeled, for the 2021 IRP, PacifiCorp intends to focus on enhancements to hourly modeling, and is not planning to adopt any intra-hour dispatch credits.

12. For combined variable energy resource (VER) and storage resources, will Plexos be allowed to choose from a variety of options for the storage duration and nameplate capacity?

Staff encourages modeling a variety of options for storage duration and nameplate capacity in combined VER and storage projects. Staff recommends including at least one other option, based on the Company's best judgement of what would constitute another reasonable option.

* Required fields

For example: Plexos could be given the additional option to select combined VER and storage resources with 6 hour batteries that consist of 25% of nameplate renewable capacity.

PacifiCorp Response:

The options modeled in Plexos will come from the supply-side resource table (SSR table). The SSR table has a variety of options for combined variable energy resource (VER) and storage resources as discussed at the September and October 2020 public-input meetings.

13. Which Wyoming wind resource locations will be studied in the IRP? Where will the wind forecast data come from?

PacifiCorp Response:

Medicine Bow is the location chosen for the Wyoming wind resource location in the 2021 IRP. Using the National Renewable Energy Laboratory (NREL) wind resource maps, the mean annual hub height wind speed at each potential project location was estimated and then extrapolated using the wind profile power law for the appropriate hub height to determine a representative wind speed. Using a Rayleigh distribution and power curve for the selected turbine technology, a gross annual capacity factor (GCF) was subsequently estimated for each site.

14. Please provide hourly solar profiles for any new solar resources under consideration in the IRP, by location, and include time zone information. Please also provide an explanation of whether the solar profiles are considered consistently across the two time zones in a way that makes sure they are not off by one hour due to time zone differences.

PacifiCorp Response:

Hourly profiles for two of the solar sites (Lakeview, Oregon and Milford, Utah) will be available in the 2020 Renewable Resources Assessment, Appendix B that is posted on PacifiCorp's 2021 Integrated Resource Plan webpage under IRP Support and Studies. The other three hourly profiles (Idaho Falls, Idaho, Rock Springs, Wyoming and Yakima, Washington) are not available but can be produced using PVSyst (a PC software package for the study, sizing and data analysis of PV systems). While data sources may be originated with any given time zone, inputs to the model are in pacific standard time.

15. Will the Plexos model have more efficient processing than System Optimizer did? For example, will Plexos be able to consider more supply side and demand side options than System Optimizer for a given amount of model run time?

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. The ability to model expansion resources will also be impacted by improvements reliability modeling, endogenous retirements and transmission option considerations.

16. Staff is interested in the 2021 IRP providing more information about which hours have the highest costs on PAC's system. This type of study will help stakeholders understand the potential benefits of service options like demand response, storage, and TOU rates.

    Staff requests that as a preliminary study, PacifiCorp provide marginal cost data in two formats:
    a. 8760 hour cost-duration curves organized from highest to lowest marginal generation cost ($/MWh) for the PAC system, PAC-E, and PAC-W, consisting of actual data from the year 2019.

b. The average marginal cost of energy on PAC's system, PAC-E, and PAC-W on a 12 x 24 grid, based on actual data from the year 2019.

PacifiCorp Response:

Please refer to attachment "Attach - 2021.033_PacifiCorp-OPUC EIM RTPD 2019 JAN-DEC.xlsx" for actual 15-minute Energy Imbalance Market prices for PACE and PACW during 2019. The EIM does not report a system price that aggregates PACE and PACW.

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.

June 18 OPUC Feedback.docx

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

Click here to enter text.

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

Thank you for participating.

* Required fields

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: Click here to enter date.

*Name: Rose Anderson | Title: **Economist**

*E-mail: Rose.anderson@state.or.us | Phone: Click here to enter text.

*Organization: Oregon Public Utility Commission

Address: Click here to enter text.

City: Click here to enter text. | State: Click here to enter text. | Zip: Click here to enter text.

Public Meeting Date comments address: **8/28/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
2021 CPA, Demand Response participant costs

☐ 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.

OPUC Staff (Staff) requests that PacifiCorp make improvements to the Participant Costs value for Demand Response (DR) resources in the 2021 CPA. Staff's recommendations are informed by recent studies of demand response customer experiences and by a more complete incorporation of the CPUC DR methodology.

To provide some background, in the 2019 CPA the levelized cost calculation for DR resources included an element called Participant Costs. Participant Costs consisted of costs to participants in a DR program, including Transaction Costs, Value of Service Lost, and Capital Costs to Participant. Participant Costs for DR resources were estimated using Participant Benefits as a proxy, similar to CPUC methodology for demand response cost/benefit analysis.[1, 2] CPUC assumes Participant Benefits are a good proxy for Participant Costs because:

> It is reasonable to assume that participants in voluntary DR programs perceive their costs as being less than the benefits, or at the very least participants perceive that they are "breaking even." Therefore, the maximum possible value of their costs is equal to the value of the benefits.[3]

[1] Applied Energy Group. PacifiCorp Conservation Potential Assessment for 2019-2038. Volume 3: Class 1 and 3 DSM Analysis. March, 2019. Pages 30-31.
[2] CPUC. 2016 Demand Response Cost Effectiveness Protocols. July 2016. Page 47. Available at: https://www.cpuc.ca.gov/general.aspx?id=7023
[3] CPUC. 2016 Demand Response Cost Effectiveness Protocols. July 2016. Page 46. Available at: https://www.cpuc.ca.gov/general.aspx?id=7023

* Required fields

The value used to represent Participant Benefits, and therefore the maximum possible value of Participant Costs, was the value of program incentives received by customers.[4] This incentive value was multiplied by 75 percent to represent the likelihood that customers are actually doing better than 'breaking even' in demand response programs, or else they would be unlikely to participate.

Staff recommends the following in order to improve the Participant Cost assumptions in the 2021 CPA:

1) The 2019 CPA assumed that DR participant costs are equal to 75 percent of the value of a DR program's incentives. For most DR resources, this approach is consistent with CPUC treatment. However, for AC cycling programs the CPUC protocols only apply 35 percent of customer incentives to Participant Costs, recognizing that the customer discomfort, and therefore the Value of Service Lost, to customers from AC cycling programs is minimal.

   The Rocky Mountain Power website for the Cool Keeper program notes,

   > Most customers don't notice the typical temperature change of approximately 1 to 4 degrees. More than 92,000 customers are currently participating in the program, and 98 percent of Cool Keeper participants are satisfied with the program.

   The 2021 CPA should follow CPUC's methodology by using 35 percent of program incentives to represent Participant Costs for AC cycling programs.

   PacifiCorp Response:

   The 2021 Conservation Potential Assessment (CPA) will use 35 percent of program incentives to represent participant costs for air conditioning (AC) cycling programs.

2) Given that smart thermostat programs are being shown to result in minimal discomfort to participants, and that smart thermostats are capable of pre-cooling and pre-heating in advance of demand response events in order to increase comfort of participants, PacifiCorp should utilize Participant Costs lower than 75 percent of incentives for participants in smart thermostat programs.[5,6]

   OPUC Staff recommends a value of 35 percent or less, consistent with the value proposed in the 2021 NWPCC Power Plan for residential space heating and space cooling.[7] In Bring Your Own Thermostat programs, a higher value may be justified to reflect the cost of a smart thermostat to the customer.

   PacifiCorp Response:

   The 2021 CPA will use 35 percent for participant costs for residential space heating and space cooling.

3) A recent BPA study on demand response for water heaters indicates that customers reported a loss of hot water about equally in weeks with and without a DLC event. Only 17 percent of customers ran out of hot water more than a couple of times in eight months for any reason (DLC event or other reason). Additionally, in Portland General Electric's (PGE) multifamily water heater pilot application, PGE

[4] Applied Energy Group. PacifiCorp Conservation Potential Assessment for 2019-2038. Volume 3: Class 1 and 3 DSM Analysis. March, 2019. Pages 30-31.
[5] Nexant. Xcel Energy Colorado Smart Thermostat Pilot – Evaluation Report. May 12, 2017. Page 118.
[6] ACEEE. National Study of Potential of Smart Thermostats for Energy Efficiency and Demand Response. 2016. Page 2-8
[7] NWPCC. Residential DR Product Assumptions (xlsx). Available at: https://www.nwcouncil.org/energy/energy-advisory-committees/demand-response-advisory-committee

expected to manage its program so that customers would perceive no change to their hot water availability. A recent evaluation of the multifamily water heater pilot showed that only six percent of aware tenants had any complaints about hot water availability, and only three percent reported a change in hot water availability over time, suggesting their issues could have been due to the program. [8,9]

Given that it is possible to run a DLC Water Heating program with little or no decline in customer experience, PacifiCorp should apply a Participant Cost of 25 percent of incentive value or less for DLC residential Water Heating.[10] This would be consistent with the water heating participant cost assumption proposed for the 2021 NWPCC Power Plan.[11]

PacifiCorp Response:

The 2021 CPA will use 25 percent for Participant cost for direct load control (DLC) residential water heating.

4) Finally, the 2019 CPA lacked sensitivity analysis of Participant Costs. Given that participant costs are highly uncertain and were listed by CPUC as one of the variables likely to influence the cost-effectiveness of DR, PacifiCorp should perform a Participant Costs sensitivity analysis similar to that included in the CPUC demand response protocols. [12]

Participant Cost sensitivity analysis should be performed for each DR resource, and it should include a low, reference, and high Participant Cost assumption for each. This would result in reporting of high, medium, and low levelized costs for demand response resources.

PacifiCorp Response:

The California Public Utilities Commission (CPUC) 2016 protocols for demand response provide specific guidance for estimating low and high participant cost sensitivities. Estimation of impacts to customer program participation due to low and high participant costs however, are not prescribed in the protocols and there is limited demand response program participation research from which to develop estimates for elasticity of customer demand. The 2021 CPA will follow the CPUC guidance in creating low and high participant cost sensitivities.

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.

Demand Response feedback -OPUC Staff-.docx

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

OPUC Staff recommends Participant Costs be reduced for several types of demand response, as further explained in the attached document.

---

[8] PGE. Docket No. UM 1827. PGE's Application for Deferred Accounting of Costs Associated with the PGE Demand Response Water Heater Pilot. Page 7.

[9] Guidehouse. Docket No. UM 1827. Multifamily Residential Demand Response Water Heater Pilot Evaluation.

[10] https://www.bpa.gov/EE/Technology/demand-response/Documents/20181118_CTA-2045_Final_Report.pdf

[11] NWPCC. Residential DR Product Assumptions (xlsx). Available at: https://www.nwcouncil.org/energy/energy-advisory-committees/demand-response-advisory-committee

[12] CPUC. 2016 Demand Response Cost Effectiveness Protocols. July 2016. Page 14-15. Available at: https://www.cpuc.ca.gov/general.aspx?id=7023

* Required fields

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

Thank you for participating.

* Required fields

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: 2020-09-17

*Name: Brian Muir Title:

*E-mail: bmuir@kemmerer.orgh Phone: (307) 466 - 3128

*Organization: City of Kemmerer

Address: City Hall Kemmerer Wyoming 83101

City: Kemmerer State: WY Zip: 83101

Public Meeting Date comments address: ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Study of Gas Efficiency at various elevations

☐ 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.

In a previous IRP document it mentioned studying natural gas efficiency at various elevations. The maximum elevation you listed was 6500, which would make it so you would not study the efficiency of natural gas in Kemmerer Wyoming which is almost 7,000 feet. Please also study at our elevation.

PacifiCorp Response:

The 6,500 feet elevation for natural gas resources are representative of Kemmerer, Wyoming. Increasing elevation causes little or no change in the efficiency of both simple cycle and combined cycle combustion turbine-generators. Increasing elevation causes combustion turbine-generator production to decrease at a rate of about three percent per 1,000 feet of elevation. Changes in elevation cause little or no change in efficiency and production for reciprocating engines.

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.

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

* Required fields

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

Thank you for participating.

* Required fields

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: 2020-09-18

*Name: Kevin Emerson | Title:

*E-mail: kevin@utahcleanenergy.org | Phone: 8016080850

*Organization: Utah Clean Energy

Address: 1014 2nd Ave

City: Salt Lake City | State: | Zip: 84103

Public Meeting Date comments address: 08-28-2020 ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Justin Brant, Southwest Energy Efficiency Project

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

2021 IRP Conservation Potential Assessment in Utah

☐ 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.

By definition, the technical achievable potential should be significantly higher than the amount of DSM that the utility can actually achieve. According to AEG technical achievable potential represents \u001C&potential which can reasonably be acquired through all future potential mechanisms, regardless of how conservation is achieved (including both utility and non-utility interventions) and ignoring cost-effectiveness considerations.\u001D (AEG CPA Vol 1, June 2019, page 11) In early years in the level of Utah DSM identified by AEG (see: 2021 Conservation Potential Assessment Draft Energy Efficiency Measure Results), is virtually the same as or lower than the amount of DSM the Rocky Mountain Power achieved in its annual report in recent years. For example, it is unreasonable for the technical achievable potential in 2021 to be so similar/below to amount of DSM that was achieved in Utah within the last 5 years. This appears to be a clear example of AEG underestimating DSM potential in the CPA. While we recognize that in latter years the amount of technical achievable potential is significant (for example, Utah\u0019s share of the total DSM reaching about 470,000 MWH in 2029 and 2030), the MWh starting point in 2021 is unreasonably low and unrealistic. Even with ambitious ramp rates, the overall amount of DSM is undervalued when the level of DSM is so unreasonably low.

1. Please explain why Utah\u0019s achievable technical potential in 2021 and 2022 is nearly identical or less than the amount of actual DSM achieved in the last 5 years (which ranged from 272,385 MWh in 2019 to 372,945 MWh in 2017), when, by definition, technical achievable potential is meant to represent potential that captures \u001Call future potential mechanisms\u001D and \u001Cignoring cost-effectiveness considerations.\u001D

* Required fields

PacifiCorp Response:

This is reflective of the baseline stock that is available and is mostly related to lighting. The saturation of light emitting diode (LED)'s is increasing significantly in all sectors and therefore the number of baseline bulbs that can be replaced is much smaller than previously.

2. Were the customer surveys that RMP conducted to determine the level of LED market adoption representative of all customers (including language, race, and income)? It seems unlikely that Utah would have the highest market penetration of LEDs, given the more ambitious building standards and energy efficiency programs and policies in other PCorp states, esp. Washington.

   PacifiCorp Response:

   PacifiCorp received 30,028 responses from Utah residential customers for the 2019 Residential Survey. This is a representative sampling of Utah residential customers.

   There has been a notable uptick in the saturation of LEDs in Utah between the two most recent surveys.
   2017 Survey = 34.1 percent of indoor/outdoor lighting for an average household is LED
   2019 Survey = 46.2 percent

3. Other states are seeing similar trends. In 2019, OR is 43%, WA is 40.8%.When looking at PCorp\u0019s slides from the Aug CPA workshop, it is concerning to see that the Whole Building/Home measure in Utah represents only 4.9% of the total but 15.9% in Oregon, when Utah is PCorp\u0019s highest growth state. Please explain the assumptions and methods that resulted in this low percentage in Utah.

   PacifiCorp Response:

   This is a difference between how Oregon and Utah model due to how the programs operate in Oregon. Oregon models all residential new construction opportunities as a whole home measure, whereas all the other states have options for both whole home measures and individual measure installations. If all measures in the 'new' vintage were summed together, the savings percentage is around 30 percent of total savings for new construction in Utah.

4. For Utah, the Building Shell measure is set at a \u001CRetro1Slow\u001D ramp rate at a time when RMP is pushing electrification and we\u0019re starting to see more demand for heat pumps. With a push for electrification the building shell measure should be at a higher ramp rate because a well-built building shell can help reduce the size and operation of heat pumps, therefore reducing overall electricity consumption.

   PacifiCorp Response:

   The ramp rates are calibrated to where programs are at today with savings and ramp up over time. As electrification ramps in Utah, the building shell measure is also ramping up and capturing more savings.

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.

https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/environment/dsm/2019-final-study/PacifiCorp_DSM_Potential_Vol_1_Executive_Summary_Final_2019-6-30.pdf
https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2021-irp/2021-irp-support-and-studies/PacifiCorp_2021_Non-Res_Measure_List_Draft_FINAL.xlsx

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

It would be very helpful if you would adjust the format for this online feedback form to make submitting data easier on the respondent's end. For example, the Responsent Comment field, it would be helpful if the text input bar was resizable so it shows multiple lines/paragraphs.

* Required fields

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

Thank you for participating.

* Required fields

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 2020-09-23

*Name: Bryce Freeman Title:

*E-mail: bryce.freeman@wyo.gov Phone: 3077775742

*Organization: Wyoming Office of Consumer Advocate

Address: 2515 Warren Ave., Suite 304

City: Cheyenne State: Zip: 82002

Public Meeting Date comments address: 09-17-2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Business As Usual Case

☐ 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.

At the September 17th meeting the WOCA was encouraged to provide more specificity regarding a business as usual case. From our perspective a business as usual case should begin with the generation (and transmission) portfolio currently in place. The OCA is interested in quantifying customer impacts that would result from incremental changes to the existing portfolio to accommodate load growth as well as such things as current environmental compliance obligations. This case should be developed without consideration of the alleged benefits of early coal retirement as early coal retirement cases are examined elsewhere in the IRP.

PacifiCorp Response:

Thank you for the comment. PacifiCorp will consider this input when defining portfolio-development cases for the 2021 IRP cycle.

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.

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

* Required fields

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

Thank you for participating.

* Required fields

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 2020-09-23

*Name: Bryce Freeman Title:

*E-mail: bryce.freeman@wyo.gov Phone: 3077775742

*Organization: Wyoming Office of Consumer Advocate

Address: 2515 Warren Ave., Suite 304

City: Cheyenne State: WY Zip: 82002

Public Meeting Date comments address: 09-17-2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Carbon Capture, Utilization and Storage, Small Modular Reactors

☐ 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.

