Duke Energy Ohio & Kentucky

2021 Local Planning Assumptions, Models and Criteria

PJM Subregional RTEP Committee Meeting – Western
December 2020

- Power Flow Models
  - DEOK works with PJM to develop the RTEP and MMWG power flow models
    - Topology verified
    - Contingencies verified
    - Bus, load and generator profiles submitted
    - Seasonal ratings profiles submitted
  - DEOK uses the most recently issued RTEP models for analysis

- Baseline Assessment

  - PJM analyzes the DEOK area
  - DEOK validates the analysis and coordinates with PJM to identify baseline reliability upgrades based on the following criteria:
    - NERC TPL Standards
    - PJM Reliability Criteria
    - DEOK FERC Form 715 Criteria

      (https://www.pjm.com/planning/planning-criteria/to-planning-criteria.aspx)

  - Baseline needs and solutions are presented to the Subregional RTEP Committee – Western and Transmission Expansion Advisory Committee

- Supplemental Projects

  - Supplemental projects address local planning needs
  - Supplemental project needs and solutions are presented at the Subregional RTEP Committee – Western and Transmission Expansion Advisory Committee meetings
  - Supplemental project drivers include:
    - Equipment condition, performance and risk
    - Operational flexibility and efficiency
    - Infrastructure resilience
    - Customer service
    - Other

- Supplemental Project Driver: Equipment Condition, Performance and Risk

  - Degraded equipment performance, material condition, obsolescence, equipment failure, employee and public safety and environmental impact
    - Criteria includes:

      Outage frequency and duration
      At risk load
      Number of customers and customer type affected
      Normal loading and loading limits
      Negative maintenance trends
      Increasing maintenance costs
      Availability of spare parts or vendor support
      Expected service life of equipment

- Supplemental Project Driver: Equipment Condition, Performance and Risk

  - Criteria includes (continued):
    - Related ancillary equipment performance
    - Programmatic replacement of equipment
    - Long lead time or construction time required for replacement
    - Risk of failure based on industry or company data
    - End of life planning criteria

- Supplemental Project Driver: Operational Flexibility and Efficiency

  - Optimizing system configuration, equipment duty cycles and restoration capability, minimize outages
    - Criteria includes:

      Operational options for switching
      Networking of radial lines
      Remedy recurring operational problems
      Provide more options to deal with non-standard operating conditions
      Enhance system operational functionality

- Supplemental Project Driver: Infrastructure Resilience

  - Improve system ability to anticipate, absorb, adapt to, and/or rapidly recover from a potentially disruptive event, including severe weather, geo-magnetic disturbances, physical and cyber security challenges, critical infrastructure reduction
    - Criteria includes:

      Improving the system's ability to absorb and recover from an interruption
      Networking of radial lines
      Eliminating three-terminal lines
      Separating circuits from shared structures or paths
      Adding or reconfiguring infrastructure to limit circuit and/or load loss
      Diversifying sources and source paths to load areas

- Supplemental Project Driver: Customer Service

  - Service to new and existing customers. Interconnect new customer load. Address distribution load growth, customer outage exposure, equipment loading
    - Criteria includes:

      Serving new customer load

      Serving additional customer load

      Customer requested infrastructure

      New infrastructure to support economic development

- Supplemental Project Driver: Other

  - Meet objectives not included in other drivers
    - Criteria includes:
      - State and/or local requirements
      - Generation retirements
      - New technology pilot projects
      - Roadway relocation or expansion projects
      - Good utility practice
      - Industry recommendations

- Retirement of Existing Facilities

  - The purpose of transmission planning is to provide that the capacity of the transmission system is maintained to ensure the reliability, efficiency, safety, resilience and security of the transmission system for the benefit of customers.
  - There are no national, regional or local standards or criteria driving the retirement and not the replacement of existing facilities. In specific situations facilities may be removed and not replaced as dictated by system and/or customer needs. However, decisions to not replace individual facilities may have the cumulative effect of negatively impacting the reliability, efficiency, safety, resilience and security of the transmission system. That cumulative negative impact could also drive the need for additional facilities to be constructed to compensate for those removed, including greenfield installations.
  - Accordingly, existing facilities are maintained in service or retired based on Good Utility Practice.


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