California ISO

Stakeholder Comments Template

Energy Storage and Distributed Energy Resources (ESDER) Phase 4

This template has been created for submission of stakeholder comments on the Issue Paper Working Group Meeting for ESDER Phase 4 that was held on March 18, 2019. The paper, stakeholder meeting presentation, and all information related to this initiative is located on the initiative webpage.

Upon completion of this template, please submit it to initiativecomments@caiso.com. Submissions are requested by close of business **April 1, 2019.**

Submitted by	Organization	Date Submitted
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Please provide your organization's general comments on the following issues and answers to specific requests.

1. **Non-Generator Resource (NGR) model**

    a. SOC management & multi-interval optimization

WPTF believes there are two different problems the CAISO is trying to solve with the SOC management proposal: (1) The need for multi-use resources to manage their SOC so that they are able to participate in the wholesale market and fulfill other obligations, and (2) the need to resolve SOC issues within the CAISO optimization that are leading to inefficient and/or infeasible dispatches for storage resources.

To address the two problems identified above, the CAISO is considering allowing storage resources to offer in a targeted SOC for a future interval. The targeted SOC would be a constraint on the resource such that the market model would ensure any charging/discharging instructions prior to that future interval would enable the resource to meet the targeted SOC. WPTF believes that while a targeted SOC may be beneficial to address problem (1) above, it could introduce additional inefficiencies within the market model for purely wholesale storage resources.

For example, having a targeted SOC by hour ending 18 in the real-time market would not actually be "seen" in the market until the real-time outlook horizon includes that operating hour. Depending on the outlook horizon, this could result in the market only having a few hours to meet that targeted SOC, which may result in an inefficient use of the resource over the day. It could have been the case that charging the resource earlier in the day at

potentially lower prices than those seen within the optimization horizon that first includes the targeted SOC would have been optimal. Ideally, the proposed solution to address problems (1) and (2) above would be more market-based oriented rather than introducing a hard constraint in the market. WPTF encourages the CAISO to consider other potential solutions as well, such as allowing the market to optimize bid curves based on resource's state of charge.

While the NGR model is conceptually sound, WPTF believes that it could use minor improvements to make it feasible for storage resources to efficiently participate in the real-time energy market. WPTF asks that the CAISO review historical dispatches of storage resources participating within the NGR model and explore which enhancements may be most effective at facilitating additional storage participation. WPTF anticipates that we would expect the following issues to be identified:

- Advisory prices that differ from the binding prices for a given interval leads to inefficient schedules. This is because the market, in an advisory interval run, forecasts a future high price. The high price is later resolved in a subsequent market run and thus does not materialize. Storage will therefore charge in the "wrong" interval. Although BCR makes a storage resource whole to its offer, it does not make it whole to the lost arbitrage opportunity that results because it was charged in the "wrong" interval and thus inefficiently dispatched.

- Current bidding parameters constrain a storage resource's ability to reflect preferred hours for discharging. Because the market can only accept monotonically increasing offers, and the NGR model accepts bids from a negative Pmin to a positive Pmax, there is no functional way to self-schedule a discharge offer. It is WPTF's understanding that this was not the CAISO's design intent and simply a function of how the model was implemented. Furthermore, while the daily upper and lower charge limits are biddable, WPTF does not believe they would be an effective way to indicate when a storage resource would prefer to discharge in certain hours over others as, based on WPTF's understanding, they are a daily biddable parameters.

- Limited visibility into the CAISO's SOC (versus the resource's calculation of their SOC) leads to infeasible dispatches. The CAISO market may calculate the resource's SOC at 75% when in reality the resource is only charged to 70%, thus the market may issue an infeasible discharging instruction. This could happen with both the NGR and NGR-REM model. Additionally, bids are submitted in real-time at T-75. There is little certainty in terms of how the CAISO market will utilize a storage resource between the time bids are submitted at T-75 and T. Therefore, market participants do not necessarily have enough information at T-75 to optimally bid.

- Artificially constrained Pmax prevents the optimization from fully using storage resources, and thus also prevents storage resources from receiving value for its full physical capabilities in the market. An RA resource must have four hours of use, but this restriction should not be carried forward to the energy market. If the optimization needs four hours from the resource, it will dispatch it in that manner. However, the CAISO model artificially limits the Pmax of an RA

storage resource to one-fourth it's full capability. Take for example, a 25MW/100MWh storage resource. Its Pmin and Pmax will be -25MW and 25MW respectively. Thus, if fully charged, the resource can maintain its maximum output of 25 MWs for four hours. However, in reality, the resource could be dispatched to 100 MWs in one hour if the Pmax in the model could be set to 100 MWs rather than 25 MWs. It is WPTF's understanding that limiting the Pmax to 25 MWs stems from the RA four-hour requirement. As a result, the market is not fully utilizing the resource's full operating range because of the four-hour restriction for it to qualify as an RA resource.

2. **Bidding requirements for energy storage resources**

WPTF supports the CAISO applying the local market power mitigation application to energy storage resources. Specifically, we support the CAISO allowing storage resources to use three default energy bid options, similar to the convention resources. First, a proxy DEB, using a dynamic default energy bid similar to the one explained in an August 24, 2018 SPP white paper.[1] We believe that because storage is an arbitrage product it is key to include the arbitrage opportunity cost in every DEB. Second, a negotiated DEB option that uses the proxy as a framework, but then also allows the CAISO to incorporate the trade-off between lifetime cycling replacement costs in their bid. Third, an LMP option, that mitigates the resource based on the lower quartile of historical LMPs of the node during which the unit was dispatched over the past 90-days. WPTF recognizes that the third option would require the resource to have been participating and dispatched in the market prior to selecting this option; however, the CAISO could consider a similar construct using electrically similar nodes until enough historical data exists.

3. **Demand Response resources**

    a. DR operational characteristics – Please provide comments on the ISO's proposal for DR resources to reflect a non-zero Pmin.

    b. Weather sensitive – Seeking feedback on potential forecasting methodologies and approaches for validating SC-submitted forecasts.

No comment at this time.

4. **Discussion on BTM Resources**

    a. Potentially removing 24x7 settlement requirement for non-resource adequacy resources utilizing the DERA/NGR participation model.

    b. Providing a forum for industry stakeholders to discuss potential QC methodologies for multi-tech type DERs for LRA consideration.

No comment at this time.

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[1]

https://www.spp.org/documents/58525/dynamic%20opp%20cost%20esr%20mitigated%20offer%20framework_20180824.pdf

5. Additional comments

Please offer any other feedback your organization would like to provide from the topics discussed during the working group meeting.