



2024

PENNSYLVANIA ELECTRIC RELIABILITY REPORT



TECHNICAL UTILITY SERVICES
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AUGUST 2025

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Executive Summary

The Electricity Generation Customer Choice and Competition Act mandated the Pennsylvania Public Utility Commission (PUC or Commission) to ensure levels of reliability that existed prior to the restructuring of the electric utility industry continue in the new competitive markets.¹ In response to this mandate, the Commission adopted reporting requirements designed to ensure the continued safety, adequacy and reliability of the generation, transmission and distribution of electricity in the Commonwealth.² The PUC also established reliability benchmarks and standards to measure the performance of each electric distribution company (EDC).³

The benchmarks and standards established by the Commission are based on four reliability performance indices adopted by the Institute of Electrical and Electronics Engineers (IEEE). Those indices are:

- SAIFI: System average interruption frequency index or frequency of outages.
- CAIDI: Customer average interruption duration index or duration of outages.
- SAIDI: System average interruption duration index or frequency of sustained outages.
- MAIFI: Momentary average interruption frequency index or occurrences of momentary customer interruptions.

Note that the Commission has only established benchmarks and standards for CAIDI, SAIDI and SAIFI. Given the uncertainty of weather and other events that affect reliability performance, the Commission has stated EDCs shall set goals to achieve benchmark performance to prepare for times when unforeseen circumstances may briefly and occasionally exceed benchmark performance.⁴ In recognition of these unforeseen circumstances, the PUC set the performance standard as the threshold for those times when an EDC can briefly and occasionally exceed benchmark performance. An EDC that consistently fails to achieve benchmark performance is considered out of compliance with the performance regulations and may require a robust corrective action plan, re-organization of management objectives, and/or regulatory penalties.⁵

As mandated, EDCs report reliability performance indices⁶ using both a rolling 12-month average and a rolling 3-year average. Appendix B provides a brief visual comparison summary of the EDCs' rolling 12-month reliability performance in each quarter for 2022 through 2024. More detailed analysis can be found in Section 4, *EDC Reliability Performance Data*. Appendix A provides the 2024 rolling 12-month and rolling 3-year reliability indices for all EDCs.

¹ Act of Dec. 3, 1996, P.L. 802, No. 138, 66 Pa. C.S. §§ 2801 *et seq.*

² Docket No. L-00970120; 52 Pa. Code §§ 57.191-57.197.

³ See, *Amended Reliability Benchmarks and Standards for the Electric Distribution Companies*, Order entered May 11, 2004, at Docket No. M-00991220.

⁴ *Id.* at 24.

⁵ *Id.* at 25.

⁶ For an explanation of performance standards, see Section 2, page 2.

Of note, only three of 11 EDCs achieved the standard performance metric in all three performance categories for the rolling 3-year average. For the rolling 12-months ending Dec. 31, 2024, only three of 11 EDCs achieved the standard performance metric in all three reliability indices. Those same three EDCs also achieved the benchmark metric in all three reliability indices.

In addition to monitoring EDCs' reliability performance, the Commission established inspection and maintenance standards for electric transmission and distribution systems.⁷ Biennial plans for the periodic inspection, maintenance, repair, and replacement of facilities, designed to meet performance benchmarks and standards, were approved by the PUC's Bureau of Technical Utility Services (TUS).

Evaluation

In general, most EDCs continued to struggle to meet benchmark performance metrics. The EDCs struggled in achieving benchmark and standard performance for the average number of outages experienced by customers, or SAIFI.⁸ As seen in Appendix B, only three of the 11 EDCs achieved benchmark for SAIFI in all four rolling 12-month quarters of 2024, as compared to four in 2023, three in 2022, and five in 2021. Out of all 11 EDCs, only two (Duquesne and PECO) have been consistently achieving benchmark for SAIFI in all rolling 12-month quarters for the past seven calendar years (2018 through 2024).⁹ PPL had been achieving benchmark for SAIFI in all rolling 12-month quarters since 2018 but experienced a challenging reliability year in 2024.

Of note, PPL experienced 17 reportable outage events in 2024, which was the most such events reported by an EDC for any of the past 32 years.¹⁰ PPL did not experience any excludable major events in 2024 and thus all 17 of those outage events impacted PPL's reliability indices. It is expected that PPL should return to a benchmark performer in 2025, barring a continuance of double-digit reportable outage events. EDCs in total experienced the most reportable outage events in 2024, 71, since 1993.

The large EDCs continue to invest significant capital through their Long-Term Infrastructure Investment Plans (LTIIPs).¹¹ Improvements in reliability and storm hardening are the primary goals of LTIIPs. Duquesne, PECO and PPL have historically expended the most through their LTIIPs and, up until 2024, all three had been SAIFI benchmark performers.