At the September 17th meeting the Company indicated that it would be willing to more thoroughly evaluate both CCUS and SMR technology with an eye toward giving the model the option to choose those technologies in the portfolio development process. The OCA believes strongly that the Company should do so and further, that CCUS and SMR technologies should be treated similarly to other technologies such as wind, solar and battery storage. More specifically, even though CCUS and SMR have not been deployed at scale to date, there is considerable reason to believe that they will be and that successive installations will bend the cost curve down, as has been the case with wind and solar. The Company should assume a learning curve for both of these technologies that stakeholders can vet.

PacifiCorp Response:

PacifiCorp continues to explore small modular reactor (SMR) nuclear as well as carbon capture, use and sequestration (CCUS). PacifiCorp will also work to identify relevant and reliable information regarding the learning curve for each of these technologies. PacifiCorp will continue to work with interested parties to determine the feasibility of third-party CCUS and enhanced oil recovery project at prospective generating facilities.

* Required fields

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.

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

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

Thank you for participating.

* Required fields

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 2020-09-23

*Name: Bryce Freeman Title:

*E-mail: bryce.freeman@wyo.gov Phone: 3077775742

*Organization: Wyoming Office of Consumer Advocate

Address: 2515 Warren Ave., Suite 304

City: Cheyenne State: WY Zip: 82002

Public Meeting Date comments address: 09-17-2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

System Reliability

☐ 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.

At the September 17th meeting the WOCA raised issues surrounding resource adequacy and system reliability, particularly with regard to system dynamic stability over summer 2020. The CAISO has increasingly designated non-resource adequacy resources as emergency capacity resources and has solicited ancillary service capacity assignments from other western balancing authorities. The WOCA is interested in exploring how these developments will impact service reliability for Wyoming customers, especially in view of the 2019 IRP preferred portfolio which calls for the early retirement of much of PAC's coal generation fleet.

PacifiCorp Response:

PacifiCorp is currently planning to model a sensitivity based on recent summer 2020 actual experience, implementing an hourly load forecast that represents these conditions in a future year. The study should indicate how portfolios respond to these events, including the risk of high costs, lost load and reserve deficiencies.

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.

* Required fields

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

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

Thank you for participating.

* Required fields

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 2020-09-23

*Name: Bryce Freeman Title:

*E-mail: bryce.freeman@wyo.gov Phone: 3077775742

*Organization: Wyoming Office of Consumer Advocate

Address: 2515 Warren Ave., Suite 304

City: Cheyenne State: WY Zip: 82002

Public Meeting Date comments address: 09-17-2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Wyoming HB 200

☐ 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.

At the September 17th meeting the Company addressed compliance with recently adopted legislation and rules in several states, including Wyoming. HB 200 adopted in the 2020 legislative session requires that Wyoming load serving utilities provide a portion of their retail electricity from low carbon thermal generation resources (CCUS). The WOCA strongly believes that the 2021 IRP should include at least a preliminary analysis regarding how the Company intends to comply with this legislation, including an analysis of existing Wyoming coal plants that are potentially suitable for such compliance.

PacifiCorp Response:

PacifiCorp will evaluate the potential impacts of HB200. Specific cases and sensitivities will be discussed at a future public-input meeting.

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.

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

* Required fields

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

Thank you for participating.

* Required fields

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 9/28/2020

*Name: Rose Anderson Title: **Economist**

*E-mail: Rose.anderson@state.or.us Phone: Click here to enter text.

*Organization: Oregon Public Utility Commission

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: **7/31/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

☐ 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 attached document with feedback.

Topic: Private Generation Study

1. Staff requests that in any private generation study for the 2021 IRP, the policy driver assumptions should be clearly explained in the text of the 2021 IRP so that parties can easily review them for reasonableness.

   PacifiCorp Response:

   PacifiCorp uses the existing regulatory structures and known incentives in each state to develop the Private Generation Forecast. The Company does not predict what regulatory structures may be adopted in the future or future incentive offerings. A summary of the current regulatory and incentive regimes in each state that were used to develop the forecast is included in the Private Generation Study.

Topic: EE Bundling

2. Staff wants to confirm that there will be additional opportunity to discuss other bundling methods beyond the proposed enhancement of varying peak by year. Staff refers to Order No 20-186 pg. 23:

   Specifically, PacifiCorp should work with stakeholders and Staff in the 2021 IRP development process to select two to four bundling strategies in an effort to identify the highest level of cost-effective energy efficiency by

state and across the system. The collaborative decision process should consider bundling energy efficiency measures by energy cost, capacity contribution cost and measure type, as well as potentially by other metrics. The company should report on the collaborative process, bundling methods chosen, and any results in a filing before the filing of the 2021 IRP.

Staff appreciates the Company's plan for modifying the previous alternative bundling approach to vary peak contribution from year to year. This does not directly address the concern raised by Staff regarding the opaqueness of the alternative bundling approach. This issue led Staff to propose that alternative methods "consider bundling energy efficiency measures by energy cost, capacity contribution cost and measure type, as well as potentially by other metrics".

PacifiCorp Response:

PacifiCorp will address this topic at the October 22, 2020 public input meeting.

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.

"July 31 Feedback"

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

Click here to enter text.

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

Thank you for participating.

* Required fields

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 2020-09-29

*Name: Kaeci Daniels Title:

*E-mail: kaeci.daniels1@wyo.gov Phone: (307) 777 - 5701

*Organization: Wyoming Public Service Commission

Address: 2515 Warren Ave. Suite 300

City: Cheyenne State: WY Zip: 82002

Public Meeting Date comments address: 09-17-2020 ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Portfolio development

☐ 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.

1. Price-policy scenarios to analyze: Develop a low CO2 price, Medium gas/no CO2 scenario, Medium gas/low CO2 scenario, High gas/low CO2 scenario. Why is there no weighted average price policy?

   PacifiCorp Response:

   PacifiCorp designs its scenarios to reflect an expected case (the "base case") and a reasonable range of alternative outcomes around the expected case. PacifiCorp does not have a reasonable means to assign probabilities to long range uncertainties, which would be highly subjective.

2. Dispatchability/flexible resource credit for coal, gas, nuclear and battery - only when paired with coal, gas, nuclear, or hydro - Potentially bring back intra-hour resource credit.

   PacifiCorp Response:

   Unless there are cost savings associated with co-location, such as with solar, then modeling co-location does not provide any incremental benefits to the portfolio-development process. While building storage on an existing site may provide cost savings, co-locating battery with coal or nuclear would not increase the value of the coal or nuclear resource. It would only potentially make the battery cheaper to build at that site. The coal or nuclear resource would still be competing just as before against other resource alternatives (i.e., renewables, front office transactions (FOTs), etc.) with unchanged costs.

* Required fields

3. Is the life of renewable resources reasonable? Please provide some data on this from rate cases/CPCN\u0019s with the WPSC.

   PacifiCorp Response:

   The design lives of the renewable resources included in the Supply-Side Resource Table for the 2021 IRP are based on data provided by Burns & McDonnell in the 2020 Renewable Resources Assessment. The 2020 Renewable Resources Assessment will be available on PacifiCorp's IRP website: https://www.pacificorp.com/energy/integrated-resource-plan/support.html.

4. How will retirement dates be optimized? Please provide the Burns & McDonald report to the WPSC.

   PacifiCorp Response:

   The 2020 Renewable Resources Assessment does not address how retirement dates will be optimized. PacifiCorp will discuss its approach to portfolio development including the modeling and consideration of potential coal retirement scenarios as the November 16, 2020 public input meeting.

5. Please include in the IRP an analysis of available market supply (FOTs) over the planning period.

   PacifiCorp Response:

   PacifiCorp discussed its 2021 IRP front office transaction planning limits during the October 22, 2020 public input meeting. These limits are annual limits applied over the twenty-year planning period.

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.

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

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

Thank you for participating.

* Required fields

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: 2020-09-29

*Name: Daney Brauchie | Title: Ms.

*E-mail: daney.brauchie@wyo.gov | Phone: (307) 777 - 5747

*Organization: Wyoming Public Service Commission

Address: 2515 Warren Ave Suite 300

City: Cheyenne | State: WY | Zip: 82001

Public Meeting Date comments address: 09-17-2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Kaeci Daniels, Pam Temte, James Branscomb

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

Supply-Side Resources and the Plexos Model.

☐ 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.

Supply-Side Resources:

1) In the final 2021 IRP please include the Supply-Side Resource table from the 2019 IRP in the 2021 IRP for comparison.

PacifiCorp Response:

The supply-side resource table for the 2019 Integrated Resource Plan (IRP) is located in Vol 1, Chapter 6, pages 115-118 and is available on PacifiCorp's website here https://www.pacificorp.com/energy/integrated-resource-plan.html. In addition, PacifiCorp's public input meeting presentations discussing updates and changes to supply-side resources for the 2021 IRP relative to the 2019 IRP (and the 2019 renewable resource assessment used in the 2019 IRP) are available on its IRP webpage. The supply-side resource table is expected to also be located in Chapter 6 of the 2021 IRP however, PacifiCorp does not plan to include the prior 2019 IRP supply-side resource table in its 2021 IRP.

2) Please provide what type of costs are included in the capital costs, variable O&M, and demolition costs for each type of resource (wind, solar, battery, nuclear, gas, and CCUS) or provide the Burns and McDonald study which might have these costs laid out.

* Required fields

PacifiCorp Response:

The 2020 Renewable Resources Assessment which provides details of the costs for wind, solar, and energy storage is available at PacifiCorp's IRP website: https://www.pacificorp.com/energy/integrated-resource-plan/support.html. The costs for other resources will be based on a similar analysis where available.

3) Please incorporate CCUS technology in the Supply Side Resource table, and please provide the benefits CCUS technology provides for RMP/PacifiCorp, shareholders, and customers.

PacifiCorp Response:

Carbon Capture, Use and Sequestration (CCUS) is included in the Supply-Side Resource table for the 2021 Integrated Resource Plan and these costs and assumptions will be discussed at the November 16, 2020 public input meeting.

If a CCUS resource were selected by the model, the benefits of the CCUS resource for customers would be the lowest risk adjusted cost of electric power.

If the CCUS resource were owned by PacifiCorp then PacifiCorp and the shareholders would benefit from recovering the regulated return on the portion of the capital investment each of the public utility regulatory authorities determine are prudent and reasonable.

If the CCUS resource is owned by a third party then PacifiCorp and the shareholders would not benefit from the return on investment. Customers might or might not benefit from the financial arrangements associated with the transfer of carbon dioxide containing flue gas from PacifiCorp to the third party.

4) Please explain why there is such a drastic difference of capital, variable O&M, and demolition costs for standalone batteries versus batteries that are paired with renewables (solar or wind)?

PacifiCorp Response:

There was an error in the formula for the solar plus batteries resource options. The error has been corrected. Any difference in the wind plus solar option is due to benefits of combining the projects.

5) Do cost curves shown on Slide 11 of the presentation show phasing out of PTCs and ITCs?

PacifiCorp Response:

No. Tax credits such as the production tax credit (PTC) and investment tax credit (ITC) are not factored into the cost or operations and maintenance (O&M) estimates in the 2020 Renewable Resources Assessment. Those credits will be factored in during the modeling of scenarios.

Plexos Model:

1) Please provide a flow chart showing the modeling process:
   a) both a high-level and detailed flow chart,

   PacifiCorp Response:

   Please refer to the slide deck for the 2021 IRP October 22nd, 2020 Public Input meeting, slide 47, publicly available at:

   https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/PacifiCorp_2021_IRP_PIM_October_22_2020.pdf

   b) provide all assumptions and inputs that are being fed into the model, including, but not limited to:
      i. CO^2 pricing and Natural Gas assumptions

* Required fields

ii. Federal and State regulations

iii. coal retirement dates

iv. intermediary steps and inputs

v. etc.

PacifiCorp Response:

The Company is currently engaged in determining model inputs for the 2021 IRP. Coal retirement dates as a component of portfolio development will be an output of 2021 IRP modeling. The development of inputs is part of ongoing discussion in the 2021 IRP Public Input Meeting process.

c) is the model stochastic, deterministic, or both? Which iterations at what points in the model are stochastic or deterministic?

PacifiCorp Response:

Please refer to refer to the response to 1a, above. Plexos models can be run in both stochastic and deterministic configurations.

2) What entity or organization developed the Plexos model?

PacifiCorp Response:

Energy Exemplar.

3) Please provide an explanation as to why the Company switched models.

PacifiCorp Response:

The Planning and Risk (PaR) and the System Optimizer (SO) models were no longer able to meet the complex analysis needs of PacifiCorp's multistate system. In addition, the Plexos model has improved functionality that addresses concerns around granularity, reliability, endogenous transmission and plant retirement analysis. The new model simplifies issue around prior model alignment between SO and PaR and aggregation sampling, and allows for reserves and loss of load probability to be incorporated into expansion planning.

4) How did PacifiCorp acquire the funding for the Plexos model?

PacifiCorp Response:

PacifiCorp did not acquire funding for the model. The costs to license the model reflect standard operating costs.

5) Please describe the transparency of the calculations within the Plexos model in relation to the previous model, and will the general public or utility commissions be able to review the inner workings of the Plexos model?

PacifiCorp Response:

Similar to other third-party optimization models, the Plexos model is subject to third-party proprietary licensing conditions. That being said, PacifiCorp will continue to make available the inputs/outputs and reporting functions that support its modeling efforts.

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.

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

---

* Required fields

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

Thank you for participating.

* Required fields

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: 2020-09-29

*Name: Kaeci Daniels Title:

*E-mail: kaeci.daniels1@wyo.gov Phone: (307) 777 - 5701

*Organization: Wyoming Public Service Commission

Address: 2515 Warren Ave. Suite 300

City: Cheyenne State: WY Zip: 82002

Public Meeting Date comments address: 09-17-2020 ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Stand-alone model runs and sensitivity runs on preferred portfolio

☐ 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.

1. Please provide the following: A model run showing the PVRR with no early coal or gas retirements to compare the preferred portfolio (all other assumptions remaining the same).
2. A model run that assumes carbon capture on all Wyoming coal plants with assumptions of CCUS with zero capital costs (assuming third party pays capital costs) and the inclusion of 45Q tax credits retained by Company. How does PVRR change with zero emissions costs?
3. Rerun the IRP model without Washington Clean Energy Transformation Act (CETA) to compare against the preferred portfolio.
4. Implementation of SF0159 where the Company purchases coal generation at avoided cost for all Wyoming units past the retirement date. To model how new generation needs change when coal generation in Wyoming is purchased at the Company\u0019s avoided cost.
5. Various sensitivity analysis related to prolonged extreme weather events sensitivity ran on the preferred portfolio, such as: 3 days of record high temperatures and more A/C load, 3 days of record low temperatures with additional heating load, 15% reduction in solar generation due to cloudy weather paired with a 15% reduction in wind generation due to reduced wind.
6. A sensitivity analysis on the preferred portfolio showing a 5% restriction in gas supply and its effect on reliability.

* Required fields

7. A sensitivity analysis on how electrification affects load growth and the Company's ability to meet reliability standards when EVs adoption rates increase exponentially in 2023.

   PacifiCorp Response:

   PacifiCorp will consider these requests balanced with other stakeholder requests and time constraints.

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.

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

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

Thank you for participating.

* Required fields

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: 2020-09-30

*Name: Pam Temte | Title:

*E-mail: pam.temte@wyo.gov | Phone: (307) 777 - 5724

*Organization: Wyoming Public Service Commission

Address: 2515 Warren Avenue

City: Cheyenne | State: WY | Zip: 82002

Public Meeting Date comments address: 09-17-2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Business As Usual Case

☐ 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.

The Wyoming Public Service Commission will provide a document that presents its idea of a business as usual case.

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.

WPSC Proposed BAU Case: Carry forward Preferred Portfolio from the 2019 IRP and make updates as follows:

1. Make necessary updates due to regulatory changes that are now part of law or provisions that are going to be enacted at a future date. (45Q tax credit, ITC and PTCs, regional haze and mandatory scrubber installations, etc...)
2. No additional assumed early retirements, let all resources live out lives assumed in the previous IRP.
3. Exclude externalities that are not currently required by law to be evaluated; such as carbon pricing or social cost of carbon.

DSM

4. Update with the current IRP forecasted information.

Updated load forecast

5. If Needing Additional Capacity: Fill additional capacity needed with the least cost resource available, while making sure reliability requirements are still fulfilled.

* Required fields

6. If Load Forecast is less than previous Load Forecast: Keep all resources the same and reduce reliance on FOTs. \
7. Final Two Years of current IRP Planning Period: Hold constant and carry forward the last year of resources assumed in the previous IRP into the final two years of the current IRP planning period.

Customer Preferences

8. Keep the same customer preferences as in the previous IRP cycle\u0019s preferred portfolio.

FOTs

9. Keep the same amount of FOTs assumed in the previous preferred portfolio and hold constant and carry forward the final year of the previous IRP FOTs into the current IRPs final two years of its planning period.

PacifiCorp Response:

PacifiCorp will consider these requests and discuss details of a business as usual case or cases at an upcoming public input meeting.

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

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

Thank you for participating.

* Required fields

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: 2020-10-02

*Name: Sashwat Roy | Title: Dr.

*E-mail: sashwat@renewablenw.org | Phone: (972) 408 - 7813

*Organization: Renewable Northwest

Address: 421 SW 6th Ave, Suite 975

City: Portland | State: OR | Zip: 97204

Public Meeting Date comments address: 09-17-2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Supply-Side Resource Options and Portfolio Development

☐ 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.

Renewable Northwest appreciates the opportunity to provide feedback on PacifiCorp\u0019s 2021 IRP effort, in particular pertaining to the Public Input Meeting held on September 17 where staff covered supply-side resources, their costs and a general overview of the portfolio development process. We understand that the current cost data provided by PAC are preliminary and will be updated after further review with consultants developing their renewable cost and performance studies. With that said, we believe that providing an appropriate methodology on modeling costs of solar, wind, battery storage and hybrid resources is crucial to the initial outlay, subsequent portfolio modeling in PLEXOS and eventual selection of the preferred portfolio.

