



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'**



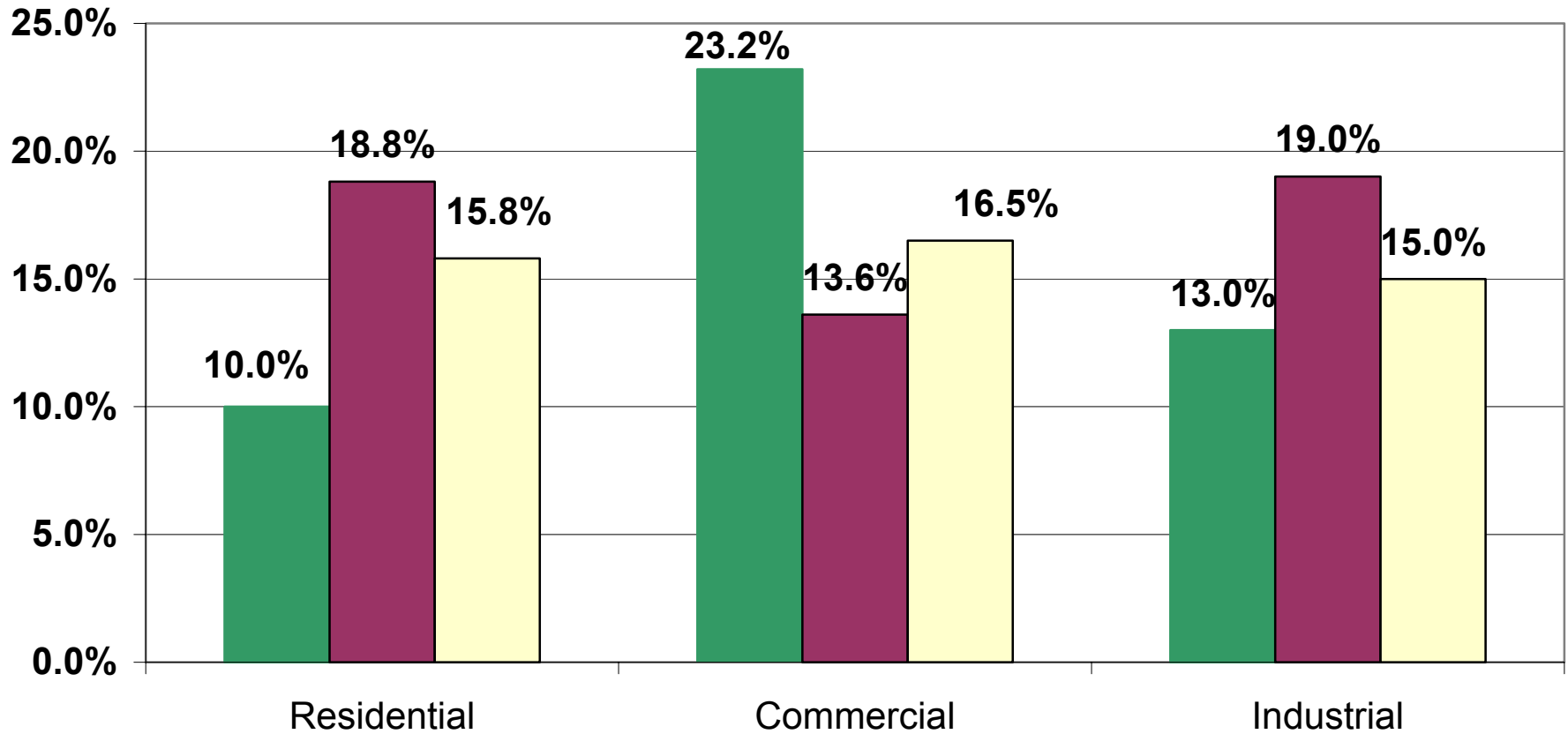
- Staffing:
 - Vertically integrated utilities and ‘restructured’ companies reduced staffing to prepare for competition
 - Southern - dropped 31% (FERC data; 1990 – 2001)
 - Entergy - dropped 49% (FERC data; 1990 - 2001)
 - PECO - 12,000 to 6,000 (my recollection)
 - IOU’s (in aggregate) per EEI dropped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

