Local Market Power Mitigation Enhancements

Issue Paper/Straw Proposal

Working Group
October 10, 2018
10:00 am – 4:00 pm

Market Design Policy

Purpose of working group:

- Review flow reversal and economic displacement examples in more depth
  - Explore potential modifications to approach
- Review EIM use-limited default energy bid proposal
  - Discuss analysis supporting proposal
- Discuss stakeholder ideas for solutions to proposal elements

Agenda:

- **Morning (10:00 AM – 12:00 PM)**
  1. Review flow reversal & economic displacement examples
  2. Discuss potential proposal modifications
     - Stakeholder discussion
- **Afternoon (1:00 PM - 4:00 PM)**
  3. Review EIM use-limited DEB analysis
     - Issue/Straw Proposal information
     - New analysis (NOB)
     - Stakeholder discussion
  4. Review reference Level Adjustments
     - Stakeholder discussion

Issues for discussion (1 of 2)

- **Real-time market power mitigation process**
  - Flow reversal: mitigation results cause EIM BAAs to change from importing to exporting
    - Competitive LMP addresses broader market issue
  - Economic displacement: additional exports dispatched because of lowered mitigated price
    - EIM specific issue
- **Default energy bid for EIM use-limited resources**
  - Existing default energy bids may not accurately reflect opportunity costs for EIM use-limited resources

Issues for discussion (2 of 2)

- **Reference level adjustments**
  - Real-time gas volatility not always captured in reference level adjustment process
    - Broader market issue
  - Reference level adjustment process needed for new EIM use-limited default energy bid

Updated market design principle for market power mitigation, default energy bids, and reference level adjustments

- EIM is a voluntary market **but the design assumes sharing of ramping capability**. In cases of mitigation involving EIM transfers to another balancing authority area, supply should not be forced to sell energy at a mitigated price **beyond its ramping requirement used for the resource sufficiency test**.* The use of mitigated bids should not result in additional economic displacement of other supply

**This test assumes sharing because it includes diversity benefit*

Local Market Power Mitigation Enhancements

PROPOSALS

Summary of proposals

- Mitigation framework enhancements
  - Prevention of flow reversal (i.e. changes to competitive LMP)
  - Prevention of economic displacement between mitigated BAAs
- EIM use-limited default energy bid
- Reference level adjustments
  - Gas resources
  - EIM use-limited default energy bid

Mitigation framework enhancements: Prevention of Flow Reversal

- Flow reversal: mitigation results cause EIM BAAs to change from importing to exporting at mitigated bid price
  - MPM is triggered when import constraint is binding
  - To protect native imbalances from market power offer prices are replaced with mitigated bids
  - These mitigated bids are not solely used to serve native imbalance which can result in a decrease in imports and even changing directions to an export
  - Import constraint is no longer binding, which triggered mitigation in the first place
  - Selling to other BAAs only because mitigated bids were used in market

CAISO proposes to calculate the competitive locational marginal price for each market run

- This addresses flow reversal because if the import BAA's bids are mitigated to the higher of the competitive LMP or DEB, it will not be economic to serve load outside of the import BAA
- Current rules prevent accurate use of the competitive locational marginal price, so:
  - Eliminate the balance of the hour mitigation rules in fifteen-minute market for more accurate unit commitment
  - Eliminate rule that if mitigated in FMM, mitigated in RTD
  - Eliminate the rule that if mitigated in the first or second 5-minute interval that the remaining 5-minute interval(s) in the given 15-minute interval is mitigated

Competitive locational marginal price adder

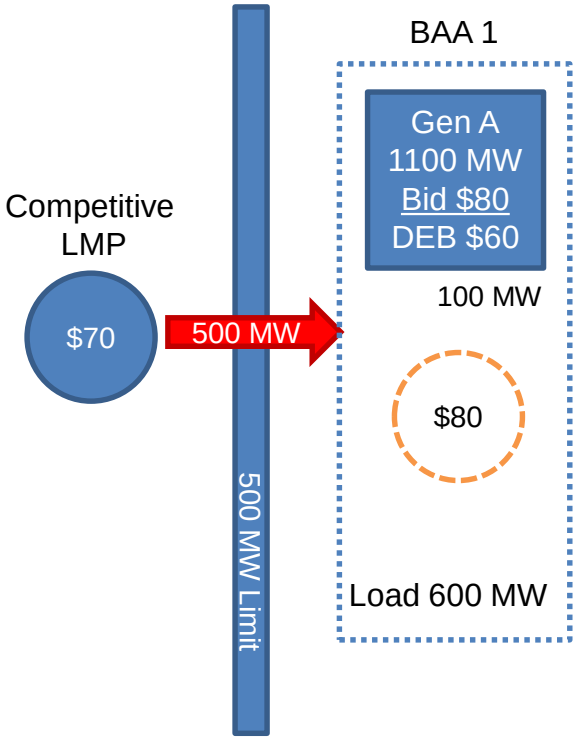
- To alleviate concerns that dispatch order changes could occur, the CAISO is proposing implementing a nominal parameter to the mitigated bid calculation
- Ensures price separation between competitive and noncompetitive areas

Following examples illustrate implementation results of incorporating this rule into the mitigation framework

- Current:
  - Competitive LMP can only decrease if previously mitigated
  - Mitigated bid = MAX (DEB, Competitive LMP)
- Proposed:
  - Competitive LMP will be recalculated in each market interval
  - Mitigated bid = MAX (DEB, Competitive LMP + $0.xx parameter)

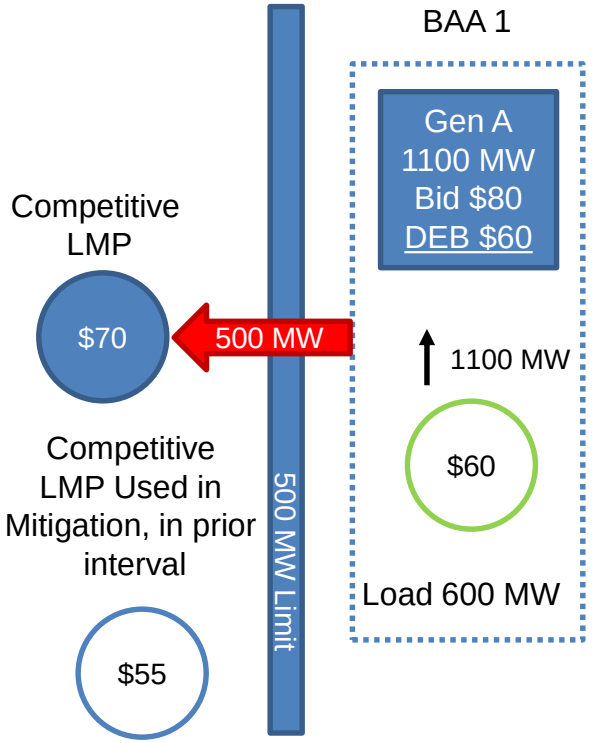
Example A: Reset competitive LMP to prevent flow reversal

