

AEP Transmission Local Planning Assumptions, Models, and Criteria

*PJM Sub-Regional RTEP
Western Meeting*

December 18, 2019

Introduction to AEP

- AEP is among the largest electric utilities in the United States
 - More than 5 million customers
 - 200,000 + sq. mi service territory
 - 32 GW of generating capacity
 - Over 40,000 miles of electric transmission lines
 - More than 3,500 substations
 - 215,000 miles of electric distribution lines
- Largest owner of electric transmission in the United States
 - Own, operate and maintain transmission facilities in 3 RTOs and 11 states
 - Interconnection with 60 major utilities across the U.S.
 - Supplying ~10% of demand in Eastern Interconnection and ~11% of demand in ERCOT

AEP Zone in PJM

- Total AEP Transmission facilities in PJM region: ~23,000 miles
 - 765 kV ~2,200 miles
 - 500 kV ~100 miles
 - 345 kV ~4,000 miles
 - 230 kV ~100 miles
 - 161 kV ~50 miles
 - 138 kV ~9,000 miles
 - Sub-T ~8,000 miles

- Connected demand modeled in AEP Transmission zone in PJM

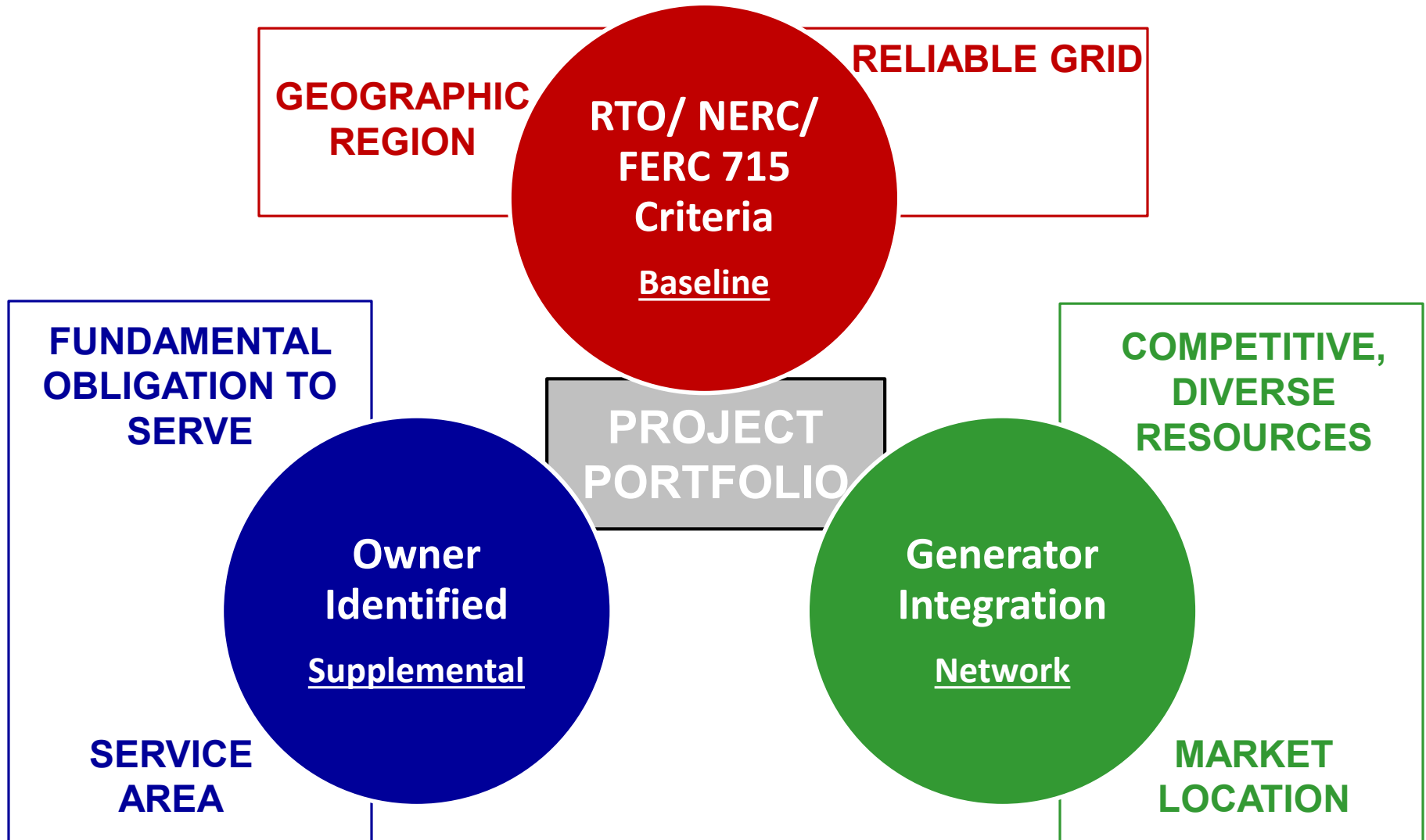
	<u>2025 Summer</u>	<u>2025/26 Winter</u>
• Appalachian	6,039 MW	7,319 MW
• Indiana Michigan	4,678 MW	3,940 MW
• Kentucky	1,043 MW	1,331 MW
• <u>Ohio</u>	<u>11,511 MW</u>	<u>9,914 MW</u>
• Total	23,271 MW	22,504 MW