- 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

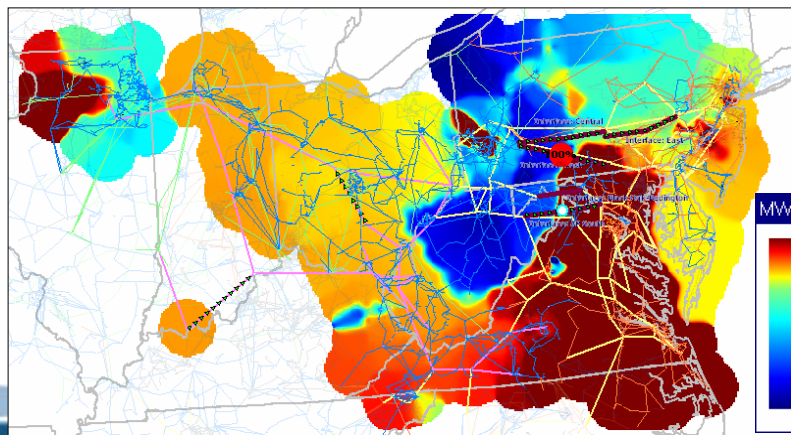


*DOE Energy Information Administration
Electric Power Monthly (April 1996, March
2006)

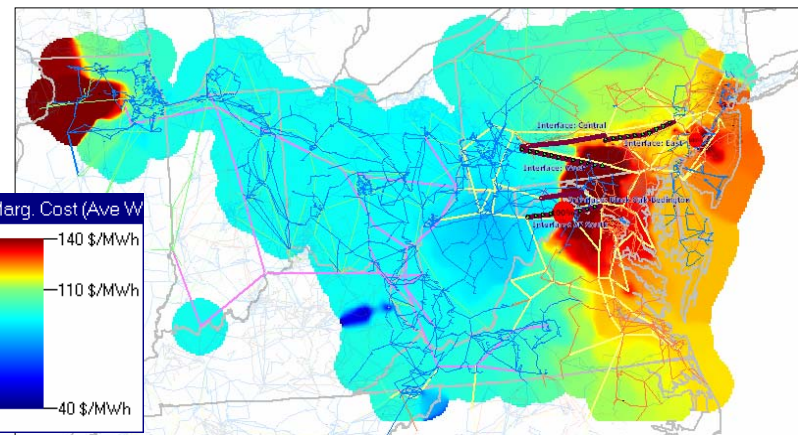
■ RTO Average ■ Non-RTO Average ■ Average

