

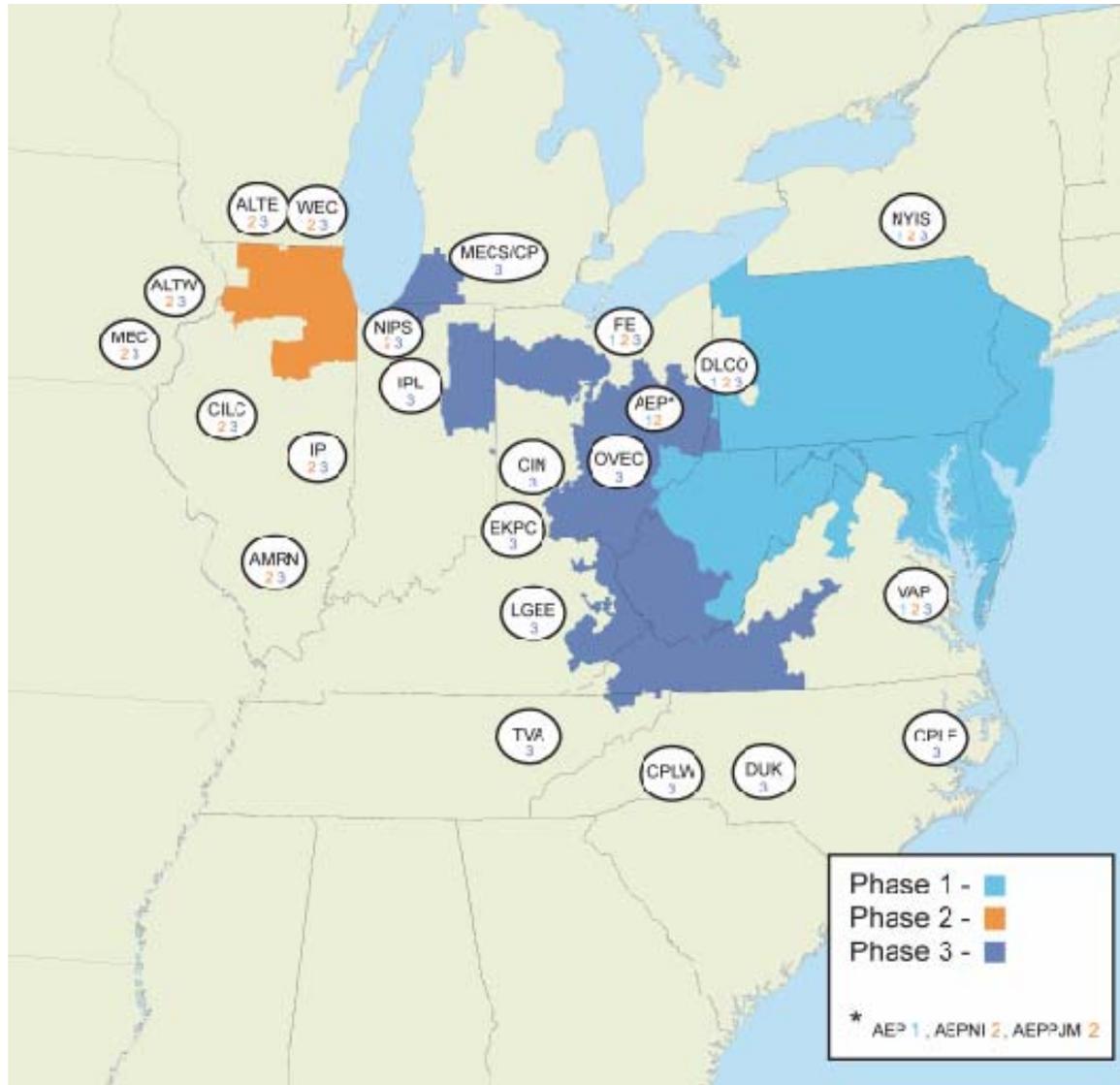


# Public Utility Commission of Texas Workshop on Resource Adequacy

## PJM Capacity Markets: Present and Future

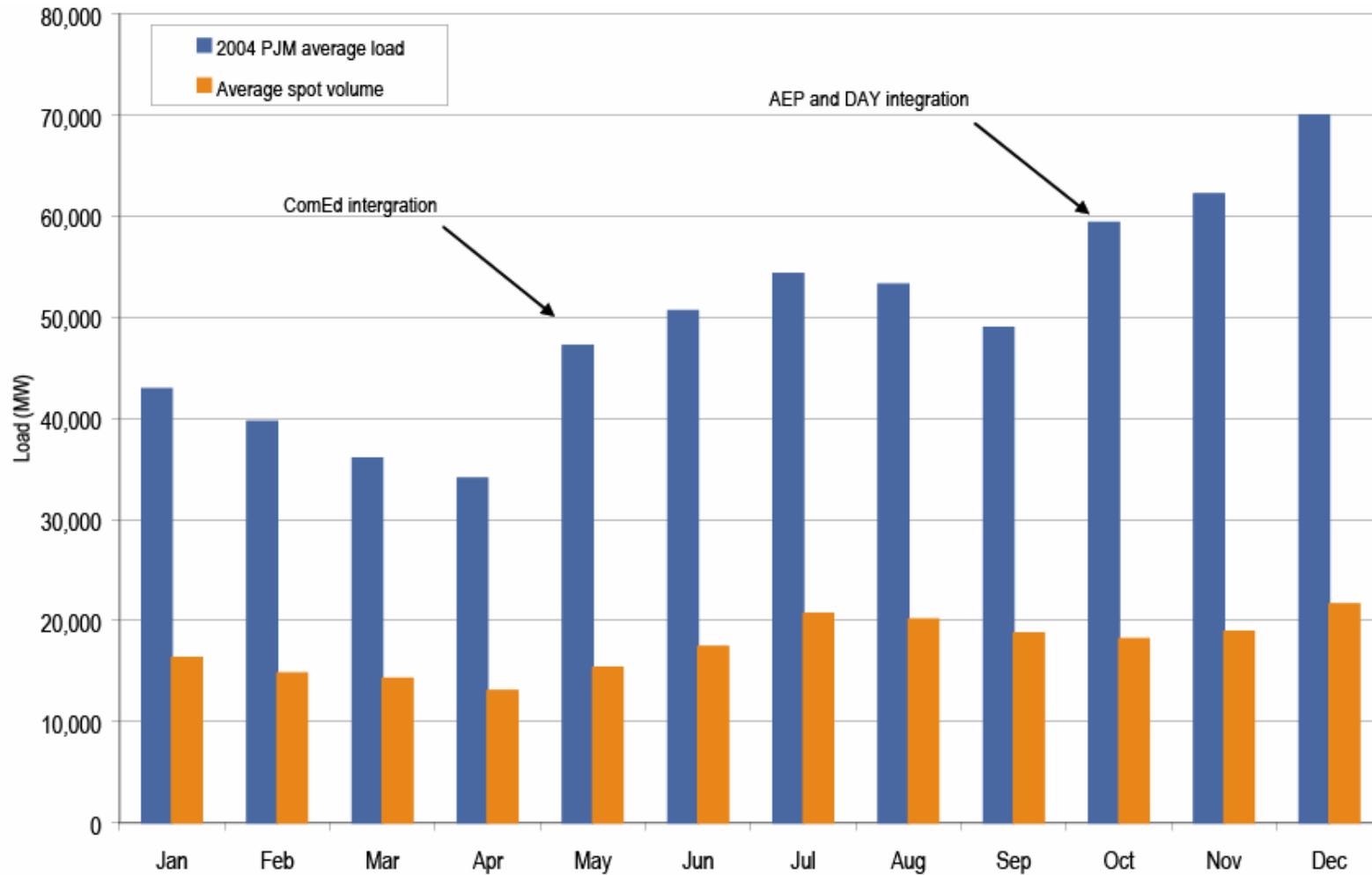
Austin, Texas  
