

Stakeholder Comments Template

Subject: 2017 Draft Stakeholder Initiative Catalog

Submitted by	Company	Date Submitted
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Advanced Rail Energy Storage, LLC (“ARES”) appreciates the opportunity to provide comments on the 2017 Draft Stakeholder Initiative Catalog and to highlight unaddressed issues related to the frequency regulation market and mileage pricing. ARES has raised these issues with the CAISO in comments in the 2015 and 2016 Energy Storage and Distributed Energy Resources stakeholder initiatives (ESDER Phases 1 and 2), but the CAISO has declined to include an examination of regulation market pricing in the scope of these initiatives. ARES has also filed comments with FERC on this same issue¹ and believes that it is essential to consider mileage pricing in a stakeholder initiative in this upcoming cycle.

ARES first seeks clarification on whether these mileage pricing issues might be captured in another initiative. In particular, ARES requests more information on the scope of the Frequency Response Phase 2 (5.14) initiative. Recognizing that frequency response and frequency regulation are treated differently by FERC² and in the CAISO market, ARES wonders how the CAISO anticipates developing market solutions to procure frequency response, given the close relationship of these ancillary service products. In the Frequency Response Phase 1 initiative, the CAISO responded to comments from the California Energy Storage Alliance requesting review of regulation product designs by stating that the CAISO will consider existing

¹ See Comments of Advanced Rail Energy Storage, LLC in FERC Docket No. AD16-20-00.

² FERC Order 755, n.5, October 20, 2011 (137 FERC ¶ 61,064).

ancillary service market designs in developing the second phase of the initiative.³ ARES requests that this be more explicitly described in either the Frequency Response Phase 2 initiative scope or in an initiative specifically addressing the regulation market and mileage payments.

Compensation for Performance in the Regulation Market

While the CAISO has implemented a market design for a regulation market in response to FERC's directive under Order 755, the regulation market is not functioning to compensate resources for performance in most hours. The CAISO compensates resources for performance through a payment for mileage. The CAISO regularly procures between 300 and 400 MW of regulation service, and earlier this year increased its procurement level to 600 MW. Between June and September, in 94.73 percent of all hours, mileage prices (both regulation-up and regulation-down mileage) are 1 cent/MWh or less, and are zero in many hours. Mileage payments are the source of compensation for performance, so with virtually no payment for performance, the market design provides no incentives for accurate and faster resources to enter this market, and no payment for those resources that are actually responding.

ARES believe that this is a serious impediment to encouraging the development of new, accurate, and fast-responding storage resources, and suggests that the market dynamics that are driving the mileage price to negligible levels most hours should be examined and remedied to provide these resources with compensation for performance, as contemplated under Order 755. ARES is also concerned that new fast and accurate resources provide significantly more mileage (regulation movement) than legacy regulation resources, but receive minimal to no compensation, resulting in undue discrimination on price and performance.

ARES suggests that the CAISO consider evaluating performance adjustments to the regulation-up and down payments as a possible solution to this problem. Another possible solution that could be examined is a "market-based" floor price for mileage bids. Setting a floor price ensures that regulation units providing mileage receive compensation for providing regulation movement. The floor price could be adjusted monthly to ensure that approximately half of the regulation payments are provided from mileage payments and half for reg-up and reg-down payments. A more detailed analysis to determine the appropriate percentage of payments

³ See page 45 of https://www.caiso.com/Documents/DraftFinalProposal_FrequencyResponse.pdf.

from mileage versus reg-up and reg-down payments would need to be conducted to ensure pay-for-performance goals are met and simultaneously managing regulation costs for customers.

Improving Market Efficiency and Grid Reliability

ARES believes that one reason for the low mileage prices is that the price-setting marginal regulation resources have an incentive to bid zero (or close to zero) to ensure that they win the reg-up and reg-down award. A second reason may be that legacy resources with poor regulation accuracy prefer receiving regulation payments instead of mileage payments which are adjusted for performance. The current reg-up and reg-down prices are attractive enough such that the marginal regulation bidders won't risk losing the reg-up and reg-down awards by bidding mileage prices above zero. ARES believes that this behavior occurs because the CAISO uses a co-optimization algorithm to find the least-cost combination of regulation and mileage bids to select the winning set of bidders for each hour. When a bidder offers reg-up and reg-down mileage bids above zero and the mileage clearing prices are zero, then this bidder loses the reg-up and reg-down awards regardless of the reg-up and reg-down price offers from this bidder.

