

Report on Performance of the California ISO's Local Market Power Mitigation Mechanism

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Outline of Presentation

- Market Power Mitigation in bid-based markets
 - Potential for over- and under-mitigation
- Review of Performance of Current Local Market Power Mitigation Mechanism (LMPM)
- Strengths of Current LMPM Mechanism
- Potential Shortcomings of Current LMPM Mechanism
- Residual Demand-Based Approach to LMPM
 - Allows Dynamic Mitigation
 - Costs and Benefits of Residual Demand Perspective
- Way forward with LMPM mechanism
 - Future research on LMPM design

Market Power Mitigation

- A local market power mitigation mechanism (LMPM) is necessitated by the Federal Power Act (FPA) requirement that wholesale prices be “just and reasonable”
 - FPA states that if a supplier has no ability to exercise market power or has adequately mitigated this ability, then it can be paid market-based prices
- Transmission constraints can limit amount of competition a supplier faces, so that cannot rely on supplier’s offers to set the price that meets FPA standard
 - Under these conditions, a LMPM mechanism ensures competitiveness of market prices
 - LMPM provides “adequate mitigation” necessary for supplier to be paid “market prices”

Market Power Mitigation

- Three attributes of LMPM mechanism
 - Determine when a supplier is worthy of mitigation
 - What to do with supplier's offers when supplier is deemed worthy of mitigation
 - What supplier and other suppliers are paid when that supplier's offer is subject to mitigation
- Characterize California ISO's LMPM mechanism in terms of these three attributes

Current LMPM Mechanism

- Determining whether a supplier is worthy of mitigation
 - Prospective designation of the competitive and non-competitive transmission paths
 - Candidate transmission paths that could be deemed “competitive” are only those paths with more than 500 hours of “managed congestion” over past 12 months
 - Department of Market Monitoring (DMM) simulates market outcomes under pre-specified system conditions and designates a transmission path as non-competitive if there are three jointly pivotal suppliers on that path
 - Some output from three largest firms is necessary manage congestion of transmission path
 - Analysis done on seasonal basis
 - All non-candidate transmission paths are declared non-competitive without an analysis of existence of three jointly pivotal suppliers

Current LMPM Mechanism

- Determining whether a supplier is worthy of mitigation
- 2-step process for determining whether to mitigate offer of a generation unit
 - Day-ahead locational marginal pricing market is run with all non-competitive paths set to have infinite capacity (CC run)
 - Day-ahead market operated with all transmission paths set at actual capacity (AC run)
- If a generation unit's schedule is increased between competitive constraints (CC) run and all-constraints (AC) run, then its offer is subject to mitigation

Current LMPM Mechanism

- What to do with mitigated supplier's offers
 - Mitigate to default energy bid (DEB)
 - Verified variable costs plus a 10 percent adder
 - LMP-based--average of lowest quartile of LMPs when unit was dispatched over previous 90 days
 - Negotiated with Independent Entity
- Price is supplier and other suppliers paid
 - Re-run all constraints model with mitigated offers and all other offers to compute day-ahead schedules and LMPs

Over- and Under-Mitigation

- Over-mitigation occurs if LMPM causes prices earned by supplier to be reduced below competitive levels
- Frequency that mitigation is triggered (CC quantity less than AC quantity) not a central concern in defining over-mitigation
 - Level of market prices earned by suppliers is most important factor
- California ISO's mechanism constructs cost-based DEB for generation unit owner in a manner that yields generous "competitive" market prices

Over- and Under-Mitigation

- Three factors contribute to generous prices
 - Information for cost-based DEB supplied by market participant
 - Ten percent bid adder for cost-based DEB
 - Supplier receives nodal price based on this cost-based DEB plus 10 percent adder
 - Price typically greater than DEB
 - Frequently mitigated units (FMU) receive even larger bid adders

Over- and Under-Mitigation

- Evidence of generosity of cost-based DEB
 - LMP-based DEBs for day-ahead market are uniformly larger than cost-based DEBs during past year
 - True for off-peak and peak-periods
 - LMP-based DEBs for real-time market are larger than cost-based DEB for off-peak and peak-periods during past year
- Supplier's unit will not be dispatched unless LMP is larger than unit's offer price
 - LMP-based DEBs larger than offer prices when units are dispatched

