MARKET POWER AND MARKET MAKERS

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Trading in Forward Markets

- Framework:
  - OTC broker market
  - Exchanges: e.g. Enron Online; ICE
- Markets
  - Energy market
  - Capacity market
  - FTR market
- Term
  - Daily
  - Longer term
- Participants
  - Sellers of energy from assets
  - Buyers of energy for load
  - Traders

Market Power

- Definition: Raise market price above competitive level
  - Profitability
  - Duration/Sustainability
- Method 1: Physical withholding
- Method 2: Economic withholding
  - Offer price > Competitive price
  - Export when export price < internal price
- Method 3: Transmission related
  - Create congestion

Competitive Price

- Competitive price in day ahead and real time spot markets is a function of:
  - marginal cost
  - opportunity cost (including optionality)
  - risk
  - scarcity
- Competitive price in forward markets is a function of:
  - Expected spot price
  - Expected fundamentals (including risk)
- Competitive price
  - Testable in day ahead and real time markets
  - Difficult to test in forward markets

Trading and Market Power Examples

- Capacity market
- Day ahead energy market and FTR market
- FTR market and information
- Bilateral OTC energy markets

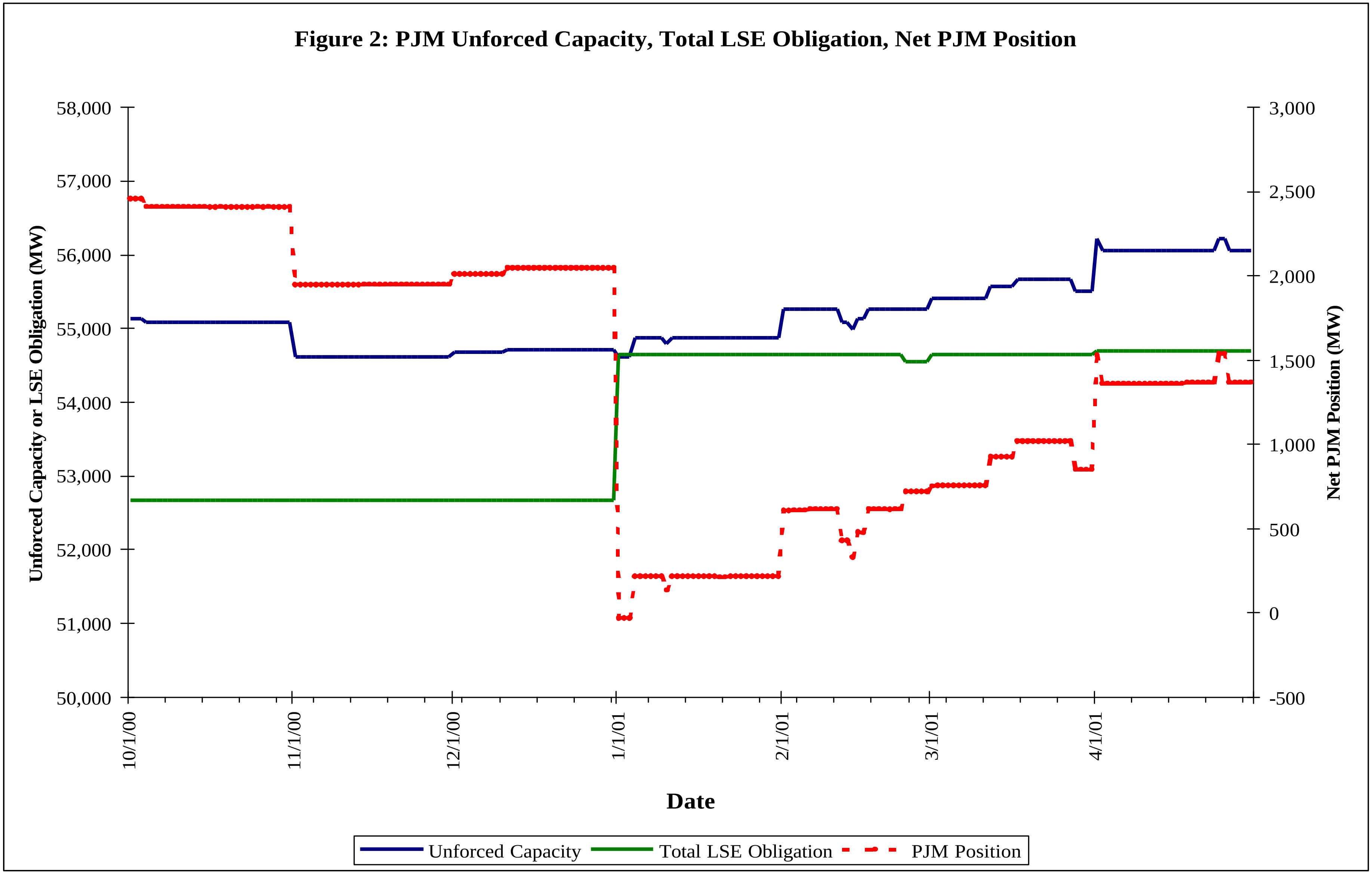
Trading and Market Power in Capacity

- Trading can enhance/create pivotal position in market
- Use of pivotal position to exercise market power
- Exercise of market power in PJM daily markets
- Relationship between market power in capacity credit markets and market power in bilateral OTC capacity credit markets
- Relationship between price expectations derived from market power in PJM daily markets and market power in bilateral forward markets
- Role of physical position
- Capacity market subject to exercise of market power via trading strategies
  - Actual exercise of market power a function of incentives
- PJM made changes to market rules to reduce incentives to exercise market power in PJM daily capacity credit markets

