



UGI Utilities, Inc. – Electric Division
Electric Reliability Outlook & Summer Readiness for 2023

Summary

UGI Utilities, Inc. – Electric Division (“UGI” or the “Company”) continues to review and implement programs that: 1) improve its summer readiness; 2) provide safe and reliable service during peak summer loading conditions; and 3) minimize customer outages and restoration times during the summer storm season. The reliability programs and initiatives that UGI has underway and under review are discussed below.

I. Reliability Enhancement Programs

a. Enhanced Vegetation Management

i. Danger Trees

UGI’s existing Danger Tree Mitigation Program continues to address danger tree removal both on and off right-of-way including the vegetation impacts caused by the Emerald Ash Borers’ devastation of Pennsylvania’s ash trees. The program targets the removal of dead or otherwise structurally unsound vegetation within striking distance of electric facilities. Danger tree activity is only expected to increase considering other invasive species impacting Pennsylvania trees.

ii. Off ROW Trees

The Danger Tree Mitigation Program also identifies and addresses off right-of-way trees that pose a threat to transmission and distribution facilities. The Company works with property owners to obtain approval to remove targeted trees.

In addition, UGI continues the practice of “ground to sky” trimming on multi-phase circuits and on single phase lines where appropriate. UGI maintains an increased vegetation management budget and resources to supplement regular trim cycles as outlined in our maintenance plan.

In Fiscal Year 2023, UGI also expanded the vegetation management group, adding a line clearance technician. The technicians’ responsibilities include identifying off right-of-way trees and working with property owners to remove them.

b. Storm Hardening

UGI’s storm hardening activities are designed primarily to reduce the number of outage events and extent of damage caused by vegetation and severe weather. One such activity is UGI’s practice of using Class 2 or Class 3 Wood Poles when replacing or installing new poles on its distribution system. Also, spacer cable is being installed in areas with a



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high risk of vegetation related issues. On the transmission system, steel, Class 1 or Class 2 poles are standard for replacements and new structures. Also, UGI continues primary line relocations to move distribution facilities from troublesome off-road locations to roadside right-of-ways. Relocating the facilities to roadside right-of-way enables more efficient and safer patrolling and restoration activities.

c. Fuses/Recloser/Automatic Switches

As part of its Long-Term Infrastructure Improvement Plan (“LTIIP”), UGI continues its Line Sectionalizing Program which identifies locations to install fuses, disconnects, and other devices to limit the number of customers affected when line damage occurs.

Further, outage durations are reduced by switching impacted customers to unaffected line segments before system repairs are made. In Fiscal Year 2023, UGI expects to add twelve (12) new sectionalizing points including fuses, solid blade disconnects, and other devices, as part of its annual sectionalizing plan. In addition, through the automation program, which is discussed further below, UGI plans to install twenty (20) three-phase reclosers and twelve (12) single-phase reclosers throughout this year.

d. Smart Grid

As part of its Long-Term Infrastructure Improvement Plan (“LTIIP”), UGI continues to extend system remote monitoring and control via wireless communication links to three-phase reclosers on select feeders. UGI continues to expand its Distribution Supervisory Control and Data Acquisition (“DSCADA”) system. To date, ninety-one (91) reclosers are remotely accessible to system operations and at least another ten (10) are planned to be added by the end of Fiscal 2023. All fourteen (14) of UGI’s 13kV voltage regulators are currently remotely accessible. To facilitate future remote communications to capacitor banks, UGI has thus far upgraded controls on seventy-seven (77) switched capacitor banks out of its one-hundred and twenty-one switched capacitor banks. The Company continues upgrading approximately twenty (20) per year. Remote management of these devices, by UGI’s System Operators, will significantly reduce switching times to sectionalize outages, restore service, and provide reliable voltage support during peak loading conditions. UGI also is preparing for a future FLISR (Fault Location, Isolation, and Service Restoration) Automation control system to improve restoration times with automated switching.

e. Conservation Voltage Reduction (“CVR”) activity

UGI currently does not engage in Conservation Voltage Reduction activity.

f. Any Other Relevant Continual Improvement Activity



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Ongoing LTTIP work - UGI's initial LTIP was approved by the Pennsylvania Public Utility Commission ("PUC" or the "Commission") in 2017 and concluded in 2022. A second LTTIP has been approved and is currently in progress. UGI identified Thirteen (13) programs that are key areas of investment. They include Reliability and Capacity Enhancement Projects, Pole Replacements, Sectionalizing/Distribution Automation, Underground Cable Replacement, and Substation Equipment. In each of these areas, UGI continues to target and replace or add equipment that provides the largest reliability benefits on an accelerated basis.