Performance of Current LMPM Mechanism

- LMPM mechanism triggered very infrequently during 2009
 - Average of 1 to 3 units per hour were subject to mitigation in day-ahead market
 - Average of 2 to 7 units per hour were subject to mitigation
- Small amount of incremental energy dispatched as result of mitigation
 - Average hourly amount less than 100 MW in all months of 2009, except September 2009

Performance of Current LMPM Mechanism

- Mild weather and depressed economy contributed to limited use of LMPM mechanism
 - Average hourly load fell by 4% between 2008 and 2009
 - Lower peak demand during 2009 than during 2008
 - Low levels of transmission congestion in both day-ahead and real-time markets
- Performance of LMPM during 2009 very unlikely to be representative of performance under hotter weather and higher level economic activity
 - Data under stressed system conditions needed to provide credible evaluation of LMPM performance

Strength of Current LMPM Mechanism

- DEB under current LMPM mechanism set above bid price that a unit owner facing sufficient competition (no ability or incentive to exercise unilateral market power) would submit
- Firm facing sufficient competition would submit bid price equal to minimum marginal cost of supplying energy
- Mitigated bid is based on verified, by Department of Market Monitoring, variable cost of supplying energy from unit plus a bid adder
 - Verified variable cost > Bid supplier would submit if faced sufficient competition
 - Verified variable cost + adder >> Bid supplier would submit if faced sufficient competition
- Conclusion--Difficult to argue that over-mitigation occurs if bid price under mitigation is greater than bid price supplier would submit if it had no ability or incentive to exercise unilateral market power

Potential Weakness of Current Mechanism

- If mitigate bid prices too frequently can destroy incentives for least-cost production by suppliers
 - Suppliers take actions to increase verified variable cost and magnitude of bid adder
 - Suppliers exercise unilateral market power by taking actions to ensure that mitigated bid prices set market prices
- Market pricing evolves to very expensive form of cost-of-service regulation
 - Market-clearing prices set using price offers above minimum variable cost of production for each supplier

Weakness of Current Approach

- Determination of competitive paths is done prospectively on a seasonal basis
 - Many aspects of network change on day-to-day basis and this could impact of competitiveness of transmission paths
 - Network and available generation could make competitive transmission paths non-competitive
 - Provide significant opportunities for suppliers to exercise unilateral market power
 - Current mechanism guards against this outcome by designating all non-candidate transmission paths as non-competitive
- Preferable approach would mitigate based on current level of competition faced by supplier
 - Guard against not mitigating when should mitigate
 - Allow offers to set prices when supplier faces sufficient competition

Alternative to Current Approach

- Possible approaches to day-ahead or real-time mitigation
 - Use residual demand curve faced by supplier
 - Uses demand bids and supply offers for hourly market
 - Residual demand curve supplier faces is market demand less willingness to supply curve of all other suppliers beside firm under consideration
- Residual demand curve can be computed for zonal market and nodal pricing market
 - Solve for market prices with price-taking offer from generation unit from zero to maximum capacity of unit
 - For each price-taking locational quantity, compute LMPs
 - These price and quantity pairs comprise residual demand curve faced by that generation unit
 - Quantifies ability of unit owner to alter market price through unilateral actions