Current MPM Run



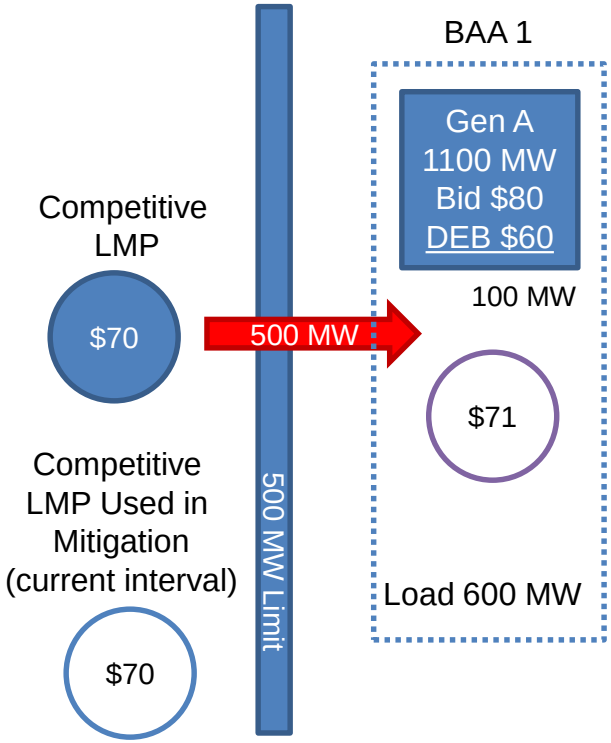
Unmitigated price: $80

Current Market Run



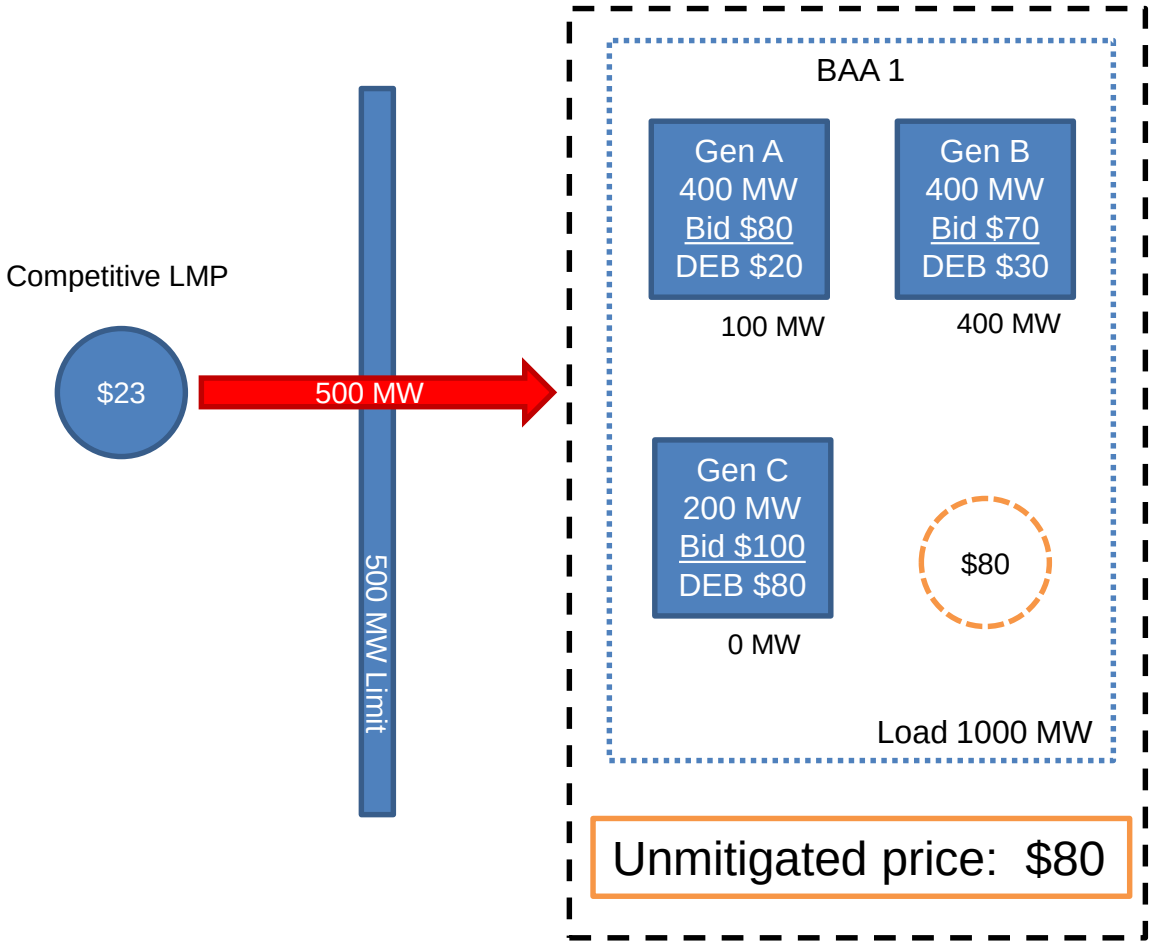
Mitigated price **results in flow reversal**: $60

