Considerations for the Design of Restructured Electricity Markets and Institutions

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Paul M. Sotkiewicz

Director, Energy Studies

Public Utility Research Center, University of Florida

paul.sotkiewicz@cba.ufl.edu

Overview

- Introduction
  - Based upon experience and observation
  - The need to understand industry operation in the context of more general legal and regulatory concepts
- System Operation
  - Puts the ideas of cost, pricing, and “markets” into context.
- Legal and Regulatory Concepts
  - So many ideas to consider and to implement either in the context of a regulated industry or a industry opened to competition.
- Power Market Concepts and Questions
  - So many things to consider if there will be competitive markets for generation

System Operation

- Security Constrained Unit Commitment (SCUC)
  - Protocol by which the utility/system operator commits units to run in advance of the real-time dispatch
  - Is this being done in a true least-cost manner?
  - How are contingencies handled for reliability?
  - Is it pre-programmed or is there an operator heuristic?
  - How is system lambda (market clearing price) determined?
- Security Constrained Dispatch (SCD)
  - How often are dispatch signals sent?
  - How is system lambda determined?
  - Are the system contingencies different than in the SCUC?

System Operation

- Contingency Constraints
  - Can these be relaxed to improve cost-effective operation? Or do they need to be tightened to improve reliability?
  - Cost impacts
- Pricing/Management Protocols for Transmission Constraints
  - Do transmission bottlenecks get explicitly priced or are these costs “socialized” across the system.
  - If bottlenecks are priced, how is this done?

System Operation

- Ancillary services
  - These include services such as reserves, voltage support, and frequency response.
  - Are these being included in the SCUC and SCD in a least cost manner?
  - How are ancillary service costs determined
- Must Run Units
  - How are these accounted for in the dispatch?
  - How are they compensated?
  - Do they set the system lambda?
  - How do consumers pay for these? If these units are run for reliability in a region, are the costs “socialized”?

Legal and Regulatory Concepts

- Independence of operating institutions
  - In a market environment, the market and system operator functions must be independent from market participants.
- Creditworthiness
  - See Enron. Enough said!
- Licensing Requirements
  - Credit, ability to deliver, quality, reliability, and market conduct.
- Facility Siting
  - Both generation and transmission
  - Can sites be chosen that will promote the least-cost expansion of the system?

Legal and Regulatory Concepts

- Interconnection
  - Needs to address reliability and cost issues
- Reliability
  - Addresses both operational security and generation adequacy.
  - Does the regulator enforce these standards?
  - What are the cost impacts to consumers?
- Integrated Resource Planning
  - Really a forecasting and advisory tool at best.
  - Can help the regulator enforce and revise reliability standards as needed.
- Demand-side resources
  - Allows consumers to respond to price or for the utility to move load to preserve reliability and reduce costs.

Legal and Regulatory Concepts

- Generator Rate Regulation
  - This is a way of managing competition through the rates generators can set.
  - Used to protect consumers from market power.
- Transmission Access, Terms, and Conditions
- Cost Separation and Cost Reflectivity
  - Rebalancing tariffs to eliminate subsidies where desired and can be used as a baseline to implement cross-subsidies where socially desirable.
- Obligation to Serve
  - While this is fundamental, there should be encouragement of both utilities and regulators to find new rate designs that will not make this financially burdensome.

Legal and Regulatory Concepts

- Market Power and Market Monitoring
- Consumer Protection and Codes of Conduct
- Existing Contracts in a Market Environment
  - Contracts for transmission service, power, and contracts associated with facility sales.
- Metering and Telemetry
  - This is important to have data on load and generation along with costs to see how efficient the system is being operated.
  - Can help in implementing new rate designs
- Information Requirements and Disclosure
  - The regulator needs information on costs and operations to do its job properly.
  - What information shall be required and how will it be used?

Legal and Regulatory Concepts

- Treatment of Distributed, Co-Generation, or Renewable/Intermittent Resources
  - How to include these resources in a non-discriminatory and cost-effective way.
- Regulator Resources
  - Staffing and training.
- Inter-agency Coordination
  - With ministries and other agencies that may hold some jurisdiction over the industry
- Governance Structures of Regulated Utilities and Institutions Where Competition is Introduced
  - Structure of governing boards
  - Voting rules
  - Authority of the board

Market Concepts and Questions

- What services should be opened to competition?
- Who can participate in the markets?
- What is the design of the market in general?
- How many markets over time?
  - Week-ahead, day-ahead, hour-ahead, real-time?
- Bidding rules and information requirements to be in the market?
- Price determination?
- Financial settlement procedures?

Market Concepts and Questions

- Separation of market and system operations?
- Procedures for handling other resources…
  - Must run units
  - Renewable and intermittent resources
- Transmission Management
  - Access
  - Pricing
- After-the-fact market information disclosure

Concluding Thoughts

- There is a lot for regulators to contemplate in undertaking industry reform.
- If competition in generation is being considered, the complexities become even greater.
- If one lesson can be taken from experience it is to move deliberately and methodically and avoid rushed decisions and implementation.