Figure 1: Aggregate Willingness-to-Supply Curve and Market-Clearing Price

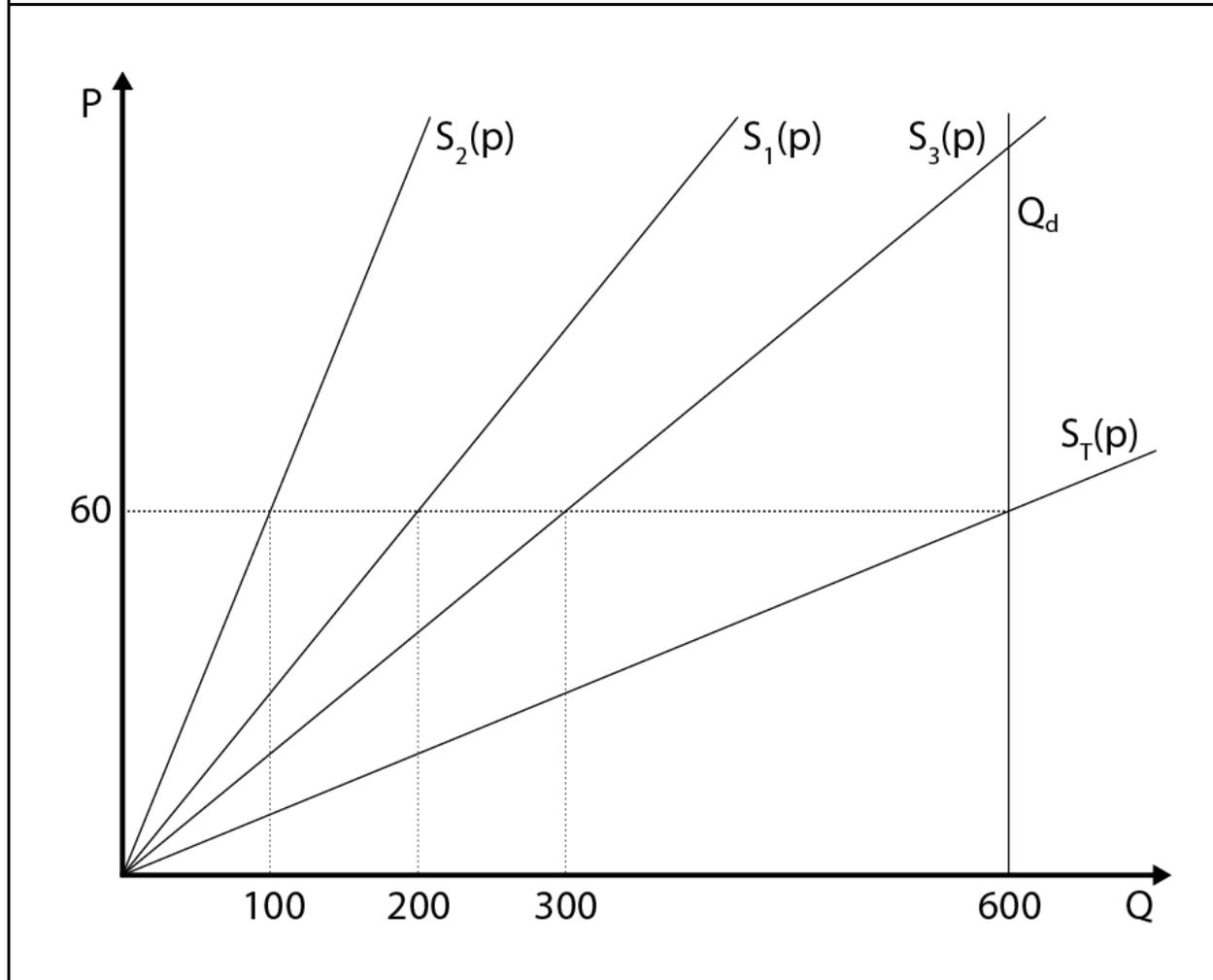


Figure 2: Construction of Residual