Energy Storage and Distributed Energy Resources Phase 3 ("ESDER 3")

Issue Paper

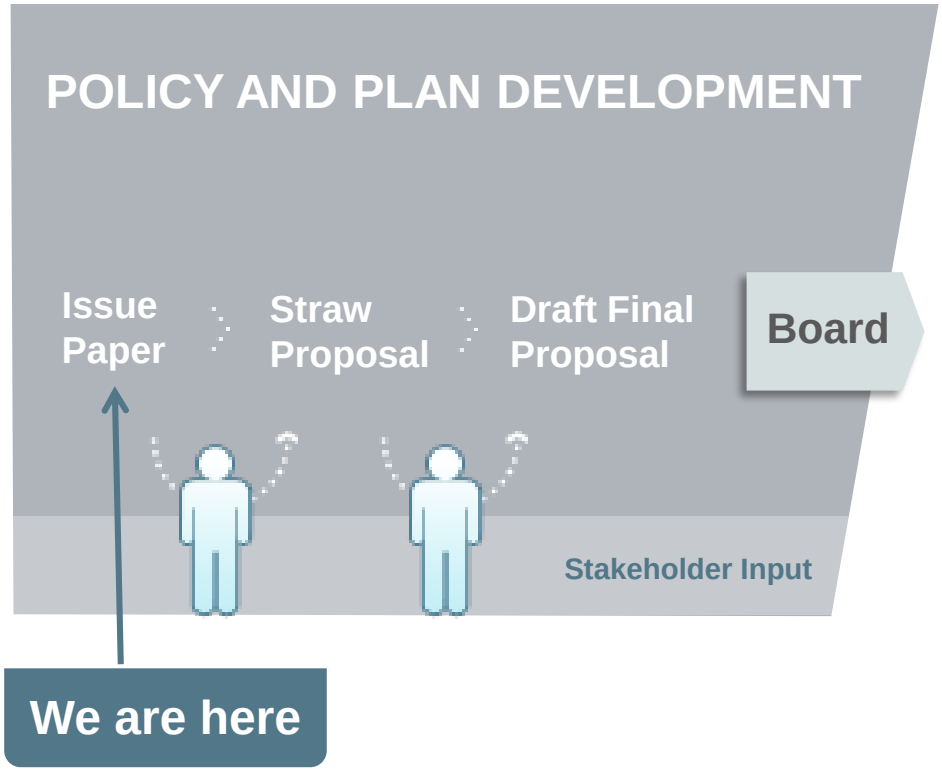
Stakeholder Conference Call
October 12, 2017
3:00 p.m. – 5:00 p.m. (Pacific Time)

Agenda

Time	Item	Speaker
3:00 - 3:10	Stakeholder Process and Schedule	Kristina Osborne
3:10 - 3:15	Introductions	Eric Kim
3:15 - 3:30	Background and Scope	
3:30 - 4:00	Potential Scope for Demand Response	
4:00 - 4:20	Potential Scope for Multiple-Use Applications	
4:20 - 4:50	Potential Scope for Non-Generator Resource	
4:50 - 5:00	Next Steps	Kristina Osborne

STAKEHOLDER PROCESS

ISO Policy Initiative Stakeholder Process



Background/Scope

ESDER's goal is to lower barriers and enhance the ability of storage and DER to participate in the ISO market

- ESDER Phase 1 was completed in 2016
  - Introduced a new baseline methodology for meter generator output and developed statistical sampling
  - Improved accuracy of SOC for day-ahead optimization and allowed an option for SOC self-management
- ESDER Phase 2 was approved by ISO Board in July 2017
  - Planned implementation for spring 2017
  - New baseline methodologies, changes to net benefits test, and tariff clarification of station power definition

Below are the potential scope items that were proposed in the Issue Paper

Demand Response

1. Demand response modeling limitations
2. Weather-sensitive demand response
3. Resource design constraints
4. Demand response aggregation rules
5. RDRR economic buy-back of day-ahead awards
6. Recognition of behind the meter EVSE load curtailment
7. Load consumption and regulation
8. Load shift product

Multiple-Use Application

1. 24x7 CAISO participation requirement for DERs
2. Wholesale market participation model for a micro-grid

Non-Generator Resource

1. Reflecting costs and NGR use limitations
2. Managing SOC and throughput limitations for MUA

POTENTIAL SCOPE FOR DEMAND RESPONSE

1. Demand response modeling limitations

- Commitment costs and the impact of a 0 MW Pmin
  - DR resource operators have identified the inability to set use limitations and appropriately define commitment costs
  - DR resources are being committed in the RUC and are susceptible to infeasible real time 5-minute dispatches
- Minimum and maximum run-time constraints
  - The existing minimum run-time constraint may not effectively utilize PDR/RDRR operational characteristics when its Pmin is equal to 0 MW
  - Stakeholders have requested the utilization of a maximum run-time constraint

2. Weather-sensitive demand response

- Weather-sensitive PDR/RDRR cannot deliver a fixed resource adequacy qualifying capacity amount since its capability depends on weather conditions

- The ISO believes that this issue requires vetting at the CPUC/LRA because the resource adequacy qualifying capacity rules are established by the LRA.

3. Resource design constraints

- Currently, PDR/RDRR design requires that aggregations must be located under a single load serving entity (LSE), represented by one demand response provider (DRP), and within a single sub-LAP
  - Stakeholders have expressed difficulty in meeting or maintaining the 100 kW minimum participation requirement
  - ISO and stakeholders can discuss removal of the default load adjustment to address this concern

4. Demand response aggregation rules

- The current Default Load Adjustment (DLA) settlement mechanism influences the requirement for PDR/RDRR aggregations to be under a single LSE.

