

Pennsylvania Summer Reliability

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A. Reliability Enhancement Programs

Pennsylvania Power Company (“Penn Power” 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. The Company has put into place plans, which are described in various filings, to further support reliability performance. These include a Reliability Plan¹ and the Long-Term Infrastructure Improvement Plan (“LTIIIP”).² Components of these plans are described below.

To reduce tree related outages, Penn Power performs cycle-based tree trimming which 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.³ Penn Power performed cycle-based tree trimming on 1,187 miles (which included in the removal of approximately 25,000 priority trees) in 2017 and plans to trim approximately 1,149 miles in 2018. Penn Power also performs enhanced trimming which removes healthy limbs overhanging primary conductors. The Company has changed its approach on enhanced trimming to focus on trimming all zones of the top five worst performing circuits, where outages were primarily caused by trees, in an effort to improve the reliability of those circuits. Penn Power will target the aggressive removal of off right-of-way trees on 418 miles of circuits in 2018.

Switches and fuses are being installed on unprotected overhead circuits for improved line sectionalizing capability, reducing the scope of an outage and allowing for quicker isolation and restoration. In addition, poles, reclosers, cutouts, arresters, fault indicators and animal guards may be replaced or installed to ensure proper line sectionalizing. Penn Power improved line sectionalizing capability on six circuits in 2017 and plans to improve six to ten circuits in 2018.

Smaller, aging overhead conductors are being replaced to improve energy efficiency, increase capacity and improve operational flexibility. Penn Power replaced overhead conductors along 4.3 miles in 2017 and plans to replace conductors along approximately ten miles in 2018.

Additional supervisory control and data acquisition (“SCADA”) devices are being installed where circuit conditions and system performance warrant. Remote SCADA controlled devices 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. The result is fewer customers affected and reduced outage durations. Penn Power installed fourteen SCADA switches in 2017 and plans to install an additional twenty-eight switches in 2018.

¹ On March 30, 2015, the Commission issued an order directing, Pennsylvania Power Company to prepare and file a revised implementation plan relating to specific topics addressed in the report issued by the Commission’s Bureau of Audits on February 12, 2015. *Implementation Plan for the Focused Management Audit of Pennsylvania Power Company*, Docket No D-2013-2365993.

² On October 19, 2015, pursuant to Section 1352 of the Pennsylvania Public Utility Code, 52 Pa. Code §§ 121.1 et seq. and the Commission’s final order in Implementation of Act 11 of 2012, Pennsylvania Power Company filed their petition for approval of its LTIIIP at Docket No. P-2015-2508948. On February 11, 2016 the Commission approved the plan.

³ 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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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 restoration. In addition, Penn Power continues to add new substations which provide a new source to serve customers and additional capacity. Penn Power created ten circuit ties, loops and new sources in 2017 and has plans to create an additional fifteen circuit ties, loops or new sources by the end of 2018.

Bare concentric neutral cable is being replaced as part of Penn Power's underground residential distribution cable replacement program. This type of cable was manufactured without an insulating jacket, causing the concentric neutral wire to corrode and fail prematurely. Penn Power replaced approximately 25,021 feet of cable in 2017 and plans to replace approximately 23,000 feet of cable in 2018.

To improve infrastructure, the Company replaces wood poles that have degraded beyond restorable condition and reinforces poles that are restorable. The Company replaced or reinforced 564 wood poles in 2017 and plans to replace or reinforce up to 270 wood poles in 2018.

Substation circuit breakers, station transformers and other substation equipment, such as insulators, switches, buses, arresters and conductors that are obsolete or in poor condition are being replaced with new equipment. Proactively replacing older equipment increases substation reliability and reduces the occurrence of equipment failure. Penn Power replaced thirty-three pieces of equipment in 2017 and plans to replace twenty-four pieces in 2018.

B. Preventative Maintenance Programs

In accordance with 52 Pa. Code § 57.198, every two years Penn Power files a Biennial Inspection, Maintenance, Repair and Replacement Plan⁴ 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.

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.

