

Virtual Bidding in the CAISO Market

Presented by
Carrie Bentley
June 29, 2020



Outline



- History
- Overview of virtual supply and virtual demand
- Virtual bidding, market clearing, and settlements
- Current level of participation in the CAISO markets
- Key take-aways

Overview of virtual bidding



- Part of FERC “standard market design”
- Initially implemented in CAISO markets February 2011
 - Suspended bidding on interties in November 2011
- In CAISO is referred to as Convergence Bidding
- Financial positions taken in the day-ahead market and liquidated in real-time at the same node

What is virtual supply and demand?



- Virtual supply offers
 - Offers to sell energy in the day-ahead market with obligation of buying it back in real-time; not tied to any physical asset
- Virtual demand offers
 - Offers to buy energy in the day-ahead market with the obligation of selling it back in real-time; not tied to any physical load
- Net virtual position
 - Net virtual supply – more virtual supply than virtual demand
 - Net virtual demand – more virtual demand than virtual supply

Virtual bidding in the market



- Virtual Supply and Virtual Demand offers are only submitted into the CAISO's Integrated Forward Market (IFM)
 - \$/MW pair bid at eligible nodes
 - No commitment costs for virtual supply offers
- Not subject to market power mitigation
- Not considered in the reliability unit commitment (RUC) process in the day-ahead market
- Over 100 entities registered as convergence bidding entities

Clearing virtual supply and demand in the energy market



- Day-ahead market treats virtual supply and demand in the same manner as physical supply and demand offers
 - Used to clear bid-in supply against bid-in demand
- Eligible to set prices
- Impacts commitment and dispatch of physical resources
 - For example, based on economics, market may opt to clear virtual supply over committing and dispatching a physical resource

Offsetting virtual supply and demand bids



- A little less than 50% of all cleared virtual bids are offsetting virtual positions
- Hedge congestion costs or earn revenues by placing virtual supply and virtual demand bids different locations in the same hour
 - Pnode A: 100 MWh virtual supply
 - Pnode B: 100 MWh virtual demand
- Offset each other and not exposed to certain uplift settlement charges

Why would an entity take a virtual position?



- Hedge against real-time price spikes or depressions
 - Load/Gen concerned that real-time price may spike at their hub due to higher than expected demand and a resource nearby that sometimes trips off on hot days
 - Load/Gen observes wind comes into the real-time market, continually lowering the price its supply is paid
- Financial participant
 - Hedge against other positions
 - Earn revenues

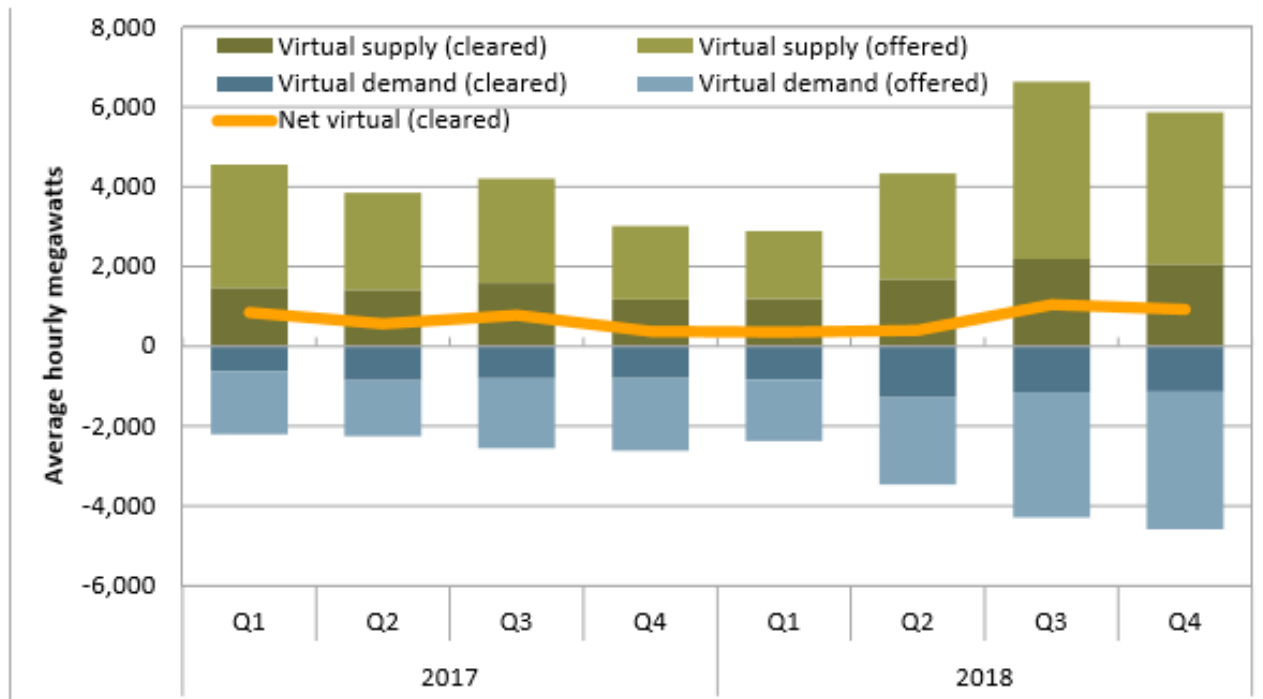
Market Benefits



- Historically a FERC requirement for market go-live
- Improves market liquidity and increase competitiveness of market
- Provides ability for market participants to hedge various risks
- When profitable, lower overall costs with more efficient day-ahead market
- Converges prices between day-ahead and real-time
 - Practically, see it being used as an effective proxy for under scheduled renewable generation in day-ahead

