BEFORE THE PUBLIC UTILITY COMMISSION OF OREGON

Alevo Analytics Comments on UM 1751 - In the Matter of Implementing Energy Storage Program Guidelines pursuant to House Bill 2193.

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, this utility evaluation of storage potential should be filed separately from the submission of the storage project proposal (which would include individual storage project's location, equipment specs, and operational behavior and other project specific data) and many different incentive opportunities within the electricity system may be identified and presented to the commission for consideration. The commission needs adequate time to consider all of these opportunities for storage deployment potential within the electricity system before receiving project proposal submissions regarding the types of projects that could provide solutions to these grid inefficiencies.

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

The commission, with possible public input, should draft a plan for storage evaluation metrics that the utilities can use in the evaluation of storage potential. This plan of storage evaluation metrics should focus on providing electricity service that is least cost, but is also of satisfactory power quality, secure from threats and reliability issues, and is environmentally sustainable. The plan should include targets, such as share of generation by resource, integration and share of renewable energy generation, emissions reduction targets or mandates, management and/or reduction of peak load, energy efficiency measures, complying with ISO/RTO and FERC mandates, price paid for electricity consumption, deferring transmission and distribution investments, differing capital investments in new capacity, optimization of imports into the state, and increasing flexibility, reliability and resiliency. There may be many assumptions such as future demand growth associated with the drafting of these metrics, so they will ultimately be will serve as a means of measuring performance and progress towards energy storage evaluation. The Commission can use these metrics to make future assessments during the IRP process.

The Commission should make it clear to the utilities that the purpose of the energy storage potential evaluation should be to identify the areas of the utility's electricity supply chain with vulnerability to reliability risks or areas with higher system costs that could benefit from the

deployment of energy storage projects. The utilities should focus their analysis efforts on these areas of inefficiency within the electricity system in order to determine which of these areas provides opportunities for storage deployment to add value to the system.

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

Yes, the utility should rank the areas of opportunity for energy storage deployment within their electricity system by giving higher weights to the opportunities that can contribute to the targets within reliability, power quality, economic, and environmental targets in the state of Oregon. These areas of opportunity will also most likely be those with the highest cost savings and greatest system benefit.

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

Please refer to Question 2 and 5.

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

The evaluation report should include an analysis of the utilities entire electricity supply chain and a storage project's viability to achieve the reliability, power quality, economic, and environmental targets in the state of Oregon. The main objective of the evaluation should be to quantify the size of energy storage that could add the maximum benefits to Oregon ratepayers in the form of lowest possible cost through the electricity rate reduction over the long term. This evaluation should be submitted before the storage project proposal submissions, because the utility must first identify the areas within their electricity supply chain with vulnerability to reliability risks or areas with higher system costs that could benefit from the deployment of energy storage projects. These would be the areas with opportunity for storage project deployment and incentivization.

The main areas of the system that the utilities should report upon in their evaluation include, but are not limited to, intermittency from renewables, ancillary services, net load reduction during day time, outages, and moving dynamic voltage and frequency controls to the distribution systems and demand centers. these areas offer potential opportunities for energy storage to optimize generator operation, integrate renewables into the grid, defer generation capacity investments, reduce ancillary services cost, reduce congestion cost, defer T&D capacity investments, reduce electricity losses, reduce electricity costs, reduce sustained outages, reduce momentary outages, reduce sags and swells, and reduce emissions.

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?

The utilities analysis results of the areas of energy storage potential within the electricity system should be presented in the form of a report. Each of these reports should be submitted to the

Commission for a review and comment process to take place by stakeholders and the Commission. The comments should identify whether or not the system needs/areas of opportunity identified in the draft reports have been valued correctly for storage potential. From these comments, the utilities will inform the Commission of which areas best valued for energy storage investments. The utilities shall choose appropriate energy storage technologies in their project proposal to support the most crucial/highly valued electricity system needs to be addressed.

We recognize that the utilities may issue requests for information (RFIs) to test vendors and projects.

