

Briefing on market power mitigation in  
the capacity procurement mechanism

# Pay As Bid vs. Uniform Price Auctions

Shmuel S. Oren

Member: California Market Surveillance Committee

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# Revenue Equivalence (Wikipedia)

The [revenue equivalence theorem](#) states that any allocation mechanism/auction in which

1. the bidder with the highest type/valuation/signal always wins
2. the bidder with the lowest possible type/expects zero surplus
3. all bidders are risk neutral, and
4. all bidders are drawn from a strictly increasing and atomless distribution

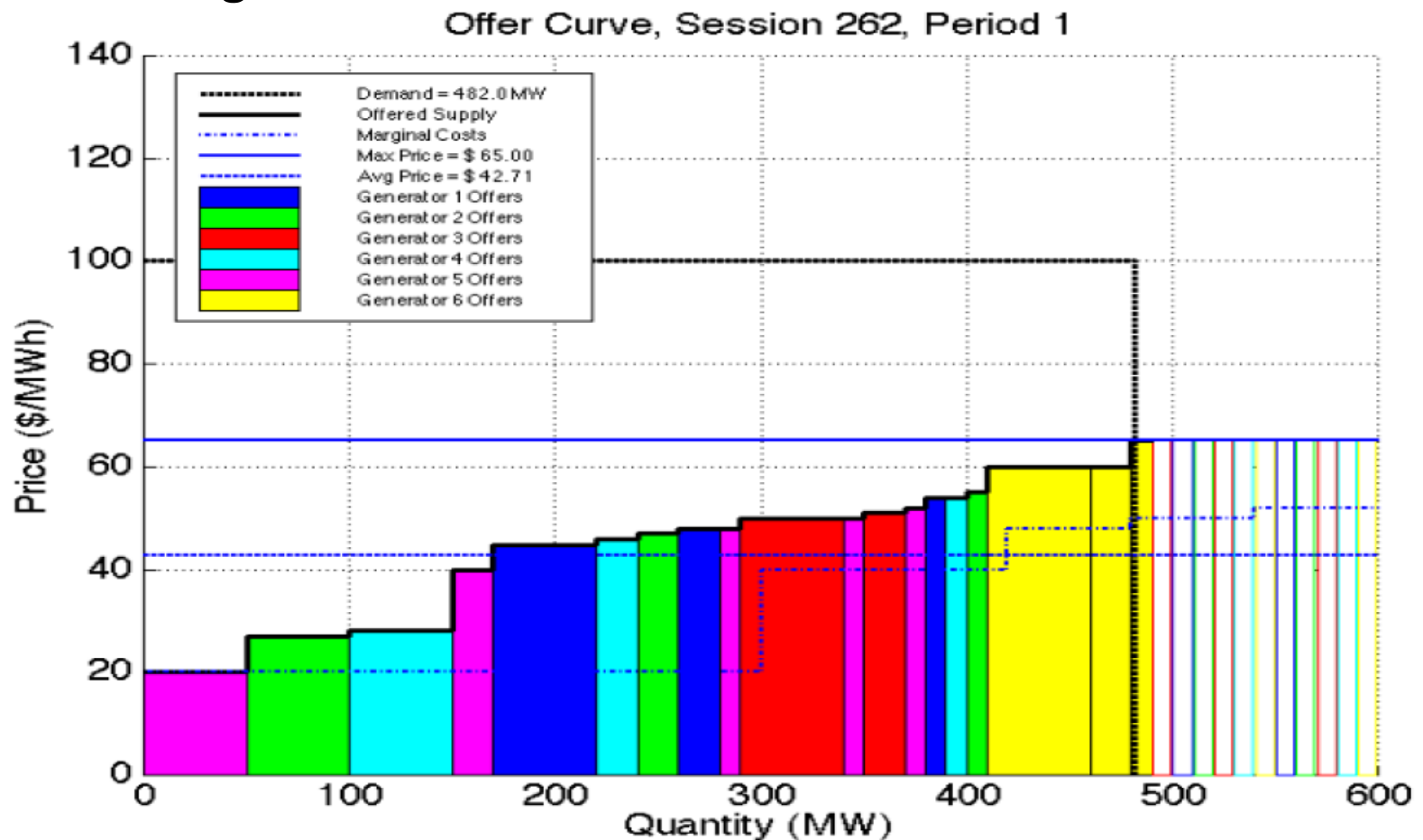
will lead to the same expected revenue for the seller

# Revenue Equivalence (Cont'd)

- Result can be extended to homogeneous multi-item procurement auction where items are procured in merit order (increasing cost).
- This implies that in equilibrium, the expected cost to the buyer is the same whether the auction settlement is “pay as bid” or “uniform market clearing price”
- In a PAB auction rational bidders will anticipate the market clearing price and adjust their offer price accordingly