April 20, 2005

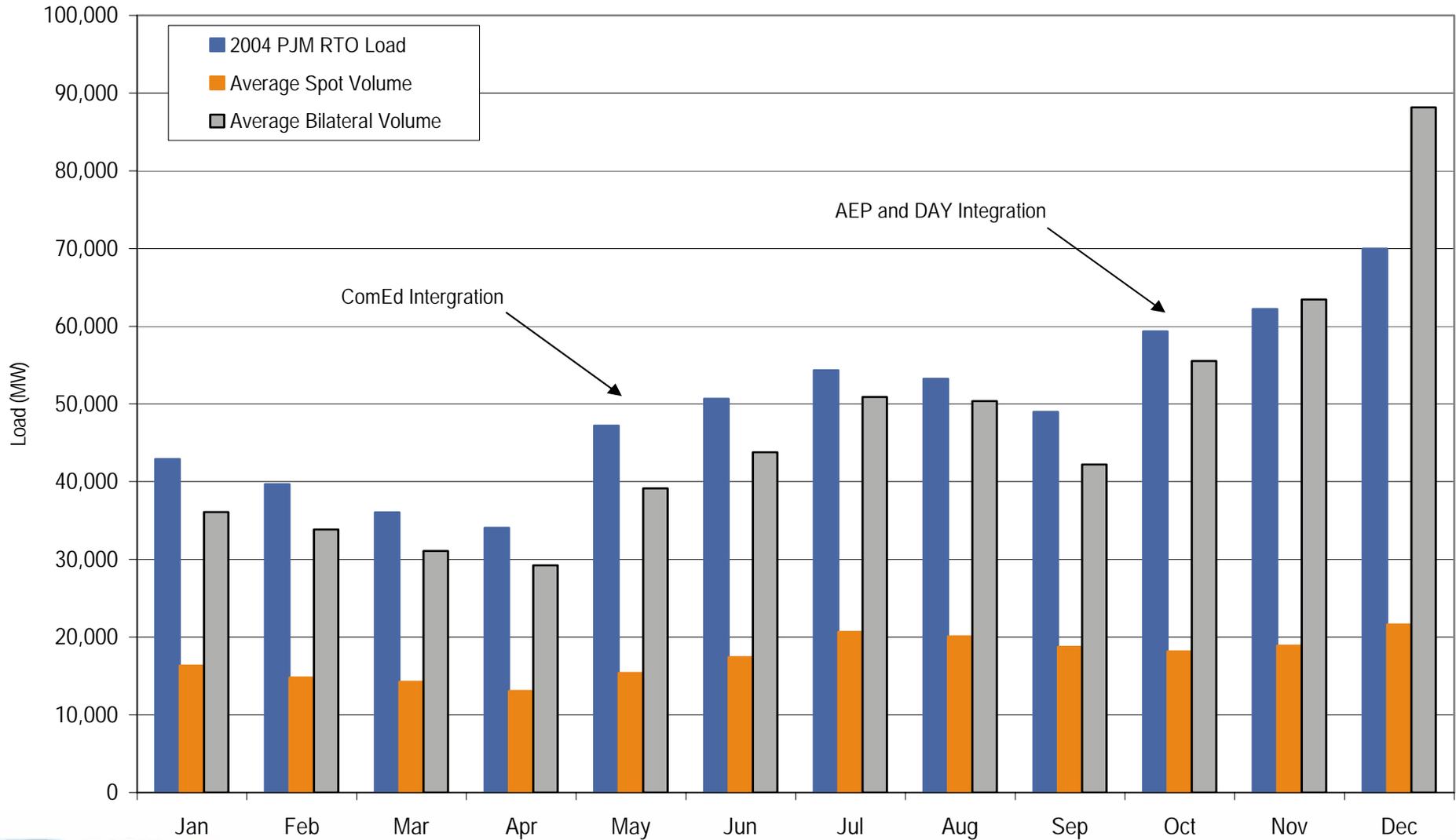
Joseph Bowring  
Market Monitor



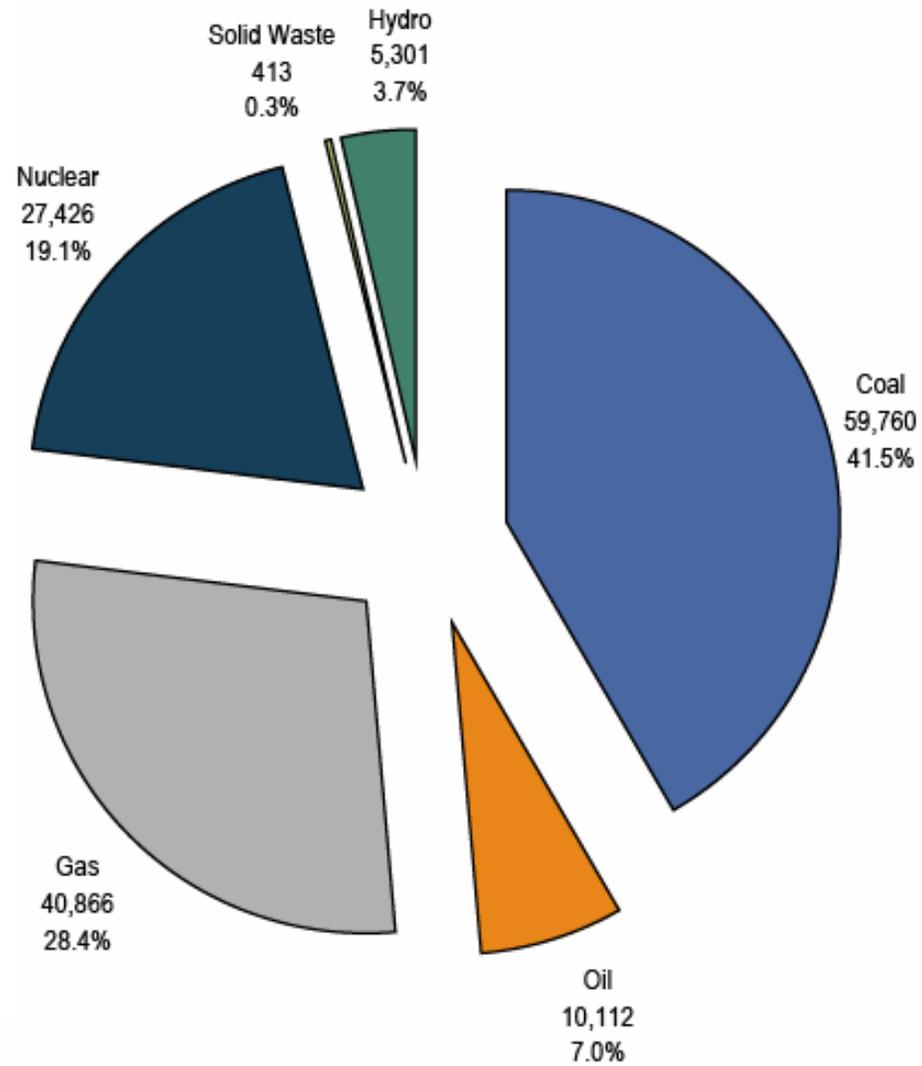
- Energy Markets (Nodal)
  - Day Ahead
  - Real Time
- Capacity Credits Markets
  - Daily
  - Long-Term
- Financial Transmission Rights Market
  - Auction Options
- Ancillary Services
  - Regulation Market
  - Spinning Reserve Market
  - Blackstart Service
  - Reactive Services

