Energy Storage and Distributed Energy Resources Phase 3

Eric Kim
Infrastructure and Regulatory Policy Specialist

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Proposals Under ESDER 3

1. New bidding and real-time dispatch options for proxy demand resources (PDR)

2. Removal of the single load serving entity (LSE) aggregation requirement and the need for application of a default load adjustment (DLA)

3. Load shift product for behind the meter (BTM) storage

4. Measurement of behind the meter electric vehicle supply equipment (EVSE) load curtailment

New bidding and real-time dispatch options for PDR

- Extending two bidding options similar to intertie resources to extend real-time market notification

1. Hourly Block – Energy schedule is committed for the full hour and is a “price taker” for RT prices with communication 52.5 minutes before flow of energy

2. 15 min Dispatchable – Dispatched in FMM with communication 22.5 minutes before flow of energy

Proposing to remove the single LSE aggregation requirement and application of the DLA

- The CAISO proposes to
  - Remove the requirement of a PDR or RDRR resource aggregation to be limited to one LSE
  - Develop a SIBR rule to only accept bids at or above the Net Benefits Test price for these resources
    - Eliminates the need for the default load adjustment settlement mechanism tied to the resource's LSE

Load Shift Product for Behind the Meter Storage

The PDR-Load Shift Resource (PDR-LSR) will enable both the decrease and increase of load as a grid service.

Key features

- Requires direct metering of the BTM energy storage device
- Resource pays full retail rate for all charging energy
- For load curtailment
  - Maintains RA capacity eligibility (traditional DR service)
  - Non-exporting rule applies
- For load consumption
  - Ineligible for RA capacity and ancillary services
  - Bid to consume must be at a negative price

Bidding and Energy Services

Bidding

- Both PDR-LSR bidding options must be uniform
  - 15-minute or 5-minute dispatchable
- Will be eligible for bid cost recovery
- PDR-LSR_{curt} can bid from NBT price to Bid Cap
- PDR-LSR_{cons} can bid from Bid Floor to < $0

Energy Services

- Energy
- Flexible Ramping Product
- Day-ahead FRP (Future DAM enhancement)

PDR-LSR Performance Evaluation Methodology

- Will measure and net out “typical use” to define incremental value of load shift provided
  - **LSR-curtailment**
    - $LSR_{curt} = [|G(t)| - G_{LM}]$
  - **LSR-consumption**
    - $LSR_{cons} = [G(t) - G_{LM}]$

LSR = Total curtailment/consumption provided

$G(t)$ = Meter value of device

G_{LM} = Typical use value

PDR-LSR "typical use" calculations

- Typical Use Curtailment (G_{LMcurt}) : 10-in-10 CLB, using 10 non-event intervals including both consumption and curtailment but only accept a value that is at or above 0.

$$G_{LM} = Max\{(G_{LMcurt} + G_{LMcons}), 0\}$$

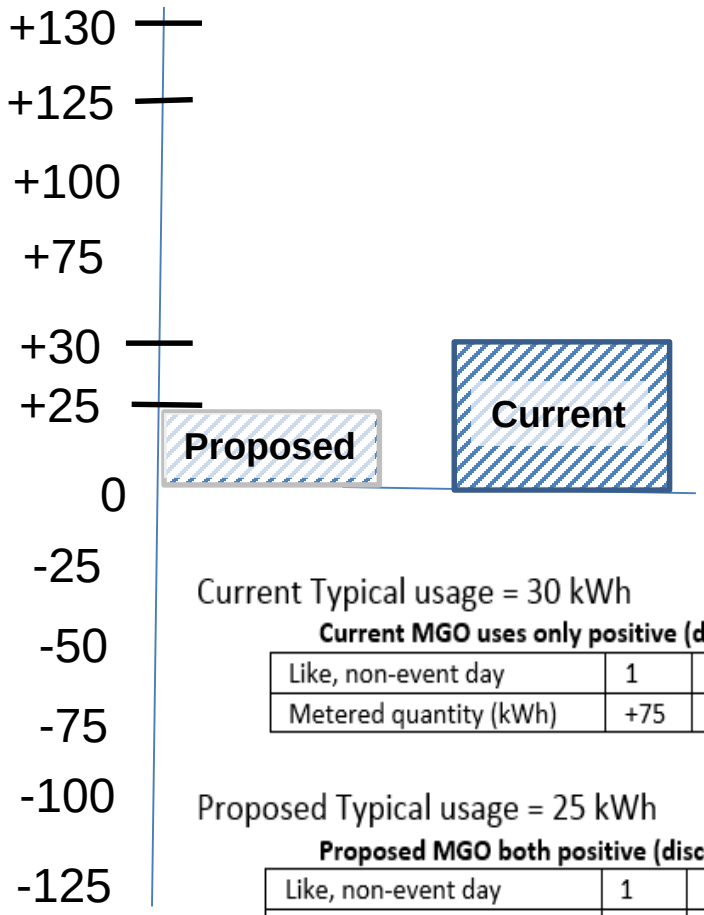
- Typical Use Consumption (G_{LMcons}) : 10-in-10 CLB, using 10 non-event intervals including both consumption and curtailment but only accept a value that is at or below 0.

