Stakeholder Comments

San Diego County Water Authority and City of San Diego Comments on Storage as a Transmission Asset Issue Paper

Submitted by	Company	Date Submitted
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The San Diego County Water Authority (Water Authority) and City of San Diego (City) appreciate the opportunity to provide comments on the California Independent System Operator's (CAISO) March 30, 2018 "*Storage as a Transmission Asset: Enabling transmission connected storage assets providing regulated cost-of-service-based transmission service to also access other market revenue streams-Issue Paper*". The Water Authority and City thank CAISO for engaging stakeholders and look forward to continued efforts to address this issue.

Formed in 1944, the Water Authority provides wholesale water supply to 24-member agencies, including the City, that span the vast majority of San Diego County and serve 97% of the county's population. The Water Authority imports approximately 90% of the water used in San Diego County, and owns and operates a regional water infrastructure that includes water storage. Associated with that water storage are energy production facilities.

The City became a municipal water supplier in 1901. Today, the City of San Diego Public Utilities Department serves more than 1.3 million people and owns and operates nine reservoirs.

Scope of policy examination

The Water Authority and City appreciate CAISO's initiative to rethink the roles of bulk storage as transmission assets. This rethinking arises in the larger context of a grid that is

shifting to a relatively high reliance upon renewable resources—in particular solar. The result is large levels of curtailment and financial loss for the parties that cover the lost output through power purchase agreements (PPAs). To date, the variability in this output has been covered, to some degree, mainly through integration of gas-fired generators located close to load, but tighter limits on greenhouse gas emissions and higher levels of renewable penetration will diminish the ability to solve problems in this manner. Nonetheless, CAISO already sees large levels of curtailment and expects much more in the future.[1]

From this larger perspective, a wide array of storage technologies offer benefits that exceed costs of deployment. For example, a 2012 study by the Electric Power Research Institute found that pumped storage had the lowest break-even capital cost and the highest benefit-cost ratio of the three major long-duration (4 hours or longer) storage options.[2] That study also underscored that long-duration and shorter-duration storage can play complementary roles and that there are many competitive options in both categories. As such, there needs to be greater clarity around revenue sources that exist in today's markets.

Even under the 10-year scenario in the California Public Utilities Commission's Integrated Resource Plans process, there remains a big mismatch between the time horizon needed for planning bulk storage assets and the methods for mobilizing market and electricity regulatory support.[3] Enabling a much clearer CAISO revenue support mechanism would facilitate efforts to attract investment in to large-scale, long-duration energy storage projects that will help with long term grid reliability.

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[1] CAISO Fast Facts: *"Impacts of renewable energy on grid operations"* (2017).
[2] Results from Case Studies of Pumped Storage Plants: Quantifying the Value of Hydropower in the Electric Grid. EPRI, Palo Alto, CA: 2012. 1023142.
[3] *Proposed Decision for Setting Requirements for Load Serving Entities Filing Integrated Resource Plans, CPUC, at* p.63.

The Water Authority and City are currently exploring the potential for a closed-loop pumped storage project, San Vicente Energy Storage Facility (SVESF), at the City's existing San Vicente Reservoir. SVESF could provide up to 500 MW of capacity and 8 hours of energy storage, which could support electrical transmission grid operations that are essential to integrating large new supplies of renewable electricity - notably solar but also wind - into the California and western power grids. During off-peak periods, such as in the mid-afternoon when solar power supplies could exceed demand, SVESF would act as a load that could relieve the grid of the excess power supply by pumping water from the existing San Vicente Reservoir to a new upper reservoir. The upper reservoir stored water would later be released to the lower reservoir by gravity to generate carbon-free energy during other periods when demand for electricity is high and renewable supplies are not able to meet this demand. The location of the project near the existing Sunrise Powerlink and its ability to use the already constructed lower reservoir offer attractive geographical and economic conditions for a project of this type. In addition to the ability to arbitrage power supplies, pumped storage offers many ancillary services that could be increasingly valued by grid operators, such as voltage support and the capacity to quickly ramp up or down during rapidly changing market and grid conditions. As is typical of pumped storage projects, there are large economies to scale at SVESF and the large size of this envisioned bulk storage project is intended to play a special role in allowing massive integration of renewables into the California electric power system—a role that is complementary to other storage technologies and market mechanisms.

