Monitoring and Mitigating Market Power

Amelia Blanke, Ph.D.
Manager, Monitoring & Reporting
Department of Market Monitoring

Western Energy Markets Training
Salt Lake City, Utah
June 2, 2022

Mission of independent market monitors

"*Each independent system operator … must include a mission statement … that identifies the Market Monitoring Unit's goals, including the protection of consumers and market participants by the identification and reporting of market design flaws and market power abuses.*"

FERC Order 719

To provide independent oversight and analysis of the CAISO Markets for the protection of consumers and Market Participants by the identification and reporting of market design flaws, potential market rule violations, and market power abuses.

Department of Market Monitoring Mission Statement
CAISO Tariff, Appendix P

Core functions of independent market monitors (FERC Order 719)

1. Review and report on the performance of wholesale markets, including quarterly and annual reports.
2. Evaluate existing and proposed market rules, and provide recommendations.
3. Notify FERC Office of Enforcement when a market participant or the ISO has engaged in conduct that may require investigation.
4. Market monitors may also perform functions related to inputs for market power mitigation.
   - Bids used in mitigation, cost review, etc.

CAISO Department of Market Monitoring

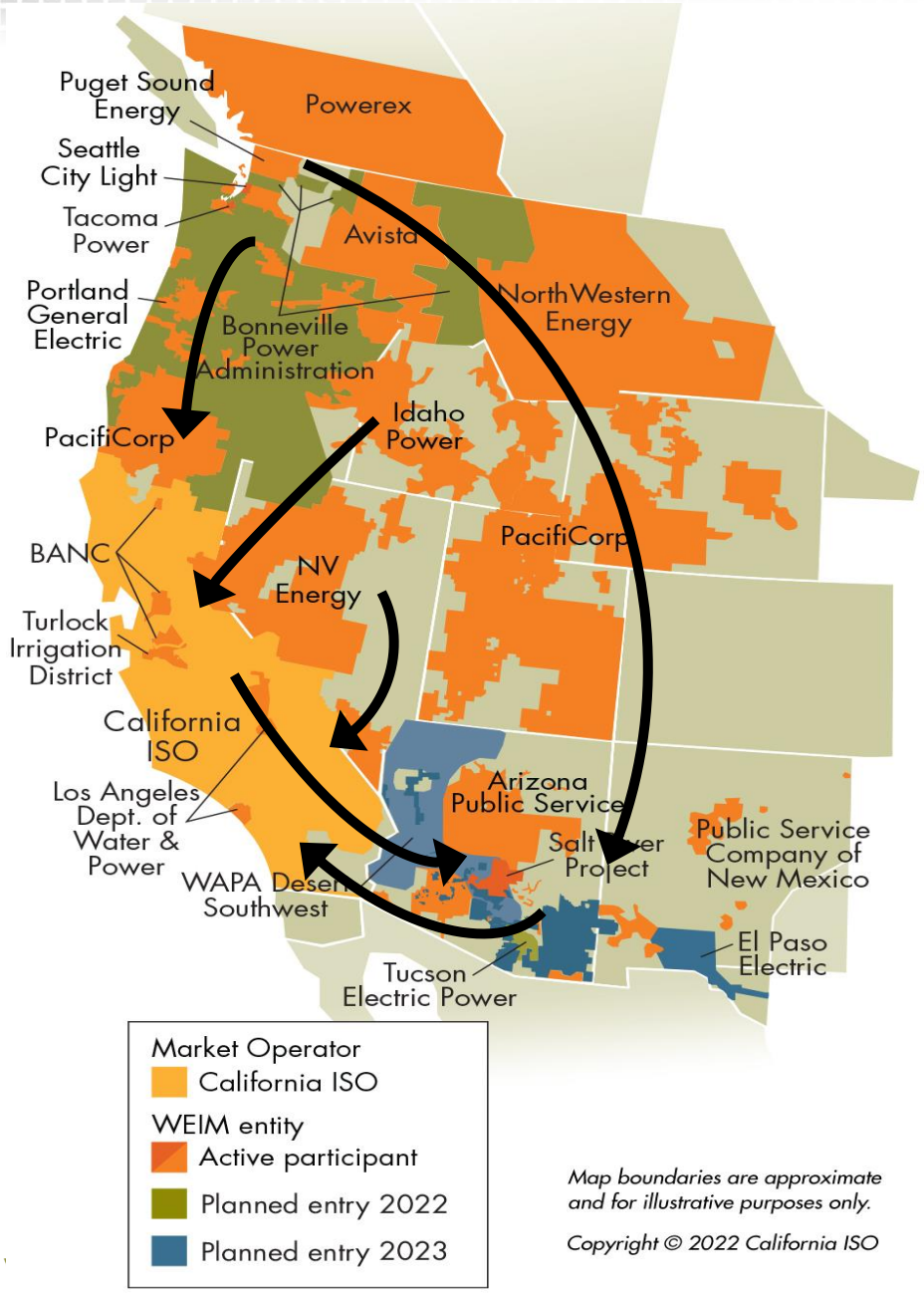
- Internal business unit of the CAISO
  - 18 staff (economics, data analysis, engineering)
  - Access to all CAISO/WEIM market and operational data
  - Work closely with CAISO staff on market design and ongoing monitoring
- Independent from CAISO management, as required by FERC Order 719
- Work and communicate closely with FERC and staff of state PUCs
  - DMM invited to present at BOSR/WIEB meetings
  - DMM outreach to individual WEIM state PUCs