$$G_{LM} = Min\{(G_{LMcurt} + G_{LMcons}), 0\}$$

Key points from performance evaluation methodology of PDR-LSR

- Both consumption and curtailment values are used when calculating “typical use”
- The no net-export rule will only apply under curtailment
- When finding non-event intervals for both curtailment and consumption, both consumption and curtailment events will be considered “events” and not used in the CBL

Example: Derivation of Typical Usage (current vs proposed)



Current- Typical Use Calculation:
Average all positive values over 10 periods

Proposed- Typical Use Calculation:
Average all positive and negative values over 10 periods

Current Typical usage = 30 kWh

Current MGO uses only positive (discharge) usage to determine counterfactual typical use

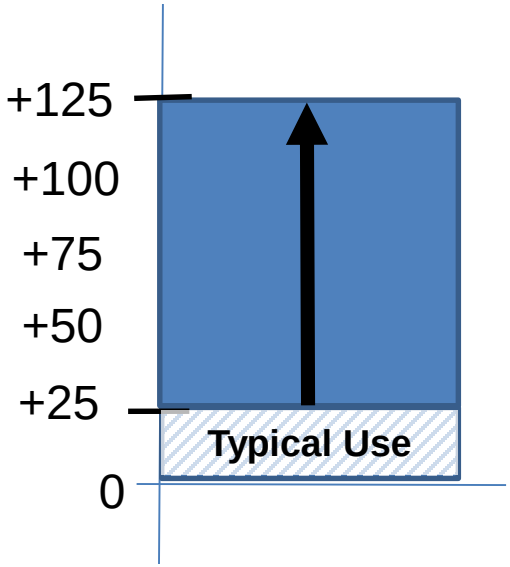
Like, non-event day	1	2	3	4	5	n/a	n/a	6	7	8	9	10
Metered quantity (kWh)	+75	+25	+25	+75	+25	-25	-25	+25	+25	+25	0	0

Proposed Typical usage = 25 kWh

Proposed MGO both positive (discharge) and negative (charge) usage to determine counterfactual typical use

Like, non-event day	1	2	3	4	5	6	7	8	9	10
Metered quantity (kWh)	+75	+25	+25	+75	+25	-25	-25	+25	+25	+25

Example 1: Typical Usage in same direction as ISO dispatch would be used to establish response