- 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.**

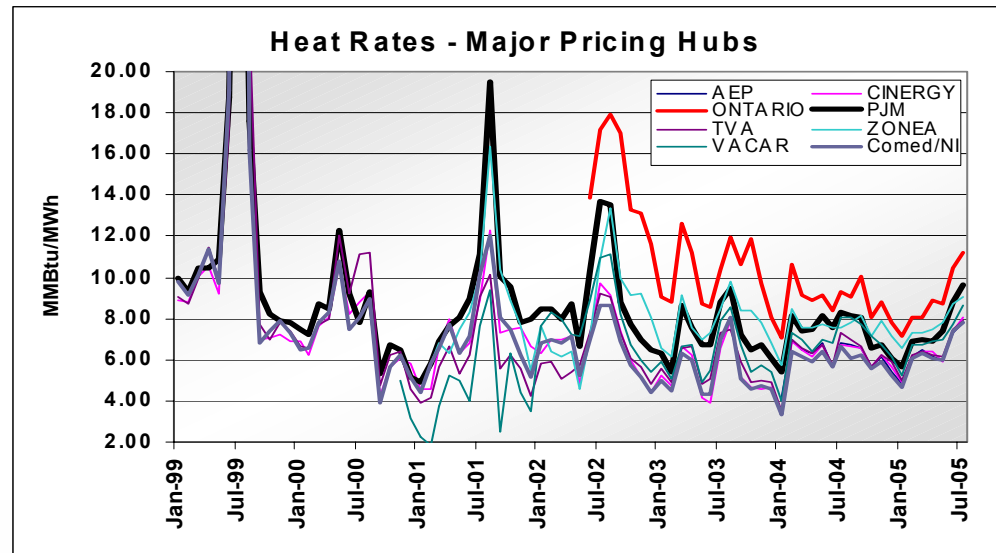
Pre-Integration Price Pattern



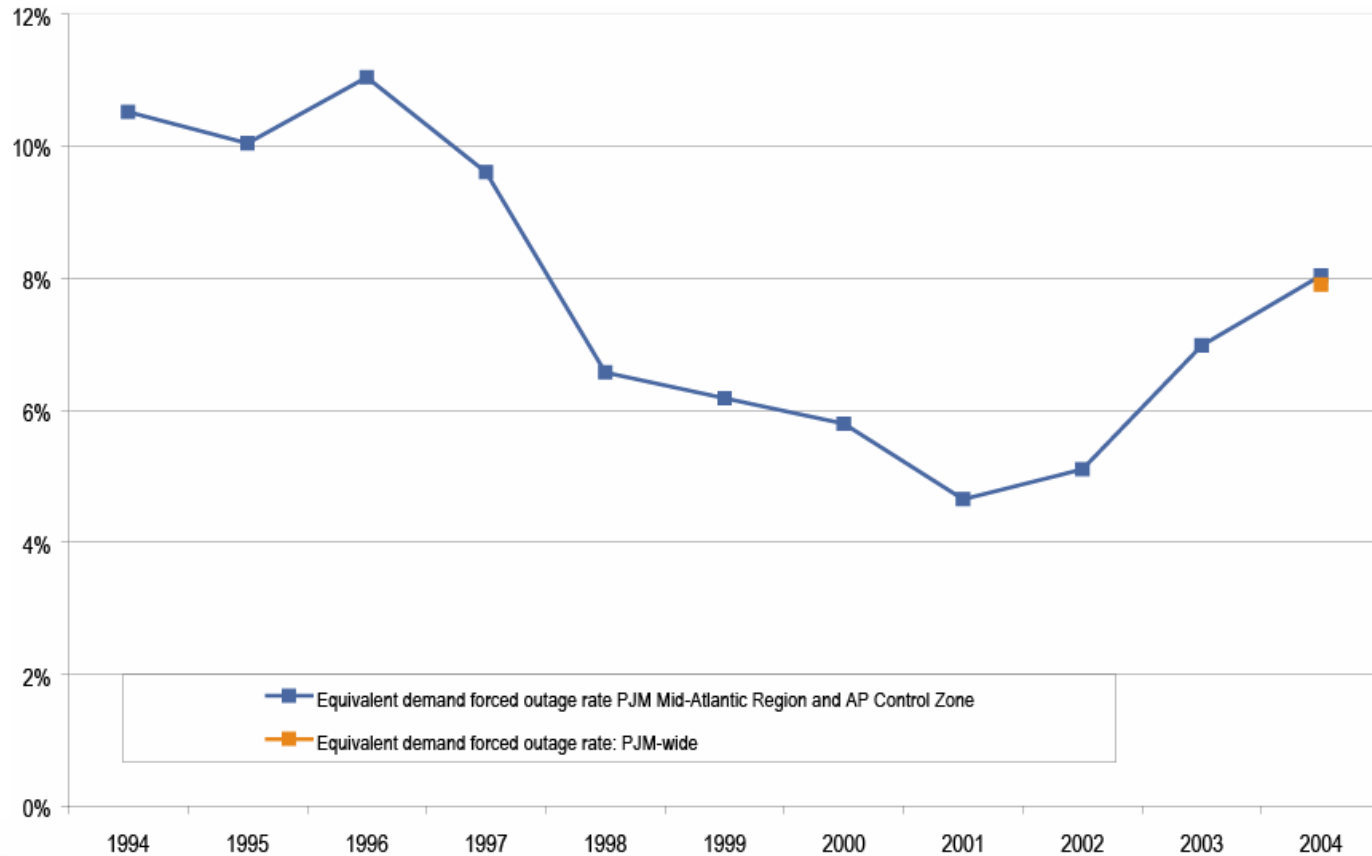
Post-integration Energy Price Pattern



