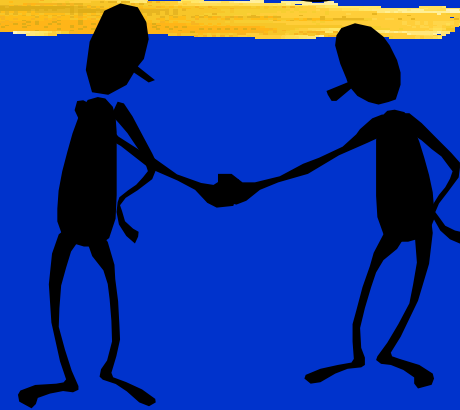


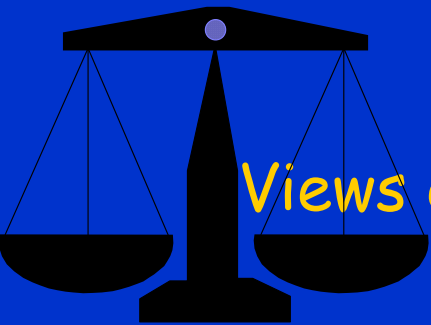
ISO as the new utility why are the states deferring?



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Federal Energy Regulation Commission
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ISO as the New Utility
Harvard Electricity Policy Group
San Diego, CA
March 1, 2004



Views expressed are not necessarily those of the
Commission



Cost-of-Service Nostalgia

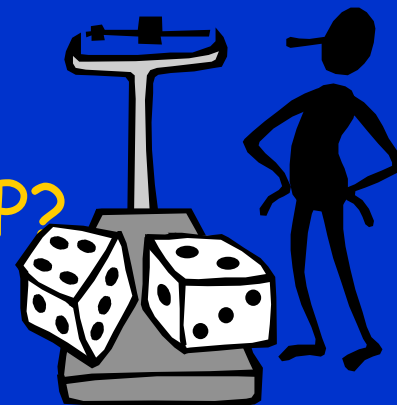


- ☹️ Cost-of-Service is Sam Insull's legacy
- ☹️ COS is a complex adjustable mortgage
- ☹️ Pre-open access Stranded Costs: \$200 billion

- ☹️ Nuclear value: < 15% of book

- ☹️ Fossil value: 200% of book; over-depreciated?

- ☹️ Cost-of-capital is lower, but capital is wasted
- ☹️ IOU becomes a cash cow for risky investments
- ☹️ Affiliate abuse is rampant
- ☹️ Consumer assumes almost all the risks
- ☹️ How do you calculate a rate for a new IPP?
- ☹️ How do you ration capacity?



History of competitive electricity markets



Research and Development (1978-1998):

- PURPA (1978)
- Joskow and Schmalensee (1983)
- Schweppe et al (1988)
- Hogan (1992, ...)

"Almost every generally accepted view was once deemed eccentric or heretical."

Everett Mendelson, Stephen Jay Gould, Gerald Holton and others to the Supreme Court

First Adapters (late 1995-2003):

- Market-based rates
- Order 888 and ISOs
- CALISO, PJM, NYISO, ISONE
- California crisis, Enron collapse and irrational exuberance