Market power mitigation in the WEIM

- Required to protect third party transmission customers reliant on WEIM authority for imbalance energy service.
  - Smaller load serving entities, independent/renewable generators, etc.
- Most participants must file for special WEIM market-based rate authority from FERC.
- No *must offer* obligation for generation, but each WEIM area must offer enough to meet capacity and ramping requirements for their balancing area.
- Energy bid mitigation (limits) triggered only when WEIM areas are separated by congestion from rest of CAISO/WEIM system.

Market power mitigation measures

- Bid caps for start-up and minimum load bids
  - Based on pre-determined unit specific costs plus 25% and opportunity cost
- Local market power mitigation (within balancing areas)
  - Energy bid mitigation triggered only when congestion occurs on uncompetitive constraint
  - Mitigation only applied to units that can relieve congestion
  - Market bids capped using cost-based energy bids (plus 10% adder)
- WEIM market power mitigation (between balancing areas)
  - Unit specific bid limits triggered only when WEIM areas are separated by congestion from rest of CAISO/WEIM system.
  - Energy bid mitigation very infrequent in WEIM
    - Triggered only during 1-2% of hours in most areas

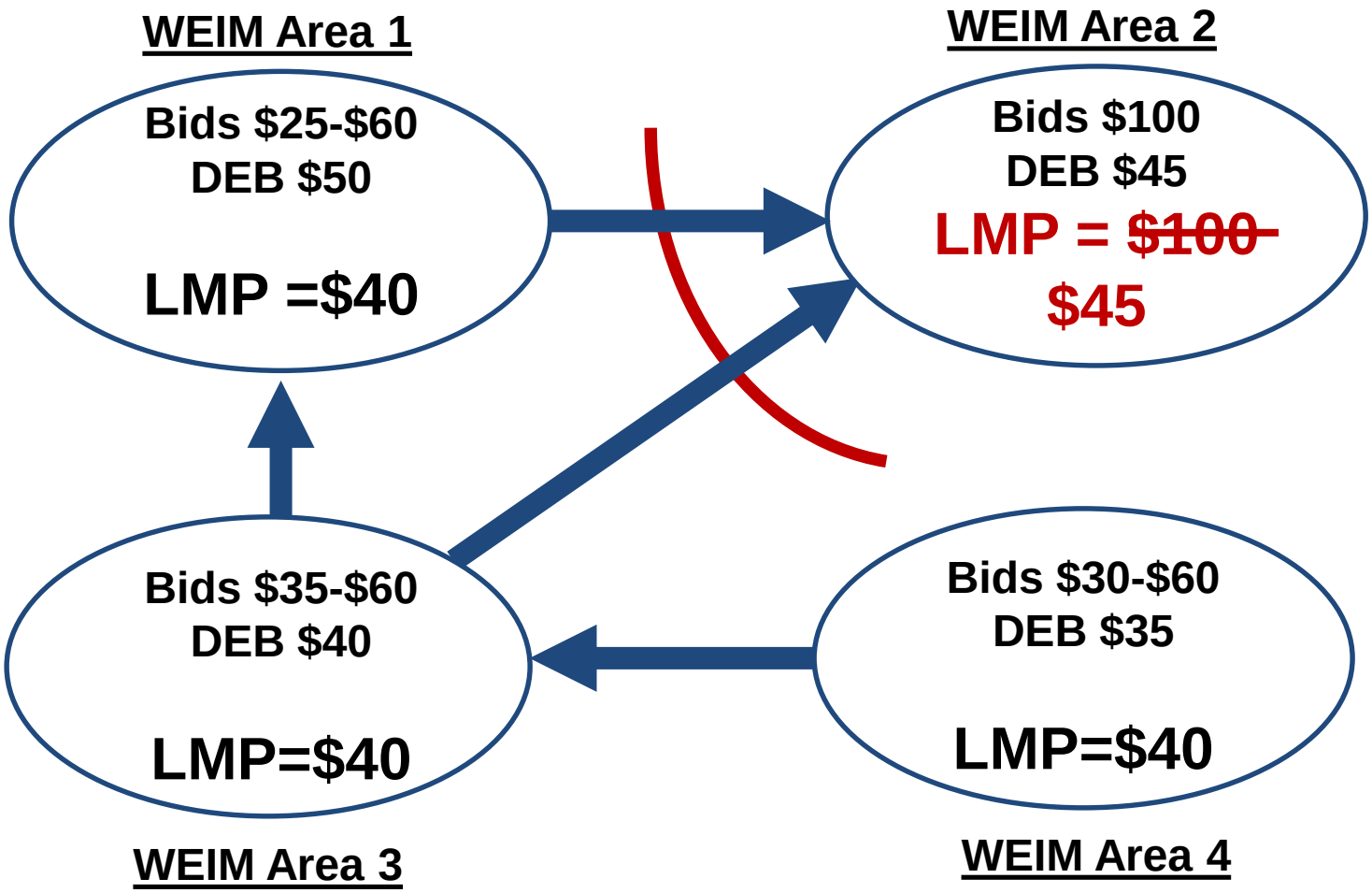


- Transfers in WEIM vary a lot by hour-of-day and season.
- General flow of transfers in net peak hours is from northwest to CAISO and southwest.
- During peak solar hours, CAISO exports excess to other WEIM areas.
- Flows can change quickly due to changes in short-term conditions.