Demand Curve of Firm 1

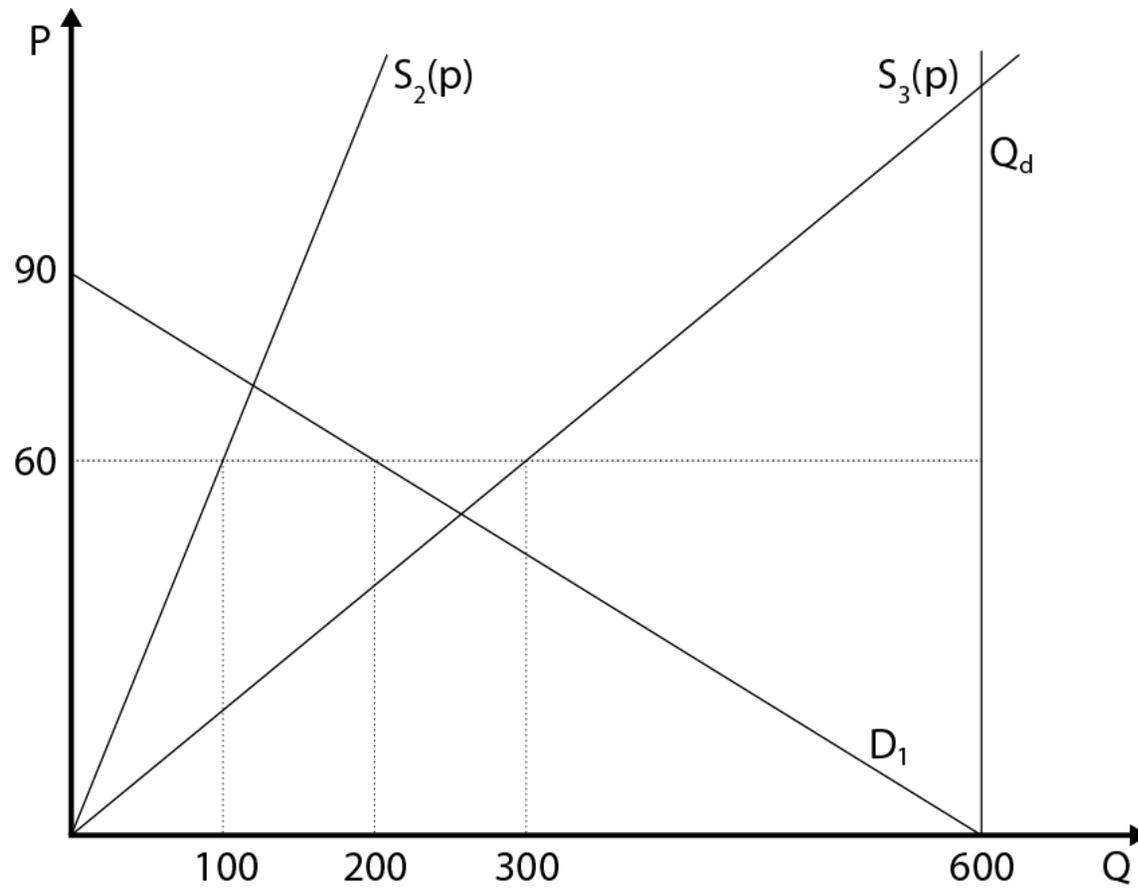


Figure 4: Form of Residual Demand Curve and Price Increase from Withholding Output