- The ISO is willing to explore modifying or removing the DLA rule to allow for multiple LSEs to exist for one PDR.

5. RDRR economic buy-back of day-ahead awards

- Stakeholders have suggested the possibility of RDRR to buy-back their day-ahead awards in the real time market
  - RDRR was designed to ensure that all reliability-triggered MWs that qualify for RA would be available to the CAISO in real-time
  - The CAISO does not plan to consider this item for ESDER 3.

6. Recognition of behind the meter Electric Vehicle Supply Equipment load curtailment

- ESDER 1 implementation included the meter generator output (MGO) performance measurement
  - Recognized a sub-metered storage devise's contribution to a facility's overall load curtailment during a CAISO dispatch event

- Stakeholders have expressed the need to extend the MGO concept to the sub-metered EVSE
  - Would provide an option for EVSE market participation independent of its host customer

7. Load consumption and regulation

- The concept of load consumption was introduced in the ESDER 2 initiative.

- A stakeholder led working group had a general consensus on load consumption capability during periods of oversupply.

- The CAISO stated in ESDER 2 that more work was needed to develop a load consumption product.

The ISO will consider the load shift product as “in-scope” for ESDER 3.

- The load shift product will enhance the PDR model to allow for broad participation by DR resources to provide grid services during oversupply conditions.

- The focus of the load shift product will be to capture excess supply and consume that energy for productive purposes at a later time.

  – Enable the provision of both load curtailment and “shift” services yet maintain prohibition on injections into the grid

POTENTIAL SCOPE FOR MULTIPLE-USE APPLICATIONS

Multiple-use applications are when DER provide services and receive compensation from more than one entity.

- Since early 2016, the ISO has collaborated with the CPUC staff in its Energy Storage Proceeding Track 2.

- A report was released on May 18, 2017 and a workshop was held on June 2, 2017.

- The following MUA topics are issues that have emerged during the collaborative effort and will be considered for ESDER 3.

Non-24x7 ISO participation requirements for DERs

- Currently, DERs utilizing the NGR model are settled 24x7 as a wholesale market resource

- NGRs are subject to financial settlement for its consumption or production in each interval
  - Regardless of market award or a dispatch

- Stakeholders desire the ability to opt out of ISO settlements in some intervals in order to provide services to other entities.

Wholesale market participation model for a micro-grid

- Stakeholders have asked how micro-grids could participate for energy and ancillary services.
- Several sub-issues were aligned in the issue paper
  - Can a micro-grid aggregate internal facilities and participate under NGR?
  - Can the entire micro-grid participate as an NGR?
  - If the NGR model does not work what other models?
  - How to distinguish between wholesale consumption for ISO grid services versus retail consumption for internal load?
- The ISO will consider exploring these paths for micro-grids.

POTENTIAL SCOPE FOR NON-GENERATOR RESOURCES

Reflecting costs and non-generator resource use limitations

- Current modeling and bidding practices allow resources to be represented in a way that meets the resource's physical limitations
  - Which also include using the ISO Outage Management System for physical outages

- Stakeholders have expressed the need to have new tools to manage throughput limitations and SOC

The ISO does not support establishing MWh throughput limitations based on economic factors, including warranties.

- The ISO is open to discussing ways to define explicit energy storage costs.
  - Some stakeholders suggested something similar to Material Maintenance Adders or Variable O & M charges.

- The ISO is open to considering a use-limited status for NGRs.
  - As long as the use-limitation is consistent with those of other generation resources and complies with the definition set by the Commitment Cost Enhancements initiative.

Market mechanisms for managing SOC and throughput limitations for MUA

- In the possible scenario that an NGR is given the ability to provide services outside of the ISO market, stakeholders want better tools for the visibility and control of the resource's SOC at the end of an ISO dispatch.

- Stakeholders have suggested three potential solutions to improve SOC management.

Suggested SOC management proposals

1. Real-time optimization and dispatch based on SOC
   - Stakeholders want a high degree of certainty on its resource between the bid and market dispatch

2. Multi-segment ancillary service bids
   - Stakeholders want to submit multi-segment A/S bids to manage their real-time SOC

3. Regulation bidding for SOC management
   - Evaluate compensation of fast ramping resource utilization

NEXT STEPS

Next Steps

Milestone	Date
Post issue paper	September 29, 2017
Stakeholder call	October 12, 2017
Stakeholder comments due	October 18, 2017
Stakeholder workshop - Issue Paper	November 6, 2017
Stakeholder comments due – Nov 6 workshop discussion and presentations	November 13, 2017

Written stakeholder comments on the issue paper are due by COB October 18 to InitiativeComments@caiso.com.

Materials related to the ESDER Phase 3 initiative are available on the ISO website at http://www.caiso.com/informed/Pages/StakeholderProcesses/EnergyStorage_DistributedEnergyResources.aspx

Acronyms

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1. DER – Distributed Energy Resource
2. PDR – Proxy Demand Resource
3. RDRR – Reliability Demand Response Resource
4. DRP – Demand Response Provider
5. EVSE – Electric Vehicle Supply Equipment
6. NGR – Non-Generator Resource
7. SOC – State of Charge
8. MUA – Multiple-Use Application
9. MGO – Meter Generator Output
10. RUC – Residual Unit Commitment
11. LRA – Local Regulatory Authority
12. LSE – Load Serving Entity
13. DLA – Default Load Adjustment
14. A/S – Ancillary Service