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.

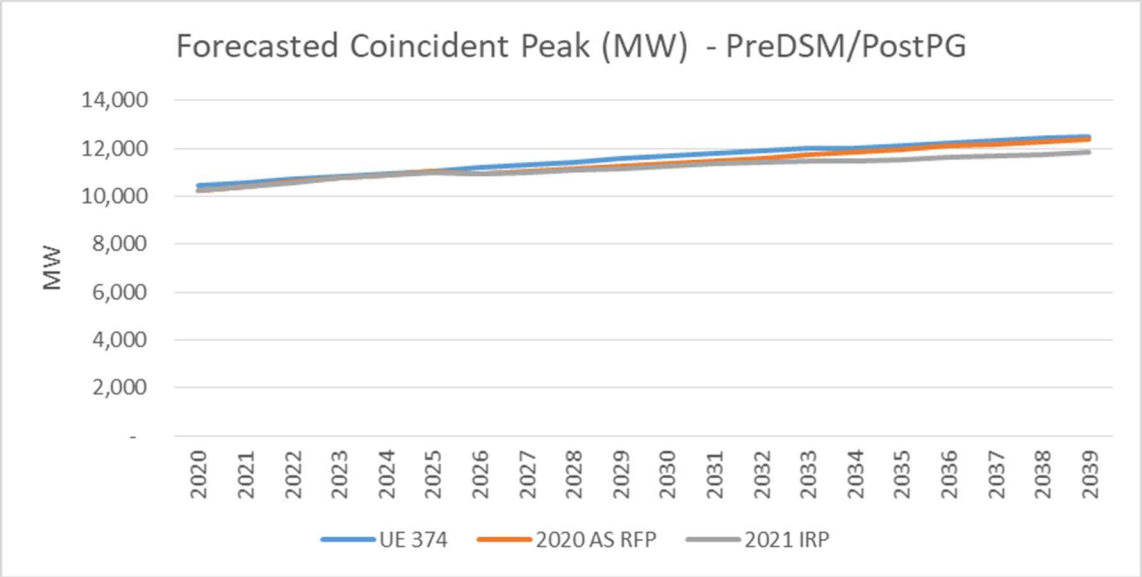
PacifiCorp Response:

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

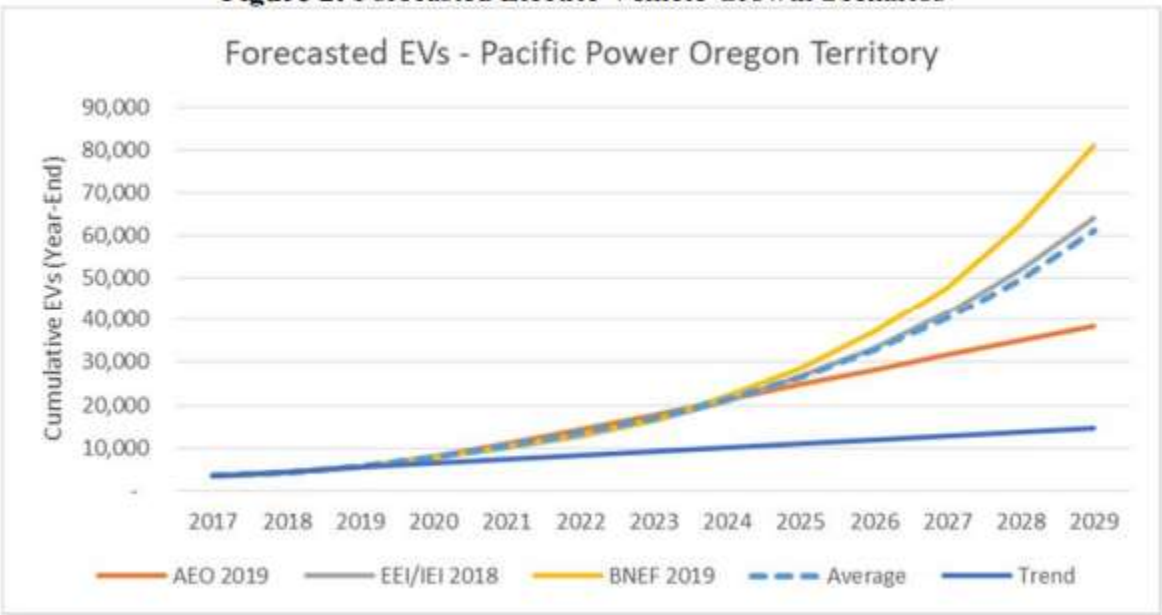
continue to improve lighting efficiency. Therefore, the exemption of specialty lamps from the EISA standards, as contemplated in the 2021 IRP, is contributing to a higher load forecast relative to the 2019 IRP.

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.

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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.

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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.

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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.

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