# PJM average hourly load and spot market volume: Calendar year 2004

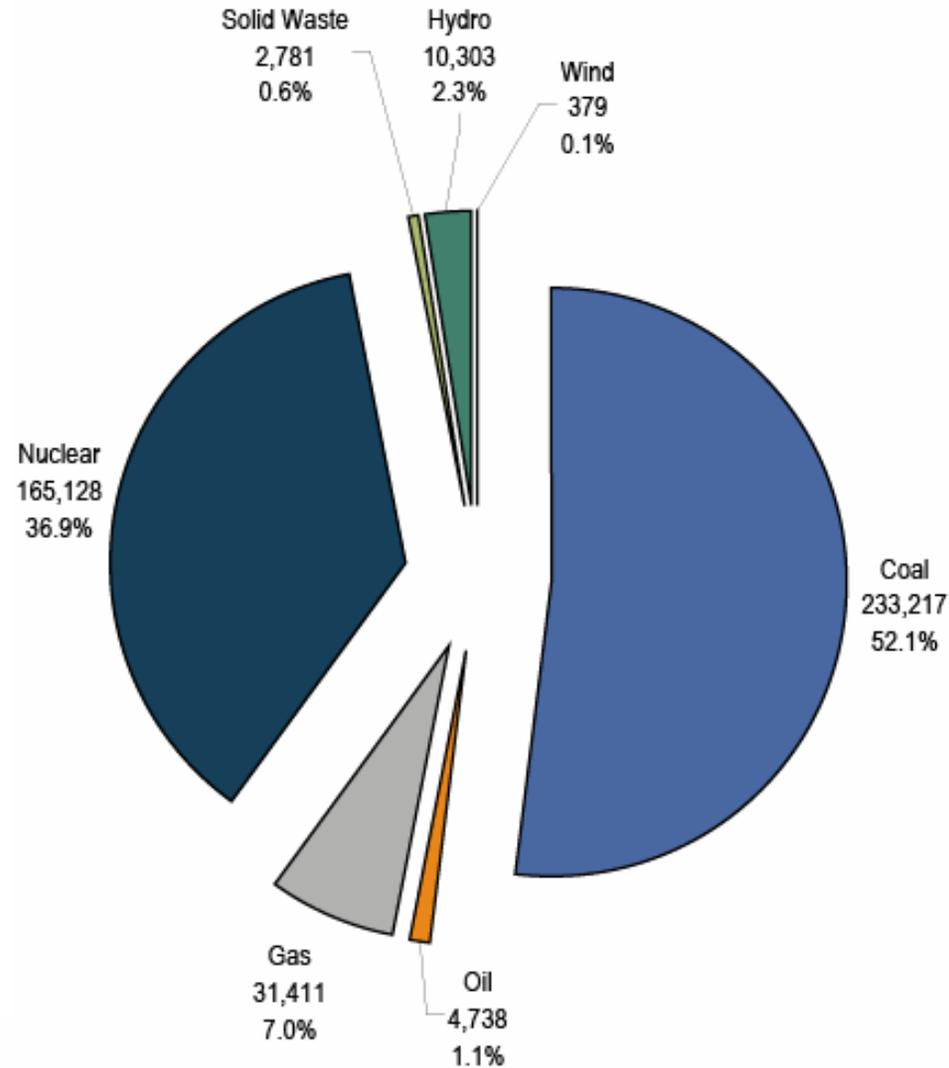




# PJM capacity by fuel source: At December 31, 2004



# PJM generation by fuel