BEFORE THE PUBLIC UTILITY COMMISSION OF OREGON

AR 616

In the Matter of	:	
	:	COMMENTS OF RENEWABLE
Rulemaking related to Renewable	:	NORTHWEST
Portfolio Standard Planning Process and	:	
Reports	:	**October 22, 2020**
	:	

I. INTRODUCTION

Renewable Northwest appreciates the opportunity to comment on the draft rule language related to the meaning of "associated energy storage" in section 11 of SB 1547 (2016), codified at ORS 469A.120, as the Oregon Public Utility Commission ("OPUC" or "Commission") undertakes rulemaking relating to Oregon's Renewable Portfolio Standards ("RPS"). Renewable Northwest appreciates Staff's recognition of the value of energy storage resources in diverse applications, including its role in integrating variable renewable energy resources as we move towards decarbonizing our electricity system. RNW supports Staff's understanding that 'associated energy storage' refers to systems where storage resources are coupled at a point of common coupling behind the point of interconnection ("POI") with renewable energy-generating facilities such that the energy generated is able to be directly transferred to the storage facility for concurrent or later use. As we explained in our June 30, 2020 comments in this docket, this understanding appears to reflect the approach that is most consistent with the language and intent of ORS 469A.120(2)(a). However, we recommend removing the draft rules' requirement that 'associated energy storage' projects must be coupled with a uni-directional inverter, as that restriction could limit various storage applications that will be important to a future, low-carbon electricity grid. As always, we thank the Commission and Staff for consideration of these comments and look forward to continued participation in this rulemaking.

II. COMMENTS

In our June 30, 2020 comments in this docket, we provided information regarding the different system configurations available for co-located or hybrid resources connected to the grid. In our description, we stated that the renewable and storage components that are coupled physically and electrically can be implemented in either AC-coupled, DC-coupled, or DC tightly-coupled configurations. All three of these configurations can charge the storage component from the renewable resource, but only AC- and DC-coupled configurations have the ability to charge a storage component from the grid using bi-directional inverters (shown in Figure 1). On the other hand, a DC tightly-coupled configuration can only charge from the renewable resource using a

DC-DC converter and a uni-directional inverter which only allows unidirectional energy flow from storage to grid.

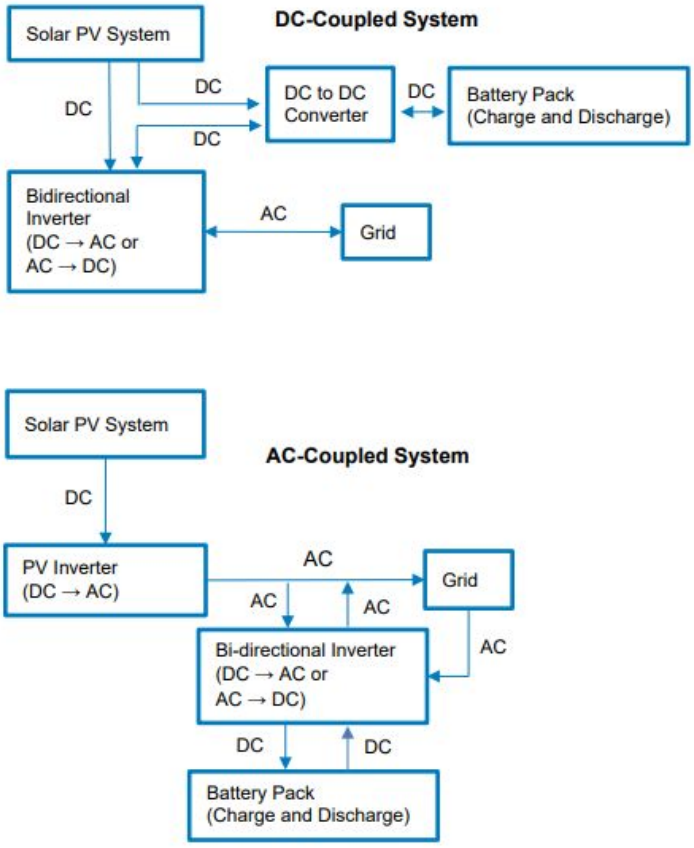

Figure 1. Co-located AC and DC-Coupled PV plus battery storage system with bi-directional inverters.[1]