Overall, our comments address two focal points: Methodology for integrating demolition costs and salvage value in IRP. In the public input meeting, staff mentioned that the demolition costs for solar, wind, storage and hybrid projects do not account for residual or salvage value of the resources. In other words, salvage value for projects after contracted lifetime is assumed to be zero. The demolition costs for solar, wind and Li-ion battery storage systems were listed as $35, $12.5 and $255 per kW. Based on current trends in the renewable energy sector, project salvage values are non-zero and can be substantial based on the type of resource and its operational characteristics. It is also worth noting that balance-of-system (BoS) components of these power plants may remain in good condition and can be sold in the market or reused in other utility-scale projects. The concept of residual value is especially significant for build-transfer agreement (BTA) projects where the utility retains ownership of the resource and can generate significant revenues from selling energy in the market.

* Required fields

We suggest a serious consideration to leverage public or vendor data sources to enumerate this salvage or residual value. This value is a non-zero positive and would likely reduce the demolition costs of variable and hybrid resources as well as standalone battery storage installations. In fact, NREL has published a detailed report evaluating residual value of multiple generation technologies, with PV showing almost 10-20% decrease in LCOE when residual value is considered. There are also technical reports which suggest that decommissioning costs of solar PV systems can sometimes be negative -- i.e. the residual value is greater than the cost to decommission the power plant. This report also states that decommissioning costs of coal power plants are the highest with mean value of $117/kW. Figure 6 in this report shows the comparison between decommissioning costs of different technologies on a per MW basis. In the context of storage resources, the end-of-life market for Li-ion batteries is a nascent but rapidly growing industry. Discounting the value of recycling lithium, cobalt or metals from batteries ten years down the line would be inadvisable. A study shows that second-life values are estimated to reach $43/kWh in 2030. On staff\u0019s call for feedback on the mathematical treatment of demolition costs in their cost modeling, we believe that these costs should be amortized with a suitable weighted average cost of capital (WACC) over the entire lifecycle of power plant operation to appropriately reflect these costs in the IRP.

Finally, we encourage PacifiCorp to review its data sources such as recent projects/RFP bids and the permitting costs that may be included among general capital costs to ensure that demolition/decommissioning costs for renewable resources are not already accounted for in some other manner.

Portfolio Development with a \u001CBAU\u001D Case. Staff suggested \u001CBusiness As Usual\u001D (BAU) as one the cases under various natural gas and carbon price trajectories in the portfolio development process. Renewable NW understands that this case emerged from recommendations from recent proceedings in Wyoming PSC. We strongly encourage PAC to be careful in developing realistic assumptions for this scenario. A fair and realistic BAU scenario should ideally consider relevant state-policy objectives and depict the upcoming economic retirements of coal power plants, not because they are emission-heavy but because they are increasingly becoming uneconomical generation sources owing to their high variable cost of dispatch. This general trend has been proven in previous PAC IRP modeling efforts as well, most notably in the 2019 IRP proceedings. The BAU case must also consider recent developments this summer in California to redefine the ability to depend on short-term market purchases or front office transactions (FOTs) for energy or capacity needs, as well as potentially taking a hard look at the company\u0019s assumptions regarding the reliability benefits of gas units under high stress conditions. Apart from these two important considerations, BAU must also consider the growing scale of energy efficiency and demand response as seen from their CPA study. We hope that staff would initiate a robust stakeholder process to define these assumptions for the BAU case over the coming months.

The energy industry is a rapidly shifting one and renewable, demand response and hybrid resources are now techno-economically viable and are able to provide a wide-varying level of grid services. At the same time, state-policy goals such as CETA in Washington and Governor Brown\u0019s EO in Oregon suggest that states are increasingly moving towards decarbonization pathways for our energy economy. This is the new normal and we recommend that PacifiCorp ensure it is reflected in the BAU scenario.

PacifiCorp Response:

PacifiCorp will consider this request balanced with other stakeholder requests and time constraints.

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.

1) Estimating the Impact of Residual Value for Electricity Generation Plants on Capital Recovery, Levelized Cost of Energy, and Cost to Consumers. NREL. January 2020. https://www.nrel.gov/docs/fy19osti/72217.pdf 2) Decommissioning US Power Plants

* Required fields

Decisions, Costs, and Key Issues. Resources for the Future. https://media.rff.org/documents/RFF20Rpt20Decommissioning20Power20Plants.pdf 3) The lithium-ion battery end-of-life market \u0013 A baseline study. Global Battery Alliance - World Economic Forum. http://www3.weforum.org/docs/GBA_EOL_baseline_Circular_Energy_Storage.pdf

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

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

Thank you for participating.

* Required fields

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 10/2/2020

*Name:	Jim Woodward	Title:	**Regulatory Analyst**
*E-mail:	Jim.Woodward@utc.wa.gov	Phone:	(360) 664-1302
*Organization:	WA Utilities & Transportation Commission (WA-UTC)		
Address:	Click here to enter text.		
City:	Click here to enter text.	State:	Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: **9/17/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Supply-side resource & CETA clarification Qs; PLEXOS case & sensitivity recommendations; resource performance & cost data request.

☐ 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 as well as three (3) Excel workbooks.

Commission Staff Feedback for PacifiCorp 2021 IRP: Public Interest Meeting #3 (Sep 17, 2020)

This feedback, dated October 2, 2020, states the informal comments, questions, recommendations, and data requests 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.

This staff feedback document is divided into three parts: 1) questions & comments regarding PacifiCorp's September 17 PIM #3 presentation content (i.e., *this Word document*), 2) additional feedback per company request for IRP modeling case & sensitivity run input, and 3) electric resource cost & performance data request.

Company response by **October 21, 2020**, is appreciated for select questions and requests in **BOLD**. The requested company response milestone is one (1) day ahead of PacifiCorp's PIM #4 (i.e., October 22-23rd). Receiving responses

* Required fields

ahead of the company's next general public meeting would enable staff to better track the evolution of the company's 2021 IRP process and continue to offer value-add feedback.

I. Public Interest Meeting #3 (9/17) – Presentation questions & comments

1. Supply-side resources (SSR) background (slide 5) - **Did company reference regional efforts (e.g., NWPCC's Generating Resources Advisory Committee (GRAC) support for 2021 Power Plan) when developing this resource cost information for the 2021 IRP?**
    a. If not, staff recommends the **Pac IRP team at least review the GRAC's 2021 Power Plan Specific Information re: reference plants**. This action should confirm Pac's resource assumptions in its western service territory align with regional consensus.
    b. Should company have additional questions after reviewing the above GRAC data, staff is happy to facilitate introductions with relevant NWPCC staff (e.g., GRAC POC Gillian Charles).

PacifiCorp Response:

PacifiCorp had not reviewed the Northwest Power and Conservation Council (NWPCC) Generating Resources and Advisory Committee (GRAC)'s 2021 Power Plan Specific Information re: reference plants.

a) Upon review PacifiCorp finds the information supports PacifiCorp's resource assumptions.
b) PacifiCorp does not anticipate a need for further information from NWPCC staff at this time.

2. Resource performance & cost summaries (slides 8 – 13) – **Please see Sec III. Electric resource cost & performance staff data request to company**.

PacifiCorp Response:

a) Please see response in Section III.

3. Portfolio development & sensitivities (slides 17 – 19) – **Please see Sec II. Staff feedback re: PacifiCorp's request for IRP modeling case & sensitivity run input**

PacifiCorp Response:

a) Please see response in Section II.

4. WA CETA – 2025 elimination of coal-fired resources (slide 25)
    a. Staff wishes to clarify the action associated with "eliminat[ing] coal-fired resources from [a utility's] allocation of electricity," pursuant to RCW 19.405.030(1)(a) is the subject of the on-going joint IRP (UE-190698) & CEIP (UE-191023) rulemaking.
    b. Staff cautions the company's interpretation that elimination of coal-fired resources from its WA allocation of electricity by 12/31/2025 may not solely equate to removing "coal-fired resources [from WA] customer rates." RCW 19.405.020(1) defines "allocation of electricity" for the purposes of setting electricity rates. However, satisfying the no coal requirement by 12/31/2025 may require compliance action on behalf of PacifiCorp beyond traditional ratemaking.

PacifiCorp Response:

PacifiCorp would appreciate any additional information regarding Staff's reference to what may be considered or required "beyond traditional ratemaking," as well as an explanation of Staff's legal reasoning for its position.

PacifiCorp acknowledges that the joint IRP and CEIP rulemaking is ongoing, and the company will continue to address this issue within the rulemaking. Previously, the company's comments submitted on June 2, 2020 (in

response to question 7) and February 28, 2020 (in response to question 12) have provided recommendations regarding compliance with RCW 19.405.030(1)(a).

Please also see PacifiCorp's response to question 10, part a, of the feedback form sent by Washington Utilities and Transportation Commission Staff on August 7, 2020 in response to the July 30-31 IRP Public Input Meeting:

"PacifiCorp disagrees with Staff's legal interpretation. Please see RCW 19.405.020, Definitions.

(1) 'Allocation of electricity' means, for the purposes of setting electricity rates, the costs and benefits associated with the resources used to provide electricity to an electric utility's retail electricity consumers that are located in this state.".

5. CETA long-term planning (slide 27)
    a. Staff appreciates PacifiCorp's awareness that discussion around equitable distribution of benefits will inform the company's 2022 CEIP (*upper right box on slide*).
    b. However, staff wishes to remind the company that **pursuant to RCW 19.405.040(8), PacifiCorp's 2021 IRP preferred portfolio needs to similarly address the equitable distribution of benefits**.
    c. Staff expects **future Pac 2021 IRP PIMs during Fall 2020 to facilitate the necessary equity discussions amongst stakeholders**.

    PacifiCorp Response:

    PacifiCorp will consider equitable distribution of benefits within its long-term planning processes as identified in the statute and subsequent rules.

6. CETA next steps (slide 29) – In addition to the planning activities listed, staff reminds the company the **filing date for PacifiCorp's 2021 draft IRP is 1/4/2021 per paragraph 26 of Order 03 (UE-180259)**.

    PacifiCorp Response:

    PacifiCorp appreciates the ongoing collaboration with Staff regarding the upcoming draft Integrated Resource Plan (IRP), and the Company continues to work toward the January 4, 2021 deliverable date.

II. Staff feedback re: PacifiCorp's request for IRP modeling case & sensitivity run input

Please reference the two (2) accompanying Excel workbooks:

- **Cases & Sensitivities_Pac 21 IRP_OR & WA staff feedback_20201002**
- **Cases & Sensitivities_Pac 21 IRP_addl WA CETA req_20201002**

As follow up to the company's request made to stakeholders during PIM #3, the first workbook includes joint recommendations developed in collaboration with Oregon PUC staff (POC: Rose Anderson) while the second workbook contains additional WA-specific recommendations intended to help the Pac IRP team's PLEXOS modeling comply with CETA. Two tabs comprise each workbook:

1. Case scenario recommendations
2. Sensitivity recommendations

Unless otherwise specified, the suggested case & sensitivity runs in these files are CETA compliant having the following common attributes:

- Applies 2.5% social cost of carbon (SCC) as a cost adder,

- Accounts for upstream natural gas GHG emissions, and
- Reflects renewable energy generation serving WA load to meet the 2030 GHG neutral standard and 2045 100% clean standard.

As part of its response to this feedback, **staff request the Pac IRP team indicate what recommended cases & sensitivities they are adopting and provide rationale for which runs they choose to exclude**.

PacifiCorp Response:

PacifiCorp will consider this request balanced with other stakeholder requests and time constraints.

III. 2021 IRP electric resource cost & performance data request

Now that the Pac IRP team has shared with stakeholders its proposed supply-side resources for use in the 2021 IRP, staff request the company update and/or populate the GREEN highlighted cells within the "2021 IRP" tab in the accompanying **Resource Cost & Performance Comparison_WA staff DR** Excel workbook. The Pac IRP team may recall this is a standard data request (DR) WA staff ask of the company during each IRP cycle. For reference, I have included PacifiCorp IRP values submitted during the 2019 IRP progress report and 2017 IRP cycles (*please see 2019 and 2017 reference tabs within workbook, respectively*).

To help the Pac IRP team prioritize work load, staff do not need this data request completed by the requested date for a company response to this PIM #3 feedback (i.e., 10/21/20). However, as part of the company response, **please indicate when the team can provide this requested resource cost & performance comparison data**.

PacifiCorp Response:

PacifiCorp will present its final supply-side resources table at the October 22, 2020 public-input meeting.

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.

Please see accompanying three (3) Excel workbooks.

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

NA.

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

Thank you for participating.

* Required fields

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: 2020-10-04

*Name: Derek Klingeman | Title: Associate

*E-mail: derek.klingeman@cadmusgroup.com | Phone: (303) 389 - 2490

*Organization: Cadmus Group

Address: 2490 Junction Place Ste #400

City: Boulder | State: CO | Zip: 80301

Public Meeting Date comments address: _____ ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: _____

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

Conservation supply curves

☐ 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.

I am just requesting the conservation supply curves that were generated in support of the IRP. I am ideally looking for hourly load profiles for end-uses where conservation measures are targeted. Thank you for your assistance.

PacifiCorp Response:

Please see the draft supply curves posted on PacifiCorp's Integrated Resource Plan webpage for the 2021 Integrated Resource Plan support and studies located at the following location:
https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2021-irp/2021-irp-support-and-studies/PacifiCorp_2021_CPA_Draft_Energy_Efficiency_Measure_Results.xlsx

The final supply curves will be posted once complete in late October or November.

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.

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

* Required fields

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

Thank you for participating.

* Required fields

PacifiCorp - Stakeholder Feedback Form

2019 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 2019 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 10/9/2020

*Name: Justin Brant Title: Senior Associate

*E-mail: jbrant@swenergy.org Phone: 303-447-0078x2

*Organization: SWEEP/Utah Clean Energy

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: Click here to enter date. ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

CPA

☐ 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.

In 2019, Rocky Mountain Power achieved 10,223 MWh in savings on HVAC measures in existing residential buildings at a levelized cost of $77/MWh. I classified measures in the CPA that are rebated through the RMP program in this category. The CPA reports a Technically Achievable Potential of approximately 4,200 MWh in 2022 with an average LCOE of $334/MWh. To bring CPA result in line program performance, at a minimum I suggest PacifiCorp makes the following changes to CPA assumptions:

- Increase incremental savings per unit for Central AC, as the efficient measure definition is a unit with a SEER of 14. Currently the RMP programs requires a minimum SEER of 15 to qualify for a rebate, and has tiered rebates that increase with increased efficiency
- Assess incremental savings from heat pump measures, as most units on the market are well above a SEER of 15
- Move to a faster ramp rate for Central AC measures, as this is already a mature market
- Assess incremental cost assumptions to bring assumed costs in line with actual program performance

In 2019, Rocky Mountain Power achieved savings on residential building shell measures in existing buildings with a levelized cost of $48/MWh. I classified measures in the CPA that are rebated through the RMP program in this category. The CPA reports a Technically Achievable Potential of approximately 6,700 MWh in 2022 with an average LCOE of $442.

* Required fields

To bring CPA result in line program performance, at a minimum I suggest PacifiCorp makes the following changes to CPA assumptions:

- Assess incremental cost assumptions to bring assumed costs in line with actual program performance

In 2019, Rocky Mountain Power achieved 36,215 MWh in savings on residential lighting measures in existing buildings at a levelized cost of $16/MWh. I classified measures in the CPA that are rebated through the RMP program in this category. The CPA reports a Technically Achievable Potential of approximately 48,409 MWh in 2022 with an average LCOE of $40. To bring CPA result in line program performance, at a minimum I suggest PacifiCorp makes the following changes to CPA assumptions:

- Assess incremental cost assumptions to bring assumed costs in line with actual program performance
- Update assumptions around Residential LED Saturation presented at the August 28 stakeholder meeting. PacifiCorp is assuming an LED saturation of 45%, with an additional 25% CFL saturation for Utah, leading to an assumption that 70% of residential sockets currently have efficient bulbs. This result is out of line with similar studies in other states. For example, the recently published NEEA Residential Building Stock Assessment found that less than 25% of sockets had LEDs. Similarly, the 2019 New York Residential Building Stock Assessment found that 52% of residential sockets had CFLs or LEDs. At the highest level reported, Massachusetts reported that in 2019 34% of sockets had LEDS and 57% contained LEDs or CFLs. Massachusetts continues to run some of the most aggressive energy efficiency programs in the country, being ranked 1st or 2nd in the ACEEE state energy efficiency scorecard. It is unreasonable to assume that RMP's service territory in Utah would have a significantly higher penetration of efficient bulbs than in Massachusetts. We suggest that PacifiCorp reassess this assumption to one where no more than 25% of residential sockets have LEDs and no more than 50% of residential sockets have efficient bulbs to bring assumptions in line with rigorous studies around the nation.

In 2019, Rocky Mountain Power achieved 27,143 MWh in savings on non-residential HVAC measures at a levelized cost of $33/MWh. I classified measures in the CPA that are rebated through the RMP program in this category. The CPA reports a Technically Achievable Potential of approximately 28,000 MWh in 2022 with an average LCOE of $140. To bring CPA result in line program performance, at a minimum I suggest PacifiCorp makes the following changes to CPA assumptions:

- Move to faster ramp rates for Commercial HVAC equipment that is already mature such as air-cooled chillers, water cooled chillers, RTUs, Packaged Heat Pumps, and Packaged ACs
- Access the incremental savings per unit given the efficient unit definition is at the low end of efficiency available in the market for some measures.
- Assess incremental cost assumptions to bring assumed costs in line with actual program performance

In commercial lighting the potential from networked lighting controls appears to be limited to facilities that currently have lighting controls. This measure can be used in a retrofit application. Suggestions for this measure include:

- Increase applicability of this measure to all commercial office and retail
- Increase the ramp rate consistent with DOE's networked lighting control program goals to achieve networked control of 30% of the building stock by 2035
- Increase incremental savings from networked lighting controls to 49% of lighting energy consumption consistent with DesignLights estimate
- Costs for networked lighting are expected to decrease over time as this emerging product gains traction. Consider reducing incremental costs for this measure in 2025 and beyond as the market matures.