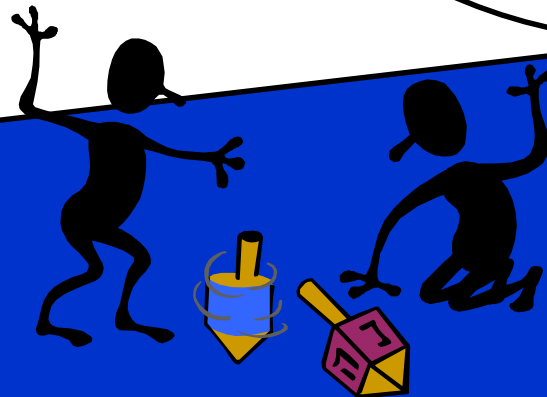
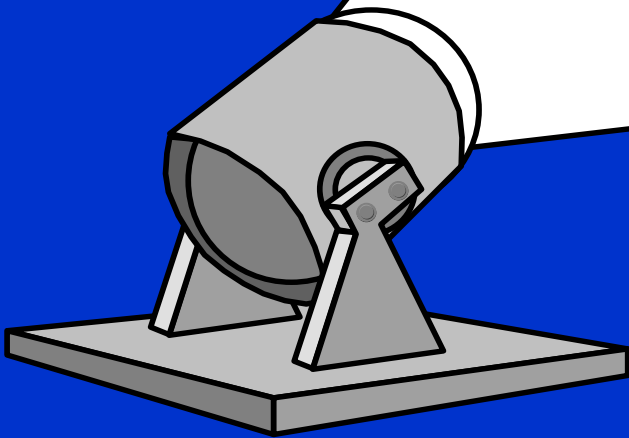
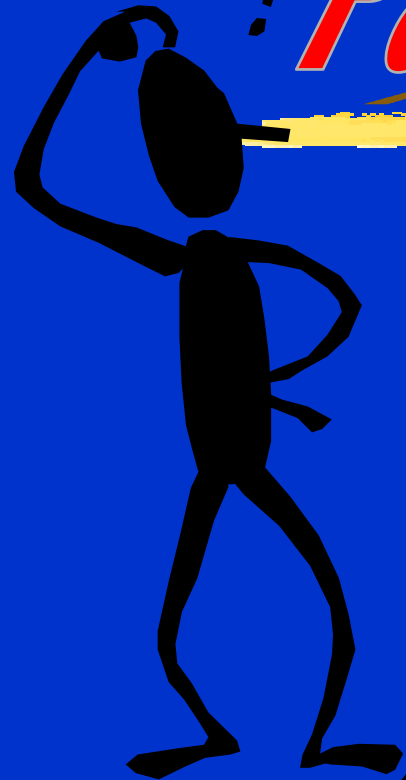
S-curve(2003-?): SMD, WMD, transmission rights

Steady-State: ? New Federal-state equilibrium



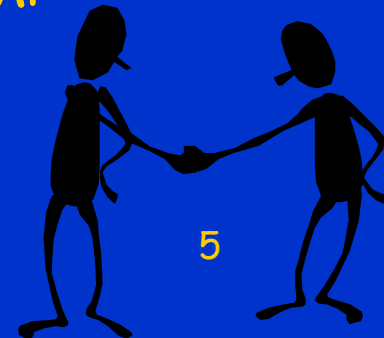
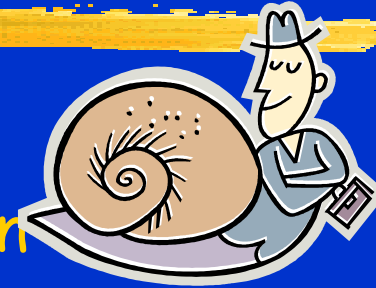
? Paradigm Change

Transitioning from
planning and
dispatch to
auction, incentive
and market power
mitigation models



Electric Restructuring requires Institutional change on all levels

- ❑ Culture: religion, customs, and traditions
 - ❑ change interval: decade to century or more
 - ❑ Theology: market v. cost-of-service regulation
 - ❑ develop ethical practices
- ❑ Formal rules: laws (FPA 35; PURPA 78; EPAct 92; 04?)
 - ❑ change interval: decade +
 - ❑ What is legal under the FPA? 'well-functioning market'
- ❑ Play of the game: regulations (888, RTO, SMD, WMD)
 - ❑ change interval: one to ten years
 - ❑ Market-based rates; hub and spoke, SMA, AMP
- ❑ Resource allocation: markets
 - ❑ change interval: real time
 - ❑ bucket shops, ISOs, Enron OnLine, SMD



RTO Rule: 02K

Dec 1999



Characteristics

- 📖 independence
- 📖 appropriate regional configuration
- 📖 operational authority
- 📖 short-term reliability

Functions

- 📖 tariff adm and design
- 📖 congestion management
- 📖 parallel path flows
- 📖 ancillary services supplier
- 📖 real-time balancing market
- 📖 efficient rate designs
- 📖 **Information:**
 - OASIS/TTC/ATC
- 📖 market monitoring
- 📖 planning and expansion
- 📖 open architecture

