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September 16, 2016

VIA ELECTRONIC MAIL ONLY

Attention: Filing Center  
Public Utility Commission of Oregon  
201 High Street, Suite 100  
P.O. Box 1088  
Salem, OR 97308-1088

Re: *In the Matter of OREGON PUBLIC UTILITY COMMISSION Implementing Energy Storage Program Guidelines pursuant to House Bill 2193*  
OPUC Docket No.: UM 1751  
DOJ File No.: 330030-GN0106-16

Filing Center:

On behalf of the Oregon Department of Energy, enclosed for electronic filing today with the Commission are the COMMENTS OF THE OREGON DEPARTMENT OF ENERGY in the above-captioned docket.

Sincerely,

*Debra Morganar*  
FOR Renee M. France  
Senior Assistant Attorney General  
Natural Resources Section

Enclosures  
RMF:jrs/#7702579  
c: Wendy Simons, ODOE

**BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON  
UM 1751**

In the Matter of )  
OREGON PUBLIC UTILITY ) COMMENTS OF  
COMMISSION ) THE OREGON DEPARTMENT OF  
Implementing Energy Storage Program ) ENERGY  
Guidelines pursuant to House Bill 2193 )  
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### **Summary**

The Oregon Department of Energy (ODOE or department) is pleased to submit these comments in response to the Public Utility Commission's (PUC or Commission) Order No. 16-316 proposing guidelines pursuant to House Bill 2193 (2015) to implement an energy storage program. The comments ODOE is submitting at this time address section C of the proposed guidelines, "Storage Potential Evaluation Requirements." The department's comments focus on two issues: the complexity of evaluating the wide range of identified use cases for energy storage projects, and the timeline for evaluation proposed in the Commission's order.

### **Energy Storage Use Cases**

The Commission's order proposes that Commission staff convene a series of workshops beginning in late 2016 to resolve several technical issues and to develop a framework for the utilities to utilize in their evaluation of proposals for energy storage projects. ODOE appreciates the effort of the PUC to outline a methodical process for developing a robust evaluation of energy storage projects by the utilities. The department is concerned, however, that the order does not adequately consider the complexity of developing robust methodologies for the valuation of the large number of identified use cases for energy storage projects.

ODOE is a co-funder, along with the U.S. Department of Energy Office of Electricity and Oregon BEST, of an energy storage pilot project in Oregon. The project, Eugene Water and Electric Board's (EWEB) "Grid Edge Demonstration," was selected through a competitive process and is supported by project partners Clean Energy States Alliance, Sandia National Laboratories and Pacific Northwest National Laboratory. This project has demonstrated to department staff the complexity of evaluating the multitude of different use cases identified for energy storage projects. The EWEB demonstration project, for instance, will demonstrate the following energy storage use cases:

*Transmission & Distribute Upgrade Deferral:* Utilizing energy storage capabilities to reduce peak demand in order to defer costly upgrades to power lines, transformers, substations, or other equipment.

*Service Reliability / Resiliency:* Providing back-up power to critical loads in the event of wider grid outages.

*Power Quality / Voltage Support:* Utilizing the power conversion systems of energy storage for dynamic, bi-directional VAR support.

*Grid Regulation:* Utilizing energy storage capabilities to provide regulation services to the grid with a faster response time than conventional assets.

*Renewable Integration (firming, ramp control, and energy shifting):* Providing balancing capabilities to smooth the output of solar and wind generators, reduce the need for curtailment of renewables, and assist variable renewable generators in meeting interconnection standards.

