# A Market Monitor's View of the Wholesale Electricity Markets

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# Introduction

Competitive markets are valuable because they are effective means to:

- Allocate resources to the highest value uses;
- Provide visible signals regarding the value of the products; and
- Organize complex processes.

Markets for electricity in particular have been implemented to:

- Improve the utilization of transmission capability by dispatching generation (and load) economically over a broad market area; and
- Send accurate economic signals (i.e., location-specific prices) to govern investment in supply, demand and transmission.

# Overview

## Background

- Deregulation replaces price regulation with competitive forces to ensure prices are "just and reasonable" and guide investment decisions.
- In it reliance on competition, FERC has mandated on market monitoring and mitigation to address potential market power concerns.

## This presentation will discuss:

- The role of market monitoring in the current wholesale power markets;
- Important findings from recent assessments of the Northeast markets; and
- The role of demand response in the development of efficient markets.

# The Focus of Market Monitoring

- Consistent with the Commission's SMD requirements, the Market Monitor identifies:
  - ✓ Flaws in market rules or other issues affecting market efficiency;
  - ✓ Market power abuses;
- Market efficiency issues have required the most resources – contrary to the assumption of most that market power is the primary focus.
- Monitoring primarily addresses the spot markets that will be conducted by the MISO.
  - ✓ Efficient spot markets should facilitate the forward markets.
  - ✓ However, monitoring does assess whether the market rules or other factors may hinder forward contracting.

# Independence of Market Monitoring

- Independence of the Market Monitor from the RTO is becoming more important due largely to its role in monitoring the RTO's operations.
- The developing RTO's are generally moving toward independent external monitoring.
- To ensure the independence of the monitoring function, the market monitor reports to:
  - ✓ the independent Board of Directors of the RTO; and
  - ✓ the Federal Energy Regulatory Commission ("FERC").

# Market Monitoring Resources and Functions

- Market monitoring is performed by a multidisciplinary team at Potomac Economics.
  - ✓ The team includes economists, engineers, database programmers, statistics and modeling experts, and research analysts.
- The monitoring function includes:
  - ✓ Real-time screening and analysis to identify circumstances that require further investigation.
  - ✓ Investigations of market operations or conduct identified through the daily screening or complaint processes.
  - ✓ Periodic analysis and reporting;

# Real-Time Market Monitoring

- Effective real-time market monitoring requires that data be received and analyzed continuously (we receive data every 15 minutes).
- The key to differentiating between market power and scarcity is to determine whether resources are being withheld from the market.
  - ✓ Physical withholding – withdrawing or derating an economic unit.
  - ✓ Economic withholding – raising a generator bid so as not to run or raise the clearing price.
- The real-time monitoring also seeks to identify market design flaws that can create inefficient or perverse incentives.
  - ✓ Design flaws are generally detected by screening the market for gaming, withholding, or other types of conduct.
  - ✓ Differentiating between design flaws and market power is critical.

# Analysis of Market Performance

- This periodic analysis would include an annual report filed with the FERC that would contain:
  - ✓ An assessment of the overall performance of the RTO markets;
  - ✓ Recommendations for changes in the market rules or other provisions to improve the efficiency of the market; and
  - ✓ An evaluation of the conduct of market participants and recommendations regarding modifications to the mitigation measures.
- The monitoring process would also include the receipt of complaints from market participants, government agencies, and the RTO.

# Mitigating Market Power

The first and best form of mitigation is to address the structural characteristics of the market:

- Promoting transmission investments to reduce congestion and associated locational market power;
- Remove barriers to investment in new generation;
- Facilitating demand-side participation in the market; and
- Divestiture – reducing concentration of supply ownership.

# Mitigating Market Power

- Even with the structural mitigation, market power concerns may still justify "behavioral" mitigation.
- Behavior mitigation includes measures that restricts a supplier from exercising market power.
- The following principles should guide the development of behavioral mitigation measures:
  - ✓ The measures should not affect participants bidding competitively – including causing suppliers to bid or generate below their marginal cost;
  - ✓ Mitigation should not artificially limit price movements – particularly during times of shortage; and
  - ✓ If possible, mitigation should be applied prospectively.

# Market Monitoring Findings

More than three years monitoring the New York market and two years monitoring the New England market have produced the following findings:

- The northeast power markets have been very competitive;
- The primary market power concerns have related to transmission congestion, where "pivotal" suppliers can arise – these issues require mitigation;
- The SMD markets are not designed to reliably reveal the true value of energy during supply shortages ("scarcity pricing");
- Scheduling rules, pricing at the borders, external transaction fees have allowed "seams" between markets to persist.