Proposed Market Run

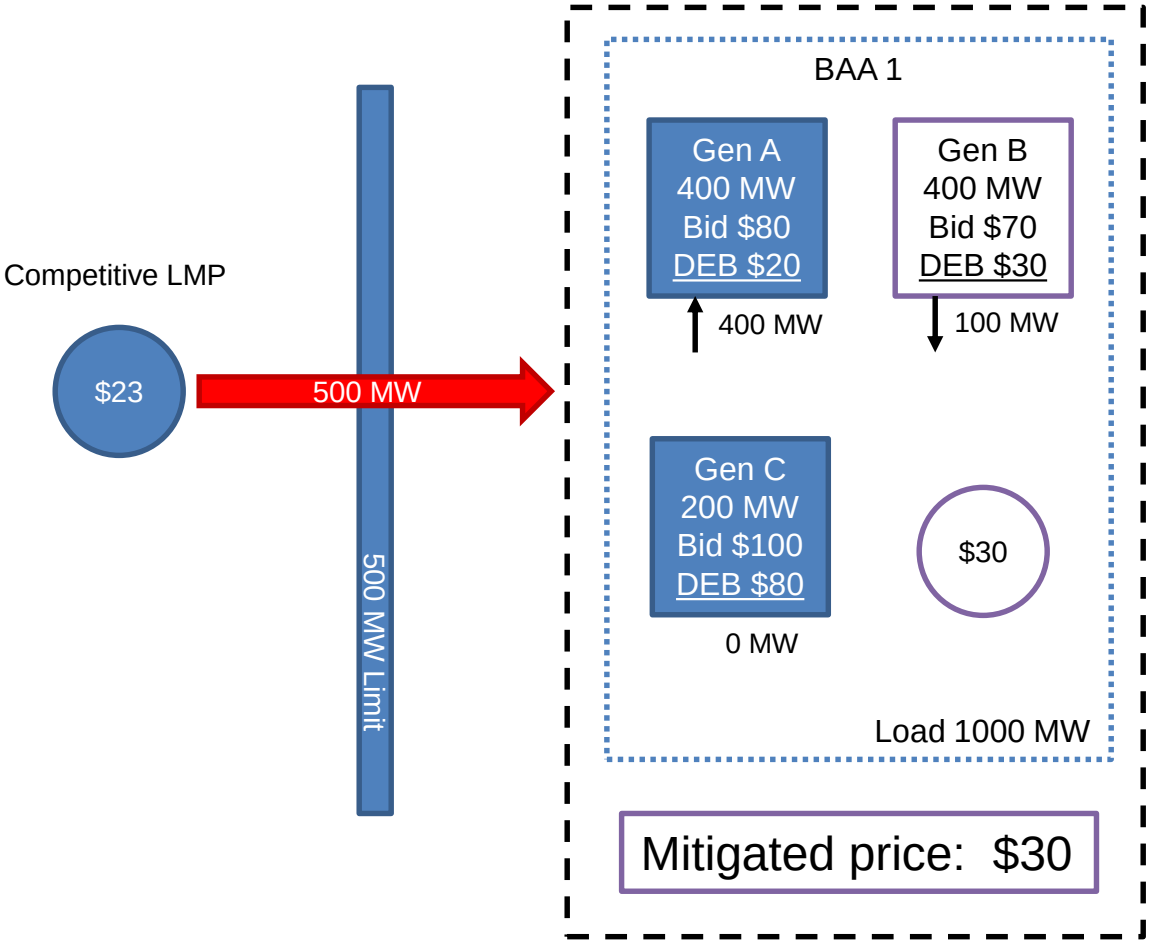


Mitigated price **with reset competitive LMP and nominal adder**: $71

Example B: Flow reversal with multiple generators - MPM Run (1 of 2)



Example B: Flow reversal with multiple generators - Market Run (2 of 2)

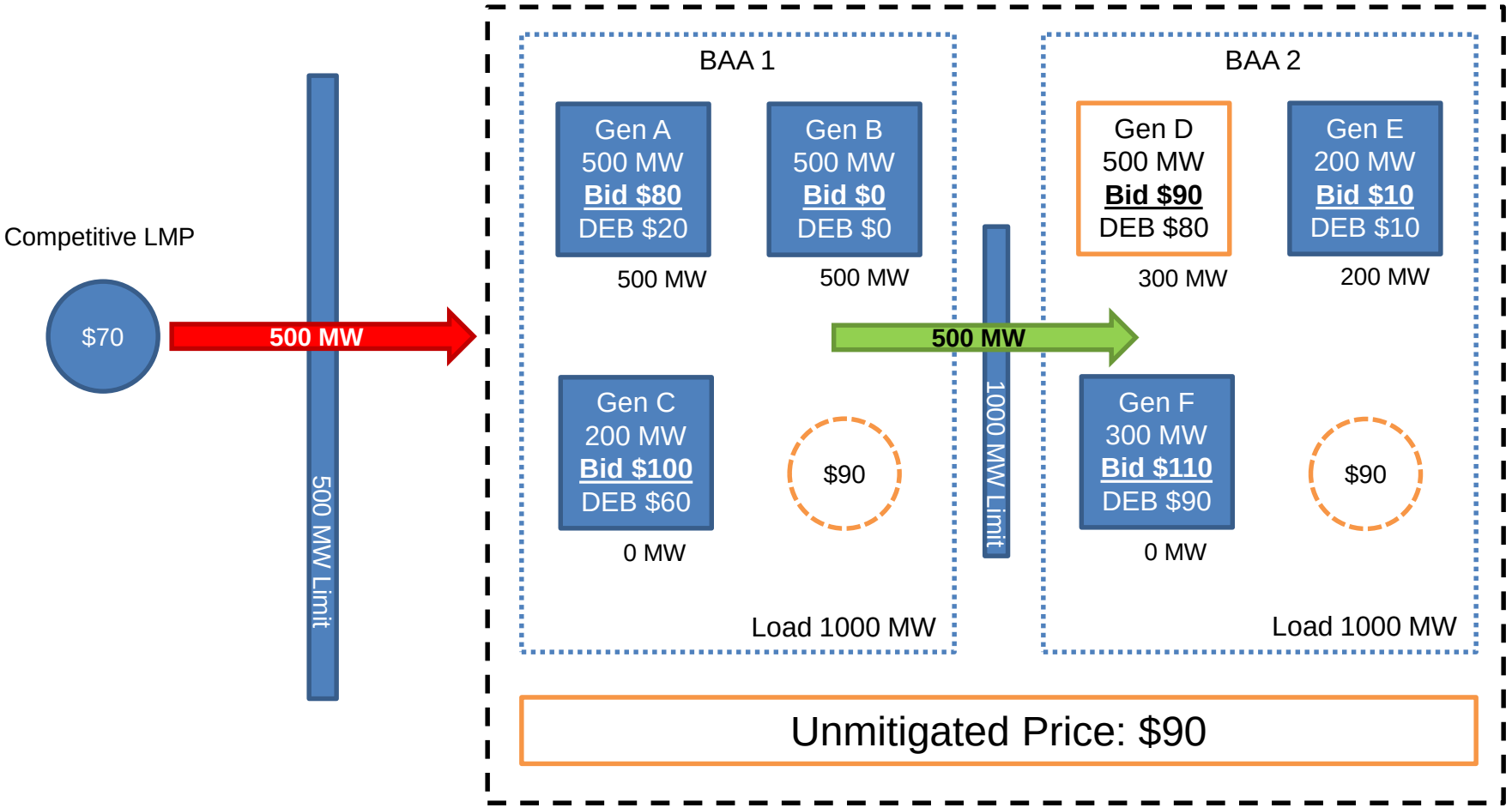


Economic Displacement – Straw Proposal

- Two or more EIM BAAs in an import-constrained bubble will trigger mitigation
- Currently, mitigated bids may result in exports that increase, or imports that decrease beyond quantities necessary to prevent the exercise of market power within the bubble

