BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

In the matter of PUBLIC UTILITY COMMISSION OF OREGON, Implementing Energy Storage Program Guidelines pursuant to House Bill 2193	Comments of Sunverge Energy

COMMENTS OF SUNVERGE ENERGY

COMMENTS REQUESTED TO INFORM STRAW PROPOSAL

1. INTRODUCTION

Sunverge Energy, Inc. ("Sunverge") appreciates the opportunity to participate in this important discussion about the role of energy storage in Oregon and this initial phase of implementation of House Bill 2193.

Sunverge is a California-based technology company focused on optimizing the value of renewable power by leveraging the practical advantages of distributed generation, energy storage and advanced networked communications. The Sunverge platform provides value across multiple domains, including utility operations, customer systems and societal policy objectives. Our current activities and future vision include optimizing distributed energy resources installed at the customer premise to provide both direct customer benefits and new system-level operational capabilities.

We encourage policy frameworks that seek to stimulate new opportunities for utilities and market participants alike through business model innovation.

Our comments include observations and recommendations based on our direct experience working with customer-sited energy storage systems that are networked and aggregated to provide a resource to the utility or grid operator. Sunverge is active in United States and internationally.[1]

2. GENERAL REMARKS

Energy storage systems bring a unique suite of capabilities that are rooted in a combination of two characteristics that distinguish it from other distributed (or centralized) energy resources. As a result, energy storage systems present similarly unique policy implications that must be considered when implementing a regulatory framework as prescribed by legislation, as this proceeding seeks to do.

First, storage energy allows two-way, fast-response flows of energy. As a result, policy frameworks must be designed with consideration for the most effective ways to address (1) charging, (2) discharging and (3) ancillary services.

Second, storage systems can be deployed at every scale of the electricity system, from bulk energy markets to the distribution system to the customer premise. Accordingly, implementation strategies must be designed with consideration for realizing benefits at multiple scales. We briefly highlight, at a high level, specific benefits that energy storage brings to various levels of the grid architecture, including:

Bulk Power System

- Fast-response ramping capabilities
- Increased renewable energy generation
- Load-shifting

[1] For example, Sunverge is a partner in the largest distributed energy storage project in North America, involving hundreds of homes in New York City and 1.8 megawatts, or 4 megawatt hours, of battery storage. More information is available from http://www.sunverge.com/con-edison-virtual-power-plant-program-combines-solar-storage-improve-grid-resiliency/.

- Demand response
- Frequency support

Distribution System

- Increased distributed energy resource capacity
- Ability to address peak demand needs with local precision
- Capital investment deferral
- Voltage support

Customer

- Increased reliability and resiliency
- Rate and bill management
- Increased renewable energy utilization
- Customer choice and engagement

Energy storage is a key component of the value chain for a resilient grid that integrates clean energy and optimizes infrastructure investments. Accordingly, Sunverge supports the development of thoughtful policy regimes and financial incentives to promote the near-term deployment of energy storage systems, particularly networked systems that can provide a variety of services to support grid operations. Storage can play a vital role in enhancing the "carrying capacity" of distribution circuits and congested areas by storing energy locally for use at more advantageous times.

3. RECOMMENDATIONS

Sunverge offers the following overall recommendations regarding the implementation of HB 2193 and the development of a comprehensive policy framework to guide the thoughtful deployment of energy storage resources in Oregon. We recognize that some of these recommendations may extend beyond the immediate scope of this proceeding, but believe that Commission action is warranted in order to effectively address the implementation of HB 2193 within the context of established policy objectives in Oregon and overall market and technology trends.

1. *Residential systems provide unique economic, environmental and reliability benefits for consumers. Commission guidelines should require that proposals include specific residential and behind-the-meter deployments.*

   Certain benefits are only available from energy storage systems located at the customer premise. First, energy storage can provide increased reliability and backup power for consumers, but only if the storage resources are located on the customer premise from in front of or behind the billing meter. Second, storage can support customers' ability to manage both the energy and demand portions of their bills, but only if located on the customer side of the meter. Third, as observed in earlier workshops, storage can increase the utilization of clean, distributed energy resources. For individual consumers, this capability would allow for the installation of more clean energy generation assets, but only if the storage resources are available on the customer premise.

   Ensuring that residential systems are included within the portfolio of projects presented to the Commission is entirely consistent with HB 2193, which calls on the Commission to consider the "reduced need for additional generation of electricity during times of peak demand", "improved integration of different types of renewable resources", "reduced greenhouse gas emissions" and "improved reliability." Further, we find nothing within HB 2193 to suggest that projects should be limited to particular applications or market segments.