The faster ramping and more accurate regulating resources provide more mileage (regulation movement) compared to slower and less accurate regulating resources. However, since their mileage payments are hovering between zero and one cent per megawatt-hour most of the time, these resources that provide a faster and more accurate response to the AGC signal incur costs to provide the service without receiving compensation. Conventional generation units operate less efficiently when output changes in response to AGC signals, compared to operating at a fixed set point. Storage resources incur round-trip efficiency losses and shortened lifespans (for battery systems) as more regulation mileage is provided.

More mileage provided to the CAISO from a regulation resource results in less overall net compensation because of the costs of operational inefficiency and losses from roundtrip efficiency. Thus, resources that have slow ramp rates and poor accuracy in response to an AGC signal will receive much lower mileage awards compared to better regulating resources. However, this creates an incentive for fast and accurate resources to offer a lower ramp rate than the technology's capability and reduce their accuracy so that they aren't disadvantaged financially by providing much more mileage compared to legacy resources. This perverse

incentive for fast ramping and accurate regulation resources is exactly opposite of the goals set out in FERC's Order 755.

The key design problem is that the co-optimization of regulation and mileage bids was based on the premise there would be significant revenue available from delivering regulation mileage. If there were significant mileage revenue, then CAISO regulation market design would have resulted higher payments for fast ramping and accurate regulation resources compared to poor regulating resources. In the CAISO report "Pay for Performance Regulation Draft Final Proposal February 13, 2012,"⁴ the optimization shows an example with mileage bids ranging from \$2 to \$3.8/MWh. If mileage prices were in this range, then the regulation market would have achieved the pay-for-performance design goal.

Finally, with negligible "pay-for-performance" differentiation among resources providing different levels of regulation performance, the CAISO's market design is not encouraging the development of fast-ramping resources. When FERC re-examines the waiver it allowed in the short run for resources to meet accuracy targets, the portfolio of resources that can provide regulation will likely be reduced. This could leave the CAISO with much higher cost regulation resources to meet its needs if it doesn't address this issue now.

Timing

A CAISO study of renewable integration⁵ shows that more and faster ramping regulation resources will be needed as more intermittent resources are added to the system. This CAISO report identifies the increasing need for fast ramping and accurate regulation resources. In order to meet this need, the CAISO needs to determine the regulation market refinements necessary to encourage the development of these types of resources. Note that the study only examined regulation needs through 2020. As California pursues a 50 percent Renewables Portfolio Standard by 2030, the trend of increasing need for fast ramping and accurate regulation resources shown in the above tables will continue. What is not clear from this study is the amount of regulation needed as a function of the ramp rate and accuracy of the regulation provided to the CAISO. A portfolio of fast-ramping and accurate regulation facilities has the potential to reduce

⁴ <http://www.caiso.com/Documents/DraftFinalProposal-PayforPerformanceRegulation.pdf>

⁵ See pages 51 and 52 of <https://www.caiso.com/Documents/Integration-RenewableResources-OperationalRequirementsandGenerationFleetCapabilityAt20PercRPS.pdf>

the amount of regulation needed to meet the grid needs, which in turn could moderate the total regulation costs to customers.

ARES believes that the time is right to begin an examination of this issue, so that market design changes could be implemented within the next two years. ARES recognizes that the issues are complex and any changes would require careful consideration to ensure competitive pricing. As more storage resources are developed under the California policy setting procurement targets for energy storage, and as more renewable resources are added to the grid, a market design that provides payment for performance will be important both to the resources providing fast and accurate response capabilities and to grid reliability. Finally, when FERC revisits its decision to allow a short-term reduction in the accuracy requirement for regulation resources, it would benefit the CAISO market to have addressed the issue of pay-for-performance.

Conclusion

As more regulation resources are required to accommodate increased renewable integration, this mileage payment issue will only continue to block the financial incentives necessary for the development of faster ramping and more accurate regulation resources. ARES urges the CAISO to clarify that this issue is included in its 2017 initiative catalog or, if not, to add it to the list.