The Transition to Standard Market Design

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Which Way from Here?
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Transitioning from cost-of-service/rate-of-return to market/incentive based regulation
The paradigm shift problem of Urban VIII

1543: Copernicus publishes a book claiming the earth revolves around the sun then dies.
Church doctrine: earth is the center of the universe
Early 1600s: Bruno burned at the stake
Galileo develops telescope, observes the universe and irritates the Jesuits
Cardinal Barberini supports Galileo
1632: Dialogue is published; bubonic plague
1633 Urban orders Inquisition of Galileo
Urban will be seen as weak if he supports him.
Guilty! Dialogue placed on the Index
Post Galileo: the quantum mechanics

Cardinal Barberini was Urban where you stand depends on where you sit.

1642: Galileo dies; Newton is born

Newton discovers gravity and the calculus continuity and certainty rule

1835: *Dialogue* removed from the *Index*

1905: Albert E introduces relativity

quantum mechanics declares that discontinuity and uncertainty are the rule

1992: John Paul II accepts to Galileo’s empirical approach to science
The law is Not optional

▶️ The ‘anything goes’ era ended in 2001
▶️ No deregulation; liberalization and restructuring
▶️ the core mission
   ▶️ prevent undue discrimination
   ▶️ establish just and reasonable rates
   ▶️ in both transmission and wholesales
▶️ Balance between market power and confiscation
▶️ Do we know it when you see it? when to intervene?
▶️ Price set in a well-functioning market. DC Circuit
▶️ SMD is FERC’s proposal to carry out its responsibility
Failed market designs

- Zonal markets (Cal, PJM, NE, UK)
- Sequential markets for energy and anc services
- One settlement systems
- Infeasible markets (Cal PX and UK)
- Ignore non-convexities (start-up and no-load)
- Ignore market power
- As-bid/first-price auctions
- All ended in administrative intervention
- No property rights to market power or poor market design
Myths and Shibboleths

☯ All electric systems have central dispatch. The question is how to do it.

☯ We are acting on lessons from failed (weeds) and successful (flowers) real experience

☯ SMD does not cure cancer, but there are no known technical impediments to SMD

☯ Market power and free riders issues must be addressed

☯ Significant State and Regional variations: RAR, CRR, access fees, DM, ...
Cost-of-Service Nostalgia

咍enames

Cost-of-Service is Sam Insull’s legacy
咍enames
COS is a complex adjustable mortgage
咍enames
Stranded Costs: $200 billion
咍enames
Nuclear value: < 15% of book
咍enames
Fossil value: 200% of book; over-depreciated?
咍enames
Cost-of-capital is lower, but capital is wasted
咍enames
Bailey’s request for higher ROE
咍enames
Affiliate abuse is rampant
咍enames
Consumer assumes all the risks
咍enames
How do you calculate a rate for a new IPP?
咍enames
How do you ration capacity?
Electric Restructuring requires Institutional change on all levels

- **Culture:** religion, customs, and traditions
  - change interval: decade to century or more
  - Market theology v. regulation
  - develop ethical practices

- **Formal rules:** laws (FPA ’35; EPAct ’92)
  - change interval: decade +
  - What is legal under the FPA? ‘well-functioning market’

- **Play of the game:** regulations (888, 2000, SMD)
  - change interval: one to ten years
  - Market-based rates; hub and spoke, SMA, SMD

- **Resource allocation:** markets
  - change interval: real time
  - bucket shops, ISOs, Enron OnLine, SMD
Changing incentives

☀ All markets have rules
☀ Job align efficiencies and incentives
☀ From fiduciary responsibility to illegal activity, eg, declared outage, high bids
Quite Free market Catch 22
- Eliminate 205/206
- After short time, the market will sort it out
- Not politically feasible, Congress will intervene
主义思想
- Mitigation is error prone
- Should it be illegal to lie about marginal cost
- Bearing false witness over the wires!!!
good market design

- Critical when market is tight
- Need SMD market to be compatible with off-SMD markets
- Efficient and competitive with truthful bidding
- Incentives and rules for truthful bidding
  - Avoid excessive mitigation
  - Demand curve for reserves
- Settlements: revenue adequacy/payments cover bid costs
- Don’t favor large players
- Deal with free riders: reservation bids
- Good information (monitoring) systems
  - Ex-ante for expectations
  - Real-time for mitigation
  - Ex-post for future decisions
bilateral market disciplined by spot market
Long-term monitored for entry barriers
Start the process when entry is possible
Demand bidding counts; trust but verify
May need to install curtailment equipment
If you are short in the spot market, you may have to pay a high price
If you are long in the spot market, you may receive a high price

Warning Label for Spot Markets
Failure to forward contract or submit demand schedules is risky and may be hazardous to your financial health
Market power: can it be discussed in polite company?

