MARKET POWER AND ELECTRICITY COMPETITION

William W. Hogan
Center for Business and Government
John F. Kennedy School of Government
Harvard University
Cambridge, Massachusetts 02138

50th Annual Antitrust Law Spring Meeting
American Bar Association
Washington, DC

April 25, 2002

ELECTRICITY MARKET Competitive Assumptions

The fundamental assumption is that there is workable competition in generation and some services, but there is a continuing monopoly in the case of the wire businesses of transmission and distribution.

The term "competition" means different things to different participants in the market:

- A (very) large number of generation suppliers.
- The ability to choose among suppliers at will.
- A (very) large number of customers.
- The ability to refuse customers at will.
- Non-discrimination and comparability.

The limiting assumptions of the competitive market include:

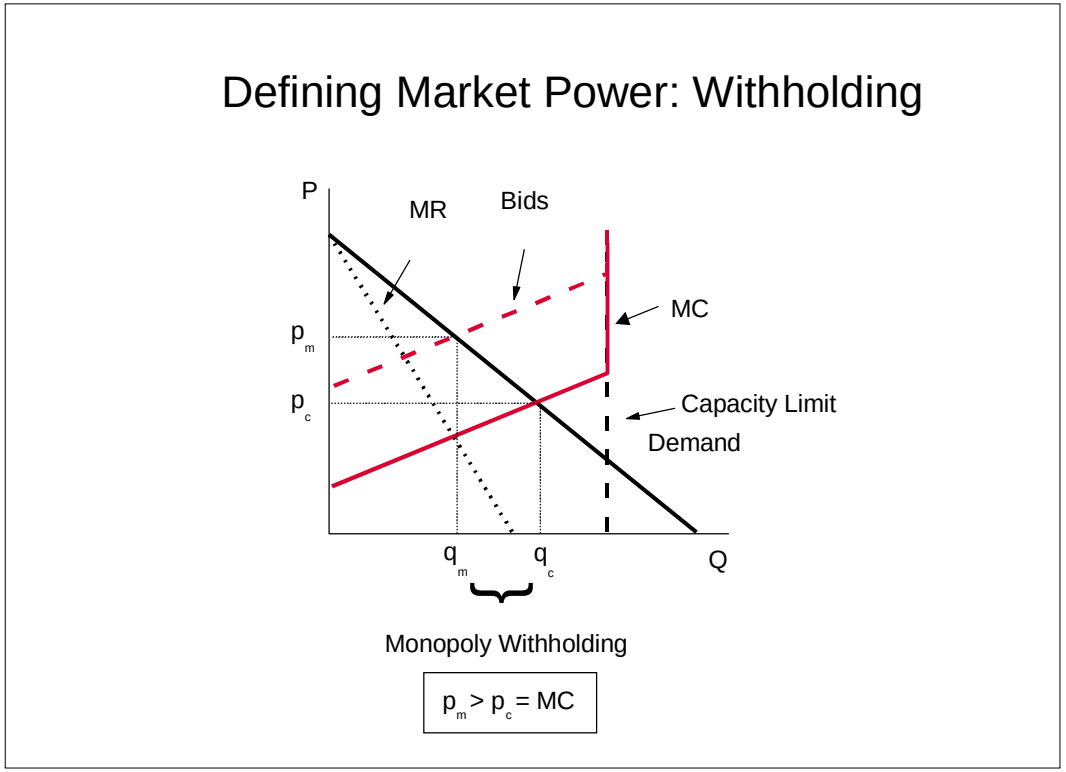
- A commodity business with no entry costs or barriers.
- Price-taking behavior by suppliers.
- Price-taking behavior by customers.
- Elimination of arbitrage opportunities under equilibrium according to the law of one price.

Unfortunately, the limiting conditions of competition between and among generators and customers do not hold in practice. There are many approximations, and we hope for workable competition.

