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December 1, 2017

VIA ELECTRONIC FILING

Oregon Public Utility Commission
Attention: Filing Center
P.O. Box 1088
Salem, OR 97308-1088

**Re: In the Matter of Portland General Electric Company 2016 Integrated Resource Plan
– Docket LC 66**

Dear Filing Center:

Enclosed for filing are comments of National Grid USA on Portland General Electric Company's Revised Addendum to its 2016 Integrated Resource Plan, which was filed in the above-referenced docket on November 9, 2017.

Thank you for your attention to this matter. Please contact me with any questions or concerns.

Sincerely,

/s/ Chris D. Zentz
Chris D. Zentz

cc: Service List

**BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON**

LC 66

In the Matter of

PORTLAND GENERAL ELECTRIC
COMPANY,

2016 Integrated Resource Plan.

NATIONAL GRID'S COMMENTS
ON PORTLAND GENERAL
ELECTRIC COMPANY'S
ADDENDUM TO ITS 2016
INTEGRATED RESOURCE PLAN

National Grid USA ("National Grid") hereby submits these comments ("Comments") on Portland General Electric Company's ("PGE's") Addendum ("Addendum") to its 2016 Integrated Resource Plan ("IRP").

I. Introduction

National Grid is interested in pumped storage projects and the ability of these large-scale energy storage projects to provide energy, capacity, and related services, including supporting the integration of renewable energy resources. National Grid is proud to be involved with the development of the two most promising pumped storage projects in the Pacific Northwest, the Swan Lake North Project in southern Oregon ("Swan Lake"), and the Goldendale Energy Storage Project in southern Washington. National Grid is jointly developing these projects with Rye Development, LLC.¹ Both projects will utilize environmentally-friendly "closed-loop" technology, are located near high voltage transmission corridors, and will each be able to provide unmatched flexibility as a resource, serving multiple roles, and providing stacked energy, capacity, and other reliability and economic benefits on a utility and/or regional basis.

As several parties have acknowledged throughout this proceeding, additional renewable generation facilities place new demands on PGE's transmission system. If approved, PGE's Addendum will result in an even greater need for tools to evaluate grid-scale energy storage as support for the integration of additional renewable generation resources. Accordingly, we respectfully request that if the Commission approves PGE's Addendum, it do so with the requirement that PGE undertake active and concrete steps to adequately evaluate and consider grid-scale energy storage projects such as Swan Lake as part of its portfolio analysis in its next IRP proceeding.

¹ Although National Grid is the intervenor in this proceeding, Rye Development, LLC shares National Grid's concerns and fully supports these Comments.

II. Comments

A. Context for PGE's Addendum Filing.

The Addendum is now before the Commission because there were concerns amongst stakeholders in this docket regarding PGE's plan to acquire renewable generation facilities on an accelerated timeline in order to take advantage of certain, expiring tax benefits. If the Addendum is acknowledged by the Commission, PGE will acquire additional renewable generation resources, which will result in an even greater need for flexibility and resource diversity to incorporate such resources.

National Grid has been an active participant throughout PGE's IRP proceeding and has consistently advocated for full consideration in the IRP of grid-scale energy storage such as closed-loop pumped storage, which is a proven, cost-effective resource that would provide PGE with the flexibility it needs to add additional renewable generation resources like those proposed in the Addendum filing.² For example, in its comments on the IRP, National Grid noted that closed-loop pumped storage is a proven, cost-effective resource that would support PGE's integration of additional renewable generation facilities and fulfill PGE's stated capacity needs.³ As has been repeatedly recognized throughout this proceeding, grid-scale energy storage is a proven, cost-effective resource for integrating large renewable generation resources.⁴ In fact, PGE recognized the value of grid-scale energy storage in integrating renewable generation in its initial IRP filing.⁵

However, despite PGE's recognition of the value of grid-scale energy storage, PGE's initial IRP filing indicated that, due to the lack of necessary analytic tools, it did not consider storage options as part of its portfolio analysis.⁶ PGE also noted that full consideration of a grid-scale energy storage device would increase "computation time."⁷ Thus, at a time when PGE and

² E.g., *In the Matter of Portland General Electric Co. 2016 Integrated Resource Plan*, National Grid's Final Comments in Response to PGE's Reply Comments, Docket LC 66 (filed May 12, 2017).