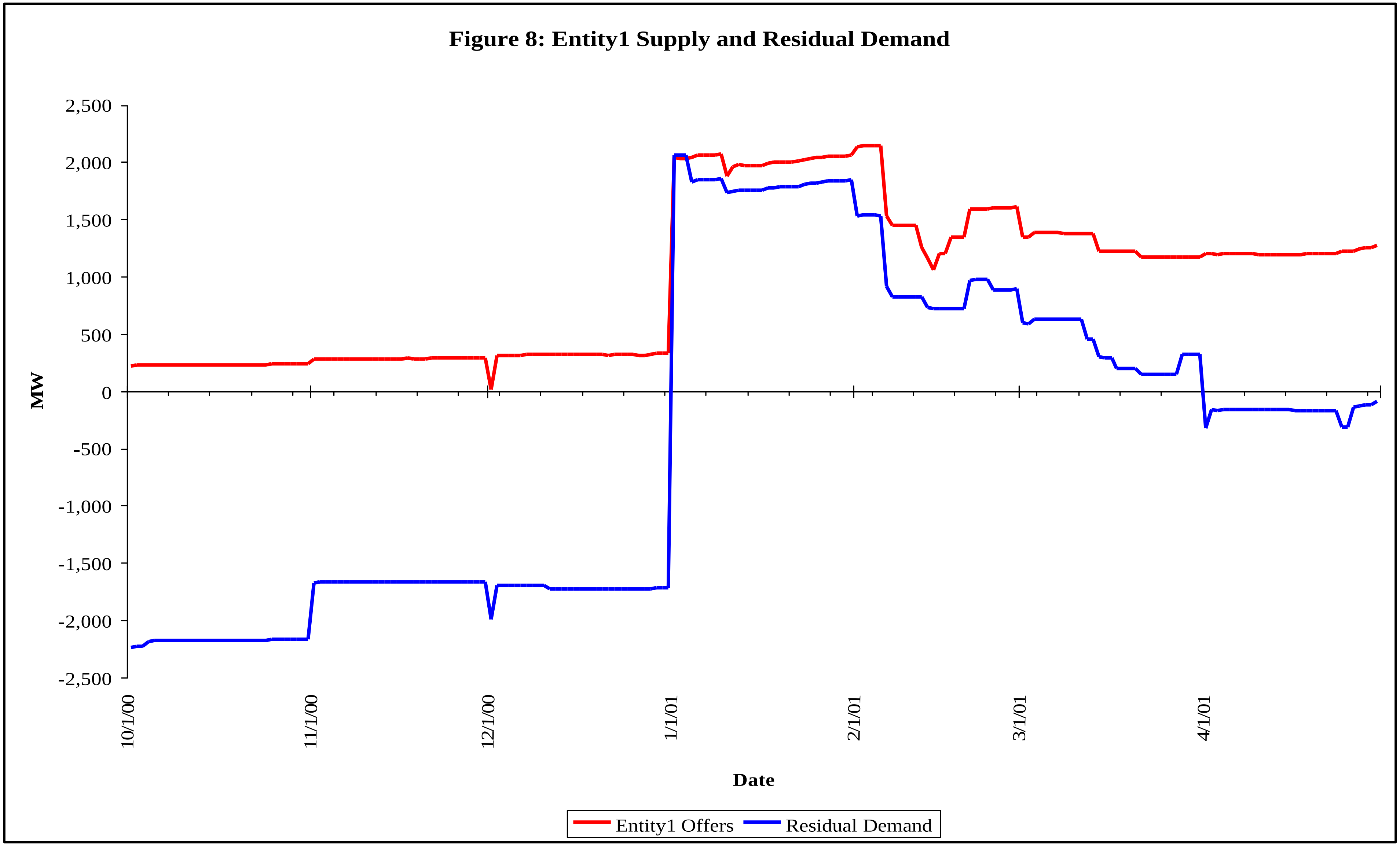
Capacity Market Dynamics

- Daily and monthly markets
- Penalty payment if LSE is deficient
- Capacity can be sold within or outside PJM
  - Firm energy
  - Relative prices
- Marginal cost of capacity
  - Direct costs close to zero for daily capacity
  - Opportunity cost: external energy markets (firm, LD)
- Inelastic demand
  - Function of forecast load