UGI also continues its 66kV air-break motorization program, which motorizes key 66kV air-breaks providing control from UGI's Control Center. In Fiscal Year 2022, three (3) 66kV air-break motor operators were installed and added to the transmission SCADA. Three (3) more are planned for installation in Fiscal Year 2023.

- g. New programs/new technology implementation/storage pilots, etc.

UGI installed three (3) stand-alone weather stations within its service territory in 2022 and plans to add another one (1) in 2023. These stations will assist in future outage prediction and storm modeling. Further, the Company is planning to install a lightning detection network in 2023 which will help locate lightning damage, reduce patrol times, and in some cases quicken restoration lightning-related outage incidents.

In October 2022, UGI upgraded its OMS system for added capabilities, such as enhanced dispatch functionality, a mobile damage assessment tool, and additional business intelligence features.

II. Preventative Maintenance Programs

In conjunction with its Biennial Inspection, Maintenance, Repair, and Replacement Plan, UGI has the following additional programs, which enhance reliability for customers.

- a. Capacitor Inspections

UGI's annual distribution capacitor inspections involve visual assessment for blown fuses and general condition reviews, as well as capacitor control operations and voltage checks for switched banks.

- b. Vegetation Management

UGI inspects all primary overhead distribution facilities for vegetation every two years. Approximately half the circuit mileage is inspected each year. These inspections assess the condition of vegetation both on and off the line's right-of-way, as well as reliability



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threats including potential damage to overhead distribution facilities. In addition, UGI has specific vegetation line treatment cycle times for its distribution circuits. This involves pruning or removal of danger trees and targeted chemical treatments at identified vegetation spots.

c. Substation Inspections

All UGI substations are visually inspected at least monthly, including physical security and general equipment reviews. Intrusive inspections and/or diagnostic tests occur periodically followed by corrective maintenance or replacement to address identified deficiencies. On a semi-annual basis (summer and winter) all substations undergo an infrared inspection to identify any thermal anomalies associated with connections, fuses, control cabinets, etc.

d. Aerial Patrols

UGI performs annual aerial Light Detection and Ranging (“LIDAR”) assessments of 230kV transmission facilities to identify any potential vegetation or encroachment concerns. In 2022, UGI also had its 66kV transmission system assessed with a LIDAR assessment.

Every 3 years, an aerial patrol of the 230kV transmission system is completed. This includes a visual inspection of wire, insulators, structures, etc. Areas of concern are photographed and reported for follow-up work.

e. Infrared Inspections

UGI continues infrared inspection during the biennial overhead line inspection program.

As stated above, UGI performs semi-annual infrared inspections of substation equipment.

f. UAV (drone) use

UGI does not currently utilize drone technology as part of its Preventative Maintenance Programs.

g. Any other relevant continual improvement activity

Overhead voltage regulators and their controls are removed from service and maintained on a fixed periodic basis per the manufacturer’s recommendation.

Intrusive inspections occur periodically on all underground line terminal equipment. Corrective maintenance or replacement is performed on deficiencies identified during these inspections.



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UGI has recently increased animal protection in several existing substation yards and has also re-evaluated its substation animal protection standards to include enhanced mitigation measures.

h. New Programs/New Technology Implementation

UGI continues to utilize and explore emerging technologies to enhance current preventative maintenance programs.

UGI initiated discussions with a Penn State University local campus to explore a pilot using mobile LIDAR, digital photography and ESRI to help identify vegetation issues on its distribution system and measure the effectiveness of its vegetation management program.

III. Capacity Planning

Based on the forecasted summer peak load, UGI does not expect any significant issues with respect to capacity from a transmission or distribution perspective. UGI performs annual planning studies and reviews transmission, substation and feeder loading under various contingencies for compliance with UGI planning and reliability criteria. Delivery system capacity expansion plans are made based on these study results. The UGI 2022 summer peak was 198.3 MW's, which is 7.4% less than the all-time summer peak of 214 MW's. The 2023 summer peak is expected to increase over 2022 due to a significant increase in commercial development/load within and around UGI's Hanover Industrial Park ("HIP"). To address this localized increase and to plan for proposed future development in the surrounding area, UGI constructed two new distribution feeders out of the Loomis substation in 2019. Other distribution and transmission system improvements in this area and others are in the design process or under construction for future anticipated growth.