# Scarcity Pricing

- This section describes how prices are formed under peak demand conditions when the system is in or near shortage.
- Scarcity pricing is important because it plays a critical role in:
  - ✓ Allowing existing high-cost units to recover their costs of remaining on the system;
  - ✓ Providing the economic signal necessary to motivate demand response;
  - ✓ Establishing efficient incentives for new investment.
- Several factors have hindered efficient scarcity pricing.

# Peak Pricing

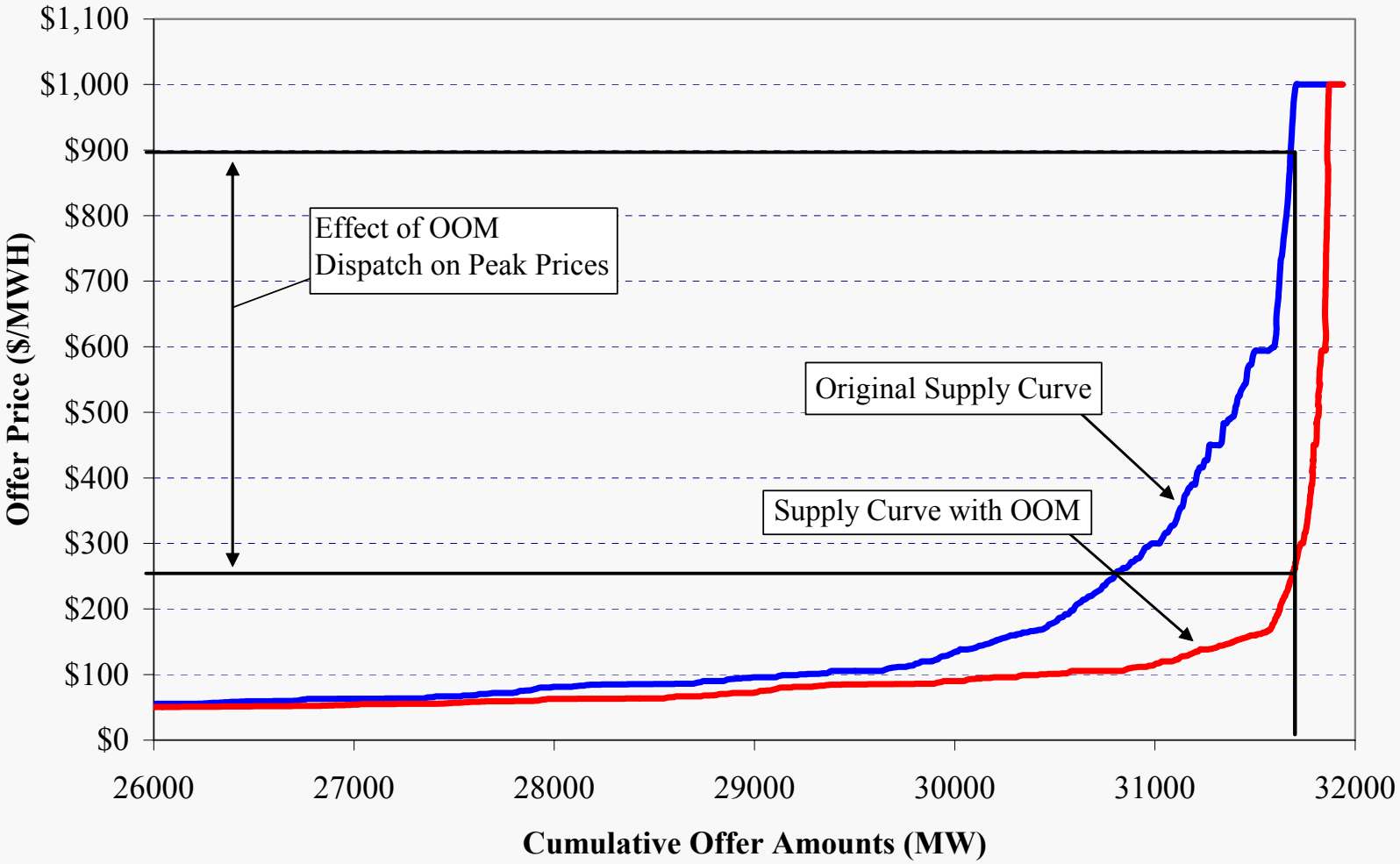
- The following actions can affect peak pricing by altering supply conditions:
  - ✓ Dispatching generation “out-of-merit”;
  - ✓ Committing supplemental resources by the market models;
  - ✓ Dispatching reserves under peak load conditions;
  - ✓ Real-time load curtailment and emergency out-of-market purchases.
- Reliability requires that operators have the ability to take these actions, but they should be taken only when necessary and the pricing rules should minimize adverse effects on prices.