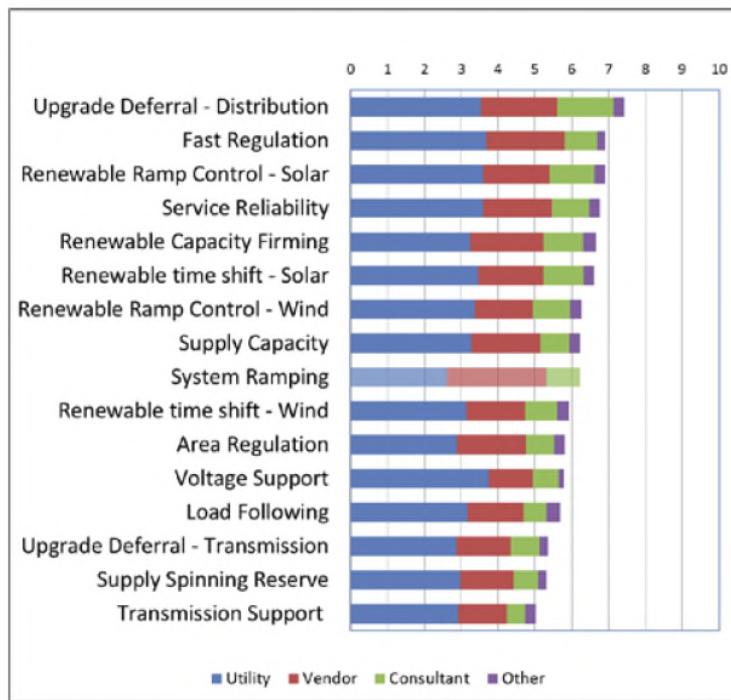
Further, ODOE staff recognizes that the EWEB project is demonstrating only a subset of the total number identified use cases for energy storage projects. For this reason, we recommend that the Commission reconsider whether the process identified in this order is sufficient to develop robust valuation methodologies for these, and other, varied use cases of energy storage projects.

To better understand the full range of use cases identified by industry, we recommend the Commission refer to technical guidance on this subject funded by US DOE and published by the National Laboratories. The department would like to refer the Commission to two documents in particular. First, US DOE produced the DOE/EPRI 2013 Electricity Storage Handbook in Collaboration with NRECA (Sandia Report SAND2013-5131, July 2013, <http://www.sandia.gov/ess/publications/SAND2013-5131.pdf>). The first chapter of the handbook, entitled “Electricity Storage Services and Benefits,” lists fifteen separate services provided by energy storage (see Table 1 below):

**Table 1. Electric Grid Energy Storage Services Presented in This Handbook**

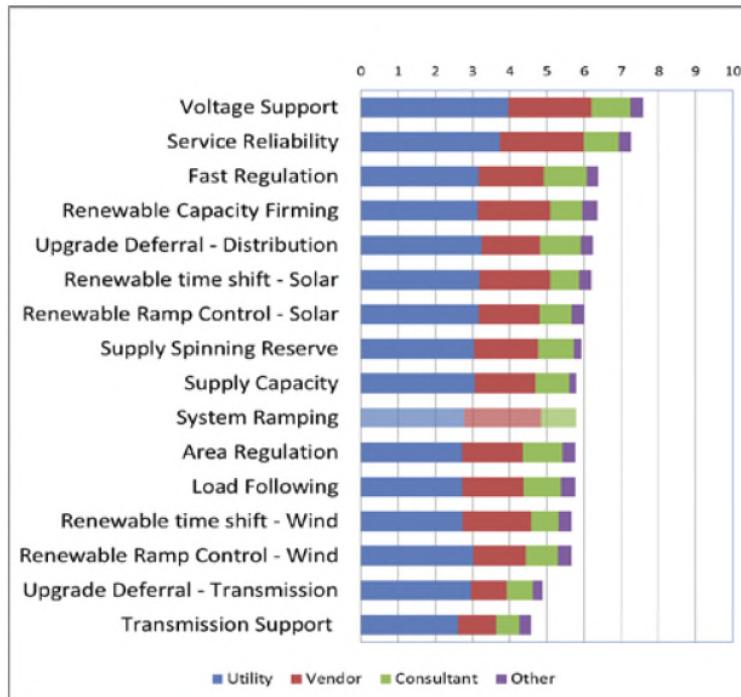
| Bulk Energy Services                             | Transmission Infrastructure Services |
|--|--------------------------------------|
| Electric Energy Time-Shift (Arbitrage)           | Transmission Upgrade Deferral        |
| Electric Supply Capacity                         | Transmission Congestion Relief       |
| Ancillary Services                               | Distribution Infrastructure Services |
| Regulation                                       | Distribution Upgrade Deferral        |
| Spinning, Non-Spinning and Supplemental Reserves | Voltage Support                      |
| Voltage Support                                  | Customer Energy Management Services  |
| Black Start                                      | Power Quality                        |
| Other Related Uses                               | Power Reliability                    |
|  | Retail Electric Energy Time-Shift    |
|  | Demand Charge Management             |

