

December 3, 2018

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
201 High Street SE, Suite 100
Salem, OR 97301-3398

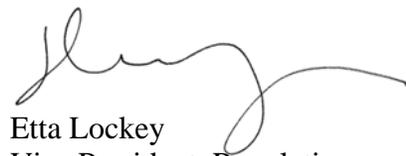
Attn: Filing Center

Re: UM 1857—PacifiCorp's Energy Storage Potential Evaluation Plan

PacifiCorp d/b/a Pacific Power hereby submits for filing in compliance with Order No. 18-327, its plan to update energy storage modeling capability to estimate all energy storage benefits.

Please direct any informal correspondence and questions regarding this filing to Natasha Soares, Manager, Regulatory Affairs, at (503) 813-6583.

Sincerely,



Etta Lockey
Vice President, Regulation

Enclosures

PacifiCorp's Draft Storage Potential Evaluation Plan UM 1857

I. Introduction

In Public Utility Commission of Oregon (Commission) Order No. 18-327 in docket UM 1857, the Commission adopted a stipulation outlining an approach for the development of PacifiCorp's two energy storage projects. PacifiCorp committed to file an explanation for a plan to improve the company's energy storage modeling capability to estimate all energy storage benefits as directed in Order Nos. 16-504, 17-118, and 17-375.

To develop the incremental next steps to advance the company's draft storage potential evaluation plan, PacifiCorp reviewed existing company resource planning tools and processes as well as the Final Energy Storage Potential Evaluation filed in this docket on April 2, 2018. PacifiCorp's review informed the company's proposed incremental steps to capture all use case benefits and to co-optimize them.

II. Proposed Incremental Steps

1. 2019 Integrated Resource Plan (IRP) Analysis

PacifiCorp's 2017 IRP included a Flexible Reserve Study in Appendix F of Volume II. A comparable study will be incorporated in the company's 2019 IRP filing, and will include a more detailed description of PacifiCorp's operating reserve obligations and capabilities during the 20-year planning horizon of the 2019 IRP. In particular, PacifiCorp will provide more detail in the Flexible Resource Needs Assessment and Flexible Resource Supply Forecast. This detail will include specifics on various operating reserve categories, including regulation, load following, spinning reserve, non-spinning reserve, and frequency response.

In addition, the company proposes that the 2019 IRP discuss and expand on the framework developed in the Energy Storage Potential Evaluation docket to bring it to the broader IRP audience. This is expected to include:

- Identifying all use cases (similar to section 4 in the Final Energy Storage Potential Evaluation, but not duplicating anything already covered in Appendix F above);
- Identifying forecasted needs for each use case (similar to Figure 5 in the Final Energy Storage Potential Evaluation);
- Identifying forecasted costs for each use case (similar to Tables 15 and 16 in the Final Energy Storage Potential Evaluation);
- Identifying opportunities to maximize value by co-optimizing use cases (similar to section 6 in the Final Energy Storage Potential Evaluation); and
- Identifying technology parameters which impact flexible resource value (similar to Table 14 in the Final Energy Storage Potential Evaluation).

To provide context for the relationship between use cases, needs, and technology, and as part of the requirement to provide an updated estimate of energy storage benefits, the cost-effectiveness

of energy storage resources will be estimated over time based on updated assumptions from the 2019 IRP (similar to sections 5 and 8 in the Final Energy Storage Potential Evaluation). PacifiCorp will also provide more detail on the black start capability and requirements of its system, its available black start supply options, and related alternative applications.

Timeline	Task
April 2019	Filed IRP to identify all use cases, forecast needs for each use case, forecast costs for each use case, co-optimization of use cases, and technology parameters to impact flexible resource value.
Biannually	Provide updates on energy storage evaluation as part of the public input process for future IRPs, and include appropriate discussion in the filed IRP.

2. Other analysis

There are several areas of additional energy storage potential analysis that are either outside the scope of the IRP or at a more granular level of detail than the IRP typically considers. The additional analyses are discussed in greater detail below.

Individual Customer Benefits

PacifiCorp will consider the benefits of energy storage resources specific to Oregon customers, in the form of 1) time-of-use charge reduction; 2) power reliability; 3) outage mitigation; and 4) demand charge reduction. PacifiCorp plans to leverage data and analysis gained from the approved Community Resiliency Pilot Program. This data will be used to derive and refine assumptions and calculations used to determine any customer costs and benefits. As a starting point, the company will hire an expert consultant that will conduct on-site technical analysis that will provide insight into the potential costs and benefits specific to PacifiCorp and its customers.