# Out-of-Merit Dispatch

- Out-of-merit dispatch ("OOM") occurs when a unit is dispatched whose energy bid exceeds the price at its location – this can be caused by:
  - ✓ The physical parameters of the unit (e.g., minimum run-times),
  - ✓ Local reliability requirements not secured by the market model;
  - ✓ Self-scheduling of relatively costly units;
  - ✓ Other operator actions;
- The following illustrative chart shows how out-of-merit dispatch can affect peak prices.
- The price effects of the other three actions that artificially increase supply in the spot market are very similar.

## Effects of Out-of-Merit Dispatch on Peak Prices

Peak Supply Curve Before and After OOM Dispatch



# Out-of-Merit Analysis

- OOM dispatch has been a bigger issue in New England since the ISO dispatched generation OOM to resolve congestion prior to implementing its new market on March 1, 2003.
- However, OOM dispatch can inefficiently affect prices in any market:
  - ✓ The spot energy is typically dispatched and prices set on a 5 or 10 minute basis.
  - ✓ Units that are not flexible in this timeframe are generally not eligible to set energy prices and, therefore, may be dispatched OOM when needed.
  - ✓ The most significant issues relate to gas turbines that are needed in peak hours, but not generally flexible enough to set energy prices
- New York and New England both have implemented market rules that allow inflexible units and external transactions set prices when they are economically justified.