The gap between the perfect and the real has many dimensions:

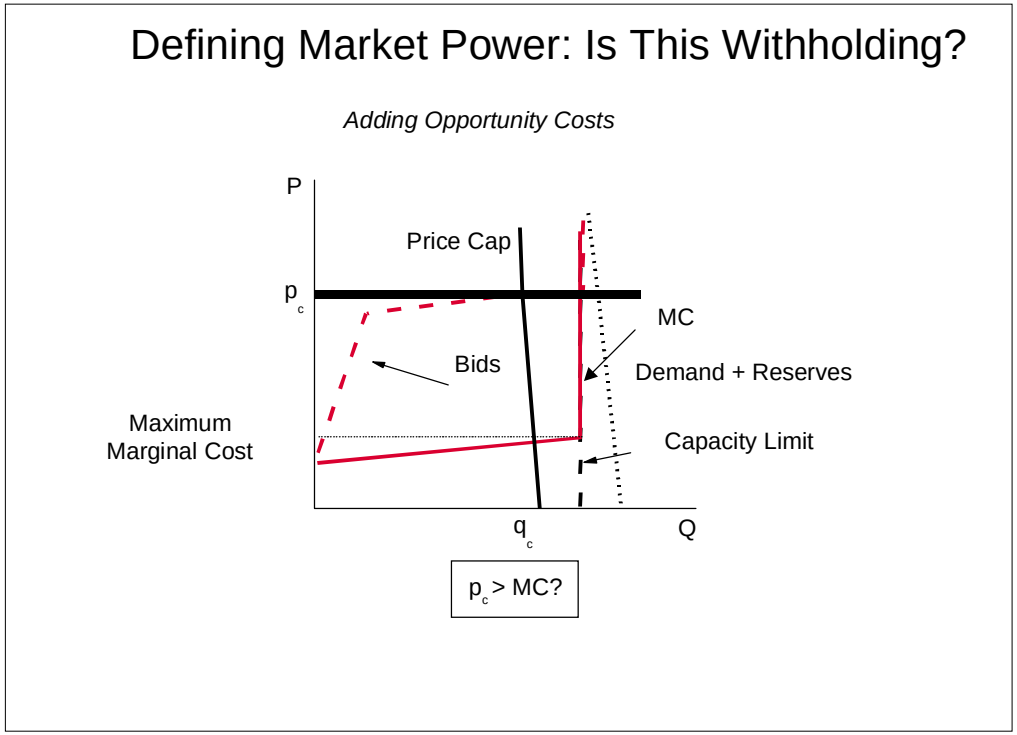
- Economic dispatch is always imperfect.
- System constraints are soft.
- Investments can be lumpy.
- Market participants seek price advantages.
- Energy and ancillary services can have dominant suppliers.
- Transmission constraints can produce pockets with high concentration.
- Conditions change quickly and prices can be volatile.

The conventional definition of market power addresses withholding some supply in order to profit from higher prices on the reduced output. This is the easy case.



- Bids exceed marginal cost to set higher market clearing price.
- Output is below capacity and price exceeds marginal cost.