With that background in mind, we agree with Staff's proposed OAR 860-083-0600(1)(a), which states that "the storage component of the system must be co-located with an RPS-eligible resource on the high-side, generator side, of the connection to the grid." As stated in our previous comments, the most suitable metric available for determining the "association" is the point of common coupling. The only way to ensure this electrical coupling is to co-locate both the renewable and storage component physically. The point of common coupling can either be on the AC side of the inverter, i.e. transmission or feeder, in the case of AC-coupled systems or can be on the DC side of the inverter in the case of DC-coupled systems. Requiring physically co-located resources with a point of common coupling ensures that an 'associated energy

[1] 2018 U.S. Utility-Scale Photovoltaics Plus-Energy Storage System Costs Benchmark. Ran Fu, Timothy Remo, and Robert Margolis. National Renewable Energy Laboratory (NREL). November 2018. https://www.nrel.gov/docs/fy19osti/71714.pdf

storage' system eligible for cost recovery via an automatic adjustment clause is most likely charged from an RPS-eligible renewable resource.

However, Renewable Northwest recommends a change to proposed OAR 860-083-0600(1)(b), which states that "associated energy storage **must** be coupled with a uni-directional inverter" to qualify as a resource for automatic cost recovery under the RPS. While we recognize that uni-directional inverters ensure that only renewable energy generated from a hybrid facility is being utilized to charge the storage component while grid-charging is limited, the rule language may limit the system design and operational flexibility of co-located resources in load pockets where bidirectional energy flow would be useful to the grid in the future. This limitation may also undervalue the range of grid services offered by co-located or hybrid resources in a future where the western region is integrated into a Regional Transmission Organization or other comprehensive organized market. This constraint could create redundancy already accounted for by contractual obligations of charging storage from renewable energy due to sizable economic benefits of the Federal Business Investment Tax Credit ("ITC"). Additionally, this restriction could discount the value of advanced metering and telemetry techniques available presently which, when installed, are able to accurately account for the share of energy transferred from the renewable resource to storage. In sum, establishing a restriction on the type of inverter used in co-located or hybrid facilities could potentially lead to undervaluation of the storage component of the hybrid resources, which according to various regional analyses may provide a significant share of energy, capacity, and ancillary services in the coming decades. These factors are explained in more detail below.

First, it is worth noting that to qualify for the 26% ITC, renewable energy facilities paired with storage resources are restricted to charge the storage with at least 75% (going up to a maximum of 100%) of its power capacity from renewable energy for a period of five years. This sizable economic incentive from the ITC is typically also applied as a contractual obligation in power purchase agreements that ensure grid-charging is minimized. This arrangement is not only consistent with the economic interests of the utility, project developer, and customers, but also helps ensure compliance with RPS requirements. Because the ITC "vests" at a rate of 20% per year over five years, any "unvested" portion is recaptured (i.e., repaid to the Department of the Treasury) if the charging regime deviates during the five years that would have made the project ineligible for the ITC in the first place.[2] This ITC structure creates another mechanism to help ensure sufficient charging from renewable energy -- at least in the first five years. After the period of five years, when the ITC expires, the storage resource may charge from the grid although it is not required or bound to do so. Due to project economics, we understand that the

[2]Guide to the Federal Investment Tax Credit for Commercial Solar Photovoltaics. U.S. Department of Energy: Office of Energy Efficiency & Renewable Energy. https://www.energy.gov/sites/prod/files/2020/01/f70/Guide%20to%20the%20Federal%20Investment%20Tax%20Credit%20for%20Commercial%20Solar%20PV.pdf

low cost of renewable generation would likely incent storage charging from the renewable resource even after the benefits from ITC expire, in order to maintain sufficient returns on investment.

