Comments of OhmConnect, Inc.
Energy Storage and Distributed Energy Resources Initiative
Demand Response Baselines Working Group

Submitted by	Company	Date Submitted
John Anderson john@ohmconnect.com	OhmConnect, Inc.	September 3, 2015

OhmConnect, Inc. (OhmConnect) offers the following comments in the stakeholder process for the California Independent System Operator's (CAISO) Energy Storage and Distributed Energy Resources (ESDER) initiative August 27, 2015 Demand Response Baselines Working Group conference call.

1. Meter Generator Output (MGO)

OhmConnect requests that the CAISO clarify whether sub-metered *loads* situated behind a retail customer's primary (net) meter would qualify under the proposal for reduction methods/use cases analogous to those summarized for sub-metered *generators* on slides 11 and 12 of the CAISO's August 27 presentation.[1]

2. Type-II Baselines (Statistical Sampling)

In what follows, it is helpful to distinguish between two use cases for statistical sampling. We note, however, that for both of these cases the statistical sampling solution proposed by the CAISO may be of short-lived usefulness to market participants owing to the impending implementation of CPUC Rule 24.

Case 1: The DRP wishes to participate in the Day-Ahead Market only. All of the retail customers in the DRP's aggregation have interval meters with hourly data granularity, but the IOU is unable to provide the DRP with RQMD for all of these customers within the time necessary for the DRP to settle with the CAISO.

On the August 27 conference call, PG&E stated that, at present, it cannot guarantee RQMD will be available for all customers in a DRP's aggregation within the timeframe necessary for settlement with the CAISO. In this case, the statistical sampling methodology outlined on slides 18-23 of the CAISO's August 27 presentation can facilitate the DRP's participation in the Day-Ahead Market. Once an appropriate sample size has been calculated, a sample of customers can be selected at random from the broader population of customers comprising the aggregation. (Of course, in order for this to work in practice, the IOU must be capable of timely providing RQMD for at least this random sample of customers.)

[1] The presentation is available at http://bit.ly/1LYKRsZ.

It is OhmConnect's understanding, however, that upon Rule 24 "go-live" in January 2016, DRPs can be assured that RQMD for all customers in an aggregation will be available from the IOU within the time required for CAISO settlement. In other words, the problem described by PG&E during last week's call should not persist after implementation of Rule 24, and hence statistical sampling for the purpose of enabling DRPs' participation in the Day-Ahead Market should no longer be necessary.

Case 2: The DRP wishes to participate in the Real-Time Market. Some, but not all, of the retail customers in the DRP's aggregation have interval meters with 15-minute data granularity. Whether or not any particular customer has a 15-minute meter is exogenous to the DRP.

In this case, the statistical sampling methodology outlined on slides 18-23 of the CAISO's August 27 presentation can *potentially* facilitate the DRP's participation in the Real-Time Market. An important consideration, however, is whether or not the customers with 15-minute meters are representative of the broader population of customers in the DRP's aggregation.

As in the CAISO's slides, let n denote the number of customers in the aggregation with 15-minute meters, and let $N > n$ denote the total number of customers in the aggregation (irrespective of meter data granularity). (Alternatively, we can define n and N to be sets, such that $n \subset N$.) Strictly speaking, statistical sampling requires that the customers in n be drawn *at random* from N.[2] In practice, it is difficult to say whether the 15-minute meters are randomly assigned among the customers in the aggregation. Thus, even if for a given value of N the value of n/N lies on or above the relevant curve on slide 22, the "virtual" meter data calculated using the expression on slide 18 ($N/n \cdot \sum_{i=1}^{n} m_i$) could significantly under- or overestimate the actual performance of the aggregation as a whole.

Because the DRP cannot choose which customers have 15-minute meters, it must instead choose which customers without 15-minute meters to include in its aggregation (i.e. the set $N \setminus n$) so as to approximate a random distribution of the 15-minute meters within the aggregation as a whole. To this end, the proportion of customers having certain observable characteristics (e.g. physical location, controllable load, etc.) should be similar across the sets n and $N \setminus n$. Note that because 15-minute meters are presently not common among residential customers (the penetration is perhaps 20%), the curves on slide 22 imply that an aggregation may need to comprise of a very large number of customers in order to qualify for statistical sampling as a means of enabling Real-Time Market participation.

Finally, similar to Case 1 above, it is OhmConnect's understanding that CPUC Rule 24 will soon make statistical sampling for the purpose of enabling participation by DRPs in the Real-Time Market unnecessary, as DRPs will be able to request that the IOUs reprogram to 15-minute data granularity the interval meters of customers registered with CAISO as part of a DRP aggregation. Nevertheless, the CAISO's statistical sampling proposal could bridge the gap in the interim and help DRPs obtain experience with Real-Time Market operations – provided that the CAISO's changes can be implemented relatively quickly.

[2] See, for instance, *PJM Manual 19: Load Forecasting and Analysis*, http://bit.ly/1UvTZEO.