



Incorporating Bid-in Demand into Local Market Power Mitigation

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CAISO is initiating process to modify LMPM to be based on bid-in demand.

- Current LMPM process is based on forecasted demand (combined with physical supply bids only)
 - ISO to maintain current approach when virtual bidding is implemented in February 2011
- FERC has ordered the ISO to move to an LMPM process using bid-in demand no later than April 2012.
- CAISO timeline
 - Kick-off stakeholder process - July 2010
 - Final proposal - October 2010
 - Board decision - December 2010
- CAISO requesting MSC opinion in advance of December 2010 Board meeting.

Previous DMM whitepapers and presentations

- *DMM Comments and Recommendations on Convergence Bidding Design Options*, presentation at August 10, 2007 MSC Meeting. <http://www.caiso.com/1c33/1c33cc343d230.pdf>
- *Attachment A: Examples of Convergence Bidding and Local Market Power Mitigation* (November 2007). <http://www.caiso.com/1c8f/1c8ff4236e8e0.pdf>
- *Local Market Power Mitigation Under Convergence Bidding*, presentation at September 18, 2009 MSC Meeting, <http://www.caiso.com/242c/242cd8d664c30.pdf>
- *Local Market Power Mitigation Options Under Convergence Bidding*, DMM whitepaper, October 2, 2009, <http://www.caiso.com/243b/243bebe3228c0.pdf>
- *Illustrative Examples of Alternative Local Market Power Mitigation*, DMM whitepaper, October 6, 2009, <http://www.caiso.com/243f/243fce76bf30.pdf>
- *Local Market Power Mitigation Under Convergence Bidding*, presentation at October 9, 2009 MSC Meeting, <http://www.caiso.com/2441/2441e8fc28e10.pdf>

Several options for incorporating bid-in demand were considered in the 2009 convergence bidding stakeholder process.

	Forecast Load	Physical Load Bids	Physical Supply Bids	Virtual Load Bids	Virtual Supply Bids
Current LMPM*	✓		✓		
Use all bids – no change to LMPM		✓	✓	✓	✓
Exclude virtual supply		✓	✓	✓	
Use all bids – Protect CC schedules and use DEBs in AC run.		✓	✓	✓	✓

* ISO opted to maintain current approach when convergence bidding is implemented in February 2011.

Problems with several options were identified in prior convergence bidding stakeholder process.

- Use all bids – No change to LMPM
 - Con:
 - Virtual supply cannot be mitigated, but may displace physical supply with higher bid (but lower DEB) in LMPM process.

- Exclude virtual supply
 - Pro:
 - Would ensure sufficient physical supply mitigated to meet IFM demand (physical + virtual)
 - Con:
 - High demand (physical + virtual) would raise bid prices accepted in CC run above competitive levels actually needed to meet market demand.
 - Highest bid accepted from each unit in CC forms floor in bid mitigation process

DMM proposal for incorporating all bid-in demand and virtual supply bids into LMPM.

- Competitive Constraints (CC) run:
 - Includes all supply and demand bids (unmitigated)
 - Includes PDR and virtual supply/demand
- All Constraints (AC) run:
 - CC run schedules “protected” with negative price-taker bids
 - Bid segments above CC schedules mitigated using current LMPM procedures.
 - Highest accepted bid in CC run used as “floor” for mitigated bid used in AC run
- Final Market Clearing:
 - Mitigated bids only used for resources with AC dispatch > CC dispatch

Base Case Example – CC Run

This base case example illustrates how virtual supply bids may undermine LMPM if included in current LMPM procedures.