³ *Id.* at 6-8 (Noting PGE's recognition in its IRP filing that renewable resources are likely to be substantially curtailed at 50% RPS and noting that closed-loop pumped storage, like Swan Lake, can avoid the need to curtail resources while also maximizing the use of PGE's existing generation fleet).

⁴ See, e.g., *In the Matter of Portland General Electric Co. 2016 Integrated Resource Plan*, Final Comments of Renewable Northwest at 8 (filed May 12, 2017); accord Staff Final Comments at 11.

⁵ *In the Matter of Portland General Electric Co. 2016 Integrated Resource Plan*, 2016 IRP at 234, Docket LC 66 ("As both renewable integration challenges grow and technology costs drop, PGE anticipates that energy storage systems will eventually be part of a cost-effective strategy for meeting [PGE's] renewable, flexibility, and capacity needs.") ("IRP").

⁶ IRP at 246 ("In particular, the energy storage evaluation exercise has highlighted the challenge of accurately quantifying the value of highly flexible resources in a planning exercise that spans several years and considers multiple futures. While it may be computationally infeasible to perform the operational analysis described above over the same set of portfolios, years, and futures evaluated in the IRP, it will become increasingly important to incorporate the insights from this type of operational modeling into the portfolio analysis framework.")

⁷ *Id.* at 235 ("Full consideration of an energy storage device (and the value it brings to a system requires detailed modeling of complex operational constraints, representation of reserve requirements, and high resolution

its ratepayers would most benefit from storage to help manage the integration of the additional renewable generation resources PGE is seeking to acquire through the Addendum filing, PGE lacks the ability to evaluate such grid-scale energy storage resources in its IRP. Therefore, projects such as Swan Lake are wholly excluded from PGE's portfolio evaluation in its IRP, even though such projects can provide significant benefits to balance the demands of incorporating the additional renewable generation facilities PGE is seeking to acquire. To remedy this issue, National Grid requests that the Commission impose conditions on the acknowledgment of PGE's Addendum filing, as further laid out in Section II.C below.

Despite National Grid's consistent advocacy for a more robust consideration of grid-scale energy storage by PGE in this IRP, National Grid has seen little action from the Commission or Staff to require PGE to address this issue. In the Commission's order acknowledging PGE's last IRP in Docket LC 56,⁸ the Commission directed PGE "to develop a wide range of portfolios for meeting its incremental capacity and energy needs" for its next IRP. The Commission went on to emphasize that these portfolios should include "developing new storage facilities."⁹ Despite this explicit directive and the recognized value of grid-scale energy storage in integrating renewable generation, PGE has failed to adequately consider grid-scale energy storage in its portfolio analysis in the current IRP. Therefore, National Grid is concerned that, if the Commission does not provide more explicit direction to PGE and condition its acknowledgment of the Addendum by imposing the conditions set out in Section II.C below, the failure to adequately consider grid-scale energy storage will be repeated in PGE's next IRP.

B. PGE's Battery Storage Proposal in Docket UM 1856 is an Inadequate Solution to the Additional Demands Placed on PGE's Transmission System by Additional Renewable Generation Facilities.

PGE recently filed its energy storage proposals and a revised energy storage potential evaluation framework (the "Battery Storage Filing") in Docket UM 1856.¹⁰ However, PGE's proposal in that docket is insufficient to address the issues associated with the additional demands placed on PGE's transmission system by the large, grid-scale renewable energy projects that PGE seeks to acquire through the acknowledgment of the Addendum.

The Battery Storage Filing proposes a variety of small-scale energy storage solutions, largely consisting of battery applications, to address the Commission's directives in Order Nos. 16-504, 17-118, and 17-375, and House Bill 2193. PGE's Battery Storage Filing states that one of the main purposes for its filing is "to conduct a variety of energy storage *experiments* to learn

characterization of renewable integration challenges, all of which dramatically increases computation time and limits the scope of the analysis in time and across futures.").

⁸ *In the Matter of Portland General Electric Co. 2013 Integrated Resource Plan*, Order No. 14-415 at 6 (Dec. 2, 2014).