The system configuration for co-located and hybrid resources affects its overall costs and benefits, due to different requirements for hardware, wiring, installation, and permitting. Benefits include revenues (or value) associated with provision of energy, capacity, and ancillary services.[3] Since typical co-located projects have lifetimes ranging from 20 to 30 years, restricting storage to only charge from co-located renewables could exclude it from some forms of future market participation. In particular, as we integrate more variable renewable energy onto the grid, the role of energy storage as a 'facilitator' appears poised to grow exponentially. Requiring a uni-directional inverter could limit the multiple value approach or "value-stacking", a key aspect of the future of energy storage resources and the grid overall.[4] The use of bi-directional inverters to convert AC electricity from the grid to DC electricity would allow storage resources to provide regulation reserves, balancing reserves and other ancillary services at a later time. These short time-scale energy products would be important to balance the variability of renewables and ensure that the grid remains clean and stable in the future.

Finally, while we recognize that restricting "associated energy storage" to projects with uni-directional inverters is relatively easy to administer, we note that technological advancements in the renewable energy and storage industry have made it possible to accurately measure energy flow and losses in facilities using advanced metering and telemetry techniques. Thus allowing projects to choose inverters would likely be administrable from an RPS perspective while also allowing utilities and project developers to fit a particular project to the needs of the grid, and not the other way round. As an example, DC-coupled configurations have the ability to charge storage with clipped power during the middle of the day, something that AC-coupled configurations cannot achieve due to inverter loading ratio ("ILR") limitations. For these reasons we recommend that the Commission consider rule language that does not restrict bi-directional inverters, which could be helpful not only for balancing authority areas ("BAA"), but also for a stable low- or no-carbon grid that ultimately benefits utility customers.

Moving beyond this rule language, which addresses cost recovery, we will briefly discuss the interplay between hybrid resources and Oregon's RPS. To consider how to reconcile the RPS with co-located storage capable of grid charging, we recommend looking to CAISO's Hybrid Resources initiative which recently released its final proposal.[5] This stakeholder initiative

[3] Opportunities for Research and Development of Hybrid Power Plants. NREL . May 2020. https://www.nrel.gov/docs/fy20osti/75026.pdf.
[4] WoodMac: Energy storage will move toward value stacking as industry matures. Utility Dive. May 2019 https://www.utilitydive.com/news/woodmac-energy-storage-will-move-toward-value-stacking-as-industry-matures/555021/.
[5] For information on the CAISO Hybrid Resources initiative, *see generally* https://stakeholdercenter.caiso.com/StakeholderInitiatives/Hybrid-resources.

examined various system architectures involving metering and telemetry placed in different locations to allow co-located resources to participate in ancillary services while also ensuring proper accounting of energy flows for ITC and RPS purposes.[6] For ITC and REC accounting, the advanced metering and telemetry architectures involve individual meters situated at the POI between a renewable energy facility and associated storage to evaluate how much energy is transported from the renewable facility to storage and from grid to storage. This information is already required for the ITC and could also ensure that double-counting is avoided in REC accounting. With that said, it may be necessary to develop new metering options or requirements and/or new requirements for additional data or inputs from resource owners to accomplish the necessary RPS reporting. With market expansion and possibilities of a RTO-West garnering steam after the success of the EIM, it is important to think about participation of co-located and hybrid systems as pivotal resources in the market and grid of the future.

Returning to Staff's proposed rule language, for the reasons above, we recommend the following change:

> 860-083-0600
> **Associated Energy Storage**
> (1) Energy storage technologies are not inherently renewable as they are not dependent on the use of a renewable energy resource. However, an energy storage device may be considered associated energy storage, consistent with ORS 469A.120(2)(a), if the device is integrated into the facility, such that the energy storage device is capable of storing ~~only~~ energy produced by the facility, either as an intermediary form of energy during the generation cycle or after electricity has been generated.
> ~~a.~~ Associated energy storage must be co-located with an RPS-eligible resource on the high-side, generator side, of the connection to the grid
> ~~b. Associated energy storage must be coupled with a uni-directional inverter~~
> (2) A facility certified as RPS-eligible may include associated energy storage if it does not conflict with other RPS-eligibility criteria, but the storage unit itself will not be separately certified.

[6] Section 4.4. "Metering and Telemetry". CAISO Hybrid Resources. Draft Final Proposal. August 2020. http://www.caiso.com/InitiativeDocuments/DraftFinalProposal-HybridResources.pdf

III. CONCLUSION

Again, Renewable Northwest thanks the Commission and Staff for consideration of these comments and looks forward to continued participation in the RPS rulemaking process.

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