The researches of many commentators have already thrown much darkness on the subject and it is probable that, if they continue, we shall soon know nothing at all about it."

Mark Twain

- Conditions for market power abuse
- Entry and/or exit barriers
- Demand response: ‘low’ demand elasticity
- High market concentration
- Market segmentation: congestion
- Profitable withholding or discrimination
**Market Power Mitigation Options**

- Hear No Evil, See No Evil, Speak No Evil
- let antitrust folks take care of it
- Punitive Ex-post (The Antitrust Approach)
- Watch (Chauncy Gardner), Report and ?
- Return to Cost-of-Service (Regression Therapy)
  - Price Caps and curtailments
  - price caped long-term contracts: number please
- Divestiture (the Big Stick): \((p - \text{amc})/p = HHI/e \) !!!!
- Dynamic must offer with bid caps
- Hydrants must be checked one hour before all fires
Market power potential is a function of the weather and topology.

Nash/Cournot equilibrium:

\[(p - amc)/p = HHI/e\]

amc = wgt. avg marginal costs

e is the market elasticity, it is a function of weather and topology.

As q gets larger, e gets smaller, \((p - amc)/p\) gets larger.

What is illegal under antitrust law without collusion?
Ex-ante is highly error prone and unilateral
- Hub and spoke
- SMA

Contract cover is important, but complex

Ex-post mitigation is too messy
- Western markets are poster child

Mitigation must be politically tuned
- High prices, scarcity rents and market power
- Bilateral market disciplined by spot market mitigation and monitored for entry barriers
Dynamic Mitigation

- After unit bids submitted in DAM and RTM
- triggers for mitigation
- **Unit must offer with Bid Caps**
  - free of behavioral assumptions, e.g., AMP
  - Fewest assumptions and guesses
  - Less error prone
  - used infrequently (guard rails and hydrants)
- Demand curve for reserves to reflect scarcity without exercising market power
- Allows competitive markets to function
Must Offer with Bid Caps (Efficient Competition)

- Require creditworthiness
- Demand bidding or contract cover: no vertical demand curves
- Develop triggers for mitigation: no withholding
- Non-punitive: Bid at marginal costs get market clearing price

Requires
- Rough calculation of marginal costs
- Day-ahead market for ex-ante correction
- Loss of load value if demand does not bid

Does not require
- Capital costs
- Regulation of marketers or forward trades
Hydro and Energy Limited Resources

- Requires forward planning of generation
- Complicated opportunity costs
- Optional special bidding rules
  - Bid daily max energy
  - DAM will get maximum revenues
- Announce rules and plan for non-economic activities
  - E.g. Fish protection, irrigation, other
- Monitoring
  - Observe bidding pattern over time
  - E.g. running off-peak and not on-peak
  - Compare to announced program
Portable Entitlement Program

POLR maintains resource adequacy requirements under state/local regulation

Portable entitlement program (fixed p and q)
- Long-term entitlements includes CRRs
- Attached to the customer
- Auto buy/sell for under/over entitlement in SMD spot
- Entitlement moves when the customer moves from POLR

Choice is real-time meters or regional blackouts

Choice should be RTM or real-time curtailment

Volatility in Real-time

Control volatility in bills: moving average option
Can the expansion market become more competitive under an independent RTO?

☯ Yes, if we have the will.
☯ Back to the 1970s.
   ☯ Can generation be competitive?
☯ ITCs like being franchised tx monopolies
   ☯ Do we need franchised tx monopolies?
☯ Are RFPs (Demsetz markets) too hard?
   ☯ Williamson's caution in Oakland cable TV
☯ Who pays? free riders? non-beneficiaries?
What is needed for competition?

- good market design and information
- organizing principle: compatible incentives
- recognition and mitigation of market power
- Interaction of markets and physics
- Market approaches to replace planning
- understand the choices
  - free market (Coasian dream). NOT
  - markets with market rules (SMD)
  - administrative rules (TLRs and OFOs)
  - State socialism
You don’t always get it right the first time.
Now you have experience
Try SMD

No, we didn’t nuke ourselves back into the stone age. We deregulated our electric utilities...

Are you a Copernican or a Ptolemaic?

All power corrupts, but we need the electricity.