RTO/ISO's role



- ⇒ Independent board
- ⇒ Facilitate stakeholder process
- ⇒ Market operator; not market participant
- ⇒ Creditworthiness: no vertical demand curves
- ⇒ Protects property rights
- ⇒ Demand side bidding
- ⇒ Capacity options should rest on LSEs
- ⇒ Information system operator
- ⇒ Flexibility and options: market/engineering/
software interface is still evolving

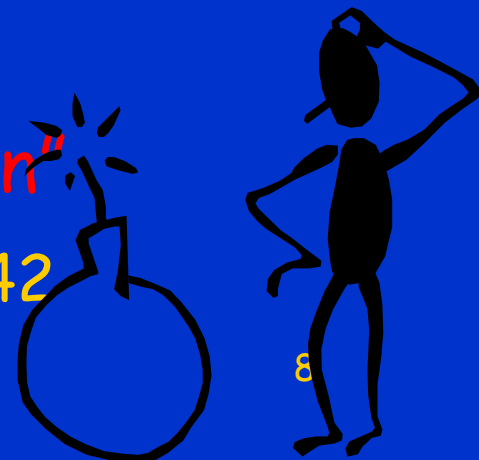
Refs must be independent



- ☯ Umpire fields a ground ball because the first baseman should have but didn't field it
- ☯ Ref makes a tackle after player misses a tackle he should have made
- ☯ Ref stops a ball from going out of bounds because it was a bad pass

"perennial gale of creative destruction"

Schumpeter, 1942



Debunking Myths and Shibboleths ($\pi=22/7$ or 3.1415...)



- ☯ All electric systems have central dispatch.
- ☯ The question is how to do it and coordinate the seams.
- ☯ We are acting on lessons from failed (weeds) and successful (flowers) real experience
- ☯ SMD does not cure cancer, but there are no known technical or economic impediments to SMD
- ☯ Market power, casino and free rider issues must be addressed
- ☯ Significant State and Regional variations: RAR, CRR, access fees, DM, ...

The law is Not optional



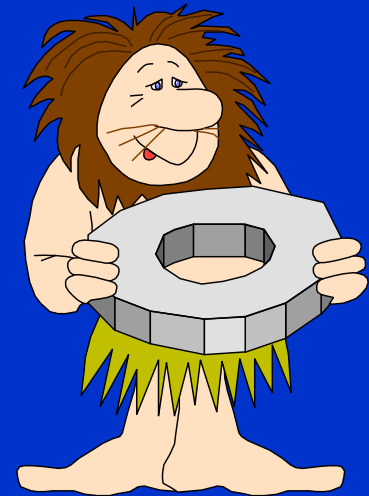
- The 'anything goes' era ended in 2001
- the core mission
 - prevent undue discrimination
 - establish just and reasonable rates
 - in both transmission and wholesales
- Not deregulation; liberalization and restructuring
- Balance between market power and confiscation
- Do we know it when you see it? when to intervene?
- Mitigation and strategic behavior are error prone
- Price set in a well-functioning market. DC Circuit
- SMD/WMD is FERC's proposal to carry out its responsibility



