

2018-2019 Transmission Planning Process (“TPP”)
Draft Transmission Plan Comments

Submitted By	Company	Date Submitted
Stewart Jensen 437-928-5588 Stewart.Jensen@hydrostor.ca	Hydrostor Inc.	February 28, 2019

Hydrostor Inc. (“Hydrostor”) is a provider of a large-scale, long-duration storage solution that can be flexibly sited. A siteable and non-emitting form of Compressed Air Energy Storage (“CAES”), Hydrostor’s Advanced-CAES is a compelling, scalable (50-500+ MW), and long-duration (4-24+ hours) energy storage solution that provides rotational inertia to the grid. It supports grid stability through its synchronous generators and grid resilience by enhancing the ability to recover from system disturbances.

Hydrostor appreciates this opportunity to provide comments on the Draft 2018-2019 Transmission Plan discussed at the California Independent System Operator Corporation’s (“CAISO”) February 14, 2019 stakeholder meeting.

Recommended Projects in the Central Coast and Los Padres Areas

Hydrostor proposed a 175 MW – 200 MW Advanced-CAES system to the CAISO through a request window submission as a means of meeting reliability needs in the Los Padres region. This project was referred to as the “Los Padres ACAES Project” in the Draft 2018-2019 Transmission Plan (the “Project”). The CAISO’s Draft 2018-2019 Transmission Plan did not recommend the Project citing that *“the project would not address all of the reliability needs in the area such as the P6 contingency of the 230/115 kV transformers at the Mesa substation.”*

As proposed, the Project may not have addressed the P6 contingency identified by the CAISO. However, Hydrostor notes that the Project did provide significant reliability benefit to the region and addressed a number of the CAISO’s identified needs. This includes resolving voltage collapse and overload issues on the 115 kV Morro Bay to Mesa/Santa Maria circuit in the event of a simultaneous loss of two 230 kV transmission connections between the Morro Bay and Mesa substations. The power flow modeling prepared in association with this application demonstrates energy storage’s ability to act as a transmission asset and supports increased consideration of storage as a transmission asset in the CAISO balancing area.

Hydrostor would appreciate the CAISO providing additional details regarding the P6 contingency which the Project was unable to address at the Mesa substation. This will enable Hydrostor to refine the Project’s design to address this additional reliability concern, enhancing a potential future request window resubmission of this Project or similar projects thereby potentially benefitting the system.

Valuation of Energy Storage as a Transmission Asset

Energy storage’s ability to benefit the electricity system has been widely documented in the industry. Similar to the Federal Energy Regulatory Commission, Hydrostor believes that energy storage offers a range of transmission system benefits and encourages the CAISO to place a greater value on the technical characteristics of energy storage generally and long-duration energy storage specifically when assessing future projects.

In addition to the specific reliability benefits of the Project noted in our request window submission, the general transmission system benefits of long-duration storage include:

- Long Duration Potential: The loss of a transmission line can result in the loss of electric service to customers for extended durations. In the context of recent natural disasters, long-duration energy storage is highly valuable to help ensure reliability.
- Maintenance Reliability: Routine maintenance of transmission assets typically requires taking these assets offline temporarily. Long-duration energy storage could allow for more frequent system maintenance by providing 12-24+ hours of local backup generation and increase the life of existing transmission assets in the region.
- Technology Diversity: The grid would benefit from technology which has capabilities distinct from what has already been deployed. The inclusion of such technology would minimize the long-term performance risks of the electricity system. Given the prevalence of lithium-ion storage (typically in 4-hour duration configurations), inclusion of long-duration storage technologies would significantly improve diversity.
- Environmental Benefits: The carbon reduction benefits of renewable generation are well recognized, and further reinforced by the adoption of Senate Bill 100 and the State's 100% renewable energy goal. Not only is energy storage an important enabling technology for continued renewable energy deployments, emissions-free generation capacity is unquestionably required to achieve a significantly decarbonized grid.
- Synchronous Generation and Rotational Inertia: The modern power system relies on rotating generators. Inertia from spinning generators, provides critical support maintaining the system stability. The impact of generator retirement has already been seen in South Australia which recently experienced a number of large blackouts. Advanced-CAES uses turbine generators (similar to current fossil-based generators, but which operate on air and result in no direct emissions) that create synchronous generation and can provide rotational inertia to support grid stability and resiliency.
- Longevity: Many long-duration energy storage technologies can operate for 30+ years to minimize long-run marginal costs of grid operation. Further, long-duration energy storage can benefit the grid by providing a reliable and ongoing backbone of long-duration storage capacity for the electricity system.
- Performance Reliability: Advanced-CAES operates with little-to-no performance degradation over time, offering reliable and predictable service to the grid for 30+ years (and much longer with adequate maintenance and minor overhaul, similar to fossil facilities).
- All-Season Performance Certainty: Electricity demand peaks are often seasonably dependent and frequently occur during temperature extremes. Advanced-CAES can deliver power regardless of weather conditions, with limited-to-no performance degradation and is not limited by state-of-charge.