source (GWh): Calendar year 2004

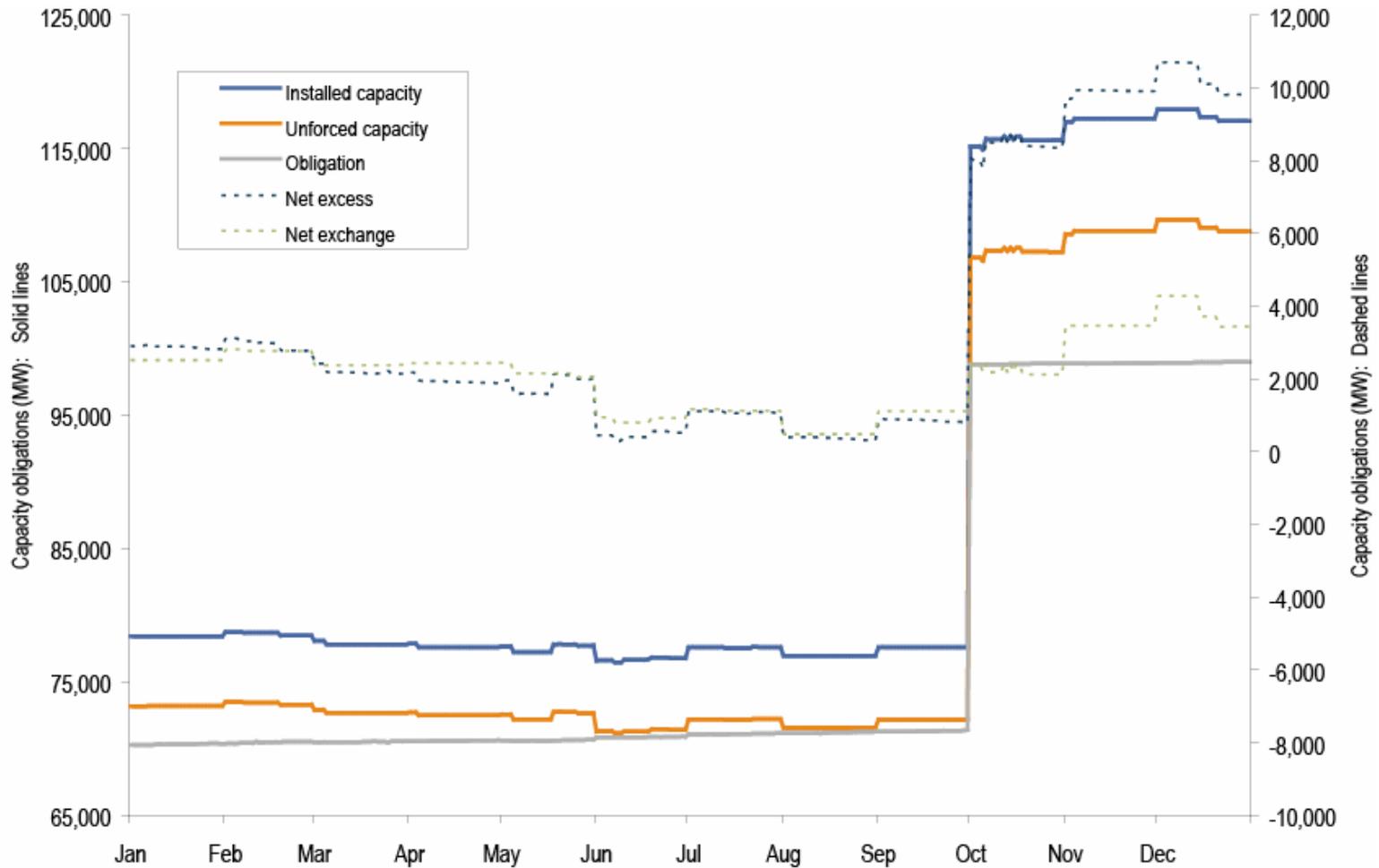


- **Locational Constraints**
- **Four Year Forward Pricing**
- **Variable Resource Requirement  
(Demand Curve)**

