Transmission Expansion Advisory Committee

February 16, 2012
Issues Tracking
• Open Issues
  – None

• New Issues
Generation Retirements
• Approximately 5400 MW’s of notifications since November 2011

• Multiple Transmission Zones

• Potential Regional Impacts
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<th>Unit</th>
<th>Capacity</th>
<th>Trans Zone</th>
<th>Age (Years)</th>
<th>Official Owner Request</th>
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<th>PJM Reliability Status</th>
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• Initial analysis completed and awaiting Generation Owner response
  – Dominion Transmission Zone
  – PSEG Transmission Zone
  – Allegheny Power Transmission Zone
  – ATSI Transmission Zone
  – DEOK Transmission Zone

• Initial analysis identified the need for transmission upgrades

• Upgrades include existing baseline projects as well as new upgrades
  – New EHV being considered to address issues in the Dominion Transmission Zone

• Stakeholder Input
Conastone – Graceton – Bagley – Raphael Road Second 230 kV Circuit
&
Crane and Wagner Retirement Sensitivity Study
• Prevailing flow is north to south from Conastone – Graceton – Bagley – Raphael Road 230 kV

• Current approved RTEP Upgrades
  – Second Conastone – Graceton – Bagley – Raphael Road 230 kV circuit

• Crane and Wagner Retirement Study Sensitivity
Crane and Wagner Retirement Sensitivity Study

- Crane 399 MW
- Wagner 998 MW

- Both reduce flow on Conastone – Graceton – Bagley - Raphael Road
Wagner and Crane generators retirement Result

- PJM performed the potential retirement study of the Wagner (998 MW) and Crane (399 MW) generators in BGE territory.
- The latest 2016 RTEP basecase was used.
- Analysis performed:
  - Baseline N-1 thermal and voltage
  - Generation deliverability
  - Load deliverability for MAAC, SWMAAC, BGE and PEPCO LDAs
  - N-1-1 voltage for the 500 kV contingencies

- Violations identified:
  - Baseline → Seven thermal and several voltage
  - Generation deliverability → 21 thermal
  - Load deliverability → Three thermal and a few voltage
  - N-1-1 → Several voltage collapse

- Remaining studies:
  - N-1-1 for below 500 kV contingencies
  - BGE local criteria study
Wagner and Crane generators retirement Result

**Potential System Upgrades to mitigate the identified violations:**

- Build Emory Grove 500/230 kV substation ($82.5 M)
  - Existing PJM baseline upgrade # b1254
- Build a parallel Conastone – Graceton – Bagley – Raphael Rd 230 kV circuit ($121 M)
  - Existing PJM baseline upgrade # b0497, b1016, b1251
- Install 500 MVAR SVC at Brighton 500 kV substation ($60 M)
- Install 200 MVAR capacitor at Hunterstown 500 kV substation ($4 M)
- Replace Conemaugh 500/230 kV transformer ($16 M)
- Rebuild Shade Gap – Roxbury 115 kV circuit ($8 M)
- Rebuild the Howard – Pumphrey 230 kV circuit ($12 M)
- Install a third Wagner 230/115 transformer ($25 M)
- Remove terminal limitation on Pumphrey 230/115 kV transformer ($0.1 M)
• Recommendation

  – Continue to evaluate the timing of existing baseline upgrades as a result of the Crane and Wagner retirement study
  – Perform additional sensitivity analysis
2012 RTEP
Scenario and Sensitivity Analyses
Previous RPS Studies

- Reliability Studies
  - 4 GW Offshore
  - 10 GW Offshore
  - 20 GW Offshore

- Market Efficiency Studies (SCOPF)
  - 4 GW Offshore
  - 20 GW Offshore

- Transmission Overlays
• The following scenario analysis will be performed as part of the 2012 RTEP

  – Renewable Portfolio Standards (RPS) Scenarios
    • 0 GW offshore
      – Perform reliability analysis
    • 10 GW offshore
      – Reliability analysis performed in 2011 RTEP
      – Perform SCOPF and develop transmission overlay by using both reliability and market efficiency analysis
    • Sensitivity of sourcing a portion of RPS from neighboring entities
      – Perform reliability analysis

  – High load growth Scenario

  – At-risk generation Scenario
    • RPM
    • Regulatory
2012 RTEP RPS Scenario Sourcing Strategy

- 10 GW Offshore (discussed last year but was not completed due to resource limitations)

- O GW Offshore

- 40% External Resource Strategy
  - Utilize same source distribution within PJM for 60% of the total renewables required
  - Assume HVDC injections into PJM for 40% of the resources
    - Utilize wind profiles for resources further west of PJM
• Develop a high growth load forecast based on a more optimistic economic projection

• Update the 2017 RTEP base case with a high growth load forecast

• Perform reliability analyses using the updated base cases
  – Generation Deliverability
  – Load Deliverability (with initial focus on historically constrained areas)
  – 15 year analyses
2012 RTEP Scenario Analyses – “At-Risk” Generation

• 2012 RTEP “AT-Risk” scenario analyses will build on the work completed in 2011

• Utilize “Coal Capacity at Risk for Retirement in PJM” report

• Perform reliability analysis on potential impact
• Reliability Analysis Scope

  – Load Deliverability analysis of select LDAs
    • MAAC
    • EMAAC
    • SWMAAC
    • Others

  – Area CETO will be increased based on the amount of “at-risk” generation located within the area

  – Additional analyses will be done focusing on potential regional issues
The Meadow Brook 138 kV breakers ‘MD-1’ and ‘MD-2’ are overstressed

Proposed Solution: Replace Meadow Brook 138kV breakers ‘MD-1’ and ‘MD-2’ (b0347.33, b0347.34)

Estimated Project Cost: $190 K per breaker

Project IS Date: 6/1/2013
• The Brambleton 230 kV breaker ‘2094T2095’ is overstressed
• Proposed Solution: Replace Brambleton 230 kV breaker ‘2094T2095’ (b1698.6)
• Estimated Project Cost: $220 K per breaker
• Expected IS Date: 6/1/2016
PENELEC Transmission Zone

- The Erie South 115 kV breaker ‘Union City’ is overstressed
- Proposed Solution: Replace the Erie South 115 kV breaker ‘Union City’ (b1821)
- Estimated Project Cost: $150 K
- Expected IS Date: 6/1/2016
• The Ironville 138 kV breaker ‘33-B-13208’ is overstressed
• Proposed Solution: Replace the Ironville 138 kV breaker ‘33-B-13208’ (b1820)
• Estimated Project Cost: $180 K
• Expected IS Date: 6/1/2016
Questions?

Email: RTEP@pjm.com