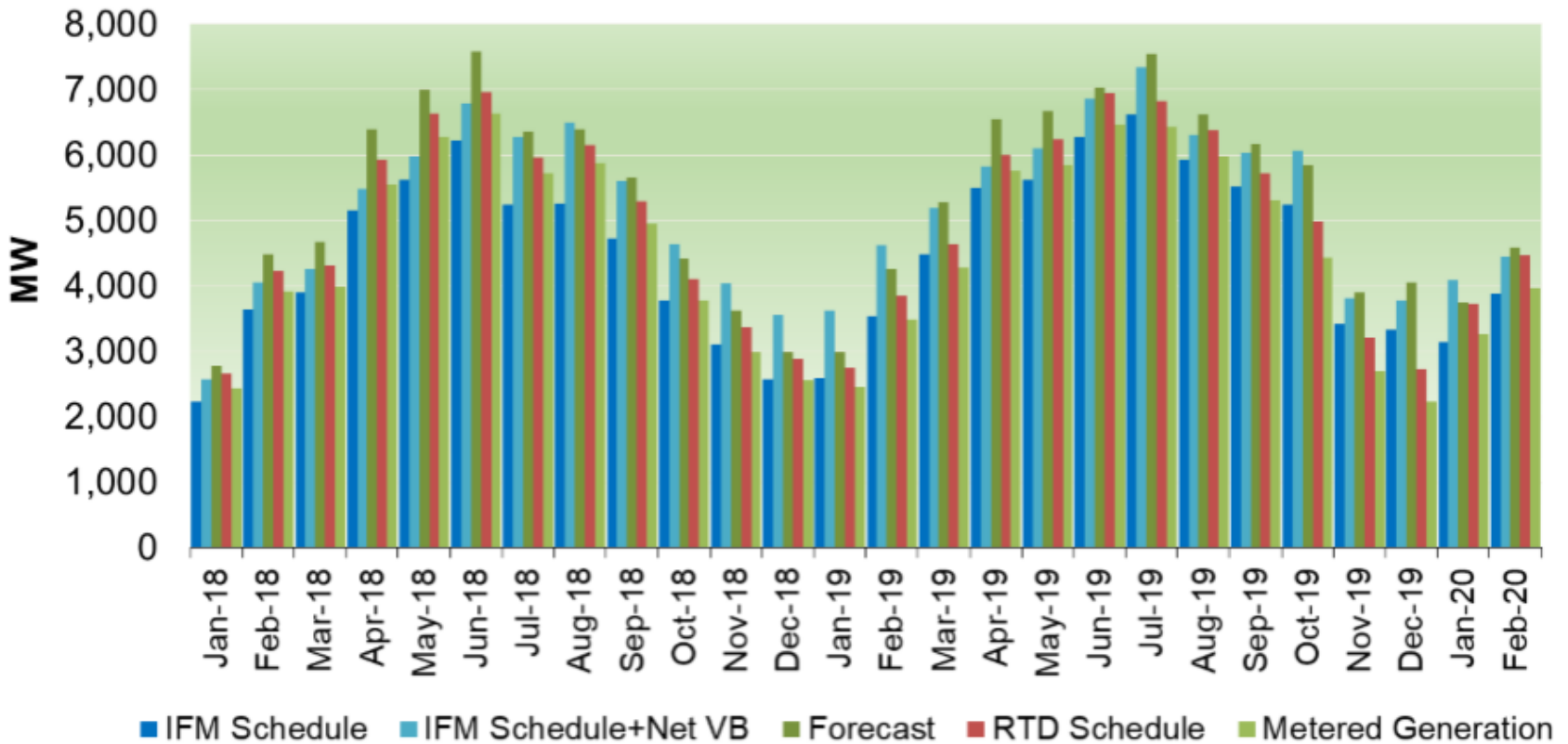
Recent(-ish) participation trends

Figure 5.1 Quarterly average virtual bids offered and cleared



- Approximately 40% of virtual offers cleared the market in 2018
- \$56M in net revenue for 2018, \$40M after cost allocation

Total monthly VERs schedules and forecasts compared to actuals



Source: CAISO Market Performance Planning Forum April 2020

Key take-aways



1. Virtuals are a key difference between a physical day-ahead market and a financial day-ahead market
2. CAISO wind in the day-ahead market
3. Liquidity at specific nodes vs entire market
4. Imperfect market tool
 - a. Cross product manipulation
 - b. Could introduce inefficiencies
5. Extended day-ahead market considerations