Day-Ahead Market Enhancements

Stakeholder Workshop

3/07/2023

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  - Please state your name and organization when asking your question.

- Virtual attendees:
  - Please raise your hand using the “raise hand” feature in Zoom, or submit your question through the chat.
  - Please state your name and organization when asking your question.

Agenda – March 7:

Time	Topic	Presenter
9:00 – 9:10	Welcome and introductions	CAISO
9:10 – 12:00	- Conceptual description of potential zonal design - Continuation of discussion from Feb 27	CAISO
12:00 – 1:00	Lunch	
1:00 – 3:00	- Detailed zonal proposal - Additional context on downward products	Vistra
3:00 – 3:55	Congestion, Capacity and Considerations	SCE
3:55 - 4:00	Wrap-up and next steps	CAISO

Day 2 plan

- Conceptual description of potential zonal design
- Imbalance reserve deployment scenarios and why they are important
- Ancillary service deliverability
- Benefits of downward products
- Why the CAISOs approach to distributing the uncertainty requirements is reasonable
- Imbalance reserves and flexible ramping product

California ISO

Imbalance Reserve Procurement without Transmission Constraints in Deployment Scenarios

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Purpose of imbalance reserve deployment scenarios

- Simulate the dispatch of the imbalance reserve awards to meet materialized uncertainty in real time
  - Co-optimized with the base scenario of balancing supply and demand
- Enforcing transmission constraints in the deployment scenarios assures that the imbalance reserve awards are deliverable in these scenarios without violating transmission constraints
  - Conservative scenarios for full deployment to meet target uncertainty
- Avoid awarding capacity to resources with low or zero opportunity cost because they are constrained by transmission constraints

Alternative: use zonal procurement instead of enforcing transmission constraints in deployment scenarios

- Similar to the regional procurement of ancillary services
  - The same import/export-constrained regions can be used
    - Limited regional transmission interface capacity used for energy imports/exports only
    - Meet regional requirements from resources inside the region
- Strives for deliverability of capacity awards inside constrained regions
  - It does not assure general deliverability of imbalance reserve awards
- To preserve the BAA diversity benefit, the regional requirements can be derived from the distribution of BAA requirements

Hybrid approach: zonal procurement and deployment scenarios without transmission constraints

- Enforce transfer scheduling limits in deployment scenarios
- Co-optimizing transfer capacity between energy and imbalance reserves is the highest contributor to EDAM benefits
  - Scheduling energy to resources with lower cost while awarding capacity to resources with higher cost results in the most efficient outcome
  - Lower cost resources in a BAA are scheduled for energy in excess of that BAA's load and export the surplus energy to displace higher cost supply in another BAA, while the displaced capacity in that other BAA is used for imbalance reserve transfers back to the first BAA
  - Capacity transfers only exist in the deployment scenarios

Comparison

DAME Proposal	Hybrid Approach (for discussion)
Concern about virtual schedule arbitrage of deployment scenario congestion that may not materialize in real time	No transmission constraints in deployment scenarios
Congestion revenue from deployed capacity flows must be collected for congestion offset or CRRs	No observed deployed capacity flows other than on interties
Conservative approach to assure deliverability	Deliverability assured only inside constrained zones; some awards may still be undeliverable; reduced confidence in operations
Performance hit for managing congestion in deployment scenarios	Increased complexity defining and managing imbalance reserve zones
LMPM for imbalance reserves in deployment scenarios	Zonal MPM in imbalance reserve zones
Marginal congestion component in imbalance reserve marginal price; complex imbalance reserve cost allocation	Hierarchical zonal marginal pricing for imbalance reserves; complex imbalance reserve cost allocation
Consistent with FRP procurement in RTM	Inconsistent with FRP procurement in RTM (deviations)

Deployment scenarios

- Base, upward, and downward deployment scenarios are simultaneously optimized to respect transmission constraints

- Upward deployment scenario → supply is added to system assuming all imbalance reserve up awards deploy as energy; demand is added to system based on distribution of upward requirements described previously

- Downward deployment scenario → supply is removed from system assuming all imbalance reserve down awards reduce energy; demand is subtracted from the system based on distribution of downward requirements described previously

Why is this important?