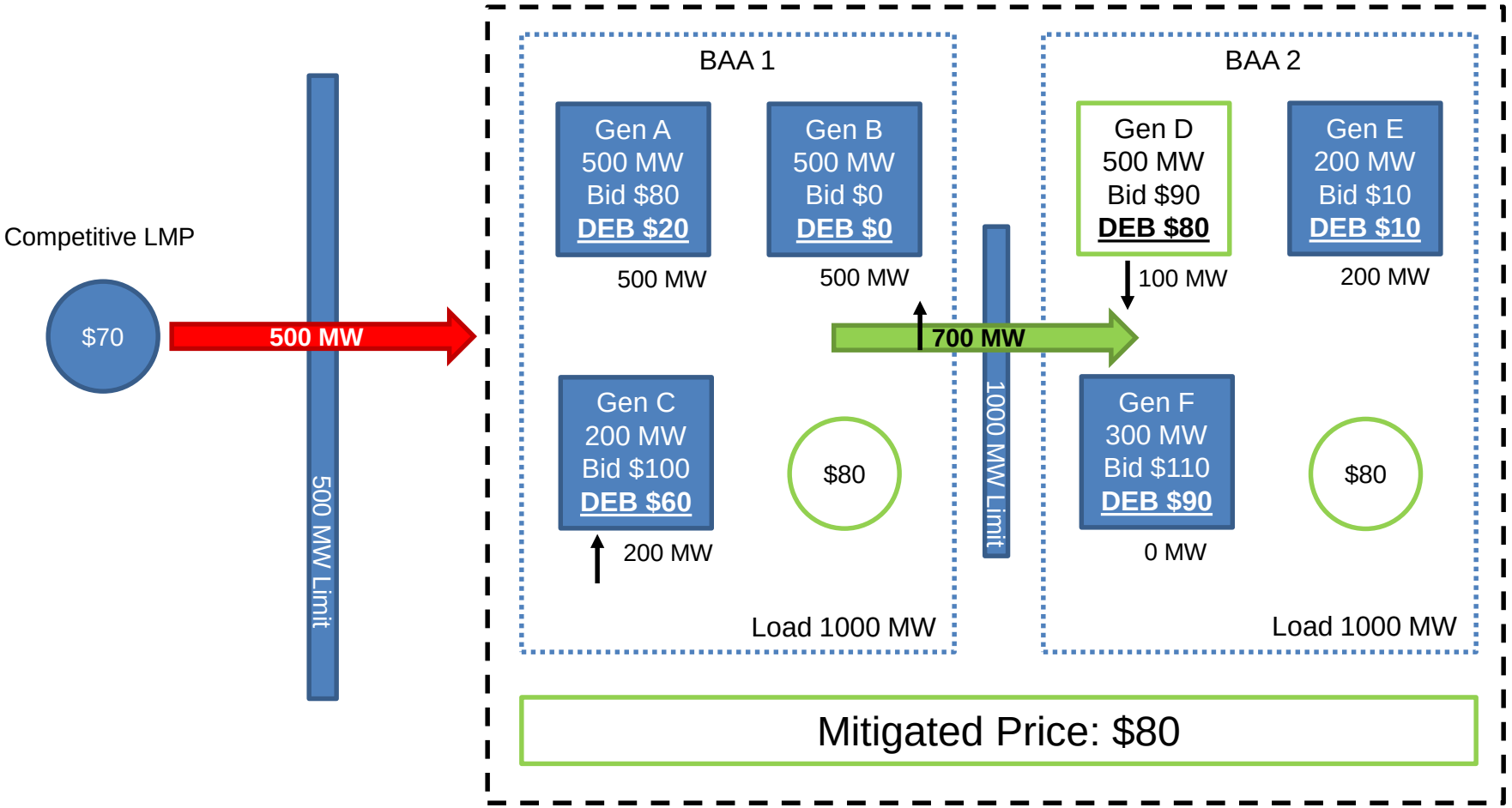
Example C (1 of 3): Current MPM Run

BAA1 exporting to BAA 2



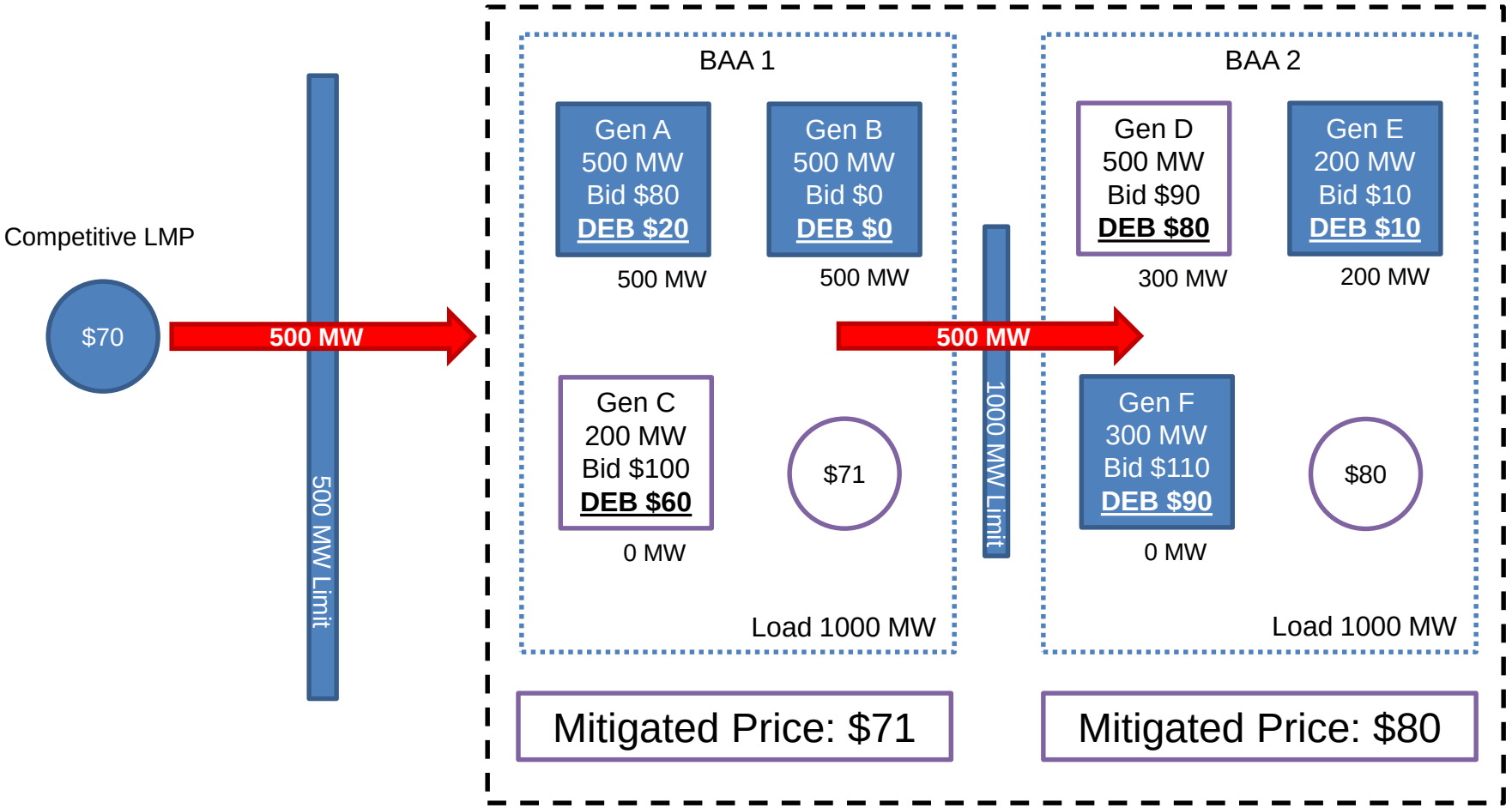
Example C (2 of 3): Current Market Run

Mitigation results: Gen C dispatched up 200 MW to serve BAA 2's load



Example C (3 of 3): Proposed Market Run

Straw Proposal rule: set exports from BAA1 to pre-mitigation schedule



Economic Displacement – proposed modification following MSC meeting with updated design principle

- EIM is a voluntary market **but the design assumes sharing of ramping capability**. In cases of mitigation involving EIM transfers to another balancing authority area, supply should not be