Fig. 1: Local Constrained Area

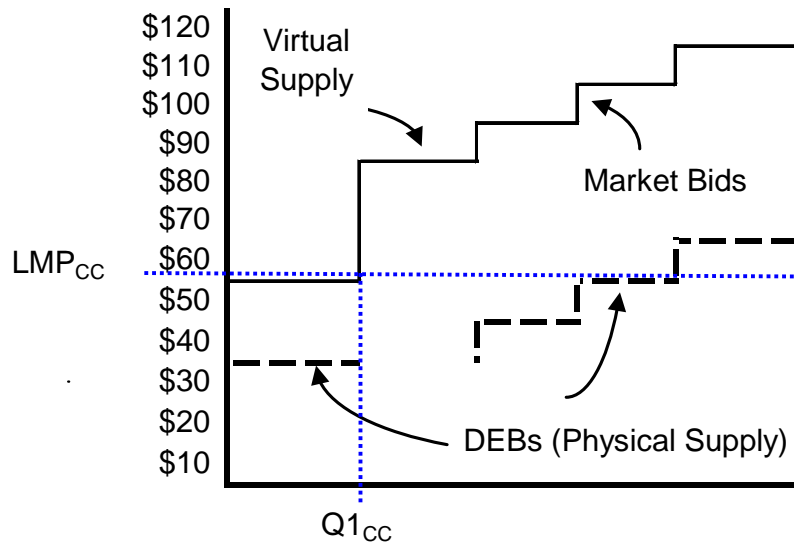
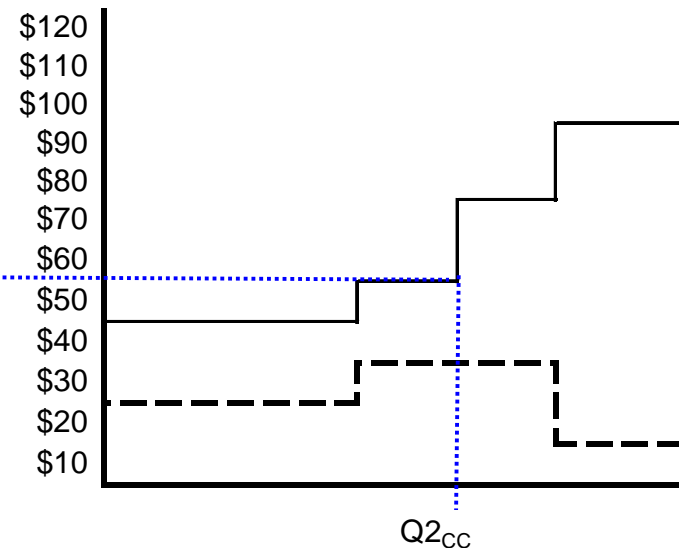


Fig. 2: Rest of System (Unconstrained)



Base Case Example – AC Run

Fig. 3: Local Constrained Area

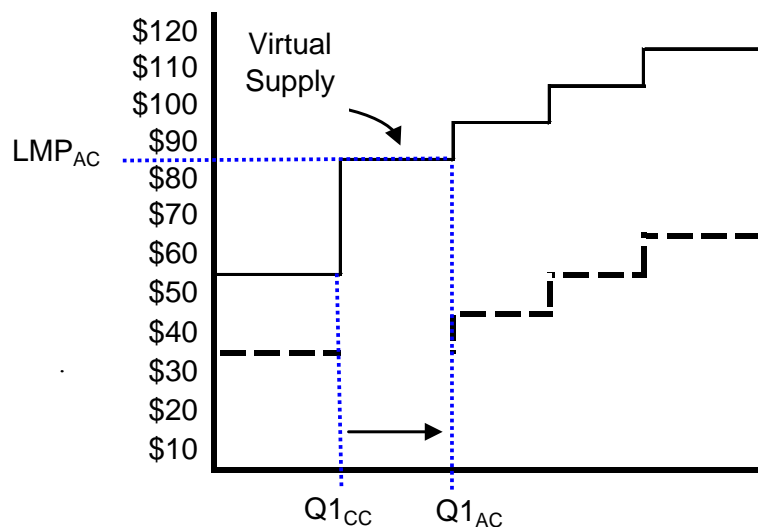
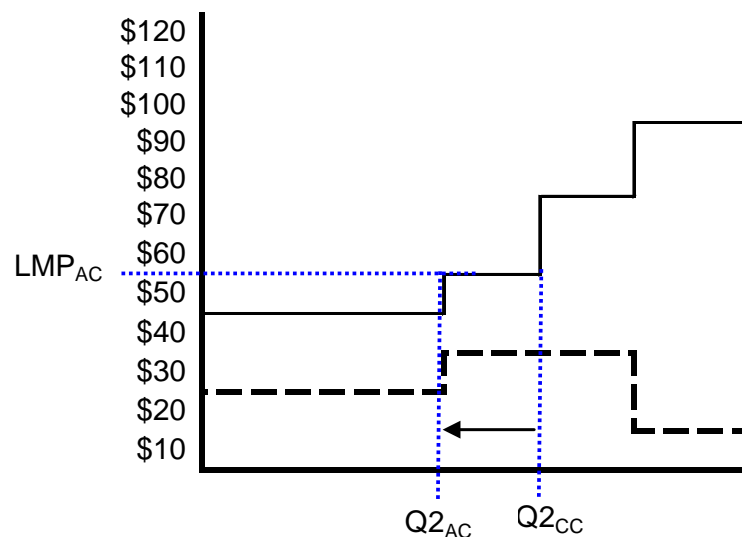


