Harvard Electricity Policy Group

panel topic day 2

Regional Transmission Organizations

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PJM
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‘When you are up to your ass in alligators you forget that your original intention was to drain the swamp'
The results of impending competition were to create various efficiencies throughout North America

**Staffing:**
- Vertically integrated utilities and ‘restructured’ companies reduced staffing to prepare for competition
  - Southern - dropped 31% (FERC data; 1990 – 2001)
  - Entergy - dropped 49% (FERC data; 1990 - 2001)
  - PECO - 12,000 to 6,000 (my recollection)
  - IOU’s (in aggregate) per EEI dropped 41% from 1990 through 2001

**Production Cost Savings**
- Bid-based, security-constrained economic dispatch done right and for a large area creates savings under all conditions
Other benefits of RTOs

- Pricing conventions and price transparency
- Forward market with no bias
- Efficient energy market
- Increase in electricity trade
- Regional transmission planning
- Reduced transaction costs
• “In an energy world in turmoil, where oil, gasoline, natural gas and even coal prices have increased by 100 percent to 400 percent in the last five years, PECO's electricity prices are a startling exception to skyrocketing energy prices. PECO customers will pay less in constant dollars for electricity in 2006 than in 1996,…”

– Penn Future September 2005
Retail Price Change (1995-2005)
RTO and Non-RTO
Eastern Interconnection, US

*DOE Energy Information Administration
Operational Efficiency of Larger Market

- Lower Energy Prices across the Expanded PJM Region
  - ESAI’s technical study: region-wide energy price without integration would be $0.78/MWh higher in 2005 than with integration.
  - Spreading these savings over the total PJM RTO’s energy demand of 700 terawatt-hours (TWh) per year yields aggregate savings of over $500 million per year.
Efficiency Indicator

- Market heat rate
  - Provides fuel adjusted measure of efficiency
  - Equivalent heat rate at Western Hub reduced from 11 MMBTU/MWh in 1999 to 7.3 MMBTU/MWh in 2004
Figure 4-13 - Trends in PJM equivalent demand forced outage rate (EFORd): Calendar years 1994 to 2004
Efficiency Indicators

• Regional security constrained economic dispatch impacts
  – Higher level of regional reliability
  – More efficient transmission utilization

• Power Transfers
  – Allegheny Power Integration in 2002 - Average on-peak transfers increased by 500 MW
  – AEP Integration in 2004 - Average on-peak transfers increased by 750 MW
PJM
Installed Reserve Requirement
Liquidity at U.S. Hubs
Q2 2005

- Dow Jones Index
- ** PJM Settlements Data
ISO Regulation and Pricing Model Definition

- Transmission is a natural monopoly and is priced at "cost-plus" by regulators
  - Build decision made by PJM, Regulator
  - Bad decision risk resides with retail customers

- Generation is bid competitively (wholesale)
  - Build decision by owner on speculation
  - Bad decision risk resides with generation owners

- ISOs price their services at cost-of-service
Problems

• Retail rates reduced and held flat during time of rising fuel prices by some states
• Rapidly rising fuel prices [coal, oil, gas]

• Transparency of RTO costs
• Hidden nature of RTO benefits

• Benefit for an IOU to be next-to but not in an RTO