EIM Market Monitoring and Market Power Mitigation

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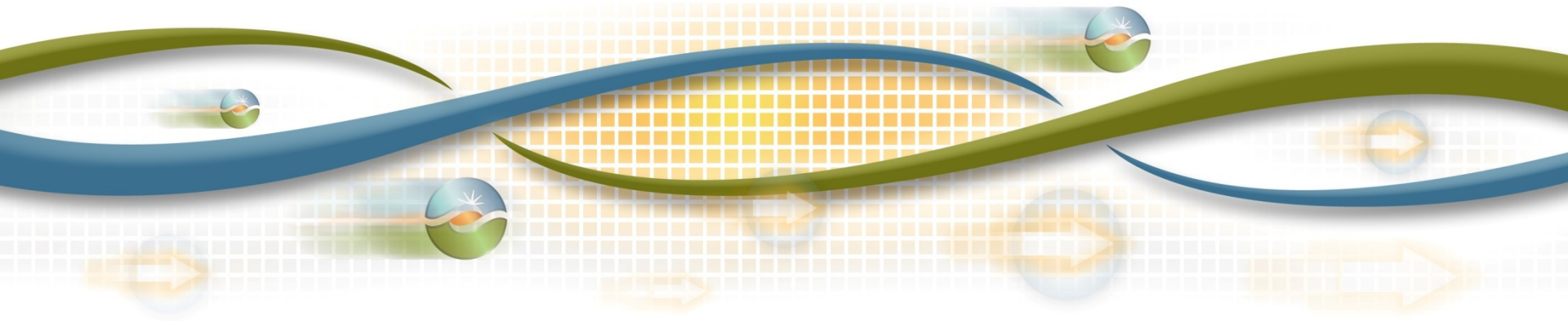
Outline

- Market monitoring overview

- Key EIM market design features relating to market power

- Local market power mitigation example

- EIM monitoring and mitigation issues

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Department of Market Monitoring

Mission Statement

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.

Appendix P, Section1.2
http://www.caiso.com/Documents/AppendixP_CaliforniaISODepartmentOfMarketMonitoring_Jul1_2013.pdf

DMM Webpage
http://www.caiso.com/market/Pages/MarketMonitoring/Default.aspx

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Market monitoring overview

- Monitor markets to assess:
  - Market performance/efficiency
  - Competitiveness/market power
  - Gaming/manipulation

- Provide recommendations on market design and operation

- Refer potential violations of FERC behavioral rules prohibiting false information and manipulation

- Prepare quarterly and annual reports on market performance

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Department of Market Monitoring

- Internal business unit of ISO
    - ~15 staff (economics, engineering, data analysis)
    - Access to virtually all ISO market and operational data
    - Work closely with ISO staff on market design/monitoring

- Independence
    - DMM Director reports directly to ISO Board
    - Administratively reports directly to CEO

- Often work/communicate closely and directly with FERC and CPUC staff

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Key EIM market design features

- Market power mitigation (direct)
  - $1,000 bid cap
  - Local market power mitigation (LMPM)
  - No local capacity requirements or must-offer obligation

- Other features
  - Base scheduling
  - Load under scheduling penalty
  - Ramping sufficiency test
  - Forward hedging by load serving entities

EIM market design: $1,000 bid cap

- High "damage control" bid cap designed to help mitigate excessive system market power, while allowing high prices during tight supply/demand conditions.

- Designed for market in which load serving entities are heavily hedged in real-time market through forward procurement/hedging:

  - Self-supply

  - Tolling contracts

  - Financial

- When real-time high prices occur in CAISO, they are limited in duration and apply to small volume of net demand.

  - Very high level of forward procurement by major LSEs pursuant to state utility commission policies.

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EIM market design: LMPM

- Mitigates bids within EIM BAA that can relieve congestion on a constraint within same EIM BAA deemed to be structurally non-competitive.

- Bids mitigated to levels reflecting marginal operating costs (or future opportunity costs for limited energy resources).

- No local capacity or must-offer requirements
  - In CAISO, state's resource adequacy (RA) program ensures that capacity is procured to meet local capacity requirements for key transmission constrained areas.