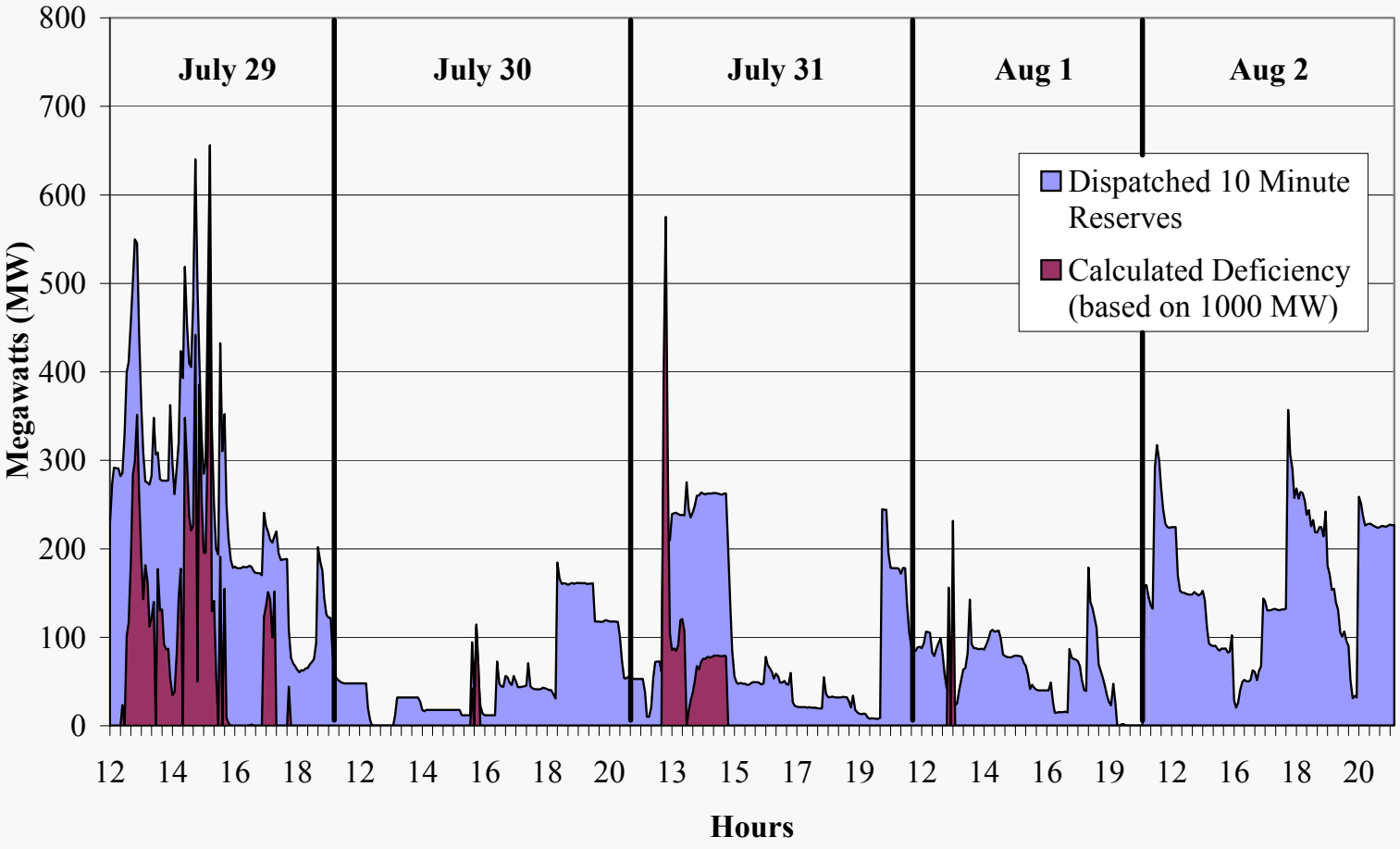
# Reserve Shortages

- Perhaps the most significant issue affecting scarcity pricing is the dispatch of reserves in the energy market.
- When the system enters shortage conditions, trading reserves for energy is sometimes necessary to ensure the requirements of the energy market are reliably met.
- Like OOM dispatch, dispatching reserves for energy will increase the supply in real-time and can prevent prices from revealing shortages.
- In a sense, the reserve market has become the marginal supplier in this case and the prices in the energy market should reflect the value of the reserve that was sacrificed.

# Reserve Shortages

- For selected peak days in late July in New York, the following chart shows:
  - ✓ The quantity of total 10-minute reserves that are dispatched in real-time in Eastern NY in each interval.
  - ✓ The deficiency, if any, of total 10-minute reserves in eastern New York (requirement = 1000 MW).
- Because other resources are often available in real-time that can provide 10-minute reserves, dispatching resources that had been designated as 10-minute reserves does not always produce a reserve deficiency (the other resources effectively become the reserves).
  - ✓ However, during the summer of 2002, were 151 of intervals (almost 13 hours) on these days when the NYISO was deficient in total 10-minute reserves.

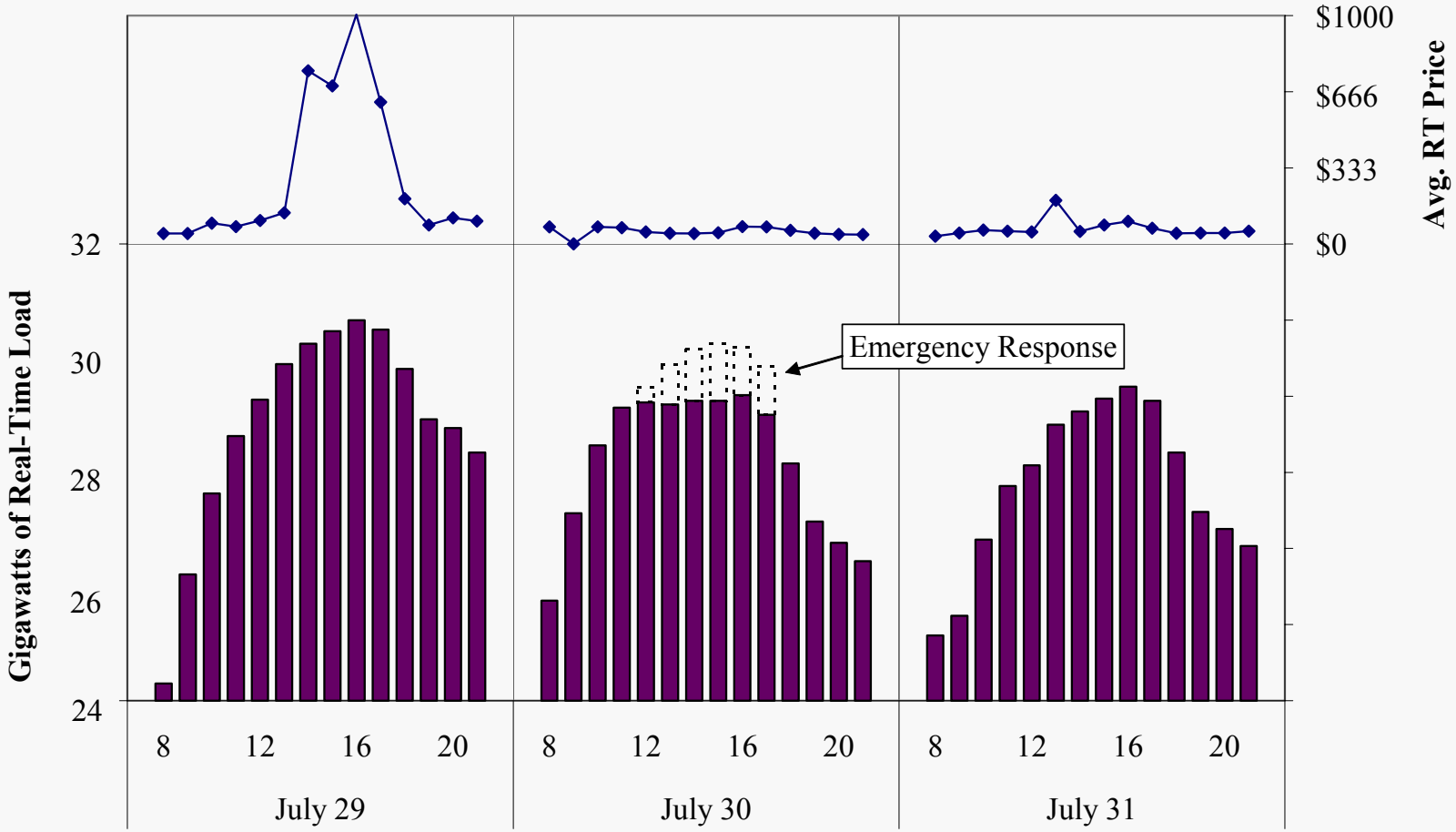
## Dispatch of 10-Minute Total Reserves in Eastern New York
## July 29, 30, 31, Aug 1, 2 -- 12 p.m. to 8 p.m.