2. *Commission guidelines should include requirements to include multiple ownership models for energy storage resources.*

   HB 2193 specifically includes consideration of multiple ownership models for energy storage resources, defining "procure" to include both "acquire by ownership", "acquire by contract the right to use the capacity of or the energy from a qualifying energy storage system" and "the acquisition of ancillary services." Nationwide, distributed energy resources, including storage, are being

deployed through both utility and consumer market channels. Regulatory commissions are examining the efficacy and impact of various ownership structures and business models with regard to distributed energy and storage. Certainly, there are certain benefits of these resources that can only be realized when there is directly access to the capabilities of the energy storage systems, but there are other benefits (access to private investment capital, for example) that are only realized through other ownership models. Accordingly, we believe it is appropriate and within the intent of HB 2193 to include a variety business models for project proposals.

3. *Consideration of energy storage resources should be included within the implementation Oregon's overarching environmental policies.*

   While perhaps beyond the scope of the immediate proceeding, the State of Oregon has established various policies focused on reduction of carbon emission, procurement of renewable energy resources and other environmental benefits. As we have stated, energy storage resources exhibit unique characteristics that can be leveraged to both accelerate and reduce the cost of achieving these related policy objective. We urge the Commission to incorporate the role that energy storage can play in achieving policy objectives beyond the immediate scope of HB 2193, but entirely consistent with the goals espoused within the legislation to assess in-state benefits, regional benefits and benefits to the overall electric system.

4. *The role of energy storage resources should be considered within the context of overall grid resiliency and security objectives.*

   Similar to overall environmental objectives, for many years and through various mechanisms, the State of Oregon has been promoting awareness of the seismic vulnerabilities of Oregon's critical energy infrastructure. Energy storage system can effectively provide valuable security and resiliency benefits with benefits

directly to the electricity systems and the emergency services it supports. We urge the Commission to incorporate an assessment of the role of energy storage into related initiatives and proceedings addressing preparation for a major seismic disruption, or "Cascadia Event".

4. QUESTIONS

In the Ruling of June 1, 2016 ("Comments Requested to Inform Straw Proposal"), the Commission posed a series of specific questions intended to inform the process of developing a straw proposal of guidelines for the procurement of energy storage resources as required by HB 2193. Our comments focus on issues relevant to residential systems and the provision of grid services through a networked portfolio. (In some cases, responses address several questions together or no comment is provided, though we may offer subsequent comments.)

What guidance should the Commission provide on the storage potential analyses?

Section 3.2.b of HB 2193 requires the utilities to include with each proposal an evaluation of the potential to store energy in their systems. The bill specifies that the evaluation should include analysis of operations and system data and how storage would complement the utility's action plans, as well as identify areas with opportunity to incentivize energy storage. We are considering whether this evaluation should be prepared early in the process and filed ahead of individual proposals.

1. *Should the evaluations of storage potential be filed separately?*

Yes, evaluations of storage potential should be filed separately and in advance of specific project proposals. The legislation calls for the evaluation to include, "The electric company's current operations and the electric company's electric system data, including customer-side data, distribution data, transmission data and data related to existing energy storage systems…to identify areas in the electric

company's electric system where there may be opportunities to incentivize the value potentially derived from energy storage systems."

The legislation further described analysis addressing, "How the addition of an energy storage system would complement proposed actions…in which the electric company has proposed an integrated, least-cost combination of resources to meet the expected needs of the electric company's customers." Each project proposal must also describe "the electric company's electric system needs and the application that the energy storage system will fulfill…."

Each of these analytic requirements involves system-wide analysis that is common to all proposed project. Further, it is exactly this kind of analysis that should guide the design and prioritization of project proposals. To the extent that this system-wide analysis must precede and inform project proposals, it should be filed separately so that stakeholders can contribute to the verification and implementation of the analysis.

2. *What guidance, if any, should we provide about the analyses to be conducted?*

   Because energy storage systems can be deployed across customer classes and system architecture, evaluations should provide sufficient information to identify specific segments of storage potential based on (1) residential and other customer classes, (2) bulk system, distribution-level and voltage-denominated network segments, (3) sufficient information about areas ("hot spots") where storage may meet critical system needs, and (4) anticipated locations and growth rates of future renewable and distributed energy deployment (both utility and customer) where storage can cost effectively complement and enhance distributed energy deployment in the future.

3. *Should utilities systematically identify and rank order the areas of opportunity?*

Yes. As we have noted, there is a clear intent within the legislation that project proposals should be informed by and evaluated according to their ability to address critical system needs. In order to guide the wise investment in new resources and opportunities presented by energy storage, it is essential that evaluations provide information that allows prioritization and identification of the projects with the greatest benefits.