IV. Significant Storm Lessons Learned from 2022

UGI had no Major Events (as defined by 52 Pa. Code § 57.192) reportable to the PUC in 2022 and one (1) Major Event thus far in 2023. UGI had one (1) Major Event Day ("MED")(as defined by IEEE Standard 1366-2012) in 2022 and no MED to date in 2023. From these and previous events, UGI sought to improve the reliability of its system in the following ways;

- UGI service/line personnel are on duty eight hours a day during weekdays and on Saturdays. A first shift and second shift trouble-man are scheduled during weekdays for quick response to service interruption calls. Since last year, UGI also hired a



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second shift trouble-man to provide extended coverage on weekdays. Call-out rosters are in place to mobilize staff when service/line personnel are not on duty or when additional resources are required.

- Implemented a contractor standby process on weekends to improve response times to emergency events.
- Pursued prearranged agreements with line construction contractors in order to expedite the on-boarding of mutual assistance aid for events that exceed UGI’s resources.
- UGI utilizes Everbridge notifications to mass contact employees before and during storm events. The system will place a phone call and send a text alerting the employees of system trouble and requesting a response that the message was received.
- UGI’s ARCOS system is set up to mobilize Scouts and Damage Assessors to provide for increased efficiency when activating resources for storm patrols.
- Dedicated emergency management resource to prepare and coordinate emergency preparedness plans, provide training, and engage in community outreach.

V. 2023 Summer Readiness

a. Capacity Additions

UGI continues analyzing its capacity resources and system needs. When capacity restrictions are identified, mitigation plans are implemented as required.

b. Transmission Preparedness

UGI performed its annual planning review of the transmission system utilizing current and forecasted load flow models. The models are used to identify voltage or thermal criteria issues for resolution. Results of this year’s analysis did not identify any issues under the various contingency scenarios reviewed.

c. Event Preparedness

UGI continuously monitors weather forecasts and plans for potential events. When threats are likely to impact the service territory, emergency response plans are triggered to estimate outages, prepare personnel, and secure resources.

d. Training

UGI is currently developing new safety and activity-based training programs to ensure employees receive proper training for assigned roles. To supplement internally developed



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training, the Company purchased licenses for an online OSHA compliant training platform that allows the Company to provide customizable training modules based on roles.

e. Personnel Sufficiency

UGI adjusts personnel in response to the severity of summer weather events. The Company's normal staffing level provides adequate response to most weather events. For more severe weather events that have a greater impact on facilities and a corresponding impact on restoration time, the Company utilizes mutual aid to expand restoration crews.

f. Any other relevant continual improvement activity

UGI runs an internal Reliability Working Group, which is an assembly of subject matter experts across all departments, that meets on a monthly basis to review recent outages, starting with the cause through the restoration, as well as current metrics, status of reliability projects and emergent issues. Based on this review, the Company identifies and implements lessons learned and/or other utility best practices and initiates actions to identify and prioritize reliability solutions from a short- and long-term perspective.

g. New programs/new technology implementation

As discussed above, UGI is making significant progress with the installation of “smart” field devices (communication enabled circuit reclosers) under the Distribution Automation program that will lay the foundation for a future, fully automated Fault Location Identification Sectionalizing & Restoration (FLISR) system. Prior to the full implementation of the FLISR system which will occur in the next several years, UGI is taking advantage of the automated field equipment and implementing an interim FLISR solution. This interim solution will utilize a real-time data controller that will notify System Operators of restoration opportunities so manual but remote switching can be performed reducing outage time.

VI. Storm Response

a. Outage Restoration Strategy

UGI's outage restoration strategy is similar to other electric utilities in the state. Its priority is public safety, such as preventing downed wire injures and damages to people and structures (e.g., from fires or other resulting hazards). While addressing public safety, UGI primarily concentrates transmission resources on restoring substation power. Then, it focuses on restoring service to feeders that serve critical infrastructure (e.g., water,



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sewer, and emergency services facilities). Next, it restores service to the remaining distribution lines starting from the substations and working outward locally. System repairs are prioritized based upon a triage response (i.e., restoring the largest number of customers first), based on: 1) location and number of resources; and 2) magnitude of the repair job. Restoring service to critical needs customers is factored into the restoration process.

b. Communication and Outreach

Traditional Customer Communication Channels

UGI maintains traditional direct-to-customer communication channels. These include information provided via recorded messages, status updates, Call Center messages on the Company’s phone system; scripts prepared for use by Call Center representatives when interacting with customers; and messages prepared for use with the Company’s ‘predictive dialer’ capability.