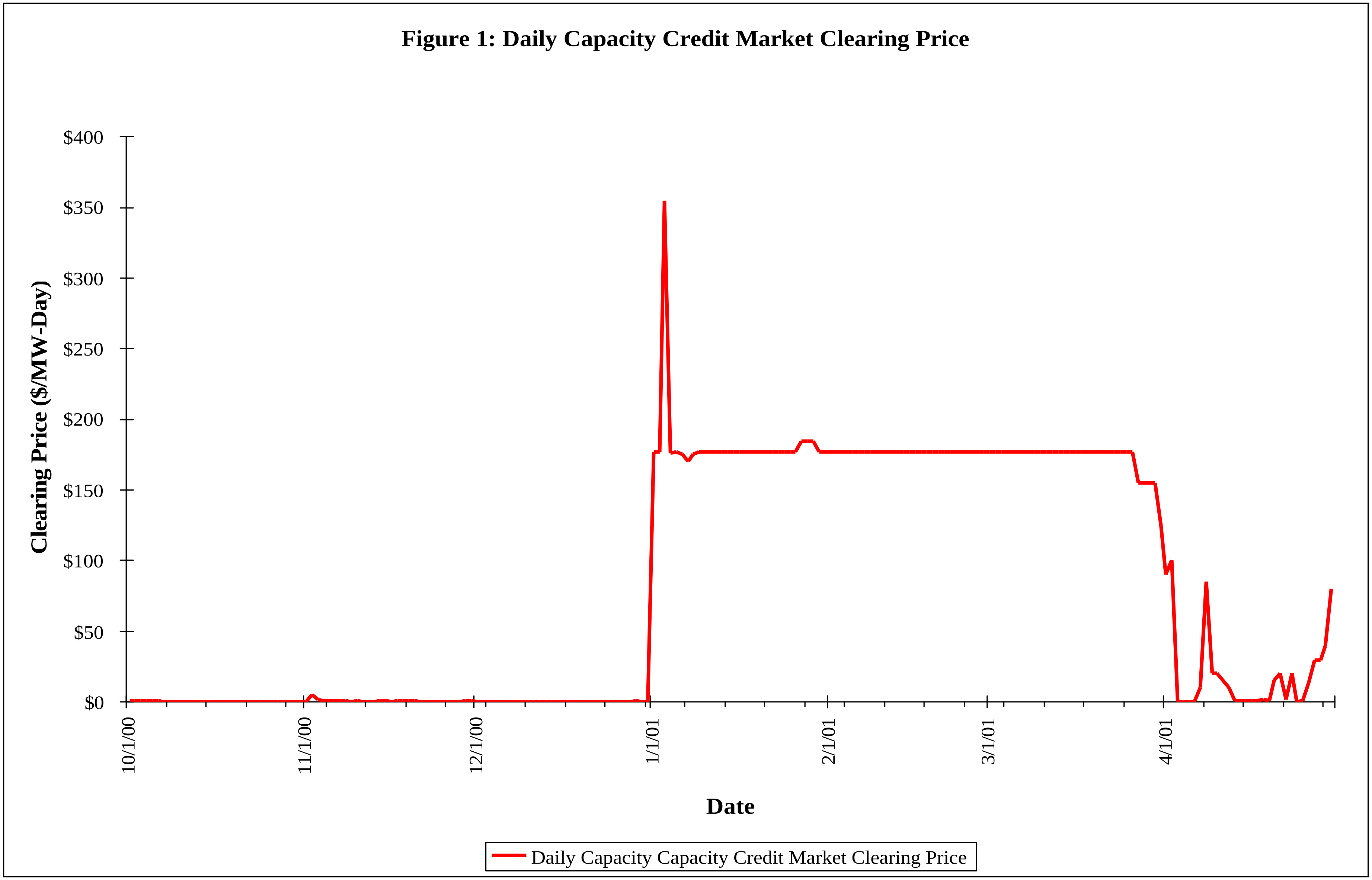
Supply and Demand



One Supplier and Residual Demand

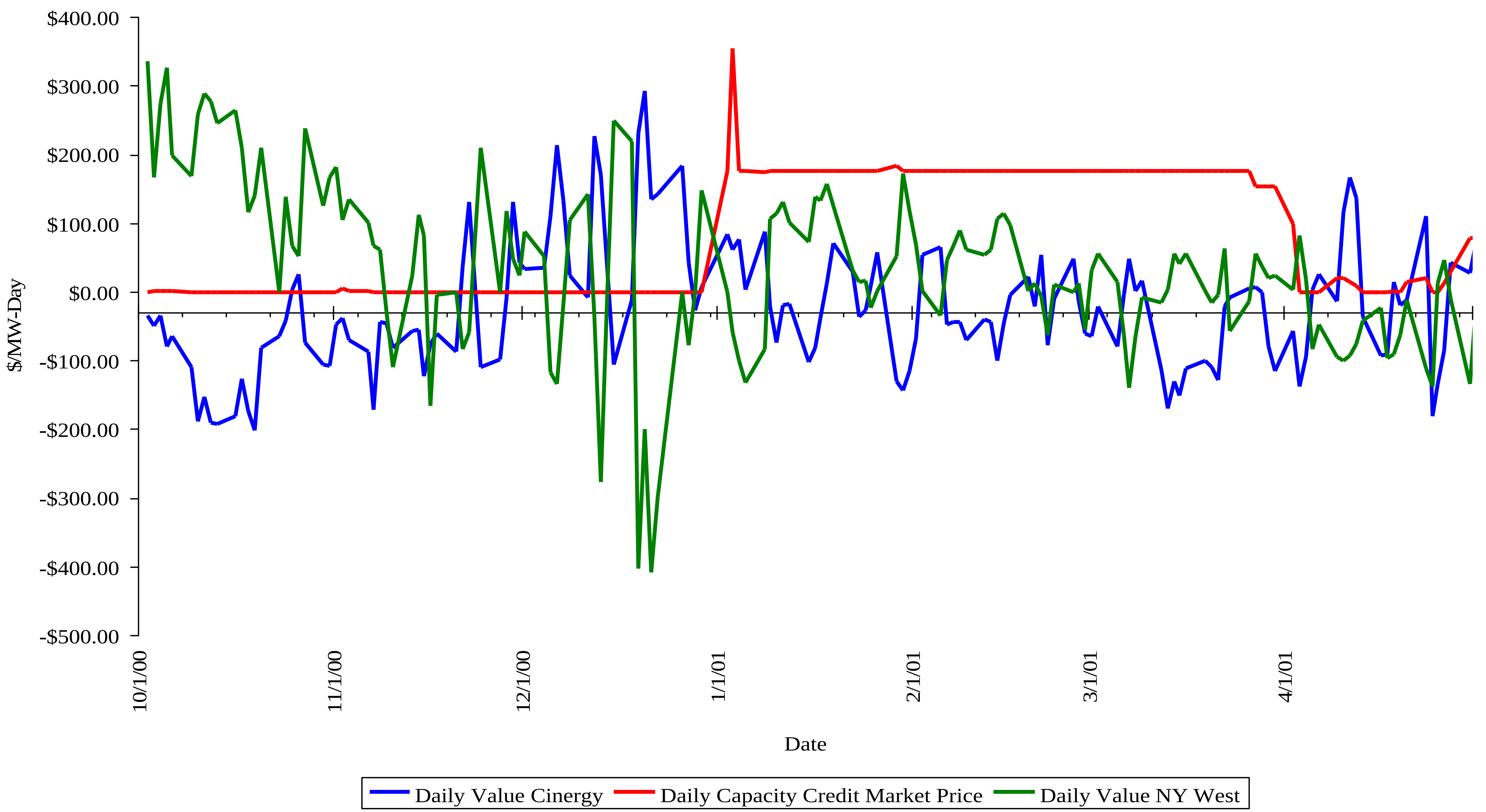


