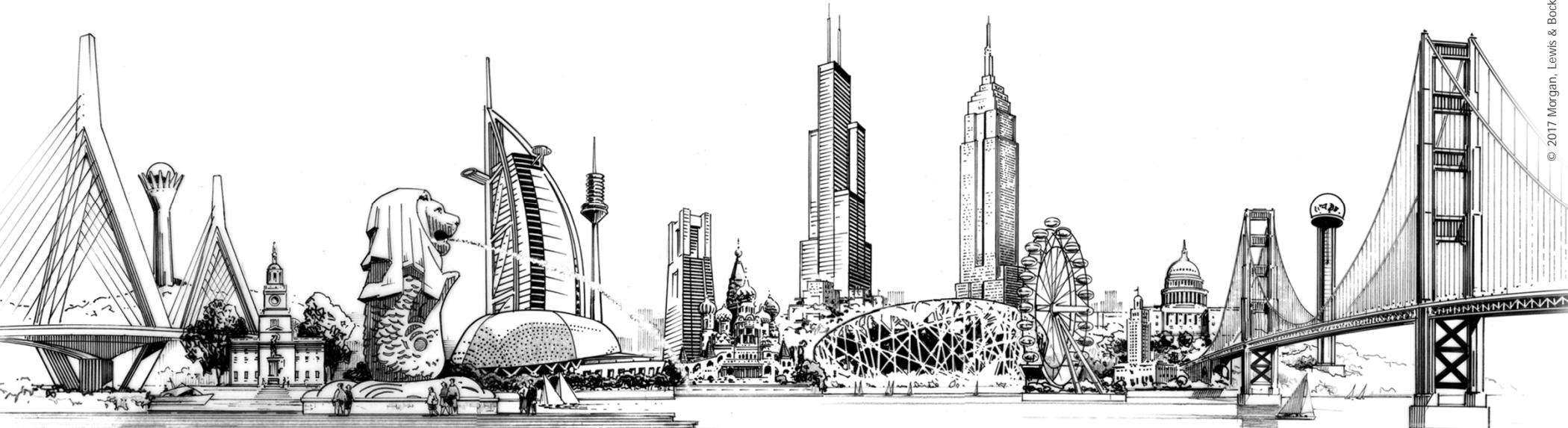


Morgan Lewis

MARKET DESIGN PROPOSALS AND THE IMPACT ON NUCLEAR GENERATION

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SECTION 01

THE CHALLENGE FOR NUCLEAR POWER PLANTS IN TODAY'S ORGANIZED WHOLESALE POWER MARKETS

Overview

- Merchant nuclear power plants in wholesale markets are at a crossroads.
- Low wholesale market prices, driven by, among other things, low cost gas and growth in renewables, are affecting the bottom line of nuclear generators.
- Since mid-2000s, nuclear power plants have announced planned shutdowns due to market issues.
 - E.g., Three Mile Island, Kewaunee, Pilgrim, Indian Point
- Losing nuclear power from wholesale markets raises myriad concerns.
 - Impacts on environmental, long-term reliability, and fuel diversity goals.
- States, the wholesale markets, FERC, and DOE are evaluating responses.
- These issues are becoming increasingly urgent.
 - Nuclear plant operators face significant uncertainty
 - The pace of regulatory response may not be soon enough
 - Once shut down, there is no easy way back for a nuclear generating plant

The Northeast Wholesale Power Markets

- Focus of Recent FERC Tech Conference is Organized Wholesale Electricity Markets in Northeast (RTOs/ISOs)
 - PJM
 - ISO New England
 - New York ISO
- Organized Wholesale Electricity Markets
 - Energy and Ancillary Services (e.g., operating reserves, reactive power) Markets
 - Capacity Markets

Northeast Energy Markets

- Energy and Ancillary Service Markets
 - Day-Ahead Energy Market
 - Load-Serving Entities schedule next day's load requirements
 - Resources submit bids to supply energy and ancillary services
 - Real-Time Energy Market
 - Resources not selected Day-Ahead can submit bids to the Real-Time market.
 - Imbalances between Day-Ahead schedules and Real-Time are resolved.
- Market Operator utilizes algorithms to identify an optimal dispatch in light of generator run-times, production costs, anticipated load levels, and transmission limitations.
 - Resources bid at or below their variable cost
- Locational Marginal Prices (LMPs) are paid by load and to resources that clear the Market Operator's optimization
 - LMP prices represent the marginal cost of supplying load at a particular location.
 - LMP prices are function of three components: energy, congestion, and losses.
 - Resource with highest cost bid that is selected by Market Operator to run sets the clearing price. All other selected resources receive the clearing price, not what they bid
 - Wide mix of resources compete in energy markets: traditional fossil, nuclear, renewables, demand response