- AEP load in the RTEP base cases is scaled to PJM forecast.

PJM Power Flow Models

- AEP supports development of and updates to RTEP base cases.
- AEP participates in development of annual series of ERAG MMWG base cases.
 - Cases include seasonal, near-term, and long-term models used in ERAG and RFC assessments of the Transmission system.
- AEP planning studies utilize available PJM RTEP base cases.
 - AEP has both summer and winter peaking zones.
 - Internal cases are developed, on case by case basis, to represent and address local historical constraints observed in real-time.

Types of Projects in PJM Region



AEP Planning Criteria – FERC 715

- AEP transmission system is planned in adherence with NERC TPL-001-4 and PJM Planning Criteria outlined in Manual 14B.
- AEP Planning Criteria (FERC 715) aligns with NERC and RTO planning criteria.
 - Also includes criteria to plan non-BES system (below 100 kV).
- All planning studies utilize the latest available PJM RTEP base cases.
 - Special cases are created to perform local area studies, if needed
- PJM evaluates compliance and adherence to above standards and criteria from regional perspective (top down), and AEP does the same from a local perspective (bottom up).

Link to AEP FERC 715:

<https://www.aep.com/about/codeofconduct/OASIS/TransmissionStudies/>

Customer Interconnections

- In accordance with NERC Standard FAC-001-2, AEP has posted requirements for interconnections of end-use customers, generators, and transmission facilities.
- To provide service to end-use customers, AEP performs initial studies to determine the system impacts and develop a plan of service for contracted load levels.
 - Required transmission upgrades are validated by PJM under baseline reliability criteria.
- AEP may, at its discretion, enhance plans to serve projected contracted load levels such that the plans are able to serve any projected non-contracted load
 - AEP consults with the customers as well as the local and state economic development organizations in assessing the likelihood of non-contracted projections.
 - Any required upgrades to meet projected non-contracted loads are considered supplemental.
 - Any required upgrades to improve grid capacity to meet projected contracted load are considered baseline.

Link to AEP Interconnection Requirements:

<https://www.aep.com/about/codeofconduct/OASIS/TransmissionStudies/>

Guidelines for TO Identified Needs

- AEP guidelines for transmission owner identified needs address equipment material conditions, performance, and risk while considering infrastructure resilience, operational flexibility and efficiency.
- The AEP guidelines allow determination of asset needs which need to be revitalized to ensure safe, reliable and cost-effective operation of the grid.
- AEP takes a holistic view of all the needs in developing solution options to best address the identified needs.

Link to AEP Guidelines for TO Identified Needs:

<https://www.aep.com/about/codeofconduct/OASIS/TransmissionStudies/>

Retirement of Existing Facilities

- The purpose of transmission planning is to ensure that the capacity of the existing transmission system is maintained or expanded as needed 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 replacement of existing facilities. Although in specific situations, facilities may be removed and not replaced as dictated by system and/or customer needs, or the design and construction of new or replacement transmission projects, 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.

Questions?