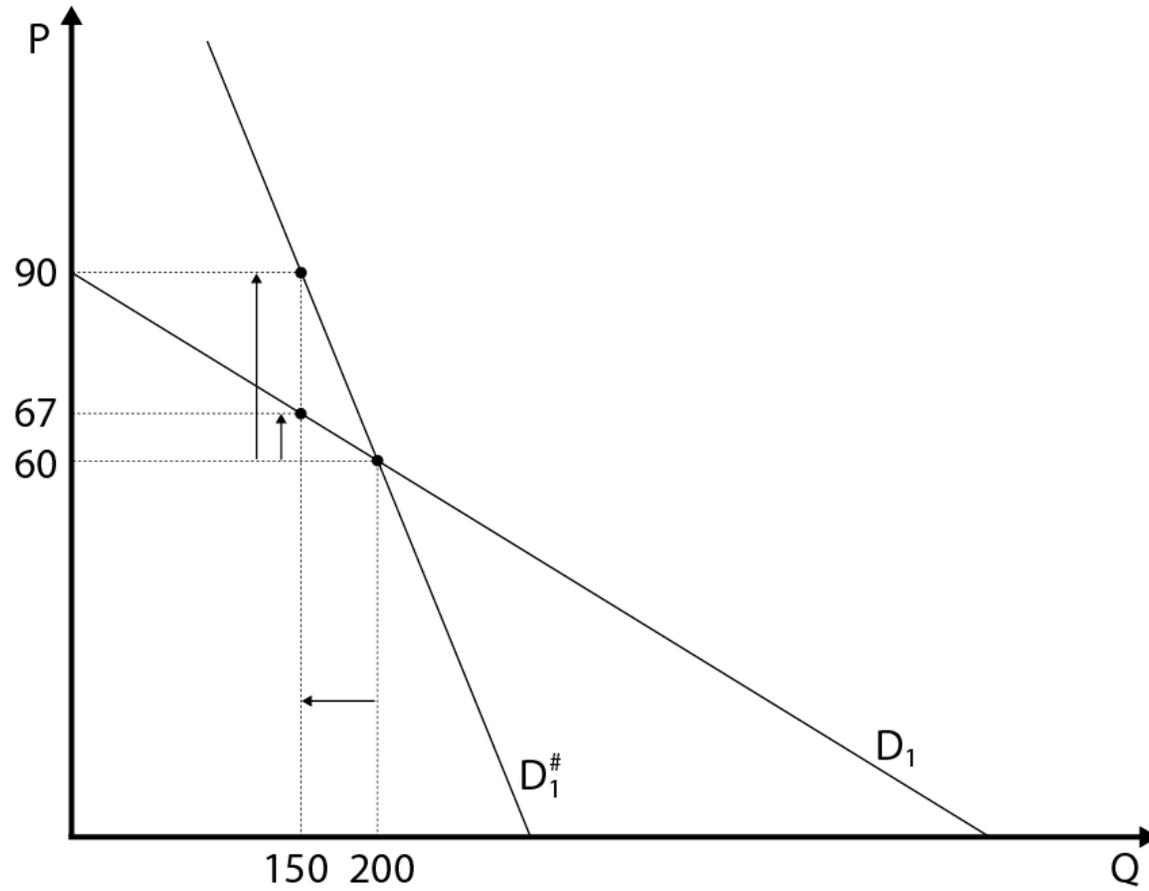
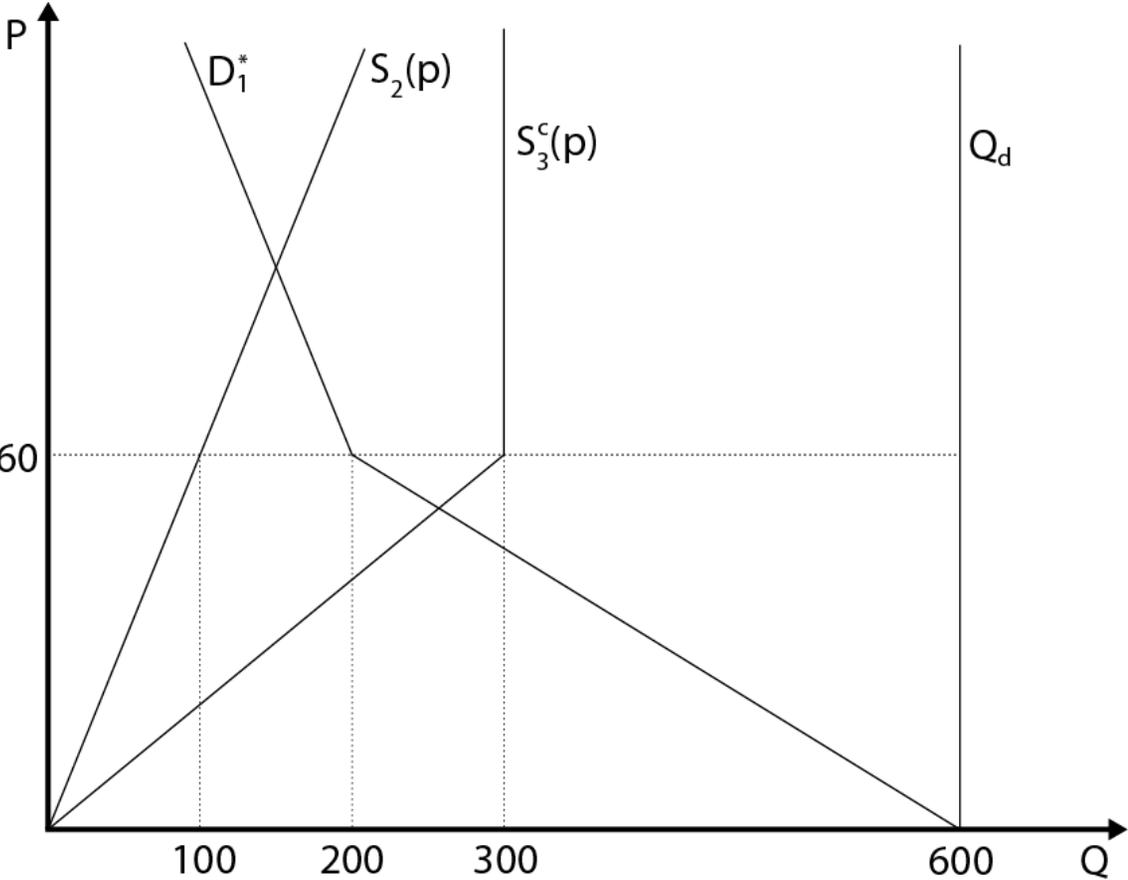


Figure 6: Residual Demand of Firm 1 with Transmission Constraints



The Way Forward

- Continue with current approach
- Initiate process to consider dynamic LMPM mechanism
 - Real-time or hour-ahead analysis to determine if competitive assessment was inappropriate for actual system conditions
- Difficult to argue that existing mechanism over-mitigates given level of mitigated bid prices
- More serious problem is incentive to increase verifiable marginal cost and bid adders
- Dynamic process based on residual demand curve may better balance two competing goals of encouraging minimum marginal cost bidding against need to protect consumers against the exercise of market power
 - Further analysis needed to find best approach
 - MSC plans to continue to undertake this analysis

Questions and Comments?