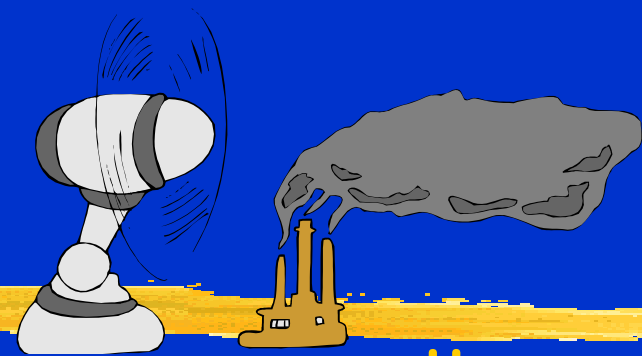
good market design



- 👤 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

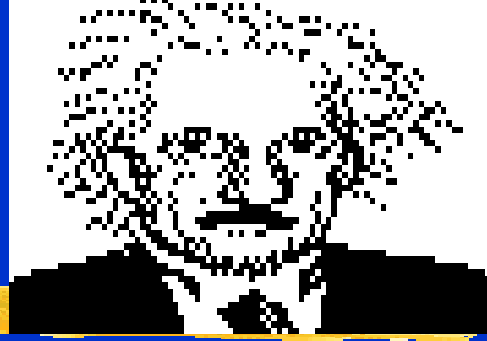


Externality and competition



- ⇒ An externality: whenever consumer well-being or a firm's production possibilities are directly affected by the actions of another market participant (MWG).
- ⇒ This definition is broad
- ⇒ Acceptable in competition: business stealing and 'creative destruction'
- ⇒ Unacceptable in competition : involuntary takings: eminent domain; excessive market power; dirty air and water; uncompensated loop flow

Problems with internalizing externalities



- ⇒ Beneficiaries pay and get property rights, but how much?
- ⇒ non-beneficiaries should not pay
- ⇒ Game: Beneficiaries get others to pay
- ⇒ Arguments for 'public good' treatment
 - ⇒ Administrative efficiency: too hard to do right
 - ⇒ Everyone benefits *eventually*
 - ⇒ Cost-benefit study (politics in drag)
 - ⇒ "Everything should be made as simple as possible ... but not simpler." Einstein

Issue: market response time

- ↪ Problem: Too slow, vertical demand curve
- ↪ Externality: system collapse or blackout
- ↪ Current Approach: reserves (inventory)
- ↪ Panic Approach: ISO buys reserves
- ↪ Future Approach: faster, maybe real-time, response (just-in-time)



Issue: entry and exit



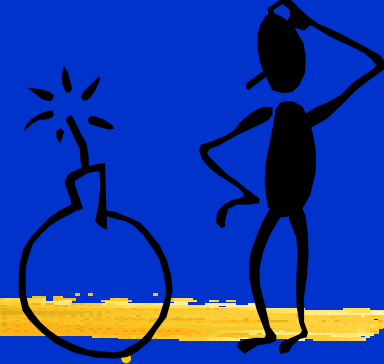
- ↪ Problem: entry
- ↪ Externality: time to enter
- ↪ Current Approach: hope
- ↪ Panic Approach: get ISO to buy
- ↪ Future Approach: forward contracts
- ↪ Problem: exit
- ↪ Externality: time for new entry
- ↪ Current Approach: vague rules
- ↪ Panic Approach: forbid it
- ↪ Future Approach: sufficient notice time

Issue: Withholding



- ↪ Problem: market power leading to inefficiencies and inequities
- ↪ Externality: non-competitive prices
- ↪ Current Approach: AMP, RMR
- ↪ Panic Approaches: let'r rip and over mitigate
- ↪ Future: resource adequacy as a hedge, dynamic mitigation, negotiated withholding, exit strategy

Issue: Transmission rights



- ↪ Problem: PTP options and network service are not mapable into FTR obligations
- ↪ Current Approach: vague rules for existing contracts; short-term Ftr obligation and questionable LT rights
- ↪ Should native load get the residual?
- ↪ Panic Approach: force fit
- ↪ Future Approach: ftr options, flowgates
- ↪ Dispatchable flowgates and Admittance pricing (Gribik)?

State responsibility: welfare of its citizens



- ⇒ resource adequacy of the state's citizens
 - ⇒ reliability POLR answers to the state
 - ⇒ Opt in and out
- ⇒ Can subsidize inside the state, but not outside
- ⇒ demand response (including curtailment)
- ⇒ management of transmission rights and risks of native load
- ⇒ siting of generation and local distribution
- ⇒ long-term generation contracts and hedging

resource adequacy

Warning Label for Spot Markets
Failure to forward contract or submit demand schedules is risky and may be hazardous to your financial health