forced to sell energy at a mitigated price **beyond its ramping requirement used for the resource sufficiency test**.* The use of mitigated bids should not result in additional economic displacement of other supply.

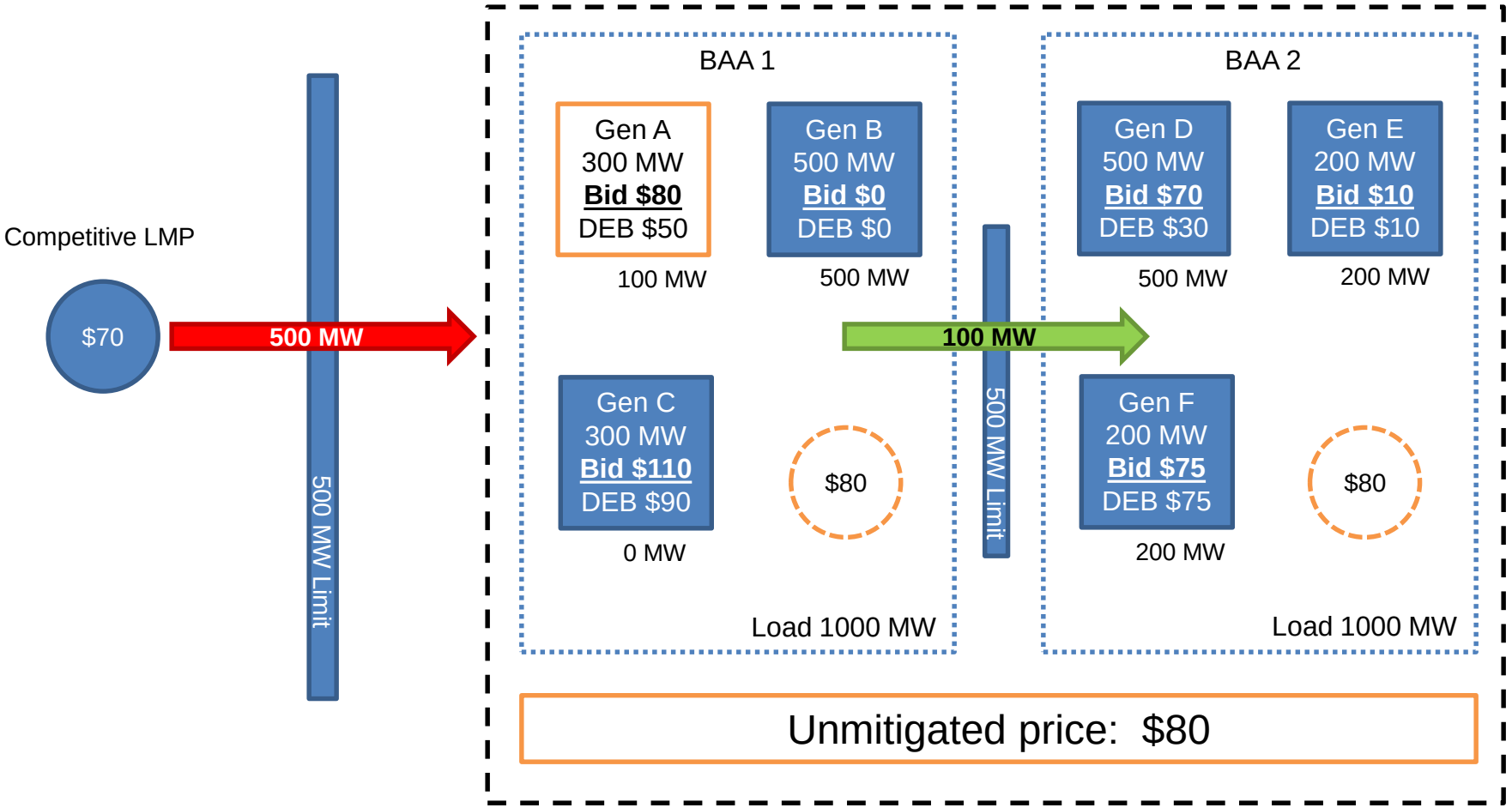
**This test assumes sharing because it includes diversity benefit*

Economic Displacement – proposed modification following MSC meeting

- To recognize the diversity (flexibility) benefits created from participation in EIM, the CAISO proposes limiting transfers between BAAs to the greater of:
  - Flexible ramping upward requirement, less the exporting BAA's imbalance; or
  - Pre-mitigation (MPM) exports