- 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

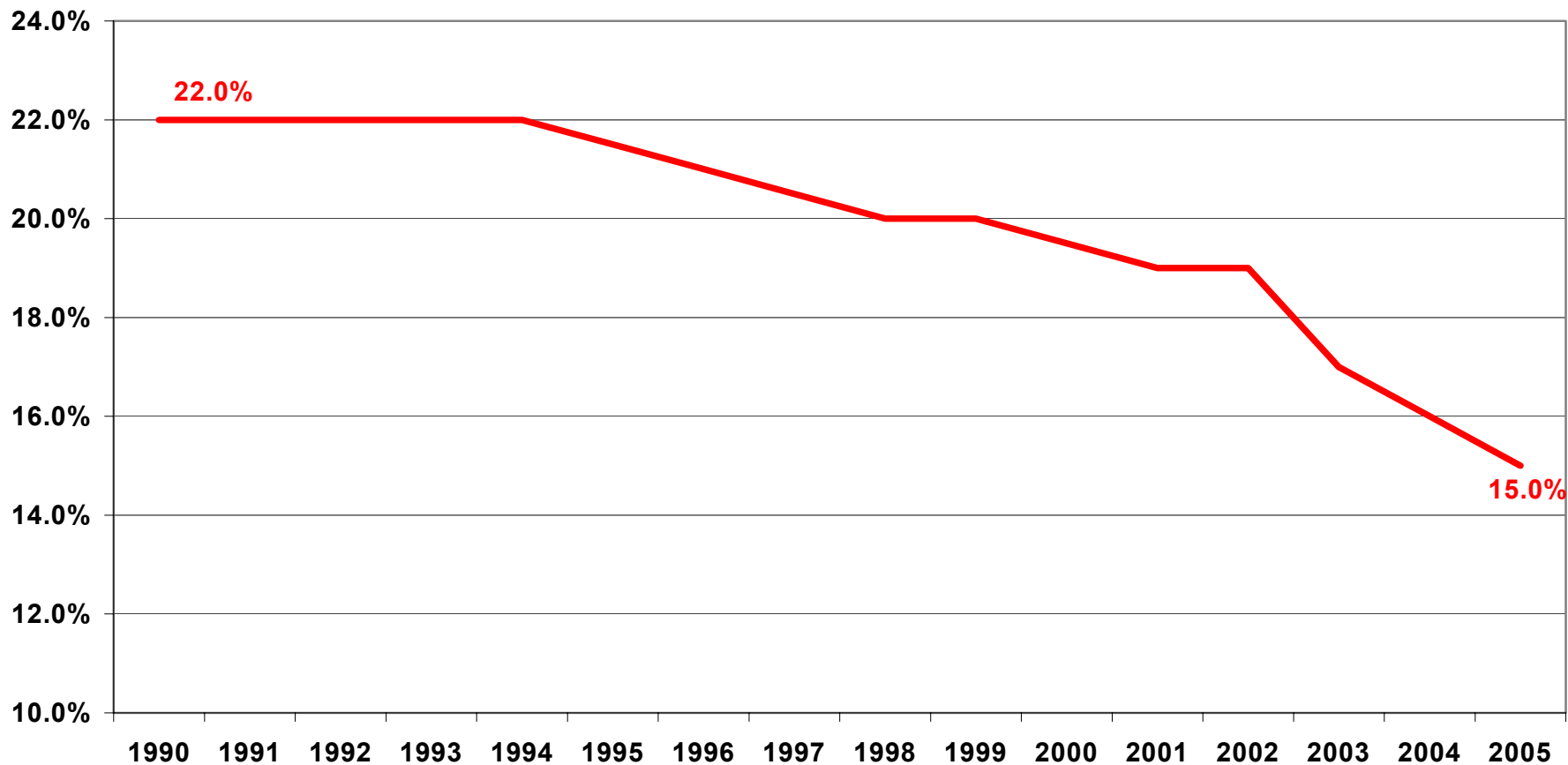


*Figure 4-13 - Trends in PJM equivalent demand forced outage rate (EFORd):
Calendar years 1994 to 2004*

