UniEnergy Technologies

April 3, 2017

Mr. Steven V. King
Director and Secretary
Washington Utilities and Transportation Commission
P.O. Box 47250
Olympia, Washington

RE: Draft Report and Policy Statement on Treatment of Energy Storage Technologies in Integrated Resource Planning and Resource Acquisition (Dockets UE-151069, U-161024)

Dear Mr. King, Commissioners and Commission Staff,

Thank you for the opportunity to submit comments on the Draft Report and Policy Statement on Treatment of Energy Storage Technologies in Integrated Resource Planning and Resource Acquisition. UniEnergy Technologies (UET) is an energy storage solutions provider with its headquarters and manufacturing facility located in Mukilteo, WA. UET is a participant in Puget Sound Energy's current IRP process, and looks forward to participating in future IRP processes of the electric utilities regulated by the Commission. We would like to offer our insights and suggestions regarding updates to the IRP process, specifically as it relates to grid-scale energy storage solutions, and comprehensive energy storage policy in Washington State.

Before then, we would like to compliment the commission and staff on their diligence and extensive work on understanding the energy storage industry and applications in the market. As you know, this is very dynamic and fast-changing industry already delivering benefits to Washington State's utilities and their customers. As pointed out in the draft policy statement, a combination of public policy, increased adoption, and cost reductions have created a strong market signal for investment in energy storage technologies.

Energy Storage Cost Declines

In terms of cost, we would like to note utility-scale batteries have declined in cost across multiple chemistries and technologies. While the policy statement references cost declines in lithium-ion battery technologies (Paragraph 19), it should also note the price of utility-scale advanced vanadium flow batteries has decreased by approximately one-third (34%) since UTC staff initiated the energy storage investigation in May 2015. While the lower costs of energy storage systems benefit utilities and their customers, it does create an extra effort for utilities to seek out up-to-date cost projections for their IRP modeling. Fortunately, there are now several credible third-party organizations that track these costs including Lazard, EPRI, and the Pacific Northwest National Laboratory (PNNL) (Paragraph 53 and 65). In addition, current market pricing is available to Washington State utilities via a number of Clean Energy Fund project proposals and has been provided voluntarily though the IRP process itself. UET has been

4333 Harbour Pointe Blvd SW, Mukilteo, WA 98275
P: (425) 290-8898 | F: (425) 740-9898 www.uetechnologies.com

open in sharing our current pricing with UTC staff and Puget Sound Energy, as part of educating the market on the actual cost of advanced flow batteries and the multiple use cases and "stacked" benefits they provide to utilities and thus the ratepayers.

Increases in Long-duration Storage Deployments

The reasons for the price decline just noted include technology improvements, economies of scale in manufacturing, and market adoption. As the statement notes, GreenTech Media (GTM) has forecast more than 2,000 megawatts (MW) of energy storage to be deployed in the United States by 2021) compared to 260 MW deployed in 2016 (Paragraph 20). Perhaps even more importantly, the same report indicates the market's fast adoption of MW has been exceeded by even faster growth in megawatt hours (MWh). The MWh's of US deployments in 2016 was forecast to reach 475MWh, a 284-percent increase over 2015 at 167MWh. This is important to note because it points to a trend in the adoption of *long-duration energy storage*. Long-duration storage, which provides energy for four (4) hours or more, is critical in providing the multiple use cases, or "stacked" benefits to utilities that are outlined throughout the policy statement.

Energy Storage Evaluation Framework

The policy statement accurately points out distributed energy resources now allow utilities to apply to distribution planning the resource portfolio approach historically used in integrated resource planning. And, while the commission staff makes a differentiation between distribution planning and the IRP process, we believe the cost modelling and evaluation framework should be consistent for both the IRP and distribution procurement purposes. Using a tool that identifies the stacked benefits or economies of scope for energy storage including all the operational and locational benefits is an approach that many have suggested and we agree with. The tool as defined would include sub-hour modeling and a net present value (NPV) approach to modeling (Paragraphs 35- 38).

However, we strongly suggest any tool using a NPV approach explicitly include *operational costs* over the lifetime of the asset, not just capital costs. We believe a good metric is the total cost of ownership (TCO), which is used by the Electric Power Research Institute (EPRI) and utilized in its energy storage evaluation tool.