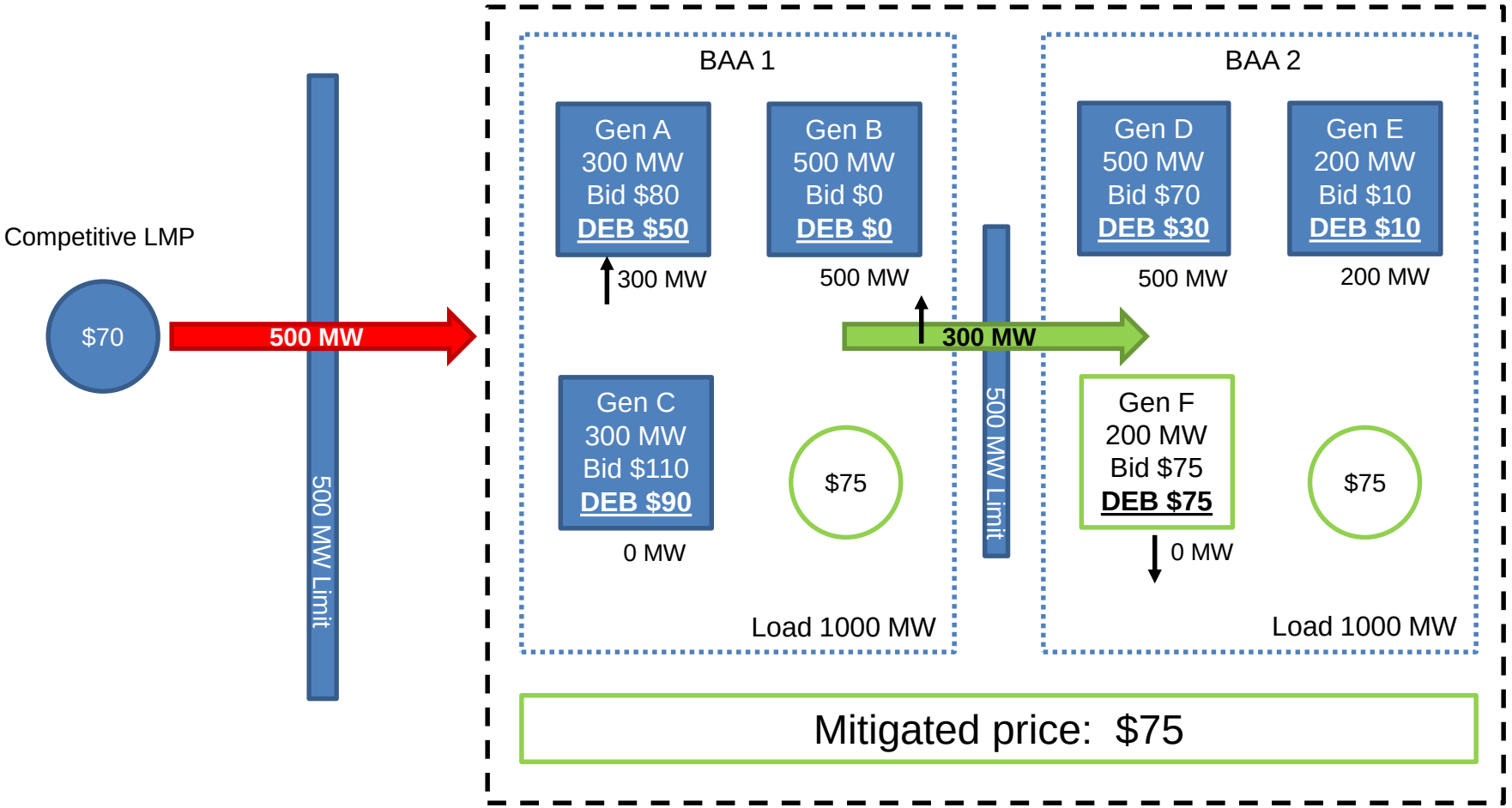
Example D (1 of 3): Current MPM Run

BAA1 exporting to BAA 2



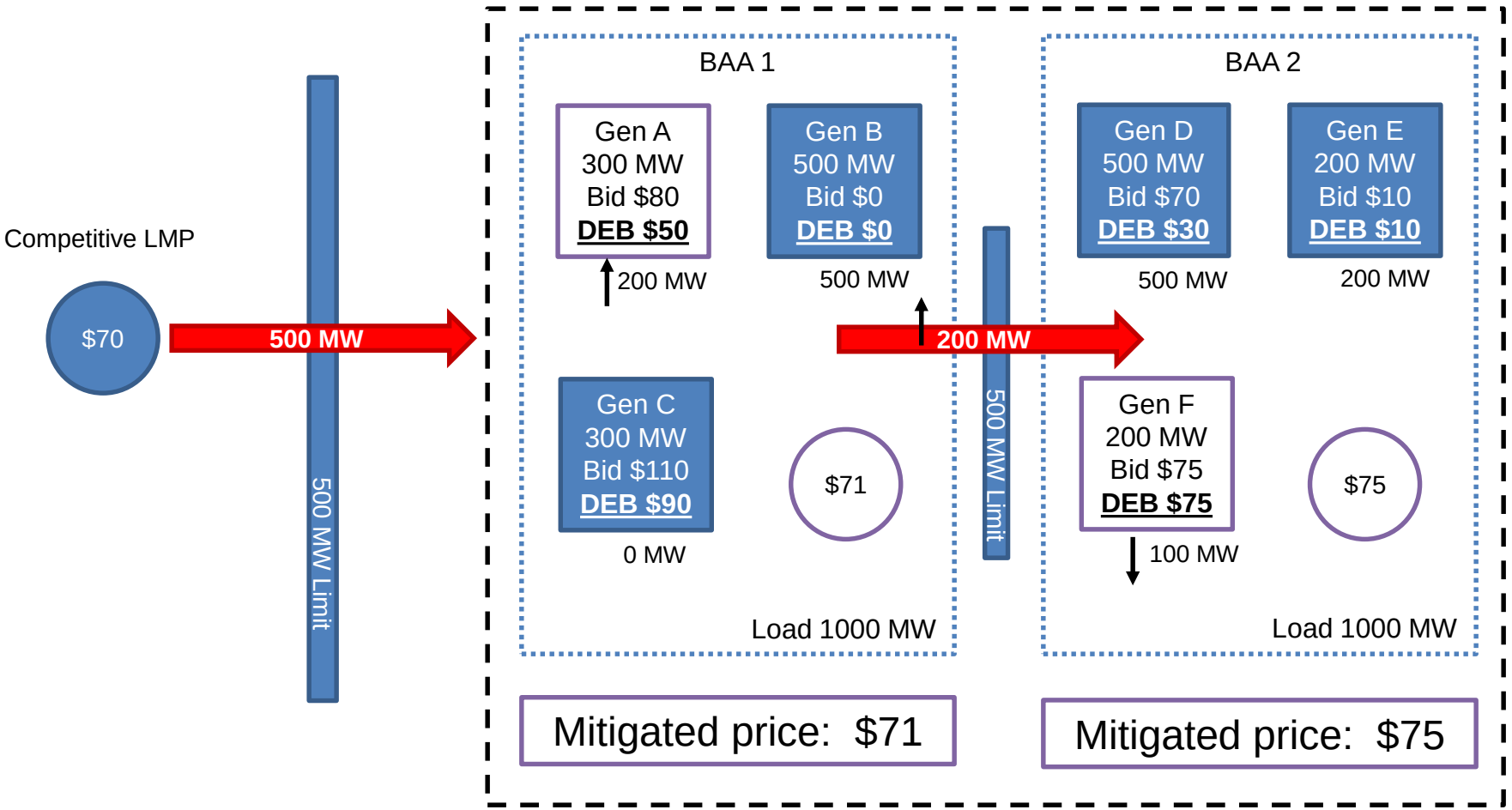
Example D (2 of 3): Current Market Run

Mitigation results: Gen A dispatched up to 300 MW to serve BAA 2's load



Example D (3 of 3): Proposed Market Run

*Set exports from BAA1 to greater of **FRU-imbalance (200 MW)**, or pre-mitigation schedule (100 MW)*