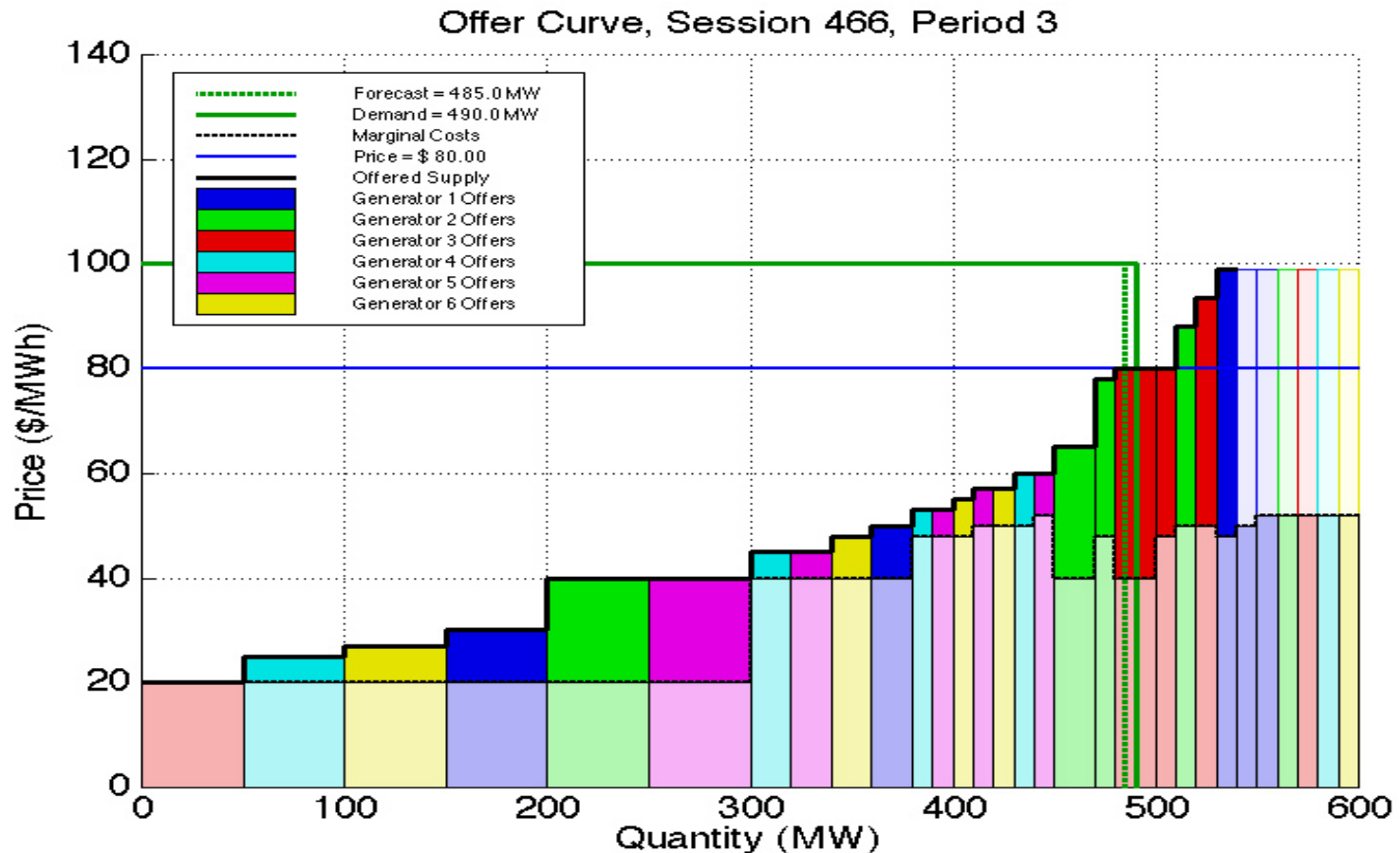
# Experimental verification (Cornell)

Each color represents a different generator. Upper line represents the offer curve while dashed line represents cost. Subjects are paid the difference between the price they receive (uniform or as bid) and their assigned cost