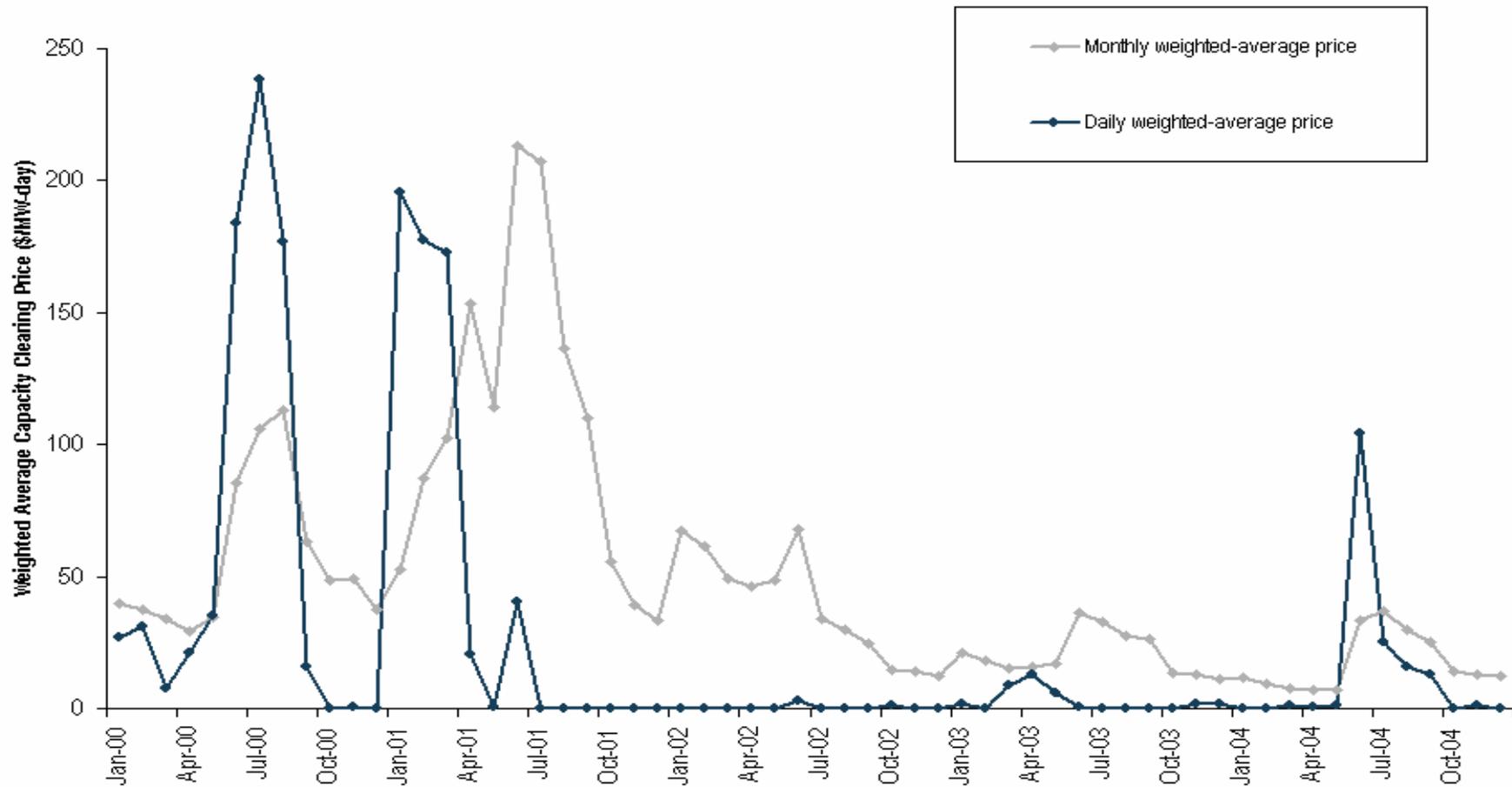
- **Disconnect Between Market Signals and Reliability**
  - Load Growth
  - Generation Retirement
  - Lack of New Capacity
  - Locational Variation in Capacity Requirements
  - Potential Reliability Violations
  - Net Revenue