Northeast Capacity Markets

- Functions of Capacity Markets
 - Provide contribution to fixed costs for resources in the organized markets
 - Ensure reserve requirements are met for load-serving entities
 - Provide price signal for new generation and facilitate new investment
- Capacity Auctions
 - Resources submit bids into auctions held advance of delivery period.
 - PJM and ISO-NE: annual auction (three years in advance)
 - NYISO: biannual auction (30 days in advance of Winter/Summer periods)
 - In conducting auction, Market Operator seeks to meet reserve requirement thresholds with the lowest-cost mix of resources, while respecting transmission constraints. Constraints cause different zones within markets.
 - Resources that clear the auction receive monthly payments in the delivery period based upon the highest cost bid accepted in the auction. Selected resources must bid into energy market during that period.
 - Wide mix of resources compete in the capacity auctions: traditional fossil, nuclear, renewables, demand response
 - Minimum Offer Price Rules/Offer Review Trigger Price: new generation resources are subject to bid floor based upon proxy price for technology type.

Declining prices in Northeastern Wholesale Markets

- Prices generally have been declining
 - LMPs
 - PJM's load-weighted average day-ahead LMP in 2016 was \$29.68/MWh, down 19.2% from 2015's average price of \$36.73/MWh.
 - ISO-NE's average annual wholesale power price in 2016 was \$28.94/MWh, the lowest since 2003.
 - NYISO's average annual wholesale electric price in 2015 was \$44.09/MWh, the lowest in NYISO history.
 - Capacity Auctions
 - The ("rest of") PJM May 2017 capacity auction clearing price was \$76.53/MW-day, down from prior three years that cleared above \$100/MW-day.
 - ISO-NE February 2017 capacity auction clearing price was \$5.30/kW-month, down from 2016's clearing price of \$7.03/kW-month.
- Causes
 - A primary driver: increased competition natural gas and renewables
 - EIA: 2016 gas prices were the lowest since 1999
 - Other factors:
 - Competition from demand response
 - Flat or declining demand (milder weather, energy efficiency programs)
 - Excess supply

What Can States Do? Authority of States over Generation

- Options: Expand Renewable Portfolio Standards to “Clean Energy” Portfolio Standard, Carbon Tax or Carbon Trading Platform, program similar to Renewable Energy Credits?
- Background: FERC v State Authority
 - FERC has jurisdiction over wholesale energy markets and prices
 - States have jurisdiction over integrated resource planning and may set state policies that favor certain types of generation through subsidies or other rules
- In recent years, several State programs to augment wholesale prices in order to accomplish State resource goals have come under attack
 - Maryland and New Jersey Contracts for Differences
 - Local utilities must enter into contracts with new generation and pay the difference between the contract price and PJM clearing price
 - Hughes v. Talen: Supreme Court rules that the programs are preempted by FERC regulation.
 - States cannot adjust an interstate wholesale rate
- The MOPR (a bid floor) in wholesale capacity markets is intended to counter certain types of subsidies to new generators

The Zero Emission Credit Programs

- Zero Emission Credit Programs are similar to Renewable Energy Credit Programs
 - Intended to recognize zero emissions benefit of nuclear generation
- Illinois ZEC Program
 - A ZEC is a tradeable credit that represents the environmental attributes of one MWh of energy produced from a qualified zero emission facility. ZEC program is 10 years.
 - Qualified: capable of generating cost effective zero emission credits in an amount approximately equal to 16% of the actual electricity delivered to retail customers in Illinois in 2014.
 - A ZEC's price is set at Social Cost of Carbon (\$16.50/MWh), subject to reduction in the amount by which actual average prices in PJM and Midcontinent Independent System Operator (MISO) exceed projected average prices.
 - Illinois utilities must buy ZECs in an amount equal to 16% of the electricity that they distribute each year, passed on to retail customers in distribution surcharges.
- New York Zero Emission Credit Program
 - Similar to Illinois; term is 12 years.
 - New York uses Social Cost of Carbon less cost of carbon in Regional Greenhouse Gas Initiative, less the amount by which the sum of the NYISO forecasted average electricity prices exceed \$39/MWh
- New Jersey, Connecticut, and Pennsylvania considering similar programs
- Challenges to both ZEC Programs have been filed in federal court
 - Last Friday, challenges to the Illinois ZEC program were dismissed

SECTION 02

PROPOSALS IN ORGANIZED MARKETS

Proposal in ISO-NE: Competitive Auctions with Subsidized Policy Resources

- ISO-NE's proposal is focused upon incorporating new generation and allowing existing uneconomic generation to retire.
 - Goal is to avoid suppressed prices caused by subsidized generation, while providing financial incentive for existing, high cost generators to retire.
- ISO-NE is considering an approach that would allow subsidized new resources to step into the shoes of existing capacity resources that are unable to retire due to reliability reasons.
- ISO-NE would conduct a two-stage auction.
 - First Stage: Regular Forward Capacity Auction where existing and planned resources compete for capacity payments.
 - Second Stage: Substitution Auction where, free of MOPR, subsidized resources compete to step into the shoes of existing resources that seek to retire. Winning bidders pay the existing resource a severance payment to retire. Existing resource permanently retires. Clearing prices to other generators unaffected.