  - RA units have must-offer obligation in market, which ensure they are subject to LMPM provisions.

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EIM market design: Other features/expectations

- CAISO expects that EIM entities will submit base schedules with sufficient generation to met load forecast.

  – Load underscheduling penalty applied only if scheduled load deviates from actual load by more than 5%.

- EIM entities required to submit supply bids to meet ramping energy requirement designed to cover:

  – Load forecast uncertainty (of base schedule only)

  – Variable energy fluctuations

  – Other sources of within hour ramping energy

- CAISO expects LSE's in PACI EIM to be hedged for all or most of real-time energy needs.

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So what is EIM designed to be?

- Relatively small real-time market (in volume as % of total load) that is designed to:

  - Meet small amounts of net demand from uncontrollable load and supply deviations.

  - Meet supply/demand deviations through economic dispatch

  - Facilitate economic exchanges between suppliers.

- EIM should not be viewed as:

  - Market in which LSEs/generators/marketers can/should rely on to buy/sell significant volume of energy.

  - Market that should have major impact on price formation in forward or daily regional prices.

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LMPM Overview

- Pre-market run made each 15-minutes (~37 minutes prior to real-time market) using market bids (unmitigated)

- If congestion occurs in this pre-market run, *dynamic path assessment* is performed to determine if supply that can relieve congestion on constraint is structurally competitive (3-pivotal supplier test).

- If constraint is deemed uncompetitive, bids for resources that can relieve congestion are subject to mitigation.

- Bids mitigated to levels reflecting marginal operating costs (or future opportunity costs for limited energy resources).

- Real-time market is then run with mitigated bids.

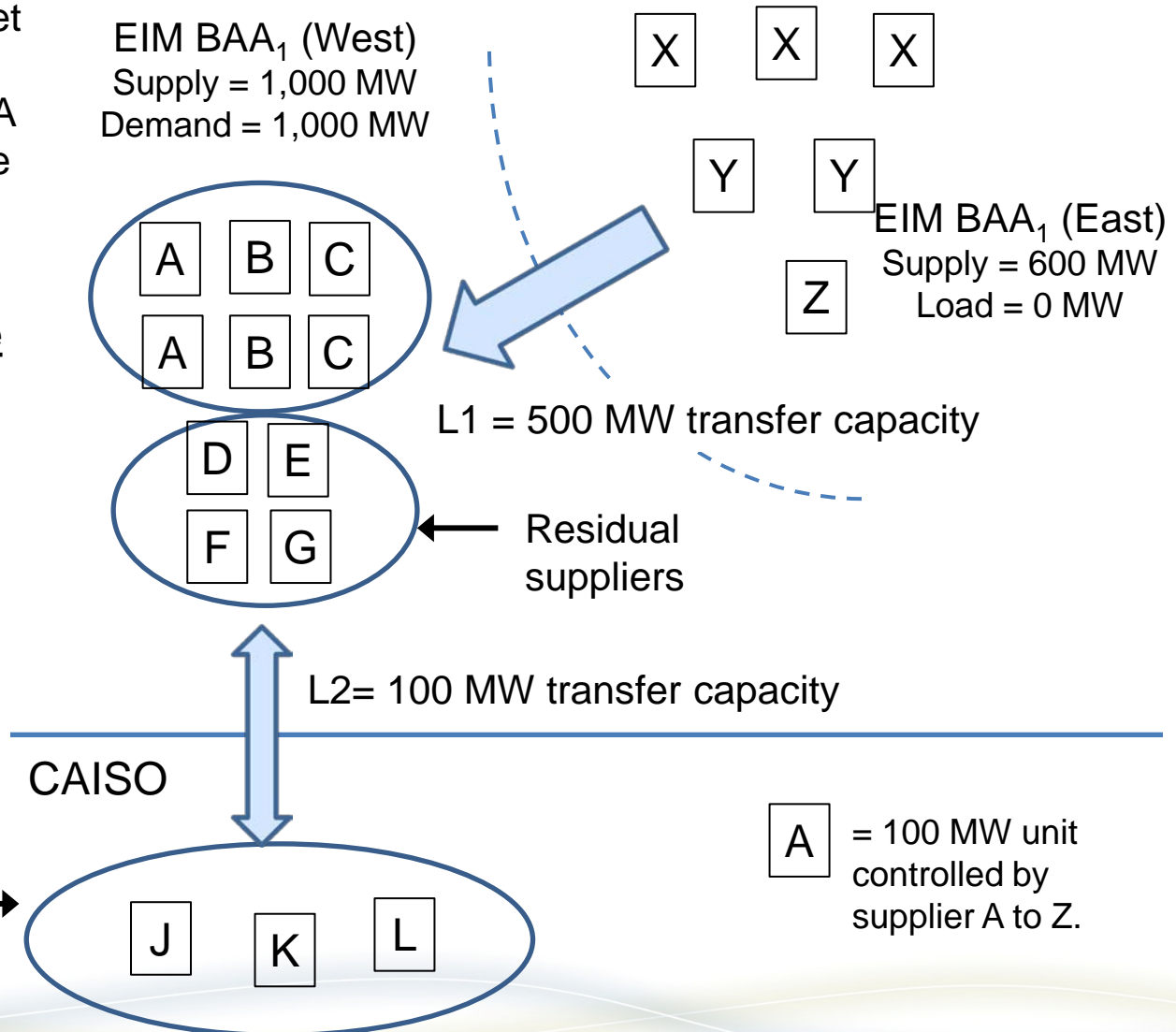California ISO
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Proposal for LMPM with EIM