Daily Capacity Prices

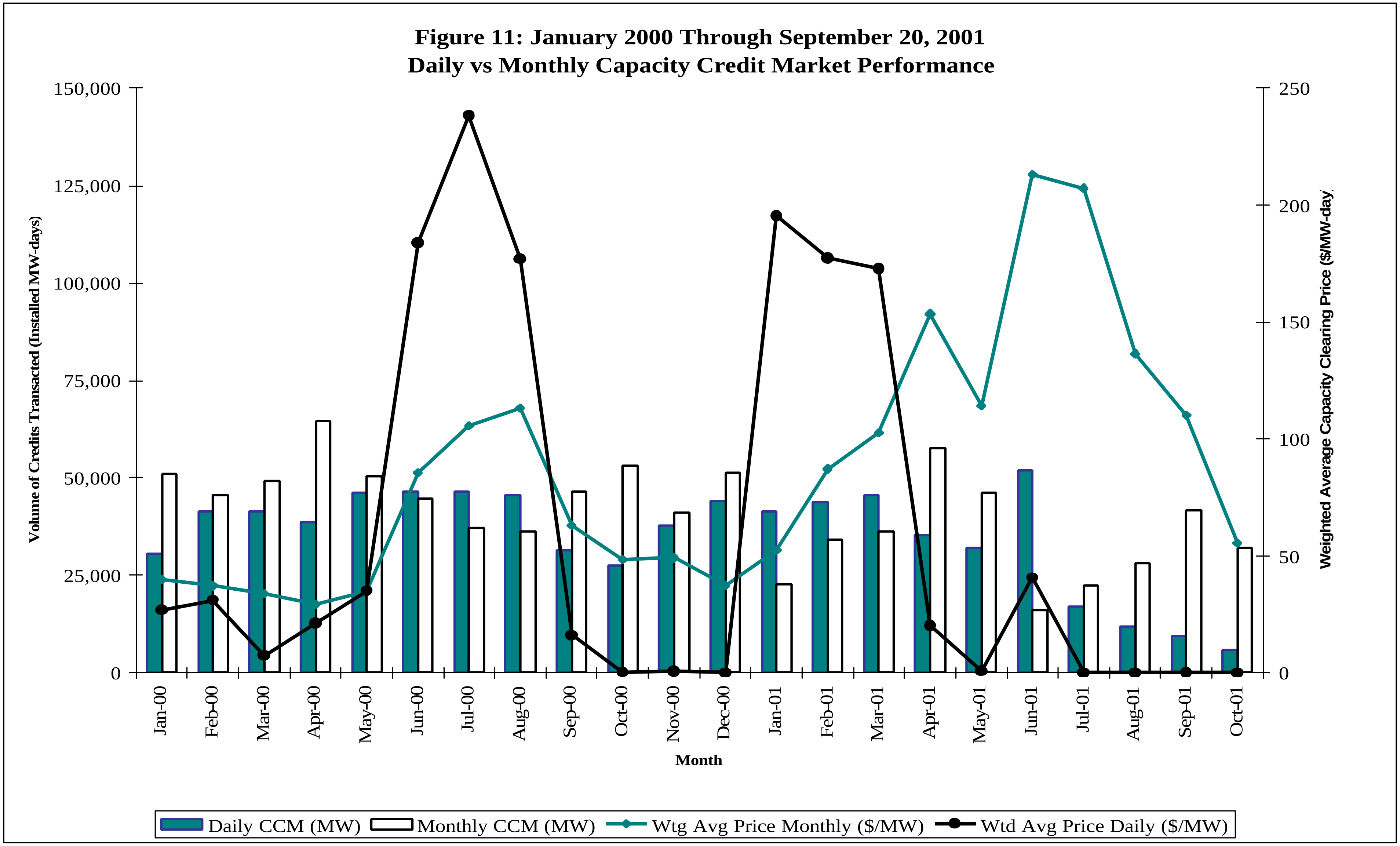


Prices and Market Comparison

Figure 4: Daily Capacity Credit Market Prices and Value of Exporting Firm Energy From Daily Forwards
October 2000 through April 2001