Several New Proposals in PJM

- PJM Energy Market Flexibility Reforms
 - PJM rules currently require nuclear generators to run at their economic minimum during non-peak periods. During such periods, nuclear generators are ineligible to set the market-clearing energy price and must be “price takers.” Only “flexible” generators can set price.
 - PJM is considering energy market rule reforms that would permit nuclear generators to set the price during non-peak periods.
- PJM Energy Market Carbon Pricing Proposal
 - PJM is considering creation of “carbon price sub-region” where clearing prices will reflect carbon price adjustments of States, as well as a “non-carbon price sub-region”.
 - Dispatch of units within carbon price sub-region would differ from non-carbon price sub-region. Carbon emitters would be less economic. PJM would track emissions of resources in the sub-region.
- PJM Capacity Market Repricing Proposal
 - PJM is considering two options to prevent subsidized generator bids from setting clearing prices.
 - Option 1: Subsidized generator bids are removed from the auction and paid solely by State subsidizing them; clearing prices are then recalculated with proxy competitive bids for the removed resources; rest of the market receives the recalculated clearing prices.
 - Option 2: Subsidized generator bids would stay in the auction initially and PJM would calculate a “suppressed clearing price.” PJM then would recalculate clearing prices with proxy competitive bids. State could direct PJM to pay resource and charge commensurate load the suppressed clearing price.

SECTION 03

COMMENTS ON FERC TECHNICAL CONFERENCE

June FERC Technical Conference

- FERC held a two-day Technical Conference on May 1 and 2 on the interplay between state policy goals and organized wholesale electricity markets
- Requested comments on the path forward:
 - Path 1 – Limited or No Minimum Offer Price Rule
 - Path 2 – Accommodation of State Actions
 - Path 3 – Status Quo
 - Path 4 – Pricing State Policy Choices
 - Path 5 – Expanded Minimum Offer Price
- Also requested comments on any principles and objectives that should guide selection on the path forward, urgency for implementing changes, and procedural steps forward
- As of July 17, 2017, FERC has received comments from 79 separate entities.

Major Themes of FERC's Technical Conference

FERC Should Accommodate State Policy Goals

- This approach would accommodate state policies that provide out-of-market support (e.g. ZECs) by allowing these resources to participate in the capacity market.
- RTOs would adjust the clearing price to be consistent with the market price had state-supported resources not received credits or would create a separate “clean energy” capacity market.
- Some argued that FERC should allow states to achieve public policy goals, such as clean energy and fuel diversity.
- Many commenters believe current market designs do not capture all market benefits, such as carbon costs, resiliency, and diversity.
- FERC should support the effort to establish cooperative federalism.

Major Themes of FERC's Technical Conference

Markets Can Price in Cost to Support State Policy Goals

- This approach (Path 4) enjoyed the broadest support among commenters.
- RTOs would value attributes embodied in state policies, such as carbon emissions or resiliency, and adjust market prices to reflect these attributes.
- The cost of each resource would reflect its cost to operate plus the value of its ability to satisfy state policies. This option would internalize positive or negative externalities into the resource's price.
- Environmental goals can be accommodated in markets as well; a carbon price adder is one potential solution.
- A carbon price adder is one potential solution.
- PJM currently considering such an approach.

Major Themes of FERC's Technical Conference

Markets Need to Be Reformed

- Almost all agreed that the status quo is unacceptable.
- Energy and capacity markets need reform.
 - Some commenters believe markets currently over-prioritize the short-term.
 - Two of the paths focused on MOPR reform; however, some advocated that the MOPR orders can provide guidance on reforms and how to incorporate resource attributes.
- Some do not believe that markets need to be reformed – accept status quo. Differing views on whether urgent action is necessary.

Another Approach

- FERC's mandate historically has been ensuring just and reasonable prices.
 - In markets, FERC traditionally seeks to ensure just and reasonable prices by striving for perfect competition.
 - FERC lacks experience in making long-term policy decisions on preserving types of generation. FERC policy usually promotes a level playing field among all resources in the market rather than choosing among technologies. FERC limited by FPA's prohibition against undue discrimination.
- Federal Legislation would be difficult to achieve but may be an ideal way to preserve carbon-free resources.
 - FERC policy to promote demand response partly a reaction to EAct 2005 provision requiring federal agencies to facilitate the growth of demand response.
 - FERC rules on transmission rights and transmission development also prompted by EAct 2005 provisions.

Biography



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