

Energy Storage Enhancements

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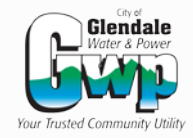
About CESA

The California Energy Storage Alliance is the definitive voice of energy storage in California.

At 100+ members strong, CESA is committed to advancing the role of energy storage in the electric power sector.

CESA is a 501c(6) membership-based advocacy group. CESA is technology and business model-neutral and is supported solely by the contributions and coordinated activities of its members.

Our CESA Members



Energy Storage in California

- **California has ambitious climate and energy goals**
- **By September 2021, CAISO will have over 1.8 GW of grid-connected storage at its disposal**
- **Storage is poised to substantially contribute to advance decarbonization while maintaining reliability**
 - Absorb excess renewable energy for later use
 - Reduce reliance on emitting local resources
 - Support meeting ramping needs
- ***However, storage is participating in a market designed for conventional assets***

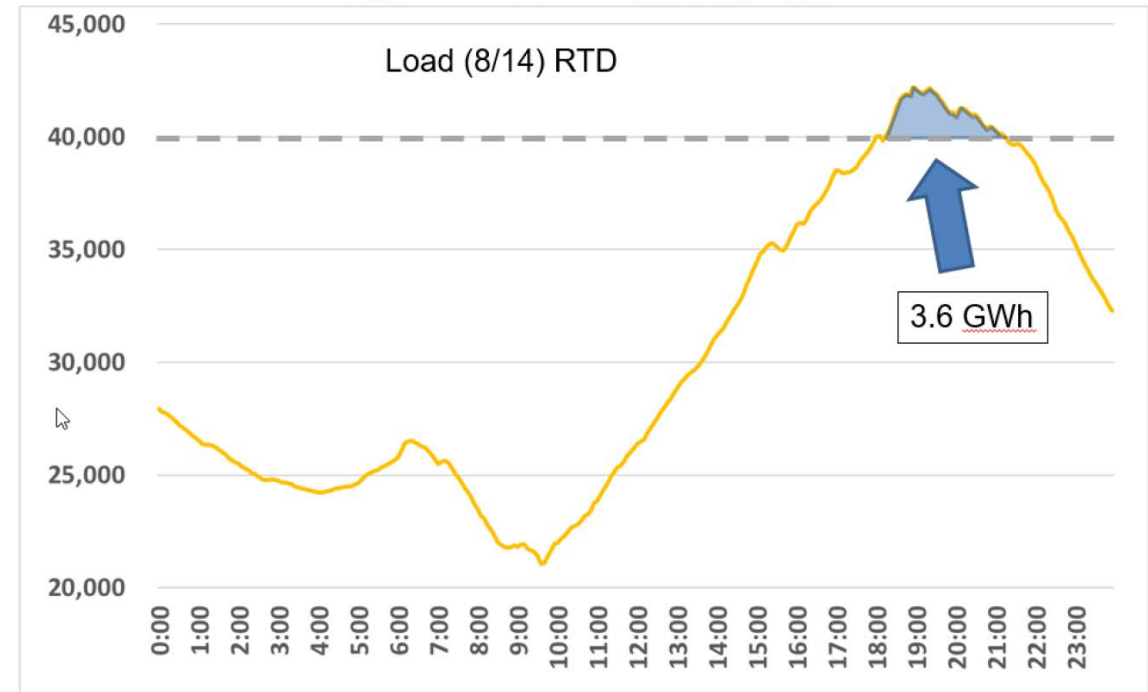
Energy Storage in California

- **Storage is a bidirectional resource with unique operational characteristics**
 - Marginal costs are affected by multiple factors (cycling, charging costs)
 - Current market bidding functionality does not allow batteries to precisely reflect cycling costs, even if additional cycling could be economic to meet reliability needs
 - Allow storage to submit multiple RT bid curves that are dependent on SOC/cycle
 - Opportunity costs are essential as storage is energy-limited
 - Today, bid cost recovery (BCR) is calculated using settled cost and revenue values from the day-ahead and real-time markets netted across the day
 - Net all costs to charge the resource with the revenue from discharging to ensure bid spread recovery
 - Dispatch decisions must consider upcoming conditions
 - The lookahead periods of the fifteen-minute market (FMM) and the real-time dispatch (RTD) are limited (120 and 65 minutes, respectively), potentially resulting in inefficient dispatch
 - How do we devise a way to incent desired outcomes while compensating for opportunity costs?

