



Day-Ahead Market Enhancements discussion

James Friedrich
Senior Policy Developer

Market Surveillance Committee Meeting
General Session
August 27, 2021

Discussion topics

- DAME objectives
- Imbalance reserves: benefits and purpose
- Imbalance reserves: 15-min product
- Imbalance reserves: demand curve v penalty price
- Limiting procurement of capacity corresponding with high energy bid price
- MPM of imbalance reserves and reliability capacity
- RUC pricing design, cost shifting, and market efficiency

DAME objectives

- Variable load and renewables increase uncertainty between day-ahead and real-time markets
- CAISO system operators are relying on out-of-market actions to procure additional capacity and ramping for uncertainty
- Integrated forward market lacks a product to procure capacity and ramping for uncertainty

Imbalance reserves intend to resolve several market inefficiencies

- Reduce out-of-market actions
- Converge IFM and RTM prices
- Create more efficient market prices that accurately reflect costs and system conditions by procuring imbalance reserves nodally and co-optimizing with energy schedules
 - Compensate resources for capacity reserved
 - Reflect need for this capacity in IFM energy prices
- Creates additional efficiencies in the RA market
 - Eliminates need to pay for 100% of RA fleet each day of the month to be available in real-time
 - More efficient use of RA fleet for meeting real-time market needs

Imbalance reserves provide a different function than reliability capacity

- Reliability capacity is designed to meet differences between IFM schedules and load forecast, similar to existing RUC
 - Also adds downward capability
- Reliability capacity would not be co-optimized with energy and thus would not produce same market efficiencies
- Imbalance reserves are 15-min dispatchable and are designed to meet uncertainty and 15-min ramping needs that hourly reliability capacity is not intended for
- Imbalance reserves should significantly reduce or eliminate need to increase RUC target above load forecast

Imbalance reserves as a 15-minute product

- Imbalance reserves is a 15 minute product in two ways
 - Imbalance reserve awards are limited to the 15-min ramp capability of the resource
 - Imbalance reserves awarded to offline resources must have a start-up time of 15 minutes or less
- Stakeholders suggest 15-min imbalance reserves may be overly restrictive and excessive
- Procuring uncertainty over multiple time horizons introduces multiple products and complexity
- Can either of existing imbalance reserve requirements be relaxed?

Imbalance reserves: demand curve v penalty price

- CAISO proposed to procure imbalance reserves based on a penalty price instead of a demand curve for the following reasons:
 - Demand curve could relax requirement based on large amounts of low-priority self-scheduled exports or exports economically bid at high prices.
 - If the market does not procure the full imbalance reserve requirement, system operators may continue to perform the out-of-market actions that imbalance reserves are intended to prevent.

Imbalance reserves: demand curve v penalty price

- Propose to procure imbalance reserve at scheduling run penalty price of \$1600 and pricing run penalty price of \$247
- Ensure imbalance reserves are procured before low-priority exports
- Exploring effects of procurement based on penalty prices and protection against potential anomalous market outcomes

Preventing procurement of capacity corresponding with high energy bid price

- Goal is to prevent capacity with low IRU/RCU cost but high energy cost from consistently being awarded IRU/RCU
- Prior to day-ahead market, CAISO will calculate and publish a max energy bid by estimating the marginal price of meeting P97.5 real-time net-load forecast
- Resources whose underlying energy bid segment exceed the max energy bid will not be awarded IRU or RCU that overlaps those segments of bid curve
- Example
 - Max Energy Bid = \$400
 - Resource's Bid Curve
 - 0-50MW @ \$100, 50-100MW @ \$250, 100-150MW @ \$450, 150-175MW = \$500
 - $IRU + RCU \leq \text{MAX}(0, 100\text{MW} - \text{EN})$
 - If energy schedule is 75MW, then IRU cannot exceed 25MW

Stakeholder feedback centers around two issues

- P97.5 price level may unduly restrict available offers
- Lack of associated real-time bidding incentives may render the method ineffective at achieving its goal

Imbalance reserve and reliability capacity bid market power mitigation (1 of 2)

- Imbalance reserves and reliability capacity products are designed to ensure the awards can be deployed without violating network constraints
- Proposing MPM for imbalance reserves and reliability capacity offers because the products are biddable and nodal
 - Requirements are distributed across system so resulting energy flows have to be delivered to specific locations
- New RUC MPM pass identifies and mitigates RCU/RCD bids similarly to IFM MPM pass

Imbalance reserve and reliability capacity bid market power mitigation (2 of 2)

- Stakeholders suggest MPM of imbalance reserves and reliability capacity is unnecessary and a bid cap is sufficient
 - During transition period?
 - After transition period?
- Other issues
 - Determining an appropriate default availability bid
 - Conduct follow-up workshop for detailed mechanics