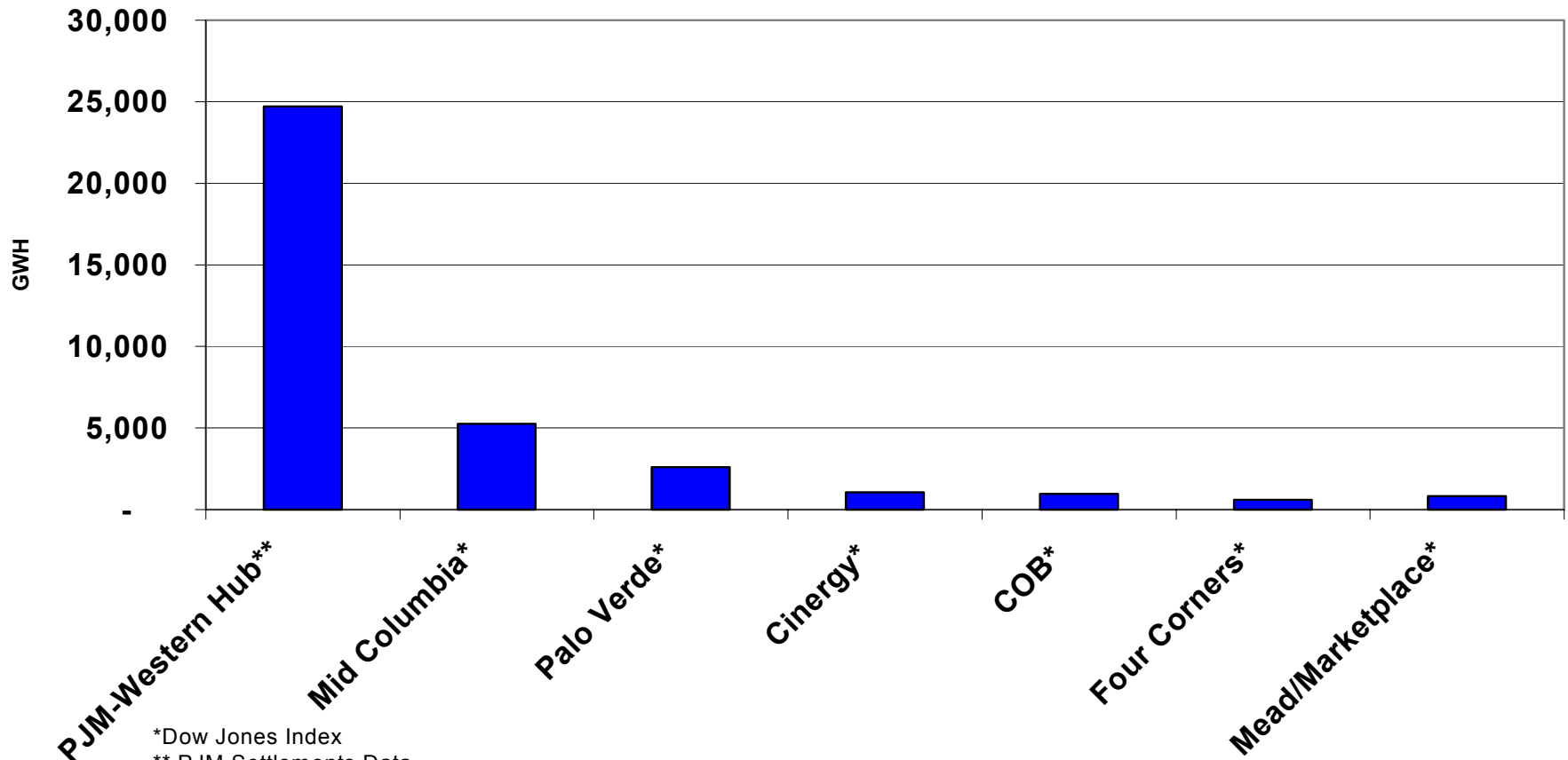


- Regional security constrained economic dispatch impacts
 - Higher level of regional reliability
 - More efficient transmission utilization
- Power Transfers
 - Allegheny Power Integration in 2002 - Average on-peak transfers increased by 500 MW
 - AEP Integration in 2004 - Average on-peak transfers increased by 750 MW

PJM Installed Reserve Requirement



Liquidity at U.S. Hubs Q2 2005



*Dow Jones Index
** PJM Settlements Data

- 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

- 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