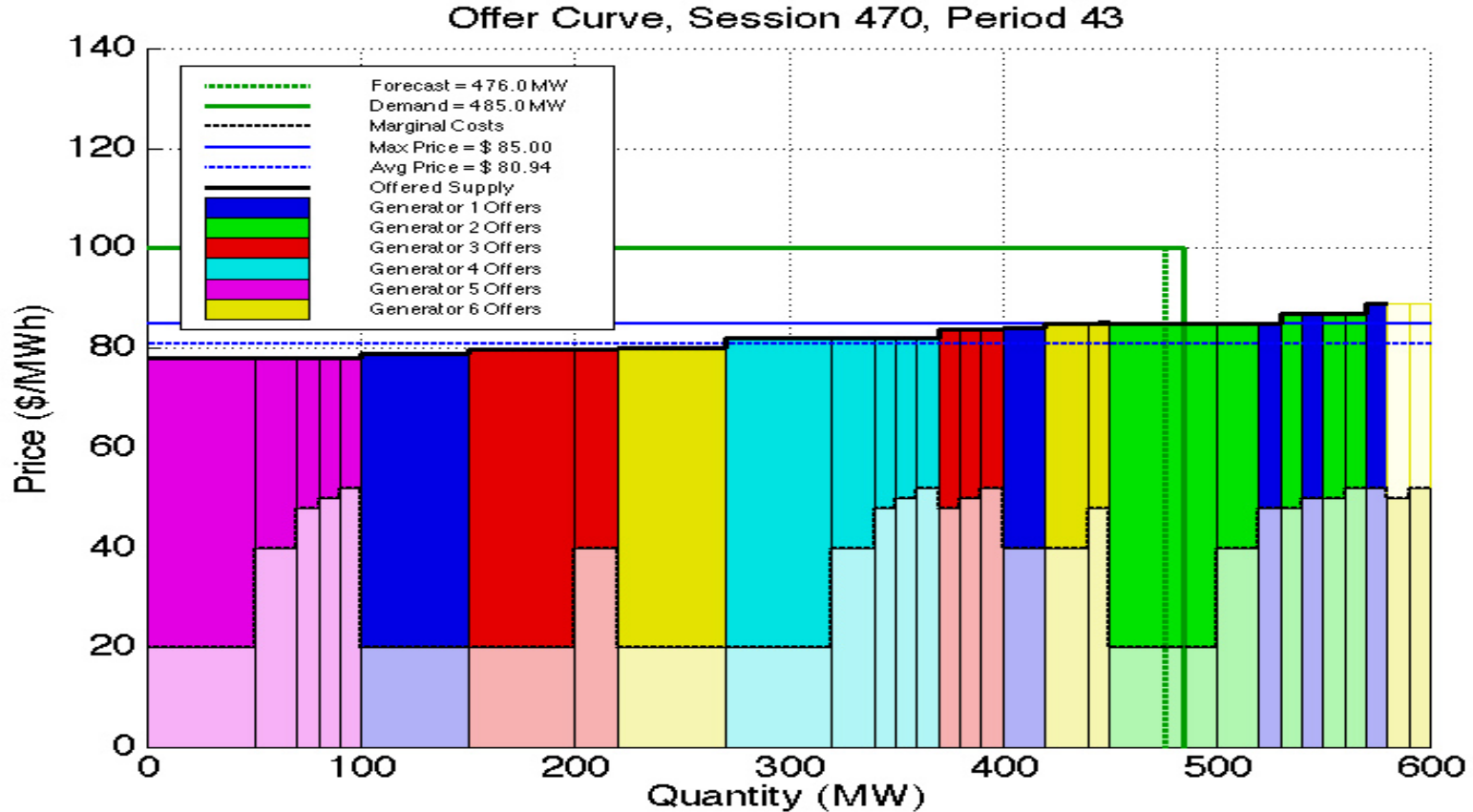
# Experimental verification (Cont'd)

In initial rounds subjects mark up their offers but merit order is largely preserved so there is no efficiency loss.



# Experimental verification (cont'd)

Eventually, bidders learn to forecast the clearing price and raise their offers to that level. The resulting offer curve is flat and conveys no merit order information so offers are selected out of merit order resulting in efficiency loss with no price savings to consumers



# PAB Pros and Cons

- In equilibrium, PAB auctions result in flat offer curves and loss of merit order information (due to bidders forecast error) that could cause inefficient dispatch
- Argument valid if commodity is homogeneous and bidding is repeated often enough to achieve equilibrium
- PAB auctions do not provide transparent market clearing price signal
- PAB reduces incentives for and adverse impact of “hockey stick bidding”. (This does not mean that PAB less vulnerable to market power in general).
- Limited theoretical results under restrictive assumption show that in a supply function equilibrium setting average procurement cost under PAB is no higher than under MCP

# Implications for CPMR

- Using long term (monthly) standing offers minimize the impact of bidders adjusting their offers in anticipation of highest clearing offer
- Backup capacity offers are heterogeneous (limited interchangeability) since they are selected based on specific characteristics such as location and resource capability
- Market for each resource category is too thin to provide a reliable competitive clearing price (susceptible to market power abuse)
- PAB auction is appropriate but for CPMR but it will not provide a price signal that can guide FRACMOO noncompliance penalties