- Limited modifications made in LMPM for EIM vs. current approach employed in CAISO

    - Apply LMPM separately for CAISO and each EIM BAA.

    - Treat all EIM entities as *net sellers*
        - Potential net buyers not excluded from 3 pivotal supplier test.

    - No changes in default energy bid (DEB) options and requirements

- No local capacity requirements or must-offer obligation.

- Interties between ISO and EIM BAAs not tested for competiveness.

    - Reflects assumption that each EIM BAA is sufficiently competitive overall absent local congestion.

Scenario 1: dynamic path assessment

1. Pre-market run using market bids shows **500 **MW of counterflow from suppliers A through G needed to relieve congestion on L1.

2. L1 deemed **uncompetitive** since residual supply of counterflow < 500 MW (D + E + F + G = 400)

3. Bid mitigation applied to suppliers A to G.

Potential supply of counterflow in CAISO not included in pivotal supplier test, but could be dispatched in real-time to mitigate congestion.
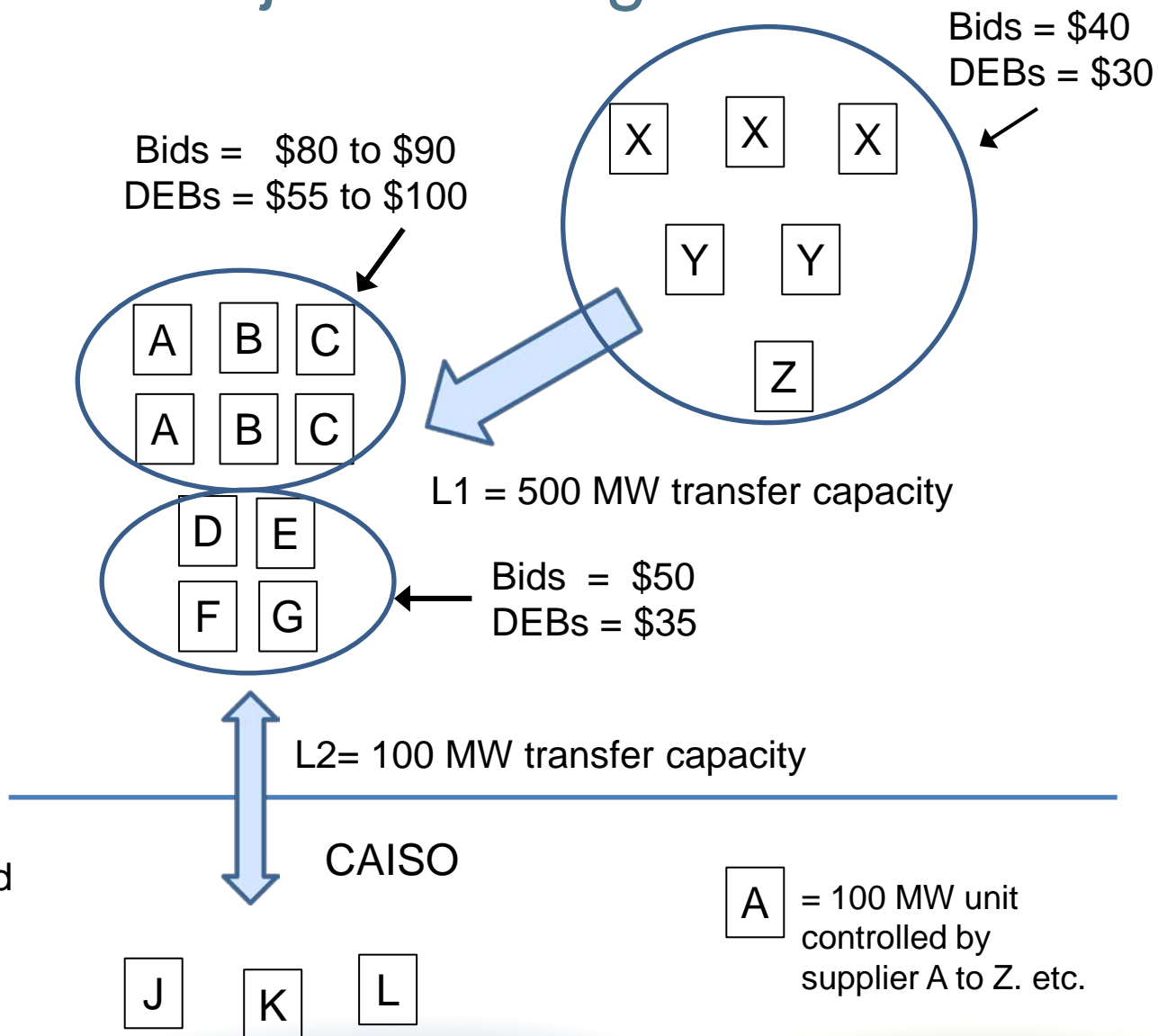
EIM BAA$_1$ (West)
Supply = 1,000 MW
Demand = 1,000 MW

X   X   X

Y   Y

EIM BAA$_1$ (East)
Supply = 600 MW
Load = 0 MW

Z

A   B   C

A   B   C