⁹ *Id.*

¹⁰ *See In the Matter of Portland General Electric Co., Draft Storage Potential Evaluation*, PGE's Energy Storage Proposals and Revised Energy Storage Potential Evaluation at 24, Docket UM 1856 (filed Nov. 1, 2017) (the "Battery Storage Filing").

more about what works best for PGE's system to effectively guide future investments."¹¹ Although these battery storage projects may have a role to play in providing local reliability and distribution-level benefits to PGE's system, these projects are not capable of meeting PGE's grid-scale flexibility and capacity needs due to their lack of scalability, higher cost on a per kW basis, and relatively short useful life.¹²

At the time of its next IRP filing, PGE's storage experiment should give it further experience with storage that may further inform a methodology for adequately considering grid-scale energy storage projects such as Swan Lake, as National Grid has recommended in these Comments. However, these experiments are not a solution to PGE's large capacity needs, nor do they provide the same grid-scale benefits PGE will require in order to manage the integration of grid-scale renewable generation projects of the type being proposed in the Addendum.

- C. *National Grid Requests that the Commission Only Acknowledge the Addendum if it is Conditioned Upon PGE Adequately Evaluating Grid-Scale Energy Storage in its Next IRP Proceeding.*

To prevent PGE from repeating the same mistakes in its next IRP, National Grid requests that the Commission place conditions on its acknowledgement of PGE's Addendum. In particular, National Grid asks that the Commission direct PGE to take the following steps before filing its next IRP with the Commission:

1. Work with stakeholders to develop better modeling that adequately captures the various values grid-scale energy storage can provide on a sub-hourly basis as both a transmission and generation asset;
2. With some refinements and improvements (described below), require the incorporation of the storage evaluation methodology developed and adopted in Commission Order No. 17-118 in PGE's next IRP.¹³ The storage methodology adopted in that order correctly values grid-scale energy storage by: (a) recognizing that any valuation of these resources requires stacking of the various grid services these resources provide; and (b) analyzing these resources requires co-optimizing the services provided by these resources to the electrical grid to ensure all of the potential values are adequately captured; and
3. Work with National Grid to ensure that Swan Lake is fully-modeled and evaluated in PGE's next IRP process. While National Grid recognizes that closed-loop pumped storage projects are geographically dependent, our region is blessed with one of the

¹¹ *Id.* at 40 (emphasis added).

¹² *Id.* at 143 ("We estimate the portfolio will cost \$108M - \$190M and will generate \$89M - \$107M of value for customers (net present value).").

¹³ *In the Implementing Energy Storage Program Guidelines Pursuant to House Bill 2193*, Order No. 17-118 (March 21, 2017).

most attractive and mature sites in the Western United States that does not require “years of environmental review and permitting,” as PGE has claimed.¹⁴

Although National Grid has recommended above that the Commission direct PGE to incorporate the storage evaluation methodology adopted in Order No. 17-118 in its next IRP proceeding, National Grid suggests that this methodology also requires some improvement, if it is going to be used in the IRP process. For example, when considering regional benefits of storage, this methodology only considers the value associated with the California energy imbalance market and does not consider the multi-regional value of projects like Swan Lake. This analysis gap may not be problematic for the methodology’s currently intended use to evaluate battery storage proposals; however, if adopted for use in the IRP process, these broader, multi-regional values must be considered, given the IRPs longer-term planning scope. Some of these multi-regional values include California energy arbitrage and “flexible services” opportunities, additional grid flexibility to support BPA’s management of the federal hydropower system, and greater regional integration amongst potential offtakers from a large, grid-scale energy storage project like Swan Lake.

Projects like Swan Lake can provide a higher value (*i.e.*, greater benefits) on a multi-regional basis as compared to a single region use-case, which could translate into lower net resource costs for Oregon. Further, any deterministic or linear analysis does not capture the option value that storage provides under uncertainty. One way to evaluate this optionality value is to construct multiple scenarios regarding the future, in addition to running multiple sensitivities to see how storage (and potentially other technologies) provide this optionality value. For example, these scenarios should consider topics such as:

- Does the scenario assess multi-regional value under a more regionalized western market in the longer-term;
- What are the assumptions around existing generation retirements and repowerings;
- Will the Northwest hydropower system become more constrained over time;
- Will there be more wet and dry years due to climate change and fewer “normal” years;
- What are the true constraints around building new thermal generation; and
- How much customer sited generation is expected, etc.

