

Pennsylvania Summer Reliability

MET-ED

A. Reliability Enhancement Programs

Metropolitan Edison Company (“Met-Ed” or “Company”) remains committed to providing safe and reliable electric service to its customers and employs various programs to strengthen the durability and flexibility of the electric system. Methods to improve the efficiency, adequacy and reliability of the distribution system are a continual focus. Met-Ed utilizes core programs to support cost-effective and reliable service. These programs include, but are not limited to:

- Vegetation Management
 - Routine cycle tree trimming removes selected incompatible trees within the clearing zone corridor, removes certain defective limbs that are overhanging primary conductors, controls selected incompatible brush, and removes off right-of-way priority trees.¹
 - Enhanced tree trimming complements the routine cycle tree trimming by removing healthy limbs overhanging primary conductors on areas where it’s determined to be beneficial.
 - In response to damage caused by the Emerald Ash Borer, a program to proactively remove Ash Trees off right-of-way was implemented.
 - Post-storm circuit patrols target the areas with high tree-related outages. Circuit patrols identify trees damaged in a storm that may eventually lead a future outage. Once identified, the tree is removed. In addition, damaged equipment identified as part of the circuit patrol is repaired or replaced.
- Customers Experiencing Multiple Interruptions (“CEMI”)
 - The CEMI program is aimed to reduce frequent or repeated outages for affected clusters of customers or frequently operated devices.
- Load Forecasting and Distribution Planning
 - The load forecasting application is used to estimate future substation and circuit loading based upon historical load data and the planning criteria guidelines are then used to provide a consistent approach for planning the safe, reliable, orderly, and economic expansion of the distribution system.
- Circuit Protection
 - The circuit protection practices are aimed at achieving safety and security for the public and employees, maximizing service reliability to customers, minimizing damage to distribution equipment, and establishing a consistent process and set of application standards for distribution circuit protection.
- Long-Term Infrastructure Improvement Plans (“LTIIP”)
 - Met-Ed first began to execute its LTIIP programs in 2016. These plans include expenditures and programs designed to accelerate repairment, improvement or replacement of aging infrastructure in order to adequately maintain and improve the efficiency, safety, adequacy and reliability of the distribution system. On January 18, 2019, Met-Ed filed a Petition for

¹ Trees located off the right-of-way that are either dead, diseased, declining, structurally compromised, severely leaning or significantly encroaching onto the right-of-way.

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Approval of Modification of its Long-Term Infrastructure Improvement Plan in order to increase overall spending in the 2019 program year. The Petition was approved, as filed, on May 23, 2019.

- Fuse Installation
 - To reduce the scope of outages, fuses and other protective devices are being installed on circuits selected based on overall performance as well as protection needs. Met-Ed installed 584 fuses in 2018.
- Circuit Ties and Loops
 - Circuit ties and loops continue to be built between radial sections of circuits. When ties and loops are available, circuits can be switched during outages to enable faster service restoration. Met-Ed installed three circuit ties and loops in 2018.
- Line Rehabilitation
 - To strengthen its electrical system, Met-Ed performs targeted circuit rehabilitation in zones one and two,² focusing on circuits having a high rate of equipment and line failure and animal-caused outages. Equipment that may be replaced includes crossarms, capacitors, insulators, lightning arresters and connectors. Met-Ed completed the rehabilitation on fourteen circuits in 2018.
- SCADA Devices
 - Existing gang operated air brake switches, disconnect switches and hydraulically-operated circuit reclosers are being replaced with supervisory control and data acquisition (“SCADA”) controlled switches that allow for remote operation to restore service to customers when an outage occurs. Remote switching eliminates the need to dispatch crews to manually operate the switches, resulting in fewer customers affected and reduced outage duration. Met-Ed installed 106 SCADA devices in 2018.

B. Preventative Maintenance Programs

In accordance with 52 Pa. Code § 57.198, every two years Met-Ed files a Biennial Inspection, Maintenance, Repair and Replacement Plan³ for approval by the Commission. This Biennial Plan is designed to reduce the risk of outages on the Company’s system and form the basis for the Company’s inspection and maintenance objectives. The Biennial Plan includes programs to conduct vegetation management, pole inspections, distribution overhead line inspections, distribution transformer inspections, recloser inspections and substation inspections.

