PacifiCorp - Stakeholder Feedback Form

2023 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 2023 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 2022-06-16

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*Organization: Salt Lake City Corporation

Address: 451 S. State St. Room 404

City: Salt Lake City State: UT Zip: 84111

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.

Spinning Reserves - Battery plus grid-forming inverter

☐ 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.

Has PacifiCorp studied or would it consider studying whether a battery with grid-forming inverter would provide a lower-cost alternative to natural gas spinning reserves? In December 2021, Hitachi Energy was contracted to build the Darwin-Katherine Battery Energy Storage System (DK BESS) in Australia. As reported in a story by Renew Economy, operation of the DK BESS system \u001Cis expected to deliver savings of $9.8 million a year because less gas will be used in the system,\u001D and deliver a payback of \u001Cless than five years.\u001D Apparently much of that savings is due to the ability of the DK BESS system to run in grid-forming mode and thereby replace the spinning reserve gas plant operation that would otherwise be required. Especially in the face of high fossil fuel prices, batteries with grid-forming inverters may represent a lower cost and non-emitting alternative to thermal resources for the provision of spinning reserves.

PacifiCorp Response (6/24/22)

PacifiCorp would note that the contingency reserve obligation for "spinning reserves" (essentially resources that start to respond to generator or transmission outages immediately) is distinct from the grid-forming effects of spinning resources, which provide inertia and other characteristics that support reliable operation of the transmission system and grid as a whole. PacifiCorp IRP modeling does not presently require that spinning contingency reserves be held on particular resource types, so battery storage could meet the entire operating reserve need. Not enforcing minimum spinning resource requirements acknowledges that a variety of other alternatives could be used to address these issues as inverter-based resources become a larger portion of the generation fleet.

PacifiCorp considers a wide range of technologies for supply-side resources. Battery energy storage systems (BESS) is among those technologies. Inverters for BESS are available with many control capabilities. The inverter controls often include a grid-forming capability. Grid-forming inverters include an isochronous function. The isochronous function works to return system frequency to normal, 60 Hertz in the United States, after a change in demand.

Grid-forming inverters are used in relatively small electrical distribution and transmission systems to ensure that the system frequency returns to the normal after the load in the system increases or decreases. Small systems have a demand from a few kilowatts to several hundred megawatts. The Darwin-Katherine electrical system is isolated from the other transmission systems in Australia. It is reported to have a demand of about 300 megawatts.[1] The savings reported for the Darwin-Katherine system are due to the unique circumstances their electrical system.

Large electrical systems require sophisticated systems and processes to maintain system frequency within acceptable limits. The Western Interconnection had a demand of approximately 165,000 MW in 2020 according to the Western Electric Coordinating Council. [2]

PacifiCorp is currently considering BESS for inclusion in the transmission system. PacifiCorp will consider grid-forming BESS in appropriate situations.

* 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://reneweconomy.com.au/hitachi-wins-darwin-big-battery-tender-in-major-step-towards-solar-only-grid/`

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.

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[1] Darwin-Katherine Electricity System Plan, 2021, https://territoryrenewableenergy.nt.gov.au/__data/assets/pdf_file/0011/1056782/darwin-katherine-electricity-system-plan-web.pdf?v=0.1.1#:~:text=The%20Darwin-Katherine%20Electricity%20System%20Plan%20charts,the%20pathway%20to%20achieving%20the%20Northern%20Territory

[2] State of the Interconnection, 2022, https://www.wecc.org/epubs/StateOfTheInterconnection/Pages/demand.aspx