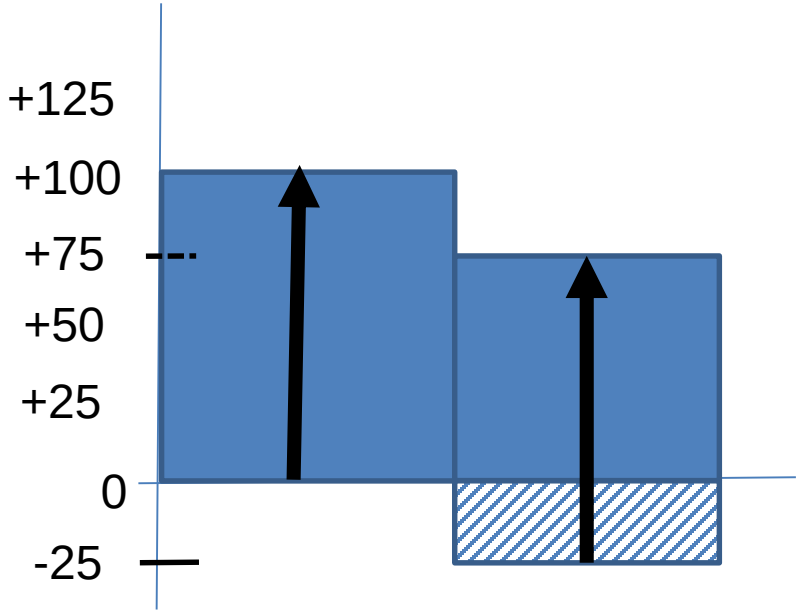
ISO Dispatch = 100 kWh (discharge)

Typical usage calc. = 25 kWh (*e.g.* retail load mgmt.)

Expected metered movement of resource would be 100 kWh for ISO dispatch incremental to the + 25 kWh for typical service provided (e.g. retail load mgmt.), thus:

Expected Metered Output = 125 kWh

Example 2: Typical Usage in opposite direction of ISO dispatch would be set to zero (0) to establish response



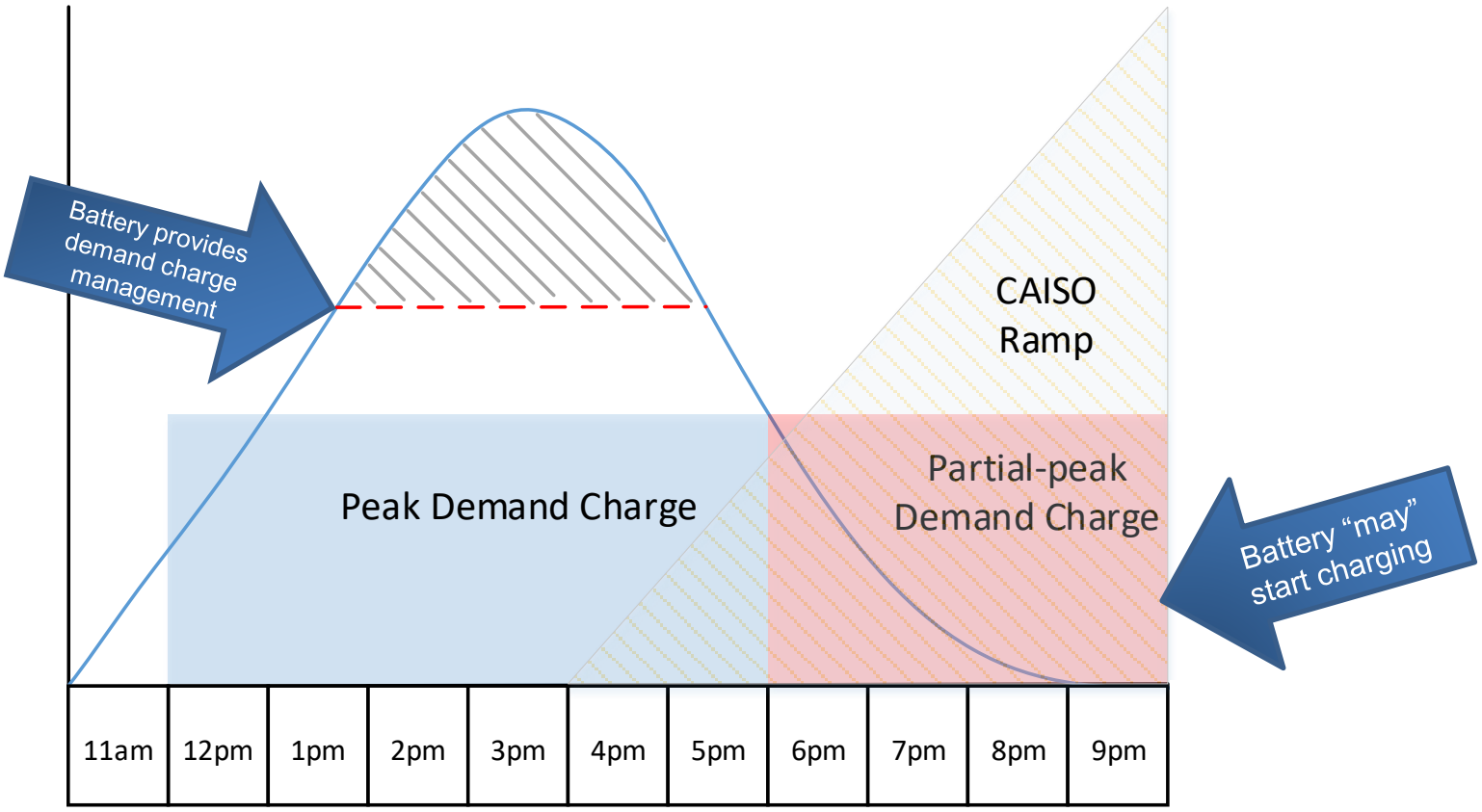
ISO Dispatch = 100 kWh (curtail/discharge)

