UGI Utilities, Inc. Electric Division

# 2024 Annual Planning Assumptions

PJM Mid-Atlantic Sub-Regional RTEP Committee

December 2023

# Agenda

1. Base Case Power Flow Model
2. Baseline Analysis
3. Supplemental Project Drivers
4. Asset Management - End of Life Criteria
5. Retirement of Existing Facilities

# 1. Base Case Power Flow Model

- UGI uses PJM-developed power flow models for all assessments
- 5-year assessment: 2029 PJM RTEP case
- Use ERAG MMWG power flow models if RTEP cases unavailable
- Loads scaled to be consistent with latest PJM Load Forecast Report

# 2. 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 its BES and performs an analysis on its non-BES facilities
- Reliability violations identified because of above analyses are addressed via baseline projects

# 3. Guidelines for Attachment M-3 Process Supplemental Project Drivers

| | Driver | Definition |
|---|---|---|
| 3a | Customer Service | Service to new and existing customers. Interconnect new customer load. Address distribution load growth, customer outage exposure, equipment loading. |
| 3b | Equipment Material Condition, Performance and Risk | Degraded equipment performance, material condition, obsolescence, including at the end of the useful life of equipment or a facility, equipment failure, employee and public safety and environmental impact. |
| 3c | Operational Flexibility and Efficiency | Optimizing system configuration, equipment duty cycles and restoration capability, minimize outages. |
| 3d | 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. |
| 3e | Other | Meet objectives not included in other definitions such as, but not limited to, technological pilots, industry recommendations, environmental and safety impacts, etc. |

# Supplemental Project Drivers

3a. Customer Service

These projects are necessary to serve new or future customers or additional load growth to existing customers. Projects may include improvements to substations or lines to ensure reliable service to our customers.

Project Drivers may include:

- Improvement to facilities to increase capacity due to load growth
- Interconnection of new customers

# Supplemental Project Drivers

3b. Equipment Material Condition, Performance and Risk

These projects are necessary to upgrade/replace equipment based on performance, increased maintenance costs, age, reliability concerns and good engineering practice. Ensuring safe and reliable operation of the transmission system are the project drivers.

Project Drivers may include:

- Asset analytics including failure rate by age and historical maintenance costs.
- Asset health and age
- Ability to service and maintain assets
- Upgrading facilities to current standards
- Public and employee safety concerns
- Environmental drivers

# Supplemental Project Drivers

3c. Operational Flexibility and Efficiency

These projects are necessary to ensure a reliable and robust transmission system to serve customers. These projects are designed to provide flexibility to address abnormal system configurations, reducing customer exposure and improving restoration.

Project Drivers may include:

- Improving system design for flexibility and increased capacity
- Ensuring the availability of assets
- Improving system design to minimize outages
- Upgrading facilities to more efficient current standards

# Supplemental Project Drivers

3d. Infrastructure Resilience

These projects are necessary to improve system design to create a more resilient transmission system, increasing operability and reducing customer exposure to events.

Project Drivers may include:

- Improving system design for sectionalizing opportunities
- Converting radial facilities to networked
- Storm hardening facilities

# Supplemental Project Drivers

3e. Other

Meet objective not included in other definitions.

Project Drivers may include:

- Projects required by governmental entities
- New technology projects
- Impacts due to the connection of DER's
- Others

# 4. 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
- Standards

# 5. 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 of existing facilities. Although in specific situations, facilities may be removed or not replaced as dictated by system and/or customer needs, and 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?