Fig. 4: Rest of System (Unconstrained)



- In AC run, non-competitive constraints are also enforced.
- Market is cleared using unmitigated bids.
- In this example, the relatively high priced virtual supply bid in local constrained area is dispatched in AC run to mitigate congestion on uncompetitive paths.
- Other physical units with high market bids (but relatively low DEBs) are not dispatched in AC run and therefore not subject to bid mitigation.

Base Case Example – Market Result

Fig. 5: Local Constrained Area

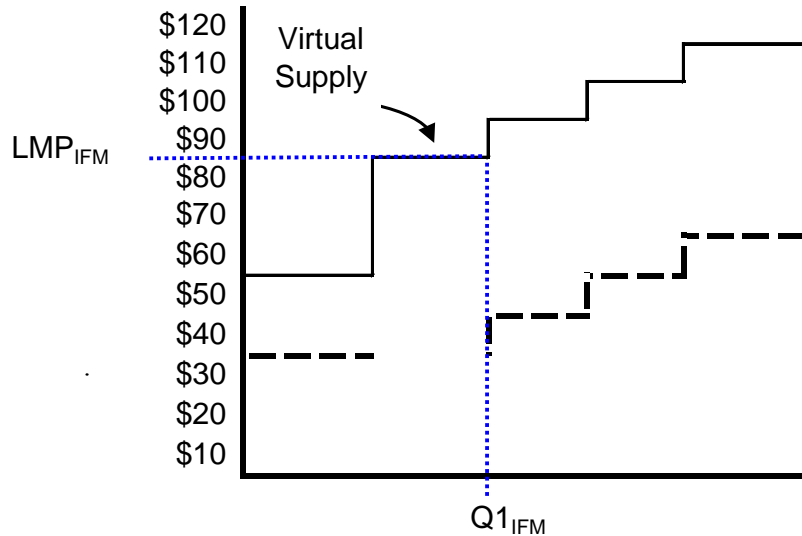
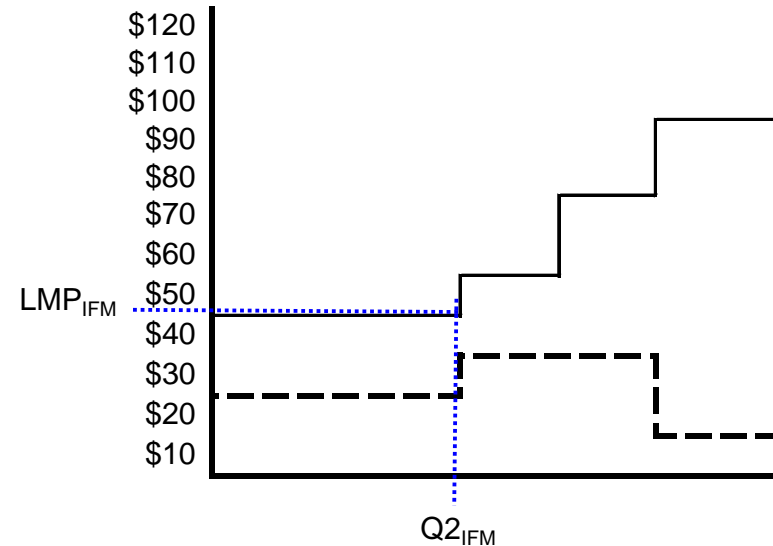


Fig. 6: Rest of System (Unconstrained)



- In IFM, the relatively high priced (unmitigated) virtual supply bid sets LPM in local constrained area.