² Zone one is defined as the portion of the circuit from the substation breaker to the first protective device. Zone two is defined as the three-phase conductor and devices after the first protective device.

³ Pursuant to 52 Pa. Code § 57.198(a), every two years an electric distribution company shall file with the Commission a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. Met-Ed submitted their Biennial Inspection, Maintenance, Repair and Replacement Plan for the period January 1, 2019 through December 31, 2020 on September 29, 2017, which was deemed approved pursuant to 52 Pa. Code § 57.198(i).

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These well-established maintenance programs ensure the existing system will continue to operate in a safe and reliable manner and serve to identify any potential system issues so they can be proactively addressed.

C. Capacity Planning

Due to ongoing system enhancements and the hard work of employees and contractors, Met-Ed is able to reliably serve its customers. The primary driver of customer demand this summer is again expected to be warm temperatures across the region.

Met-Ed does not foresee significant concerns with system delivery capacity during the upcoming summer based on its performance during last summer's peak. Ongoing facility enhancements designed to improve reliability, load-bearing upgrades, and customers' adoption of energy efficiency and conservation opportunities are being viewed as additional opportunities to ensure the reliability and capacity availability of the system.

D. 2018/2019 Storm Update and Lessons Learned

In calendar year 2018, Met-Ed had a total of seven reportable⁴ storm events, of which four of these were major events.⁵ This is a significant increase from 2017, where Met-Ed experienced zero major events.

Throughout restoration efforts, working safely and efficiently is the main objective. Regional conference calls are held for preparation and logistics planning. Effective planning allows for the precise deployment of crews, supplies, and equipment. Employees are also staggered around the clock to maximize productivity.

After each significant storm event, Met-Ed leadership conducts post-storm review meetings to identify and disseminate lessons learned which are used to improve the emergency response plan.

From storm review action items identified as a result of 2018 and early 2019 restoration events, Met-Ed will:

- Assign a Company liaison for affected Emergency Management Agencies (“EMAs”) during larger restoration events and continue to reach out to EMAs during smaller events as well.
- Implement order-based damage assessment.

Met-Ed continues to work and strive to safely restore all customers in a timely and efficient manner.

⁴ Reportable is defined as an event where filed reports are necessary to the Pennsylvania Public Utility Commission.

⁵ This includes one event, which is currently under appeal.

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E. 2019 Summer Readiness

Capacitor Inspections – By June 1, 2019, Met-Ed will have inspected all line capacitor banks and completed all necessary repairs or replacements to ensure at least 98% availability.

Substation – By June 1, 2019, Met-Ed will have inspected all substation capacitor banks and completed necessary repairs or replacements to ensure minimum 98% available reactive support. In addition, a review of spare equipment will have been completed. Spare equipment includes voltage regulators and substation cooling items such as transformer fans.

By June 1, 2019, Met-Ed will have cleaned and inspected all transformer cooling systems. Cleaning removes the accumulation of Cottonwood seedlings that are released each May and June. In addition, fans and pumps are inspected and their functionality verified during the cleaning process.

Capacity Additions:

- **Middletown Junction 230/115kV #5 Transformer and Reactor Upgrade** – This project increased the transformer capacity by replacing the 84 MVA transformer with a 300 MVA transformer. This equipment is already in service.
- **South Lebanon – Frystown 69kV Line Reconductor Upgrade** – This project upgraded conductor on the South Lebanon – Frystown 69kV 83 line. This equipment is already in service.
- **Ringling Rocks – West Boyertown Line Reconductor Upgrade** - This project upgraded terminal equipment, and reconducted the 69kV Ringling Rocks – West Boyertown 69 kV 806 line. This equipment is already in service.
- **East Tipton – North Boyertown Line Reconductor Upgrade** – This project upgraded terminal equipment, and reconducted the 69kV East Tipton – North Boyertown 873 line. This equipment is already in service.
- **Lincoln Substation 115kV Terminal Upgrades** – Upgraded terminal equipment at the Lincoln substation on the Straban terminal. This equipment is already in service.
- **Lyons Substation 230-69kV Transformer Addition** – Added a third 230-69kV transformer at the Lyons substation. This equipment is already in service.
- **Mountain Substation** – This project will add a 28 MVAR 115kV capacitor at the Mountain substation to improve voltage regulation. This equipment is expected to be in service by June 1, 2019
- **Cleona – West Lebanon Line Reconductor Upgrade** – This project will upgrade terminal equipment, and reconductor the 69kV Cleona – West Lebanon 94 line. This equipment is expected to be in service by June 1, 2019.
- **Adamstown – South Reading Line Reconductor Upgrade** – This project will upgrade terminal equipment, and reconductor the 69kV Adamstown – South Reading 806 line. This equipment is expected to be in service by June 15, 2019.