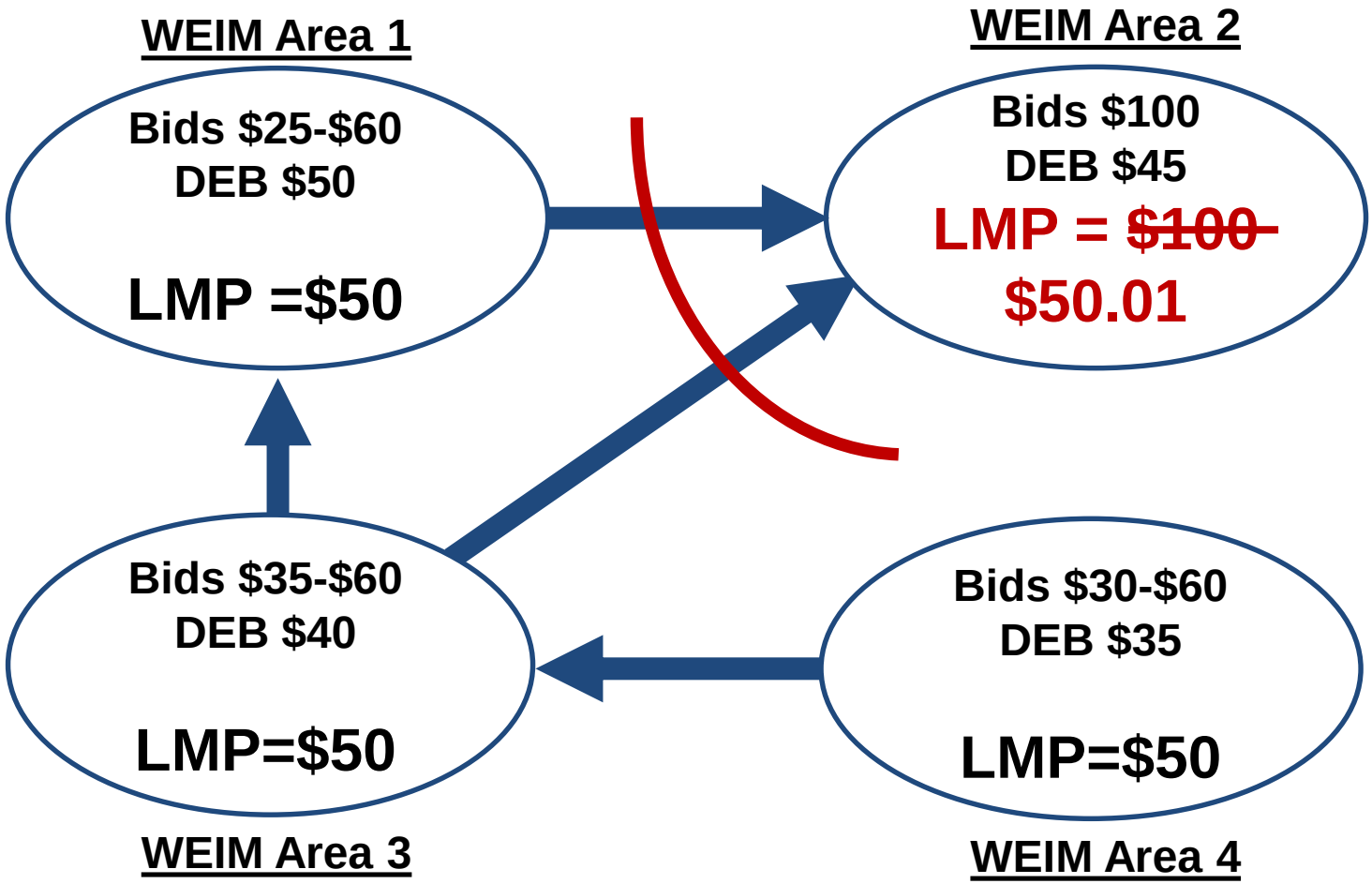
Market power mitigation in the WEIM

- Mitigation in WEIM areas based on same automated approach used in CAISO's day-ahead market
  - Run market optimization with unmitigated bids
  - Test congested constraints for structural market power
  - Mitigate some bids for resources which relieve uncompetitive congestion
  - Run market optimization with mitigated bids