DEB-based LMPM – CC Run

Fig. 7: Local Constrained Area

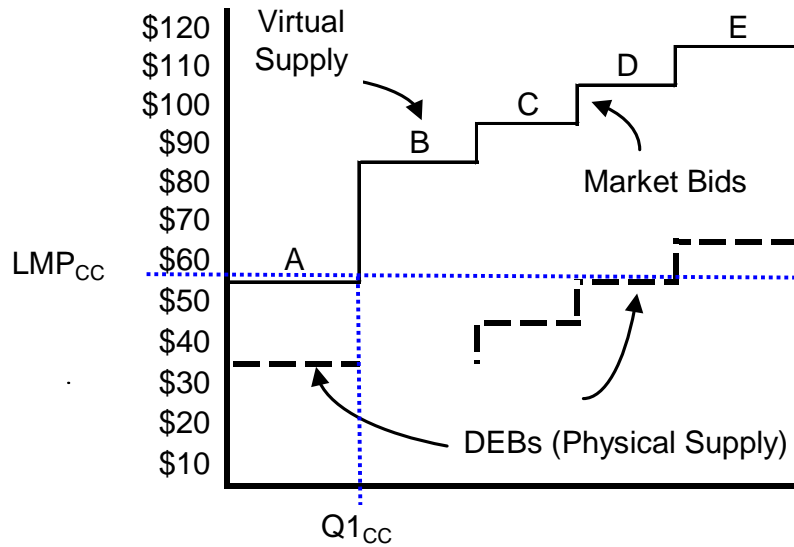
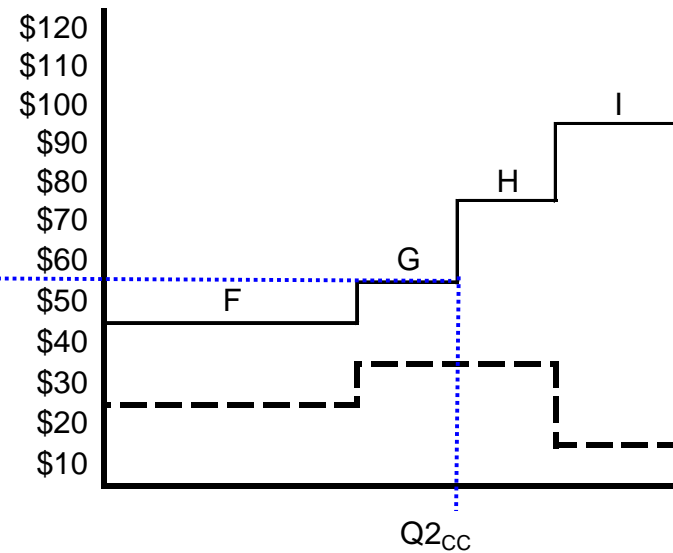


Fig. 8: Rest of System (Unconstrained)



CC run same as current LMPM approach:

- Units dispatched in merit order based on unmitigated bid price.
- Highest bid accepted in CC run set "floor" for each unit's mitigated bid in AC and IFM.

However, unlike current LMPM, dispatch levels in CC are "protected" in AC run with negative priced bids (see next slide)