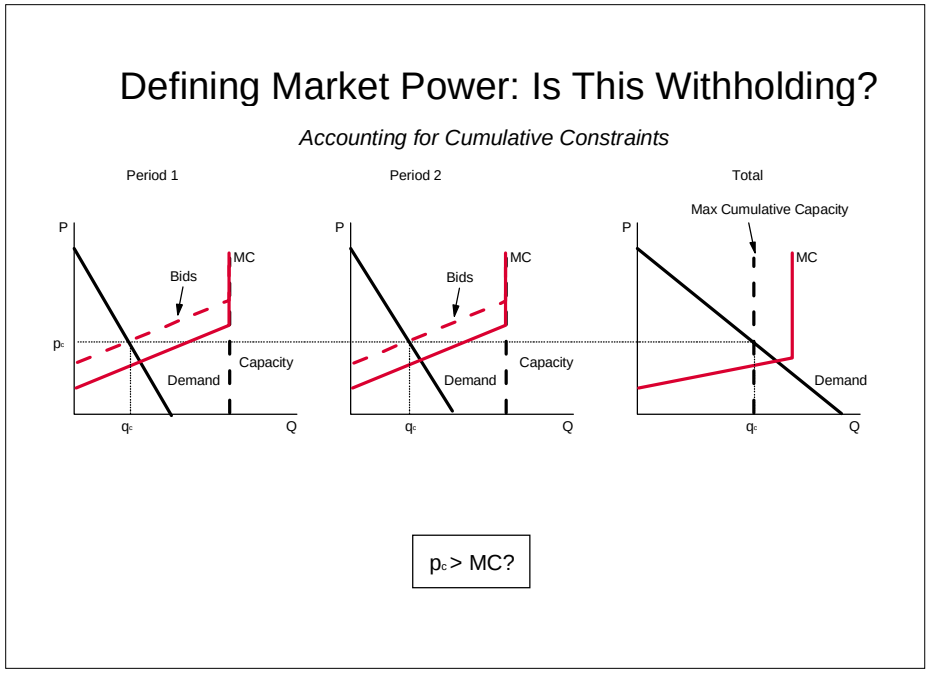
In practice, it may be difficult to define or recognize a significant use of market power. Consider the conditions that arise with opportunity costs.



- Bids exceed direct marginal cost.
- Output is at capacity with reserves and price exceeds the direct marginal cost.
- Is this an exercise of market power that deserves mitigation?

In practice, it may be difficult to define or recognize a significant use of market power. Consider the conditions that arise with cumulative output restrictions.

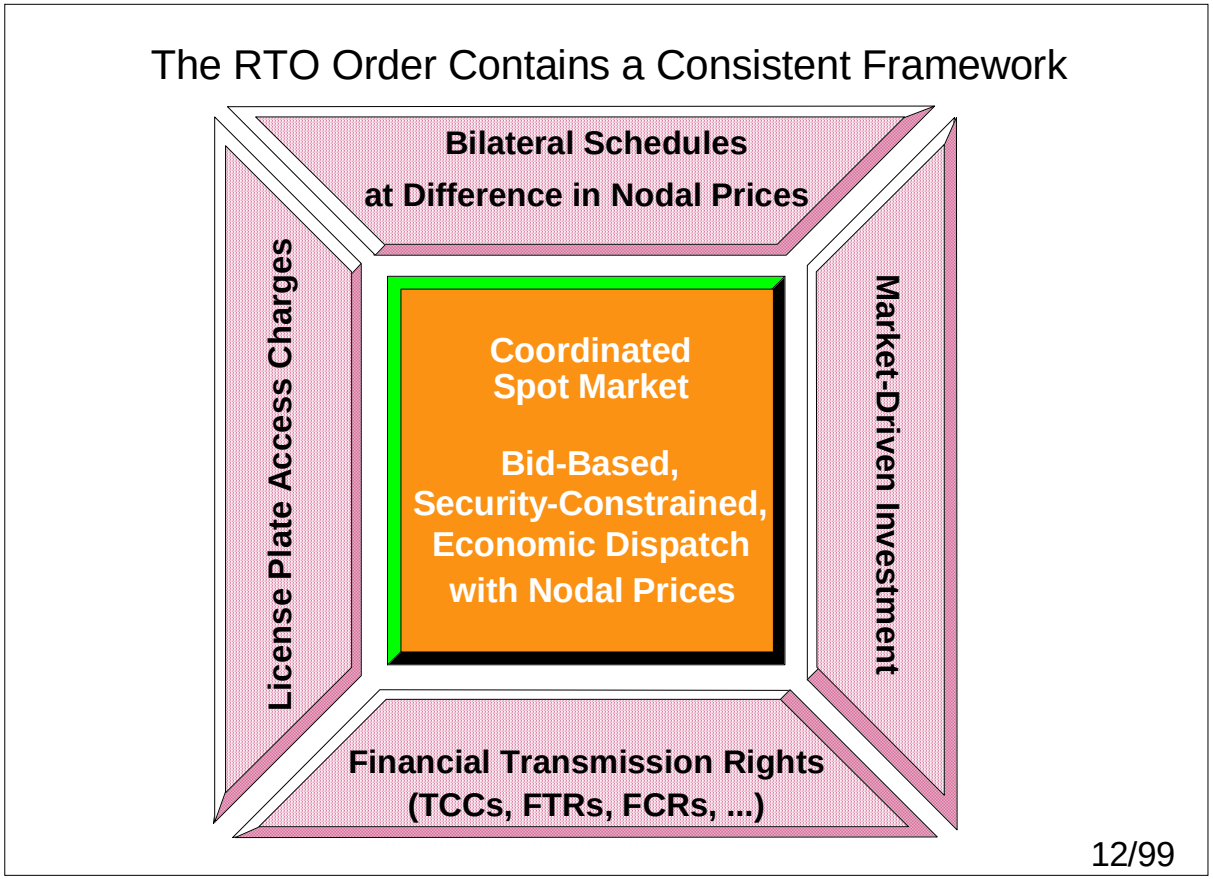
Examples: Hydro facilities with limited water storage. Environmental rules.