We included these comments in our initial response to docket UE-161024 dated November 2, 2016:

> *One area in particular that needs more attention in modeling energy storage is degradation of capacity and efficiency over the lifetime of the storage system. Current battery technologies have significant differences. Examples include a 5-7 year life of a battery with limited cycles versus a 20-year life with unlimited cycles, and accelerated reduction in efficiency as certain storage systems age. Other examples are floor and ceiling constraints on the use of stored energy, and specific site constraints that require specific use cases and modelling. While others have suggested storage be addressed as "technology agnostic", we believe these differences between technologies are economically significant and should be addressed explicitly.*
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> *We propose the IRP process adopt a total cost of ownership (TCO) or levelized cost of storage (LCOS) model for the IRP process. This type of financial modelling is used in other areas in the IRP*

and is an effective way of addressing the degradation, cycling, state of charge, and multiple use case comparisons among battery storage technologies.

Interaction with Regional Transmission Planning

We agree the energy policies enacted by Washington have driven energy diversity and discouraged the use of fossil-fueled generation resources which are often distant and require the use of regional transmission systems (Paragraph 21-24). We believe the procurement and implementation of cost-effective, reliable long-duration energy storage will enable Washington state energy policies to impact regional transmission planning decisions in much the same way it elevated the need for utilities to address renewable resource integration. We acknowledge the resource planning process for the distribution system is fundamentally different than integrated resource planning process for transmission system, however, we do not agree that the policy statement should be limited to the distribution level. Rather we believe Washington should set policy to acknowledge the complexities and different modeling approaches and recommend the two processes should inform each other, and areas of collaboration and positive interaction be sought to improve the integration with the two systems. Specifically, energy storage at both the distribution and transmission levels should be considered as a possible means of providing additional benefits to the citizens of Washington.

Sharing of Proprietary Utility Models

Modeling for energy storage is complex with the potential for hundreds of data points based on location and timeframe. The UTC has identified two publicly available tools to model energy storage use cases: the Battery Storage Evaluation Tool (BSET) model from PNNL and EPRI's Energy Storage Valuation Tool (ESVT) (Paragraph 49). There are also several sub-hourly modelling tools available commercially by subscription, and some utilities have developed their own propriety modeling tools (Paragraphs 37-38).

We fully support transparency in modelling during the IRP process and would encourage the Commission to urge use of the BSET or ESVT tools so all stakeholders can test assumptions and model. If a utility chooses a proprietary system, we believe they should provide full-access to the tool to all stakeholders and allow stakeholder to model alternative scenarios. Any concerns the area of securities law can be otherwise handled than restricted access to tools.

We suggest this based on prior experience in others states who have involved a third-party for independent model analysis. In California for example, the utilities are required to engage an Independent Evaluator (IE) to handle proprietary data and model alternative scenarios. However, we believe this system has not led to the transparency that is the spirit of the rule. **Clean Energy Fund**

Washington has developed a multi-pronged path to diversify our state's energy mix and reducing the impact of electricity generation on the environment. Through policy and voter initiatives, the citizenry has indicated that a greater use of clean energy is an important environment and economic model. To that end, the Washington state legislature has allocated funds via the state's Clean Energy Fund for the past two capital budgets (and is considering additional funding in the 2017 session) to assist utilities in investing and developing the infrastructure, including energy storage, that this path requires.

The policy statement requires utilities to demonstrate they have been actively pursuing funding opportunities via the Clean Energy Fund and the Department of Energy to match their investment in

energy storage (Paragraph 57). We believe this statement could be made stronger by explicitly stating the utilities should participate in *each round* of Clean Energy Fund program, to ensure they are continuously evaluating energy storage as an option for their procurement, and remaining current on use cases, technology and pricing in the dynamic market.

Finally, we realize the Commission staff has purposefully used broad terms such as "reasonably considered all the costs and benefits" of energy storage against other energy generation and transmission option (Paragraph 44). While this provides some flexibility for the Commission and staff, we also hope the learning process and public feedback on these consolidated dockets will allow for more specific guidance in the future.

Again, thank you for the opportunity to submit our comments to the Commission on beneficial updates to the IRP process in Washington and comprehensive policy energy storage in Washington. We are happy to answer any questions you have about our suggestions.

Sincerely,

Renee Gastineau
Manager, Business Development and Marketing

Russ Weed
Vice President of Business Development and Marketing,
General Counsel