Storage and Reliability

- **The current market formulation might create a situation in which storage resources are not fully charged to cover periods of tight supply**
 - As prices climb with the net peak ramp, storage resources holding out for peak discharge could be inefficiently dispatched due to the lookahead periods of RTD

Figure 2: RTD Net Loads on 8/14



Storage and Reliability

- **CESA is fully committed to ensuring energy storage contributes to reliability**
- **Any method to preserve state-of-charge (SOC) to meet system needs must:**
 1. Be a market-driven solution dependent on prices
 2. Properly compensate storage resources for their SOC and opportunity costs
 3. Balance the need for certainty with the need for fast and flexible capacity

Policy Options to Retain SOC

- **Extending the real-time market optimization horizon**
 - CAISO concluded this is not technologically feasible currently
 - CESA considers this solution should be explored in the long-term as it would greatly simplify the current constraints of the FMM and RDT optimization processes
- **Scarcity pricing**
 - Theoretically, the threat of higher scarcity prices could incent storage to retain SOC for later dispatch
 - From CESA's perspective, this solution does not resolve the issue fully as inefficient dispatch could still occur given the lookahead horizon in RTD

Policy Options to Retain SOC

- **Creating an energy shift product**
 - CAISO would procure energy in DA market from the storage fleet at a specific strike price
 - This product would internalize the opportunity cost of storage retaining SOC for later periods
 - After storage clears for this product, a requirement would be imposed in RT to prevent discharging below a certain shifting amount
 - The daily quantity purchased by the ISO could be based on the potential shortfall identified within the RUC analysis
- **CESA considers this option is promising, as it aligns with developments in the Resource Adequacy (RA) framework, and it can ease contracting by load-serving entities (LSEs) that seek energy shifting for their portfolio**
- **It is unclear how this product would interact with the RTD optimization**

Policy Options to Retain SOC

- **Creating a biddable stored energy product within the real-time market**
 - ISO would infer needed SOC and impose a constraint in both markets to ensure its availability
 - This product would be bid and priced on the marginal resource clearing for SOC
 - The requirement would specify a total amount of SOC in MWh
- **CESA considers that, while this option is workable, it may be more complex as it would require owners to internalize their opportunity cost in a higher number of bids**
- **Moreover, this solution might require the inclusion of deliverability considerations to align with other AS**

CESA's Perspective

- **In comments to the Issue Paper, CESA agreed with the list of preliminary issues put forth by the ISO**
- **CESA recommended a two-phase approach for this initiative**
 - Phase 1 would prioritize issues that currently affect energy storage utilization and compensation (BCR, MIO, spread bidding), targeting a December 2021 approval date
 - Phase 2 would focus on assessing the effectiveness of proposed solutions, targeting a Q1 2022 approval date
 - Phase 2 should include a cost-benefit analysis regarding extending the RT lookahead horizon
- **In general, CESA favored the development of an energy shifting product to replace the MSOC, although this need could be modified by Phase 1 results**
 - Ease of implementation
 - Potential effects on contracting

CESA's Perspective

- **CESA understands the need to develop a consensus solution that allows the ISO to retain SOC for reliability purposes**
- **Issues that currently affect energy storage utilization and compensation (BCR, MIO, marginal costs) must remain in scope even if the ISO decides to first focus on MSOC replacement**
- **Since extending the RTD lookahead might not be technically feasible at this time, the ISO should focus on the development of the energy shifting or biddable SOC products**
- **CESA sees some advantages for the energy shifting product**
 - Allows owners to internalize their opportunity costs in hourly bids
 - Would not affect co-optimization of other services in RTD
 - Provides assurances to the ISO and LSEs regarding the behavior of storage

CESA's Perspective

- **Additional Member Feedback:**

- Developers need clarification on how MSOC successors would interact with hybrid and co-located storage
 - These requirements or products could direct paired assets (particularly co-located storage) to charge from the grid
 - Grid-charging impacts both the Federal Investment Tax Credit (ITC) as well as CA state taxes

A scenic view of a city at dusk with a large power line tower in the foreground. The sky is a mix of orange, pink, and blue, with some clouds. The city lights are visible in the distance, and the power lines stretch across the frame.

Audience Q&A

Please submit your questions.



Thank you!

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