

**PPL ELECTRIC UTILITIES**  
Mid-Atlantic Sub-Regional  
RTEP  
2016 Planning Assumptions

February 4, 2016



PPL Electric Utilities

# 2016 RTEP Analysis

- PPL starts with a PJM RTEP developed Power Flow model which includes PPL 69 kV and above system topology.
- PPL began working with PJM to develop a 2021 basecase in October 2015.
- Contingencies are formatted in alignment with new NERC TPL-001-4 standard.
- PPL's focus is assuring our system topology and load distribution is correct in the PJM RTEP model.



# Load and Generation Assumptions

- Loads are modeled consistent with the 2016 PJM Load Forecast Report.
- PPL EU breaks the PJM forecasted load down to a more specific load distribution per region based on historical load profiles.
- PPL considers a 50/50 weather normalized peak summer, winter and light load for analysis consistent with PJM methodology.
- PPL EU considers various generation scenarios on 69 kV and 138 kV systems to determine the most severe load supply capability requirements.
- Topology Assumptions: the model includes all upgrades up to and including the 2021 study case year.



# PPL EU Reliability Principles and Practices

- PPL's Reliability Principles and Practices (RP&P) document has been developed over the years to ensure that acceptable and appropriate levels of service remain consistent with good utility practice.
- PPL EU RP&P has been filed with FERC as FERC 715 and describes the reliability criteria for 69 kV and above facilities.
- Ensures the regional power system can sustain probable contingencies and disturbances with minimal customer interruptions. (Consistent with NERC TPL standards).
- Ensures PPL can adequately serve each customer's needs with respect to capacity, voltage, and reliability.



# 2016 RTEP Approach for Baseline Assessments

- Baseline Projects
  - ❖ Projects which resolve a system reliability criteria violation.
- PJM and PPL perform separate analysis on the PPL LDA within the Mid-Atlantic Sub-Regional zone to comply with:
  - ❖ NERC Transmission Planning TPL standards
  - ❖ PJM Reliability Planning Criteria (Manual 14B, Attachment D)
  - ❖ PPL EU Reliability Principles and Practices (FERC 715 filing)



# Supplemental Projects

- Projects not required to meet NERC, PJM, or TO reliability criteria:
  - Examples include reinforcements to address local load growth, taps to new distribution substations, deteriorated equipment replacement, etc. (*more on following pages*)
- PPL EU follows PJM process for submittal of supplemental projects.
- PPL EU submits supplemental projects to PJM so they can be included in the RTEP model.



# Supplemental Projects: Examples of Drivers

- Aging Infrastructure
  - A majority of PPL EU's transmission system was installed during expansion periods and it is now approaching the time where structures should be replaced to maintain integrity.
- Increase system reliability
  - Using latest PPL specifications in rebuilds will decrease the frequency and duration of outages due to failed components, lightning, and other weather-related events.
  - Rebuilding facilities to current standard designs will eliminate line tapped transformers at regional substations.



# Supplemental Projects: Examples of Drivers

- Combat specific line failure concerns
  - Particular assets though the industry standard at the time, such as cellon treated poles, wood upswept arms, conductor splices, were prone to increase in degradation.
- Address Worst Performing Circuits
  - PPL has identified worst performing circuits which increase customer outages. Improvement on these lines will improve quality of service.



# Supplemental Projects: Examples of Drivers

- Increase in capabilities of equipment
  - Rebuilds utilizing new technology will provide better communication, analytics and operations that will restore customers in shorter periods of time.
- Relays and Control Houses
  - Reduced maintenance, remote monitoring, improved data recording, supports PPL EU fiber upgrades, and upgraded battery systems.
  - Reduced human performance error with uniformity.