Additionally, UGI provides regular updates, information, and links to additional resources on key topics to customers via bill messages, bill inserts, printed notices and a monthly customer newsletter called “Connections” included with both printed and electronic bills.

UGI further conducts an extensive municipal outreach program aimed at reinforcing relationships and providing information to public safety professionals and emergency response officials. Topics include coordination of incident response efforts, safety, planned construction projects, and other matters of mutual concern.

Broadcast Media, Social Media, Digital Communication Channels and Tools

The UGI Communications and Community Relations Department and the UGI Customer Outreach Program use an integrated platform of channels to provide critical information to customers. Additional communications are provided to customers and community residents during extreme weather events, emergency situations and service outages. The communication channels and tools that UGI utilizes include:

- Media communications, such as:
 - Public Service Announcements
 - Media advisories
 - News releases
 - On-air interviews and appearances
- UGI website postings, such as:
 - Banners on UGI.com homepage
 - Activation of an Outage Center ‘tile’ link on the UGI.com website
 - Live/updated information on Outage Center Map
- Social media information and update postings, such as:



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- Facebook
- Twitter
- UGI Connection (blog)
- Linked-In
- Instagram
- Outbound email to customers who provided their email address to the Company

All content provided to customers and interested parties is consistent across the print, broadcast, digital and social media channels. In addition, electronic links are provided on social media posts to take customers and interested individuals to copies of the original documents. UGI also maintains response protocols for inquiries from customers that are posted on social media sites. First, customers who may have an emergency are directed to contact UGI’s Call Center. Customers who post service-related matters on one of the Company’s social media sites are treated as ‘escalated’ inquiries, and the customer is asked to send a private communication (email or call) so that specific customer information can be collected and an appropriate response provided by Company representatives.

- c. Outage restoration and storm response best practices implemented and/or identified for future implementation

UGI uses a restore before repair approach, such that customers that can accept service are restored through switching and fuse replacement before engaging the field crews in repair work. This method of operation applies throughout the restoration effort such that as line segments become available to return to service after repairs are made, they are placed in service to restore service to customers on them.

UGI has adopted a practice where outage restoration strategy is determined by a combination of outage events and customers affected. UGI uses a centrally controlled operation during minor event restorations. Scouts, line clearance, and line construction crews are dispatched from the control center to verify device status, perform switching, assess OMS events, and begin restoration. For smaller events, this strategy maximizes personnel efficiency and provides a central command center to oversee restoration. For major events, UGI uses a decentralized mode of operation. Depending upon the extent of the damage to its system, UGI divides its service territory into areas and assigns an area coordinator to manage damage repairs in each area. Each area coordinator has complete responsibility to plan and manage the resources to restore service in his/her assigned area. UGI has found this strategy eliminates communications bottlenecks such that available resources are used most effectively.

- d. Any other relevant continual improvement activity



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UGI improves event preparedness through Storm Group meetings and drills focused on pre-planning, on-boarding, communications, etc. UGI also modifies its incident command structure, to better align with Electric Division personnel abilities. This enhances the execution of storm restoration plans and resources. In addition, UGI is an active member of the EDC Storm Best Practices Group and the North Atlantic Mutual Assistance Group.

e. New programs/new technology implementation

UGI recently replaced its existing outage management system (OMS). The upgrade included features that improve functionality for internal and field resources. A key enhancement is the addition of a mobile tool available to UGI's field assessment teams and repair resources that links directly to the new OMS. The tool provides for a two-way transfer of information between the field and UGI's System Operations Department during restoration events including outage dispatch and field damage assessment data such as outage cause, type of system damage, material needs and ETRs. This electronic exchange of non-emergency data will reduce the volume of verbal communication during events and result in a more effective and efficient communication of information that will be tracked and utilized within the OMS.

VII. Supply Chain Issues

a. Procurement concerns for equipment/materials

The Company continues to monitor the supply chain to ensure equipment/material is available to meet customer needs. The primary concern at this time is around longer lead times for procuring materials and equipment. This is particularly the case with respect to transformers. In response, UGI is now planning jobs further in advance and planning contingent work in case materials are further delayed. However, at the present time the Company is currently stocked sufficiently to meet all current and planned work.

UGI is also concerned with significant increases in price for some electrical system components. UGI is exploring substitution options and other alternatives for some materials and equipment that are becoming increasingly difficult to acquire.