SAIFI performance overall worsened for all EDCs in 2024 as compared to 2023 with the exceptions of Pike County and Wellsboro. The total number of customers interrupted, customer minutes interrupted, and interruption events all increased significantly in 2024. There had been

⁷ See, *Revision of 52 Pa. Code Chapter 57 Pertaining to Adding Inspection, Maintenance, Repair, and Replacement Standards for Electric Distribution Companies*, Order entered May 22, 2008, at Docket No. L-00040167.

⁸ See, Section 2, below, for an explanation of SAIFI and all other reliability indices.

⁹ It is noted that Duquesne only had one rolling 12-month quarter in the past seven years, 2nd quarter 2024, where it did not achieve benchmark performance for SAIFI.

¹⁰ See, Section 3, below, for more information on reportable outage events and major events.

¹¹ The large EDCs are Duquesne Light, Met-Ed, Penelec, Penn Power, PECO, PPL and West Penn. The Small EDCs are UGI, Citizens', Pike County and Wellsboro. Note that Pike County does have an LTIIP but the expenditures are very small as compared to the large EDCs.

an overall trend downward for customers interrupted and customer minutes interrupted since 2019. Hopefully, 2024 was an aberration in terms of the number of outage events due to storms and will moderate in 2025. TUS notes that SAIFI is an important index as it relates directly to the number of service outages experienced by a customer. The impacts and disruptions to life-sustaining and productive activities caused by electric service outages will obviously be reduced if there are less outages. However, this is not meant to minimize CAIDI as that represents the average duration of an outage for a customer, which is also very important.

As explained in last year's reliability report, as EDCs introduce more distribution automation into their systems, CAIDI will most likely increase.¹² The two factors that affect CAIDI are response times and repair times. While some EDC LTIP programs may have CAIDI benefits, EDCs may address CAIDI through increases or changes (*i.e.*, utilizing overnight and weekend shifting) in skilled staff and through base rate cases. Only three EDCs achieved benchmark performance in CAIDI for calendar year 2024, as compared to four in 2023. EDCs will be expected to improve worsening CAIDI, but reducing service outages from occurring in the first place is crucial to improving reliability performance.

As noted in several previous reliability reports,¹³ electric reliability and resilience¹⁴ in Pennsylvania appear to be most challenged during storm activity that brings down off-right-of-way (OROW) trees, and overhanging limbs from canopy trees above the clearing zones within the right-of-way (ROW) onto the distribution lines. EDCs are continuing to struggle to achieve sustained benchmark performance in all three reliability indices. This is the direct result of vegetation management policies, programs and storm activity. Storm activity acts upon the vulnerability of weakened trees in the overhanging canopy, and OROW trees. Since 2015, and continuing throughout 2024, vegetation has been the number one cause of outages and lost customer-minutes in Pennsylvania. This issue has increased sharply and can be seen in the individual EDC performance details in Section 4, below, and for all Pennsylvania EDCs in Section 5, below.

TUS notes that EDCs should consider both controllable (primarily equipment failure and in-ROW vegetation) and uncontrollable (OROW vegetation) outage causes in reliability and resiliency planning. For controllable outage causes, EDCs can undertake programs through LTIIPs, regular capital improvement projects, and effective and prudent vegetation management practices to reduce controllable outage causes as much as possible. For example, PECO Energy Company and FirstEnergy Pennsylvania Company have each recently shortened the vegetation management trimming cycle.¹⁵ TUS believes that EDCs should review their vegetation management programs to ensure that expenditures and procedures are most efficiently and effectively directed at the main

¹² Available here: https://www.puc.pa.gov/media/3123/draft-2024-electric-reliability-report-8-2024_final.pdf.

¹³ Available here: <https://www.puc.pa.gov/filing-resources/reports/electric-service-reliability-report/>.

¹⁴ Resilience has many definitions, but commonly is understood to align generally with the definition in Presidential Policy Directive 21: "...the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents." <https://obamawhitehouse.archives.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil>.

¹⁵ See, *Biennial Inspection, Maintenance, Repair and Replacement Plan of PECO Energy Company*, filed September 27, 2024, and the revised *Biennial Inspection, Maintenance, Repair and Replacement Plan for FirstEnergy Pennsylvania Electric Company*, filed February 28, 2024, both at Docket No. M-2009-2094773.

cause of service outages. EDCs could also collaborate through associations like the Energy Association of Pennsylvania and discuss emerging technologies and methodologies for vegetation management, such as artificial intelligence, satellite-based data, and other creative “outside-the-box” thinking beyond just trimming vegetation on a set periodicity.

However, EDCs can also address OROW vegetation issues by working to improve the reliability and performance of their facilities within the ROW. EDCs should consider utilizing methodologies to protect conductors within the ROW from hazards that may come from OROW, such as targeted undergrounding, covered overhead conductors (*i.e.*, tree wire), and hybrid undergrounding (an emergent technology involving moving conductors low to the ground or in shallow underground conduit, which may be less costly as compared to full undergrounding).¹⁶ Any protection method’s effectiveness must be balanced with the impacts of the costs on ratepayers. However, EDCs could utilize LTIPs and fully projected future test years in base rate cases to propose such initiatives, even as pilot programs, and receive feedback from stakeholders on costs versus expected benefits.