Second, Sandia funded the Distributed Energy Storage Roadmap for the National Alliance for Advanced Technology Batteries (NAATBatt Distributed Energy Roadmap Report, Sandia National Laboratories PO #1367842, Feb. 17 2014, [http://naatbatt.org/wp-content/uploads/2015/06/NaatBatt\\_Report\\_FINAL\\_021814.pdf](http://naatbatt.org/wp-content/uploads/2015/06/NaatBatt_Report_FINAL_021814.pdf)). The purpose of this project was to survey electric utilities, storage vendors and other stakeholders of the electricity grid concerning their views about the optimal use of distributed energy storage technology and the principal barriers that prevent widespread deployment of that technology on the grid today. This analysis included surveying utilities, consultants and energy storage vendors to explore the highest interest use cases. Figure 7 (below) from the NAATBatt report, ranks sixteen use cases for primary applications, where the application is the distributed energy storage device dispatch priority:



**Figure 7 - Primary Applications Ranking**

The Sandia project also asked respondents to rank secondary applications, where the application is bundled with another primary application to provide additional benefits. This is often referred to as “value stacking”, in this case only stacking two use cases. Figure 8 illustrates the different ranking for secondary applications, demonstrating the complexity of evaluating energy storage use cases, especially multiple use cases for a single energy storage system:



**Figure 8 - Secondary Applications Ranking**

### Proposed Timeline for Evaluation

Additionally, while the department appreciates the Commission's interest in making progress on the implementation of HB 2193 in a timely fashion, ODOE has concerns with the timeline proposed in section C.

The order outlines eight *minimum* requirements that the utilities must include in their draft storage potential evaluation guidelines to be filed by June 1, 2017. Given that the order proposes that PUC staff complete development of a framework for these evaluations by March 31, 2017, it seems unreasonable to expect the utilities to convert that framework into robust evaluation guidelines in 43 business days (between March 31 and June 1).

As one example of the challenge that this timeline presents, ODOE highlights here one of the Commission's eight proposed minimum requirements for the utility's draft storage potential evaluation guidelines: "*d. Identify system locations with the greatest storage potential.*" While ODOE agrees that this type of analysis would be of significant value to the state, the utility, and the market, we are concerned that it would be impossible for the utility to complete this analysis in a meaningful way in the timeline proposed.

To identify system locations with the greatest storage potential would require the development of an energy storage sizing and siting optimization model that takes into account, among other things, the multitude of different use cases of energy storage projects, optimized for various outcomes (e.g., maximizing the value of the storage projects or minimizing overall system costs)

across the utility's entire electric transmission and distribution system. ODOE recommends that the Commission consider the existing academic and industry literature on the complexity of developing energy storage sizing and siting optimization tools, for example:

[http://www.ee.washington.edu/research/real/Library/Reports/storage\\_siting\\_and\\_sizing.pdf](http://www.ee.washington.edu/research/real/Library/Reports/storage_siting_and_sizing.pdf)

The department appreciates the opportunity to comment on the proposed guidelines, and appreciates the work of the Commission in developing them.

DATED this Friday, September 16, 2016.

Respectfully submitted,

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Attorney General

/s/ Renee M. France

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Of Attorneys for Oregon Department of Energy