Local Market Power Mitigation Enhancements

EIM USE-LIMITED DEFAULT ENERGY BID

EIM use-limited default energy bid recognizes circumstances of EIM resources

- Proposal allows for EIM use-limited resources DEB calculation to include:
  - Opportunities to sell energy outside of the EIM, in bilateral markets
  - Opportunities to sell energy in the future according to storage availability
- Used as an alternative to existing DEB options to better approximate opportunity costs for EIM market participants

EIM use-limited default energy bid proposal

$$MAX\ (DA\ Peak\ Index, MA\ Index_{+1}, MA\ Index_{+2}, \ldots, MA\ Index_{+N}) \times 1.10$$

- These components represent short- and long-term horizons:
  - *DA Peak Index* – Day-ahead (DA) peak price at a specific trading hub
  - *MA Index* – Month-ahead (MA) price at a trading hub for the successive month *m* after the current month
  - *N* – The number of months of storage capability that the use-limited resource has available
- MAX used to reflect opportunity cost of generating energy today, at the highest price that energy could be sold in the future
- Peak hourly electricity prices published by an index

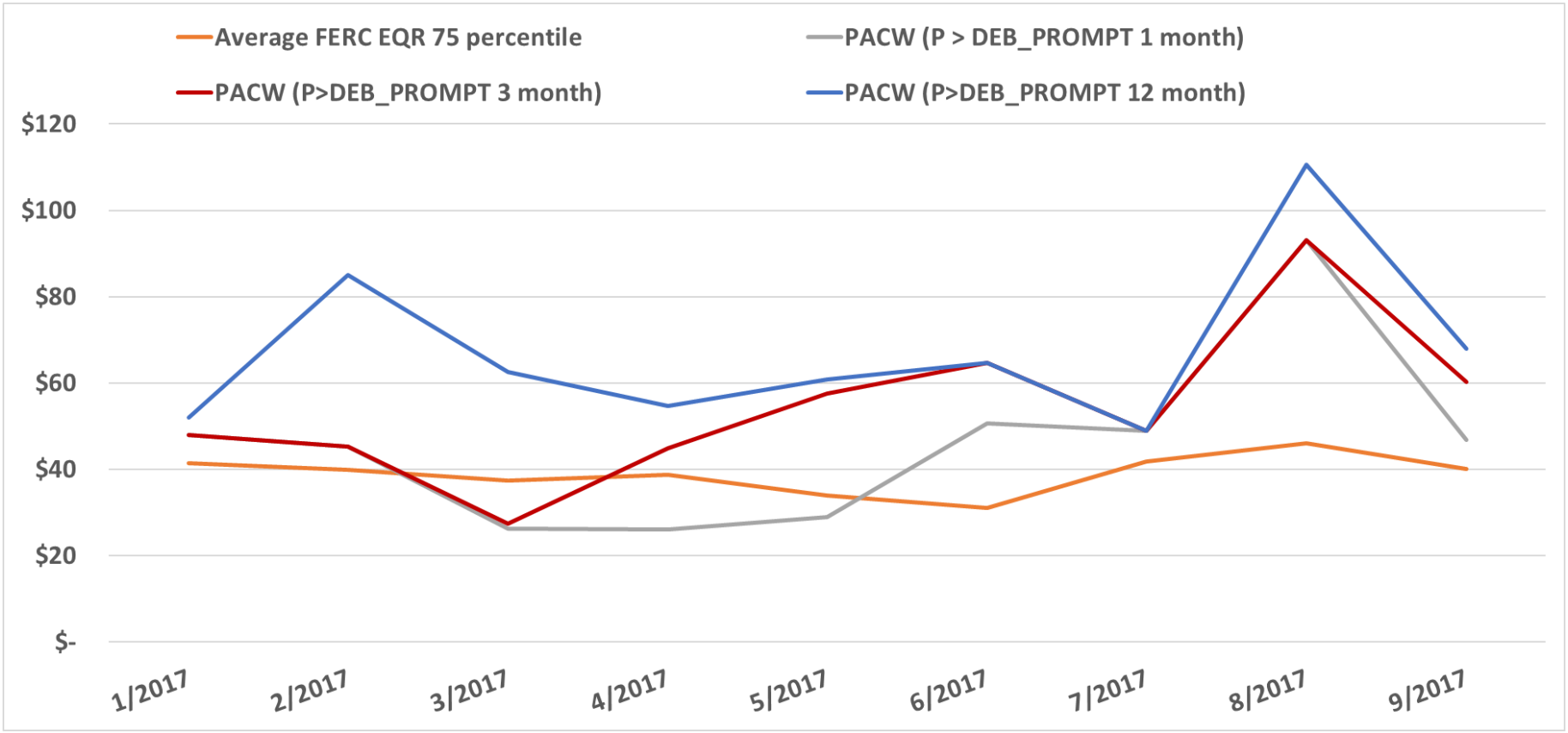
Day-ahead peak index term in EIM use-limited default energy bid

- What does it represent?
  - Opportunity cost due to daily limitations?
  - Additional term in formula to capture when current prices are greater than monthly future prices due to inaccuracy in future prices?

