PG&E comments on PRR 1627

PG&E has reviewed CAISO’s proposed solution to the issue of undeliverable upward flexible ramping product from batteries due to state of charge constraints, as well as the empirical arguments made by CAISO as to the urgent need to enforce deliverability by incorporating upward flexible ramping product awards into the estimate of needed SOC to deliver all energy and capacity awards in real time. We agree with the CAISO’s arguments and believe the proposed solution will prevent undeliverable FRU awards from batteries in the real time markets. Given the urgency of making sure upward flexible ramping procurement is feasible, the proposed constraint, although it may over-correct, seems to be an appropriate and implementable approach to mitigating the issue for the summer of 2025.

PG&E would like to point out a potential near-term defect with the proposed change in the SOC(AT) constraint, and also to present a proposal for a slightly different reformulation of that as well as the “energy-only” SOC constraint that might be a better mid-term solution to the problem.

1. The CAISO’s proposed SOC(AT) constraint is

This formulation treats FRU as exactly equivalent to energy awards as well as expected regulation energy usage. A significant difference between FRU and the other products is that it should be reversed and re-procured in each successive real time market, whereas this formulation accumulates FRU procurement over the real-time optimization horizon and will thus tend to unnecessarily constrain both FRU and energy awards in the later intervals of the optimization based on FRU procurement in the preceding intervals, rather than just guaranteeing its deliverability in the first non-binding interval. Given the large amount of flexible ramping capability held in the battery portfolio, as well as the re-initialization of SOC to telemetry in each successive market, this over-constraining of procurement may not have significant adverse effects on battery participation in the real time FRU and energy markets, but the pattern of procurement should certainly be monitored to ensure that CAISO isn’t preventing access to needed flexibility under stressed conditions.

1. PG&E’s concerns about CAISO’s proposed formulation, especially its asymmetric treatment of the downward flexible ramping product and the excessive constraints placed on procurement of FRU in later real-time intervals, have inspired us to propose the following alternative set of constraints to correctly address SOC-constrained flexible ramping procurement:

 (assuming sign convention of FRD is negative here – if positive, then -FRD)

This formulation does not directly modify the SOC constraints themselves, but constrains total procurement in each period to be feasible to SOC limits. This may potentially be less constraining on solutions in the later intervals than the SOC constraints themselves, which as CAISO has pointed out might require some version of the flexibility reserve “envelope constraints” to limit flexible ramping procurement in both directions.

PG&E has appreciated the opportunity to participate in the discussion of this problem, and supports CAISO continuing to work on cost-effective and nondisruptive solutions to the problem within the real-time market algorithms.