In 2019, Rocky Mountain Power achieved 39,983 MWh in savings on Energy Management measures at a levelized cost of $36/MWh. However, the CPA reports a Technically Achievable Potential of approximately 35,000 MWh in 2022 with an average LCOE of approximately $50/MWh. To bring CPA result in line program performance, at a minimum I suggest PacifiCorp makes the following changes to CPA assumptions:

- Move to faster ramp rates for SEM, Retrocommission, and Commissioning measures to make potential consistent with program performance
- Assess incremental cost assumptions to bring assumed costs in line with actual program performance

PacifiCorp Response:

Thank you for your detailed suggestions and input. It would be helpful to see the work papers underlying the analysis stated in the recommendations. It is important to note that the CPA is designed to provide a guide of the long-term efficiency resource to inform near-term program planning but not to exactly portray what will be acquired in the very short term. That being said, feedback provided in state-specific stakeholder working groups on near-term program achievement and experiences is also considered in development of the CPA.

Overall, the high LCOE pulled by measure categories include those measures which may be technically achievable but may not be selected as an economic resource. Savings from the technical achievable potential reflect current information on expected measure savings, and, to these extent they are being compared to historical achievements, should be compared to adjusted gross savings, not to gross savings. It appears that the MWh values noted in the feedback form are gross savings, which may explain much of the discrepancy. In addition, remaining savings opportunities in 2022 may be less in many categories as over time, more of the potential is acquired. In other words, the amount of savings in 2019 per measure category may no longer be available three years in the future. For many measure categories, savings opportunities decline over time as more savings are achieved and as efficient technologies become standard. Similarly, costs may increase over time as lower-cost measures are adopted. As the energy efficiency market is dynamic due to code and standards changes, technology improvements, customer behavior and economics, the CPA is a long-term planning tool to represent the resource of efficiency overall within the context of long-term resource decisions across the system.

Examples of how the principles noted above can be applied to answer the questions raised are below:

Regarding residential HVAC measures, the 2019 savings referenced are the unadjusted gross savings. In the annual report, a 52% realization rate is applied, so the adjusted gross savings are roughly half this value. The potential study uses updated data on measure savings, and therefore would be more in line with the adjusted savings and more reflective of the savings that could be realized in 2022. For residential building measures, the high LCOE reflects the inclusion of measures that are technically achievable but not economically achievable and therefore are not reflected in actual program results.

Recent RMP customer survey data was used to inform the residential lighting baseline. Comparing to the market baseline data from 2016/2017 used in the RBSA does not account for the major growth in customer adoption of efficient lighting in the past four years. Actual customer data was chosen as more reflective of the service territory.

Data Support

NEEA RBSA (Source for Residential LED Saturation): https://neea.org/img/uploads/Residential-Building-Stock-Assessment-II-Single-Family-Homes-Report-2016-2017.pdf

New York RBSA (Source for Residential LED Saturation): https://www.nyserda.ny.gov/About/Publications/Building-Stock-and-Potential-Studies/Residential-Building-Stock-Assessment

* Required fields

Massachusetts Residential Lighting Assessment (Source for Residential LED Saturation): http://ma-eeac.org/wordpress/wp-content/uploads/RLPNC_1810_LtgMarketAssessment_FINAL_2019.03.29.pdf

DesignLights Energy Savings Estimates for Networked Lighting Controls: https://www.designlights.org/lighting-controls/reports-tools-resources/energy-savings-from-networked-lighting-controls-with-without-LLLC/report/

DOE Solid State Lighting Forecast: Source for forecast of lighting control penetration: https://www.energy.gov/sites/prod/files/2019/12/f69/2019_ssl-energy-savings-forecast.pdf

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.
Click here to enter text.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

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 10/16/2020

*Name: Rose Anderson Title: **Economist**

*E-mail: Rose.anderson@state.or.us Phone: Click here to enter text.

*Organization: Oregon Public Utility Commission

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: **8/28/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
August CPA Presentation

☐ 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.

1. Other utilities in Oregon, California, and even Oklahoma have been using connected thermostats with central cooling and heating DR programs, capturing both energy efficiency and DR savings from this increasingly common household and business appliance. DLC Smart thermostats were among the most cost-effective demand response technologies, with the most technical potential in Oregon in the 2019 CPA. Can PAC share why such programs have not been proposed as pilots, especially in PACW given PACs reliance on FOTs as a capacity product? Are there any constraints PAC is facing that inhibit the company from researching and proposing pilot DSM offerings using this well-established technology?

   PacifiCorp Response:
   DLC DR programs in PACW have not been identified as cost-effective resources for our customers through our long-term planning process until 2029. The company operates over 400 MW of DR in Rocky Mountain Power today as cost-effective resource and continues to update planning models with the best known information about the costs and performance of these resources. When resources are determined to be cost-effective for the system and our customers the company will pursue them. PacifiCorp is planning to issue an RFP for DR in Oregon and Washington in January 2021 to determine if there are cost effective program options to acquire in the near term.

2. In order to help states understand their CPA results, it would be helpful to see a table of cumulative potential, by end use, by state, by sector (residential/commercial/industrial.)

* Required fields

PacifiCorp Response:
This breakdown of detail will be provided and posted to the website for all states except Oregon where Energy Trust of Oregon performs the potential assessment and provides bundles of resources to the PacifiCorp IRP model.

3. Staff recommends that in the future the diagram on page 5 should include levelized costs as an output and include the 'bundling' step before the costs are input into the IRP models.

   PacifiCorp Response:
   We will take this suggestion into consideration for future presentations.

4. Does the Oregon CPA analysis take into account rapidly rising building code, per Executive Order 20-04?

   PacifiCorp Response:
   As Executive Order 20-04 was effective in spring 2020 and the Commission is currently developing its draft work plans to address the Executive Order, the potential impacts have not been included for the 2021 IRP CPA.

5. Why was the "large project adder" removed from the projection for OR (pg. 33)?

   PacifiCorp Response:
   The large project adder methodology used in the last CPA cycle was not used for this cycle due to the inclusion of specific custom large project savings in the short term targets complicating the concept of creating an average placeholder for potential yet unspecified future opportunities. The CPA is designed to be a long term representation of typical savings opportunities. Custom, large opportunities are not well represented in the study process but will continue to be considered within short term program planning opportunities in addition to IRP resource selections.

6. Please provide the reasoning for using a 5 year amortization period for demand response? See Page 48 of August presentation. Please include answers to the following:

   a. In what way does the 5-year amortization period align with current procurement practices?

      PacifiCorp Response:
      The five-year amortization period aligns with current procurement practices as five years is considered to be a reasonable length of time to ramp demand response programs yet minimize risk of technical obsolescence.

   b. Is any DR infrastructure expected to be used and useful to PacifiCorp after five years?

      PacifiCorp Response:
      Five years is a reasonable estimate for the useful life of rapidly advancing technologies and also aligns with the assumptions for contracting.

   c. Is the DRMS cost amortized over five years, and if so is that amortization timeframe consistent with the expected lifetime of that equipment? If it's not consistent with the lifetime of that equipment, please explain why its use is acceptable for those costs.

      PacifiCorp Response:
      For modeling considerations, fixed set up costs that may be incurred in early years are spread over the life of the contract. DRMS costs are assumed to be for vendor supplied software and platforms enabling utility control of the end use devices.

7. Please provide an explanation of why Pacific Power states will use the TRC test for demand response, while Rocky Mountain Power states use the UCT? (See page 48.)

* Required fields

PacifiCorp Response:
The assumption to use TRC for Pacific Power states and UCT for Rocky Mountain Power states is aligned with state guidance for energy efficiency benefit/cost tests.

8. Please list and describe each of the inputs from the CPA that will go into the PLEXOS model for:
    a. Efficiency resources, and

    PacifiCorp Response:
    Technical achievable measures from the CPA will be grouped into bundles as determined through the ongoing energy efficiency bundling analysis process for each state and are then provided as an input to IRP modeling. Measure bundles are characterized as 20 years of hourly savings impacts in megawatt. Each bundle is assigned a levelized cost.

    b. Demand response resources

    PacifiCorp Response:
    Technical achievable demand response measures from the CPA are expected to be grouped into state-specific program bundles as described on slide 28 of the October 22, 2020, public input meeting presentation. As Plexos is a new model, we are still determining how the available demand impacts and grid services of DR measures will be input to the model.

9. Will there be a 'participant cost' for customer-sited battery energy storage demand response? (See page 45.) If so, please provide the cost that will be used and the reasoning for selecting it.

    PacifiCorp Response:
    The customer sited battery energy storage measure will be modeled as "bring your own battery" program and so no participation costs will be assumed.

10. Will PacifiCorp model the use of customer-sited storage devices including batteries and water heaters to increase load to absorb excess RE generation as an alternative to curtailment of RE generation?

    PacifiCorp Response:
    The model is not designed to specifically link distributed storage dispatch with renewable generation.

11. Slide 49 says in previous studies some costs have been shared across states. Will that cost sharing occur in the 2021 CPA? Why or why not?

    PacifiCorp Response:
    Costs that will be shared are administrative support costs where, for example the same FTE is able to manage the same program across multiple states.

12. DRMS costs haven't been included in the CPA in the past (Slide 49.) Will they be included in the 2021 CPA? Why or why not?

    PacifiCorp Response:
    DRMS costs specific to each DR program will be included as ongoing O&M costs as the study assumes that DRMS is a vendor supplied solution to integration of dispatch of the specific resource. Utility wide investments in a system side DERMs solutions will not be included as the company has no definitive plans to invest in such a system at this time.

13. The August presentation says on slide 61 that "The assumption in RMP states is that potential for central cooling and heating would be captured through switches, not connected thermostats." Please provide more description of 'switches' and how they differ from connected thermostats.

    PacifiCorp Response:

* Required fields

The Coolkeeper program in Utah controls residential and small commercial central air conditioners through switches installed on each unit. The incremental cost to add new participants by installing switches on their equipment is low and therefore the most cost-effective approach for this market segment for RMP is to continue adding switches to air conditioners and potentially heat pumps going forward versus expanding to a new control approach over wi-fi for smart connected thermostats.

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.
Click here to enter text.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

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 10/19/2020

*Name: Richard Keller Title: Click here to enter text.

*E-mail: Rick.Keller@puc.idaho.gov Phone: (208) 334-0348

*Organization: Idaho Public Utilities Commission

Address: Click here to enter text.

City: Click here to enter text. State: **ID** Zip: Click here to enter text.

Public Meeting Date comments address: **10/22/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Modeling Assumptions / Plexos Update

☐ 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 explain the Company\u0019s approach to validating the new Plexos optimization simulation model used in the 2021 Integrated Resource Plan. Please provide the methodology, guidelines, and/or procedures specifically used by the Company to validate the model to ensure it represents actual system operation. In addition, please answer the following: a) Will the Company validate modeled system performance results against actual system performance results? If not, why not? b) If so, please provide evidence illustrating that actual system performance results are comparable to Plexos modeled results.

PacifiCorp Response:
The Company is performing a benchmark test of Plexos against the 2019 IRP preferred portfolio. Given a similar use of optimization math, it is reasonable to anticipate that that the benchmark result from the Plexos model will yield similar results given similar inputs, with variances ascribed to differences in modeling functions employed by each tool. The IRP team is working closely with Energy Exemplar, the Plexos vendor, on technical aspects of this benchmarking effort. The benchmarking effort was discussed at the October 22, 2020, public input meeting for the 2021 IRP, including discussion of set-ups, the initial L&R and progress on benchmark runs. The benchmark run result will be discussed at the upcoming November 16, 2020, public input meeting. Validation of the inputs and outputs of the Plexos model is conducted as it has been historically as part of IRP quality control practices. Please note that IRP modeling is not benchmarked against actual operations as the model is based on proxy resource selections and forecast data to assess potential futures under a variety of scenarios.

* Required fields

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.
Click here to enter text.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

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 10/19/2020

*Name:	Lindsay Beebe	Title:	**Ms.**
*E-mail:	Lindsay.beebe@sierraclub.org	Phone:	(860) 490-7828
*Organization:	The Sierra Club		
Address:	340 E. Garfield Ave.		
City:	**Salt Lake City** State: **UT**	Zip:	**84115**

Public Meeting Date comments address: **9/17/2020** ☒ Check here if not related to specific meeting

List additional organization attendees at cited meeting: **Ed Burgess, eburgess@strategen.com**

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Resources Assumptions, Market Reliance, Coal Operations, Carbon Price, Load Forecast and DSM

☐ 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.

Resource Assumptions

1. Refer to slide 8 from the September 17, 2020 Public Input Meeting.
   a. Please explain the rationale for the "50% pwr, 4 hours" battery configuration.

PacifiCorp Response:

The options included in the assessment are intended to provide screening level comparisons between different technology options to determine which options merit further development and a more detailed analysis. The information provided in the assessment does not represent the only options available for PacifiCorp to consider for planning purposes. In order to provide a representative configuration for energy storage co-located with a renewable generating facility, the system was sized at 50 percent of the maximum capacity of the renewable asset with a four-hour duration. This duration is based on Burns & McDonnell's experience modeling the performance of energy storage systems in areas of high renewable penetration and paired with renewable energy sources. In these cases, this duration tended to have more attractive levelized costs of energy to the grid when including system inefficiencies across different methods of system control. Levelized costs of electricity, however, will vary significantly depending on project location, execution strategy, and renewable resource to name a few considerations. Accordingly, if a battery energy storage system (BESS) appears to merit further development, it should be pursued following this assessment with greater site and project specificity. The AC charging and discharging capacity of the battery also depends on project considerations including the interconnection type, BESS use case, and range in local energy prices. Without any warranted further detail into any of these factors at this level of study, a 50 percent capacity could allow for less curtailed energy or greater arbitrage potential than other capacities and is expected to serve as an appropriate screening point for planning purposes.

* Required fields

b. Would PacifiCorp consider including other battery configurations in the model including "50% pwr, 3 hours" and "50% pwr, 2 hours"?

PacifiCorp Response:
PacifiCorp does not believe modeling a variety of storage duration options paired with renewables in the 2021 IRP will provide incremental benefits that would justify the increase in complexity. In addition, given the high level of renewable and storage penetration in the 2019 IRP and assuming similar levels are identified in the 2021 IRP portfolio development, the benefits of shorter duration storage options would be diminished, which would also indicate that modeling those options is less justified.

c. During the meeting PacifiCorp mentioned a solar inverter loading ratio of 1.3. Please explain whether this is also used for solar plus storage resources. Please explain the rationale for this ratio.

PacifiCorp Response:
Yes, an Inverter Loading Ratio (ILR) of 1.3 is assumed for all solar options, which is within a range of typical utility system designs. Depending on the application and requirements for firmer solar generation, ILR values commonly range from just greater than 1 to 1.4. This value also depends on expected interconnection type, AC capacity ratio between the PV facility to the interconnection limit, and potential use cases when paired with an energy storage system. A larger ILR value will typically yield greater capacity factors at greater overall cost of installation of the PV facility to install greater DC capacity.

2. Refer to slide 13
   a. Please explain the source for the Base Capital, Var O&M, and Fixed O&M values listed.

PacifiCorp Response:
The Base Capital, Var O&M and Fixed O&M values were provided by Black & Veatch. PacifiCorp provided owner's costs.

Market Reliance

1. Please explain what types of transactions are considered under the category of Market Reliance

PacifiCorp Response:
Consistent with the 2019 IRP, the 2021 IRP modeling assumes a limit to short-term firm front office transactions, which are available in capacity expansion portfolio planning to meet capacity needs.

2. Please provide an overview of the typical delivery points for market purchases and sales for the PacifiCorp system and any associated transmission costs.

PacifiCorp Response:
PacifiCorp's typical delivery points are Four-corners, Mona, Palo Verde, COB, NOB and MidC. For transmission costs, please refer to PacifiCorp's OATT transmission rates for long-term firm point-to-point transmission. Consistent with prior IRP cycles, 2021 IRP modeling does not include transmission costs related to market purchases and sales.

3. Please explain what analysis PacifiCorp has done or plans to do to assess the overall supply and availability of market resources over time.

PacifiCorp Response:
Please refer to the analysis performed by PacifiCorp to assess the overall supply and availability of market liquidity, provided at the 2021 IRP September 17, 2020, and October 22, 2020, Public Input Meetings.

4. Does PacifiCorp have a predetermined threshold for the amount of market purchases that can be included as resources in its final plan?

PacifiCorp Response:
Please refer to materials provided at the 2021 IRP October 22, 2020, Public Input Meeting, specifically on slide 43.

* Required fields

Coal Operations

1. Please describe any constraints PacifiCorp intends to apply to the operation of its coal units, including Must Run or Minimum Burn.

   PacifiCorp Response:
   The Company intends to apply ramp rates, minimum and maximum capacity, heat rates, planned maintenance, forced outages, minimum fuel requirements, minimum up and down times, economic dispatch, CO_2 price, and plant wide emission caps.

2. Would PacifiCorp consider including a sensitivity analysis that includes all of the following 3 scenarios:

   a. Coal plants with must run or minimum burn constraints
   b. Coal plants with seasonal must run or minimum burn constraints
   c. Coal plants no must run or minimum burn constraints

   PacifiCorp Response:
   The Company is willing to consider these sensitivity recommendations balanced with other stakeholder requests, modeling capabilities and time constraints.

3. Would PacifiCorp consider including a model run that specified all coal units to be retired by a certain date? (e.g. 2030)

   PacifiCorp Response:
   The Company would consider running such a case Balanced with other stakeholder requests, modeling capabilities and time constraints.

4. Will PacifiCorp's model reflect any parameters intended to reflect provisions in existing or future coal supply agreements (e.g. minimum take obligations)?

   PacifiCorp Response:
   Yes, fuel supply agreements are considered in the development of IRP model inputs and coal supply analysis.