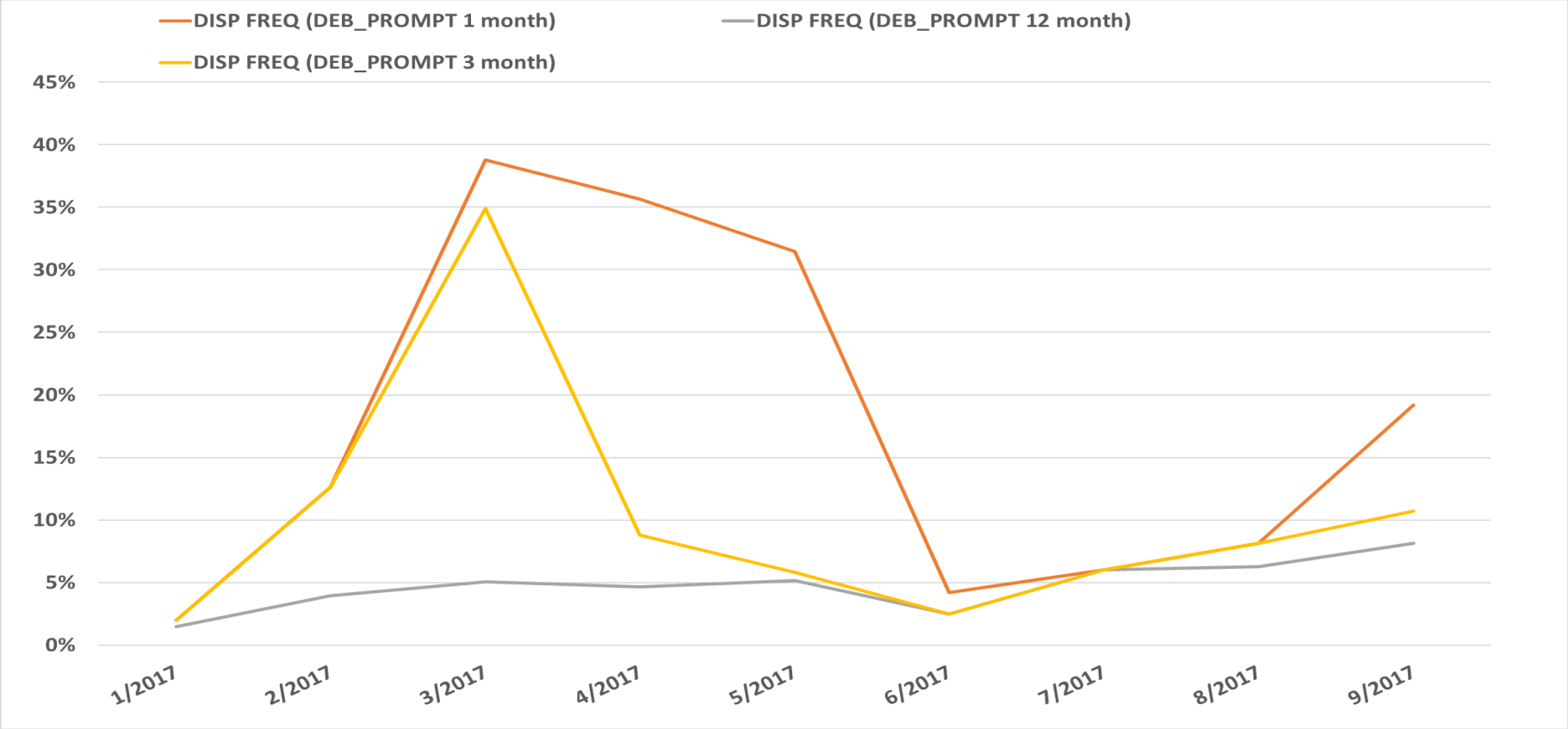
CAISO analysis:

- October 2016 – September 2017
  - Reviewed historic bilateral prices at Mid-Columbia (Mid-C)
  - Compared values to actual locational prices to EIM prices over same time interval at PACW
- Assumed resources were bidding at default energy bids and received market revenues during those intervals
  - Compared results to EQR data for BC Hydro

Average monthly dispatched (PACW) prices compared to EQR transactions



Percentage of intervals dispatched at PACW prices



Counterfactual comparing DEB dispatch to optimal

Date	Frequency Dispatched (12 month storage)	Optimal Price to Operate	Optimal Dispatch Pct
Jan-17	10%	$35.64	90%
Feb-17	6%	$36.63	95%
Mar-17	6%	$33.31	97%
Apr-17	6%	$34.68	98%
May-17	5%	$35.26	97%
Jun-17	2%	$34.11	100%
Jul-17	6%	$38.89	76%
Aug-17	7%	$45.85	54%
Sep-17	11%	$41.06	58%

This analysis shows the following

- Resources with more storage have higher DEBs and are dispatched less frequently
- Generally resources bidding in at these default energy bids receive revenues greater than the 75th percentile of observed FERC electric quarterly report data
- Resources with little storage may be dispatched “too frequently” during summer months
- Resources may opt for this DEB option, an ISO opportunity cost DEB, or a negotiated DEB
- Reference level adjustment process allows for updates when real-time electricity prices spike

Local Power Market Power Mitigation Enhancements

REFERENCE LEVEL ADJUSTMENTS

Commitment Costs and Default Energy Bid Enhancements policy established reference level adjustment process

- CAISO reference levels based on published price information may not always be accurate
  - Suppliers request a before-the-market adjustment to reference level
- Supplier's actual costs must be more than CAISO calculated reference level
  - Retain sufficient justification supporting the need for a reference level adjustment request
- Bidding up to a supplier's reasonableness threshold is not a safe harbor and reference level adjustment requests must be based on actual costs

Reference level adjustments – gas resources proposal

- Recent gas market events, CAISO reconsidered treatment of real-time gas price volatility in reference level adjustment process
- A supplier may request a manual consultation if reference level request exceeds the automated reasonableness threshold
- CAISO to review requested amount, documentation, and observed same-day gas trading information available on trading platform
  - Approve reference level adjustment if requested amount appears to reflect current costs
  - May automatically adjust reasonableness threshold for gas region if costs apply to other resources

Reference level adjustments – EIM use-limited resources proposal

- Day-ahead price index may not reflect actual real-time electricity prices for short-term limitations
  - Adjustments to reference level may be made to the day-ahead energy component of equation

$$MAX\ (DA\ PEAK\ INDEX, MA\ INDEX, MA\ INDEX_{+2}, \dots, MA\ INDEX_{+N}) \times 1.10$$

- Resources must demonstrate the sale of real-time energy prices is greater than day-ahead index prices
  - Real-time ICE trading information or bilateral offers to buy electricity
- Reasonableness threshold amount to be determined based on analysis examining the historical variation of index prices and hourly bilateral prices

Local Market Power Mitigation Enhancements

NEXT STEPS

EIM Governing Body Classification

- The following proposals fall within the EIM Governing Body's primary approval authority:
  - Freeze transfer quantities from mitigation schedule run between EIM BAAs areas
  - EIM use-limited resources default energy bid
- The following proposals fall within the EIM Governing Body's advisory role:
  - Recalculation of competitive locational marginal price
  - Reference level adjustment process
  - Gas price indices

Proposed Initiative Schedule

Milestone	Date
Stakeholder Working Group Meeting	October 10, 2018
Stakeholder Written Comments Due	October 17, 2018
Post 2nd Revised Straw Proposal	October 31, 2018
Stakeholder Call	November 8, 2018
Stakeholder Written Comments Due	November 29, 2018
Post Draft Final Proposal	December 21, 2018
Stakeholder Call	January 3, 2019
Stakeholder Written Comments Due	January 10, 2019
EIM Governing Body Meeting	March 12, 2019
Board of Governors Meeting	March 27-28, 2019

Please provide supplemental comments to Issue/Paper Straw Proposal comments by October 17, 2018 to initaitivecomments@caiso.com