Daily and Monthly Prices

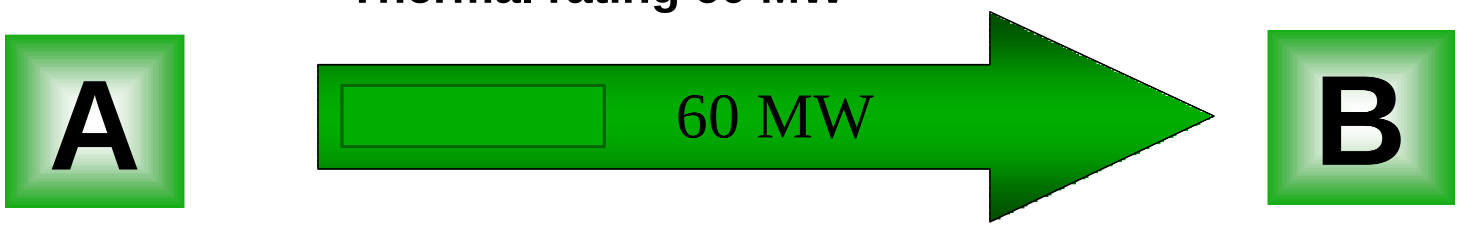


Trading and Market Power in Energy

- Trading in PJM day ahead energy market:
  - Financial offers/bids: increment/decrement bids.
- Trading in PJM monthly FTR market
- Combination used to exercise market power
- FTR position taken on a radial path
- Financial offers and bids in day ahead market used to create congestion on the path
- Congestion makes FTR position valuable
- Typically in radial portion of transmission system
- No physical positions
- PJM introduced rule which eliminates incentive to engage in this behavior

Incs/Decs/FTRs

Thermal rating 60 MW



40 MW FTR

LMPDA = $25

10 MW INC

LMPDA = $25

LMPRT = $25

INC VALUE -$0

DEC VALUE -$250

FTR VALUE $1,000

NET VALUE $750

LMPDA = $25

10 MW DEC

LMPDA = $50

LMPRT = $25

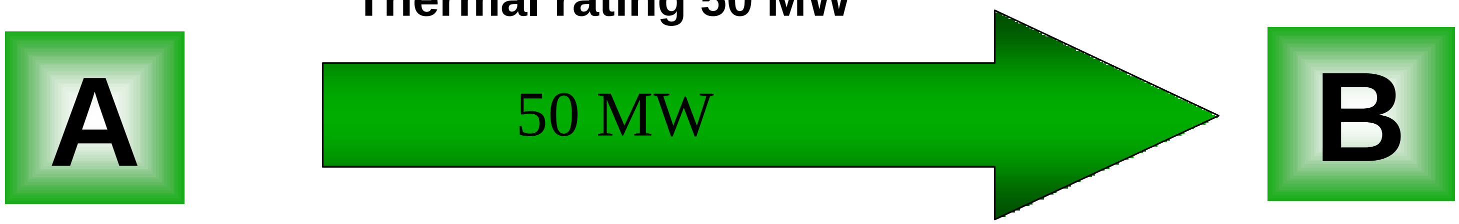
Trading and Market Power in FTRs

- Transmission outage/derating posted after close of monthly FTR market: reduced flow on a path(s)
- Asymmetric access to information possible
- Incentives to gain access to information
- Purchase of FTR in PJM monthly FTR market on path(s)
- Congestion makes FTR position valuable
- No physical positions
- PJM made rule changes to remove the incentives to engage in this behavior

