



Virtual Bidding Benefits and Costs

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What is Virtual Bidding?

- Willingness to buy or sell energy in day-ahead market with opposite transaction in real-time market mandated
 - 50 MWh purchase in day-ahead market with 50 MWh sale in real-time market
 - Purely financial transaction to exploit difference between day-ahead and real-time prices
- If market participant believes real-time price will be higher than day-ahead price, should buy day-ahead energy and sell it in real-time
 - Increased day-ahead demand drives up day-ahead price
 - Increased real-time supply pushes down real-time price
- Actions of virtual bidders cause day-ahead and real-time prices to equal one another on average
 - Eliminates predictable differences in real-time and day-ahead prices



Benefits of Virtual Bidding

- Provides strong incentives for day-ahead and real-time prices at all locations where virtual bidding is permitted to equal one another in expectation
 - Does not require suppliers to alter how they operate their units in order to sell output in real-time market despite scheduling in day-ahead market
 - Suppliers can focus on scheduling in least-cost manner and use virtual bidding to sell output in desired market
 - Similar logic applies to load scheduled by LSEs
 - Could require 100% of ISO's load forecast to be scheduled against physical generation in day-ahead market
 - Load serving entities (LSEs) could then use virtual bids to move some of these purchases from day-ahead to real-time market
- Eliminates high barriers to entry into market for exploiting day-ahead and real-time price differences
 - Currently only generation unit owners and LSEs can engage in "virtual bidding"
 - Loads can submit "incredible" price responsive demand bids to avoid buying in day-ahead market
 - Generation can submit "incredible" supply bids to avoid selling in day-ahead market
 - By eliminating this barrier to participation in "virtual bidding," market participants need not own generation to engage in virtual bidding
 - Purely financial participants can increase depth of day-ahead energy market
 - PJM currently accepts an average of roughly 9000 MW of virtual supply and demand bids each hour
 - Eliminates any excessive profits generation owners and LSEs might currently earn from "virtual bidding"



Costs of Virtual Bidding

- Large virtual positions by a supplier or load may create incentives to increase or decrease real-time price
 - Supplier or LSE must still have ability to influence real-time price significantly, which seems unlikely at current level of forward contracting in California
- Large virtual positions across nodes may create incentives to operate generation units to cause congestion in real-time market
 - Supplier or LSE must have a significant FTR position across two nodes—PJM solution of refunding FTR revenues
- Most all potential costs are the result of large virtual positions by a small number of suppliers
 - Solution—Limits on MWhs of virtual bids within an hour or day
- Many market participants, each providing a small quantity of virtual bids, enhances market efficiency



Implementation Issues

- FERC has ordered CAISO to consider implementing virtual bidding at start of LMP market
- Virtual bidding at all nodes versus only at trading hubs
 - New York ISO only allows it at zonal level
 - PJM allows virtual bidding at all node in network
- How to set limits on MWhs of virtual bidding
 - How to adjust these limits over time
- How to set credit requirements on virtual bidding
 - Suppliers and LSEs
 - Traders and other financial market participants