SCE Issue Paper comments – Energy Storage Enhancements (ESE)

Submitted by: Beverly Brereton, beverly.a.brereton@sce.com and Aditya Chauhan, aditya.chauhan@sce.com

Southern California Edison (SCE) provides the following comments on the California Independent System Operator (CAISO) Issue Paper[1] and Meeting on Energy Storage Enhancements (ESE) held May 5, 2021. SCE welcomes the CAISO's openness towards the contribution of proposals from stakeholders. SCE encourages the CAISO to provide either a cost-benefit analysis of individual proposals or, at the least, follow the CAISO's own policy guideline. SCE encourages the CAISO to provide more details on the energy shift product and other elements within the issue paper so that SCE and other stakeholders can appropriately opine more specifically on many of the proposals. SCE recommends inclusion of the listed issues below for consideration. These are:

- Outage management and resource substitution rules for storage resources may differ relative to fossil fuel resources with Resource Adequacy (RA) obligations
- Short-Term Unit Commitment (STUC) enhancements
- Multi-interval optimization and the distribution between advisory and binding intervals
- Bid cost recovery calculation should include intervals when the storage resource is charging and discharging for the operating day. Inclusion of intervals when the resource is idle establishes a different calculation relative to fossil fueled resources.
- The nexus between intra-hour bidding and the Bid Cost Recovery (BCR) calculation
- The CAISO's exploration of new products
- State of Charge (SOC) dependent charge rates
- More robust formulation needed for the Default Energy Bid (DEB) for energy storage resources
- The usefulness of improvements to Variable Energy Resource (VER) forecasts
- Consideration of potential Minimum Online Constraint (MOC) replacements
- Incorporating SOC into Exceptional Dispatch (ED) decisions

Outage Management

The existing rules for outage management were designed for fossil fuel resources. In particular, resources with resource adequacy obligations when seeking approval for a planned outage will be required to provide substitute capacity which reflects the recent change proposed within the Resource Adequacy Enhancements initiative. SCE is interested in the CAISO's insights on the application of this rule to hybrid and co-located resources. The CAISO should address outage management for storage

[1] https://stakeholdercenter.caiso.com/StakeholderInitiatives/Energy-storage-enhancements

resources within this initiative rather than allowing it to be subsumed within other initiatives where the topic may not be addressed at all.

Short-Term Unit Commitment (STUC)

SCE urges the CAISO to consider STUC enhancements within scope. If the CAISO shares more details of its concerns on STUC extension challenges with stakeholders, there is a higher likelihood that stakeholders may help realize a feasible solution. At the least, the CAISO should work toward incremental extensions to STUC as technological limitations allow to enable resource operators to better optimize their State Of Charge (SOC) and net revenues as well as how the resource is bid into the CAISO market.

Multi-Interval Optimization (MIO)

SCE is concerned about any proposal to reduce the number of advisory intervals. Lookahead periods are valuable instruments toward ensuring reliability and allowing the CAISO ample time for resource positioning. If advisory intervals were to be reduced for one set of resources while leaving the rest of the fleet's treatment unchanged it is unclear on how this would work within the current optimization. It is also unclear if this would have a detrimental impact on either reliability or price volatility. The CAISO would have to fully explore these concerns as part of any proposal.

Finally, BCR exists for when dispatches are needed but uneconomic. If resources are awarded schedules outside of economic conditions, BCR provides assurance that generators will recover their costs. These BCR payments can balloon particularly if opportunity costs are a consideration in the construction of the offers submitted to the CAISO market.

BCR Calculation and Netting over 8-9 hours rather than 24

SCE has concerns over such a proposal, especially given that the market has already undergone a Day Ahead Market (DAM)-Real Time Market (RTM) BCR netting split. Further increasing the granularity within which netting is allowed also opens the opportunity for potential market abuses of BCR. This vulnerability in the market can also interfere with the CAISO's incentives to dispatch resources for reliability by making some resources look cheaper only when viewed within a limited 8-9 hour framework. Finally, the CAISO should note that the standard of 4-hour batteries may not always remain and is already evolving.

At the least, the CAISO should provide data on typical BCR payments in the DAM and RTM.

Intra hour bidding

SCE requests the CAISO opine on the interplay between this proposal and spread vs threshold bidding, with feasibility as the primary concern. SCE also requests the CAISO opine on the interplay between the

increasing BCR netting granularity proposal and intra-hour bidding. SCE notes its concern in the beginning of these comments that a policy proposal shouldn't have its costs outweighing the benefits.