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

For the evaluation report of storage potential, there is enough publicly available information on storage technologies to complete storage potential assessments. The project proposals, however, should contain relevant information for RFIs that support the project proposal and can be anonymized if necessary. The utilities should manage the RFI process and should anonymously report the outcomes of the RFIs to the Commission. These RFI details, in an anonymized and high-level format, should be included in the utility's project proposal in the form of a comparative analysis between storage technology types in order to maintain a transparent application process. The Commission must be able to verify that the utility is making a vendor agnostic decision to address the valued electricity system needs as identified by the storage potential evaluation reports.

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

Since it is being suggested in this response that the RFI details should only be included in the storage project proposal, and not in the storage potential evaluation report, it is recommended that the Commission review the utility's choice of storage technology through the comparative storage technology analysis in the proposal selection process.

Should the Commission consider setting guidelines for competitive bidding?
The Commission may require utilities to follow competitive bidding guidelines.

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

Yes, the Commission should establish guidelines for competitive bidding in order to determine whether or not the utilities have made decisions regarding their choice of storage technology type or combination of technologies within their project proposal that can best and most efficiently serve the customer base and the future electricity system needs.

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

Since storage technologies are relatively new and can provide generation, transmission, distribution, and demand services, the Commission should assess whether or not storage will be treated fairly in the existing competitive bidding process.

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

Given that storage technologies are relatively new and there is a learning curve associated with these technologies, the Commission should have some involvement in the competitive bidding process, as determined by the Commission, to ensure that competing storage technologies are treated and assessed fairly within the procurement process.

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?

The Commission should state that proposals with a more diverse set of characteristics, such as various use cases that address the reliability, power quality, economic, and environmental targets in the state of Oregon will be valued over proposals that only consider one technology type or service to be provided by the storage project.

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?

Yes, since storage technology is new and a learning curve is associated with the evaluation of potential services that storage can provide, such as generation, transmission, distribution, and demand, the Commission should encourage the utilities to demonstrate new use cases and technologies.

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

All of the above of different use cases, technologies, and ownership structures, should be promoted since storage can be highly distributed and provide a wide range of benefits.

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

The utilities should be encouraged by the Commission to test and prove new and innovative applications or technologies. For example, the utilities can be required by the Commission to test storage projects that provide simultaneously stacked services of frequency response, transient response, peak shaving, solar firming, distribution deferral, transmission deferral, generation peaking plant deferral, and reduced operational costs.

What information should utilities include with a proposal?
Section 3.2.c of HB 2193 (green section below) 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?

The guidelines should require that the project proposals include a section explaining the potential services that the energy storage will provide, and how these services will address the system needs identified by the utility. There should also be a requirement for the project proposals to include the methodology for quantifying the energy storage benefits that they are claiming the projects will provide to the grid and to the ratepayers, along with the system data that is required in order to perform these valuations.

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

The utilities should include the rules the assumptions for dispatching the energy storage for multiple services and clarify whether or not the sub-hourly dispatch of energy storage will be possible in addition to day-ahead scheduling of services.

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?

The cost-effectiveness of a project should be calculated through the creation of a set of metrics that can assess both the costs and benefits of the storage project. The costs and benefits from each of these metric categories that are listed below are indicative for metrics that can be used to compute a Benefit to Cost ratio of storage projects.

Distribution Capital Savings
Deferred transmission capacity investments
Deferred distribution capacity investments
Deferred capital replacement
Avoided purchase of other distribution devices
Reduced equipment failures

Distribution O and M Savings
Deferred asset management planning
Improved distribution planning
Reduced distribution equipment maintenance cost
Reduced distribution operations cost

Reduced disconnection and reconnection costs

System Optimization
Reduced electricity loss
Reduced energy use due to optimized system voltages
Improved load balancing

Electricity Cost Savings
Reduced electricity cost
Demand savings
Reduced electricity consumption
Savings from shifting peak demand
Reduced costs due to optimized system voltages
Reduced energy use from demand response
Capacity savings

Power Interruptions
Reduced sustained outages
Reduced major outages
Reduced restoration costs
Reduced outage frequency
Avoided cost to restart industrial/ commercial business operations
Avoided cost of spoiled inventory
Improved response time to restoration
Extended outage restart assistance
Avoided lost sales due to outages
SAIDI improvement
SAIFI improvement
CKAIDI improvement
CKAIFI improvement
MAIFI improvement