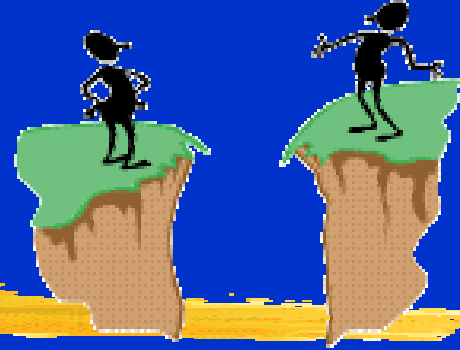
- ↪ bilateral market disciplined by spot market
- ↪ Long-term monitored for entry barriers
- ↪ Start the process when entry is possible
- ↪ Demand bidding counts; trust but verify
- ↪ May need to install curtailment equipment
- ↪ If you are short in the spot market, you may have to pay a high price
- ↪ If you are long in the spot market, you may receive a high price

Portable Entitlement Program

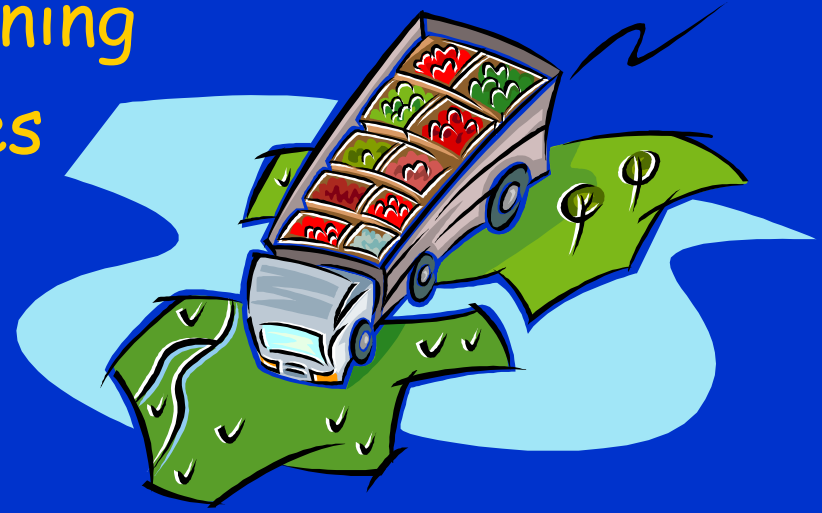
- ☺ POLR maintains resource adequacy requirements under state/local regulation
- ☺ Portable entitlement program (fixed p and q)
 - ☺ Long-term entitlements includes tx rights
 - ☺ Attached to the customer
 - ☺ Auto buy/sell for under/over entitlement in SMD spot
 - ☺ entitlement moves when the customer 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 option₂₀



federal role



- ⇒ interstate markets
- ⇒ interstate reliability including curtailment
- ⇒ transmission rights market design
- ⇒ short-term market design: RTM, DAM,
- ⇒ backstop transmission siting
- ⇒ Oversight of interstate planning
- ⇒ Prevent cross-state subsidies



ISO/RTO role



- ⇒ Independent
- ⇒ Revenue neutral auctioneer
- ⇒ Planner
- ⇒ Group coordinator
- ⇒ Owns no electric assets
- ⇒ Takes no market position
- ⇒ Software developer

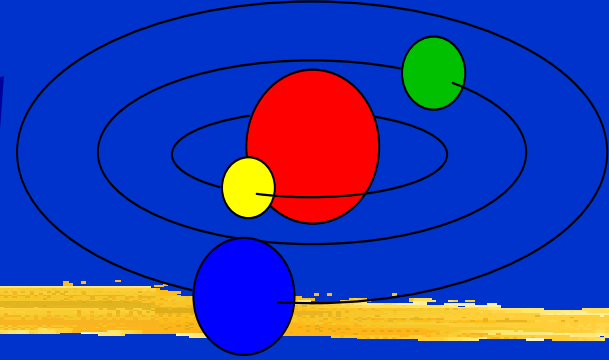
What is needed for competition?



- 😊 good market design and information
- 😊 organizing principle: compatible incentives
- 😊 recognition and internalization of externalities
- 😊 markets and incentives for reliability
- 😊 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



transitions are not easy



"A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it."

Max Planck, "Scientific Autobiography and Other Papers"

