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COMMENTS OF THE PUBLIC ADVOCATES OFFICE ON THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR'S (CAISO) DRAFT 2019-2020 TRANSMISSION PLANNING PROCESS UNIFIED PLANNING ASSUMPTIONS AND STUDY PLAN POSTED ON FEBRUARY 21, 2019 AND THE 2019-2020 TRANSMISISON PLANNING PROCESS PRESENTATION AND STAKEHOLDER MEETING ON FEBRAURY 28, 2019

March 14, 2019

The Public Advocates Office at the California Public Utilities Commission (CPUC or Commission) is the state's independent consumer advocate with a mandate to obtain the lowest possible rates for utility services, consistent with reliable and safe service levels, and the state's environmental goals.

The Public Advocates Office submits the following recommendations on the California Independent System Operator's (CAISO) Draft 2019-2020 Transmission Planning Process (TPP) Unified Planning Assumptions and Study Plan posted on February 21, 2019 and the 2019-2020 TPP presentation and stakeholder meeting on February 28, 2019.

1.The CAISO Should Provide the General Assumptions for Energy Storage for the TPP Study Plan

In the Draft 2019-2020 TPP Unified Planning Assumptions and Study Plan (TPP Study Plan), the CAISO provides information on assumed resource adequacy capacity and charging speed for energy storage in its discussion on energy storage.[1] However, the CAISO did not provide information on the assumptions it will use to determine energy storage costs; and it did not identify the specific performance characteristics it will employ to evaluate energy storage for grid reliability solutions in this 2019-2020 TPP cycle. In its comments on the 2018-2019 CAISO Transmission Plan, the Public Advocates Office recommended that the CAISO provide, at the beginning of a given TPP cycle, the energy storage assumptions that the CAISO will use to evaluate options to mitigate grid reliability issues. Specifically, the Public Advocates Office

[1] 2019-2020 Transmission Planning Process Unified Planning Assumptions and Study Plan, February 21, 2021, CAISO, p. 15.

requested that the CAISO provide its assumptions on "capital and maintenance costs, discharging capacity, charging speed, applicable storage technologies, anticipated charging source(s) and lifecycle time frame"[2] for energy storage. Therefore, the Public Advocates Office recommends that the CAISO provide its assumptions for determining energy storage costs and performance in comparison to wire solutions for grid reliability for the 2019-2020 TPP cycle and in the 2019-2020 TPP Study Plan. These assumptions should illustrate the method that will be used to compare solutions with different life expectancies as energy storage can have a different life expectancy based on the energy storage technology selected[3] than a transmission wire solution.

2. The CAISO Should Provide the Operating Assumptions for Energy Storage Reliability Solutions

The Public Advocates Office recommends that when the CAISO identifies energy storage as a possible solution for mitigating grid reliability issues and/or for replacing gas fired generation, the CAISO provide information on the assumed energy storage operator, charging source, energy storage operation, and likely energy storage lifecycle. This additional information would assist with facilitating comparisons of energy storage solutions with other proposed solutions.

3. The CAISO Should Provide the Valuation Assumptions for Energy Storage

The CAISO should clarify if the potential to repurpose or refurbish lithium-ion battery energy storage after its expected 10-plus year life for reuse is considered in CAISO's energy storage valuation analysis.

If you have any questions regarding these comments, please contact Kanya Dorland at Kanya.Dorland@cpuc.ca.gov.

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[2] Public Advocates Office comments on the CAISO 2018-2019 Transmission Planning Process and Transmission Plan, February 28, 2019, p. 5.

[3] While pumped water storage has a life expectancy that is greater than 50 years, other energy storage technologies tend to have shorter life expectancies, such as the estimated 25-year lifecycle for flywheel storage and 10-year lifecycle for lithium-ion battery storage. Other energy storage technologies are being tested to provide grid level storage power such as air energy storage, aqueous sodium-ion, lead acid batteries as well as flywheels.

Flywheel: https://www.energy.gov/sites/prod/files/2015/05/f22/Beacon-Power-Flywheel-Aug2013.pdf.

Compressed Air Energy Storage: https://www.energy.gov/sites/prod/files/2015/05/f22/SustainX-Isothermal-Compressed-Air-ES-Aug2013.pdf.

Sodium-Ion: https://www.energy.gov/sites/prod/files/2015/05/f22/Aquion_Sodium-Ion-Battery-Aug2013.pdf.

Lead-acid: https://www.energy.gov/sites/prod/files/2015/05/f22/EastPenn-UltraBattery-Aug2013.pdf.