⁴ Pursuant to 52 Pa. Code § 57.198, every two years an electric distribution company shall file, and receive approval from the Commission of, a biennial plan for the periodic inspection, maintenance, repair and replacement of its facilities. On March 4, 2016 Paul Diskin, Director, Technical Utility Services, issued a letter approving the Companies' biennial inspection, maintenance, repair and replacement plan effective January 1, 2017 through December 31, 2018. Further, on September 29, 2017, Penn Power submitted the plan effective January 1, 2019 through December 31, 2020.

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C. Capacity Planning

Due to ongoing system enhancements and the hard work of employees and contractors, Penn Power 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.

Penn Power 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. 2017/2018 Storm Update and Lessons Learned

In calendar year 2017, Penn Power experienced two major events. During any weather event, safety remains the number one priority.

On March 8-11, 2017, 16,557 customers were affected when sustained high winds of over twenty-five miles per hour and wind gusts of over fifty miles per hour persisted over a seven-hour period impacting the Penn Power service territory. Downed trees and access issues slowed restoration efforts as the trees had to be removed and specialized equipment had to be brought in to gain access before restoration could take place.

On November 5-7, 2017, 19,298 customers were affected when severe thunderstorms, strong winds and numerous lightning strikes impacted the Penn Power service territory. Downed trees made multiple roads inaccessible requiring forestry and local municipalities to clear them before restoration efforts could take place. In addition, damaged trees and limbs overhanging the work zone had to be removed to ensure the safety of employees working below. Specialized equipment was brought in to gain access where normal trucks were unable to.

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, Penn Power leadership conducts post-storm review meetings to identify and disseminate lessons learned which are used to improve the emergency response plan.

E. 2018 Summer Readiness

Capacitor Inspections – By June 1, 2018, Penn Power will have inspected all line capacitor banks and completed all necessary repairs or replacements to ensure at least 98% availability.

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Substation – By June 1, 2018, Penn Power 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.

Capacity Additions

- **Rebuild Cedar Street-Frisco East and West 69 kV Line** – This project upgraded the Cedar Street-Frisco East and West 69 kV lines with higher capacity wire and installed new higher capacity switches. This equipment is already in service.
- **Campbell-Keisters Line Conversion** – This project rebuilt the Penn Power portion of the Keisters – Campbell 69 kV line to operate at 138 kV. This equipment is already in service.

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 2018. Based on the system conditions modeled, the Penn Power transmission system is expected to sufficiently support the forecasted peak summer loading.

Two aerial patrols are conducted annually by Penn Power to inspect transmission facilities. The purpose of routine patrols is to ensure the integrity of in-service transmission lines to maintain safe and reliable service. The first aerial patrol has been completed and the second 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. Penn Power has operational procedures 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, Penn Power completed an emergency exercise on May 11, 2018. The exercise facilitated the testing and validation of key emergency response roles, systems and processes. The primary objective of each 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, Penn Power’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

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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 Penn Power management.

Staffing – Penn Power is appropriately staffed for the 2018 summer storm season. Penn Power performs an annual staffing analysis that accounts for attrition, including retirements, to determine the proper staffing levels of craft workers. Penn Power then enrolls students in the Power Systems Institute (“PSI”) based on the results of the analysis. PSI is a unique, two-year program that combines classroom learning with hands-on training. Penn Power hired eight line worker graduates and four substation electrician graduates in 2018. 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 Penn Power. The following colleges have partnered with Penn Power to support these line worker and substation electrician development:

- Kent State University (Ohio)
- Stark State College (Ohio)

For larger scale events, Penn Power 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 Penn Power, 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.

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F. Storm Response

Outage Restoration Strategy – Penn Power begins preparing for potential outages long before severe weather hits. When inclement weather is forecasted, plans are activated to ensure an adequate number of crews are prepared to tackle the damage. Part of this preparation includes running a model that estimates the impact of an impending weather threat and calculates the expected number of customers impacted. This output, along with historical storm experience, is used to estimate the impact of the weather event 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 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, Penn Power is in the process of incorporating 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 managers 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 of 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 provides safety messages via newspapers, radio, and online banner ads.

Penn Power 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

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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.

Penn Power’s mobile website and mobile app allow 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 and app, as well as the full Penn Power website, also allow customers to register for outage-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, Penn Power 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 Penn Power 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 – Penn Power 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.