- Nodal procurement ensures that both energy and imbalance reserve awards are transmission feasible at the time they are procured
  - More granular congestion management = more likely you'll get what you pay for and relies on market optimization rather than operator action
- The nodal approach does not assure real-time deliverability; the goal is not to knowingly procure reserves behind constraints
  - Operational concern that would take out-of-market actions to manage
  - Financial concern that market participants may be paying to procure for reserves that are useless and paying to re-dispatch around them in real-time
- Nodal approach more accurately prices imbalance reserves AND energy

Ancillary Service Deliverability and Real-Time Re-optimization
CAISO Draft 2023 Policy Initiatives Catalog – Item 6.1.1

- Ancillary services are procured based upon system and zonal requirements
  - Zonal approach does not guarantee that the ancillary services are deliverable
  - Operators perform studies to identify day-ahead awards that are not accessible and block these resources from being awarded ancillary services

- This initiative will look at implementing nodal ancillary services
  - This functionality will also support the re-optimization ancillary services in real-time because operators will be assured the capacity awards are deliverable. This is a long-term scarcity pricing goal as part of a phased approach to price formation enhancements.

Additional context on AS deliverability

- Situation with AS deliverability is manageable but not optimal
  - System operators have been wanting nodal AS
  - Operators want to run the grid, not manage the market
- Operators find it extremely difficult to identify a problem with AS deliverability until operator observes the congestion in real-time ("land mine situation")
- Blocked AS awards more prevalent with higher loads and higher outages
  - Would be more challenging with imbalance reserve
  - Would be more challenging for EDAM; EDAM BAA operators would have to be trained in how to recognize and manage these issues

Additional context on AS deliverability

- Creates issues with AS “buyback” settlement and re-dispatch costs
  - Generators bidding are “available” but not “deliverable”

- That nodal imbalance reserves may technically make it more likely (all else equal) for AS to be procured from undeliverable capacity is a better argument **for** nodal AS than **against** nodal IR
  - If nodal is the direction we eventually want to go, why wait
  - Operators already know how to manage undeliverable AS in meantime
  - Co-optimized AS is not yet a part of EDAM

Benefits of downward products

- Market efficiency benefits
  - Deployment scenarios identify downward reserves on resources not providing counter-flow to a constraint
  - Capacity payments incentivize more downward capability from non-renewables
  - Symmetry with FRP design; RT price formation and deviation settlement
  - Form RT must-offer requirements for EDAM entities
- Operationally within the CAISO downward dispatch capability is less of a concern but the “belly of the duck” gets lower every year as renewable penetration increases
- Low-impact way to maximize the regional market’s flexibility for current and future system conditions and new day-ahead market participants
  - If the operational need/incremental cost is low the product will have a low price

Why the CAISOs approach to distributing the uncertainty requirements is reasonable

- Uncertainty requirements are calculated at the BAA level
  - Diversity benefit
  - "Top-down" approach – CAISO is not estimating uncertainty at a nodal level
- Uncertainty requirements are divided by load/wind/solar contribution and then distributed nodally in proportion to load distribution factors (for load) and VER forecasts (for wind and solar)
  - Distribution does not identify varying uncertainties between resources/nodes within its own category (load, wind, solar)

Why the CAISOs approach to distributing the uncertainty requirements is reasonable

- A “bottom-up” approach would require massive data requirements to collect, analyze, and store uncertainty distributions for thousands of nodes
  - Forecasting errors can cancel each other out when aggregated
  - Issues with data availability and granularity of forecasts
- Local requirements would result in higher overall procurement
- Improvements can be made to the uncertainty distribution over time

Imbalance reserves and flexible ramping product

- The same FRP deliverability/pricing concerns exist with imbalance reserve
  - They are procured in the same way for the same reasons; magnitude of IR requirement will be higher
  - CAISO disagrees with assertions that any differences between the products (biddable v non-biddable) or markets (DA v RT) resolves these concerns
  - Congestion management is an integral part of day-ahead markets

Plan for tomorrow

- More on FRP
  - Implementation of nodal FRP and its impact on implementation of imbalance reserve
  - A preview for when data/analysis on the performance of FRP might be available
  - Clear articulation of why FRP was implemented when it was
- Side by side comparison and criteria
- Design proposal to address CRR impacts

Upcoming meetings

- DAME workshops:
  - February 27, 2023 from 1 p.m. – 5 p.m. (virtual)
  - March 7, 2023 from 9 a.m. – 4 p.m. (hybrid)
  - March 8, 2023 from 9 a.m. – 12 p.m. (hybrid)

- Market Surveillance Committee meeting:
  - March 10, 2023 from 9 a.m. – 12 p.m. (virtual)

Comments

- Please submit comments on the DAME workshop discussions by end of day March 24 using the template provided on the initiative webpage.