Typical usage calc. = -25 kWh (*e.g.* recharging device)

ISO expected movement of the resource would be 100 kWh to meet the ISO dispatch (left illustration). **ISO's proposed Expected Metered Output = 100 kWh**

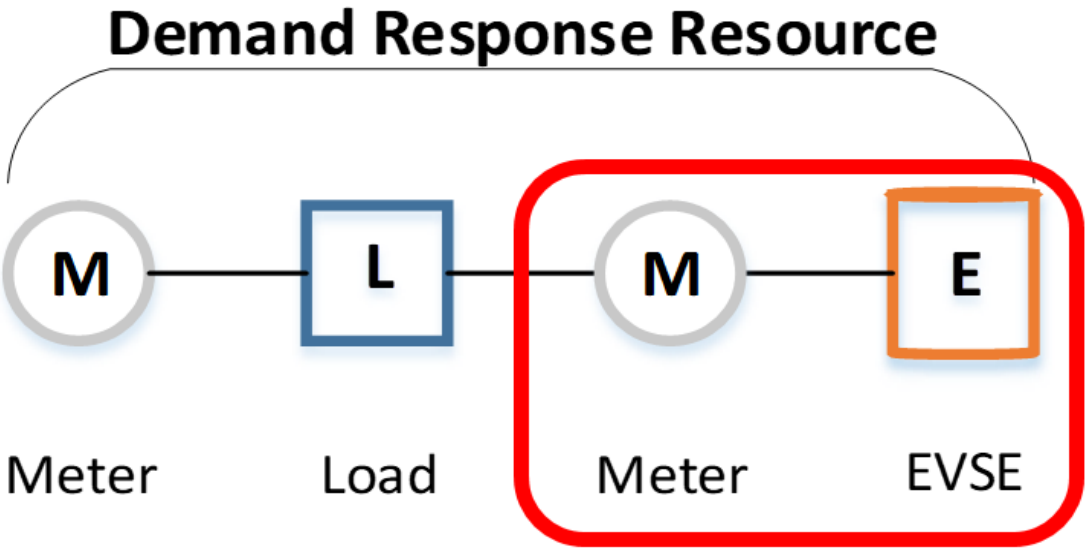
Storage stakeholder requests movement from typical use position be considered in to meet the dispatch (right illustration)
Storage community's proposed Metered Output = 75 kWh (adds typical use as part of performance)

Potential scenario: Example 2



Proposing to enable EVSE sub-metering and extend MGO performance method for EVSEs

- The proposal will allow for an EVSE's performance to be measured differently from the host facility



Registration and Metering Standards

- EVSEs will be able to calculate two types of customer load baselines

1. EVSE residential – Will use a 5-in-10 customer load baseline

2. EVSE non-residential – Will use a 10-in-10 customer load baseline