



Day ahead market enhancements 15-minute granularity discussion

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General Session
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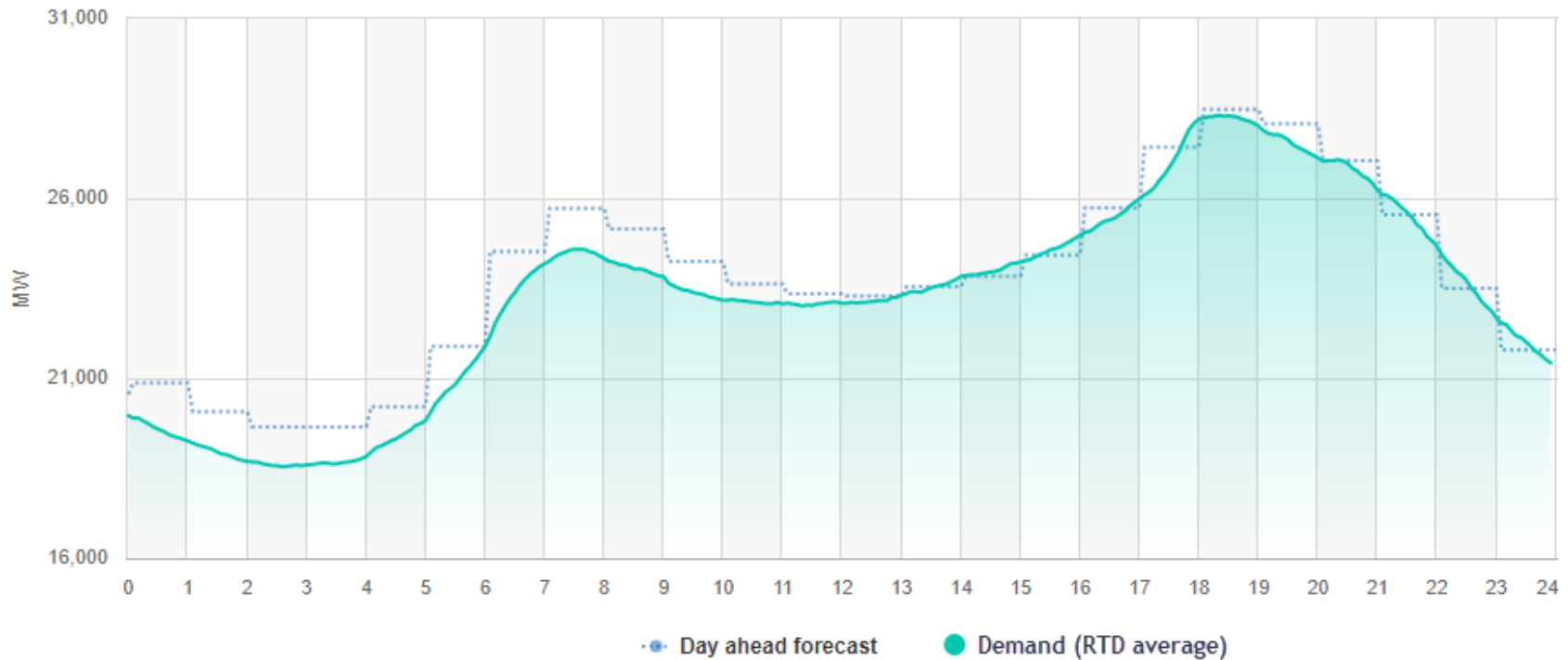
The ISO will address day-ahead market enhancement initiative in two phases

- Phase 1: 15-Minute Granularity
 - 15-minute scheduling
 - 15-minute bidding
- Phase 2: Day-Ahead Flexible Ramping Product (FRP)
 - Market formulation of FRP consistent between day-ahead and real-time market
 - Evaluate combining integrated forward market (IFM) and residual unit commitment (RUC) processes
 - Improve deliverability of FRP and ancillary services (AS)
 - Consider re-optimization of AS in real-time 15-minute market

Schedule for phase 1 and phase 2 of the day-ahead market enhancement initiative

- **Phase 1: 15-Minute Granularity**
 - Confirm Implementation Feasibility: Q4 2018
 - Draft Final Proposal: Q1 2019
 - EIM Governing Body: Q1 2019
 - ISO Board of Governors: Q1 2019
 - Implementation: Fall 2020
- **Phase 2: Day-Ahead Flexible Ramping Product (FRP)**
 - Technical Workshops: Q4 2018
 - Second Revised Straw Proposal: January 2019
 - Draft Final Proposal: March 2019
 - EIM Governing Body: May 2019
 - ISO Board of Governors: May 2019
 - Implementation: Fall 2021

The ISO's current day-ahead market is limited due to hourly scheduling



- Granularity differences occur HE20 – HE24
- Downward uncertainty materializes HE01 – HE12

15-minute scheduling granularity in the day-ahead market will more closely follow actual ramp (Phase 1)

- Operational benefits
 - Commit resources to more closely match steep net-load ramps
 - Reflect sharp changes in ramp that occur within the hour
 - Improve variable energy resource scheduling in day-ahead
 - Pacific Northwest hydro resources can provide 15-minute schedules in day-ahead, but not real-time
- Technical challenges
 - Market optimization to solve for 96 intervals vs. 24
 - Solving market within current market timelines
 - Settlement updates to nearly all charge codes

Design elements to change from hourly to 15-minute scheduling granularity

- 15-minute bidding for day-ahead and real-time market
- 15-minute residual unit commitment process
- Bid submission timeline pulled in one hour to 9:00 AM
- Inter-SC trades submitted for each 15-minute interval
- Hourly load meters can be shaped into 15-minute values
- Clarification to ancillary services rules

In general, all hourly rules move to 15-minute granularity

Corresponding design changes to the energy imbalance market

- Base schedules will now be submitted with 15-minute granularity
- Resource sufficiency evaluation balance test performed for each 15-minute interval
 - Under/Over scheduling penalties by 15-minute interval
- Resource sufficiency evaluation capacity test performed for each 15-minute interval
 - Failure results in EIM transfers limited for 15-minute interval

Aligns ISO day-ahead schedule & EIM base schedule

Confirm implementation feasibility of 15-minute scheduling in Q4 2018

- CAISO to evaluate implementation approaches to reduce solve time in Q4 2018
- Hold posting draft final proposal since policy clarifications may be needed