Carbon Price

1. Refer to slide 18 from the September 17, 2020 Public Input Meeting. Please explain what CO2 price will be included (if any) in each of the four scenarios and the rationale for each of these.

   PacifiCorp Response:
   CO_2 assumptions for the 2021 IRP will be discussed at the November 16, 2020, Public Input Meeting.

2. Would PacifiCorp be open to considering a carbon price that was applied to load served in some but not all of its jurisdictions?

   PacifiCorp Response:
   The Company is willing to consider this sensitivity balanced with other stakeholder requests, modeling capabilities and time constraints.

Load Forecast and DSM

1. Refer to slide 4 from the July 30-31, 2020 Public Input Meeting
   a. Please confirm whether PacifiCorp's load forecast reflects rollbacks of federal codes and standards

   PacifiCorp Response:
   Yes, the load forecast currently informing the 2021 IRP reflects the rollback of federal codes and standards for Phase 2 of the Energy Independence and Security Act.

2. Refer to slides 5 and 6. Please provide the "system energy load forecast" and "system peak load forecast" both with and without the rollbacks described above. Please provide the underlying data.

* Required fields

PacifiCorp Response:
PacifiCorp has not performed the requested analysis.

3. Please describe how the rollbacks described above were factored into PacifiCorp's Conservation Potential Assessment (CPA). If they were not factored in please explain why PacifiCorp did not include a corresponding increase in achievable potential.

PacifiCorp Response:
The CPA assumptions for residential lighting standards and baseline were provided during the August 28, 2020, CPA workshop. As shown on slide 11 from that workshop, The CPA assumes a rollback of the second phase of EISA in all states except California and Washington, where those standards remain in state law. As noted on that same slide, remaining potential is relative to state-specific baseline assumptions, which may be more efficient than the second phase of EISA standards (e.g., California 100% LED).

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.
LINK TO COMMENTS IN GOOGLE DOC:
https://docs.google.com/document/d/1og1UVwAObnp6sTfLVMFPzvjxZtajq6yfOtKIce7f5S0/edit?usp=sharing

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated. This form does not allow for comments to be edited with rich content, like links or bullets, or for document upload. Consider expanding input methods.

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

Thank you for participating.

* Required fields

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: 10/24/2020

*Name: Shannon Anderson | Title: Click here to enter text.

*E-mail: sanderson@powderriverbasin.org | Phone: Click here to enter text.

*Organization: Powder River Basin Resource Council

Address: 934 N. Main St.

City: Sheridan | State: WY | Zip: 82801

Public Meeting Date comments address: 10/22/2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

Portfolio development

☐ 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.

As a follow-up to the discussion on regional haze, the company should provide disclosure at the next IRP meeting how the second phase of regional haze planning will be modeled in the 2021 IRP. Specifically, since the company has represented the proposed early retirement dates of some coal units to WY DEQ as justification for not conducting a 4-factor analysis in the second planning period, will the company consider the early retirements as a compliance option for regional haze? How will the company's representations to WY DEQ be incorporated in the 2021 IRP analysis? What is the "benchmark" or "base" case for regional haze?

PacifiCorp Response:

Further discussion on regional haze and portfolio development will be provided at the November 16, 2020 Public Input Meeting.

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.

http://deq.wyoming.gov/aqd/regional-haze/

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

The company should consider early retirement of certain coal units as a compliance requirement for regional haze as part of portfolio development.

---

* Required fields

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

Thank you for participating.

* Required fields

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: 10/24/2020

*Name: Shannon Anderson
Title: Click here to enter text.
*E-mail: sanderson@powderriverbasin.org
Phone: Click here to enter text.
*Organization: Powder River Basin Resource Council
Address: 934 N. Main St.
City: Sheridan
State: WY
Zip: 82801
Public Meeting Date comments address: Click here to enter date. ☐ Check here if not related to specific meeting
List additional organization attendees at cited meeting: Click here to enter text.

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

☐ 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.
In testimony to the Wyoming Public Service Commission on the 2019 IRP our organization provided information about the value of water rights at the Naughton and Bridger power plants. We would like a response from the company on how they will incorporate risk, cost, and benefits regarding water use and water rights in the 2021 IRP for both coal plants planned to be early retired and those planning to run longer.

PacifiCorp Response:

The water rights for both the Naughton and Bridger Power Plants are tied to the continued operation of the plants and beneficial use of the water. PacifiCorp considers the benefits, costs and risks associated with water rights for each plant based on current and future operating plans. PacifiCorp closely monitors and documents its water use, and evaluation and future planning to ensure adequate water and backup sources are available for each plant are part of standard operation and maintenance procedures. The water needs of the respective Naughton and Jim Bridger power plants have been met even in extended drought years that have occurred during the power plants' history of operations. PacifiCorp does not foresee any immediate or near-term risk to the power plants' water supply needs while the respective generation plants continue to operate.

The water rights owned by PacifiCorp will remain in good standing for a period of time after the power plants retire and stop using the water rights. PacifiCorp is evaluating options to lease, transfer, sell or otherwise use its existing water rights if the power plants no longer require them. If leases, transfers, sales or other uses are not possible after a power plant retires, then the water rights will likely expire in approximately three years after they cease to be beneficially used.

* Required fields

PacifiCorp has historically not included costs, risks and benefits associated with water rights at plants in the IRP due to their speculative nature. Consistent with past IRPs, the Company does not plan to consider these rights in the 2021 IRP.

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.
https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/rising-water-stress-risk-threatens-us-coal-plants-largely-clustered-in-5-states-60670594

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
The company should value the amount of water rights that will be made available upon retirement of the various coal units as a benefit to coal plant retirement. Additionally, the company should estimate the risk of climate change and regional drought in terms of water use at its coal plants. Both the cost/risk and benefits related to water use and availability should be inputs in the 2021 IRP.

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

Thank you for participating.

* Required fields

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: 10/26/2020

*Name: Mark Touranangeau | Title: Director

*E-mail: mtourangeau@ableridenergy.com | Phone: (801) 678 - 9346

*Organization: Able Grid Energy Solutions

Address: 12675 N Mud Springs Cir

City: Kamas | State: UT | Zip: 84036

Public Meeting Date comments address: 10/22/2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: None

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

1. Performance Cost Summary 2. Plexos Benchmark Studies 3. Supply Side Resources - Energy Storage

☐ 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 the attached Word document titled "AGES PAC IRP Stakeholder Feedback_10-26-2020.docx"

1. Performance Cost Summary: Li-ion battery costs and related information

The costs presented in the Performance and Cost Summary tables for utility scale Li-Ion batteries are not reflective of current greenfield development costs. There is publicly available data that shows the costs for recently transacted utility scale (in front of the meter) projects throughout WECC that are generally below the Base Capital shown for a 50 MW four-hour duration BESS. These costs, specifically the initial capital costs, when normalized to this size and duration, are typically lower than what's presented in the table.

The attached file titled "Market data pricing points.xlsx" has pricing and related data for projects in NM and NV that are available through their Public Service Commission's websites, under dockets from PNM and NV Energy respectively, where both utilities have sought/are seeking approval for these projects from their Commissions.

Also attached is the Lazard Levelized Cost of Storage Analysis – Version 6.0. This annual analysis of the levelized cost of different storage technologies and applications was released on October 19, 2020. Along with Lazard's Levelized Cost of Energy Report, this report has become one of the industry's most relied upon sources of recent market and OEM data on the cost of deploying storage resources.

* Required fields

On page 15 in the Appendix of the Storage report, there is a breakdown of the initial and ongoing costs of Li-ion storage. Notable, Lazard lists the initial capital costs of a 100MW/400MWh system as $73-$140 MM, or $730-$1,400/kW. This compares to PacifiCorp's estimates for a 50MW/200MWh at $1,828/kW. While some economies of scale are realized on the balance of plant costs going from 50MW/200MWh to 100MW/400MWh, this cannot explain the total difference in costs between Lazard's and PacifiCorp's estimates on a $/kW basis.

Able Grid's goal in bringing this publicly available information to PacifiCorp's attention is to ensure PacifiCorp uses the most accurate, up to date initial and ongoing costs for Li-ion BESS in the 2021 IRP. This will ensure the model(s) select the appropriate amount of storage in the appropriate regions for the least cost/least risk portfolio that PacifiCorp chooses for your 2021 Action Plan, based on the costs and benefits that this system resource brings to PacifiCorp's customers and shareholders.

PacifiCorp Response:

Operational and cost information shown in the PacifiCorp Technology Assessment are screening level in nature and do not reflect guaranteed costs. The information provided in the Assessment is based on Burns & McDonnell's experience as an EPC contractor, design engineer, and consulting firm in the energy storage and renewable energy generation industries. Estimates concentrate on differential values between options and not absolute information. While it is fair to consider the Lazard Levelized Cost of Storage Analysis as one reference point among many for general market research, the cost ranges presented in that document are not necessarily directly comparable to the screening estimates provided to PacifiCorp. Certain scope, capital cost, and/or O&M cost assumptions/methodologies in the Lazard estimates are either unclear or different than those used for the PacifiCorp technology assessment.

2. Plexos Benchmark Modeling

Able Grid applauds the improvements in portfolio modeling available through the Plexos Benchmark model. In particular, the ability to run ST scenarios based on an hourly dispatch instead of four-hour blocks for representative days will help identify the benefits of fast reacting technologies as more VERs are deployed onto PacifiCorp's system.

PacifiCorp Response:

Thank you for your comment.

3. Supply Side Resources – Energy Storage

Statements from both Dan McNeil and Kelcey Brown during the October 22, 2021 IRP Stakeholder Meeting indicated that they are not knowledgeable as to what capabilities Li-ion BESS can bring to the PacifiCorp's integrated system. Able Grid's assumption is that this lack of knowledge applies across most of the merchant function's market facing roles, albeit unevenly. Able Grid would like to make the following recommendations:

a) Burns and McDonnell have accumulated significant information and internal engineering experience on the engineering and construction of utility scale Li-ion BESS. They can provide information from different OEM's on the technical characteristics and capabilities of Li-ion BESS system. Able Grid recommends that PacifiCorp engage Burns & McDonnell to provide technical and related information to employees in the merchant function that will be managing BESS systems – either as hybrid or stand-alone systems – as they are integrated onto PacifiCorp's system

PacifiCorp Response:

Engineering and consulting services are contracted on a competitive basis. PacifiCorp expects Burns & McDonnell will continue to submit proposals to provide those services and therefore are likely to be considered for such services.

b) Ascend Analytics is a software services company that focuses on energy analytics. They have extensive experience in modeling the deployment of BESS in both RTO and non-RTO markets. Ascend is supporting analytics and valuations on BESS projects, including testimony on behalf of utilities, for several WECC utilities

and PacifiCorp neighbors. They have also been retained by ISO-NE for their internal market monitor to validate expected energy storage performance and revenue.

Ascend provides both software and consulting services, and Able Grid recommends that PacifiCorp's trade floor and support functions engage with Ascend to see how BESS dispatch can provide valuable services across the energy dispatch spectrum, from fast response frequency regulation all the way to capacity.

PacifiCorp Response:

Thank you for your suggestions.

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.

Click here to enter text.

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

Click here to enter text.

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

Thank you for participating.

* Required fields

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 11/3/2020

*Name: Jim Woodward Title: **Regulatory Analyst**

*E-mail: Jim.Woodward@utc.wa.gov Phone: (360) 664-1302

*Organization: WA Utilities & Transportation Commission (WA-UTC)

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: **10/22/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Public participation principles, CPA final results, EE bundling methodology, market reliance assessment, PLEXOS benchmark update, modeling case & sensitivity runs as required per draft WA-UTC IRP rule, non-energy impacts, distributed energy resources.

☐ 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 as well as two (2) referenced NEI technical reports.

I. Public Interest Meeting #4 (10/22) – Presentation questions & comments

Public participation

1. General comment / request re: Supply-side resource table results (slides 3 – 8), CPA final results (slides 9 – 28) – During PIM #4 several stakeholders expressed concern the Pac IRP team is posting support & reference files to the IRP website but not messaging the listserv such files are ready for external review. Staff believes **increased listserv notifications on the part of the Pac IRP team as to when interim deliverables are posted would significantly increase the value of the external stakeholder review process**. Specifically, staff would appreciate **email notifications** when the following items are ready for review:
   a. **Supply-side resource tables**
   b. **Final CPA technical achievable measure files**

   PacifiCorp Response:

   PacifiCorp appreciates this recommendation and will provide notice to the IRP email distribution list when future support and reference files are added to the company's IRP website.

* Required fields

CPA final results

2. Final technical achievable potential comparison – ALL states (slide 14) – During the discussion of why there is a dramatic reduction in technical achievable potential captured in the 2021 vs. 2019 IRP, staff note an apparent disconnect between short term energy efficiency (EE) annual technical potential limits and current EE achievements. Given Pac will use PLEXOS to determine EE cost effectiveness, has the team considered **relaxing (i.e., increasing) their near term technically achievable constraints to reconcile the technical achievable potential shortfall in the near term with the higher potential anticipated after 2026?** Note: Taking the above corrected action means Pac would change its ramp rates for select measures in the near term.
    a. If Pac does not undertake such modeling reconciliation, staff recommends **Pac explain why they cannot maintain the current EE resource acquisition levels within the CPA in the 2021 IRP narrative**.

PacifiCorp Response:

Results presented on slide 14 show less technical achievable potential in early years which then grows and declines over twenty years. This trend is due to the ramping up of non-lighting measures and is consistent with the pattern of efficiency potential that the NW Power Council is modeling in the 2021 Power Plan. Although 2021 technical achievable potential appears low, the plot does not include savings from existing and incremental Home Energy Reports (HERs). The savings from new incremental HERs for 2021 are included in the final measure list posted to PacifiCorp's Integrated Resource Plan webpage.

By 2022, the technical achievable potential grows significantly even without HERs included. For example, in Washington, the 2022 technical achievable potential is 85,938 MWh. In the Draft 2021 Annual Conservation Plan which is currently out for stakeholder review, the 2021 Target Savings is 43,766 MWh, well within the 2022 technical achievable potential.

3. Demand response resource costs (slide 21) – The Pac / AEG team explained how demand response (DR) is calculated using the total resource cost (TRC) and utility cost test (UCT) within the IOU's west and east control areas, respectively. However, from a practical standpoint, staff is unsure whether the TRC and UCT would yield material cost differences given the CPA incorporates very few (if any) non-energy DR benefits. **It is unclear to staff why DR in the west and east should be treated differently when determining cost effectiveness using PLEXOS. Please explain.**

PacifiCorp Response:

As demand response resources rely upon customer participation and costs, PacifiCorp aligned state-specific DR cost effectiveness test approaches with state-specific energy efficiency cost effectiveness measures. In Washington, Oregon and California, the primary test for EE is the TRC and in Utah, Idaho and Wyoming, the primary test for EE is the UCT.

4. Calculating levelized costs (slide 23) – The Pac team stated the 6.9% interest rate is PacifiCorp's weighted average cost of capital (WACC). However, per CETA, resource costs need to incorporate the social cost of GHGs (SCGHGs), which is closer to 2.5% before inflation. **Please reconcile the application of this interest rate when calculating levelized costs that are CETA compliant**.

PacifiCorp Response:

To clarify, the Pac team stated the 6.9% is PacifiCorp's weighted average cost of capital (WACC), not the interest rate as stated in the question. The resource modeling of social cost of GHGs emissions are CETA compliant. Slide 23 is calculating the levelized cost for a demand response program. The social cost of GHG emission cost gets applied to a resource based on its emission rate. In the IRP model, the social cost of GHG emission costs is based the amount of emissions generated multiplied by the emission price. The social cost of GHG emission costs are applied separately on top of the resource's levelized cost. For a demand response programs there are no GHG emissions, so no GHG emission costs would be assigned. Likewise, for a natural gas thermal plant, there are GHG emissions, so social cost of GHG emission costs do get assigned to the thermal plant.

* Required fields

5. Ramped grid interactive water heater potential (slide 25) – Given installation of grid-interactive equipment upon equipment turnover & new construction, **do Pac's assumptions for its WA service territory align with treatment of direct load control (DLC) water heaters that need to be CTA-2045 compliant, if sold after 1/1/21 (*see RCW 19.260.080*)?**
    a. If so, per WA law, staff supports question / concern raised by NWEC on Thu, 10/22, that one would expect WA participation rates for this measure to be noticeably higher, given the new WA code should lower the cost of entry. **Staff strongly recommends Pac / AEG CPA team re-visit WA ramp rate or justify why no such change needs to be made to this measure.**

PacifiCorp Response:

The current DR results for grid-interactive water heaters are driven by assumptions aligned with those developed by the NW Power Council through their stakeholder process for its 2021 Power Plan assumptions for the share of water heaters that will be CTA-2045 compliant, which is a regional estimate. Based on this request, we plan to update these assumptions as follows:

- In Washington, assume that all new residential and commercial electric storage water heaters will be CTA-2045 compliant starting in 2021.
- In Oregon, assume that all new residential and commercial electric storage water heaters will be CTA-2045 compliant starting in 2022.

This will increase the potential for Grid Interactive Water Heater DR but will decrease the potential for the water heater direct load control (switch) program. Please note that potential impacts will still start in 2022 due to the one-year program setup assumption.

EE bundling methodology

6. Targeting winter capacity (slide 34) – **Can CPA team offer some concrete examples of measures that may be cost effective because they address winter capacity requirements?**

PacifiCorp Response:

Measures that lead to space heating, lighting and water heating may all address winter capacity needs as those end uses tend to occur during weekday morning and evening hours when winter demand is highest.

