Storage Design and Modeling

Initial Discussion &
BCR, DEB, & OMS Working Group

Stakeholder Meeting

December 11, 2024
9 am – 12 pm

Reminders

- This call is being recorded for informational and convenience purposes only. Any related transcriptions should not be reprinted without ISO's permission.
- The meeting is structured to stimulate dialogue and engage different perspectives.
- Please keep comments professional and respectful.
- Please try to be brief and refrain from repeating what has already been said so that we can manage this time efficiently.

Instructions for raising your hand to ask a question

- Open the Participant and Chat panels from the bottom right.
- If you are connected to audio through your computer or used the “call me” option, select the raise hand icon  located on the bottom of your screen.
  - **Note**: *3 only works if you dialed into the meeting.
- Please remember to state your name and affiliation before making your comment.
- You may also send your question via chat to either **Brenda Marquez** or to all panelists.
- If you need technical assistance during the meeting, please send a chat to the event producer.

Agenda

Time	Topic	Presenter
9:00 – 9:05	Welcome and today's agenda	Brenda Marquez
9:05 – 9:20	Topic groups and timeline	Sergio Dueñas Melendez
9:20 – 9:40	Intro to SOC management topics	Dinesh Das Gupta
9:40 – 10:00	Intro to distributed & paired resources topics	Dinesh Das Gupta
10:00 – 10:10	Break	
10:10 – 10:30	ISO framing of BCR, DEB, and OMS topics	Sergio Dueñas Melendez
10:30 – 11:30	Stakeholder presentations on BCR, DEB, & OMS topics	Various stakeholders
11:30 – 11:55	Open discussion	
11:55 – 12:00	Next Steps	Brenda Marquez

CAISO Policy Initiative Stakeholder Process

We are here

Introduction

Working Group Process

1. **Foundation**
   Level-set to ensure mutual background understanding
2. **Scoping and Group Categorization**
   Establish topics and initiative organization
3. **Presentations**
   Understand each other's perspectives. Work together to resolve questions brought up during discussion
4. **Problem Statements**
   Define focused goals and problems for the policy initiative to address

Working Group Process

- This initiative will tackle a wide array of topics pursuant to energy storage in different configurations
- To ensure adequate and productive discussions, staff recommends categorizing topics in a manner that allows for parallel development while respecting stakeholders' time
- Staff believes that grouping topics will allow for organized discussions, holistic consideration of issues, and the potential to resolve matters in a staggered manner
- The topic groups presented in the following slide are meant to stimulate conversation, they are not final, and are subject to stakeholder feedback

Overview of scope and topic groups

BCR, DEB, & OMS Topics

- Uplift redesign (BCR)
- DEB enhancements
- OMS enhancements

SOC Management Topics

- System SOC mechanism
- Biddable SOC participation pathway
- SOC definition and calculation
- Nonlinearity at high and low SOC
- SOC management for capacity awards

Distribution-level & Paired Resources Topics

- Distribution-level Storage
- Co-located resource settlement enhancements
- DEB for hybrid resources

Tentative timeline

Dec. 11, 2024		**Meeting 1: 9am-12pm** Initial discussion BCR, DEB, & OMS: Working group
Jan. 23, 2025		**Meeting 2: 9am-4pm** BCR, DEB, & OMS: Discussion SOC Management: Working group
Feb. 20, 2025		**Meeting 3: 9am-4pm** BCR, DEB, & OMS: Discussion Distribution-level & Paired Resources: Working group
March, 2025		BCR, DEB, & OMS straw proposal posting
Mar. 24, 2025		**Meeting 4: 9am-4pm** BCR, DEB, & OMS: Straw proposal discussion SOC Management: Working group

**All dates are tentative until confirmed through a notice in the ISO's Daily Briefing.*

Tentative timeline

Apr 16, 2025		Meeting 5: 9am-4pm BCR, DEB, & OMS: Revised straw proposal preparation Distribution-level & Paired Resources: Working group
May, 2025		BCR, DEB, & OMS Revised straw proposal posting
May 28, 2025		Meeting 6: 9am-4pm BCR, DEB, & OMS: Revised straw proposal discussion SOC Management: Issue paper development
Jun. 25, 2025		Meeting 7: 9am-4pm BCR, DEB, & OMS: Draft final proposal preparation Distribution-level & Paired Resources: Issue paper development
July, 2025		Draft final proposal posting on BCR, DEB, & OMS Issue paper posting on SOC Management and Distributed & Paired Resources

**All dates are tentative until confirmed through a notice in the ISO's Daily Briefing.*

State-of Charge (SOC) Management

SOC Management (1/5)

