ELECTRICITY RESTRUCTURING: OPEN ACCESS AND MARKET DESIGN REVISITED

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Open Access Revisited: Lessons Learned
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Electricity restructuring is not easy in principle or in practice. The practice is producing many second thoughts.

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There is a tension between the role of market decisions and the special requirements of electricity systems. This is about restructuring, not deregulation.

“Market mechanisms should be used where possible, but in circumstances where conflicts between reliability and commercial objectives cannot be reconciled, they must be resolved in favor of high reliability.” (Blackout Task Force Report, April 2004, p. 139.)

A decentralized market with supply and demand equilibrium over the network sets an ideal. But this “completely bilateral” market is not possible in the case of electricity.
ELECTRICITY MARKET

The public policy debate over reshaping the electricity industry confronts major challenges in balancing public interests and reliance on markets.

“The need for additional attention to reliability is not necessarily at odds with increasing competition and the improved economic efficiency it brings to bulk power markets. Reliability and economic efficiency can be compatible, but this outcome requires more than reliance on the laws of physics and the principles of economics. It requires sustained, focused efforts by regulators, policy makers, and industry leaders to strengthen and maintain the institutions and rules needed to protect both of these important goals. Regulators must ensure that competition does not erode incentives to comply with reliability requirements, and that reliability requirements do not serve as a smokescreen for noncompetitive practices.” (Blackout Task Force Report, April 2004, p. 140.)

The focus should be on investment incentives and innovation, not short-run operational efficiency.

What should be the default rules when markets don’t suffice?
ELECTRICITY MARKET

Electricity Restructuring

The failures of electricity restructuring have ranged from the embarrassing to the negligent. Public officials and market participants are at a crossroads. But the road to take depends on the diagnosis of the failures and the identification of the needed corrections.

- **Go Back.** Can markets work well in the case of electricity? If not, then the old model of monopoly and regulation may be the best choice. But has too much happened since EPAct of 1992? It would be both difficult and expensive to go back, and the delay would create even more crises.

- **Stand Still.** Can we simply stay where we are and fix a few leaks, letting the regulators go home early? The rules are in turmoil and market institutions are fragile. The ostrich strategy is an invitation to continued surprises, and this should be no surprise.

- **Go Forward.** Can we go forward, put good markets in place, and treat the costs of the mistakes as the sunk costs of an expensive education? This requires leadership by the regulators, in Washington and in the states. We know what we must do:
  - Regional Transmission Organizations.
  - Standard Market Design.
  - Significant Demand Participation.
  - Market Power Mitigation.
ELECTRICITY MARKET

A Market Framework


The RTO Order SMD NOPR Contains a Consistent Framework

Coordinated Spot Market
Bid-Based, Security-Constrained, Economic Dispatch with Nodal Prices
Bilateral Schedules at Difference in Nodal Prices
License Plate Access Charges
Financial Transmission Rights (TCCs, FTRs, FCRs, CRRs, ...)

Poolco...OPCO...ISO...IMO...Transco...RTO...ITP...WMP...: "A rose by any other name ..."
The FERC “Successful Market Design” (SMD) faces major political opposition. A recent focus is cost-benefit analysis. A priority issue should be investment incentives.

The cost-benefit focus should be on investment incentives, not operational efficiency. With workable markets, market participants spending their own money would be better overall in balancing risks and rewards than would central planners spending other people’s money. If not, restructuring itself would fail the cost-benefit test.
There is experience with and without the “Successful Market Design” (SMD). There is one way to get it right, and many ways to get it wrong. This produces different failure modes.

Cost-Benefit Analysis of (SMD)

Open Access Non-Discrimination

SMD

Not SMD

SMD working in Mid-Atlantic, New York, New England. Planned for California (MRTU), Midwest (2005), ...

1997 1998 1999

CAISO
The first market design in PJM was not SMD, and failed abruptly.

Cost-Benefit Analysis of (SMD)

Key Defects

- Single Zonal Price

Market suspended on first hot day in June 1997.

SMD implemented in April 1998.
The first market design in New England rejected SMD, and failed more slowly.