Despite the many benefits SVESF could offer, current market arrangements do not reflect the true value of the potential services made available by a project of this size. Moreover, bulk energy storage projects have long lead times for marketing, planning, financing and construction;

to facilitate timely implementation of such projects over the coming decade much clearer market and policy signals are needed. The Water Authority and City believe that this Issue Paper, along with complementary activities by CAISO, could help address these challenges because as CAISO states in this Issue Paper, there is uncertain middle ground "between the generator-oriented approach rejected in Nevada Hydro and the transmission-only approach approved in Western Grid".[4]

Bulk storage assets are not generation resources and cannot be procured through normal generation markets. Yet, bulk storage capabilities go beyond traditional transmission services. While it's important that CAISO's standard Transmission Planning Process (TPP) continues, there is a rapid shift towards renewable energy in California and in the western United States that will require larger and more capable storage systems than can be accommodated through normal the normal TPP. The needs for storage will be measured in the gigawatts while the storage projects approved through the TPP by CAISO have fallen short of this need.[5] These larger storage assets, like the potential SVESF, can help with renewables integration and grid reliability, but the economics need to be improved to facilitate project development and ensure optimal operation of the overall electric grid.

A blended approach to cost recovery

The Federal Energy Regulatory Commission's (FERC) policy statement identified four principles that an energy storage asset cover for providing transmission and market services.[6]

[4] CAISO *Storage as a Transmission Asset: Enabling transmission connected storage assets providing regulated cost-of-service-based transmission service to also access other market revenue streams, Issue Paper*, at p. 6 (March 30, 2018).
[5] *Id,* at p. 7.
[6] Policy Statement, 158 FERC ¶61,051 at p. 9.

One, it must be cost competitive with transmission. Two, it must avoid double recovery for providing the same service. Three, it cannot suppress market bids. Four, it cannot jeopardize ISO/RTO independence. Utilizing these principles, the Water Authority and City offer the following comments on strategies that CAISO could follow.

a. Support through TAC-like mechanisms

The Water Authority and City believe that there should be a blend of the "wholly in rate base" and the "partially in rate base" approaches to cost recovery for assets under a Participating Transmission Owner's (PTO) Transmission Access Charge (TAC) rate base. Understanding that double recovery for providing the same service must be avoided, a blended approach offers the opportunity for TAC-like floor payments and then the option to move projects into market payment streams as ancillary services markets mature.

The Water Authority and City are mindful that CAISO and other relevant bodies are, in effect, creating a market for storage services. As such, there will be reluctance to create permanent TAC-like mechanisms that would fund bulk storage on the basis of project costs or other mechanisms. Some method for migration from these base payments to market mechanisms that does not create double recovery will be needed. That migration could occur for future projects—once the first bulk storage projects are built. Or it could occur for all projects as the market for storage services matures and becomes more reliable alongside the expansion of renewables and the tightening of limits on CO_2 emissions. To assist in the migration of fixed to more market-oriented payments, it would be useful for CAISO to calculate the expected value from each of the services that a storage asset provides to help facilitate transitioning from fixed payments to market payments. This approach could help create transparency that could help investors predict how migration will occur and also make it easier for CAISO and other

authorities to identify double recovery. It could also create transparency around services provided by bulk storage that may continue to be undervalued even after market migration occurs—for example, black start, n-1 support, frequency regulation, voltage support and grid stability. While this is challenging, the advantage of this approach is that it offers a reliable base stream with additional revenues, which help to ensure that storage assets, such as pumped storage, have a consistent and sustaining funding stream. For capital intensive long-lived storage assets, like pumped storage, investors require a robust and credible framework before they will proceed.

b. Contractual provision of "cost based" Transmission service without becoming a PTO

As CAISO notes that the two options outlined in the PTO's TAC rate base will provide the primary options for contractual provisions without becoming a PTO, the Water Authority and City still support a blended option and understand CAISO's need to develop new rules, roles and responsibilities that are not covered under the existing PTO rules.

Understanding FERC's direction to maintain ISO/RTO independence, the Water Authority and City see no need for CAISO to alter its role as an independent system operator. Instead coordinating with other agencies such as the California Public Utilities Commission (CPUC) and aligning CAISO's initiatives will help advance storage assets, such as pumped storage, which are vital to helping reach California's renewable energy and greenhouse gas goals.

The blended approach outlined above would also help preserve and expand the use of market bidding for storage services. The Water Authority and City support CAISO's inclination against requiring TAC-supported storage services from zero-bidding its services into

the market. Such large volumes of storage services at pre-determined bids that do not reflect their real market value will suppress the market for storage just at the time that market is taking shape. There should be some glide path for bulk storage projects, even supported by TAC-like base payments, to participate in the market with the right kinds of market surveillance.

Conclusion

The Water Authority and the City appreciate the opportunity to provide these comments and thanks CAISO for its consideration of these comments.