Topic	• Consider developing a System SOC mechanism
Description	• System SOC tracks the total energy available across all energy storage resources. • Developing metrics focused around the system SOC metric may allow the ISO to better optimize the storage fleet • System SOC does not track effects from limited transmission

SOC Management (2/5)

Topic	• Consider developing a biddable SOC market participation pathway
Description	• Current non-generator resource (NGR) model approximates dispatch and subsequent value through megawatt-price bid pairings • Physical and operational characteristics like maximum discharge at a given SOC are not modeled in the existing bid/offer price curve structure • Biddable SOC pathway would allow energy storage resources to have charge and discharge bids in relation to their SOC

SOC Management (3/5)

Topic	• Enhance SOC definition and calculation
Description	• The resource may face physical constraints not reported to the market that prevent it from following its dispatch, such as stored energy that is inaccessible due to cell imbalance, or consequences associated with the resource fully discharging its stored energy • Enhancing definition and calculation of SOC would improve the ISO's confidence in storage resources' ability to follow dispatch during tight system conditions

SOC Management (4/5)

Topic	• Consider non-linearity's impacts at high and low SOC (foldback)
Description	• Energy storage resources have non-linear maximum charging and discharging abilities • When the resource is almost full or empty, foldback may occur, impacting dispatch • Better accounting for non-linearity, especially at the extremes, may enhance storage resource performance

SOC Management (5/5)

Topic	• Explore SOC management for capacity awards
Description	• Currently, the SOC calculation does not fully model the impacts of capacity awards, particularly flexible ramping product (FRP) • This may result in storage resources being unavailable for other commitments, potentially jeopardizing reliability • This topic would explore enhancements to existing requirements on energy storage capacity awards and consideration of increasing resource bidding flexibility

Distribution-Level and Paired Resources

Distribution-Level Resources and Paired Configurations (1/3)

Topic	• Promote alignment between distribution-level and bulk system storage constraints
Description	• Distribution-level storage assets provide wholesale energy storage via the distribution network, rather than a direct interconnection • Distribution-level storage assets follow both the ISO tariff and distribution protocols • Aligning the ISO tariff and the distribution protocol would enhance operational confidence

Distribution-Level Resources and Paired Configurations (2/3)

Topic	• Enhance settlement provisions regarding co-located configurations
Description	• Energy storage resources in co-located configurations have unique parameters and challenges • This topic explores enhancements to settlement provisions, including BCR, following increased operational experience with co-located resources

Distribution-Level Resources and Paired Configurations (3/3)

Topic	• Develop a DEB for hybrid resources
Description	• Hybrid resources lack a default energy bid (DEB) • Defining a hybrid DEB will allow bidding up to the soft-offer cap, per summer 2024's soft-offer bid cap changes under Price Formation Enhancements

Open Discussion

Topic Groupings & Prioritization

Break

Working Group on BCR, DEB, & OMS

Overview of Topics

BCR, DEB, & OMS (1/3)

Topic	• Refine BCR provisions for energy storage (i.e, uplift redesign)
Description	• In the Storage BCR and DEB enhancements initiative, the ISO closed major market design gap related to existing BCR • This topic seeks to holistically explore whether energy storage resources should receive BCR, and if so, in what circumstances • Specifically, this topic would address the fact that storage assets are not exposed to real-time prices if deviating from day-ahead schedules

BCR, DEB, & OMS (2/3)

Topic	• Explore DEB enhancements & consider standard approval for storage reference level change requests
Description	• Stakeholders have recommended modifications to the storage DEB in prior initiatives • Price Formation Enhancements, Phase 1, provided additional flexibility to the soft-offer cap for bids during stressed conditions • Storage reference level changes requests are currently manually processed by ISO staff • Automation and standard approval would provide clarity for market participants

BCR, DEB, & OMS (3/3)

Topic	• Enhance OMS to align with storage outages
Description	• Review lower and upper SOC real-time biddable parameter use • Clarify how SOC physical outages impact Pmax/Pmin outages • Enhance OMS functionality to adequately support outage submissions from storage assets

ISO Department of Market Monitoring Presentation

PG&E Presentation

Vistra Presentation

Open Discussion

Next Steps

Next steps

- Upcoming milestones:*
  - 1/08: Comments on initial discussion and BCR, DEB & OMS working group due
  - 1/23: Stakeholder meeting on BCR, DEB, & OMS topics and working group on SOC Management topics (*agenda subject to stakeholder comments)*

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For reference

- Visit initiative webpage for more information: https://stakeholdercenter.caiso.com/StakeholderInitiatives/Storage-design-modeling

- If you have any questions, please contact ISOStakeholderaffairs@caiso.com

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