Day-Ahead Market Enhancements
discussion

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General Session
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Discussion topics

- DAME objectives
- Imbalance reserves: benefits and purpose
- Imbalance reserves: 15-min product
- Imbalance reserves: demand curve vs 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?
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 <= MAX (0, 100MW – 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