Reliability, Risk and Energy Diversity

NCSL Policy Webinar
April 17, 2014

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PJM as Part of the Eastern Interconnection

- 27% of generation in Eastern Interconnection
- 28% of load in Eastern Interconnection
- 20% of transmission assets in Eastern Interconnection

KEY STATISTICS

- PJM member companies: 850+
- Millions of people served: 61
- Peak load in megawatts: 165,492
- MWs of generating capacity: 185,600
- Miles of transmission lines: 62,556
- 2013 GWh of annual energy: 832,331
- Generation sources: 1,365
- Square miles of territory: 243,417
- Area served: 13 states + DC
- Externally facing tie lines: 191

21% of U.S. GDP produced in PJM

As of 1/1/2014
Electricity Usage closely tied to:

- State of the economy
- Weather conditions
- Price
- Public policy directives and incentives
The Changing Generation Fleet in PJM:

- Plant retirements resulting from recession and resulting depressed demand for electricity
- Coal-plant retirements from EPA Regulations
- Coal-plant retirements from Low Natural Gas Prices
- Nuclear Plant viability from Low Gas Prices, Wind Subsidies, NRC Requirements and Public Opposition
- Potential “stress testing” of future customer-driven responses: Demand Response, Roof-top solar and Energy Efficiency
The Future Picture:

- System will Have Adequate Reserves: PJM procures future resources to meet expected demand—*but*
- Greater *diversity* of the generation mix: decreased dependence on coal, more mix of demand response, natural as-fired generation, renewable resources
- Greater *price volatility*
- System operating under *tighter conditions*—Loss of the traditional “cushion” provided by large base-load generation
PJM’s Changing Fuel Mix

2007 PJM installed capacity:
- Coal: 66,286
- Gas: 47,599
- Nuclear: 30,884
- Solid Waste: 7,311
- Renewable: 65
- Hydroelectric: 7,131
- Petroleum: 10,640

Capacity cleared market for 2016/2017 delivery year:
- Coal: 45,148
- Gas: 61,888
- Nuclear: 30,801
- Solid Waste: 8,299
- Renewable: 961
- Hydroelectric: 7,535
- Petroleum: 8,419
Transitioning from Coal to Gas

2009 to Date: 26,000 MW in Retirement Notices
The Winter of 2014: Indicators?

- Extreme Cold Weather Conditions
- Extremely High Natural Gas prices affecting power generation costs: Hitting customer bills
- Poor generator performance: Units unable to start due to equipment problems
- Unpredictable and opaque market for natural gas
Minimum Temperature for each day in January 2014
Columbus, Philadelphia, Chicago and Richmond

Shortage Pricing was triggered by the Voltage Reduction ACTION on the evening of Jan. 6 and by a reserve shortage on the morning of Jan. 7.
• Markets attracting over 20,000 MW of new generation
• Markets attracting over 15,000 MW of demand response and energy efficiency
• Examining/processing market rule changes to
  – ensure year-round availability of resources,
  – ensure reliability of imports from neighboring regions,
  – examining additional incentives for fuel diversity and fuel deliverability
An Added Complication:

Who Decides?
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• States:
  – State Energy Policies: Governors/legislators
  – State PUCs
• FERC
• Environmental Agencies
  – US EPA
  – State EPA
• Power Authorities
  – BPA, TVA et al.
WHAT CAN STATES DO?

• Ensure realistic renewable targets: Avoid “planning by bumper sticker”
• Oversee activities of retailers: Ensuring “truth in advertising” re: requirements on industrial and commercial customers
• Support a strong delivery system: Transmission and distribution systems
• Work with neighboring states: Electrons don’t respect state boundaries
LET’S TALK…

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