Comments of OhmConnect, Inc.
Energy Storage and Distributed Energy Resources
Revised Straw Proposal

Submitted by	Company	Date Submitted
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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 September 17, 2015 Revised Straw Proposal (Proposal). Our comments focus exclusively on the alternative PDR/RDRR performance evaluation methodologies in section 6 of the Proposal.

1. Meter Generator Output (MGO)

OhmConnect requests that CAISO clarify whether its MGO proposal will better enable retail customers with behind-the-meter solar PV generation to participate in PDR/RDRR aggregations. Under CAISO's current rules, solar PV customers are not credited for reductions to their "pure loads" during intervals in which their metered net consumption is negative. (CAISO's practice is to set $N_t = 0$ for all intervals t in which $N_t < 0$.) However, if customers can meter their solar PV generation with sufficient precision and granularity – in other words, if solar PV customers can establish G in Figure 3 of the Proposal (page 25) – then the proposed Meter Configuration B1 ("Load Reduction Only") should permit these customers to establish, and to receive credit for, reductions to their pure loads, $N - G$, in all intervals. Moreover, Table 1 (page 28) indicates that under Meter Configuration B1 only the pure load component of a location is registered in the PDR/RDRR. Because the registration in this case purposely disregards solar PV generation, it would seem that the appropriate "Export Check" is not $N_t \geq 0 \; \forall \; t$, but rather $N_t - G_t \geq 0 \; \forall \; t$.

2. Type-II Baselines (Statistical Sampling)

OhmConnect supports the ISO's proposal to allow statistical sampling for the purpose of facilitating participation in the Real-Time and Ancillary Services Markets when 5- or 15-minute meter data is not available for all locations in a PDR/RDRR. We have some concern, however, with the strict condition that DRPs "be required to demonstrate that each PDR/RDRR sample was selected at random" (page 34). Specifically, OhmConnect is concerned that in the case of residential end-use customers truly random assignment of 15-minute meters among the locations in a PDR/RDRR will be expensive and will not efficiently utilize the existing stock of residential meters with 15-minute data capability.

As an example, suppose a PDR/RDRR consists of 1,000 residential locations. Based on the table on page 39 of the Proposal, the DRP would be required to select at random a sample of (at least) 210 locations from this population of 1,000 in order to utilize the Type-II baseline option. It is OhmConnect's understanding that perhaps 20 percent of residential end-use customers in California presently have interval meters with 15-minute data granularity. Thus, of the 210 locations randomly selected from the population, on average only 42 will have 15-minute meter data capability.[1] The DRP will have to upgrade the meters at the remaining 168 locations, presumably at its own expense. Although the IOUs have stated they will not charge DRPs fees to reprogram customers' interval meters from hourly to 15-minute data granularity during the Rule 24 Initial Implementation, it is not clear that this practice will extend to subsequent phases of Rule 24.

Therefore, as an alternative, CAISO could allow DRPs to select the sample of locations with 15-minute meter data granularity so as to *approximate* random assignment of 15-minute meters among the population of locations in a PDR/RDRR. Let $x_{i,j}$ denote the j^{th} observable and quantifiable characteristic of location i known to affect i's baseline consumption and/or curtailment potential. It is reasonable to assume that the sample $n^* \subset N^*$ is representative of the (sub)population $N^* \subseteq N$ if the following set of inequalities holds:

$$\left| \frac{\frac{1}{n^*}\sum_{i=1}^{n^*} x_{i,j} - \frac{1}{N^*}\sum_{i=1}^{N^*} x_{i,j}}{\frac{1}{N^*}\sum_{i=1}^{N^*} x_{i,j}} \right| \leq z \ \forall \ j$$

i.e. the (absolute) percentage difference between the average value in the sample and the average value in the population is less than z% for each observable determinant of consumption/curtailment, x_j. This approach should help ensure that "sample members [are] selected with no bias to any factor such as size, location, or customer type" (page 34). And in keeping with page 39 of the Proposal, n^* and N^* would still be chosen such that:

$$\frac{n^*}{N^*} \geq \frac{271}{N^* + 271}$$

The location characteristics to include in the vector $\boldsymbol{x}_i = \left(x_{i,1}, x_{i,2}, \ldots, x_{i,J}\right)$ and the value to assign to the parameter z in the above set of inequalities are potential topics for discussion at the October 12, 2015 ESDER stakeholder meeting.

[1] In this example, the number of locations k in the randomly selected sample with 15-minute meter data granularity is characterized by a hypergeometric distribution with parameters $N = 1{,}000$, $K = 200$, and $n = 210$, such that the expected value of k is $n \cdot K/N = 42$.