DEB-based LMPM – AC Run

Fig. 9: Local Constrained Area

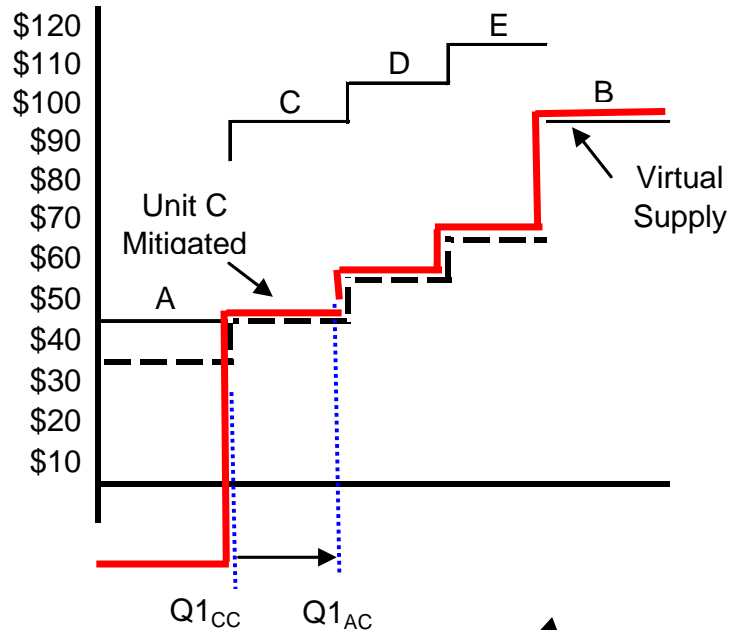
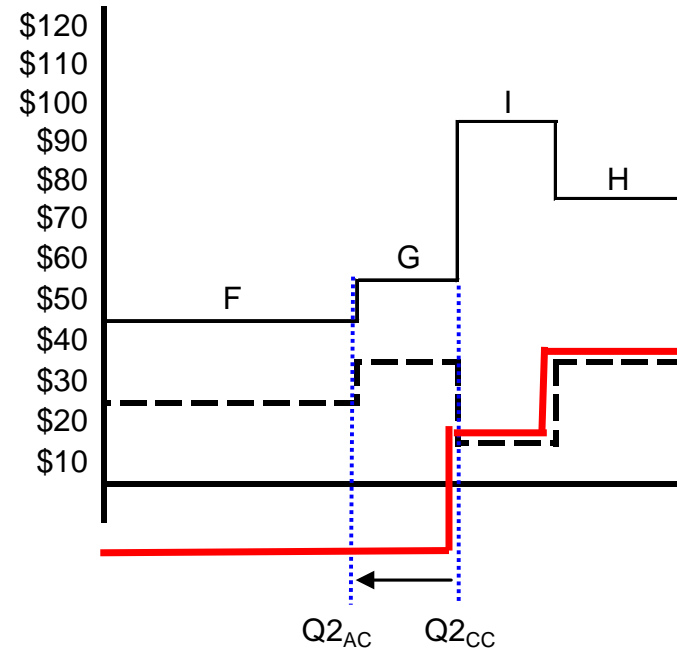


Fig. 10: Rest of System (Unconstrained)



- Mitigated bids used in AC run with uncompetitive constraints enforced:
- Negatively priced CC schedules minimize mitigation:
 - Units in constrained area are dispatched up over only as needed to relieve congestion on non-competitive constraint.
 - Outside of constrained area, units with lower DEBs not dispatched up in AC run.

