# Energy Storage Service White Paper Comments

January 27, 2023

WECC asked stakeholders to review the Energy Storage Services white paper and share their feedback. The paper covers the functions that storage provides to the grid. The comment period was open from November 21 through December 21, 2022. WECC received six anonymous comments. Below is a compilation of the comments.

## Stakeholders Comments

***How clear are the definitions in the paper for each of the following topics?***

*Weighted average 1 to 5*

- Energy Services: 4
- Transmission Services: 4.5
- Ancillary Services: 4.33

***Did this paper cover all the key energy storage products and services?***

- 83.3% Yes

***How well are the benefits and uses of each of the following described in the document?***

*Weighted average 1 to 5*

- Energy Services: 3.33
- Transmission Services: 3.67
- Ancillary Services: 3.67

***One of the goals of the paper is to compare how energy storage products and traditional resources provide these services. On a scale of 1 to 5, with 1 being very poorly and 5 being very well, how does the paper make the comparison?***

*Weighted average 1 to 5*

- 3.33

***How adequately does the paper describe the gaps in how existing energy storage provides these services?***

*Weighted average 1 to 5*

- 3

| Comment | Reference |
|---|---|
| The white paper provides a good high-level description of the potential services that could be provided by ES. However, the paper does not sufficiently cover or discuss the potential challenges with providing some of the services mentioned. Additional information will be provided in the comments section of the survey. | |
| Energy storage is center stage in addressing the challenges related to the transformation for a clean energy future. The question is whether a resource mix consisting of weather dependent resources (solar/wind) and energy storage can replace the need for dispatchable gas generation. And if so, how much storage will be needed. I have two other questions that go beyond the scope of the report: (1) the battery manufacturing capability. the upstream/downstream environmental impacts, material supplies, decommissioning. etc costs for both the electric and transportation sectors and (2) an assessment of affordability -cost to consumers. | |
| The paper fails to fully discuss current operation practices regarding merchant use of energy storage vs. reliability use. Many of the services cited require battery storage to not be fully discharged or fully charged, so they can stay flexible. The paper also fails to discuss the opportunity in the market to capture the best price, and the timing of discharging, and the possible need for reliability uses and the ability to peak shave. Services such as black starting require that discharge is not done below a certain level. A merchant operator may operate these resources to exhaustion without consideration of the need for black start capability. Future use of resources need to have very clear requirements on who and how they are to be used. Dual-use, marketing use and reliability use all need to have established boundaries which have not been established yet. This white paper addresses the positive of energy storage, but needs to be tempered with addressing the challenges, as well. | |
| All generation types are treated the same in many interconnection queues, adding a Energy Storage facility to an area to alleviate congestion will increase congestion because the requested product of Network Resource Interconnection Service aims to ensure all network resources in an area can be generating at the same time to serve network load. Transmission service requests also typically come in for firm service on energy storage so that developers can make a profit on the EIM market, potentially generating at the same time as other generators in the area of congestion. Storage treated like all other generation in interconnection queues just leads to more congestion. | |
| Need to add Power Quality concerns (voltage deviation), especially for very fast ramp rates and/or resources that are connected to weak grids.<br>The last sentence needs clarification. If the author is intending to describe AGC-induced real-power oscillations when an IBR is frequency-responsive, then this is an issue that we have observed at the Grid Operations, but this idea needs to be described in more detail. A link to a paper would be very illustrative if a paper on this topic exists. | Section 1.2.2, Ramping Capability |

| Comment | Reference |
|---|---|
| The term synthetic inertia for IBRs can be misleading and a source of confusion since it's associated with mimicking energy extraction from stored kinetic energy from a rotating mass. This is a term that the industry is trying to eliminate to describe IBRs potential capability to respond during the inertial time period. A preferred and industry accepted term that should be used is "Fast Frequency Response".<br>The counterbalancing only occurs if IBRs are designed and operated with FFR capability. It's not clear if all new IBR resources are capable of FFR and if they are, it's not clear if they are operating with FFR enabled and if they are being operated with sufficient headroom. The paper would benefit by having these needs identified.<br>There are currently no requirements for resources to maintain frequency responsive reserves or headroom to respond to underfrequency events. This document should provide some guidance or recommendation for Balancing Authorities to consider headroom requirements, especially if these ES resources are providing both market and transmission services.<br>The last two sentences need to be clarified. The grid frequency is the prime dictating point that needs to be maintained. So, if the system inertia decreases, then IBR would need to ensure it. Not aware of any quantifiable studies that can relate the system inertia with the amount of IBR needed. This document should briefly discuss it and guide how this can be done or, at a minimum, encourage others to do such study-related projects. | Section 1.2.6, Synthetic Inertia from Storage Resources |
| Increased penetration of IBRs and retirement of traditional synchronous machines may significantly reduce system strength. This may pose challenges for ES to operate as expected and to maintain dynamic stability. This paper should include a discussion about grid forming capabilities as an option for ES resources to improve dynamic stability under high IBR penetration.<br>This paper doesn't discuss the challenges of Momentary Cessation and disturbance ride-through, which are significant challenges with IBRs in general. A blanket statement that ES improves dynamic stability is unsupported by recent historic events. | Section 1.3.3, Improve Dynamic Stability |
| None of the technologies are 100% efficient because they all have inherent losses. Additional clarification is needed to illustrate this limitation for ES. | Section 2.4, Observations and Gap Analysis, Time Shifting, Storage Solution |

| Comment | Reference |
|---|---|
| The paper should discuss the regulatory barriers for dual/multi-use. | Section 3.1, Transmission Deferral and Congestion Relief |
| Paper should discuss the challenges of balancing economic usage of ES vs preserving capacity for relief. | Section 3.3, Observations and Gap Analysis, Duration of Relief, Storage Solution |