L1 = 500 MW transfer capacity

D   E

F   G

Residual suppliers

L2= 100 MW transfer capacity

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J   K   L

A = 100 MW unit controlled by supplier A to Z.

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Scenario 1: Bids subject to mitigation

1. Results of pre-market mitigation runs :

   - LMP on east side of L1 = $40.

   - LMP on west side of L1 = $80.

   - System marginal energy cost of $40 with shadow price of $40 on L1.

2. Suppliers A through G subject to bid mitigation.

3. $40 $SMEC_{CC}$ set by suppliers X, Y and Z used as floor in mitigating suppliers A through G.

Bids = $40
DEBs = $30

X   X   X

Y   Y

Z

Bids = $80 to $90
DEBs = $55 to $100

A   B   C

A   B   C

L1 = 500 MW transfer capacity

D   E

F   G

Bids = $50
DEBs = $35

L2= 100 MW transfer capacity

CAISO

J   K   L

A = 100 MW unit controlled by supplier A to Z. etc.

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Scenario 1: Bid mitigation

	Supplier A	Supplier B	Supplier C	Suppliers D, E, F and G
Market bid	$80	$90	$90	$50
DEB	$55	$90	$100	$35
$SMEC_{CC}$	$40	$40	$40	$40
Mitigated bid	$55	$90	$90	$40

Mitigated bid = Max[$SMEC_{CC}$, Min(DEB, Market bid)]

