



California ISO
Your Link to Power

Changes to Local Market Power Mitigation due to addition of Bid-In Demand and Convergence Bidding

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Overview

- LMPM with bid-in demand and convergence bidding.
 - DMM proposal
 - Alternatives
- Enhancements to competitive path assessment.
 - Potential changes in CPA methodology and/or thresholds.
 - Other changes in market power screens/mitigation (CPA and LMPM)
- Process
 - LMPM enhancements to conclude in February, 2011.
 - CPA enhancements are decoupled with proposed LMP enhancements - will be on separate track.

Alternatives for incorporating bid-in demand were discussed during 2009 convergence bidding stakeholder process.

- Use all bids (physical + virtual) – 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)
 - Cons:
 - High demand (physical + virtual) would raise bid prices accepted in CC run above competitive levels needed to meet market demand.
 - Highest bid accepted from each unit in CC forms floor in bid mitigation process
 - Could result in infeasible solutions under high load conditions.

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

Benefits of DEB-based LMPM approach

- Allows all supply and demand bids to be included in LMPM
- Eliminates concerns about how virtual bids (and PDR) may undermine LMPM.
- Increases market efficiency by ensuring that physical supply needed for uncompetitive constraints is considered in merit order of DEB.
- Competitively priced virtual supply and PDR competes with physical supply:
 - Unmitigated bid prices of physical units on system wide basis (CC run)
 - Mitigated bid prices of physical units for requirements in 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.

Moving forward with DMM proposal

- Methodology has been discussed with stakeholders and MSC multiple times.
- ISO has confirmed that February BoG approval is sufficient time to implement with bid-in load.
- DMM plans to perform simulation of proposed change in MPM rules to determine impact of proposed change.
 - Current LMPM w/ VB and proposed LMPM w/ VB.
 - Impact of proposal on unit mitigation and prices.
 - Simulation analysis contingent on model benchmarking well.
 - If perform simulations, will publish in Nov/Dec.
- Request MSC review and opinion on proposals.

Alternative approach: Identify and mitigate market power based on congestion management effectiveness.

- Recent suggestion by ISO for alternative LMPM that addresses the bid-in load and convergence bid issues
 - New alternative requires additional discussion and analysis.
- Target mitigation to those resources that can provide effective counter-flow on uncompetitive constraints that are (predicted to be) congested.
 - Based on shift factors, not dispatch in all-constraint run.
- Still requires CPA for competitive / uncompetitive designations.

Mechanics of alternative LMPM approach

- Execute competitive constraint run to establish competitive dispatch.
- Run additional power flow at end of competitive constraint run with all constraints applied
 - Determine which uncompetitive constraints are binding
 - Get shift factors from resources to uncompetitive constraints that are congested)
- Identify resources with local market power
 - Resources that are effective in providing counter-flow on congested uncompetitive constraints have local market power.
- Apply mitigation to all resources that have local market power.
 - Mitigate bid curve from CC dispatch up to maximum capacity.

Features of alternative LMPM approach

- Addresses potential for virtual bids to undermine LMPM of physical resources.
- Eliminates inadvertent mitigation due to general re-dispatch in AC run.
- Likely result in more resources mitigated, more MW mitigated than needed to relieve congestion on binding uncompetitive constraint.
- May result in different congestion than AC run or market run.
- Removes need for all constraint run.
- In direction of more dynamic mitigation of local market power

Competitive Path Assessment

Next Section is on
Competitive Path Assessment Enhancements

Modifications to competitive path assessment

- Potential modifications to current CPA approach
 - Relax current CPA criteria, but allow paths to be quickly re-assessed based on actual conditions.
 - Supplement CPA with RSI – relaxed CPA but can use RSI for short-term designation changes if path appears uncompetitive.
 - More frequent assessments, ability to assess more quickly.
- RSI approach (on-line)
 - Use PJM-style approach to assess each constraint based on actual bids/conditions.
 - RSI can include price screen.
 - Requires integration with market software.

Potential modifications to existing CPA methodology

- Relaxing assumptions requires faster test / designation change.
- Monthly path designations.
- Changes in congestion threshold
 - Reduce 500 hour threshold.
 - Base on market congestion (no RMR+ExD)
 - Test constraints congested in past 3 months or same month last year.
- Inclusion of more current generation and transmission outages.
- Default designation competitive
- Use 2-pivotal supplier in CPA.

Incorporating Residual Supply Index (RSI)

- Supplement to existing approach
 - Use RSI to review designations given current conditions.
 - If RSI shows uncompetitive, change designation until re-test.
 - Useful if conditions change or path designation was wrong.