- An entire WEIM balancing area is tested for competitiveness if the area is separated from other areas by import congestion
  - i.e. If WEIM transfer limits *into* WEIM area congested in import direction
- Group of multiple contiguous WEIM areas may all be subject to mitigation if group of areas is separated by congestion from the system

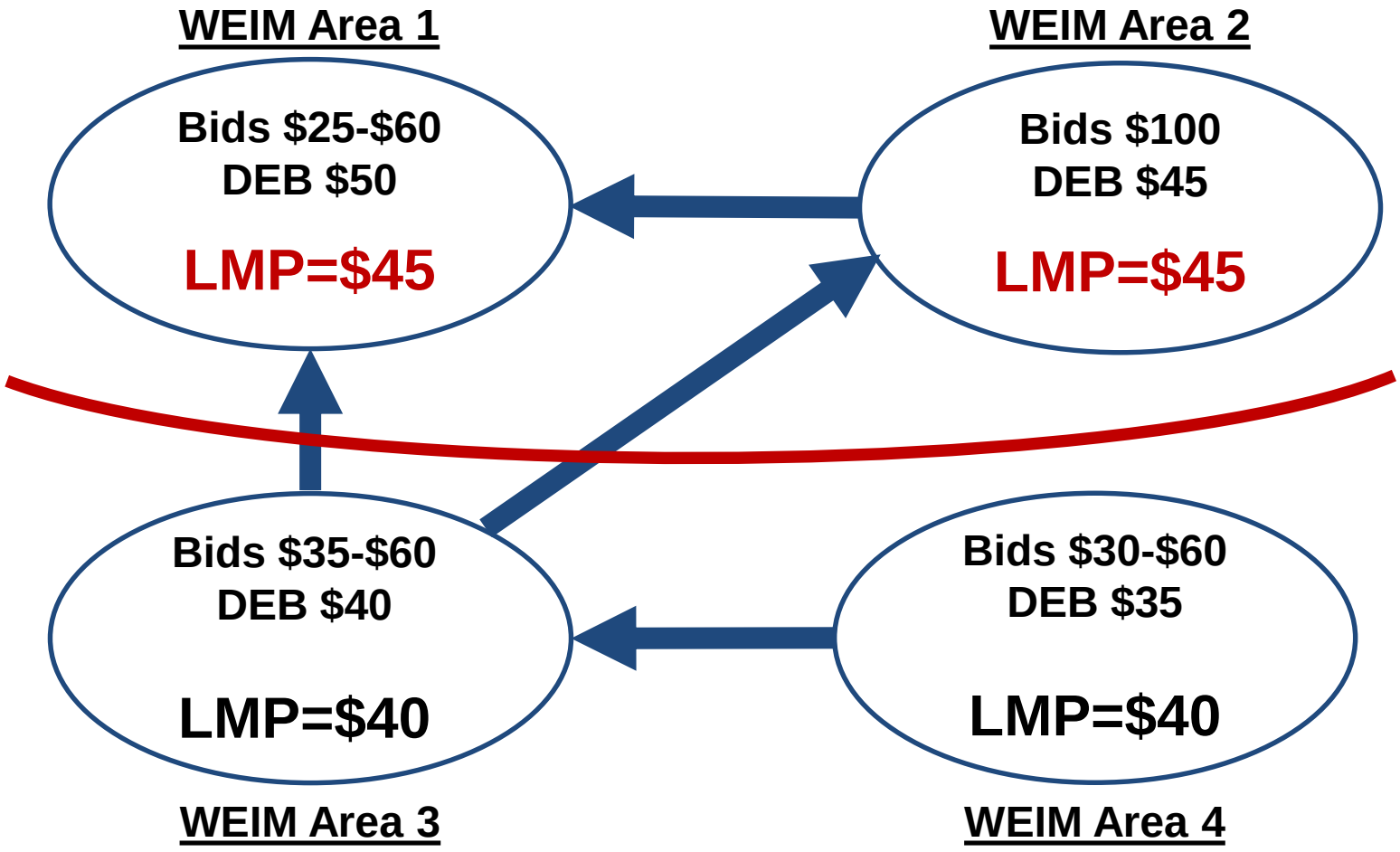
Example #1: LMP within constrained WEIM area set by DEB



