Building Infrastructure in a Changing World...
Looking Backward to Look Forward

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PJM Interconnection

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Where to Start:
Reviewing the Fundamentals...
PJM works quietly behind the scenes to coordinate the movement and trade of electricity in 13 states and the District of Columbia.
Creation of Independent Grid Operators

- Air Traffic Controllers for the Transmission Grid
- Match Generation to Load
- Stock Market for Electricity
- Energy Market Pricing
PJM as Part of the Eastern Interconnection

Key Statistics

- Member companies: 960+
- Millions of people served: 61
- Peak load in megawatts: 165,492
- MW of generating capacity: 171,648
- Miles of transmission lines: 81,736
- 2014 GWh of annual energy: 792,580
- Generation sources: 1,304
- Square miles of territory: 243,417
- States served: 13 + DC

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

As of 7/2016
PJM – Focus on Just Three Things

Reliability
- Grid Operations
- Supply/Demand Balance
- Transmission monitoring

Regional Planning
- 15-Year Outlook

Market Operation
- Energy
- Capacity
- Ancillary Services
THE WEST'S ENERGY IMBALANCE MARKET

Eight states
35.3 million customers
$72-208M estimated annual savings

PJM’s Changing Fuel Mix

2007 PJM Installed Capacity (MW)

- Coal, 66,286
- Petroleum, 10,640
- Renewable, 65
- Hydro, 7,311
- Solid Waste, 713
- Nuclear, 30,684
- Gas, 47,566

Iron in the Ground (ICAP)

Cleared Capacity for 2019/2020 Delivery Year (MW)

- Coal, 41,948
- Petroleum, 7,391
- Renewable, 1,304
- Hydro, 7,707
- Solid Waste, 787
- Nuclear, 25,889
- Gas, 70,382

(UCAP)
New Resources Brings New Infrastructure Requirements

- Natural Gas Generation: Pipeline Infrastructure
- Distant Locations to Load Centers
- Rooftop Solar: Supporting Infrastructure for Delivery of Power
Who Decides on Needed New Infrastructure?

- **Generators**: The Market Decides: Competitive risk-taking by new generators to build and sell into wholesale electricity markets — generators pay the costs to upgrade the grid in order to connect.

- **Transmission**: Reliability needs identified by the grid operator — transmission lines approved by the state PUCs

- **Natural Gas Pipelines**: Approved by Federal Energy Regulatory Commission

- **Oil Pipelines**: State and federal permitting
POLICY CHOICES…

*The Long and Winding Road…*
The Past

- **Transmission**: Built to support major generation projects
- **Connect distant generation to load**;
  **Distribution**: One way delivery of power to the home
- **Grid Costs**: Rate-based to the home utility’s customers
- **ROI**: Little focus on transmission as a stand alone business element
**Policy Choice: A Strong or Weak Grid?**

Characteristics of the “Strong” Grid:

- Generation distance from load
- Meet the needs for future transmission expansion
- Costs socialized to reflect interconnected nature of the grid
- Broad regional approach
Policy Choice: The Alternative:

The localized grid…

• Generation closer to load
• Centralized focus on development of DSR, energy efficiency and renewables
• Transmission/distribution grid as an enabler of alternative generation
• Transmission focused on meeting state/local needs
An Added Complication

Who Decides?
Who Decides?

- States:
  - State Energy Policies: Governors/legislators
  - State PUCs
- FERC
- Regional Transmission Organizations
- Environmental Agencies
  - Non-attainment areas
  - RGGI et al.
Avoiding the Quagmire of Inaction

“Hanging in mid-air”: a dangerous place
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