- On-line replacement for existing approach
 - Would replace both CPA and current LMPM.
 - Use RSI to ID uncompetitive paths during market runs.
 - Mitigate set of units with effective supply of counter-flow.
 - Tests need to be included in market software.
 - Development and implementation time horizon likely past 2011.
 - Could be “Phase 2” of enhancement process.

Wrap Up

- ISO process to modify LMPM to incorporate bid-in demand should be high priority for MSC in 2010.
 - Issue has been raised at prior Convergence Bidding and MSC meetings.
 - Requesting MSC propose alternatives / review existing alternatives in October and opinion in advance of February 2011 Board meeting.
- Proposed alternatives should identify market impacts and specific implementation details where possible.
- DMM will provide paper on its proposed modifications to LMPM/CPA in early November.

Reference Slides

The remaining slides are provided for reference purposes.

These slides have been presented
in previous whitepapers and MSC meetings.

DMM Proposal for LMPM

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

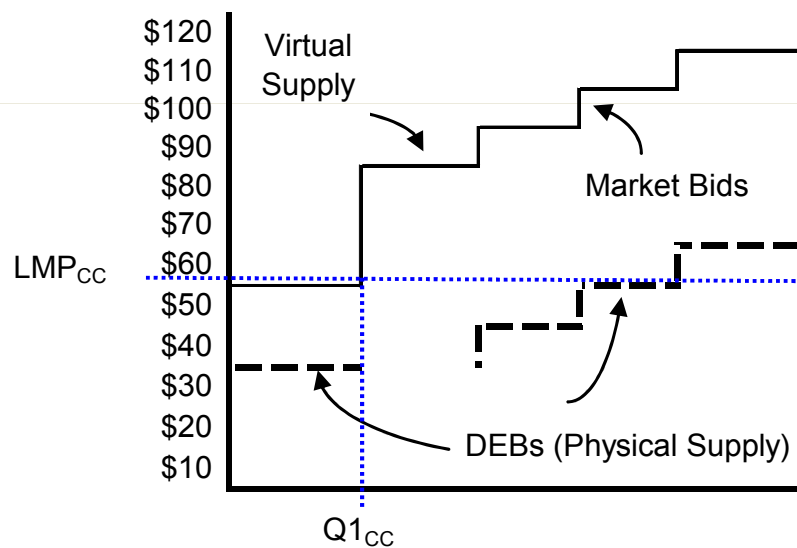
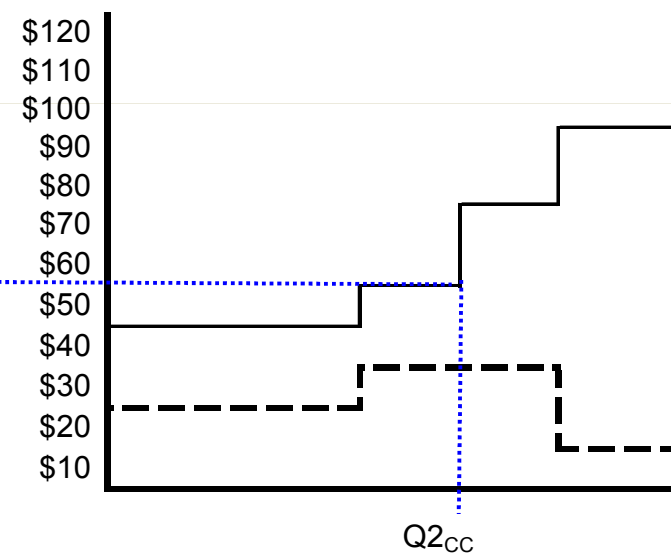


Fig. 2: Rest of System (Unconstrained)



