Lessons Learned: The Polar Vortex

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AEP – background

5.3 million customers in 11 states
Industry-leading size and scale of assets:

- **AEP’s Operational Capacity**: 42,000+ MW
- **Asset**
  - Firm Generation: 40,740 MW
  - Transmission: 40,000 miles
  - Distribution: 221,000 miles

- **Industry Rank**
  - Firm Generation: # 4
  - Transmission: # 1
  - Distribution: # 2

- **Fuel Mix**
  - Coal/Lignite: 60%
  - Natural Gas: 23%
  - Wind, Hydro, Solar & Pumped Storage: 8%
  - Nuclear: 5%
  - EE/DR: 4%
Polar vortex: The grid wake-up call

- The polar vortex was a wake-up call
- It tested the strength of the grid and revealed areas of significant concern
  - Is the industry taking on too much too fast?
  - Why is there no transitional framework?
  - Will reliability be the collateral damage?
Why harmonization matters

• Maintaining reliability in the wake of new EPA regulations
  • MATS and 111(d)
  • A significant percentage of the nation’s baseload coal plants are being retired
  • Natural gas is the presumed replacement
• Emergency response
  • Both industries play a critical role in the day-to-day lives of customers
The value of diversity

Source: PJM
January facts & observations

- PJM called 10 Emergency events in January – not just in the polar vortex
- 89% of generation that AEP is retiring in 2015 was called on to meet demand in January
- 13,000 MWs of generation that was available in January will be retired in 2015

Source: PJM
PJM outages at peak

Total forced outages: 40,200 MW (22% of total PJM capacity)

- Coal: 13,700 MW, 34%
- Gas Plant Outages: 9,700 MW, 24%
- Natural Gas Interruption: 9,300 MW, 23%
- Nuclear: 1,400 MW, 4%
- Other: 6,100 MW, 15%

Source: PJM
• Temperatures had remained subzero?
• Voluntary DR hadn’t shown up?
• Additional capacity had gone off?
• The polar vortex had occurred in 2016?

Source: PJM
Infrastructure challenges

The US gas pipeline grid

The US electric transmission grid

Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System
What is being done?

FERC has been very active on this issue

- AD12-12: Coordination between natural gas and electricity markets
- Order 787 (RM13-17): Authorizes RTOs to communicate non-public data regarding generators directly with natural gas pipelines under certain conditions
- Numerous technical conferences
RM14-2

• Coordination of the scheduling processes of interstate natural gas pipelines and public utilities

• AEP proposes:
  • Hourly gas nomination cycles
  • Current bumping protocols
  • Comparative economic analysis of alternatives
What can policymakers do?

- Understand that the move to gas will bring about dramatic changes for the electric industry
- Be open to creative new proposals
In summary

• The industry is taking on too much too fast
  • We must take the time to prioritize policy objectives
  • We need to be able to isolate cause and effect relationships

• There is no transitional framework
  • We need time and coordination to ensure that the timing and framework of new regulations are aligned with how the electrical grid actually operates

• Reliability will be the collateral damage
  • Maintaining grid reliability must be a critical part of decisions and the transition