Cost-Benefit Analysis of (SMD)

Key Defects

- Single Zonal Price
- No Bilateral Schedules

Generation investments ignored constraints. Rules then created barriers to entry.

SMD implemented in March 2003.
The first market design in California rejected SMD in many ways, and was already a failure before the price explosion.

Cost-Benefit Analysis of (SMD)

Key Defects
- Zonal pricing
- No economic dispatch, PX and market separation

"Dec" games and repeat of ISONE investment problems. System "fundamentally flawed."

SMD proposal in MD02 of June 2003.
Cost-benefit analysis is important, but the usual problem is in identifying the costs and the benefits. Asking the wrong question to focus on what can be done may ignore what is most important.

- Assume that many designs can support open access and non-discrimination.
- Assume that approximately the same investments will develop under any design.
- Focus on operating efficiency benefits that are likely to be small and may not be worth the effort.

Given these assumptions, the benefits of SMD may not be worth the costs. But these assumptions dispose of the principal arguments for SMD, and for electricity restructuring.

The evidence is clear, albeit difficult to quantify with big model precision. The assumptions are not correct, and market failures experienced under these assumptions have first order consequences.

The SMD is the “successful market design” and the only way known to work. There are many ways to get it wrong, but the alternatives impose large and avoidable costs.
The Successful Market Design challenge dictates the need for some central institutions to support markets through the seeming oxymoron of “coordination for competition.” What to do when markets alone do not suffice?

Central institutions differ in the degree of involvement and impact on the market.

- **Central Coordination.** Organized markets are required to avoid the “separation fallacy” and facilitate exchange between willing buyers and willing sellers in voluntary transactions. (E.g., energy purchase and sales in spot markets.)
  
  - Design can be compatible with largely decentralized decisions.
  - Emphasis is on consistent incentives.
  - Evaluation remains neutral on market choices.

- **Central Procurement.** Administrative determination of required products and services with imposition of mandatory payments as a condition of participation in the system. (E.g., operating reserves with charges collected through uplift payments.)

  - Emphasis is on assured outcomes.
  - Central judgment and mandatory payment replace market forces.
  - Slippery slope could undermine broad purpose of electricity restructuring.
Guidelines for design of electricity market institutions include:

- Define Products and Services Consistent with Real Operations.
- Create Property Rights.
- Establish Consistent Pricing Mechanisms.
- Design Central Institutions to Emulate Efficient Market Operations and Incentives.
- Target Structure and Scope of Central Interventions to Address Market Failures.
- Set Principled Limits for Interventions Based on the Nature of the Market Failure.
- Keep Focus on Goal of Workable, not Perfect, Markets.

**The demand for action by regulators demands that regulators keep their eye on the ball.**

**Focus on market design and market failures.** Better to fix a bad design than to micromanage bad decisions.

**Be afraid of the reflexive market intervention that sows the seeds of intervention.** Good advice might be: “Don’t just do something, stand there.” Better advice would be: “Look, and look hard, before you leap.”

Intervene where needed, and know how to stop!
The need for central institutions arises from the existence of prominent forms of market failure.

A Dangerous Definition of Market Failure. “The market fails to do what the central planner wants.”
Drawing a line between merchant and regulated transmission investment is a pressing requirement.

- **FERC Intentions.** FERC’s stated policy is to support both merchant and regulated transmission investment.

- **FERC Actions.** Motivated by pressure to stimulate transmission investment, recent FERC decisions undermine the policy goal. The mandated economic investment rules in PJM and cost socialization rules in New England defy the logic of electricity restructuring.

- **Slippery Slopes.** Regulated investment shifts the risks and provides cost recovery mechanisms not available to the merchant investor. Absent a bright line between regulated transmission investment and competing alternatives, there will be enormous and justifiable pressure on the regulator to put generation and demand investments on the same playing field of reduced risk and mandatory collection through regulated mechanisms. The intended modest domain of regulated transmission investment would expand to include integrated resource planning. The end state could be recreation of the central regulatory decision problems that motivated electricity restructuring in the first place.
TRANSMISSION INVESTMENT

Challenges

Draw the line between regulated and merchant investments to focus on market failure.