Example #2: LMP for constrained WEIM Area 2 set by competitive LMP (SMEC in this simple example)



Example #3: A WEIM balancing area is tested for competitiveness if it is part of group of areas separated by congestion from WEIM system



Market power mitigation measures (continued)

- CAISO/WEIM system wide bid caps
  - $1,000/MW “soft” bid cap normally in effect
  - Bid cap raised to $2,000/MW if extremely high natural gas prices or bilateral market prices
  - Spot market sales < $1,000/MW soft cap must be cost justified
- FERC’s west wide price cap for bilateral trades
  - Spot market sales < $1,000/MW soft cap must be cost justified

Monitoring market power in the WEIM

- Structural measures
  - Pivotal supplier test
    - *Can demand still be met without any large supplier?*
  - Residual supply index (1, 2, or 3 largest suppliers)
- Conduct
  - Bid cost markup
    - *What is units bid cost compared to unit's marginal cost?*
  - Physical withholding
    - *Is some lower cost capacity being withheld from market so that higher cost units set prices?*
- Performance
  - Price cost markup
    - *How does actual market clearing price compare to market prices that would result if all units bid marginal cost?*

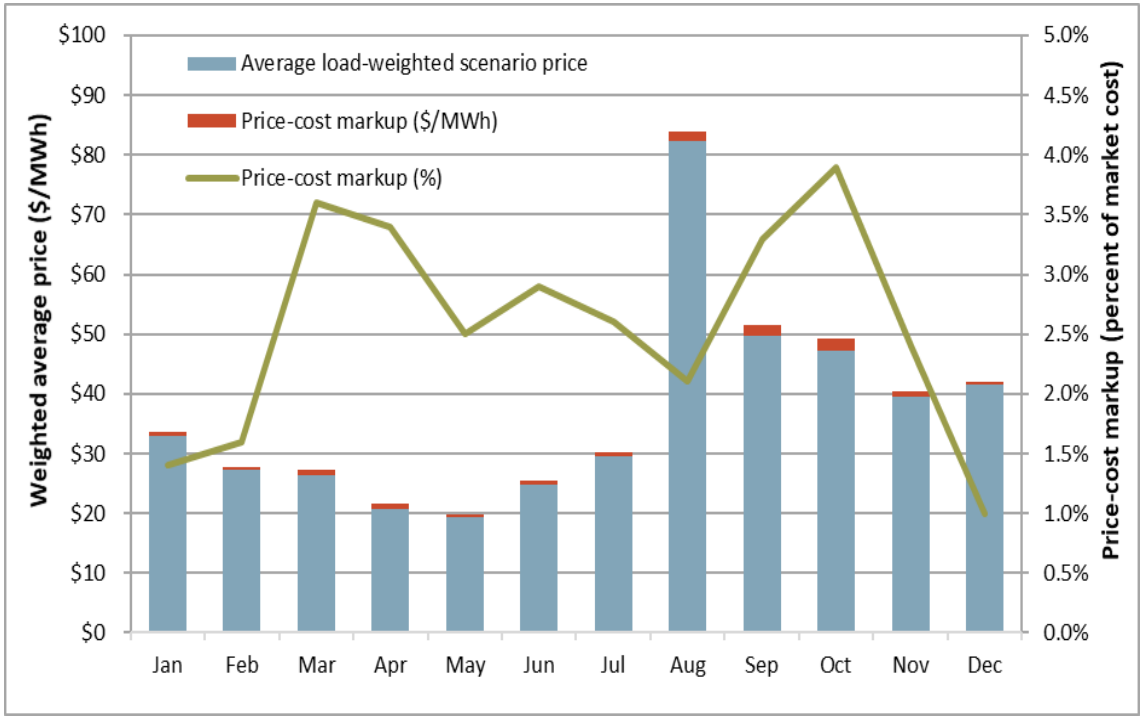
Market competitiveness

- Price cost markup of CAISO day-ahead market
  - DMM re-runs day-ahead software with marginal cost bids for gas fired units
  - Results show CAISO day-ahead market prices have very low mark-up over cost (e.g. 2-3 percent on annual basis)