Transmission Outage/FTRs

Thermal rating 60 MW

Thermal rating 50 MW



40 MW FTR

LMPDA = $25

LMPDA = $25

LMPDA = $25

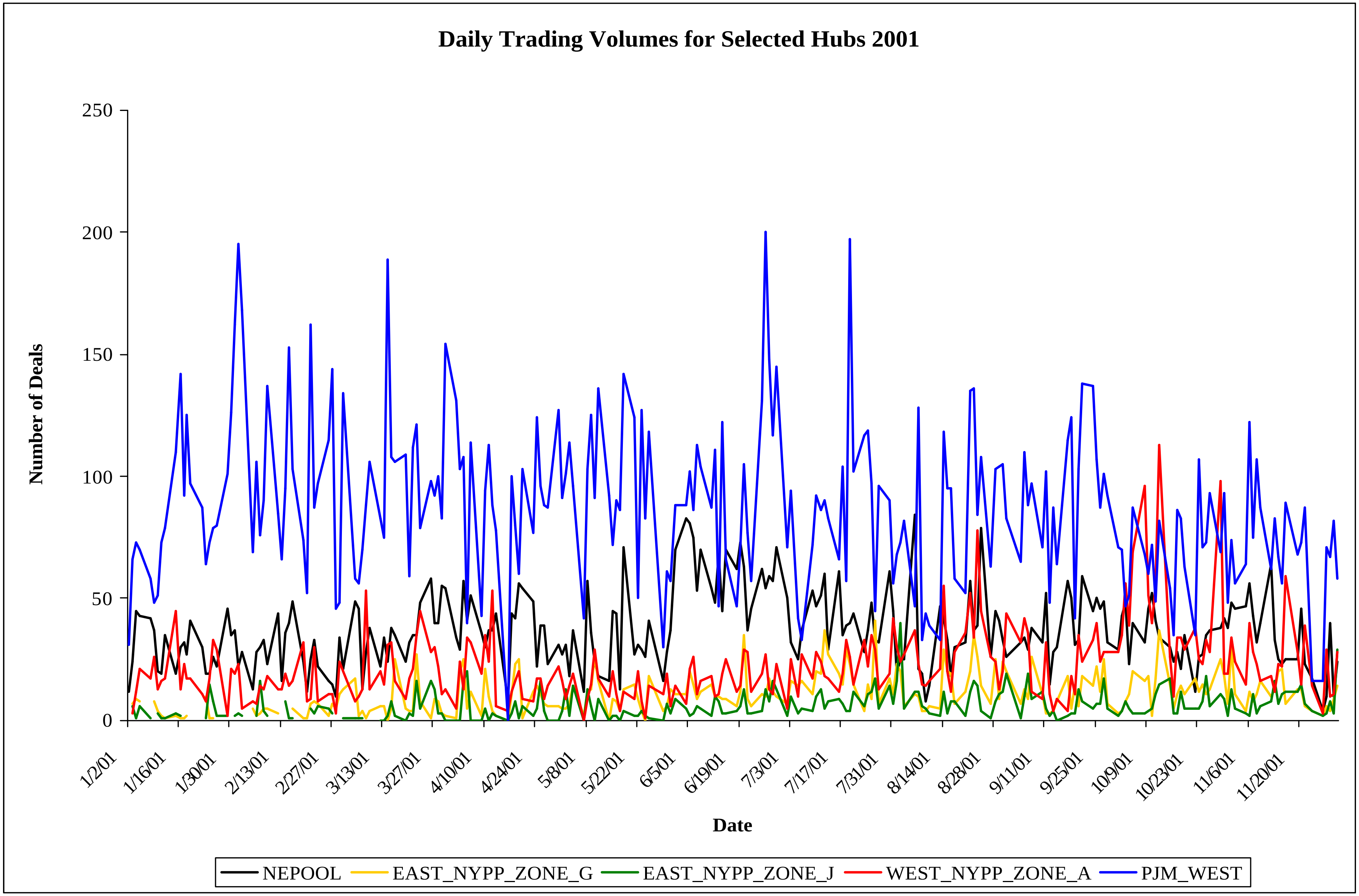
LMPDA = $50

FTR VALUE $1,000

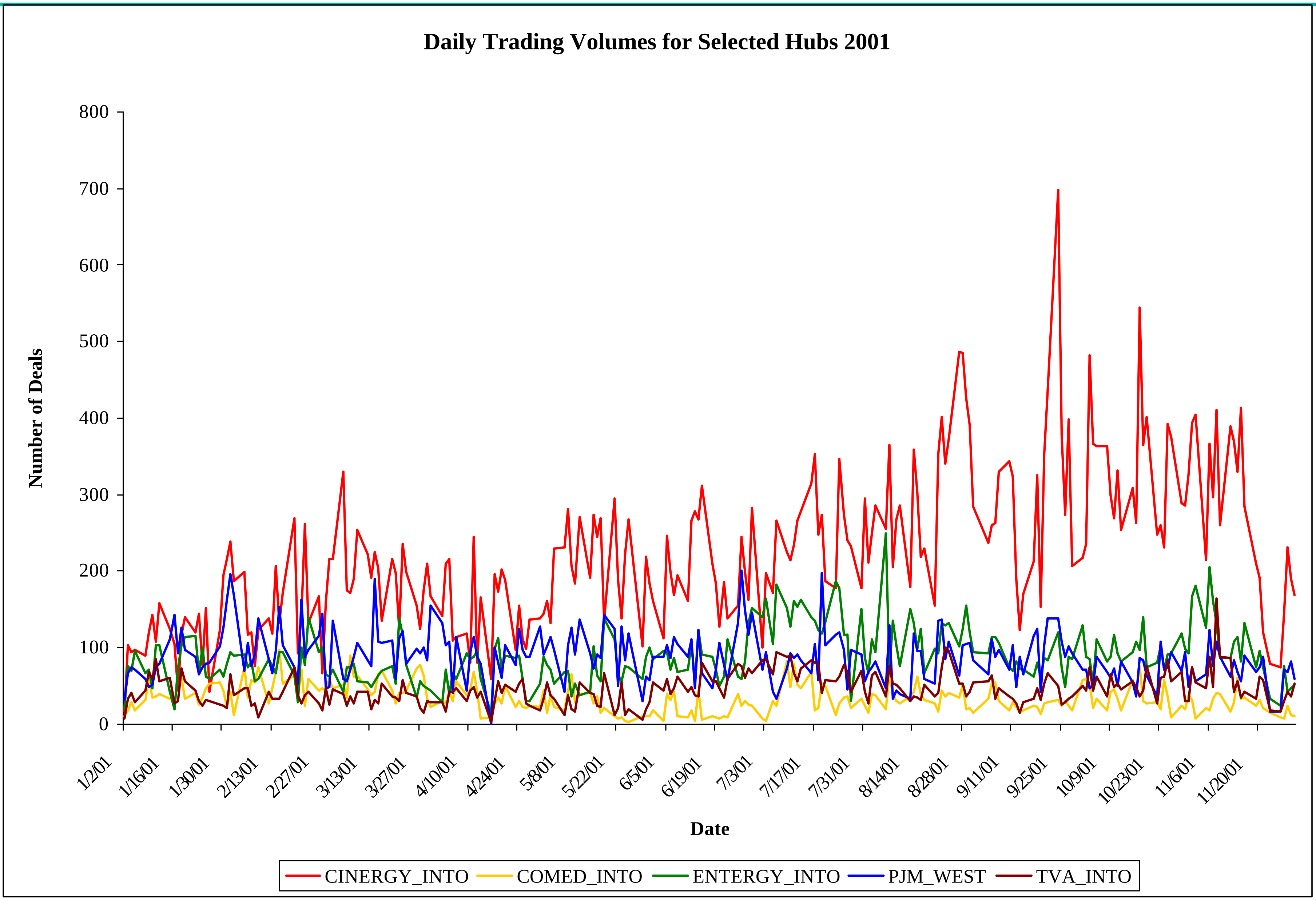
Trading and Market Power in Energy

- Trading in OTC bilateral energy market
- Liquidity
  - Number of trades
  - Number of participants
  - Relative size of participants
- Potential size of positions
  - Credit
  - Assets
- PJM West Hub is relatively liquid
- Into Cinergy, Entergy are relatively liquid
- Other trading points less liquid
- Impact of active balancing market as constraint
- Test: compare day ahead prices with daily forwards

Trading Volumes: PJM and North



Trading Volumes: PJM and West



Results of Trading

- Arbitrage between DA and RT markets
- Arbitrage between short term and long term markets
- Potentially value FTRs based on expected congestion
- Potentially value energy based on expected spot market/fundamentals including market power
- Leverage existing asset-based market power
- New opportunities for market power
- Hedging/risk transfer
- Development of more efficient forward markets
- More liquid: more players; more trades
- Less ability to game
- More reflective of expected fundamentals

IF YOU HAVE QUESTIONS

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