- Bids exceed direct marginal cost in order to reflect the opportunity cost of cumulative constraint.
- Output is at capacity and price exceeds the direct marginal cost.
- Is this an exercise of market power that deserves mitigation?

ELECTRICITY MARKET — Competitive Structure

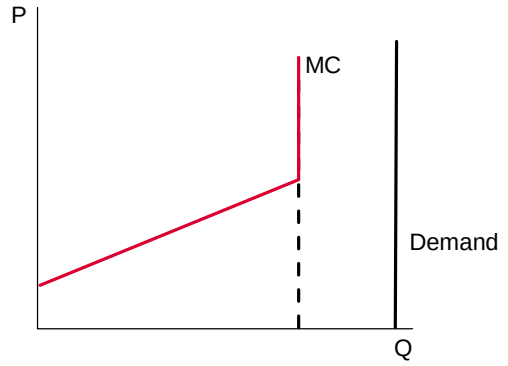
The RTO Millennium Order defines an efficient model for a competitive electricity market.



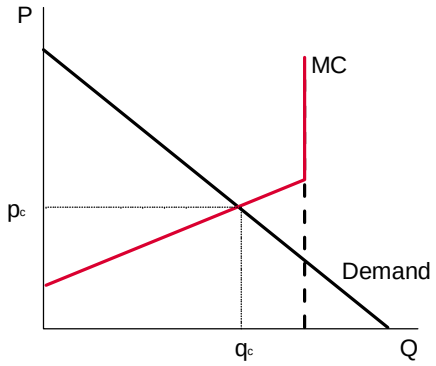
This supports a standard market design. The basic structure should be adapted to develop market power mitigation that is consistent with the transition to a competitive market.

Immediate adoption of a number of the key elements of the long-term market design would help in the transition. Demand side participation would operate to moderate price spikes.

Half A Market Has No Solution



A Workable Market Has A Workable Solution



"The highest priority must therefore go to establishing the essential conditions of an ideally functioning energy market that does not now exist: real-time metering and pricing at least on an hourly basis to a sufficient fraction of the market. Once these are installed, wholesale price spikes will be automatically severely limited, and such spikes as continue would be economically beneficent, in consideration of their effects on both the supply and demand side -- inducement of efficient levels of capacity, on the one side, and of conservation, on the other."[1]

---

[1] Alfred E. Kahn, "The Adequacy of Prospective Returns on Generation Investments Under Price Control Mechanisms," Electricity Journal, March 2002, p. 45.

Within the general market structure of Order 2000 and the Standard Market Design, there are many proposals for mitigating market power as part of a transition to competitive markets.

