CESA
CALIFORNIA ENERGY STORAGE ALLIANCE

DISCUSSION & SCOPING PAPER ON RENEWABLE INTEGRATION: MARKET AND PRODUCT REVIEW, PHASE 2

May 2, 2011

The California Energy Storage Alliance (CESA) strongly supports the positive direction and constructive tenor of the proposals set forth in the CAISO's *Discussion & Scoping Paper on Renewable Integration, Phase 2*, dated April 5, 2011 (Phase 2 Paper). CESA encourages the CAISO to aggressively pursue its stated objectives for Phase 2 of its Renewable Integration: Market and Product Review that are supportive of early adoption of energy storage, namely to: (a) develop a comprehensive framework for the market to be designed and implemented over the next several years to provide additional operational flexibility and (b) target specific near term market design changes and new market products to integrate variable energy resources.

Introduction

Consistent with proposals set forth in the FERC's *Notice of Proposed Rulemaking on Frequency Regulation in Organized Power Markets*, issued on February 17, 2011 (Frequency Regulation NOPR), the CAISO appears ready to change its regulation payment method to include a payment based on the rate of speed of response to a CAISO control signal to reduce total MW capacity of regulation service needed to manage the grid. As the FERC preliminarily concludes, this approach would fairly and reasonably compensate all types of resources, particularly energy storage, for ramping performance on a comparable basis. As CESA has noted in its previous comments submitted in this stakeholder process reasonable "mileage payment" for services rendered would, (i) motivate existing resources to improve their performance, (ii) attract new fast responding energy storage resources, and (iii) compensate all regulation service providers based on the full value of the products that they actually provide.

The FERC proposes a two-part payment structure for regulation that would include a capacity payment and a performance payment with an accuracy adjustment. In addition to a capacity payment, the FERC proposes that ISOs/RTOs compensate regulating resources with a mileage payment that would sum the total absolute value of a resource's up and down movement multiplied by the price per MW of ACE correction. CESA has been encouraged by the affirmative steps the CAISO has taken in recent months with adoption of its Regulatory Energy Management program, and notes that this appears to suggest a new sense of urgency in reducing barriers to energy storage into its markets. CESA urges the CAISO to take a leading role in implementing the FERC's Frequency Regulation NOPR, and using flexibility it may be afforded to advance deployment of energy storage technology.

Comments

CESA provides the following comments on the specific questions that are posed in the Phase 2 Paper that relate to energy storage:

Capacity Payment

- Is there a minimum required amount of stored energy for a given interval of time for a storage device to qualify to provide Regulation service?

There should be no need for a minimum required amount of stored energy for a given interval of time for an energy storage system to qualify to provide regulation service. This topic was discussed in great detail during the stakeholder process that led to the CAISO Board of Governors' approval of Regulation Energy Management (REM) mechanism. The REM proposal states that "a resource which has selected REM can satisfy the 60 minute continuous energy requirement for regulation in the day-ahead market,"1 as long as the resource can provide continuous regulation service over the hour, (e.g., through either their energy storage capacity or participation in REM), then there should be no minimum required amount of stored energy.

- In real-time, should resources awarded to provide Regulation in subsequent intervals be disqualified from providing Regulation in subsequent intervals if the resource's stored energy falls below a minimum energy threshold due to energy releases in previous intervals?

As discussed above the REM mechanism will ensure energy storage resource can continuously provide regulation service. There is no reason to disqualify energy storage systems from providing regulation in subsequent intervals if the system's stored energy falls below a minimum energy threshold due to energy releases in previous intervals, furthermore the CAISO's existing "No-Pay" provision will adequately address situations where resources are unable to provide the service in real time.

- How would the ISO account for inter-temporal opportunity costs in the price of Regulation energy for a storage device given the price could be different than the price of Regulation energy provided by a conventional resource due to potential inter-temporal constraints applied only to storage?

Where appropriate, resources should be permitted to include inter-temporal opportunity costs in their capacity bid because it reflects the total cost of that resource providing regulation capacity.

Accuracy Adjustment

- Does the fact that the ISO procures Regulation up and Regulation down as separate services have an impact on how the ISO would implement a performance payment?