DMM Proposal for LMPM Base Case Example – AC Run

Fig. 3: Local Constrained Area

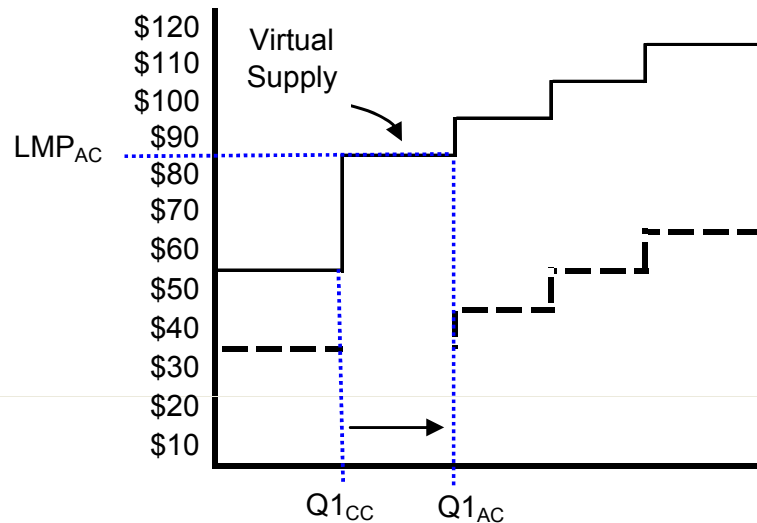
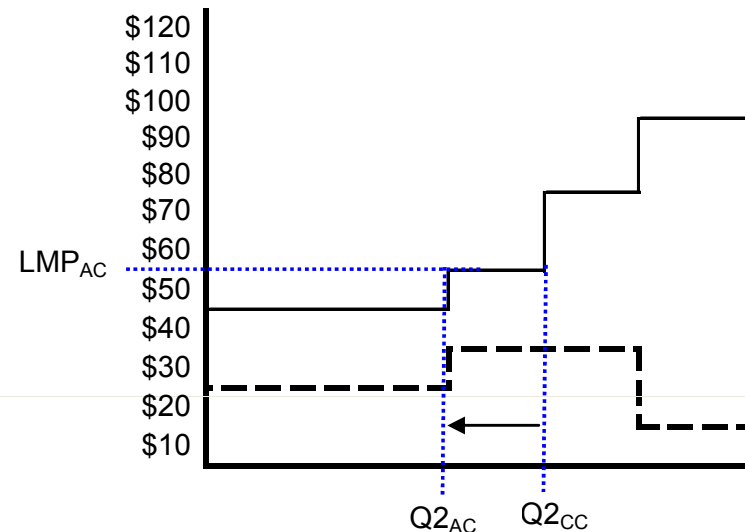


Fig. 4: Rest of System (Unconstrained)



- 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.

DMM Proposal for LMPM

Base Case Example – Market Result

Fig. 5: Local Constrained Area

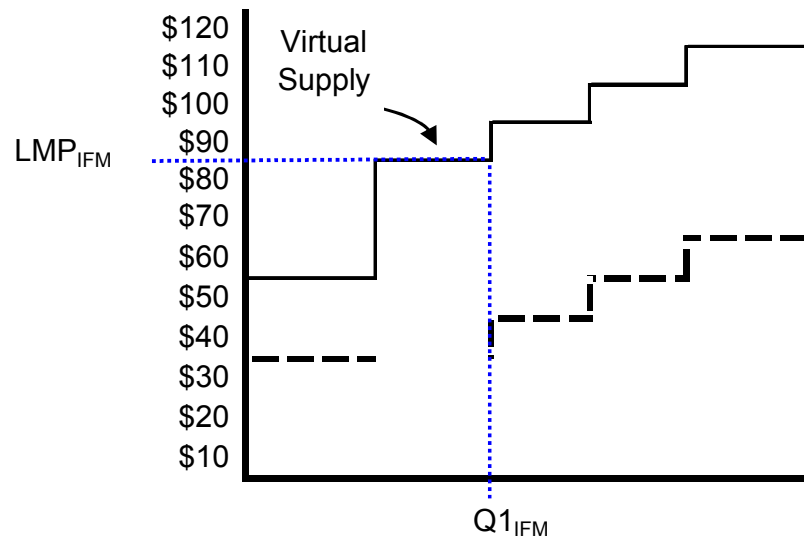
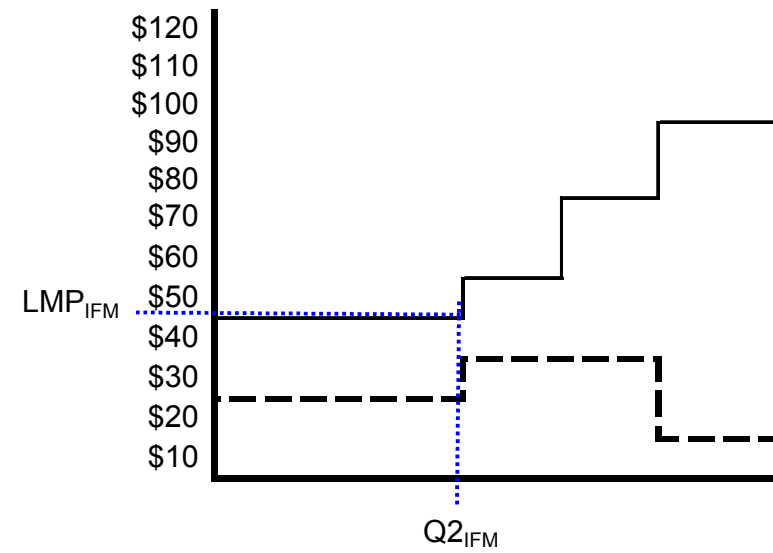