- Cost-of-service regulation.
- Divestiture.
- Forward contracts.
- Hard price caps.
- Pay-as-bid auctions.
- Soft price caps.
- Installed Capacity Requirements.
- Bid caps.
- Ex-post Refunds

The transition rules must incorporate as much of the critical market design features as possible along with an internally consistent method of moving from the old to the new. Hence, any transition framework should include explicit consideration of how well it is likely to work in a market setting and how it will ensure a transition to an efficient, workable market.

The most difficult problem is distinguishing good high prices from bad high prices.

- **"Just and Reasonable."** In the presence of shortages, high prices can be both efficient and beneficent. Demand will respond, supply will enter, and the market will adjust.
- **"Unjust and Unreasonable."** In the presence of strategic withholding, high prices are symptoms of a market failure. Regulatory intervention in the short-run targets bad behavior under market rules; or standard anti-trust litigation targets illegal activity.
- **"Just Unreasonable."**[2] In the presence of bad market design, exacerbated by shortages or transmission constraints, high prices can be perverse outcomes resulting from legal behavior and operation within the market rules.

Good policy would recognize the difference by, for example, targeting those who exercise market power. And this same policy would exclude:

- Small Single-plant Suppliers.
- Energy Limited Facilities.
- Net Buyers.
- New Entrants.
- Traders in Financial Contracts.

---

[2] A California savant. For example, see California Independent System Operator, "Proposed Market Stabilization Plan of the California Independent System Operator Corporation Provided in Response to Letter Order of March 30, 2001, Federal Energy Regulatory Commission, Washington DC, Docket No. EL00-95-012, April 6, 2001, p. 2.

Market power exists in electricity markets and its exercise can produce high prices. Market power mitigation is developing, but recent experience has increased the urgency of the problem

- Restructured electricity markets can experience price spikes. California saw sustained high prices in 2000-2001.
- Useful prescription of mitigation policy depends on diagnosis of the underlying causes.
- The complexity of electricity markets precludes a simple test of the exercise of market power and creates behavior that appears similar or the same for generators with or without market power.
- The best time for design of market power mitigation policy is before restructuring and sale of generation assets.
- Standard market design and effective demand-side participation on the short-term energy market are necessary conditions for a workably competitive electricity markets.
- Price caps, both hard and soft, create as many problems as they solve. Pay-as-bid auctions produce no benefits relative to a uniform-price auction and create new problems in the electricity market. Capacity requirements precipitate more regulation.
- A combination of divestiture, bid-caps and vesting contracts can provide market power mitigation during a transition, supporting a gradual move to a workably competitive market.
- The details matter, a lot.

Supporting papers and additional detail can be obtained from the author. William W. Hogan is the Lucius N. Littauer Professor of Public Policy and Administration, John F. Kennedy School of Government, Harvard University and a Director of LECG, LLC. This paper draws on work for the Harvard Electricity Policy Group and the Harvard-Japan Project on Energy and the Environment. The author is or has been a consultant on electric market reform and transmission issues for American National Power, Brazil Power Exchange Administrator (ASMAE), British National Grid Company, Calpine Corporation, Comision Reguladora De Energia (CRE, Mexico), Commonwealth Edison Company, Conectiv, Detroit Edison Company, Duquesne Light Company, Dynegy, Edison Electric Institute, Electricity Corporation of New Zealand, Electric Power Supply Association, GPU Inc. (and the Supporting Companies of PJM), GPU PowerNet Pty Ltd., Mirant Corporation, National Independent Energy Producers, New England Independent System Operator, New England Power Company, New York Independent System Operator, New York Power Pool, New York Utilities Collaborative, Niagara Mohawk Corporation, Pepco, Public Service Electric & Gas Company, PJM Office of Interconnection, San Diego Gas & Electric Corporation, Sempra Energy, TransÉnergie, Transpower of New Zealand, Westbrook Power, Williams Energy Group, and Wisconsin Electric Power Company. The views presented here are not necessarily attributable to any of those mentioned, and any remaining errors are solely the responsibility of the author. (Related papers can be found on the web at http://www.ksg.harvard.edu/whogan).