4. *What guidance, if any, should we provide about the details of the evaluation report filed with the Commission?*

   and

5. *What should the evaluation report include and in what detail?*

   We believe that the evaluation report should include sufficient detail to inform distribution planning at a granular level, including feeder and circuit-level information. This level of detail is consistent with the distribution planning efforts currently underway in California (as detailed in proceeding R.14-08-013 and subsequent utility filings) and New York (especially the Distribution System Implementation Plans required in the Reforming the Energy Vision proceeding, 14-M-0101). This level of detail is warranted so that storage resources can be deployed strategically and bring benefits on a localized basis. At a minimum, the evaluation reports should outline the process by which such system information will be produced and made available to stakeholders and market participants.

6. *What process, if any, should we use for review and comment on the analysis results? For example, should the utilities prepare a draft report for stakeholder and Commission review and comment? We recognize that the utilities may issue requests for information (RFIs) to test vendors and projects.*

   and

7. *Should the utilities report on the outcome of these RFIs? Should the results of such RFIs be included in the evaluation report?*

   and

8. *If yes, what action, if any, should we take on the report?*

   While we leave to the discretion of the Commission the best method to develop and incorporate stakeholder comments, we believe that it is highly valuable to have stakeholders be able to review, refine and comment upon the analysis that comprises the evaluation reports. Accordingly, high-level results should be available for review and comments from the stakeholders in this proceeding. Not only will this provide a level of transparency that is appropriate, it is worth recognizing that a tremendous amount of expertise exists among the stakeholders and market participants in the energy storage industry. It would be a missed opportunity not to leverage this expertise as Oregon moves forward to achieve the objectives of the legislation. With regard to specific actions from the Commission, we believe it is appropriate for the Commission to take action to certify that the evaluation reports adhere to guidance provided by the Commission and, if not, to seek remedies and updates from the utilities.

Should the Commission consider setting guideline for competitive bidding?

The Commission may require utilities to follow competitive bidding guidelines.

9. *Should we establish guidelines for competitive bidding for storage projects?*

   and

10. *If yes, what guidelines should we prescribe? To what extent should the existing competitive bidding guidelines serve as the model?*

    and

11. *What role, if any, should we have in reviewing bid results?*

    Yes, the Commission should establish guidelines related to a competitive process to procure storage resources from market participants and suppliers. In particular, we believe that guidelines should focus on the capabilities of the resources, the cost effectiveness, and the services required. In contrast, we believe that solicitations and procurement should not be guided by the specific technologies involved. (For example, we do not believe that solicitations should define specific battery types, but rather, on the ability of the resources to deliver the services required.)

How should the Commission encourage diversity among projects?

Section 3.1.b of HB 2193 directs us, in developing the guidelines, to consider ways in which to encourage utilities to invest in different types of energy storage systems.

12. *How should we encourage investment in different systems?*

    and

13. *Should we require utilities to submit proposals for multiple storage projects that test the use of storage in different applications, test different ownership structures, demonstrate promising new uses and technologies, or test some other critical differentiating factor among projects?*

    and

14. *What differences in storage projects should be promoted (e.g., different use cases, different technologies, different ownership structures)?*

    and

15. *To what extent should the goal be to test and prove new and innovative applications or technologies?*

As stated, we believe that the Commission should establish guidelines that require a diversity of projects according to (1) application (residential, commercial, distribution-level, transmission-level) and (2) ownership models (utility-owned, customer-owned, etc.).

In particular, residential applications provide valuable, local reliability and environmental benefits that are available directly to consumers. Therefore, guidelines should establish a specific allocation of projects that are focused on residential applications. In California, for example, the recently revised Self-Generation Incentive Program reserve 15% of the program budget for residential energy storage resources.

Residential energy storage provides benefits that are only available from resources located at the customer premise. However, these resources, through intelligent networking and management, can also provide critical services to support grid operations. Therefore, we believe that a specific allocation for residential applications is appropriate and consistent with the HB 2193 legislation.

Further, because many consumers are acquiring distributed energy and energy storage resources through commercial (and not utility) channels. As a result, while we expect and support utility-led projects in the immediate term, we believe that Oregon has a valuable opportunity to leverage the current and future distributed energy resources that exist at residential homes. The guidelines should establish mechanisms to test procurement of services from energy storage under different utility, consumer and third-party ownership models.

Finally, we believe that HB 2193 has prioritized the procurement of energy storage resources and services to support economic, reliability and environmental benefits. We encourage the Commission to establish a policy

framework and guidelines that are focused on the services required and are, to the greatest degree possible, technology-agnostic. We do not see a need for the Commission to support the testing, development or validation of specific technologies, such as battery type. Rather, we believe the guidelines should prioritize deployment and procurement of needed services that can be delivered today.

What information should utilities include with a proposal?

Section 3.2.c of HB 2193 details the information and analysis to be included with a proposal, such as technical specifications, estimated capital and output costs, and system benefits.