SCE also requests that the CAISO provide existing data to determine how many resources fall under the various SOC buckets (or any SOC histogram determined by the CAISO).

End-of-horizon SOC parameter

SCE requests the CAISO clarify on what information this parameter would provide that is not already conveyed by the usage of the End-of-hour SOC parameter. The CAISO should also opine on interplay between the two parameters. For instance, if the information conveyed by one parameter does not comport with the other. SCE requests that the CAISO explain why the End-of-horizon parameter will not suffer from similar deficiencies as the end of day parameter that was rejected in ESDER 4.

Exploring new products such as dispatchability differentiated products, energy shift product, biddable SOC product

Dispatchability differentiated product

The CAISO should consider a product to sell energy in DA that is fully re-dispatchable in RT thereby providing flexibility. The CAISO should also consider another product to sell DA energy that is not re-dispatchable in RT and must perform in the RT market according to its DA schedule. The CAISO could determine how much of each product is needed based on a forecast of operating needs.

Energy shift product

The CAISO should elaborate on this part of the proposal. For instance, why is this product needed at all? Doesn't having both a day-ahead price, a real-time price and virtual bidding already provide the market the tools to do this efficiently? How would this interact with the existing energy procurement for net load, in terms of percentile, etc.? How does would this interact with a day-ahead Flexible Ramping capacity (or similar) product? How would the CAISO determine the quantity needed? Is load paying for the same energy twice? Is there a capacity component or interplay with capacity procurement? For instance, what would happen if a resource receives a Regulation dispatch and is unable to provide the energy shift product?

The energy shift product seems to be structured as a call option. SCE requests additional details about this product from the CAISO particularly, whether a single strike price is possible for the product and potential liquidity for this product type to ensure sufficient competition can materialize for the product.

Biddable SOC product

SCE requests details on this proposal. Additionally, how does this differ from the energy shift product? If resources are selling/buying SOC, different sized resources cannot trade equivalently. For instance, a 10 Wh battery selling 50% SOC would not be providing the energy associated with 50% SOC for a 20 Wh battery.

Better representation of costs (energy, opportunity, cycling)

SCE agrees that storage resources must be able to reflect their operating costs in their bids. SCE also agrees that opportunity costs (relative to hours withing the 24-hour optimization) are irrelevant within the DAM on account of the 24-hour simultaneous optimization that characterize market clearing in the DAM.

The inclusion of opportunity and cycling costs within bids for energy storage resources in the RTM in a manner that does not trigger market mitigation of the resource's offer remains unresolved. The current formula for the default energy bid excludes cycling costs; and the horizon for opportunity cost inclusion in bids is limited by the very short forward-looking horizon within the RTM software. Unless the forward-looking horizon can be extended any limited inclusion of opportunity costs for energy storage resources will result in their sub-optimization in the market-

SOC dependent optimal charge rates

The CAISO had indicated the possible use of alternative approaches for bidding energy storage resources in the market using the SOC rather than an explicit MW quantity. SCE supports exploring bidding methodologies that let storage providers represent the resource's physical capability to the market, and then letting the market find the optimum use of the resource. This would need to include management of the SOC. The use of the resource's SOC in the determination of optimal charge rates may suffer from similar deficiencies as spread that violate the monotonicity rules that govern bid curves in the market. An alternative may be to consider the SOC dependent optimal charge rates similarly as the bid curve is represented for the multistate generator configurations that capture the discontinuity of this type of bid curve for gas resources in the CAISO market.

Better VER forecasts to help DAM

SCE believes that better VER forecasts would be very helpful toward all resources impacted by the benefit, including Co-located Resource performance.

Implementing additional local constraints to replace MOC

SCE requests more details. Additionally, will the CAISO be developing and implementing new constraints within this initiative? Will the CAISO inform market participants of any new constraints before they go online, should they arise from this initiative or others?

Exceptional Dispatch development to incorporate SOC

SCE supports Opportunity Cost (OC) compensation in Exceptional Dispatch (ED), contingent on the ED being performed by the CAISO for grid reliability. Many questions arise due to the lack of details. Among them, given that the existing DEB formulation for storage includes OC, would any change be needed to accommodate opportunity cost compensation in ED?