

FE East (PJM Mid-Atlantic) Local Planning Assumptions For 2018



Updated January 2018

FE – PJM Partnership

- FE performs separate analysis from PJM on it's zonal areas
- PJM and FE perform analysis consistent with NERC and RF planning requirements
- PJM focus is to apply PJM criteria (Manual 14B: Attachment D)
- FE focus is to apply:
 - FE Facility Connection Requirements
 - FE Transmission Planning Criteria
- Net result is the validation of each other's assessments to assure planning criteria violations are real and then propose upgrades in accordance with the PJM process for ultimate stakeholder review.

FE Facility Connection Requirements

- Detailed connection requirements established for connection of any generation or load to the FE transmission system
- Required to ensure no degradation to the reliable operation and to facilitate maintenance of the transmission system
- Ideally, the outage of any major piece of substation equipment can be scheduled for maintenance without disrupting the transmission system.
- **www.firstenergycorp.com/feconnect**



FE Transmission Planning Criteria

- Intended to meet or exceed all applicable minimum requirements of the North American Electric Reliability Corporation (NERC), ReliabilityFirst (RF) and PJM
- Applicable to FirstEnergy owned Bulk Transmission and Transmission (non Bulk) facilities
- Addresses loadability criteria, voltage level criteria, voltage and transient stability requirements, load curtailment criteria, voltage regulation requirements, reactive power requirements and short circuit requirements.
- Bulk Transmission level voltages are 100kV and above.
- Transmission (non Bulk) level voltages for networked systems range from 34.5 kV to 100kV as defined by zonal area.
- <http://www.pjm.com/planning/planning-criteria.aspx>

FE “Maintenance Condition” Contingency Analysis

- At Spring/Fall forecasted peak.
- Analysis of N-1 contingencies with any one transmission element (line section or transformer) out of service due to maintenance.
- To ensure the ability to take equipment out for maintenance for an extended period of time.



Setting Loads in System Models

- The loads in the system models are established using three sources:
 - FE Operating company distribution substations, and retail transmission connected customer substations, use FE Internal Load Forecast Data Management System (LFDMS)
 - Wholesale customer substations (eg Rural Electric Cooperatives and municipals) are also forecasted in LFDMS, utilizing forecasted information provided by the customers
 - Overall system forecasted loads are provided by the FE Retail Tariff Analysis & Forecasting group

Building the Model

- The base FE models are updated annually and use a 50/50 load forecast
- The updated FE system model is inserted into the latest available model from NERC/RF MMWG
- 90/10 and light load forecast sensitivity cases as well as others (eg base generating unit outages) are used to assess constraints and robustness of solutions
- FE will provide the base model used in developing it's local plans to PJM consistent with any applicable confidentiality restrictions, PJM's CEI process and copyright limitations.

Proposed Transmission Projects

- Projects based on the FE Energizing the Future (EtF) Program
 - PJM RTEP (Criteria Driven) requirements
 - FE Reliability Enhancement (Reliability Driven) methodology
- FE will follow the established PJM stakeholder process including participation in the TEAC and/or Subregional RTEP meetings as well as established internal stakeholder discussions as necessary.
- FE will consider stakeholder feedback/suggestions received at these meetings prior to finalizing it's local plans.

Transmission Planning Process

As a member of PJM, FirstEnergy actively participates in the Regional Transmission Expansion Plan (RTEP) process to identify future transmission system additions and improvements.

Future transmission system additions and improvements are based on:

- Coordinated Planning/Protection studies between PJM and FirstEnergy
- Ensuring compliance with applicable reliability standards and planning/protection requirements established by NERC, ReliabilityFirst, PJM and FirstEnergy
- Projects and/or solutions necessary to mitigate identified planning criteria violations on the FirstEnergy system
- Study results and connection requirements for new load and new generation connections

Transmission Reliability Enhancement Process

The Reliability Enhancement (RE) process identifies future transmission projects that:

- Reduce the duration and frequency of unscheduled outages
- Upgrade the condition of equipment
- Modernize the infrastructure
- Enhance system performance
- Improve operational flexibility, resiliency, and situational awareness
- Increase/restore load serving capability
- Address IT Network system reliability, obsolescence, compliance & security
- Maintain/enhance cyber and physical security

Future transmission system projects are identified for consideration based on EtF Project/Program methodology