- Competitiveness of real-time WEIM prices
  - Low bid-cost markup for most capacity
  - CAISO day-ahead market used as competitive benchmark for WEIM prices
  - Difference in WEIM and CAISO prices driven by two factors
    - Transmission limits from lower cost areas to higher cost areas
    - Green house gas (GHG) costs embedded in CAISO prices

Measuring competitiveness

Figure E.4 Day-ahead market price-cost markup – default energy, commitment cost, and import bids scenario (2020)



- Market rerun software
- Competitive scenario
  - Gas bids lowered to cost
  - Start-up and minimum load bids lowered to 110% of cost
  - Import bids lowered to high opportunity cost

http://www.caiso.com/Documents/2020-Annual-Report-on-Market-Issues-and-Performance.pdf

Some current WEIM market design issues

- Resource sufficiency evaluation
  - Two tests: capacity test and flexible ramping test
  - Level of test requirements
  - How to count capacity in capacity test
  - Consequences of failing test

- WEIM day-ahead market (EDAM)
  - Flexible ramping requirements
  - Transmission requirements for imports used to meet day-ahead WEIM resource sufficiency test
  - Allocation of congestion revenues
  - Governance

For more information …..

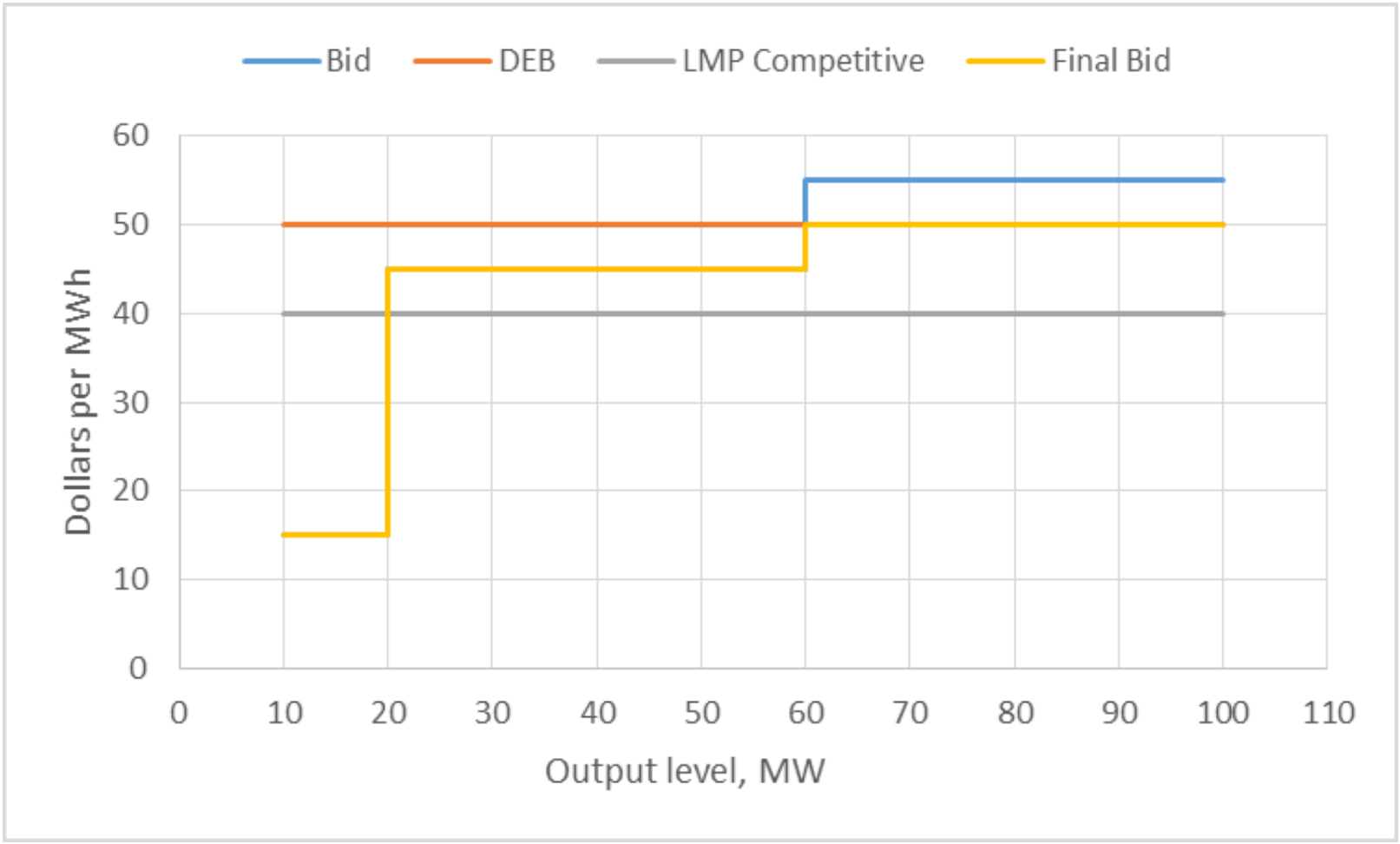
- Department of Market Monitoring webpage
  - http://www.caiso.com/market/Pages/MarketMonitoring/Default.aspx