National Grid understands the challenges and limitations of doing this kind of analysis, which is why these scenarios and sensitivities can be analyzed at a lower level of rigor than a traditional IRP analysis, while still informing the IRP process. This is possible because the purpose of such an analysis would be to evaluate the robustness of a resource under a highly-uncertain future that is constantly evolving, rather than engaging in a highly-detailed and time-consuming analysis that may not even be possible with the current tools at PGE’s disposal. This additional analysis should not be limited to considering grid-scale energy storage resources.

¹⁴ Battery Storage Filing at 24 (Noting that pumped hydro facilities “require years of environmental review and permitting...”).

Furthermore, this analysis would fit within PGE’s planning paradigm of “least cost, least risk” by further accounting for risk through more robust scenario and sensitivity analysis that reflects larger and more profound changes to both the supply and demand side of the electricity system. Under this type of analysis framework, grid-scale energy storage, once analyzed, would likely have a very high value in comparison to other resources considered, given the multitude of different services grid-scale energy storage can provide across a wide range of scenarios and sensitivities. As a result, this type of analysis framework would likely conclude that grid-scale energy storage is one of the most cost-effective options for meeting PGE’s current and future needs, while also providing PGE with the optionality to effectively manage and address future uncertainties that may arise in the energy markets.

D. *The Commission Should Also Consider Developing a Procurement Framework for Grid-Scale Energy Storage and Work with its Washington Counterpart on Energy Storage Issues.*

In addition to imposing the above minimum conditions on the acknowledgement of PGE’s Addendum, National Grid also suggests that the Commission consider developing a framework for PGE to procure grid-scale energy storage projects, considering their unique and numerous benefits to the electric grid. National Grid suggests that such a framework could be developed through Staff-led technical workshops or through a new docket before the Commission.

Additionally, National Grid recommends that the Commission consider coordinating its grid-scale energy storage efforts with the Washington Utilities and Transportation Commission (“WUTC”). In Docket U-161024, the WUTC issued a “Report and Policy Statement on the Treatment of Energy Storage Technologies in Integrated Resource Planning and Resource Acquisition” (the “Storage Policy Statement”).¹⁵ The Storage Policy Statement provides guidance to Washington utilities on planning, modeling, and regulatory treatment of storage resources in their respective IRP processes. This guidance is an important first step in adequately considering grid-scale energy storage in the IRP process and, therefore, National Grid suggests that the Commission should consider working with its Washington counterpart to build upon the directives in the Storage Policy Statement and to adopt similar guidance and requirements.

¹⁵ Report and Policy Statement on the Treatment of Energy Storage Technologies in Integrated Resource Planning and Resource Acquisition, WUTC Docket U-161024 (issued October 11, 2017), available at: <https://www.utc.wa.gov/layouts/15/CasesPublicWebsite/GetDocument.ashx?docID=237&year=2016&docketNumber=161024>.

III. Conclusion

National Grid respectfully requests that the Commission impose the conditions recommended in these Comments on its acknowledgement of PGE's Addendum, particularly considering the increased need for grid-scale energy storage solutions to aid in the integration of the renewable energy projects like those PGE is seeking to acquire through the Addendum filing. Without these conditions, PGE's IRP will continue to lack a suitable methodology for evaluating grid-scale energy storage solutions at a time when PGE's need for storage is at its greatest.

Furthermore, considering the relative cost of the storage proposals put forth by PGE in Docket UM 1856 and the least-cost resource planning context of the IRP process, there is an even greater need for an adequate methodology to evaluate larger, grid-scale energy storage projects like Swan Lake in the IRP. Unlike the battery storage proposals under consideration in Docket UM 1856, pumped storage is the only proven, reliable, and cost-effective solution to PGE's grid-scale flexibility and capacity needs—which are in part due to the addition of more renewable generation resources like those proposed in the Addendum.

Therefore, for the reasons given above, PGE should be required to fully evaluate and consider grid-scale energy storage resources like Swan Lake in its next IRP.

Dated this 1st day of December, 2017.

Respectfully submitted,

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