



Market Power Mitigation in Wholesale Electricity Markets

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Introduction

- Potomac Economics provides independent market monitoring to a number of large integrated Independent System Operators (ISOs), or Regional Transmission Organizations (RTOs) including:
 - ✓ Midcontinent ISO (MISO);
 - ✓ ERCOT;
 - ✓ New York ISO; and
 - ✓ ISO New England.
- To ensure that the markets operate competitively and efficiently, the markets should monitoring competently and mitigated with appropriate.
- We helped develop and implement the market power mitigation framework for each of the RTOs we monitor.
- This presentation reviews the market power mitigation principles and methodologies we recommend.

Market Power in Electricity Markets

- Market power is the ability to profitably raise the price of a product;
 - ✓ Market power exists in nearly every product market, the most of which are not regulated -- only perfectly competitive markets exhibit no market power;
 - ✓ Market power is not always bad -- Market power provides incentives for firms to innovate and is the basis for the patent laws;
- It is generally more costly to eliminate all market power than to allow the some market power so “perfect competition” is not the appropriate standard.
- Market power in electricity markets is generally caused by transmission constraints that isolate an area and create local market power -- constraints may occur naturally or by manipulation of transmission or generator.
 - ✓ This market power is generally transitory -- thus, “behavioral” mitigation to limit abuses of market power is reasonable and effective.
 - ✓ Behavioral mitigation stops the behavior by capping the supply offer.
 - ✓ However, when behavioral mitigation is not possible because investigation is necessary, sanctions are generally employed to deter the behavior.



Market Power Mitigation Principles

- As with the development of other market rules, mitigation measures should be developed based on sound economic principles.
- We generally proposed the following principles:
 - ✓ Only attempts to exercise market power should be mitigated
 - ✓ Mitigation should not interfere with competitive conduct
 - ✓ Imposing mitigation unnecessarily is costly to the market
- Unnecessary mitigation is costly because:
 - ✓ Generators' competitive offer prices (marginal costs) cannot be accurately known
 - ✓ Inappropriately mitigating resources can change the dispatch in ways that harm both the resource and the system.



Conduct and Impact Mitigation Framework

- It is costly to intervene in the market when it is not justified (when market power is not being exercised).
- We employ the “conduct and impact” mitigation framework to ensure that imposing mitigation measures is warranted.
- The conduct-impact framework operationalizes the definition of market power:
 - ✓ Abuse of market power occurs when a supplier has the ability and incentive to use its supply position to raise prices or guarantee payments.
 - ✓ Conduct Test: the supplier has withheld supply or otherwise operating its supply uneconomically.
 - ✓ Impact Test: as a result, the market prices or guarantee payments have increase significantly.



Conduct that May Warrant Mitigation

- We test for the following conduct that may warrant mitigation:
 - ✓ Economic withholding – raising an offer price or other parameter to not run and raise the clearing price, or raise make-whole payments
 - ✓ Physical withholding – withdrawing or derating an economic unit to raise clearing prices or make-whole payments
 - ✓ Uneconomic production – producing substantially more than is economic in order to overload a constraint
- We employ conduct thresholds to ensure that the conduct is a substantial deviation from a competitive offer price.
 - ✓ This allows maximum reasonable flexibility to the resource owners
- The conduct thresholds vary based on the severity of the market power concerns:
 - ✓ \$100 per MWh for constraints that are not chronic
 - ✓ \$10 to \$100 for chronically constrained areas
 - ✓ \$25 per MWh for offers resulting in uplift



Performing the Impact Test

- RTOs' own market software is used to estimate the price impacts of the conduct.
 - ✓ In MISO, we set it up to run automatically (every 5 minutes in real time) to calculate the price impacts of conduct failing the impact tests.
- The impacts must be substantial for mitigation to be warranted.
 - ✓ The thresholds are the same as the conduct thresholds for different constrained areas.
- The impact test is the most significant distinguishing feature of this mitigation framework:
 - ✓ If conduct is not significantly impacting the market outcomes, it is not market power.
 - ✓ The impact test causes MISO to mitigate **less than one** percent of the units that fail the conduct test.