- CAISO Tariff, Appendix P
  - http://www.caiso.com/Documents/AppendixP_CAISODepartmentOfMarketMonitoring_asof_Apr1_2017.pdf

- Eric Hildebrandt, Executive Director
- Amelia Blanke, Manager, Monitoring and Reporting
- Ryan Kurlinski, Manager, Analysis and Mitigation

Data appendix

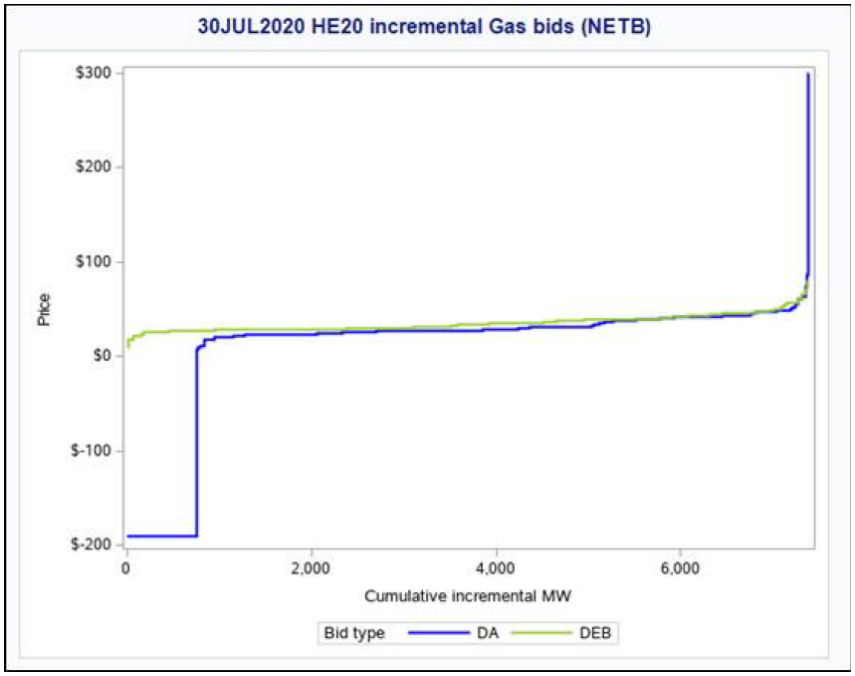
Bids and mitigation examples: mitigated bid