For demand charge reduction and time-of-use charge reduction analysis, bill savings estimates will be calculated for a selection of different customers using the refined Oregon assumptions for a representative set of customer classes based on the company’s current tariff structures. Information gained through this pilot may lead to the development of tariffs or other compensation structures for the shared use of storage facilities.

The benefits of power reliability are highly customer specific, and difficult to calculate or estimate without a broader understanding of how Oregon customers may benefit from energy storage and the costs associated with achieving the intended results. There are national estimates and methodologies for determining benefits of the increased reliability of using storage to limit the impacts of short-term outages. These typically are based on customer surveys estimating the economic costs of an outage, combined with utility Customer Average Interruption Duration Index estimates, which can establish a generic estimated value of reliability. PacifiCorp proposes using actual data rather than attempting to develop generic assumptions on the value of reliability. As proposed, the company will work with a consultant to develop a method to value the costs and benefits of reliability using a compilation of actual individual facility data.

Similar to reliability, the Community Resiliency Pilot is also designed to provide customers information on the technical requirements of an energy storage system that will allow them to operate during a long term outage. This analysis will provide the cost of installing storage, typically in conjunction with solar, to meet this need. The analysis will also look at how the storage costs compare to those of traditional back up generation facilities. Through this process, PacifiCorp will attempt to understand the unique benefits received by specific customers using storage during a long term outage.

Through the Community Resiliency Pilot the company will begin to understand the operating characteristics of energy storage systems installed for resiliency and start to assess how to balance customer needs with PacifiCorp system needs.. In the long term, opportunities may exist to stack individual customer benefits with utility system benefits (aggregate customer benefits). For instance, a portion of the stored energy in a customer’s energy storage system could be deployed to meet system needs, while ensuring adequate stored energy is retained to meet a customer’s specific needs. It is anticipated that the individual customer could be compensated either for the energy deployed or for maintaining dispatchable capacity.

The table below outlines the associated tasks needed to understand and possible quantify individual customer benefits and cost.

Table 1: Individual Customer Benefits Timeline

Timeline	Task
First Quarter 2019	Select Community Resiliency Technical Consultant.
Second Quarter 2019	Develop Technical Review Format and initial participating communities.
Third Quarter 2019	Conduct Technical Review.
Fourth Quarter 2019	Provide Technical Analysis to Customers and develop Oregon Specific Energy Arbitrage and Demand Reduction Analysis.
First and Second Quarter 2020	Evaluate expansion of Community Resiliency Pilot and Evaluate Development of Customer Sited Storage Compensation Structures.

Transmission and Distribution (T&D) Capacity Deferral Analysis (Alternative Evaluation Tool)

The Alternative Evaluation Tool is used in T&D planning to assess the potential of non-wires solutions to T&D needs. On an annual basis, PacifiCorp identifies distribution feeders, distribution substations and local transmission lines with anticipated thermal or voltage constraints driven by load growth and recent load additions. The costs and benefits of facility upgrades such as replacement of equipment or increasing wire size are evaluated against the costs and benefits of various non-wires solutions including demand side management, energy storage and solar generation. The first step of this comparison involves a screening with the Alternative Evaluation Tool to determine which of the non-wires solutions are technically effective and reasonably close to the cost of a facility upgrade alternative. The current tool only

accounts for T&D deferral benefits from the non-wires solutions and does not yet reflect the anticipated stacked benefits of generation and storage resources. For the spring 2019 capital budget planning evaluation, the Alternative Evaluation Tool will be modified to account for these estimated stacked benefits. Additionally, the 2019 tool update will reflect the most current cost assumptions for generation and storage resources from the 2019 IRP analysis. Non-wires solutions that are initially identified by the tool as technically effective and within 25 percent of the cost of a facility upgrade alternative are then evaluated further using the specific characteristics of the site, type, scale and other features of the non-wires solution to more accurately account for the stacked benefits of that solution.

Timeline	Task
First Quarter 2019	Alternative Evaluation Tool modifications to capture estimated stacked benefits and reflect current cost assumptions from 2019 IRP analysis.
Second Quarter 2019	Perform capital budget planning evaluation. PacifiCorp will provide notice to the Commission if a near-term non-wires solution is competitive with the cost of a facility upgrade.
Annually	Update Alternative Evaluation Tool and perform capital budget planning evaluation.

III. Conclusion

PacifiCorp’s proposed incremental steps for evaluating energy storage resources within the company’s IRP and Alternative Evaluation Tool strikes a balance in developing a workable and informative methodology to value energy storage resources. PacifiCorp’s plan creates a system for the evaluation of energy storage resources that is transparent, multifaceted, and can identify energy storage capabilities in a manner that benefits customers. PacifiCorp looks forward to continually working with the Commission and stakeholders to review and evaluate energy storage capabilities in our resource strategy decision making.