

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's 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's 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 Business As Usual (BAU) Case. Staff suggested Business As Usual (BAU) as one of 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's 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 technoeconomically 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's 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