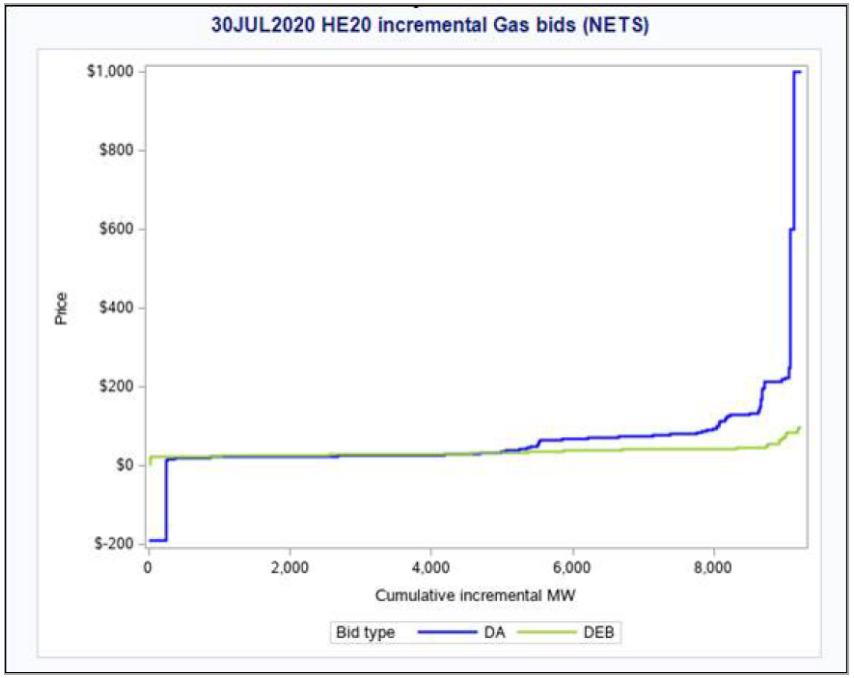


Net buyer vs. Net seller

bids < most cost estimates

some bids > cost estimates





http://www.caiso.com/Documents/ReportonMarketCompetitivenessJul30-312020.pdf

Supply and demand (day-ahead market)

Figure 3.2 Supply bids (hour 20, July 28 - 31, 2020)

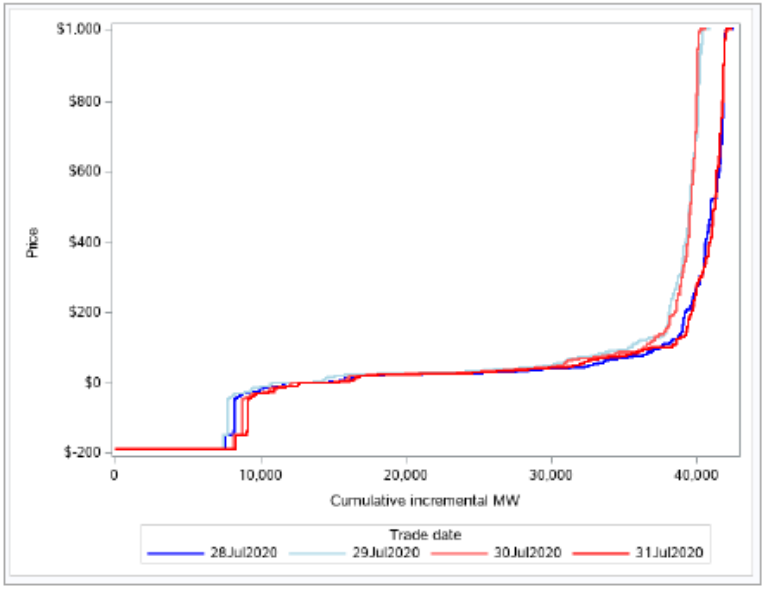
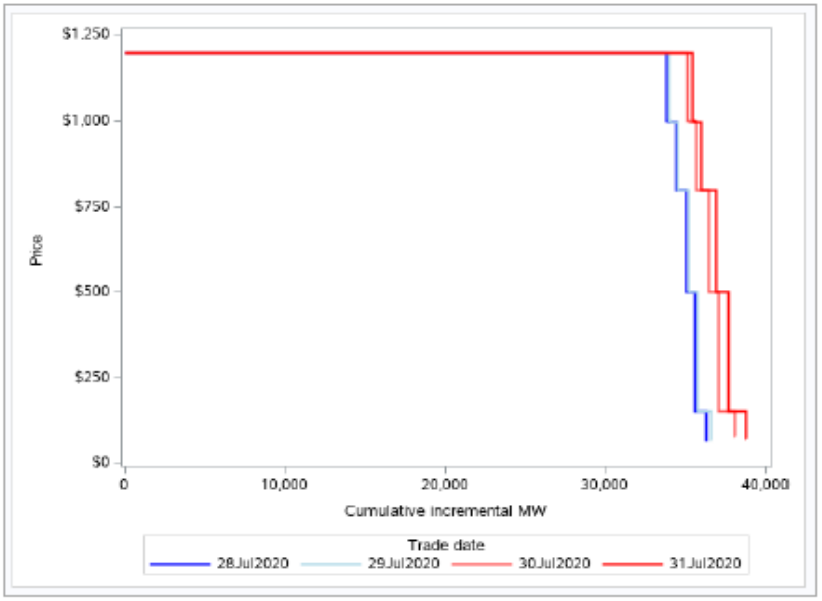


Figure 3.1 Load bids (hour 20, July 28 - 31, 2020)



http://www.caiso.com/Documents/ReportonMarketCompetitivenessJul30-312020.pdf

Impact of congestion and greenhouse gas on prices (2020)