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 8/20/2018

*Name: Jeff Bishop Title: CEO

*E-mail: jeff.bishop@keycaptureenergy.com Phone: Click here to enter text.

*Organization: Key Capture Energy

Address: 150 State Street

City: Salt Lake City State: UT Zip: 84102

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.
Modeling of energy storage

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

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

Key Capture Energy (KCE) is an energy storage development company with a focus on utility-scale battery storage projects. KCE is starting construction on its first 20 MW battery storage project in New York in fall 2018, and has amassed a development portfolio of stand-alone energy storage projects ranging from 2-200 MWs.

KCE would like to provide feedback on energy storage, with specific focus on the 2019 Pacificorp Integrated Resource Plan (IRP) Public Input meeting from July 26-27, and using as a base for our comments the Rocky Mountain Power (RMP) 2017 IRP.

As stated in their 2017 IRP, RMP hopes to develop “a cost-conscious plan to transition to a cleaner energy future with near-term investments in both existing and new renewable resources, new transmission infrastructure, and energy efficiency programs,” (1). The integration of energy storage systems in RMP’s mix can provide emissions reduction, deferment of transmission and distribution upgrades, and increased efficiency and reliability, while being cost-effective.

Energy storage projects are a necessary part of the electric grid of the future. Storage systems are fuel neutral, meaning that they can capture energy from all generation sources to optimize for use during outages, peak hours, or grid management purposes. Yet, they also serve as an essential integrator for renewable sources, such as wind and solar. As more renewables are integrated and efficiently allocated to perform peak shaving, the necessity for inefficient, fossil-fueled peaker plants would be relieved, while also reducing peak pricing for electricity consumers. For commercial and industrial consumers, it also has the potential to save money through decreased and shorter outages. In a 2016 Massachusetts’ State of Charge report, it was determined that the addition of 600 MW of advanced energy storage by 2025 would capture $800 million in system benefits to Massachusetts ratepayers in a more resilient grid.

* Required fields

In RMP's 2017 IRP, energy storage is discussed for its potential to displace natural gas (pg. 7), integrate with renewable energy (pg. 178), and a list of a variety of other use cases, particularly electric energy time shifting, capacity, regulation, reserves, voltage support, and transmission and distribution congestion relief (pg. 128). The plan also notes that current models are difficult to capture the complete value of storage, and RMP is working on how to best model energy storage systems for future IRPs (pg. 255). However, the plan did not yield any storage systems for its Preferred Portfolio.

KCE asks for the Pacificorp 2019 IRP process to consider:

Energy Storage Benefits:
-Allow multiple use cases for storage system in system modeling. While the 2017 RMP IRP notes the ability of storage to stack multiple use cases (pg. 255), the model does not take this into account. For instance, a four-hour battery that provides peak capacity can also provide grid services for the many hours where peak capacity is not needed.
- Modeling should be changed to intra-hourly basis; hourly modeling does not capture full extend of benefits. There are several validated commercial models are available that can calculate economic resources including intrahourly dynamics, such as PLEXOS, PSO and FESTIV; however, the 2017 IRP states energy storage is modeled hourly (pg. 168).
- Modeling should include other operational benefits of storage that accrue to the entire system as avoided costs. These include: (1) reduced operating reserve requirements; (2) reduced start-up and shut-down costs of all generation facilities; (3) improved heat-rate of thermal plants and consequently reduced emissions; (4) reduced uneconomic dispatch decisions, in the form of uplift or revenue sufficiency guarantee payments; (5) reduced curtailment of renewable resources; (6) reduced risk of exposure to fuel price volatility; and (7) reduced local emissions for areas with emissions restrictions. A Dec 2016 state-commissioned study of storage in Massachusetts found the total value of these system benefits was greater than the value of the direct, compensated services of storage. The 2017 IRP analyzed the cost of storage and its impact on other resources at two locations determined based on storage's ability to integrate with renewable generation (pg. 178, 256).

Energy Storage Costs:
-Similar to the process from the 2015 IRP to the 2017 IRP, update the most recent cost analyses of the systems to ensure the most competitive bidding. For example, in CAISO regarding the impending Puente Gas Plant development, the unavailability of up-to-date pricing greatly stifled consideration of an energy storage system. However, through competitive bids received through a request for information, it was found that a battery system in fact was much more competitive than originally believed.
-All data should come from publicly available sources, such as IHS Research, GTM Research, BNEF, and Navigant; however, the cost data from the Battery Energy Storage Study is "based on currently available industry projections, as well as DNV GL's interaction with industry partners, and basic cost reduction assumptions," (pg. 21). The costs determined by DNV GL are significantly greater than those determined by other sources and utilities, such as Northern Indiana Public Service Company, Hawaiian Electric Company, and Arizona Public Service, who utilize a range of public sources.
- Expected cost curves for installed system costs should follow the rapidly declining cost curves that have been in recent years. The Battery Energy Storage Study does show declining system cost curves.

Energy Storage Degradation:
- Similar to the process with system costs, the assumptions for battery degradation rates should be updated for the upcoming IRP based on publicly available data.
-The 2017 accounts only for degradation over 20 years (pg. 125). However, Portland General Electric's 2016 IRP takes into consideration energy storage systems both with and without degradation. This is important because warranties will often account for degradation, and therefore manufacturers will supplement the systems with additional batteries to make up for this decrease in capacity.
- The 2019 Pacificorp IRP Public Meeting Input presentation from July 26-27 indicates a battery storage lifespan of 3500 cycles until there is 80% of the original battery life. Lithium ion batteries typically are defined as end-of-life at 60-65% of original battery MWhs, and as noted above, contracts can be structured between the operator of the battery and the battery manufacturer such that the project is either oversized initially based on use cases, or augmented with additional batteries over the contract life such that the project retains full energy over the contract lifespan.

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When modeling storage to consider the multiple use cases and flexibility of the resource along with its rapidly declining costs, numerous utilities have determined that energy storage is cost-effective and have added systems to their portfolios. These utilities include Hawaiian Electric Company, Tucson Electric Power, and Arizona Public Service.

Utility-scale stand-alone energy storage projects are competitive in markets now, and as such, the suggested Supply-Side Resource Study modeling of 1 MW projects in the Pacificorp 2019 IRP Public Input Meeting from July 26-27 should be expanded to 1 MW, 5 MW, and 200 MW projects.

Energy storage will play a crucial role in helping Pacificorp improve the efficiency of existing generators, increase the amount of renewable energy sources into the grid (especially at the distribution level) and enable the flexibility of these resources, and enhancing the overall reliability and resilience of the electric grid.

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.
Massachusetts State of Charge Study - https://www.mass.gov/files/documents/2016/09/oy/state-of-charge-report.pdf
CAISO Puente Gas Plant development - https://www.greentechmedia.com/articles/read/energy-storage-nrg-puente-gas-peaker-plant-cost#gs.X1Vn1AI
Pacificorp 2019 IRP Public Input Meeting July 26-27 - https://www.greentechmedia.com/articles/read/energy-storage-nrg-puente-gas-peaker-plant-cost#gs.X1Vn1AI

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

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

Thank you for participating.

* Required fields