# SolarCity Comments

## Energy Storage and Distributed Energy Resources ("ESDER") Stakeholder Initiative

| Submitted by | Company | Date Submitted |
|---|---|---|
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**Comments:**

SolarCity provides these comments on the California Independent System Operator's (CAISO) Energy Storage and Distributed Energy Resource (ESDER) initiative's revised draft final proposal. SolarCity appreciates this opportunity to comment and thanks CAISO for its hard work and collaboration to create a robust market design proposal that enhances market efficiency and allows energy storage and distributed energy resources (DER) to effectively compete at wholesale level.

SolarCity supports CAISO's proposal in its current shape and form and encourages rapid implementation of PDR metered generation output (MGO), retail baseline adjustments and performance modifications for net export of PDR.

| Proposal | | Overall Level of Support (Fully Support; Support With Qualification; or, Oppose) | Comments (Explain position) |
|---|---|---|---|
| Allow an NGR resource to provide its initial state of charge (SOC) as a bid parameter in the day-ahead market. | | Fully Support | No Comments |
| Allow an NGR resource the option to not provide energy limits or have the ISO co-optimize an NGR based on the SOC. | | Fully Support | No Comment |
| Allow a PDR/RDRR resource the option of a performance evaluation methodology based on Metering Generator Output ("MGO") concepts. | As proposed. | Fully Support | No Comment |
| | With modification proposed by SCE. | Support with Qualification | Please see below |
| Proposal to support use of statistical sampling | | Support | No Comment |

**Performance evaluation methodology based on Metering Generator Output ("MGO") concepts**

CAISO's proposal to adjust for typical retail load modifying behavior (G_LM) is established by using a look back of similar "Non-Event Hours". An "Event Hour" is any CAISO market award, dispatch or outage recorded for PDR/RDRR that occurs during a CAISO hour ending (HE) interval. This adjustment is subtracted from actual response to financially settle performance as shown below.

DR_SUPPLY(t) = - [G(t)-G_LM]

Southern California Edison (SCE) has proposed a modification to the accounting of "Event Hour" using a Net Benefit Test Price (NBT) threshold. NBT is an exogenous price required by FERC order 745 in which demand response resource bids are deemed cost effective. The price threshold is a monthly value and is published by the CAISO before each operating month.

SCE's proposal disqualifies any dispatch intervals as "Event Hours" if market clearing price is below NBT to prevent gaming behavior that can artificially decrease retail load adjustments. This is illustrated in table 1 in SCE's proposal[1].

There are two elements of SCE's proposal that should be noted: (1) it could prevent unreasonable gaming behavior that manipulates retail baseline adjustments and (2) it could also cause market distortions reducing efficiency and eliminating competitive structure of wholesale markets. To demonstrate this we provide an illustrative example.

A behind-the-meter energy storage system which submits economic bids for PDR in two consecutive days is considered. The true cost of the asset composed of marginal cost and opportunity cost of cycling and retail load management is estimated to be $30/MWh across all hours for both days. For the sake of simplicity we further assume that typical retail load adjustment for the resource (G_LM) has been 0 as of trade date 1. We also assume that for both trade dates considered the resource has no retail obligation for HE14-19 and the energy is only being provided for wholesale.

**Trade Date 1**

| HE | Bid Price (c) ($/MWh) | Market Price (p) ($/MWh) | Market Award (MA) | NBT ($/MWh) | Event Hour | G_LM | Market Settlement (MA-GLM)x(P-c) |
|----|----|----|----|----|----|----|----|
| 14 | 30 | 20 | 0 | 40 | No | 0 | 0 |
| 15 | 30 | 25 | 0 | 40 | No | 0 | 0 |
| 15 | 30 | 38 | 1 | 40 | No | 0 | (1-0)x(38-30) = 8 |
| 16 | 30 | 32 | 1 | 40 | No | 0 | (1-0)x(32-30) = 2 |
| 17 | 30 | 36 | 1 | 40 | No | 0 | (1-0)x(36-30) = 6 |
| 18 | 30 | 33 | 1 | 40 | No | 0 | (1-0)x(33-30) =3 |
| 19 | 30 | 27 | 0 | 40 | No | 0 | 0 |

**Trade Date 2**

| HE | Bid Price (c) ($/MWh) | Market Price (p) ($/MWh) | Market Award (MA) | NBT ($/MWh) | Event Hour | G_LM | Market Settlement (MA-GLM)x(P-c) |
|----|----|----|----|----|----|----|----|
| 14 | 30 | 29 | 0 | 40 | No | 0 | 0 |
| 15 | 30 | 28 | 0 | 40 | No | 0 | 0 |
| 15 | 30 | 45 | 1 | 40 | Yes | 1 | (1-1)x(38-30) = 0 |
| 16 | 30 | 47 | 1 | 40 | Yes | 1 | (1-1)x(32-30) = 0 |
| 17 | 30 | 46 | 1 | 40 | Yes | 1 | (1-1)x(36-30) = 0 |
| 18 | 30 | 41 | 1 | 40 | Yes | 1 | (1-1)x(33-30) = 0 |
| 19 | 30 | 29 | 0 | 40 | No | 0 | 0 |

In both trade dates, the resource is economically dispatch based on true marginal and opportunity costs. In trade date 1, the resource was financially settled, however all dispatch intervals would be classified as "Non-Event Hours" based on SCE's proposal. This leads to an accumulated G_LM adjustment of 1 MWhs for HE15-18 for the prospective trade dates. On trade date 2, the resource was economically dispatched

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[1] https://www.caiso.com/Documents/SCEProposedModificationtoMeterConfigurationB2.pdf

at prices above NBT; however, due to having retail adjustments (G_LM = 1 MWh), the resource receives no financial settlement and is unduly penalized. This mechanism creates a distortion to market efficiency and can increase customer costs.

Despite the fact that the resource had no retail activity during HE15-18 on both dates and the energy dispatched was solely provided as demand response, a penalty was enforced reducing the economic value of a market award. To hedge unforeseen risks of market prices falling below NBT, hence preventing unreasonable retail load adjustments, market participants are left with no option but to artificially inflate their bids to NBT, which in the long run elevates market prices and is inconsistent with competitive structure of wholesale markets.

Furthermore, while the NBT may be applicable to conventional demand response resources, the NBT methodology may be of limited relevance to determine the cost-effectiveness of BTM storage wholesale market dispatch. Unlike conventional demand response, energy storage incurs cost for charging energy which needs to be properly accounted for to determine its cost effectiveness. This is of particular importance because there is no other avenue for behind-the-meter storage to participate in CAISO's markets today other than as a Proxy Demand Resource.

It is SolarCity's recommendation that if CAISO decides to adopt SCE's proposal, CAISO should further investigate alternative mechanisms to eliminating gaming without reducing market efficiency.