Comments on Flexible Ramping Product
Revised Draft Final Proposal

Submitted By	Company or Entity	Date Submitted
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Powerex appreciates the opportunity to provide these comments on the Flexible Ramping Product Revised Draft Final Proposal ("Proposal") published on August 9, 2012. Powerex supports several elements of the CAISO's Proposal. However, Powerex has two substantial areas of concern - the CAISO's methodology for calculating flexi–ramp need and the CAISO's cost allocation methodology continues to be inconsistent with its cost allocation principles.

Ramping Need

Powerex appreciates the CAISO clarifying that the "Net system demand = load + export – import – internal self-schedules - supply deviations" and understands that the flexi-ramp need is the ***potential net system demand change*** between real-time intervals. Powerex understands that the CAISO's modified approach to determining flexi-ramp needs is based on utilizing historic changes in net system demand to determine an expected net system demand change range within a 95% confidence interval. Powerex has substantial concerns with this approach.

First, this approach appears to fail to recognize the difference between *variance* drivers of ramping needs and *uncertainty* drivers of flexi-ramp needs. For example, intertie ramps cause a one-directional need for flexi-ramp of known quantity, whereas VER output or load uncertainty or non-VER deviations from schedule cause a two-directional need for flexi-ramp of unknown quantity. Any modeling of flexi-ramp need based on treating uncertainty and variances equivalently will therefore be significantly inefficient.

Second, the CAISO's approach does not appear to recognize that the best source of data to determine the expected change in supply or demand with a specified degree of confidence from one interval to the next is very different for different supply resource types and different for demand. For example, a very good source of data for determining expected changes in load is perhaps the CAISO's proposed approach of looking at historic changes in load over the past 12 months for the same time of day. In contrast, the best source of data for determining expected changes in VER output is not looking at historic changes in VER output for the same time of day, but rather a combination of the level of scheduled VER output and historic deviations from a similar level of VER output (independent of the hour of the day). The best source of data for determining expected changes in intertie ramps, are clearly the known ramps themselves.

Consider an interval with stable load and all supply being provided by non-VER resources. Such an interval should require a modest, relatively symmetric need for flexi-ramp. Variance drivers of flexi-ramp are small due to load, and hence supply, being scheduled at similar levels one interval to the next. Uncertainty drivers are low as load forecasts are more accurate in

stable load intervals, and supply uncertainty is generally low from non-VER resources. In contrast, consider the same scenario, but with 5,000MW of the supply coming from VER output that is at its midpoint of production. This would require substantial additional flexi-ramp up and flexi-ramp down to cover the increased uncertainty of VER output. Next consider if the 5,000MW of the VER supply was coming from VER output that was at its maximum output of production rather than midpoint, then more flexi-ramp down would be required and less flexi-ramp up. In short, Powerex believes the CAISO's flexi-ramp demand forecast methodology must recognize the differences between resource types and demand as well as the differences between variance and uncertainty.

Powerex strongly recommends that the CAISO consider revising its flexi-ramp need methodology as follows:

1) Calculate expected variability changes due to all supply schedules, including intertie ramps, based on the actual known schedules for respective interval.

2) Calculate expected variability changes due to load schedules based on actual known load schedules for the respective interval.

3) Calculate expected uncertainty changes (separately for up and down) due to deviations from schedule based on historic data for load (for same hour).

4) Calculate expected uncertainty changes (separately for up and down) due to deviations from schedule based on historic data for non-VER resources, including interties (for same hour)

5) Calculate expected uncertainty changes (separately for up and down) due to deviations from schedule based on historic data (of similar resource output level intervals) for VER resources

An overall flexi-ramp need can then be calculated at the 95% confidence interval, by combining these five different needs (with a base assumption of a correlation of zero between these five needs).

Bid Cap and Floor

Powerex currently has no objections to the proposed $250/MWh and $0/MWh bid cap and floor, respectively.

Co-Optimizing FRP with Energy and AS

Powerex has no objections with the CAISO proposal to co-optimize flexi-ramp with Energy and AS however, Powerex believes flexi-ramp (from generator or interties) should be treated and scheduled similar to AS on the interties to ensure transmission is set aside to ensure flexi-ramp is feasible and deliverable.

Cost Allocation

Powerex understands the proposed allocation of flexi-ramp costs to fixed ramps would only be for flexible ramping in the opposite direction of the fixed ramp (when the fixed ramp is in the same direction of net system demand). However, this proposed allocation does not recognize the implicit value of fixed ramps when they align with the overall system need for ramp due to variance. Powerex therefore continues to believe the CAISO's proposal for cost allocation is inconsistent with the CAISO's cost allocation principles. More specifically, Powerex believes the CAISO's approach will discourage intertie participants from providing valuable hour-to-hour

ramping capability that reduces true overall flexi-ramp needs. For example, when such intertie ramps are in the same direction as the CAISO's net system ramping needs due to variance, these intertie schedules reduce the CAISO's true physical need for flexi-ramp, yet will be exposed to flexi-ramp costs (in the opposite direction) under the CAISO's proposed cost allocation methodology. In contrast, intertie schedules that do not change at all hour to hour, will not be exposed to any flexi-ramp costs whatsoever Accordingly, participants will be discouraged from providing hour to hour intertie schedule changes that provide net ramping benefit to the CAISO grid.

While Powerex appreciates the CAISO recognizing its previous comments in this Proposal, Powerex refers the CAISO to a still unanswered issue raised in those comments. This Proposal allocates flexi-ramp costs to known fixed ramps that are aligned with known system ramp needs (for flexi-ramp in the opposite direction of the fixed ramp), even when those fixed ramps are reducing the CAISO's system need for flexi-ramp due to variance. In other words, whereas a resource with a flat block schedule across a day would not be allocated any flexi-ramp up or down costs (appropriately), a resource that is moving in sync with the CAISO known variance ramping needs with certainty (via a fixed ramp), is allocated flexi-ramp costs when that resource is reducing the need for ramp in the direction of system need.

Powerex reiterates the need for the CAISO to allocate costs separately for drivers of flexi-ramp that are variances versus uncertainty, and to provide non-refundable credits for resources providing beneficial variances that reduce the CAISO's physical ramping needs. Alternatively, as a simple approach, the CAISO could exempt any intertie resource flexi-ramp cost allocation due to intertie ramp for the day, if that resources ramps were net beneficial across the day relative to the CAISO's net flexi-ramp needs due to variance.