7. Possible bundling principles (slide 35) – Per PIM #4 discussion, staff understands a combination of energy and capacity reductions will inform Pac's proposed approach to bundling EE measures for the 2021 IRP. Staff supports this approach as it broadly aligns with the NWPCC's methodology to also consider capacity reductions. However, to show the market value of energy resources can offset resource cost, the NWPCC ties EE energy value benefits to the market prices in each of the 800 futures evaluated. In contrast, Pac appears to use a "single future" market price forecast to calculate the net cost of capacity.
    a. If my above compare / contrast between the Pac and NWPCC proposed bundling methodologies is correct, **how will the IRP team ensure via its PLEXOS stochastic risk analyses the net cost of capacity calculation reflects a market price that is internally consistent with each future?**

PacifiCorp Response:

In order to realize capacity expansion portfolios that consider all factors simultaneously including intertemporal effects, a full 20-year deterministic study is conducted in each case. There are no variances in futures represented in this type of study and introducing the concept of multiple futures would be inappropriate – this is a fundamentally different kind of study compared to a study featuring stochastic draws to represent a vast array of possible futures. However, inputs for portfolio optimization may be informed by inputs developed through a stochastic assessment. Using stochastics to develop inputs is one method of arriving at values that are risk-adjusted to use as inputs to non-stochastics models. PacifiCorp interprets the NWPCCs study as a methodology to inform the development of model inputs for deterministic linear optimization. There is a multiplicity of tools, research, expertise and historical data

used to develop inputs to IRP modeling. The NWPCC study is not indicating a need to model 800 futures to align with 800 results, but providing results based on 800 futures does indicate what a reasonable result might look like. In the 2021 IRP process, portfolio optimization is followed by a stochastic Monte Carlo simulation, which assesses the value of EE bundle performance and cost characteristics across a range of load, market, hydro and thermal outage conditions.

Market reliance assessment

8. Market reliance expectations (slide 41) – PacifiCorp indicated weather contributing to the 8/19/20 resource adequacy (RA) event was associated with "1-in-35-year" meteorological conditions.
   a. Building off this statement, **has the Pac IRP team considered whether what is now a 1-in-35-year event could become, for example, a 1-in-10 or 1-in-5-year event in future?**

   PacifiCorp Response:

   PacifiCorp has not conducted an analysis of whether an event similar to the 8/19/20 weather event could become more frequent in the future. However, as part of a 2021 IRP sensitivity analysis, PacifiCorp does intend to evaluate the implications of sustained weather events on load and subsequently on resource need, including reliance on front-office transactions (FOTs).

   b. More broadly, **how is Pac considering climate change (CC) when proposing its front office transaction (FOT) limits listed on slide 43 of the PIM #4 technical presentation?**

   PacifiCorp Response:

   The new FOT limits are not driven by climate change per se, but reflect declining market liquidity that is attributable to a variety of factors, including retiring generation facilities, and uncertainty in load and hydro resources as a result of weather.

   c. If CC is not explicitly considered when developing these FOT limits, **staff strongly recommends Pac justify <u>why not</u> as part of its 2021 IRP narrative**.

   PacifiCorp Response:

   Climate change is expected to result in generally higher temperatures, though it could potentially also result in more volatile conditions that could contribute to more extreme low temperatures. Higher temperatures in the summer would contribute to reduced market purchase availability, particularly in areas that are summer peaking. In light of recent trends and events, the Company has proposed FOT limits for summer peaking areas that are zero in the summer, so there isn't any room for a further reduction. Similarly, in areas that are winter peaking, the Company has also proposed FOT limits that are zero in the winter. While climate change could potentially contribute to reduced risk in the winter, there is a lot of uncertainty, and recent history on market liquidity indicates that shrinking resource margins are not confined to the summer.

   To the extent resource retirements and uncertainty are increasing the risk of shortfalls in summer peaking areas, resource additions are likely necessary. This should in turn increase the supply of resources in summer peaking areas. A reasonable portion of those resources are likely to be available in the winter, when local requirements are lower than in the summer. The opposite is likely to occur in winter peaking areas, which are likely to continue having additional resources available in the summer due to the need to meet winter peaks. Because the Company is only allowing for reliance on market transactions outside of a market's peak season, the ability to rely on market is less likely to be impacted by climate. To the extent climate variability significantly increases uncertainty in peak seasons, the availability of market purchases in other periods may well increase. In light of those circumstances, the Company does not believe further adjustment to FOTs for climate change is necessary.

9. FOT limits (slide 43) – When reducing 2021 IRP winter & summer limits compared to 2019 IRP limits, the market reliance assessment (slides 36 – 42) references declining liquidity trends (observed during 2015 – 20) and a 2020

resource adequacy event that occurred the week of 8/17. However, **what forward-looking stochastic risk analyses has Pac incorporated to arrive at the current proposed summer and winter FOT reductions?**

a. Furthermore, **why has Pac chosen to drop FOT limits and maintain a constant cap over the entire 20-year time horizon versus varying levels (e.g., ramping down) over the next two decades?**

PacifiCorp Response:

PacifiCorp has not performed a forward-looking stochastic risk analysis, primarily due to the fact that factors that affect market hub liquidity are associated with the WECC wide supply and load conditions. These factors include each load serving entities resource plan, load forecast, retirement expectations, forced outages, planned maintenance, etc., that are unknown to PacifiCorp to undertake a market risk liquidity analysis. What PacifiCorp has observed in the marketplace is a declining trend in liquidity at each of the market hubs Palo Verde and MidColumbia and subsequent energy emergencies that occurred in 2020 due to tight supply conditions across the West. In addition, there have been studies conducted by E3 that show that the region as a whole will be short in the near term and the California Independent Operator has already stated that it expects to be short in 2021. For these reasons PacifiCorp believes it is prudent to reduce its FOT limits at the applicable hubs during the applicable seasons. We will continue to monitor market conditions to better inform our expectations for the future.

b. If the Pac IRP team has not explicitly considered question 9.a, **staff support PacifiCorp undertaking a "variable FOT limit" sensitivity as part of their PLEXOS LTCE modeling.**

PacifiCorp Response:

Thank you for this feedback.

PLEXOS benchmark update

10. PLEXOS benchmark update (slide 45) - Re: "2021 IRP will incorporate loss of load probability (LOLP) in the expansion," staff commends company for incorporating LOLP into its LTCE modeling. This reliability component aligns Pac's 21 IRP with Pacific NW regional efforts (e.g., NWPCC using LOLP in 2021 Plan to assess NW power supply adequacy).
    a. **What LOLP maximum is Pac planning to use for the 2021 IRP?** For comparison, NWPCC is using a 5% LOLP RA threshold.

    PacifiCorp Response:

    An LOLP target has not yet been established for the 2021 IRP. While the possibility of using an LOLP target directly in the modeling was discussed, it has not proved workable to model it endogenously as part of portfolio expansion.

    Instead, the current expectation is that capacity requirements will be based on a specified percentage of hourly load, rather than the single peak load. For example, instead of a 13% planning reserve margin based on the peak hour, a 13% planning margin would be applied in every hour. As a result, resources will need to be procured to ensure this planning reserve margin is met in all hours. Similar to the Planning Reserve Margin studies conducted in prior IRPs, portfolios representing a selection of planning reserve margin levels (e.g. 13-17%) will be prepared and analyzed stochastically to identify LOLP outcomes at different planning reserve margins. The expectation is that LOLP will decline steadily as planning reserve margin increases and be relatively uniform across portfolios at a given planning reserve margin. The selection of a planning reserve margin would be based on the LOLP outcomes that are achieved at that level.

11. Endogenously incorporating reliability modeling within PLEXOS (slide 45) – **How does Pac intend to make use of PLEXOS for stochastic risk analysis? Specifically, how does the company's risk analysis approach relate to the number and scope of the cases and sensitivities the IRP team intends to run?**

a. During the 2019 IRP cycle, Pac used their PaR model to quantify a "risk credit" for EE (mostly to reflect avoided gas price volatility risk). **Should stakeholders anticipate Pac repeating this type of analysis internally within PLEXOS?**

PacifiCorp Response:

Yes, a risk credit will be applied for EE in the 2021 IRP.

b. Are there other risks Pac hopes to quantify via PLEXOS besides gas price volatility that are not currently listed in the case matrix (i.e., load growth, market prices, CO2 regulation)?

PacifiCorp Response:

Yes, the company will consider risk around hydro generation from stream flow and thermal outages.

c. If so, could this reduce the need to run "deterministic" cases? Or could it change which "deterministic" cases Pac runs during the 21 IRP cycle?

PacifiCorp Response:

No, the inclusion of more stochastic parameters is not expected to influence the number of deterministic studies that may be conducted. In contrast to the 2019 IRP, the Company does not anticipate a need for a series of deterministic reliability runs to develop each case portfolios, as sufficient reliability requirements will be included in each capacity expansion run.

12. Model features leveraged (slide 46) – Re: flexible interface that is "closely integrated w/ Excel, w/ advanced copy & paste support," **will the Pac IRP team be able to share Excel reports of input variables and scenario outputs w/ stakeholders as they are developed?**
    a. Note: Rolling file circulation with stakeholders should facilitate public concurrence as Pac's PLEXOS LTCE modeling narrows in on a preferred portfolio.

PacifiCorp Response:

PacifiCorp is committed to a transparent and accessible IRP process, and will make data available as part of its IRP filing. However, making scenario outputs available as part of an iterative process for each input variable and scenario/case would not be practicable due to time constraints in advance of the April 1, 2021 required filing.

II. UPDATED staff feedback & questions organized by IRP topical category based on CR-102 version of joint IRP & CEIP rules posted on 10/24/20

Required case & sensitivity runs

WAC 480-100-620(10) in the above linked CR-102 version of the joint IRP & CEIP rules outlines the following two scenarios (i.e., cases) and one sensitivity PacifiCorp's 2021 IRP modeling must address to comply with CETA:

Scenarios

1. **CETA incremental cost** (*sub-section -10(a)*) – Scenario's conditions & inputs should mirror the preferred portfolio except for those factors that would change if RCW 19.405.040 and RCW 19.405.050 were not in existence.

PacifiCorp Response:

PacifiCorp appreciates this feedback and plans to fully comply with WAC 480-100-620 and other CEIP/IRP rules associated with the Washington Clean Energy Transformation Act.

2. **Future climate change** (*sub-section -10(b)*) – Should analyze impacts including, but not limited to, changes in: snowpack, streamflow, rainfall, heating & cooling degree days (HDD, CDD), and customer load due to climate change.

* Required fields

PacifiCorp Response:

PacifiCorp appreciates this feedback and plans to fully comply with WAC 480-100-620 and other CEIP/IRP rules associated with the Washington Clean Energy Transformation Act.

Sensitivities

3. Maximum customer benefit scenario (*sub-section -10(c)*) – Maximize customer benefits described in RCW 19.405.040(8), prior to balancing against other goals / constraints.

PacifiCorp Response:

PacifiCorp appreciates this feedback and plans to fully comply with WAC 480-100-620 and other CEIP/IRP rules associated with the Washington Clean Energy Transformation Act.

Staff realizes the above required scenarios and sensitivity may modify the PLEXOS modeling recommendations staff originally circulated with the company on Oct. 2. **Staff recommends reconciling these scenario and sensitivity requests during the WA staff-PacifiCorp modeling working sessions scheduled for Monday, November 9**.

Non-energy impacts

Within the context of PacifiCorp's planned PLEXOS LTCE modeling:

1. **What non-energy impacts (NEIs) are the utility planning to include?**

PacifiCorp Response:

PacifiCorp is planning to include the traditional conservation NEIs currently incorporated within measure definitions as stated below. PacifiCorp is also coordinating with other IOUs in Washington to expand the NEI research and quantification for EE and DR in within the next few months and will incorporate those findings when complete in 2021. This plan was discussed as part of the November 30 TAG meeting. The study will provide numerical justification for the NEI proxies.

2. **How are these NEI benefits being monetized?**

PacifiCorp Response:

NEIs are represented as cost credits to the resource cost inputs, effectively lowering the cost of the resource.

3. **What types of proxies have been considered?**

PacifiCorp Response:

The emission proxy noted below has been considered.

4. **Where are the impacts being quantified for each resource (e.g., in the resource cost assumption inputs, elsewhere in the LTCE model)?**

PacifiCorp Response:

PacifiCorp has previously modeled a limited set of NEI assumptions, such as water savings and productivity/O&M savings from some lighting measures. These savings are captured as a reduction in cost, embedded in the data used as inputs to the IRP model. The proposed EPA public health proxy NEI for EE is a new and broader addition to the measures already in place for specific measures. The Company intends that this adder of $28.70/MWh (once escalated from 2017$ to 2020$ to align with IRP data) will be applied to all Washington energy efficiency in cases which assume the SC-GHG modeling assumptions. As this is a flat adder, the quantification of NEI benefits incorporated in the pricing of the Washington bundles may be footnoted in an appropriate table in the Resource Options chapter of the 2021 IRP. The Company anticipates the NEI-adjusted values will also be reflected in the inputs and output of particular cases on the 2021 IRP data disc.

* Required fields

Staff reminds PacifiCorp that **relying on the NWPCC Regional Technical Forum's (RTF) traditional conservation / EE perspective of NEIs is inadequate for CETA compliance.**

Furthermore, **developing a "roadmap" for how to address NEIs in future IRP cycles is inadequate to address CETA**. At minimum, **Pac will need to develop NEI numerical proxies** (*see NEI question 3 above*) **for the 2021 IRP**. Suggestions for such NEI proxies include:

- A **minimum percentage adder** like the 10% EE adder. Justification is needed for what adder value is recommended.
- **Emissions proxies** leveraging the particulate matter (PM) 2.5 study PacifiCorp commissioned ABT Associates to complete for the IOU in 2018.

As mentioned above, the Pac IRP team will need to provide justification for NEI numerical proxies. Justification may include citing previous studies. Staff have attached the following two technical reports to this PIM #4 feedback email, if consulting these references will help the Pac IRP team develop such proxies:

- **PacifiCorp's 2018 PM 2.5 technical report**
  - Benefit range of $0.0011 – 0.0025 / kWh suggested (*see report p. 19*)
- **EPA's 2019 Public Health Benefits per kWh of EE & RE technical report**
  - Benefits-per-kWh values listed for various EE & renewable energy technologies across the Pacific NW (*see Executive Summary pp. 2 – 4*)

Distributed energy resources

Given the PacifiCorp IRP team's attention is now on PLEXOS LTCE optimization, staff wants to re-visit the below five DER-focused questions as they relate to **optimizing DERs using PLEXOS**.

Staff asks the Pac IRP team to either **provide answers to the below questions via the PIM stakeholder feedback process or discuss the team's path forward during an upcoming staff-company bi-weekly meeting**.

1. **How and when will PacifiCorp be able to estimate the allowable level of DERs of different types on the various feeders or substations on their system?**

   PacifiCorp Response:
   This question was addressed as part of the 12/7/2020 discussion between PacifiCorp and Washington Utilities and Transportation Commission (WUTC) Staff.

2. **How and when will Pac be able to value different levels of DERs of different types on the various feeders or substations or system?**
   a. Note: Valuation of DERs and avoided cost calculations will be key, including transmission and distribution avoided (or deferred), ancillary services, and other NEI inputs.

   PacifiCorp Response:
   This question was addressed as part of the 12/7/2020 discussion between PacifiCorp and WUTC Staff.

3. **How and when will Pac be able integrate various levels and types of DERs at the IRP level of analysis, keeping in mind DER benefits are often quantified at the sub-hourly level?**

   PacifiCorp Response:
   This question was addressed as part of the 12/7/2020 discussion between PacifiCorp and WUTC Staff.

4. (*DER intersection w/ equity*) - **Is Pac planning to investigate providing grants or discounted cost DERs of certain types to low-income or vulnerable customers?**
   a. **If not, staff strongly recommends the Pac IRP team consider undertaking similar studies** to better address CETA's equity objectives.

* Required fields

PacifiCorp Response:

Yes, PacifiCorp is planning to conduct an assessment of energy and nonenergy benefits and reductions of burdens to vulnerable populations and highly impacted communities. Working with community members to understand how benefits and burdens are distributed, the design of grants or other programs with allocation of additional resources may be pursued to create equitable distribution.

5. **How do DERs complement Pac's utility-scale generating resources?**

PacifiCorp Response:

This question was addressed as part of the 12/7/2020 discussion between PacifiCorp and WUTC Staff.

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.

Please see accompanying two (2) technical reports.

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

NA.

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

Thank you for participating.

* Required fields

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: 11/6/2020

*Name: Rose Anderson | Title: Click here to enter text.

*E-mail: rose.anderson@state.or.us | Phone: Click here to enter text.

*Organization: Oregon Public Utility Commission

Address: Click here to enter text.

City: Salem | State: OR | Zip: Click here to enter text.

Public Meeting Date comments address: **10/22/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Front Office Transaction Limits

☐ 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.

On page 43 of the October 23 presentation, are the new Front Office Transaction limits applicable to all hours during the summer and winter, or only to peak hours? For example, would the new limits prevent Plexos from acquiring market purchases from COB during nighttime hours in August or at 11 am in September? If PacifiCorp is constraining market purchases in PLEXOS during off-peak hours, then OPUC Staff requests an additional portfolio be included in the 2021 IRP that relaxes constraints on market purchases during off-peak hours to a more reasonable level.

PacifiCorp Response:

PacifiCorp intends to apply the Front Office Transaction limits discussed at the October 22, 2020 public-input meeting across all hours during the applicable summer and winter months. In regard to the summer months of June to September specifically, PacifiCorp plans to assume that there is no purchase capability at COB, NOB, and Mona and up to 500 MW of purchases available at MidC.

PacifiCorp would note that because of the rising dependence of the WECC on solar power generation, off-peak or light load hour (LLH) periods are no longer synonymous with the lowest risk conditions. For example, overnight power prices are now frequently higher than prices in the middle of the day. Increasing dependence on duration limited energy storage would also contribute to lower purchase availability overnight. As a result, PacifiCorp does not believe that there is likely to be sufficient market liquidity to justify allowing higher market purchases for reliability in LLH periods over the IRP study horizon.

* Required fields

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.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Please make sure that the constraints on market purchases are not excessively stringent during off-peak hours. At the very least, OPUC Staff requests one portfolio in the IRP where off-peak hour purchases are significantly less constrained than on-peak hours.

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

Thank you for participating.

* Required fields

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 11/10/2020

*Name: Hannah Oakes Title: Click here to enter text.

