

Flexible Resource Adequacy Criteria and Must-Offer Obligation Phase 2 Issues Paper, Posted June 25, 2015

Submitted by	Company	Date Submitted
Edward G. Cazalet MegaWatt Storage Farms, Inc. ed@MegaWattSF.com 650-949-0560	NGK Insulators, Ltd.	July 10, 2015

NGK Insulators, Ltd. (“NGK”) is a large international firm focused on the power, ceramics and electronics businesses. NGK is the manufacturer of the NAS battery system that is proven in extensive commercial operation for two decades. Globally, more than 450 MW of commercially proven NAS battery capacity at over 190 locations with 6 to 7 hours of energy storage (over 3000 MWh) are currently in operation and additional large projects are in current development. NGK has existing proven manufacturing capacity of more than a GWh per year of storage capacity. www.ngk.co.jp/nas/

MegaWatt Storage Farms, Inc. (“MegaWatt”) is a storage advisory firm. MegaWatt prepared these comments on behalf of NGK.

NGK and MegaWatt commend the CAISO on this initiative to revisit its proposals for flexible resource adequacy, including consideration of the flexibility that can be provided by electricity storage projects.

NGK’s and MegaWatt’s comments are generally applicable to most multi-hour battery and other fast, multi-hour storage and two-way hybrid technologies.

COMMENTS

The Issues Paper makes clear that mid-day overgeneration, multi-hour two-way ramps and shorter-term, two-way ramps are significant reliability and market issues facing the CAISO.

The paper highlights CAISO forecasts for net loads to drop as low as 6,000 MW in non-summer months and often below 10,000 MW. Evening ramps as large as 15,000 MW by 2024 are forecast. In addition, California's plans for 40% renewables in 2024 and 50% in 2030 imply that the overgeneration and ramping challenges will be even greater.

The paper also suggests that 10-minute and hourly ramps are increasing and that short-term flexibility is important.

NGK and MegaWatt suggest that the primary focus of this effort needs to be on raising the mid-day "belly of the duck" and lowering the evening "head of the duck".

Resource adequacy therefore needs to focus on moving many GWH of mostly solar generation from mid-day to the evening peaks as well as to respond to fast ramps up and down, while reducing greenhouse gas (GHG) emissions. There are two alternatives (1) shift some end use loads from mid-day to the evening or (2) employ energy storage with sufficient energy storage capacity and fast ramping, charge and discharge capacity. Given that the Legislature and CPUC have no plans for fully transactive retail markets, the importance of the second alternative, long-duration energy storage (LDES), is evident.

Recently it has also become evident that large-scale deployment of storage is feasible and economic. This conclusion is supported by the significant amount of storage that is in the CAISO interconnection queues; the huge responses to the IOU storage RFOs; the declining prices of storage; and the availability of proven manufacturing capacity.

A study by E3 (https://ethree.com/documents/E3_Storage_Valuation_Final_Phase_1.pdf) has shown that many GW of 6-hour or more LDES, or its equivalent, will be needed to raise the "belly of the duck" and reduce overgeneration with less curtailment of solar.

In addition, if this LDES is also required to be fast ramping in both directions then the CAISO 10-minute, 1-hour and 3-hour ramping needs identified in the Issues Paper will also be satisfied.

Finally, the current flexible capacity product is constrained by historical definitions of Net Qualifying Capacity (NQC) as described in the Issues Paper. NQC is a one-way, 4-hour, 3 days in a row, peaking product. This NQC product is increasingly irrelevant to the needs identified in the Issues Paper and should not constrain the definition of the flexible capacity product.

RECOMMENDATIONS

NGK and MegaWatt recommend refocusing this Flexible Resource Adequacy initiative on two-way, fast ramp, long-duration capacity that can raise the “belly of the duck” and lower the “head of the duck”.

Minor modifications of the current formulas for Effective Flexible Capacity (EFC) that depend on 4-hour NQC will not address the need to shift many GWH of mid-day overgeneration to the evening peaks.

Instead, NGK and MegaWatt suggest that Effective Flexible Capacity be defined by an *idealized storage product* with at least 6-hours of two-way, dispatchable energy storage at full rated discharge and charge capacity. Flexible RA requirements can be based on this idealized capacity. The capability of actual storage projects of any duration and non-storage products including generation and demand response can be rated against the capability of this idealized storage product.

In summary a substantial refocus of this initiative, as recommended here, is needed to properly address the flexible resource adequacy needs of the CAISO and California.