# Emergency Demand Response Programs

- Emergency demand response called for by the ISO can also affect real time prices by altering the balance of supply and demand in real-time.
- The following chart show actual loads and real-time prices on the July 30th when the New York's Emergency Demand Response Program ("EDRP") was invoked.
- EDRP capacity is relatively costly – participants are paid the higher of the locational price or $500 per MWh for each MWh curtailed, but it does not set spot energy prices because it is called four hours in advance.
- The chart also shows an estimate of the demand reduction that was achieved on July 30th – the actual reduction achieved is not yet known.
- Prices under peak conditions are relatively sensitive to changes in supply or demand, which is consistent with the change in prices realized from July 29th to July 30th (when EDRP was called).
- We are working with New York to allow the demand response, when economic, to set energy prices at its curtailment price.

## Real-Time Load, Prices, and Emergency Demand Response
## New York State



# Peak Pricing Conclusions

- Discrete periods of shortage should be expected in most markets, yet current pricing rules often hinder the markets from posting energy prices that reveal its value.
- The long-term solution is to utilize a reserve demand curve that explicitly recognizes the economic trade-off between reserves and energy.
- Short-term measures were implemented to address these issues in New England, but were not initially carried forward under New England's SMD to be implemented in early 2003.
- We are developing short-term solutions to these issues for New York and New England that can be implemented prior to next summer.

# The Role of Demand Response

- Demand response can play an important role in these markets to:
  - ✓ Set efficient energy prices under peak conditions;
  - ✓ Improve economic efficiency by making better consumption decisions;
  - ✓ Increase reliability by rationing scarce supply;
  - ✓ Mitigate market power by limiting price increases;
- Emergency demand response programs can achieve relatively large reductions, but are only a first step.
- RTOs should understand that their role is to ensure that market rules facilitate participation by the demand-side in their:
  - ✓ Energy markets;
  - ✓ Ancillary services (operating reserves) markets; and
  - ✓ Capacity or resource adequacy markets.

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David B. Patton is the President of Potomac Economics, which specializes in economic and strategic consulting to energy clients. He provides strategic advice, analysis and expert testimony on deregulation, transmission pricing, asset valuation, market design, and competitive issues. He currently serves as the Market Advisor and the New York ISO and ISO New England where he is responsible for identifying and remedy flaws in the market design or attempts to exercise market power. Potomac Economics has also been engaged by the Midwest ISO and Southwest Power Pool to be their Independent Market Monitor.

With regard to competitive issues, Dr. Patton has provided expert testimony or analysis in a number of horizontal electric mergers and electric-gas convergence mergers before the FERC, state regulatory agencies and the Department of Justice. He has also analyzed competition in antitrust cases on behalf of electric utility and natural gas clients before the Department of Justice and the Federal Trade Commission.

Prior to developing his energy consulting practice, Dr. Patton served in the Office of Economic Policy at the FERC where he advised the Commission on policy issues ranging from transmission pricing and open access to mergers and market power. He has published and spoken on a broad array of topics related to emerging competitive electric markets, including transmission congestion and pricing, risk management and market power in a deregulated electric industry.