Power Quality
Reduced momentary outages
Reduced sags and swells
Limit total harmonic distortion "THD" levels
Delivery of acceptable Voltage, Current, and Frequency
Reduce voltage violations

Distributed Energy Resources
Increased integration of DERs in the service territory
Increased integration of renewable fuel sources

Increased DER nameplate capacity in the service territory (in MW)
Avoided electricity costs by energy produced by DERs (kWh)
Enable microgrids
Increased number of EVs in the service territory
Reduced fuel transportation expense from EVs
Reduced costs from DER

Customer Benefits
Daily usage data with price signals for managing energy usage
Day ahead pricing signals allowing customers to plan usage
Increased customer control of appliances and lighting
Increased customer access to the energy management portals
Improved customer satisfaction
Increased customer choice and control
In-home feedback tools
Customer consumption info on dedicated website
Customer selected due dates
Better informed customer reps
Convenience - no longer require meter access to meter readers

Air Emissions
Avoided GHG emissions compliance cost
Avoided SOx, NOx, and PM-10 emissions compliance cost

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

When comparing storage projects with each other, the Benefit to Cost ratio from each storage project metric category should be calculated and compared for each project so that the Commissions can determine which storage projects should be selected for implementation by the Commission.

When comparing a storage project to a traditional non-storage solution of a particular grid inefficiency (such as a need for the construction of a new peaking plant to meet increasing peak capacity requirements), then the cost of the non-storage solution should be compared with the cost of the storage solution providing the needed service (in this case the increased peaking capacity) minus the additional benefits resulting from the stacked benefits that the storage project can provide to the system. These additional stacked benefits may include reduced energy price, peak load shifting, more efficient utilization of T&D assets, increased renewable penetration, reduced wear and tear cost for T&D and generation equipment, and greenhouse gas emissions reduction.

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

All of the necessary comparative project parameters, such as the Benefit to Cost ratio per project metric category, breakeven cost, and Return of Investment (RoI) time calculations must be included in the project proposal in order for each project to be compared with other storage project proposals by the Commission and any metrics that the Commission encourages the utilities to use, such as the metrics provided in question 18.

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)?

Projects should be evaluated by comparing the cost-effectiveness of each metric category for each project. For example, the cost-effectiveness of all the metric categories of a transmission investment deferral project can be compared with the cost-effectiveness of all the metric categories of another transmission investment deferral project. When comparing a project providing only a single metric category with a comprehensive project (one that is providing multiple metric categories), then the cost-effectiveness of only the selected metric category within the comprehensive project can be compared with the cost-effectiveness of the transmission investment deferral project.

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?

Projects should be evaluated according to their cost-effectiveness as well as the degree to which they address the reliability, power quality, economic, and environmental targets in the state of Oregon. It may be more beneficial for the Commission to choose a combination of projects that satisfies immediate goals that require immediate solutions, as well as projects that will address multiple aspirational targets and provide value to the electricity system over an extended period of time. For projects that will provide more long term solutions, then the breakeven cost and Return of Investment (RoI) time should be examined for each project.

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

Economic and non-economic assessments should be relied on by the Commission to assign weights to projects with a higher cost/value-effectiveness for all metric categories provided by

the Commission, as well as the degree to which the projects address the reliability, power quality, economic, and environmental targets in the state of Oregon.

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

Yes, the Commission should require the utilities to evaluate at least one non-storage alternative for each use case that it is evaluating in order to use an unbiased process to determine which type of solution is more economically beneficial to the ratepayers of Oregon, as well as which solution can provide most benefits to the grid over time.

25. How should we weigh non-quantifiable benefits?

Non-quantifiable benefits such as providing four-quadrant power and reactive power control at a lower cost than central station technologies, mitigating voltage sag and swell, enabling of microgrids through the increased integration of wind and solar, resource optimization of fuel and renewables, and frequency and voltage regulation and demand response, enhanced frequency response, and transient stability support, should be given weights based on the degree to which they address the reliability, power quality, economic, and environmental targets in the state of Oregon.

This concludes Alevo Analytics comments.

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