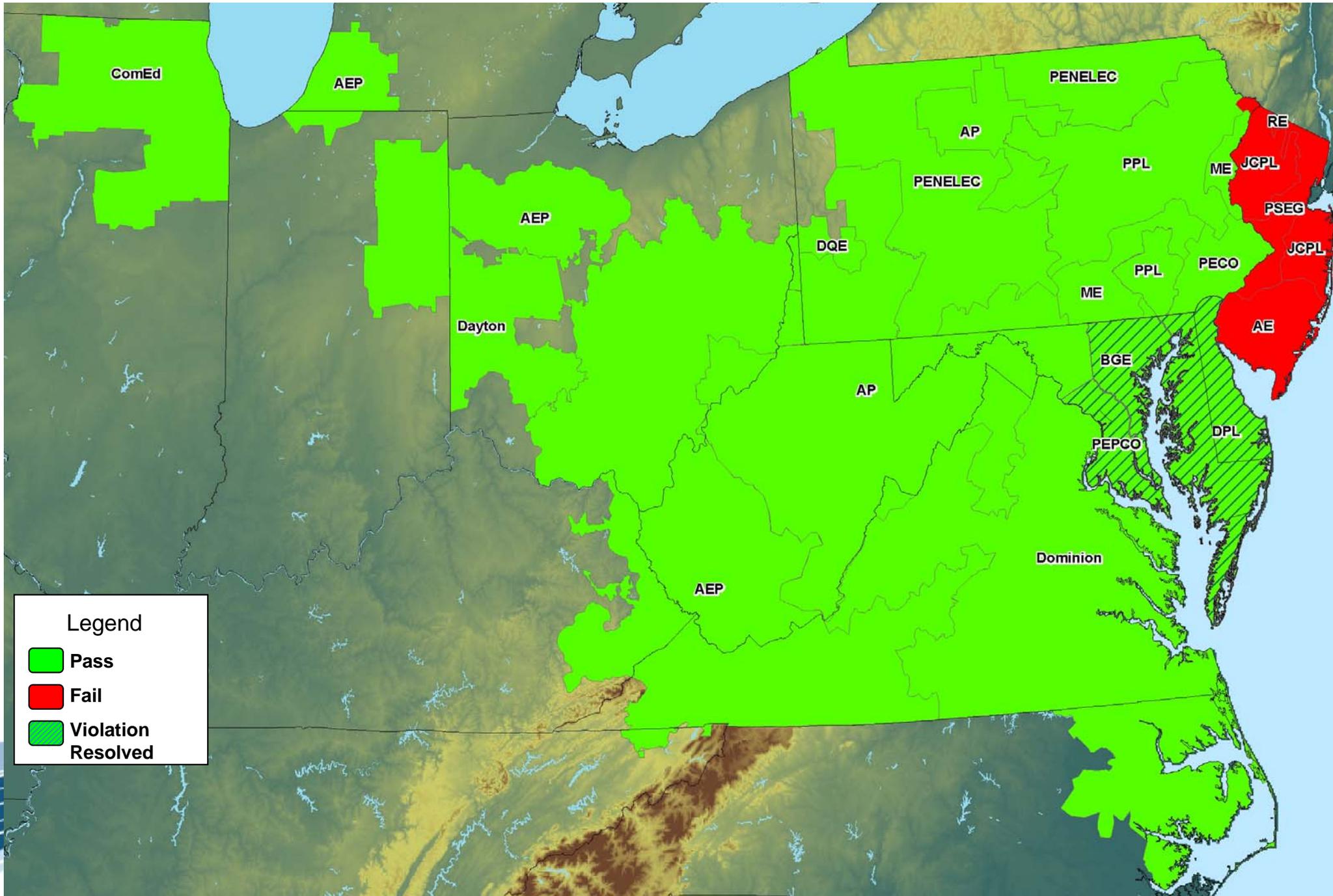
# Capacity obligations to the PJM Capacity Market: Calendar year 2004



# PJM Daily and Monthly Capacity Credit Market (CCM) performance: Calendar years 2000 to 2004

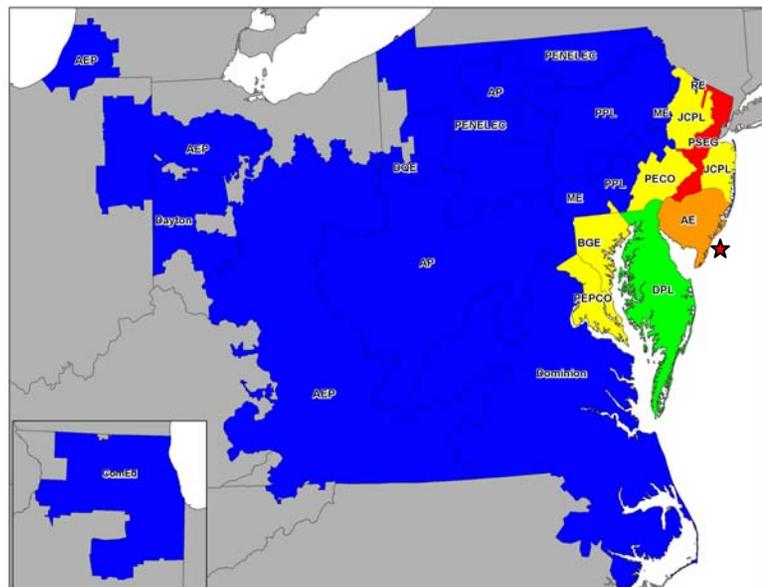
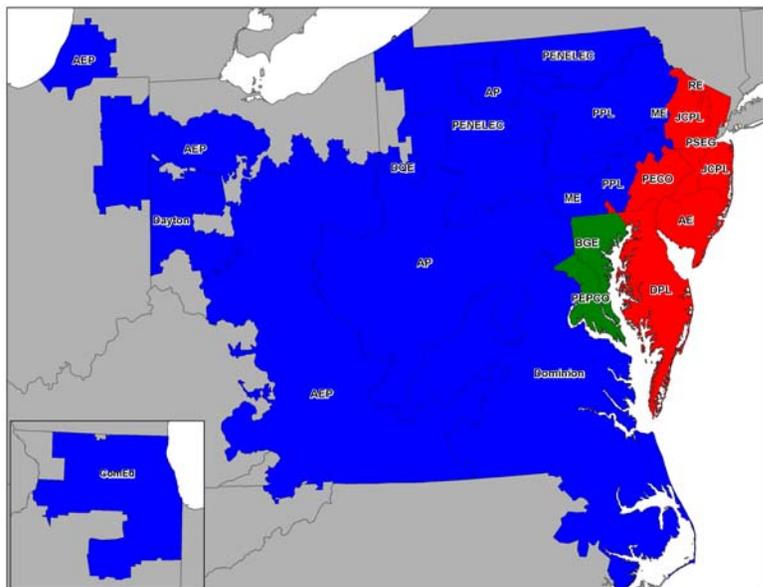