16. *What, if anything, should the guidelines add, clarify, or otherwise address as to these requirements?*

    and

17. *What additional information should utilities provide with their proposals, and why?*

    As stated earlier, we believe the Commission guidelines should establish that utilities should include (or outline a process to provide) information that allows granular (feeder-level) information that will allow identification of critical needs and support enhancing the "carrying capacity" of the distribution grid to integrate widespread deployment of distributed energy resources. This is consistent with the HB 2193 legislation and best practices in other states.

Section 3.2.c.D requires that utilities submit, with each proposal, an evaluation of the cost-effectiveness of the project, conducted in a manner we establish. We want to ensure a thorough assessment of a proposal including both a quantitative and qualitative assessment of the benefits, costs, and risks of the project (recognizing some benefits, in particular, may not be quantifiable).

18. *How should we calculate cost-effectiveness?*

    and

19. *How should the cost-effectiveness of a proposal be compared to other proposals and to traditional non-storage solutions?*

    and

20. *What information and assessments should we require with a proposal to demonstrate the utility has conducted a full quantitative and qualitative assessment?*

    Cost effectiveness should be evaluated based on the total benefits available from the proposed projects versus the investment required. For storage technologies, this requires development of new ways to estimate value and combine values from multiple applications. (This stands in contrast, for example, to traditional cost-effectiveness tests applied to demand-side management measures.) Therefore, we support a process by which cost-effectiveness criteria can be developed with input from utilities, staff and other stakeholders.

How should the Commission evaluate proposals?

Section 3.3 of HB 2193 requires us to consider each proposal and determine whether it is consistent with the guidelines, reasonably balances the value for ratepayers and utility operations and the costs of the project, and is in the public interest. After considering these factors we may authorize the utility to develop one or more of its projects.

21. *What criteria should we use to evaluate and compare projects? Should different criteria be used for different types of projects (e.g., should the criteria for evaluating and ranking a transmission investment deferral project be different than the criteria for evaluating a project that tests an emerging use or technology)?*

    Yes. Different evaluation criteria are appropriate based on application type and business models employed. In particular, we believe that evaluations should prioritize the ability of the resources to deliver critical grid operations services and customer benefits. Accordingly, residential systems should be evaluated based on (1) direct consumer benefits (reliability, increased utilization of customer renewable generation, load shifting, rate management) and (2) grid

service benefits (resiliency, grid efficiency, load shifting, peak load management, integration of intermittent generation).

The capability of any energy storage project to support grid operations is particularly relevant and should be a primary evaluation criterion. The ability to facilitate aggregation and orchestration of individual systems and thereby deliver energy to the grid as if from a single resource (a "virtual power plant") is one of the unique qualities of distributed storage and should be considered in the evaluation. An additional benefit under a distributed storage model is that the storage resource can be located directly at the point of load, which contributes to avoiding losses and improving grid efficiency, helping to offset distribution network upgrades, and enhances land use requirements that may be associated with other conventional or renewable energy facilities.

22. *Should we prioritize projects with immediate impacts, stress projects that hold promise of substantial benefits over the long-term, or seek a balance between projects serving different ends?*

    and

23. *Should we give greater weight to certain kinds of projects (say projects with a higher benefit-cost ratio) than to others?*

    and

24. *For a given use case, should we require utilities to evaluate alternatives to the use of storage?*

    and

25. *How should we weigh non-quantifiable benefits?*

We believe that energy storage systems are being deployed today that provide valuable consumer and grid operations benefits. Therefore, we believe that guidance should prioritize immediate deployment. Further, we believe it is appropriate to prioritize those projects that demonstrate a greater ability to deliver:

- Services supporting grid operations
- Customer reliability and grid resiliency
- Increased utilization of renewable energy resources

We further believe, as we've noted earlier, that it is important to consider storage projects within the context of other state energy and security goals. Therefore, projects that can increase the use of clean energy sources (both at the customer premise and connected to the distribution or transmission grids) and prepare for anticipated emergency situations (such as a "Cascadia event") should be prioritized.

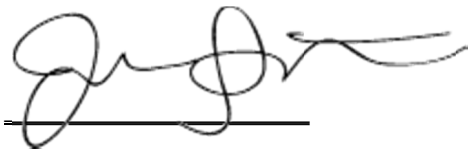
Accordingly, guidelines should consider and prioritize projects that enhance (1) consumer benefits (backup power, increased dg usage), (2) other state goals (climate, energy) and (3) overall resiliency. Many of these benefits are difficult, if not impossible, to quantify.

Sunverge appreciates the work of the Commission and appreciates the opportunity to contribute to this discussion. We look forward to working with stakeholders and the Commission in the development of the record on this matter.

Dated: June 22, 2016

Respectfully submitted,

For **Sunverge Energy**



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