Decision on energy storage and distributed energy resources phase 4

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The ESDER 4 Initiative contains three enhancements for board approval and one informational item.

Decisional Items:

1. Optional end-of-hour state-of-charge parameter for storage resources
2. Parameters to better reflect demand response resource operational characteristics
3. Streamline market participation agreements for non-generator resource participants

4. Demand response capacity valuation study to inform demand response's contribution to system reliability and system resource adequacy needs

The ESDER 4 initiative provides enhancements for efficiently dispatching storage resources

- Storage is the predominate resource type in the ISO's interconnection queue
  - 1500 MW of interconnected storage capacity by the end of 2021
  - Lithium-ion batteries with 4-hour duration and hybrid resources
- The ISO markets have largely been designed around gas and renewable resources
  - Enhancements are needed to integrate and accommodate the unique attributes of storage
- Enhancements are needed to meet the growing influence of storage resources on the market and grid reliability

1. End-of-hour state-of-charge parameter provides real-time management of future use commitments of storage resources.

- Currently state-of-charge is managed through self-scheduling
  - freezes out flexibility for the CAISO and storage operator
  - does not allow setting a minimum or maximum state of charge range
- End-of-hour state of charge bid parameter is submitted as a minimum and maximum MWh range
  - must respect ancillary service awards and physical minimum and maximum charge constraints
- Both self-scheduling and the end-of-hour state-of-charge parameter impact the bid cost recovery settlement
  - requires market revenues to be evaluated against bid cost recovery settlement in each interval to avoid gaming concerns

2. New parameter to better reflect demand response resource run-time limitations

- Some demand response program designs have a limited number of activations and a set number of hours available for dispatch within a day

- Proposal provides demand response resources a new daily max run time constraint
  - Maximum daily run time constraint allows a demand response resource to identify the maximum number of hours per day the resource could be “curtailed”
  - Optional master file parameter, not a requirement
  - Minimum 1 MW curtailment size threshold to mitigate system performance impact

3. Streamline market participation agreements for non-generator resource participation

- Currently, non-generator resources must execute both a participating load agreement and a participating generator agreement
- Propose allowing non-generator resources to participate under a single participation agreement
  - Non-generator resources that operate as a storage device or choose to operate only as a generator will execute the participating generator agreement
  - Non-generator resources operating as dispatchable demand response will execute the participating load agreement
- Non-generator resources operating under existing agreements not required to execute new agreements

4. Demand response capacity valuation study to inform its system RA value given its variable and use-limited nature

- Demand response is currently treated as a RA resource that can deliver a fixed capacity quantity whenever called
- Demand response has a variable capacity nature and use- and availability-limitations affecting its contribution to reliability
- Consulting firm E3 assessed how demand response could be evaluated under an effective load carrying capability (ELCC) methodology like other variable energy resources
- Study successfully demonstrated how ELCC can be applied to demand response and how to allocate capacity value across different demand response program types
- Study's purpose is to inform CPUC and need to reconsider capacity value of DR given the needs of the transforming grid

Stakeholders are overall supportive although some prefer more sophisticated approaches

- Energy storage proposal comments
  - Stakeholders supportive of the end-of-hour state-of-charge parameter with the bid cost recovery refinement to address gaming issue
  - DMM expressed that the bid cost recovery tool could be more sophisticated and less restrictive under certain conditions
- Demand response proposal comments
  - Stakeholders strongly supported the ability to use a maximum daily run time parameter
  - Application of ELCC to DR not supported by DR community given potential capacity value reassessment

The ESDER Phase 4 proposals advance the efficient and effective use of energy storage and distributed energy resources in the ISO market

Management requests the Board approve the following three proposed items:

1. An optional end-of-hour state-of-charge biddable parameter for storage resources;
2. Establishing parameters to better reflect demand response resource operational characteristics; and
3. Streamlining market participation agreements for non-generator resource participants.