

**BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON**

**UM 1856 / UM 1857**

In the Matter of

PORTLAND GENERAL ELECTRIC  
COMPANY, and

PACIFICORP, dba PACIFIC POWER,

Draft Storage Potential Evaluations

Comments of Renewable Northwest and  
the NW Energy Coalition in Response to  
PacifiCorp and Portland General  
Electric’s Draft Storage Potential  
Evaluations

**I. INTRODUCTION**

Renewable Northwest and the NW Energy Coalition thank the Oregon Public Utility Commission (“Commission” or “OPUC”) for this opportunity to comment on the draft storage potential evaluations (“Draft Evaluations”) that Portland General Electric (“PGE”) and PacifiCorp filed pursuant to Order 17-118. We appreciate the efforts undertaken by OPUC Staff (“Staff”), the utilities, and stakeholders to implement HB 2193 and to advance the understanding, modeling, and development of energy storage in Oregon.

Both Draft Evaluations represent an initial step toward properly identifying the costs and benefits of the energy storage systems to be proposed by the utilities as part of this energy storage program. In these comments, we identify areas that PacifiCorp and PGE should analyze further. This additional analysis will result in a more accurate understanding of the costs and benefits of energy storage systems, and likely in a greater diversity and number of cost-effective<sup>1</sup> storage projects ultimately selected.

Renewable Northwest is a nonprofit advocacy organization that brings together its business and nonprofit members to promote the expansion of environmentally responsible renewable energy

---

<sup>1</sup> Renewable Northwest and the NW Energy Coalition use the term “cost-effective” for simplicity and are aware that under HB 2193, Section 3, Subsection 3(a), the Commission is to evaluate utility proposals based on their consistency with the Commission guidelines for this program, the balance of value and costs, and the public interest. As Order 07-118 shows, the Commission and Staff appears to have recognized that proposed projects in this program do not have to be strictly cost effective.

resources in the Northwest. Our membership includes storage developers as well as organizations that understand that storage is a key component of a cleaner grid. The NW Energy Coalition is a non-profit organization whose primary purpose is to promote an energy future that is clean, reliable, affordable, and equitable. The NW Energy Coalition provides technical and policy leadership on energy issues in this region, and seeks to promote the development of renewable energy, energy conservation, and affordable energy services, working with utility companies and others to achieve these goals. Both organizations participate in resource planning, procurement, and storage-specific discussions and proceedings throughout the Northwest. Of particular importance to this proceeding, we were active stakeholders in the development of the Commission's framework for this Draft Evaluations in Docket No. UM 1751.

## **II. GENERAL COMMENTS ON THE DRAFT EVALUATIONS AND THE FUTURE OF THE EVALUATION OF STORAGE EVALUATION**

The projects and use cases that PacifiCorp and PGE identified demonstrate that storage projects can cost effectively meet both utility needs and the needs of individual customers. In fact, the Draft Evaluations appear to underestimate both the diversity and the number of storage projects that could cost-effectively contribute to meeting utility and customer needs. Similarly, the evaluations appear to underestimate the magnitude of the net benefits associated with the use cases and projects that the utilities identified. These details are discussed below with respect to each Draft Evaluation.

The ability for stakeholder and storage industry experts to continue to contribute to the utilities' storage potential evaluations and project selection is now limited. Renewable Northwest and the NW Energy Coalition support the work that the utilities have done thus far as a first step in evaluating storage potential on their systems. However, we encourage the Commission to ask the utilities to look more broadly across their systems for additional cost-effective storage projects, and to refine their assumptions on the net-benefits of the projects, applications and use cases that they have already identified.

Looking forward, we encourage the Commission to apply the lessons learned from Oregon's first energy storage program to future utility planning and procurement processes. Energy storage is an important component for a cleaner, more efficient, and more reliable electric grid, but much work remains to be done to build up our collective ability to understand and accurately model the multi-faceted benefits of storage facilities. With emerging resource alternatives such as storage, increasingly diverse generation portfolios, and sub-hourly energy markets, our utilities' capability to model sub-hourly system flexibility is increasingly important. For that reason, PacifiCorp and PGE should improve and carry forward the modeling practices and capabilities

developed in this program into their IRPs and transmission and distribution planning processes. We encourage the Commission to kickstart a process for Oregon utilities to transition to planning and procurement processes that can fairly and accurately evaluate technologies like storage.<sup>2</sup>

Additionally, foundational issues like the distinction between storage of electrons and thermal energy storage require more discussion before any particular technologies are excluded from participating in certain utility programs. At the highest level, all of these resources are providing optionality, flexibility, and security to the grid. Fair competition between all of the technologies competing to provide these services is in the best interest of consumers.