Fig. 6: Rest of System (Unconstrained)



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

DMM Proposal for LMPM

DEB-based LMPM – CC Run

Fig. 7: Local Constrained Area

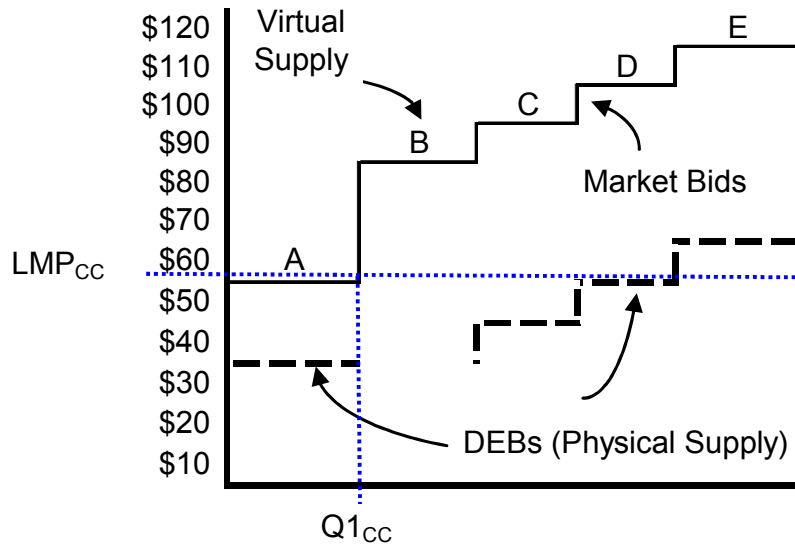
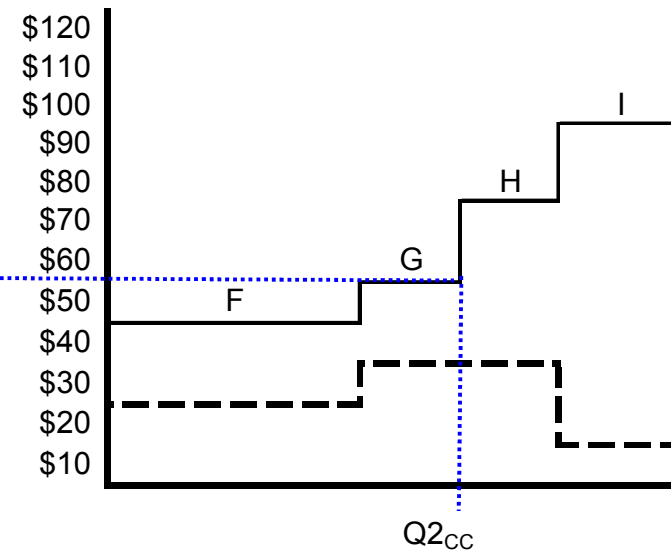


Fig. 8: Rest of System (Unconstrained)



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)