1 Regulation Energy Management Draft Final Proposal, 12/14/2010, Section 7.2

The fact that the CAISO procures regulation up and regulation down as separate services should have no meaningful impact on implementing a performance payment. Specifically the amount of MW movement in response to a CAISO control signal can be accounted for separately for regulation up and regulation down dispatch signals, a separate accounting mechanism will allow the CAISO to apply performance payments to resources in the separate regulation markets.

- Are there minimum threshold performance standards to be eligible to receive a performance payment?

The accuracy metric would measure how well a resource is hitting its dispatch signal within a tolerance band and determine the performance payment. If a resource is determined not to be following its signal, the CAISO would rescind a portion of the performance payment received by that resource. This will ensure that compensation for all resources is tied to how well they actually respond to the CAISO's control signal while ensuring an accurate fast resource appropriately is paid more than an accurate slow resource.

- Is there a correlation between fast ramping and accuracy? For instance, can a single fast ramping regulating resource be more accurate in satisfying ACE correction than several slower ramping regulating resources?

There is a correlation between fast ramping and accuracy. First, resources that are more flexible and can ramp more quickly will reach their dispatch target faster and can then be re-dispatched more often. Thus, fast regulation resources provide much greater ACE correction than more ramp-limited resources. Because of their fast and accurate response, energy storage technologies provide a greater amount of ACE correction per MW of Regulation capacity than slower ramping resources. Because slower-ramping resources cannot switch directions quickly, they sometimes provide Regulation in a counterproductive direction and, as a result, actually add to the ACE, requiring dispatch of other resources to counteract it. A Pacific Northwest National Laboratory (PNNL) study concluded that fast responding energy storage resources (such as flywheels and batteries) could be as much as 17 times more effective than conventional ramp limited Regulation resources because of how quickly and accurately it responds to a system imbalance.[2] In addition, a recent California Energy Commission study found that "on an incremental basis, fast ramping storage can be up to two to three times as effective as adding a combustion turbine to the system for regulation purposes."[3]

Net Energy

- The CAISO solicits comment on whether establishing a mileage payment would make the netting of energy across the settlement interval a moot point.

[2] Makarov, Y.V., Ma, J., Lu, S., Nguyen, T.B. "Assessing the value of Regulation Resources Based on Their Time Response Characteristics." Pacific Northwest National Laboratory, PNNL – 17632, June 2008.
[3] "Research Evaluation of Wind Generation, Solar Generation, and Storage Impact on the California Grid," Study by KEMA, Inc., done for California Energy Commission; June 2010.

Hourly net energy payments and performance payments are not redundant. In fact, both types of payments are necessary components of the appropriate compensation structure for Regulation resources. Regulation is a separate Ancillary Service market product that should compensate resources to set aside capacity and then modify its output as directed by a CAISO control signal. The performance payment is designed to compensate Regulation resources for the amount of ACE Correction the resource is providing in real-time to maintain system reliability. Energy payments also provides desirable incentives for efficiency – a storage device with low conversion losses would pay less for net energy than a device with high losses. In addition, all Regulation resources should either be paid or pay for the energy it injects or withdraws. For example, net energy sales or purchases for the purpose of maintaining state of charge should be settled in the appropriate energy market.

Conclusion

In addition to actions within its control described above, in the coming months, the CAISO should also encourage the California Public Utilities Commission (CPUC) to focus on operational capability, rather than simply capacity, as has been the case thus far in its Long Term Procurement (R.10-05-006) and Resource Adequacy (R.09-10-032) proceedings. Emphasis, for example, on load following and regulation capacity up and down in all of the CPUC's various active proceedings should likewise be accelerated.

Finally, as stated in CESA's previous comments leading up to this stage in the stakeholder process, CESA strongly urges the CAISO to proactively embrace the CPUC's invitation in its recent Energy Storage OIR (R. 10-12-007): "The Commission notes that the CAISO and the CEC could play important roles in the identification of viable and cost-effective energy storage systems that could be amenable for large-scale deployment in California, and we therefore invite and welcome the active participation of the CAISO and the CEC in this rulemaking." (OIR, p. 7).