PJM
Regional Transmission Planning Process

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PJM Interconnection
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PJM as Part of the Eastern Interconnection

KEY STATISTICS

- PJM member companies: 500+
- Millions of people served: 51
- Peak load in megawatts: 144,644
- MWs of generating capacity: 164,905
- Miles of transmission lines: 56,250
- GWh of annual energy: 729,000
- Generation sources: 1,271
- Square miles of territory: 164,260
- Area served: 13 states + DC
- Internal/external tie lines: 250

26% of generation in Eastern Interconnection
23% of load in Eastern Interconnection
19% of transmission assets in Eastern Interconnection
19% of U.S. GDP produced in PJM
Two Tier Governance

INDEPENDENT BOARD

Members Committee

- Generation Owners
- Transmission Owners
- Other Suppliers
- Electric Distributors
- End-Use Customers
RTEPP Analytical Approach

- Planning Process Overview
- Compliance With Reliability Standards
  - North American Electric Reliability Council (NERC) Criteria
    - ERO
  - ReliabilityFirst Criteria (RFC), SERC – RROs
- Planning Assumptions
  - Load Forecasting
  - Generation Interconnections
- Load Deliverability Criteria
- Generator Deliverability Criteria
RTEP Process Characteristics

- Ongoing and cyclical
- 15 year planning horizon
- Comprehensive and Holistic
- Collaborative
- NERC, RFC compliance
- FERC-approved
• **R1.** The Planning Authority and Transmission Planner shall each demonstrate through a valid assessment that its portion of the interconnected transmission system is planned such that the Network can be operated to supply projected customer demands and projected Firm Transmission Services, at all demand levels over the range of forecast system demands, under the contingency conditions as defined in Table I. To be valid, the Planning Authority and Transmission Planner assessments shall:
  
  – **R1.1.** Be made annually.
  
  – **R1.2.** Be conducted for near-term (years one through five) and longer-term (years six through ten) planning horizons.
  
  – **R1.3.** Be supported by a current or past study and/or system simulation testing that addresses each of the following categories, showing system performance following Table 1.
  
    • **R1.3.2.** Cover critical system conditions and study years as deemed appropriate by the responsible entity.
• **R2.** When System simulations indicate an inability of the systems to respond as prescribed in Reliability Standard TPL-002-0_R1, the Planning Authority and Transmission Planner shall each:

  – **R2.1.** Provide a written summary of its plans to achieve the required system performance as described above throughout the planning horizon:
    • **R2.1.1.** Including a schedule for implementation.
    • **R2.1.2.** Including a discussion of expected required in-service dates of facilities.
<table>
<thead>
<tr>
<th>Standard</th>
<th>Category</th>
<th>Contingencies</th>
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<tbody>
<tr>
<td>TPL-001</td>
<td>A</td>
<td>All Facilities in Service</td>
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<tr>
<td>TPL-002</td>
<td>B</td>
<td>Fault with Normal Clearing – Loss of all Facilities Associated with a Single Contingency</td>
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<td>TPL-003</td>
<td>C1</td>
<td>Bus Section Faults</td>
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<td>C2</td>
<td>Breaker Failure</td>
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<td>Fault with Normal Clearing Followed by Re-Dispatch Followed by a Second Fault with Normal Clearing (n-1-1 Contingency)</td>
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<td>C5</td>
<td>Multiple Circuit Tower Line</td>
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<td>TPL-004</td>
<td>D</td>
<td>Extreme Events</td>
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</table>
Load Forecast Assumptions

- 50/50 peak load forecast
  - Based on “normal” summer weather
  - 50% probability that forecast will be exceeded due to hotter than normal weather
  - Does not represent emergency conditions
  - Demand response is not activated

- 90/10 peak load forecast
  - Based on “extreme” summer weather
  - 10% probability that forecast will be exceeded due to hotter than normal weather
  - Represents emergency conditions
  - Demand response is activated

- Load deliverability models 90/10 load in area under test and 50/50 load elsewhere

- Generator deliverability and all other criteria tests model 50/50 load
Generation Modeling Assumptions

- **Generation Interconnection Process**
  - Study Process
    - Feasibility Study
    - System Impact Study
    - Facilities Study
    - Construction Service Agreement / Interconnection Service Agreement

- **Queue Volumes**
  - Withdrawal rates

- All Interconnection Projects Included in RTEP Studies Upon Execution of Interconnection Service Agreement in Same Manner as In-service Projects

- Interconnection Projects Having Executed a Facilities Study Agreement are Included in RTEP Analyses to the Extent That Their Interconnection Rights Contribute to the Need For Transmission Upgrades
Transmission system’s capability to deliver energy from aggregate of all capacity resources to an electrical area experiencing a capacity deficiency.
Strength of the transmission system to ensure that the aggregate of generators in a given area can be reliably transferred to the rest of PJM.
New Jersey RTEP Upgrades

132 upgrades required
(2003 – 2012)
### Overload Reduction For Single Contingencies

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<tr>
<th>Overloaded Facility</th>
<th>Fr Name</th>
<th>To Name</th>
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<th>Without Susq- Roseld</th>
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Questions?