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Transmission Preparedness – An annual transmission readiness review is conducted with the transmission operations department to discuss the capability and reliability of the system for the summer. The detailed review did not reveal any significant issues for the summer of 2019. Based on the system conditions modeled, the Met-Ed transmission system is expected to sufficiently support the forecasted peak summer loading.

Two aerial maintenance patrols are conducted annually by Met-Ed to inspect transmission facilities. The purpose of the routine patrols is to ensure the integrity of in-service transmission lines to maintain safe and reliable service. Both of these aerial patrols will be completed by year end.

Additionally, PJM Interconnection LLC (“PJM”) has operational procedures identified to effectively control and mitigate contingency outage conditions on the transmission system. Met-Ed has operational procedures outlined to implement any PJM required actions and to mitigate contingency conditions on the lower voltage systems (<100kV).

Emergency Exercise – As part of the FirstEnergy Utilities (“FEU”) Emergency Preparedness program, Met-Ed completed an emergency exercise on April 4, 2019. The exercise facilitated the testing and validation of key emergency response roles, systems and processes. The primary objective of the exercise was to ensure a complete understanding of the restoration process by all participants through exposure to a variety of real-world scenarios and decision-making challenges that could be experienced during actual restoration events.

Event Preparedness – FirstEnergy’s in-house meteorologists use highly sophisticated, proprietary data and forecasting models specifically designed to provide actionable intelligence. When predicted weather meets specific criteria, planning and preparation work is immediately initiated, often days before forecasted impact.

As part of the preparation efforts, Met-Ed’s executive leadership and operations managers implement the emergency restoration process. Based on available data, resource needs are evaluated and requests are submitted to the FEU Emergency Operations Center. These requests can include, but are not limited to: line resources (both internal to FirstEnergy and external), hazard responders, damage assessors, public protectors, vegetation crews, and equipment and material needs. Depending on the predicted magnitude of the event, pre-identified staging areas can be quickly activated to prepare for the efficient deployment of crews and equipment.

Refresher Training – All employees with emergency response roles receive appropriate refresher training at specified intervals to ensure they are immediately deployable when an event impacts the system. Expectations for employees to complete appropriate training and verify all equipment and personal protective equipment are available and in proper working order are communicated each year during emergency exercises and verified by Met-Ed management.

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Staffing – Met-Ed is appropriately staffed for the 2019 summer storm season. Met-Ed performs an annual staffing analysis that accounts for attrition, including retirements, to determine the proper staffing levels of craft workers. Met-Ed then enrolls students in the Power Systems Institute (“PSI”) based on the results of the analysis. PSI is a two-year program that combines classroom learning with hands-on training. Met-Ed is planning to hire approximately fifteen line worker graduates and five substation electrician graduates in 2019. The objective of the PSI program is to proactively hire a diverse group of individuals that will fulfill the line work and substation electrician staffing needs for Met-Ed. The following colleges have partnered with Met-Ed to support these line worker and substation electrician development:

- Pennsylvania Highlands Community College (for Substation students)
- Reading Area Community College (for Line and Substation students)

For larger-scale events, Met-Ed is able to supplement its own resources by accessing FirstEnergy’s portfolio of operating companies that includes the additional three companies located within Pennsylvania, as well as an additional six operating companies in other jurisdictions. The consistency in standards and work practices employed across all ten of these operating companies enables streamlined resource sharing in a way that promotes both safety and efficiency.

FirstEnergy, for itself and its affiliated operating companies including Met-Ed, is a member of the following Regional Mutual Assistance Groups (“RMAGs”) and can call upon them to request additional resources when needed:

- Great Lakes Mutual Assistance Group
- North Atlantic Mutual Assistance Group
- Southeastern Electrical Exchange

A National Response Event can be activated by Edison Electric Institute member utilities when multiple RMAGs cannot adequately support the resource requirements of the requesting utilities. In addition to working with RMAG organizations, FirstEnergy works with non-RMAG utility companies and contractors to secure resources.