Finally, customers will be better served if utilities lean on the expertise embedded within the storage industry when scoping and refining storage potential solutions. One of the limitations of this docket, from our perspective, is that it did not facilitate a dialogue and data exchange between the utilities and storage developers. Such an exchange could have helped utilities identify storage solutions, fine tune project specifications, and better estimate the net-benefits of energy storage systems. Future storage procurement efforts should better leverage the expertise of the storage industry. For these same reason, it appears likely that the final project proposals will not result in a diversity of ownership models--one of the evaluation criteria highlighted in the Commission Order.<sup>3</sup> We encourage the Commission to use this last opportunity in the evaluation stage of this docket to encourage utilities to identify use cases for storage that would support a diversity of ownership models.

### **III. COMMENTS ON PGE'S DRAFT EVALUATION**

Renewable Northwest and the NW Energy Coalition commend PGE for its broad look at all levels of its system to identify potential storage applications and use cases and for the utility's utilization and combination of multiple models to estimate the potential value of meeting utility needs with storage solutions. However, we are concerned with PGE's treatment of Transmission Congestions Relief and Transmission Upgrade Deferral.

The main high-level shortcoming we identified of PGE's Draft Evaluation is that it fails to identify any storage projects, even generically speaking, and, as such, does not identify any storage cost estimates. Without cost information, and especially considering the late stage of this process, stakeholders and storage industry experts are unable to point PGE toward the most cost-

---

<sup>2</sup> An example of how the Commission could approach such transition is the Washington Utilities and Transportation Commission's Draft Report and Policy Statement on Treatment of Energy Storage Technologies in Integrated Resource Planning and Resource Acquisition (Mar. 6, 2017) available at [https://www.utc.wa.gov/\\_layouts/15/CasesPublicWebsite/CaseItem.aspx?item=document&id=142&year=2016&docKetNumber=161024](https://www.utc.wa.gov/_layouts/15/CasesPublicWebsite/CaseItem.aspx?item=document&id=142&year=2016&docKetNumber=161024).

<sup>3</sup> UM 1751, Re Implementing Energy Storage Program Guidelines pursuant to House Bill 2193, Order 17-118, Appendix A at 6 (Mar. 21, 2017).

effective project designs and the most up-to-date data illustrating storage technology costs. In this regard, we recommend that the Commission encourages both utilities to use the remaining time in preparing their final storage potential evaluations (“Final Evaluation”) and project selection to solicit the expertise and most current information from storage technology developers and manufacturers. For additional details on this topic, please see the cost information that we provide below in response to PacifiCorp’s storage cost assumptions.

Contrary to the Commission’s and Staff’s direction,<sup>4</sup> it appears that PGE did not fully evaluate transmission-level storage deployments. As Figure 1-2 in the Draft Evaluation shows, PGE assigns value to Transmission Upgrade Deferral but does not ascribe any value to Transmission Congestion Relief.<sup>5</sup> According to PGE, “PGE transmission system modeling suggests limited congestion issues on its transmission system, leading to no meaningful basis to monetize benefits.”<sup>6</sup> However, the congestion on BPA’s transmission system along the I-5 corridor, of which PGE is a large user, is well documented. In fact, the 2017 ColumbiaGrid System Assessment of the “South of Allston” congestion notes that PGE anticipates constructing a third 230-kV line from Trojan to Harborton to, among other things, help alleviate this congestion.<sup>7</sup>

The ColumbiaGrid Assessment illustrates the connection between Transmission Congestion and Transmission Deferral; the former being a precursor to the need for new transmission and the benefit storage can provide from potentially deferring that need. The congestion along the I-5 corridor is known to coincide with PGE’s summer peak hours. As such, the ability of any storage project to reduce PGE’s peak load generation and transmission requirements, and thereby limit the congestion along the I-5 corridor, provides congestion relief value and transmission deferral value. Hence, such values should be incorporated into PGE’s Final Evaluation and project selection.

---

<sup>4</sup> *Id.* at 7.

<sup>5</sup> UM 1856, Re Portland General Electric’s Draft Storage Potential Evaluation, Draft Storage Potential Evaluation, Attachment A at 6 (Jul. 14, 2017).

<sup>6</sup> *Id.* at 13.

<sup>7</sup> Columbia Grid, 2017 System Assessment (Aug. 2, 2017) available at <http://www.columbiagrid.org/Notices-detail.cfm?NoticeID=150>.

#### IV. COMMENTS ON PACIFICORP'S DRAFT EVALUATION

Renewable Northwest and the NW Energy Coalition appreciate the level of specificity and detailed modeling of storage solutions in PacifiCorp's Draft Evaluation. PacifiCorp's modeling efforts are largely thorough and sound for the use cases that the Company analyzed. We make several comments below pointing out additional areas where PacifiCorp could enhance its modeling of the storage solutions they identified.