*E-mail: hmoakes@hollandhart.com Phone:

*Organization: Wyoming Industrial Energy Consumers

Address:

City: State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Business As Usual Cases

☐ 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.
WIEC has emailed a Joint Party recommendation for two business as usual cases that we would like to see modeled in the 2021 IRP. This document includes a chart, and therefore emailing this document is the most effective way to convey the recommended BAU cases.

PacifiCorp Response:

Thank you for your feedback. PacifiCorp will consider these requests balanced with other stakeholder requests and time constraints.

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.
Please see accompanying two (2) technical reports.

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

* Required fields

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

Thank you for participating.

* Required fields

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 11/17/2020

*Name: Nancy Kelly | Title: Click here to enter text.

*E-mail: nancy.kelly@westernresources.org | Phone: (208) 234 - 0636

*Organization: Western Resource Advocates

Address: 307 West, 200 South, Suite 2000

City: Salt Lake City | State: UT | Zip: 84101

Public Meeting Date comments address: **11/16/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

Effect of tranmission topology changes on modeled transmission capacity

☐ 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.

When PacifiCorp\u0019s evaluation of transmission topology is complete, please provide the incremental transmission capacity (direction, size, and location) resulting from the 2021 IRP transmission topology as compared with the 2019 IRP transmission topology. This information should not be confidential since we are asking for the change in capacity only

PacifiCorp Response:

Thank you for this recommendation. PacifiCorp will provide the delta between the 2021 IRP transmission topology and the 2019 IRP transmission topology as available/able.

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.

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

Click here to enter text.

* Required fields

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

Thank you for participating.

* Required fields

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 11/17/2020

*Name: Rose Anderson Title:

*E-mail: rose.anderson@state.or.us Phone: (503) 580 - 0209

*Organization: Oregon Public Utility Commission

Address: 201 High St

City: Salem State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: 11/16/2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Market price forecast

☐ 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.

Staff recommends PacifiCorp include a low market price, high volatility sensitivity in the IRP to determine PAC's optimal portfolio in a future where additional renewables mandates result in more renewables and less gas buildout WECC-wide. This WECC-wide buildout in Aurora would include additional renewable generation attributable to existing community preference goals, CETA requirements, and WECC-wide utility clean energy goals. It would also exclude new gas builds in Washington and Oregon.

PacifiCorp Response:

Thank you for your feedback. PacifiCorp will consider these requests balanced with other stakeholder requests and time constraints.

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.

Please see accompanying two (2) technical reports.

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

* Required fields

NA.

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

Thank you for participating.

* Required fields

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 11/17/2020

*Name: Rose Anderson Title: **Economist**

*E-mail: Rose.anderson@state.or.us Phone: Click here to enter text.

*Organization: Oregon Public Utility Commission

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: **10/22/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

☐ 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.

Oregon PUC Order No 20-186 directed PacifiCorp to work with Staff and Stakeholders on a collaborative decision process regarding efficiency measure bundling.

PacifiCorp should work with stakeholders and Staff in the 2021 IRP development process to select two to four bundling strategies in an effort to identify the highest level of cost-effective energy efficiency by state and across the system. The collaborative decision process should consider bundling energy efficiency measures by energy cost, capacity contribution cost and measure type, as well as potentially by other metrics. The company should report on the collaborative process, bundling methods chosen, and any results in a filing before the filing of the 2021 IRP. PacifiCorp may hire a third party to conduct this analysis if needed due to resource constraints, but should coordinate with stakeholders on the scope of the work and timing.

PAC delivered a valuable presentation on some of the major considerations when bundling efficiency measures based on energy and capacity values. While the presentation was fantastic, it is unclear to Staff how PAC will incorporate

* Required fields

collaboration into the process as the conclusions of that presentation were somewhat open-ended and there was no set timeline for further engagement.

1. When will bundling methods be finalized?

   PacifiCorp Response:

   As described in the October 22, 2020 public-input meeting material PacifiCorp will conduct some additional analysis and present 2-to-4 bundling methodologies for the 2021 IRP. PacifiCorp plans to present this information at the January 14-15, 2020 public-input meeting.

2. How will they be chosen?
   a. What role will stakeholders have in identifying the final bundle methods?

   PacifiCorp Response:

   PacifiCorp invited stakeholder feedback following the October 22, 2020 public-input meeting presentation however, to date has received no specific feedback or recommendations regarding potential bundling approaches. There will be opportunity for additional stakeholder feedback during and following the January 14-15, 2020 public-input meeting discussion.

3. Will PacifiCorp please provide OPUC Staff with workpapers behind the measure bundling methodology for review and a follow up workshop to ask questions on the bundling methodology before the methodology is finalized?

   PacifiCorp Response:

   PacifiCorp will provide its rationale and support for the bundling methodologies approach and recommendation as part of the January 14-15, 2020 public-input meeting. PacifiCorp is happy to have a follow-up call with OPUC Staff following that discussion if needed at request of the OPUC Staff.

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.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

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 11/25/2020

*Name: Nate Blouin Title: Click here to enter text.

*E-mail: nate@interwest.org Phone: 6037243266

*Organization: Interwest Energy Alliance

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: **11/16/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Lisa Hickey

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

Brownfield transmission, modeling related to WY investigation

☐ 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.

1. Referring to slide 4 of the most recent public input meeting presentation, when is network service transmission capacity from retiring assets made available for interconnection purposes? How are transmission customers notified of this change to network service transmission capacity on the OASIS website? Is the entire transmission capacity released? If not, how is the available capacity determined? 2. Please list and describe any modeling changes you have made in preparation for the 2021 IRP which were the result of the WY 2019 IRP investigatory docket and ongoing discussions with WY PSC staff.

PacifiCorp Response:

1. A reduction in network transmission service for a retiring asset may occur when the transmission customer who has designated that asset as a network resource requests to permanently undesignate the resource per Section 30.3 of PacifiCorp's Open Access Transmission Tariff (OATT) on file with the Federal Energy Regulatory Commission (FERC). Until such permanent undesignation is requested, either in full or in part, the transmission provider is unable to assume in its study work (e.g., studies of new generator interconnection requests or new transmission service requests) that a transmission customer's asset will be retired.

   Upon receipt of an undesignation request, the transmission provider will review the network transmission service customer's megawatt (MW) allocation associated with the resource being undesignated, reduce the network customer's network rights in that MW amount, and post those undesignated MWs on PacifiCorp's

* Required fields

Open Access Same-Time Information System (OASIS) as available transfer capability on the effective date of the termination. When a transmission customer undesignates a network resource, whether for retirement or other purposes, the network resource reduction requested by the customer is reflected on OASIS in the Designated Network Resources spreadsheet at https://www.oasis.oati.com/woa/docs/PPW/PPWdocs/DesignatedNetworkResources.xlsx. Per the FERC OATT, the network customer may designate other resources to replace the undesignated resource, and additional transmission service rights will be allocated depending on availability and queue position.

2. A written order in the investigation docket of PacifiCorp's 2019 IRP has yet to be issued. PacifiCorp will review and adjust its modeling efforts as applicable / practicable upon receipt of the order. In addition, PacifiCorp plans to model carbon capture retrofit and gas conversion options at its Wyoming plants and a requested "business as usual" case(s) based on Wyoming-specific stakeholder feedback.

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.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

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 11/25/2020

*Name: Jim Woodward Title: **Regulatory Analyst**

*E-mail: Jim.Woodward@utc.wa.gov Phone: (360) 664-1302

*Organization: WA Utilities & Transportation Commission (WA-UTC)

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: **11/16/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
PLEXOS benchmarking results, price-policy modeling scenarios, distributed energy resource (DER) questions.

☐ 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.

I. Public Interest Meeting #5 (11/16) – Presentation questions & comments

1. PLEXOS benchmarking, action plan window results vs. 20-year planning period (slides 5 – 7) – Staff appreciated the modeling team's walkthrough of the PLEXOS benchmarking similarities and differences compared to the SO 2019 IRP preferred portfolio. During PIM #5, the Pac modeling team maintained that PLEXOS's endogenous consideration of reliability and stochastics explained why storage (battery) and utility solar + storage appeared to function as "substitutes." However, staff observes two different substitution trends affecting storage and utility solar + storage over the 20-year planning horizon: 1) storage instead of utility solar + storage during the action plan window and through most of the 2020s vs. 2) solar + storage instead of storage during the 2030s, with an inflection year of 2028. If the locational value of solar + storage yields reliability benefits, one could infer that PLEXOS would always choose solar + storage over standalone storage.
    a. **If PLEXOS benchmarking results differences are primarily due to the LTCE model's endogenous reliability considerations, staff would appreciate further clarification why this difference in model architecture is producing two different substation trends over the 20-year planning period.**

2. Price-policy scenarios (slide 10) – Staff are accustomed to seeing three descriptors for each scenario (i.e., demand, gas price, GHG price). However, the slide only describes each scenario according to its gas price and

* Required fields

CO2 cost. **Is the modeling team incorporating the load / demand forecast into these 5 scenarios? Or do these considerations come later?**

3. CO2 cost scenarios (slide 14) – Re: SCGHG assumptions, staff is glad to hear PacifiCorp has adopted a 2.5% discount rate as required under WA's CETA. **Staff reminds the company will need to update its SCGHG price scenario for the 2021 IRP to reflect inflation**. The Social Cost of Carbon page on the WA-UTC's external website reflects the SCC in 2019 dollars per metric ton.

4. Power price scenarios (slide 15) – **WA staff agree and support the market price recommendation submitted by Oregon PUC staff on Nov 17 and posted to PacifiCorp's Stakeholder feedback web page. WA staff strongly encourage the Pac IRP team to adopt such an Aurora price forecast for purposes of the company's 2021 IRP modeling**. Not doing so may risk the company making planning decisions based upon an artificially low market price forecast that does not consider CETA cost impacts.

II. Distributed energy resource questions related to PacifiCorp's distribution planning

Per the company's request during the Nov 23 bi-weekly IRP touchpoint, staff is re-circulating the following DER discussion questions that pertain to PacifiCorp's distribution planning.

Note: Staff's treatment of DERs in the below questions considers more than just private generation sources that are behind the customer meter. WA-UTC staff expect the **2021 electric IRPs to also consider DER options that require more control/planning on behalf of the utility (e.g., community solar initiatives)**.

1. **How and when will PacifiCorp be able to estimate the allowable level of DERs of different types on the various feeders or substations on their system?**
    a. Note: To adequately answer question 1, Pac will likely need to consider more than just the results from the company's 2020 private generation study.

2. **How and when will Pac be able integrate various levels and types of DERs at the IRP level of analysis, keeping in mind DER benefits are often quantified at the sub-hourly level?**

3. **How and when will Pac be able to value different levels of DERs of different types on the various feeders or substations or system?**
    a. Note: Valuation of DERs and avoided cost calculations will be key, including transmission and distribution avoided (or deferred), ancillary services, and other NEI inputs.

How do DERs complement Pac's utility-scale generating resources?

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.
NA.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Note: Staff is re-circulating DER questions to get a better perspective of how the IRP process intersects w/ company's distribution planning. The company specifically asked staff to re-issue these questions during the Mon, 11/23, staff-company bi-weekly IRP touchpoint.

---

* Required fields

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

Thank you for participating.

* Required fields

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 12/4/2020

*Name: Hannah Oakes Title: Associate Attorney

*E-mail: hmoakes@hollandhart.com Phone: (720) 376 - 4838

*Organization: Wyoming Industrial Energy Consumers

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: 12/3/2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting: Click here to enter text.

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

Page 18: Reliability, Evaluation of portfolio performance under strained system/regional conditions (i.e., sustained weather events) based on actual events that have occurred in recent year

☐ 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.

In accordance with the Commission\u0019s public deliberations held on October 8, 2020, for Wyoming Docket No. 90000-147-XI-19 (Record No. 15389), In the Matter of the Commission\u0019s Investigation Pursuant to Wyoming Statute ﷺ 37-2-117 of the Integrated Resource Plan filed by Rocky Mountain Power on October 18, 2019, WIEC requests that PacifiCorp include an analysis in the 2021 IRP with respect to the potential impact on resource adequacy of weather events that cause renewable energy production to be depressed over an extended period of time. PacifiCorp has indicated that it intends to incorporate such analysis in the 2021 IRP based on actual events that have occurred in recent years, as noted in its December 3, 2020 IRP Public Input Meeting slides, at p. 18. WIEC recognizes that analysis of historical data from PacifiCorp\u0019s system is likely the best place for PacifiCorp to start with this analysis; however, the event WIEC would like to see studied might occur less than once in ten years. As such, there might not be enough historical data to reveal the magnitude, duration, and frequency of such events. Thus, if the historical data turns out to be insufficient, then an assumed hypothetical event should be generated, at least as a sensitivity case. To generate this hypothetical event scenario, PacifiCorp should use outage events that occurred on a system with similar geographic features and generation portfolios as PacifiCorp\u0019s. The hypothetical event should be at least 39 hours in length, based on the actual

* Required fields

event physically experienced on the MISO system, referenced below. WIEC requests that PacifiCorp incorporate a stochastic analysis of these weather related extended outage risks as part of its PLEXOS analysis of resource options or, alternatively, as part of any supplemental loss of load expectation, loss of load hours and/or expected unserved energy analysis PacifiCorp may be undertaking as part of its 2021 IRP. Additionally, WIEC requests that PacifiCorp explain how it is modeling such potential weather-related extended outage risks in the 2021 IRP. As background and to provide context to this request, the 2019 Preferred Portfolio calls for PacifiCorp to bring significant amounts of renewable energy resources online, and PacifiCorp has limited experience integrating renewable resources into its existing generation portfolio while simultaneously retiring existing dispatchable facilities. This inherently creates some uncertainty with respect to how the shift to less-dispatchable capacity and increased reliance on variable energy (i.e., renewable resources) will impact the operations and reliability of its system. Further, the 2019 IRP did not perform any deterministic or stochastic analyses with respect to the potential impact on resource adequacy from weather events that may depress renewable energy production over an extended period of time. This risk is discussed in an article from E&E News about the impacts of the 2019 polar vortex on the Midcontinent Independent System Operator, Inc. (MISO) northern region and describes how the dramatic dip in wind energy production and forced outages on thermal plants on January 30-31, 2019 had to be offset with increase production from coal and gas-fired units within the region, imports from other regional systems, and demand reduction mechanisms. \u001CTurbine shutdowns in polar vortex stoke Midwest debate\u001D, E&E NEWS, Tomich, Jeffrey (Feb. 27, 2019), available at https://www.eenews.net/stories/1060122535. More recently, during January 28-30, 2020, the entire MISO footprint experienced a severe \u001Cwind drought\u001D for a period of 39 hours where the total wind generation output in MISO dropped to less than one percent of nameplate capacity. MISO Operations Report \u0013 Markets Committee of the Board of Directors (Mar. 24, 2020), available at https://www.misoenergy.org/events/loss-of-load-expectation-working-group-lolewg---june-9-2020/. WIEC\u0019s request seeks to ensure PacifiCorp\u0019s electric system is not at risk to similar outages that will impact PacifiCorp\u0019s customers.

PacifiCorp Response:

Thank you for your feedback. PacifiCorp will consider this request balanced with other stakeholder requests and time constraints.

In response to IRP requirements in Washington and Oregon, PacifiCorp will scope and model a climate change sensitivity/scenario that will incorporate the best science available to analyze impacts including, but not limited to, changes in snowpack, streamflow, rainfall, heating and cooling degree days, and load changes resulting from climate change, which may include the weather events raised in this request. In addition, the company is likely to include observed trends, future projections, and potential system impact in the discussion of the analysis.

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.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
Click here to enter text.

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

Thank you for participating.

* Required fields

* Required fields

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: 2020-12-04

*Name: Justin Brant | Title:

*E-mail: jbrant@swenergy.org | Phone: (541) 760 - 0042

*Organization: SWEEP

Address:

City: | State: | Zip:

Public Meeting Date comments address: ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

2021 CPA Final Measure Results

☐ 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.

SWEEP has concerns with the CPA results posted in the file 2021 Conservation Potential Assessment Final Energy Efficiency Measure Results. The full Achievable Technical Potential appears to not be consistent with recent Rocky Mountain Power (RMP) program results and RMP\u0019s program goals for 2021 in Utah, this discrepancy heightens the need to complete two requests made by SWEEP in previous Stakeholder Input forms that are currently unresolved. In 2021, the CPA found an Achievable Technical Potential of 344,258 MWh in Utah. This is the amount of Class 2 DSM available in Utah without regard to cost. Given that RMP had approximately 24,490,305 MWh of sales in Utah in 2019 this is equivalent to a total Achievable Technical Potential of about 1.4% of sales per year. Leading utilities in the Southwest, such as Xcel Energy in Colorado, have submitted plans to cost-effectively achieve savings equivalent to more that 1.7% of sales in 2021. There are many similarities between the service territories of RMP in Utah and Xcel in Colorado making it difficult to fathom how Xcel could plan to cost-effectively achieve more Class 2 DSM in its service territory than is technically achievable regardless of cost to RMP. The achievable potential in the CPA actually declines in 2022, when Xcel expects to achieve similar levels of savings. The CPA results also seem inconsistent with RMP\u0019s own recently filed Class 2 DSM forecast. In this forecast, the Company plans to achieve 291,841 MWh of Class 2 DSM. To achieve these savings, RMP would need to acquire 75% of the achievable residential Class 2 DSM not including Home Energy Reports and 84% of the non-residential Class 2 DSM potential. Given that much of the potential in the CPA is very costly and likely not cost-effective, it does not appear feasible that the Company could acquire this high level of the total energy efficiency potential in its service territory. Taken together, these results show that the CPA is vastly underestimating the amount of Class 2 DSM available in Utah. SWEEP has made two previous requests in its Stakeholder Feedback Form from 1/3/2020. First, we requested that the Company compare

* Required fields

results from the 2021 and previous CPAs with historical program achievement in Utah and other jurisdictions. This would allow the Company to ground truth some of the assumptions in the CPA and identify areas where assumptions in previous CPAs did not materialize in the market. Second, SWEEP asked the Company to develop multiple cases for Achievable Technical Potential to help assess the tradeoffs between investments in energy efficiency versus other resources. Again, given the low potential identified in the CPA, we believe this request is even more important to identify potential cost savings from maintaining investments in DSM resources at a reasonable level. SWEEP asks the Company to complete these requests in time to inform the IRP modeling. We stand ready to assist in any way possible.