• **A Possible Line Between Merchant and Regulated Investment.** Regulated investment for economic upgrades would be limited to those cases where the investment is inherently large relative to the size of the relevant market and inherently lumpy in the sense that the only reasonable implementation would be as a single project like a tunnel under a river. Everything else would be left to the market. This results in a two-part test:
  
  o **Economic Justification:** The (expected net present value) aggregate benefits exceed the aggregate costs. This is the usual social welfare calculation that applies to all regulated investment under traditional regulation. Nothing new.
  
  o **Market Failure Justification:** The investment is large and lumpy enough to materially affect market prices, making the ex post rights worth less than the cost of the investment. A new test.

Some transmission investments and most other (generation and demand side) investments would not meet the second test. This principled boundary could provide a plateau on the slippery slope.

• **A Dangerous Definition of Market Failure.** “The market fails to do what the central planner wants.” This is the de facto definition apparent in FERC’s recent actions on transmission investment. It is not hard to see where this leads. Most investments would be left to the purview of the regulators and central planners, who operate a better collection agency.

  If the central planners (or regulators) know what to do, then do it.

  *But if true, what is the need for electricity restructuring and markets?*
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?
Market power exists in electric energy markets and its exercise can produce high prices. Market power mitigation is important. However, there is less here than meets the eye.

- California saw sustained high prices in 2000-2001. A widespread exercise of market power has been cited for up to 50% of the price increases.  
  \(^1\)

- Other tests of the counterfactual simulations yield results implying that the exercise of market power had little or no impact on electricity prices.  
  \(^2\)

- What looks like withholding may have an alternative explanation, and plant specific investigations have yet to produce clear evidence of significant physical withholding.  
  \(^3\)

- Market power seems to be a manageable problem in the eastern RTOs.

- Dynamic models produce different results than static, single-price simulations. The details matter.  
  \(^4\)

- “We do not have a good theory of oligopoly.”  
  \(^5\)

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\(^3\) For example, the initial investigation by the California Public Utility Commission identifying instances of possible withholding during shortage hours. On further examination the FERC Staff concluded that “[t]here is no evidence that any of the generators withheld any material amounts of available power during the hours of the firm service interruptions.” Federal Energy Regulatory Commission, “Staff’s Review of California Public Utility Commission’s September 17, 2002, Investigative Report On Wholesale Electric Generation,” March 26, 2003, p. 4, (emphasis in original).


\(^6\) Yves Smeers, Department of Mathematical Engineering and Center for Operations Research and Econometrics, Université catholique de Louvain, Louvain-la-Neuve, Belgium, “Market Power in Electricity,” SESSA Meeting Stockholm, October 7-8, 2004.
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.

"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." 7

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Within the general market structure of Order 2000, the Standard Market Design, and the Wholesale Market Platform, there are many tools 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."* 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.

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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.

- 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 error in the models is larger than the effects being estimated.
- 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.
- As always, the details matter, a lot.
ELECTRICITY MARKET

Too Hard?

Will Congress and the states support successful market design to facilitate markets and honor the priority of reliability?

Pressure on the FERC has been sustained

- Opposition from states in the Southeast and Northwest.
- Two days after the White Paper, Senate Energy Committee votes 13-10 to impose a two year moratorium on the Standard Market Design. FERC announces it will wait until it sees the outcome of the energy bill, which may be a long wait.
- To obtain unanimous consent and go to conference with the energy bill, Senator Shelby received a commitment to delay SMD for years. This would “cripple” FERC. (FERC Chair Pat Wood, September 15, 2003)
- The failure analyses of Blackout 2003 focused on the right questions and pointed to the structural connection with market design. Will there be an energy bill? An electricity bill?
- “These recent FERC actions signal a clear attempt by FERC to utilize creative mechanisms to force electric utilities to join RTOs regardless of the economic merit or benefits to ultimate ratepayers in the affected states.” (Letter to the President, nine southern governors, February 3, 2004)
- FERC launches new market power and market pricing reviews in 2004. The agenda includes revisiting Order 888?

Will Congress avoid the “separation fallacy”? Will FERC be able to act responsibly and follow through? Will the country endure a further long period of expensive experimentation with accidents waiting to happen? Will we undo electricity restructuring in an attempt to save it?