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Scenario 1: Bids before/after mitigation
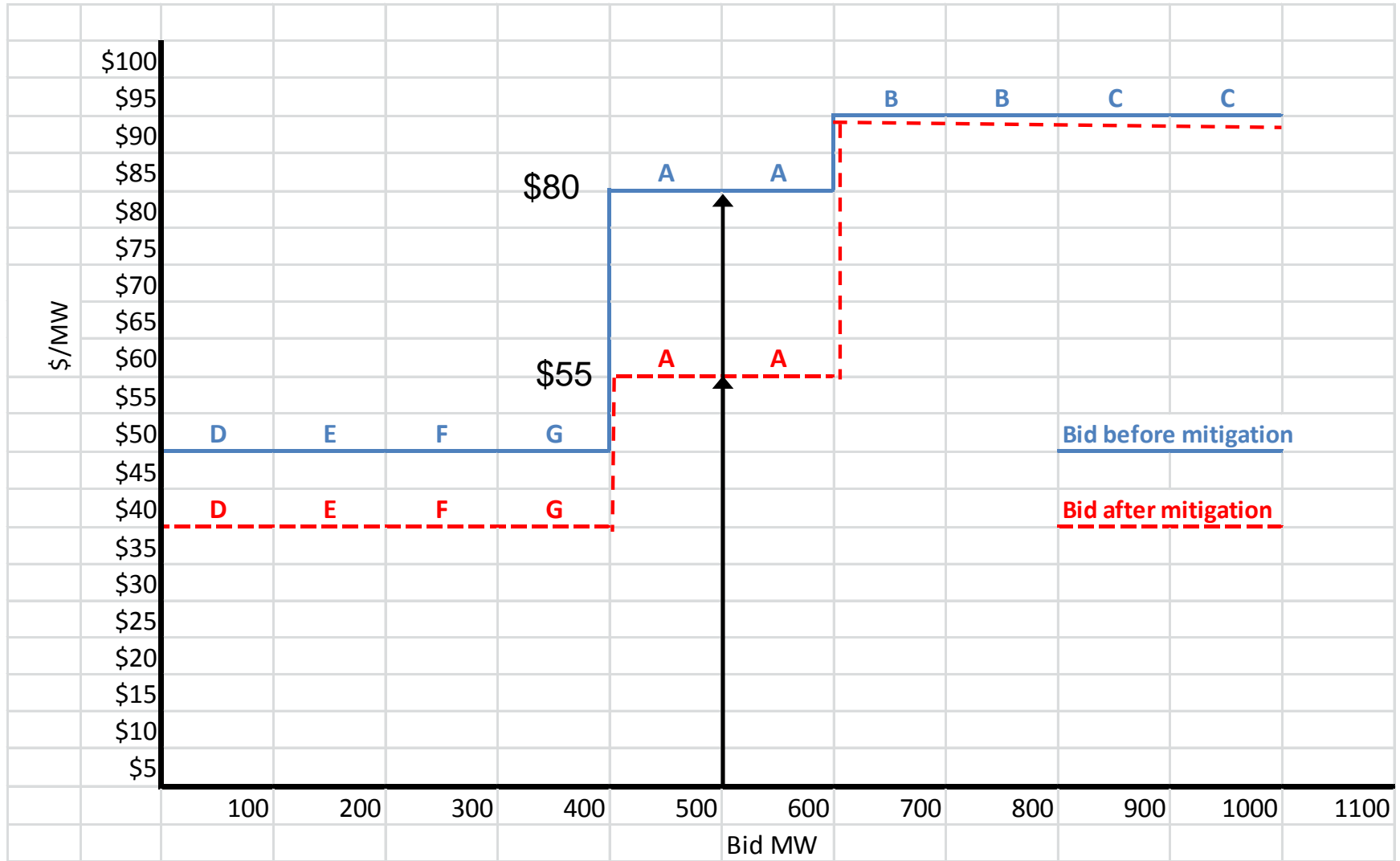
Selected EIM monitoring issues

- Base load/supply schedules
  - Resource sufficiency
  - Load underscheduling

- Local congestion within EIM
  - Insufficient participation by resources most effective in mitigating congestion.
  - Can be mitigated by out-of-market actions taken by EIM Entity
  - Can also be mitigated by rule change requiring offering of supply by resources needed to efficiently mitigate local congestion.

- Competiveness of overall EIM market prices
  - Market power at overall EIM BAA
  - Could be mitigated by rule change to extend LMPM to test competiveness of EIM BAA when congestion occurs into EIM BAA.

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