DEB-based LMPM – Market Result

Fig. 11: Local Constrained Area

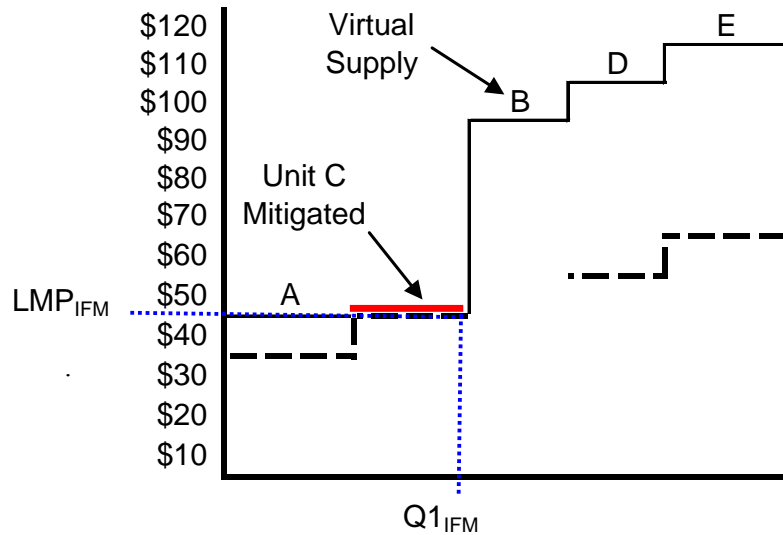
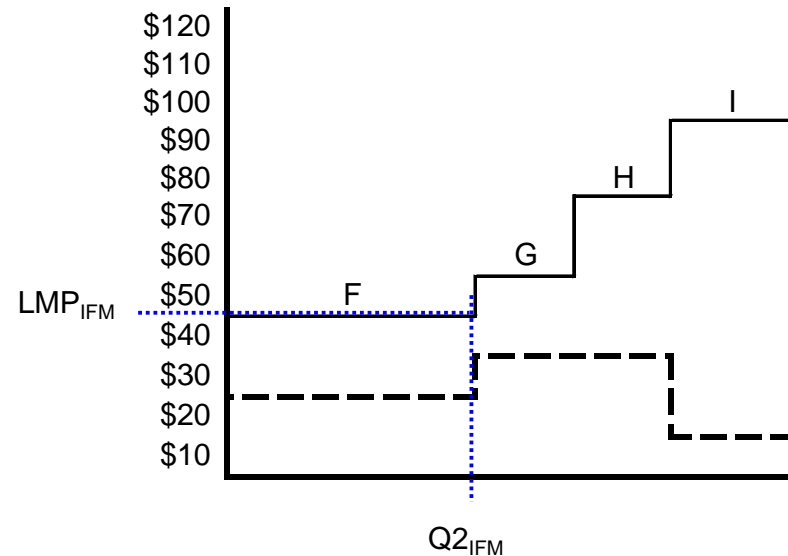


Fig. 12: Rest of System (Unconstrained)



- Only Unit C has mitigated bids used in IFM/RTM.
- Higher priced virtual supply does not set LMP in local constrained area.
- Lower priced virtual supply still free to “compete” with physical supply in CC run, AC run and IFM/RTM.

Benefits of DEB-based LMPM approach

- Allows all supply and demand bids to be included in LMPM, while eliminating concerns about how virtual bids (and PDR) may undermine LMPM.
- Increases market efficiency by ensuring that physical supply needed to meet local uncompetitive constraints is considered in merit order of DEB (rather than market bid price).
- Allows competitively priced virtual supply and PDR to compete with physical supply based on:
 - Unmitigated bid prices of physical units on system wide basis (CC run)
 - Mitigated bid prices of physical units to meet minimum generation requirements within uncompetitive areas (AC run).
- Ensures that units subject to mitigation are subject to mitigation only at minimum level needed to resolve congestion on uncompetitive constraints in AC run.
 - More economically efficient mix of units mitigated, but would not increase total amount of capacity mitigated.

Prior comments on approach proposed by DMM

■ ISO

- Indicated approach could not be implemented by Feb 2011 date of virtual bidding
- Wanted to vet approach further, but no specific problems identified.

■ MSC

- Could increase market efficiency (B.Hobbs)
- Wanted to vet approach further, but no specific problems identified.
- Suggested possibility of other options.

■ Stakeholders

- CPUC and PG&E supportive
- SCE supportive, but suggest further review
- Generation owners not opposed, but supportive of further review?
 - Support more dynamic approach to assessment of path competitiveness

DMM pursuing options for making designation of competitive vs. non-competitive paths more dynamic.

- Potential modifications to current CPA approach
 - Relax current CPA criteria, but allow paths to be quickly re-assessed based on actual conditions.
 - DMM currently developing simulation tool to allow more automated CPA.
- PJM-style RSI approach
 - Use PJM-style approach to assess each constraint based on actual bids/conditions.
 - RSI can include price screen
 - Could be combined with CPA approach

Conclusions/Recommendations

- ISO process to modify LMPM to incorporate bid-in demand should be high priority for MSC in 2010.
 - *CAISO requesting MSC opinion in advance of December 2010 Board meeting.*
- DMM requests MSC review of approach proposed by DMM.
 - *Suggestions for further analysis?*
- Any alternative approaches suggested by MSC should be identified and assessed.
 - *Specific implementation details must be considered.*