F. Storm Response

Outage Restoration Strategy – Depending on the predicted severity of an impending weather event, Met-Ed typically begins preparing for potential outages before severe weather hits. Based on the projected impact to Met-Ed’s system, plans are activated so that properly scaled preparations can be made.

Information obtained through various tools and resources is critical to determine the type, number and location of resources needed to assure prompt restoration of service. Line

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personnel, damage assessors and hazard responders are integral resources in providing initial and ongoing assessments of the damage in the field. Line personnel are equipped with mobile data terminals (“MDT”) in their vehicles and enter damage information directly into the MDT. This information is immediately available for viewing in the Outage Management System (“OMS”). The OMS is the central collection point for all relevant information concerning damage reports, assessment and configuration of the electric distribution system. During emergencies that meet triggering criteria, the circuit quarantine process is used for rapid assessment and repair of heavily damaged circuits. Additionally, there are two apps that employees can use on mobile devices to automatically enter damage information into the Company's OMS.

In response to power outages and other systems emergencies, FirstEnergy maintains a copy of its Emergency Plan for Service Restoration which provides the guidelines for all common processes and procedures for conducting emergency preparedness, response and service restoration. Further, Met-Ed incorporates a number of Incident Command System principles into its emergency response organization to adhere to the principles and high-level structure of the National Incident Management System as appropriate in an electric utility environment.

Communications and Outreach – External Affairs consultants establish communications with emergency management agencies, local officials, county commissioners, and legislators and their offices in advance of and throughout a storm to keep them apprised of preparation and planning efforts. Communications representatives also contact the media to enlist their help in encouraging customers to prepare for the likely storm events and provide information on who to call if they lose power. Proactive email alerts and phone messages are initiated to key stakeholders alerting them to the potential for extended power outages. These efforts and face-to-face outreach are closely aligned with the Company’s service restoration efforts. The Company also provides safety messages via newspapers, radio, and online banner ads.

Met-Ed customers can stay abreast of restoration progress through a variety of means. A customer can access the Storm Restoration Process page of the Company’s website to learn about the damage assessment and repair prioritization processes as well as the importance of customer calls and outage reporting during the restoration process. Customers can access the 24/7 Power Center outage map that provides county-by-county information. Through this site users can obtain the number of customers served and the number of customers out of power at the county level as well as estimated time of restoration (“ETR”) information. In addition, the 24/7 Power Center outage map shows the status of crews restoring service, and informs customers when crews have been dispatched, when they are working on a repair and when additional crews or equipment are needed to complete restoration work.

Met-Ed’s mobile website allows customers to report outages and connect to the 24/7 Power Center outage map which has been optimized for mobile devices. From the mobile site, customers can view personalized outage status for an outage they have reported. The mobile website, as well as the full Met-Ed website, also allow customers to register for outage-

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related alerts via text messages and/or email. These platforms also provide instructions to use two-way text messaging, an interactive option for customers to report outages and obtain outage updates.

Furthermore, Met-Ed uses Twitter and Facebook to share additional safety reminders, ETRs, updates on restoration efforts, explanations of the restoration process and information about the arrival of additional crews, water and ice locations, and links to other resources such as shelters.

In addition, Interactive Voice Response (“IVR”) messaging is used to communicate restoration information to customers. Messaging is also relayed to customers who have called Met-Ed regarding their individual outage. Live agent customer service representatives are available and have the same information at their disposal.

For extended power outages, Communications issues regular news releases and media advisories over both traditional media channels and social media to update customers on the status of power restoration efforts, as well as provide realistic ETRs so customers can plan accordingly. Communications proactively issues safety messaging ranging from avoiding downed wires to properly hooking up and operating generators. The Company also has plans in place to provide free water and ice to customers without service. Once locations have been determined, this information is communicated to customers via the IVR, press releases, social media and the website.

Outage Restoration and Storm Response Best Practices – Met-Ed continues to review each storm event, and many of the practices adopted as mentioned above stemmed from sharing best practices with other utilities, a practice that continues today.