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.

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

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

Thank you for participating.

* Required fields

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 12/11/2020

*Name: Jim Woodward Title: **Regulatory Analyst**

*E-mail: Jim.Woodward@utc.wa.gov Phone: (360) 664-1302

*Organization: WA Utilities & Transportation Commission (WA-UTC)

Address: Click here to enter text.

City: Click here to enter text. State: Click here to enter text. Zip: Click here to enter text.

Public Meeting Date comments address: **12/3/2020** ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Coal retirement variants, recommended sensitivity, price-policy scenario contents (i.e., SC-GHG methodology), Colstrip 3&4 early closure/divestiture economic analysis update.

☐ 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.

Commission Staff Feedback for PacifiCorp 2021 IRP: Public Interest Meeting #6 (Dec 3, 2020)

This feedback, dated December 11, 2020, states the informal comments, questions, recommendations, and data requests 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.

This staff feedback document is divided into three parts: 1) questions & comments regarding PacifiCorp's December 3 PIM #6 presentation content, 2) staff update re: company proposal to model Colstrip 3&4 closure/divestiture earlier than 2025 as part of the 2021 IRP process, and 3) WA 2021 electric IRP compliance template updated to reflect WA-UTC's draft final IRP rule (*12/4/20 release date*).

Company response by **December 31, 2020**, is appreciated for select questions and requests in **BOLD**.

I. Public Interest Meeting #6 (12/3) – Presentation questions & comments

* Required fields

1. Jim Bridger Units 1 and 2 (slide 5) – Excluding the 2023 coal retirement variant for both Jim Bridger Units 1 and 2, the other four operating variants for each unit violate WA CETA's requirement that "on or before December 31, 2025, each electric utility must eliminate coal-fired resources from its [WA] allocation of electricity," pursuant to RCW 19.405.030(1)(a) assuming current state allocations for this plant remain. **Please confirm that if PacifiCorp's 2021 preferred portfolio (PP) ultimately selects one of the later operating variants for Bridger 1 and 2, Jim Bridger will be removed from WA rates in accordance with CETA.**

2. Naughton Units 1 and 2 (slide 8) – Based on discussion that occurred during PIM #6, **WA staff concur with OR staff's request to consider Naughton retirement earlier than 2025**. While WA staff acknowledge that WA ratepayers are not responsible for Naughton, the arguments made about Naughton's relative operating inefficiency and the plant not being a candidate for gas conversion due to its high altitude are persuasive. The modeling team should at least consider the impact to PacifiCorp's system a Naughton retirement earlier than 2025 would have.

3. Jointly owned coal units operating variants (slide 13) – **Please see Sec II response re: WA-UTC staff's perspective on the Colstrip 3&4 closure/divestiture economic analysis**.

4. Other studies (slide 18) - **How is WA's required maximum customer benefit sensitivity covered by the 6 proposed sensitivities listed?** As a reminder, per draft final WAC 480-100-620(10)(c), this sensitivity should model the maximum amount of customer benefits described in RCW 19.405.040(8) prior to balancing against other goals.

5. Price-policy scenario update (slide 35) – Staff appreciates the IRP modeling team's verbal walk-through of PacifiCorp's two-step approach to accounting for the social cost of greenhouse gas emissions (SC-GHG) during PIM #6. As staff have stated during numerous meetings and in a variety of email correspondence to the company, the SC-GHG methodology will be a prime area of scrutiny during WA's 2021 IRP cycle. To this end, **staff strongly encourage Pac to include their SC-GHG modeling methodology in the company's draft IRP to be filed by 1/4/21**. To capture what was discussed during PIM #6, **this methodology should go into detail how Pac's SC-GHG:**
    a. **Price-policy assumptions will determine resource selection and**
    b. **Dispatch cost adder will appropriately price the SC-GHGs into actual utility operations**.

II. Staff update re: PacifiCorp's proposal for a Colstrip 3&4 closure/divestiture economic analysis

As discussed during staff's Mon, 12/7, IRP bi-weekly check-in with the company, PacifiCorp proposes addressing staff's request for an economic analysis of closing/divesting Colstrip 3&4 earlier than 2025 as part of the 2021 IRP portfolio development process. Specifically, the Pac IRP team proposed a "bookend" approach by developing case(s) that would close/divest Colstrip as early as the end of 2022 and as late as 2027.

After internal discussion, **staff accept PacifiCorp's proposal with the following caveats**:

1. The case study approach needs to be able to **isolate the effects of a Colstrip 3&4 closure/divestiture on Pac's broader system**. If an early Colstrip closure/divestiture is not part of Pac's 2021 IRP PP, Pac's case approach should calculate the additional cost of closing/divesting Colstrip early relative to the PP.

2. **PacifiCorp should be ready to discuss the results of this Colstrip 3&4 early closure/divestiture economic analysis during the WA-UTC's 2/22/21 recessed Open Meeting devoted to PacifiCorp's 2021 IRP**.

* Required fields

III. Updated WA 2021 electric IRP compliance template

As promised during staff's Mon, 12/7, IRP bi-weekly check-in with the company, **please find attached an updated WA 2021 electric IRP compliance template**. This Excel spreadsheet includes the following updates to the file staff originally circulated with Pac on 6/26 following PIM #1:

- Rule references (*see column C*) have been changed to reflect the WA-UTC's draft final IRP rule (*12/4/20 release date*). Generally, the IRP contents section has been changed from -610 to -620.

Sub-section -610(10) Scenarios and sensitivities (*see spreadsheet rows 38 & 39*) now details the minimum two scenarios and one sensitivity required per rule.

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.

Revised WA 21 electric IRP compliance template provided for reference and inclusion in company's draft 21 IRP filing.

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

Staff strongly recommends company populate the revised WA 21 electric IRP compliance template and submit as an appendix with PacifiCorp's 21 draft IRP due to the WA-UTC by 1/4/21.

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

Thank you for participating.

* Required fields

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: 2020-12-17

*Name: Shannon Anderson
Title:
*E-mail: sanderson@powderriverbasin.org
Phone: 3077630995
*Organization: Powder River Basin Resource Council, National Parks Conservation Association, & Healthy Environment Alliance of Utah (HEAL Utah)
Address: 934 N. Main St.
City: Sheridan
State:
Zip: 82801
Public Meeting Date comments address: 12-03-2020
☐ Check here if not related to specific meeting
List additional organization attendees at cited meeting:

*__IRP Topic(s) and/or Agenda Items:__ List the specific topics that are being addressed in your comments.
Regional Haze Compliance

☐ 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.
Powder River Basin Resource Council, National Parks Conservation Association, and HEAL Utah, recommend Pacificorp model a reasonable range of likely pollution control requirements necessary to comply with the federal regional haze program. Continued litigation over past regional haze requirements, along with a new incoming federal administration, create uncertainty regarding the stringency and timing of pollution controls that will be implemented during the IRP planning window. To adequately capture a reasonable range of regulatory risks, we request model runs that incorporate SCR controls at Jim Bridger 1 & 2, Wyodak, Naughton 1 & 2, and all 5 units at Hunter & Huntington, as more fully described below.

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.
This request is supported by the current FIP for Wyoming round 1 regional haze and the prior FIP for Utah round 1 regional haze previously approved by EPA.

Recommendations: Provide any additional recommendations if not included above - specificity is greatly appreciated.
For Jim Bridger 1 & 2 and Wyodak, PacifiCorp should consider SCR requirements included in the current FIP. Since these SCRs are currently required by the FIP, they are part of the \u001Cbusiness as usual\u001D/base case. For Naughton 1 & 2, PacifiCorp should consider SCRs as part of the second planning period, to be installed no later than December 31,

* Required fields

2025. While PacifiCorp may think no additional controls will be needed and compliance can occur through capacity reductions, a Biden Administration EPA will likely require SCRs. For Hunter & Huntington, PacifiCorp should consider SCRs on all 5 units, to be installed no later than December 31, 2024. Although EPA recently finalized a new SIP BART Alternative, and the previous FIP required SCRs on 4 units. And SCR could be deemed necessary at Hunter 3 under the reasonable progress program. There is significant regulatory risk in ignoring the likelihood of 5 SCRs in Utah, given the amount of visibility impairing pollution and the proximity to Class 1 areas (national parks and wilderness). SCRs continue to be required to comply with regional haze at coal units across the country as the best way to reduce NOx emissions. The Utah plants are no exception. Should PacifiCorp wish to consider retirement as an alternative compliance option instead of installation of SCR, please model a retirement for the unit no longer than the dates discussed above. If alternative retirement dates are used, please provide an explanation of why they are chosen. PacifiCorp should provide information to stakeholders regarding where the SCR investment costs are being included in its modeling (e.g. which operating variants, and during which time periods for each operating variant).

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

Thank you for participating.

* Required fields

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: 2020-12-18

*Name: Ana Boyd Title:

*E-mail: ana.boyd@sierraclub.org Phone: (415) 977 - 5649

*Organization: Sierra Club

Address:

City: Oakland State: CA Zip: 94062

Public Meeting Date comments address: 12-03-2020 ☐ Check here if not related to specific meeting

List additional organization attendees at cited meeting:

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

Coal Plant Operating Variants and Operating Limits, Minimum Take & Must Run Requirements, Business As Usual Case, Customer Preference, Transmission, Power Prices, RFP Results, Follow up to previous Feedback Request

☐ 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.

Coal Plant Operating Variants and Operating Limits 1. Refer to slides 5-13 from the December 3, 2020 Public Input Meeting presentation. a. Please provide the costs (in total $ or $/kW) assumed for each of the coal units associated with the \u001Cmajor overhauls\u001D in each year shown on the slides. b. Do any of the major overhauls include SCR or other pollution control technology? Do they include any Coal Combustion Residual Rule compliance costs? c. Are there other capital investments being made in each unit in addition to the major overhauls? If so please provide these costs. d. Please explain the rationale for selecting specific years for each Operating Variant and why these differ between units (e.g. Coal-Ret 2028 for Jim Bridger 1 versus Coal-Ret 2027 for Jim Bridger 2) e. Sierra Club requests that PacifiCorp consider a uniform 3 year interval for economic coal plant retirement options. f. Sierra Club requests that PacifiCorp include a 2028 retirement date for the Hayden plant due to the recent Colorado Air Quality Control Commission ruling on Regional Haze. (Please refer to Chase Woodruff, Coal plant closures accelerated with air commission approval of Regional Haze plan (Nov. 20, 2020), https://coloradonewsline.com/briefs/coal-plant-closures-accelerated-with-air-commission-approval-of-regional-haze-plan/.) g. Please explain whether the operating limits to comply with the Regional Haze second and third planning periods are assumed to impose any changes to plant performance characteristics (e.g. heat rate, ramp rates, minimum/maximum output levels) due to installation of pollution control technologies or other operational changes to the plants. h. Do any of the Operating Variants for Jim Bridger 3 & 4 factor in additional changes in the post-2030 timeframe due to Idaho Power\u0019s planned exit from units 3 & 4 in 2028 and 2030, respectively? (Refer to IPC\u0019s Second Amended 2019 IRP, available at

* Required fields

https://docs.idahopower.com/pdfs/AboutUs/PlanningForFuture/irp/2019/SecondAmended2019IRP.pdf.) If so, which additional changes are considered? For example, would PacifiCorp assume ownership of Idaho Power\u0019s share of the plant (and associated costs of that ownership)? Minimum Take & Must Run Requirements 1. Refer to PacifiCorp\u0019s response to Sierra Club request submitted on October 19, 2020, Coal Operations Question 1, which states, \u001CThe Company intends to apply ramp rates, minimum and maximum capacity, heat rates, planned maintenance, forced outages, minimum fuel requirements, minimum up and down times, economic dispatch, CO2 price, and plant wide emission caps.\u001D a.

Please provide the specific values of these input assumptions for each coal unit, indicating which dates these assumptions apply to. b. Please indicate which units are assumed to operate with \u001Cmust run\u001D unit commitments and over which time period these must run designations apply. If any of the above information is deemed confidential, Sierra Club would be willing to sign a protective agreement. Business As Usual Case 1. Refer to slide 14 from the December 3, 2020 Public Input Meeting presentation, Business As Usual Case Requests (\u001CBAU\u001D). Sierra Club supports use of the 2019 IRP preferred portfolio as a BAU Case. 2. Sierra Club additionally requests that the BAU scenario not include any of the following coal unit constraints: a) Must Run, b) Minimum Fuel Burn, c) Take or Pay Obligations. a. In the alternative, Sierra Club requests that these constraints be removed as a sensitivity analysis. Customer Preference 1. Please describe the sequence for modeling customer preference. Does the model select resources absent any customer preference and then make subsequent adjustments if necessary? Or are customer preferences built into the initial modeling constraints? 2. How are incremental costs and/or savings from customer preference resources being tracked relative to system-wide resources? 3. Please provide a comprehensive list of the types of customer actions or requirements that this captures (e.g. corporate purchases, municipal energy goals, etc.). Does this include any of PacifiCorp\u0019s voluntary clean energy tariffs or programs? 4. In the forecast for customer preference depicted on slide 36 from the December 3, 2020 Public Input Meeting presentation, does the base case reflect only existing customer preference decisions? Or does it also include incremental decisions that have not yet been made? Transmission 1.

During the November 16, 2020 Public Input Meeting, PacifiCorp indicated that if a coal unit retires it is assumed that transmission would become available for new resources but that any delay could risk that the transmission capacity is taken up by a competing resource that may not be used to serve PacifiCorp load. Please provide, or otherwise describe the following: a. Current requests for transmission access from external resources, b. Available transmission capacity on existing lines, c.

Expectations for the magnitude and location of additional transmission access requests may be likely to occur (including on new lines), d. What is the assumed time delay for transmission capacity to become fully subscribed by external transmission access requests after a coal plant is retired? 2. Please explain why the Boardman-Hemingway line is being proposed for endogenous selection but the Gateway options require additional testing for this to occur. Sierra Club recommends that the Gateway line also be endogenously selected by the model in the same manner as Boardman-Hemingway. 3. Is the 20% OATT credit anticipating new transmission requests or reflective of the current status? Is this reflective of PacifiCorp\u0019s entire system or are there locations where the share is significantly more or less than 20%? Power Prices 1. Please refer to slide 15 from the November 16, 2020 Public Input Meeting presentation. a. Please provide the underlying 8760 data for the power price forecasts. b. Sierra Club recommends that PacifiCorp illustrate the temporal variation in its power price forecasts through a month-hour graphic similar to that included in Arizona Public Service\u0019s 2020 IRP: (Please refer to APS 2020 IRP at 131, available at https://www.aps.com/-/media/APS/APSCOM-PDFs/About/Our-Company/Doing-business-with-us/Resource-Planning-and-Management/2020IntegratedResourcePlan062620.ashx?la=en&hash=24B8E082028B6DD7338D1E8DA41A1563.) RFP Results 1. Please refer to slide 24 from the November 16, 2020 Public Input Meeting presentation, which indicates that PacifiCorp\u0019s Initial Short List for its All-Source RFP included \u001C3,173 MW of solar or solar + storage projects (includes 1,330 MW of collocated storage capacity); 2,479 MW of wind projects; 200 MW of stand alone storage.\u001D a. Sierra Club requests that PacifiCorp provide anonymized median bid price information from its Initial Shortlist (or full list of bids) in a similar format to Xcel Energy. (Please refer to Robert Walton, Xcel solicitation returns \u0018incredible\u0019 renewable energy, storage bids (Jan. 8, 2020),

https://www.utilitydive.com/news/xcel-solicitation-returns-incredible-renewable-energy-storage-bids/514287/). b. If PacifiCorp is unable to provide this information, please provide a detailed explanation as to why this information cannot be provided. Follow up to previous Feedback Request 1. Refer to PacifiCorp\u0019s response to Sierra Club request submitted on October 19, 2020, Load Forecast and DSM Question 2, which states \u001CPacifiCorp has not performed the requested analysis.\u001D a. Please explain how the impact of these rollbacks on PacifiCorp\u0019s load forecast was determined if this analysis was not performed. b. In light of the recent presidential election that may alter the fate of these rollbacks, Sierra Club requests that PacifiCorp model a sensitivity that does not include them and restores federal codes and standards for Phase 2 of the Energy Independence and Security Act. 2. Refer to PacifiCorp\u0019s response to Sierra Club request submitted on October 19, 2020, , Resource Assumptions Question 1(b). a. Sierra Club requests that PacifiCorp include 1 additional smaller sized battery configuration (e.g. 2 hours or 3 hours) as a resource option. This would be consistent with other IRP modeling exercises in the Western U.S. such as those recently performed in California and Arizona which include 1-hour and 3-hour duration batteries. While longer duration batteries provide greater value to the system, this must be balanced with overall cost which is primarily driven by duration. Sierra Club\u0019s expert consultant, Strategen Consulting, has extensive experience with the battery storage industry and has advised that shorter duration batteries can still capture significant value and are worth considering. While we recognize that short duration batteries have diminishing returns as additional storage resources are added, it is still worthwhile to consider these additions in the early years. Moreover, shorter duration batteries can be effective at addressing initial peak demand needs, while longer duration can be used subsequently as the the peak is diminished. (See, e.g., Ray Hohenstein, Solving "range anxiety": Meeting peak electricity demand with the most cost-effective duration portfolio (Oct. 17, 2018) https://blog.fluenceenergy.com/meeting-peak-electricity-demand-with-energy-storage-duration-portfolio.)

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.

A PDF version of Sierra Club's Feedback has been provided via email to the following address: irp@pacificorp.com. The PDF version includes the table referenced in Power Prices, Question 1(b).

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

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

Thank you for participating.

* Required fields