DMM Proposal for LMPM

DEB-based LMPM – AC Run

Fig. 9: Local Constrained Area

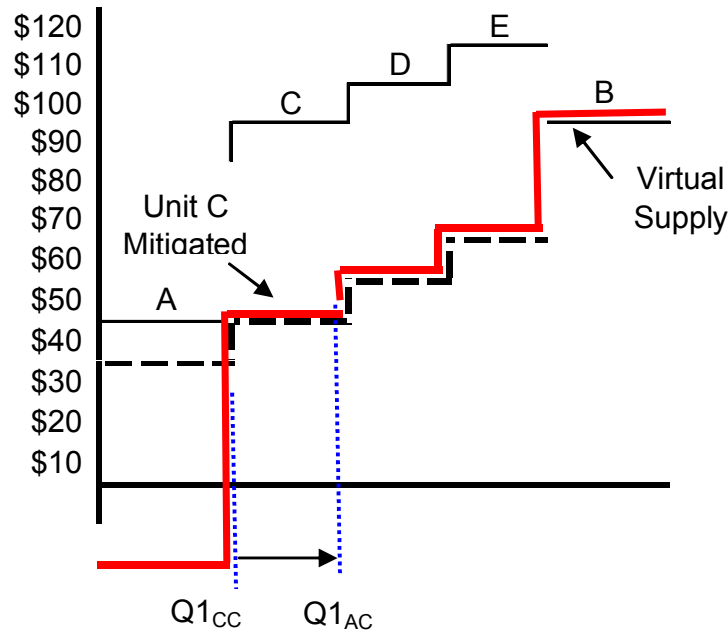
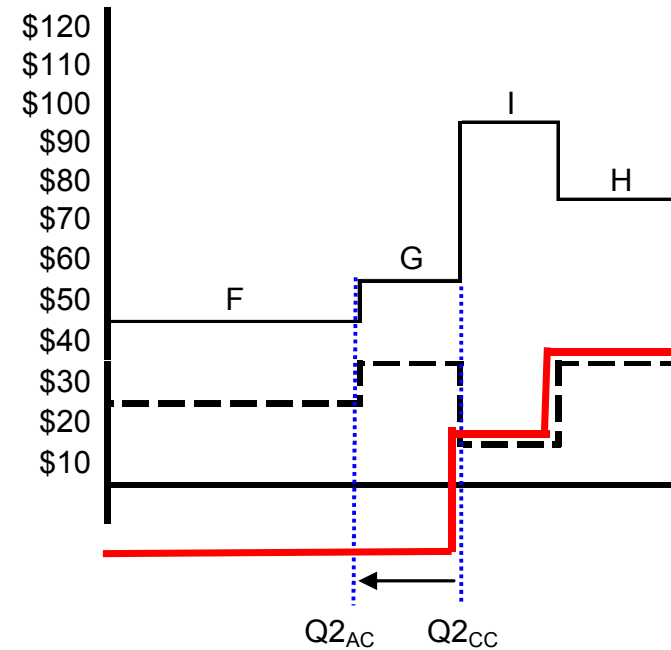


Fig. 10: Rest of System (Unconstrained)



- 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.

DMM Proposal for LMPM

DEB-based LMPM – Market Result

Fig. 11: Local Constrained Area

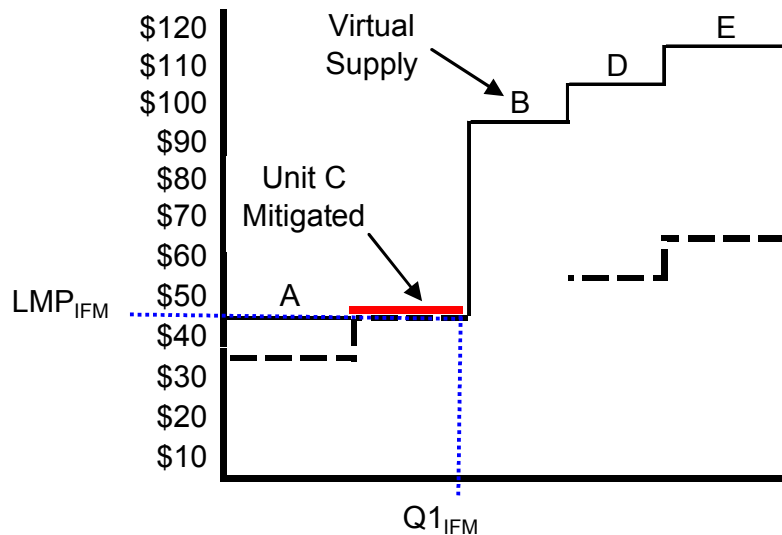
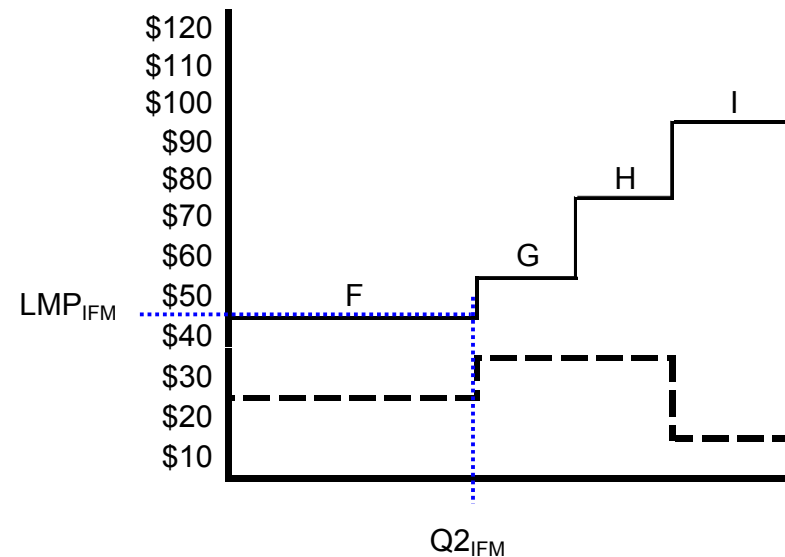


Fig. 12: Rest of System (Unconstrained)



- 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.