Energy storage is a proven, reliable solution that can provide significant benefits to transmission systems. This is evidenced by the actions of regulators in other regions who are already allowing energy storage assets to provide both regulated and unregulated services¹.

Hydrostor believes that if CAISO put a greater emphasis on quantifying these system benefits, a number of economically viable energy storage projects will be identified. As the deployment of such

¹ One example of this is the approval from the Australian Energy Regulator ("AER") for a proposal from ElectraNet to allocate a portion of the cost of a utility-scale energy storage project to the transmission ratebase, while enabling the asset to provide generation services to the National Electricity Market in parallel. July 14, 2017. <https://www.aer.gov.au/node/53705>

projects would clearly benefit the system, Hydrostor recommends the CAISO place further quantitative values on these attributes when conducting project-specific economic analysis.

Beginning in 2018, the CAISO's Storage as a Transmission Asset ("SATA") process has sought to enable transmission connected storage assets providing regulated cost-of-service-based transmission service to also access other market revenue streams². However, at the January 2019 stakeholder meeting, the CAISO temporarily suspended SATA initiatives to address certain issues through the ESDER 4 process³. Hydrostor supports the CAISO's SATA process and encourages the CAISO to restart the SATA process expeditiously so that storage can play a greater role as a transmission asset. The dual treatment of storage assets as generation and transmission assets is in the best interests of California ratepayers, as it will help ensure that the most cost-effective outcomes are possible by ensuring appropriate value recognition for all benefits of an asset on the grid. Leveling the playing field for storage assets that play both a generation and transmission role will only ensure more competitive outcomes for the grid.

Finally, we believe it would be beneficial to better integrate the CAISO TPP with the California Public Utilities Commission's ("CPUC") Integrated Resource Planning ("IRP") process, implicitly recognizing the dual-value of long duration storage assets to both transmission and longer-term generation needs. This is inherently an important principle to provide true least-cost planning to the system. Currently, the TPP and IRP are not well-integrated in that solutions are identified independently through each process, while storage, and long duration bulk scale storage in particular, clearly has a role to play in both processes and, as a result, their proposed procurement outcomes. Hydrostor has filed comments to this effect with the CPUC as part of their Rulemaking 16-02-007⁴ and would be happy to further discuss with the CAISO how such a process could be designed.

We thank the CAISO for considering these comments in finalizing the transmission plan and look forward to continuing to work with the CAISO and other stakeholders during the 2018-2019 and 2019-2020 Transmission Planning Processes.

² CAISO. March 30, 2018. *Storage as a Transmission Asset Issue Paper*

³ CAISO. January 14, 2019. *Storage as a Transmission Asset Webinar Presentation*

⁴ Hydrostor. December 20, 2018. *Comments of Hydrostor, Inc. on Ruling of Assigned Commissioner and Administrative Law Judge Seeking Comment on Policy Issues and Options Related to Reliability*