

# FirstEnergy (FE) PJM Assumptions Meeting

SRRTEP Committee Meeting  
December 16, 2019



# FirstEnergy Transmission – Annual Planning Analysis

- **FirstEnergy (FE) performs separate analysis from PJM on the FE zonal areas**
- **PJM and FE perform analysis consistent with NERC and ReliabilityFirst (RF) planning requirements**
- **PJM focus is to apply PJM criteria (Manual 14B: Attachment D & G)**
- **FE focus is to apply, based on the system planning model:**
  - FE Transmission Planning Criteria
  - FE Facility Connection Requirements
  - FE Energizing the Future (EtF) Project / Program Methodology
- **Net result is the validation of system analysis by FE and PJM to then propose baseline or supplemental projects in accordance with the PJM process**

# FirstEnergy Transmission – Building the System Model

- **The base FE model is updated annually and use a 50/50 load forecast**
- **The updated FE system model is inserted into the latest available model from NERC/RF Multiregional Modeling Working Group (MMWG)**
- **A 90/10 load forecast sensitivity case as well as other sensitivity cases (ex: light load and maintenance condition analysis) are used to assess constraints and robustness of solutions**
- **FE provides the base model used in developing it's local plan to PJM consistent with any applicable confidentiality restrictions, PJM's CEI process and copyright limitations**

# FirstEnergy Transmission – Updating System Loads

The loads in the system models are established using three sources:

- 1. FE distribution substations and retail customer transmission connected substations use the FE Internal Load Forecast Data Management System (LFDMS) to forecast loads**
- 2. Wholesale customer substations (ex: Rural Electric Cooperatives and Municipals) are also forecasted in LFDMS utilizing information provided by the wholesale customers**
- 3. FE aggregated system forecasted loads are provided by the FE Retail Tariff Analysis & Forecasting group**

# FirstEnergy Transmission – Planning Criteria

- **Intended to meet or exceed all applicable minimum requirements of the North American Electric Reliability Council (NERC), ReliabilityFirst Corp (RFC) and PJM**
- **Applicable to FirstEnergy owned Bulk Transmission and non-Bulk Transmission facilities**
  - Bulk Transmission facilities are 100 kV and above
  - Non-Bulk Transmission facilities are networked systems less than 100 kV
- **Address loadability criteria, voltage level criteria, voltage and transient stability requirements, load curtailment criteria, voltage regulation requirements, reactive power requirements and short circuit requirements**

*Supporting Document Location: [www.pjm.com/planning/planning-criteria](http://www.pjm.com/planning/planning-criteria)*

# FE Transmission – Supplemental Project Planning Assumptions

- **The Supplemental Project process categorizes system needs into five categories:**
  - Equipment Material Condition, Performance and Risk
  - Operational Flexibility and Efficiency
  - Infrastructure Resilience
  - Customer Service
  - Other
  
- **For FirstEnergy, Transmission system needs that follow the Supplemental Project process are based on:**
  - *FirstEnergy Energizing the Future (EtF) Project/Program Methodology* document
  
- **And Customer Service connections that follow the Supplemental Project process are based on:**
  - *FirstEnergy Requirements for Transmission Connected Facilities* document
  - *FirstEnergy Transmission Planning Criteria*

# Supplemental Project Assumptions – Global Factors

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*From the FirstEnergy Energizing the Future (EtF) Project/Program Methodology document...*

## **FE Global Factors**

- Criticality, Impact on Reliability, Customer Outages
- Failure Risk, Age and Condition, Obsolescence, Operational or Design Limitations.
- System Reliability and Performance
- Substation and Line Equipment Limits
- Reliability of Non-Bulk Electric System (Non-BES) Facilities
- Load at Risk and Customers Impacted

# Supplemental Project Assumptions – Condition Projects

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*From the FirstEnergy Energizing the Future (EtF) Project/Program Methodology document...*

## 1.1 Substation Condition Rebuild / Replacement

Evaluation of Component and Operational / Maintenance History

- *Circuit Breakers, Power Transformers, Protection Systems, Capacitor Banks...*
- *Line Arresters, Switches, Risers and Connections, Metering, Facilities...*

## 1.2 Line Condition Rebuild / Replacement

Evaluation of Component and Operational / Maintenance History

- *Steel and Wood Pole, Line Hardware, Switches Conductor...*
- *Evaluated with historical or recently completed field condition assessments.*
  - Results in projects to rebuild the Transmission line or the replacement of components.

# Supplemental Project Assumptions – System Performance

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*From the FirstEnergy Energizing the Future (EtF) Project/Program Methodology document...*

## 2.0 System Performance

Evaluation of the transmission system to improve the overall reliability and system performance for customers.

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| <b>2.1 Equipment / Technology / Design Upgrades</b> | <b>2.7 Build New Transmission Line</b>            |
| <b>2.2 System Conversion Methodology</b>            | <b>2.8 Generation Switching Stations</b>          |
| <b>2.3 Network Radial Lines</b>                     | <b>2.9 Upgrade Relay Schemes</b>                  |
| <b>2.4 Reconductor / Rebuild Transmission Line</b>  | <b>2.10 Automatic Sectionalizing Schemes</b>      |
| <b>2.5 Add / Replace Transformers</b>               | <b>2.11 Add SCADA Control</b>                     |
| <b>2.6 Add / Expand Bus Configuration</b>           | <b>2.12 Improve Fault Recorder Communications</b> |

*NOTE: Certain Condition and Operational Flexibility needs may also be classified as contributing to an System Performance need.*

# Supplemental Project Assumptions – Operational Flexibility

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*From the FirstEnergy Energizing the Future (EtF) Project/Program Methodology document...*

## **3.0 Operational Flexibility**

Strengthen and improve the reliability and performance of the Transmission system for future capacity and operational flexibility.

**3.1 Permanent Reactive Device**

**3.2 Replace Breakers**

**3.3 Operational Metering**

*NOTE: Certain Condition and Performance needs may also be classified as contributing to an Operational Flexibility need.*