Reference Levels

- All mitigation depends on the competitive benchmark used.
- Reference levels serve as the benchmark used to perform the conduct test.
 - ✓ The reference levels are intended to reflect a resource's marginal costs, including legitimate risk and opportunity costs.
 - ✓ In addition, a reference level is calculated for all other bid components, including start-up costs, minimum generation costs, and the physical parameters of the unit.
- Reference prices vary over the output range of a unit and are primarily based on the past accepted bids or operating practices for the unit.
 - ✓ This allows reference prices to reflect the output blocks that have very high marginal costs even though their variable costs may be low.
- Reference levels are computed separately for peak and off-peak periods, and are adjusted continually for changes in fuel prices or other factors.



Reference Level Methods

- Three methods are used to calculate reference levels:
 1. Past accepted bids during competitive periods (because the market disciplines suppliers to offer competitively),
 2. Lowest LMPs when the resource was dispatched, and
 3. Cost data collected from the supplier and/or consultation.
- Most monitors use only the third method, which ignores the valuable information contained in suppliers historic offers.
- Participants have access to their reference levels.
 - ✓ If they can show that they are unjustifiably low, the IMM may adjust the reference level temporarily or permanently.

Reference Level Methods

- We believe that it is critical that reference levels reflect a resource's full marginal costs, not just their variable cost. This includes:
 - ✓ Opportunity costs associated with output limitations that may apply over a day, week, month or year – the key factor for hydro resources;
 - ✓ Operational or economic risks;
 - ✓ Major maintenance expenses and schedules (even though the costs may only be incurred years in the future)
 - ✓ Effects of PPAs or other contracts on a suppliers' incentives;
- The magnitude of these factors will vary by unit and significant effort must be employed to ensure that the reference levels are accurate.
- These factors can also change by day or hour, so:
 - ✓ The reference level updates must be automated and timely; and
 - ✓ Reasonable conduct/impact thresholds allow offer flexibility to account for these factors.



Operating Cost Survey Website

- Collecting production cost information and physical operating details is key for developing accurate reference levels.
- We use a secure website we've developed for this purpose:
<https://www.potomaceconomics.com/ocs>
- Over 100 survey parameters are collected, but many are optional.
- Market participants can submit:
 - ✓ Cost and capabilities via XML or CSV formats
 - ✓ Operating mode schedules (eg. 2x1 or 1x1, oil or gas)
 - ✓ Requests for consultations
- Initial validation is performed upfront rejecting submittals when they fail to validate, accompanied by error messages.



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David B. Patton is President of Potomac Economics and has 26 years of experience as an energy economist. He provides expert advice, analysis and testimony to clients in the electricity and natural gas industries. His areas of expertise include market design and monitoring, merger and other market power analysis, transmission pricing, asset valuation, and congestion management.

Potomac Economics currently serves as the Independent Market Monitor for the New York ISO, ISO New England, Midwest ISO and ERCOT. In these capacities, Dr. Patton advises the ISOs on market issues and monitors the markets to identify and remedy flaws in the market design or attempts to exercise market power. Potomac Economics has also provided independent monitoring of transmission operations or supply procurements for APS, PNM, PacifiCorp, OG&E, MidAmerican Energy, Duke, and Entergy.

Dr. Patton has provided expert testimony and analysis on competitive issues in a number of electric utility mergers, other antitrust cases, and market-based pricing cases before the FERC, state regulatory agencies, the Department of Justice and the Federal Trade Commission. Prior to consulting, Dr. Patton was a senior economist in the Office of Economic Policy at the FERC where he advised the Commission on policy issues ranging from transmission pricing and open access to mergers and market power.

Dr. Patton has published and spoken on a broad array of topics related to deregulation and the development of competitive electricity markets. He holds a Ph.D. in Economics from George Mason University, with concentrations in industrial organization and finance.