Our chief concern with PacifiCorp's Draft Evaluation is that it appears to have altogether excluded any meaningful evaluation of certain use cases (capacity, load following, arbitrage). These omissions do not undermine the analysis of the specific storage solutions that PacifiCorp identified, or PacifiCorp's ability to comply with the minimum procurement requirement contemplated in HB 2193 (5 MWh). However, these omissions raise the question of whether the Draft Evaluation missed additional cost-effective storage solutions on PacifiCorp's system. The Commission should encourage PacifiCorp to analyze these other use cases more rigorously for its final storage potential evaluation and before project selection.

PacifiCorp's frequency response value assumptions may be low. PacifiCorp uses two publicly available contracts to value frequency response. However, both are contracts with long-existing hydro resources in the Northwest that happen to have surplus frequency response capability.<sup>8</sup> It is unlikely that that these roughly 75-year old resources, with their embedded costs long paid for, represent the marginal cost of new frequency response resources. As section 4.1.3 of PacifiCorp's Draft Evaluation points out, in the PJM market energy storage systems are the marginal resource being built to provide frequency response. While it is difficult to assess the long-term supply and demand of frequency response resources in the Northwest market, PacifiCorp's two data points are likely biased toward the middle to low range of the possible long-term costs of frequency response in the region. Such a bias would cause PacifiCorp to underestimate the value of storage projects. Renewable Northwest and the NW Energy Coalition encourage the Commission to ask PacifiCorp to conduct a sensitivity with higher frequency response value assumptions.

We are also concerned that, given the rapid pace of technological improvements and cost declines in the storage industry, some of the energy storage cost assumptions in PacifiCorp's Draft Evaluation<sup>9</sup> may already be outdated. Based on feedback from our members who are currently developing projects similar to that assumed in PacifiCorp's study report, it appears that:

- The storage equipment costs are 5-10% too high.

---

<sup>8</sup> UM 1857, Re PacifiCorp's Draft Storage Potential Evaluation, Draft Storage Potential Evaluation at 20 (Jul. 14, 2017).

<sup>9</sup> *Id* at 15 (Table 3-1).

- The power conversion equipment cost (assuming only the inverter units) are closer to \$80/kW (2018) and \$60/kW (2021)
- The power control system cost (assuming they are referencing an energy management system and site controller) is \$50-60/kW too high.
- The balance of system costs looks accurate.
- The Installation costs can vary quite a lot. For a power system (<30 min) PacifiCorp's costs are accurate. However, for a 4hr system the installation costs can be much lower (\$10-15/kWh).
- Given the above corrections, the total power components cost appears to be off by at least 100%. A more accurate total power components cost for 2018 is \$233/kW.
- The total cost of energy components are closer, but a more accurate number for 2018 is \$320/kWh.

Similarly, while Table 5-6 shows that the Draft Evaluation assumes a round-trip efficiency of 80%,<sup>10</sup> feedback from our members indicates that a round-trip efficiency assumption of 85%-90% is likely more accurate for a lithium-ion system.

We encourage the Commission to request that PacifiCorp reruns its analysis with these updated cost figures and efficiency parameters to determine if additional projects look to be cost-effective and are worth pursuing further. PacifiCorp's actual procurement process would then confirm if these costs can be met and should ultimately determine which projects should be developed. Without such a sensitivity to take into account the rapid cost declines in storage, the Draft Evaluation may have missed projects due to PacifiCorp's high-cost and low round-trip efficiency assumptions. As a result, without such a sensitivity those projects will not even advance to the proposal stage of this docket.

## V. CONCLUSION

Renewable Northwest and the NW Energy Coalition again thank the Commission for this opportunity to provide feedback on PacifiCorp's and PGE's Draft Evaluations. As we outlined above, we are generally encouraged by the Draft Evaluations as a first step in the utilities efforts to identify the costs and benefits of the energy storage systems to be proposed by the utilities as part of this energy storage program. However, we encourage the Commission to require the utilities to further explore the issues that we outlined above so that the Final Evaluations can serve as a foundation for the selection of projects based on a more accurate understanding of their potential costs and benefits. Due to the key role that energy storage is likely to play in our changing grid, we also encourage the Commission to kickstart a process to guide Oregon

---

<sup>10</sup> *Id.* at 36.

utilities' transition to planning and procurement processes that can fairly and accurately evaluate technologies like storage.

Respectfully submitted this 25<sup>th</sup> day of August, 2017.

*Cameron Yourkowski*

Cameron Yourkowski  
Senior Policy Manager  
Renewable Northwest  
[cameron@renewableNW.org](mailto:cameron@renewableNW.org)

*/s/ Silvia Tanner*

Silvia Tanner  
Staff Counsel  
Renewable Northwest  
[silvia@renewableNW.org](mailto:silvia@renewableNW.org)

*/s/ Fred Heutte*

Fred Heutte  
Senior Policy Associate  
NW Energy Coalition  
[fred@nwenergy.org](mailto:fred@nwenergy.org)