<b>Unit Type</b>	<b>20 Year Levelized Fixed Cost</b>	<b>Realistic Dispatch Average Net Revenue 1999 to 2004</b>
Combustion Turbine (CT)	\$72,207	\$36,195
Combined Cycle (CC)	\$93,549	\$52,243
Pulverized Coal (CP)	\$208,247	\$137,015



May 2007 – June 2008

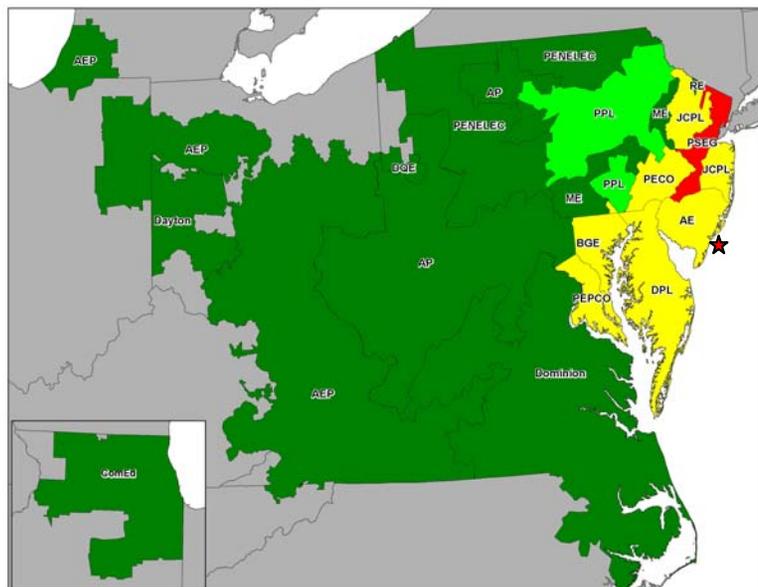
May 2008 – June 2009



May 2009 – June 2010

## Value of Capacity (\$/MW-day)

- \$20 - \$39 =
- \$40 - \$59 =
- \$60 - \$79 =
- \$80 - \$99 =
- \$100 - \$119 =
- \$120 - \$139 =
- \$140 - \$159 =



★ The increase Capacity Import Capability into Southern NJ is due to Transmission upgrades effective May 2009

- Forward looking
  - Competition from new entry
  - Investment incentives
- Locational capacity prices
  - Investment incentives
  - Retirement incentives

- Performance incentives
  - RPM: Historical EFORd based
  - Alternative: Actual performance on high load days
- Net revenue offset
  - RPM: Historical data
  - Alternative: Actual net revenues
  - Incentive effects
  - Energy market power effects

- Reliability issues
- Inadequate investment signals
- Retirement issues
  - Non-market bilateral contracts
- Risks to overall market design

- Capacity markets susceptible to market power
- Locational capacity markets more susceptible to market power

- Market power mitigation plan integrated into market design
- To prevent exercise of market power by existing resources
- Not applied to new resources
- Limited to relatively small local capacity markets

- No physical withholding
- No economic withholding
  - Structure
  - Behavior
  - Performance

- All existing generation resources must offer capacity in auctions except
  - Units reasonably expected to be physically unable to deliver
  - Units that have a physically firm commitment to an external sale of its capacity
  - Units constructed as energy only resources
- If failure to offer
  - Unit cannot be used to satisfy any capacity obligation for that delivery year.

- Price impact
  - If withholding results in an increase in market prices by more than 5 percent
  - MMU may postpone clearing auction
  - MMU would request review by FERC

- Identification of locational deliverability areas (LDAs) by PJM
- Preliminary Market Structure Screen
- Market Structure Screen applied in auction clearing process

- Market Structure Screen failed if, for constrained area (LDA)
  - HHI exceeds 2500
  - Any Capacity Market Seller has market share > 20%
  - There are three or fewer pivotal suppliers

- Mitigation may be applied if screen failed
  - Only in specific constrained area (LDA)
  - If a unit attempts to exercise market power
  - If that attempt would increase market price
  - Mitigation means unit offer limited to avoidable cost plus 10 percent (incremental cost of capacity)

- Mitigation does not limit scarcity prices
  - New entry offers not mitigated
    - All resources receive new entry price when new entry required
  - If total capacity offered is less than required, price set by demand curve
- Mitigated units receive higher of
  - LDA market clearing price
  - Overall market clearing price

- RPM costs too much.
- Why not eastern PJM only?
- Why not lower prices in early years?
- End state should be energy only market, RPM is wrong direction
- RPM issues better solved by transmission solutions
- RPM will overcompensate existing generation

# QUESTIONS?