

UGI Utilities, Inc. Electric Division
2021 Annual Planning Assumptions

Agenda

- Base Case Power Flow Model
- Baseline Analysis
- Supplemental Project Drivers
- Asset Management - End of Life Criteria

Base Case Power Flow Model

- UGI uses PJM-developed power flow models for all assessments
- 5-year assessment: 2026 PJM RTEP case
- Use ERAG MMWG power flow models if RTEP cases unavailable
- Loads scaled to be consistent with 2021 PJM Load Forecast Report

Baseline Analysis

- PJM performs baseline analysis to identify thermal, voltage, stability, and short circuit issues in accordance with the following criteria:
 - NERC Reliability Standards
 - PJM's Transmission Planning Criteria as per Manual 14B
 - UGI's Transmission Planning Criteria as filed with PJM and FERC (FERC Form 715)
- UGI verifies PJM's analysis on BES part of system and performs analysis on non-BES part of system
- Reliability violations identified as a result of above analyses are addressed via baseline projects

Supplemental Project Drivers

- 1) Equipment Material Condition, Performance, and Risk
- 2) Operational Flexibility and Efficiency
- 3) Infrastructure Resilience
- 4) Customer Service
- 5) Other

Supplemental Project Drivers

(Equipment Material Condition, Performance, and Risk)

Examples:

- Degraded equipment performance
- Operational performance
- Asset health and age
- Ability to service and maintain lines and equipment
- Obsolescence
- Asset modernization and standardization
- Equipment failure
- Asset analytics (failure rate by age, historical maintenance)
- Safety (Public and Employee)
- Environmental impacts

Supplemental Project Drivers

(Operational Flexibility and Efficiency)

Examples:

- System configuration optimization
- Criticality of assets
- Availability of assets
- Equipment duty cycles
- Ability to restore
- Outage time minimization
- Radial customers
- Improving system functionality

Supplemental Project Drivers

(Infrastructure Resilience)

Examples:

- Sectionalization opportunities
- Weather-related concerns
- Converting radial facilities to networked
- Ring bus

Supplemental Project Drivers

(Customer Service)

Examples:

- Serving existing and anticipated new business
- Support future load growth
- Exposure to outages
- Equipment loading

Supplemental Project Drivers

(Other)

Examples:

- Generation projects including distributed generation
- Technological enhancements
- MVAR support capability
- Industry-based recommendations

Asset Management - End of Life Criteria

- The following slides identify the planning criteria for UGI Utilities' Asset Management End Of Life (EOL) needs. An EOL need is defined as the need to replace a transmission line between breakers operating at or above 100 kV or a transformer, the high side of which operates at or above 100 kV and the low side of which is not connected to distribution facilities, which the Transmission Owner has determined to be near the end of its useful life, the replacement of which would be an Attachment M-3 Project.
- The goal of the UGI Utilities' asset management strategy is to ensure the reliability, efficiency, safety, resilience, and security of the transmission system for the benefit of customers.
- In the evaluation of the assets, UGI Utilities' review may consider age, operational history, maintenance, performance, manufacturer and accepted industry practices, and current engineering design standards associated with the asset types. The evaluation includes, but is not limited to, the following components and parameters:

Transformers

- The following parameters are primarily considered when determining if transformers are near or at the end of their useful lives:
 - Age
 - Risk of failure
 - System criticality
 - Increasing negative trend in tests
 - Obsolescence/spare part availability
 - Loading and fault history
 - Dissolved gas in oil
 - Insulation power factor
 - Moisture content
 - Good Engineering Judgement/Industry Best Practices
 - Environmental considerations

Transmission Lines

- The following parameters are primarily considered when determining if transmission lines are near or at the end of their useful lives:
 - Age
 - Past performance/Reliability
 - System criticality
 - Increasing negative trend in maintenance inspection
 - Failure risk
 - Historical industry performance
 - Applicable codes and regulations
 - Good Engineering Judgement/Industry Best Practices
 - Safety Concerns
 - Environmental factors
 - Other operational and design considerations
 - Engineering Analysis

Line Support Structures

- The following parameters are primarily considered when determining if transmission poles and towers are near or at the end of their useful lives:
 - Age/Condition
 - Lattice Tower “Pack Out”
 - Accessibility
 - Foundations and Subsidence
 - Lattice Tower Steel Member Deformation
 - Steel Structure Fasteners
 - Lattice Tower Connection Condition
 - Engineering Analysis
 - Maintenance History

Line Conductor

- The following parameters are primarily considered when determining if transmission conductors are near or at the end of their useful lives:
 - Age/Condition
 - Number of splices
 - Splice type
 - Insulator/Connector Condition
 - Shield wire
 - Micro-ohm testing

Questions?