TUS recommends that EDCs, as they continue to improve upon their capital improvement plans, LTIPs, and required emergency response and business continuity plans,¹⁷ evaluate the impact of increasingly severe weather on their systems and look to increase resiliency in those plans. In addition to the two reliability and resiliency efforts described below, TUS suggests that EDCs may utilize academic and climate resources already in Pennsylvania for such planning. EDCs may want to partner with universities and/or climate modeling entities to better understand vulnerabilities at the regional and local levels and to better target mitigation investments.

EDCs should also look at the total costs that a sustained outage may have on customers and society and consider these factors in any cost/benefit analysis. For example, an updated version of the Interruption Cost Estimate (ICE) Calculator was recently released and provides EDCs and other stakeholders with a way to understand costs of service outages and to estimate benefits of reliability investments.¹⁸

Reliability Collaborative

Based on the findings of the PUC’s reliability report released on Sept. 16, 2020, and the reliability performance in the first two quarters of 2020, TUS issued an informal data request to the EDCs and the Energy Association of Pennsylvania (EAP) that generally focused on what EDCs believed the challenges were to consistently meet the reliability benchmarks. TUS then held an informal discussion on Oct. 16, 2020, with the EDCs and EAP about the responses to the data request.

¹⁶ More information on protecting conductors may be found here: [Fault Count and Frequency Reduction | Distribution](#).

¹⁷ All EDCs are required to have emergency response and business continuity plans. *See*, 52 Pa. Code § 101.

¹⁸ More information on the ICE Calculator is available here: <https://icecalculator.com/>, where it is noted that the ICE Calculator is a reliability planning tool designed for electric utilities, government organizations, and other entities interested in estimating interruption costs and/or the benefits associated with reliability improvements in the United States. The tool was developed by Lawrence Berkeley National Laboratory and Resource Innovations, Inc. The update to the ICE Calculator was supported through direct funding by sponsoring electric utilities as well as the U.S. Department of Energy.

For the Commission to more fully inform any subsequent electric reliability policies or actions pursuant to those issues, the Commission, via a Secretarial Letter served on June 3, 2021, initiated an Electric Reliability Collaborative (ERC), and invited the EDCs, EAP, and statutory advocates to participate.¹⁹

The ERC focused on reviewing the electric distribution reliability regulations, with particular attention to the calculation of the reliability performance metrics and also discussed exploring whether options such as performance-based rates tied to reliability metrics may lead to improved reliability performance at a reasonable cost, developing an understanding of the customer experience with electric reliability in Pennsylvania, and exploring how the Commission, EDCs, and other stakeholders can work together to lessen the impact of OROW trees on electric reliability.

The first meeting of the ERC was held on July 21, 2021, and subsequent meetings occurred on Sept. 10, 2021, Feb. 11, 2022, April 8, 2022, April 20, 2023, and the latest being April 28, 2023. Meeting points of discussion included electric reliability in general, OROW trees, consideration of the IEEE 2.5 beta method for calculation of the reliability statistics, approaches on the IEEE 2.5 beta in other states, and regulatory and procedural considerations of any proposed change to reliability statistical methodologies in Pennsylvania.²⁰ Pennsylvania EDCs have forwarded their positions about utilizing IEEE 2.5 beta methodology as it applies to improving the reliability of Pennsylvania's electric distribution system and TUS provided its recommendations to the Commission. The Commission subsequently concurred with TUS' recommendation to initiate a notice of proposed rulemaking. The Commission's Law Bureau, with assistance from TUS, will draft an order for consideration by the Commission that will initiate a Notice of Proposed Rulemaking to change the regulations at 52 Pa. Code §§ 57.191-198 to accommodate the adoption of the IEEE 2.5 beta method and the IEEE definition of a Major Event Day. It is anticipated that the draft order will be prepared for a public meeting later in the summer of 2025.

¹⁹ The Secretarial Letter was served on June 3, 2021, at Docket No. M-2021-3024513.

²⁰ The IEEE methodologies utilized by the EDCs are found at IEEE 1366-2012, *IEEE Guide for Electric Power Distribution Reliability Indices*.

Resiliency Deep Dive Project

In 2024, TUS applied for and was awarded a Deep Dive technical assistance project sponsored by the Federal Department of Energy through the National Laboratories.²¹ The National Renewable Energy Laboratory (NREL) is providing technical assistance to TUS in 2025 on resilience and threat-based planning for extreme events impacting electrical distribution systems. The project objective is to evaluate electric distribution system resilience to extreme weather and changing climate conditions, with considerations for the implications of increased reliance on the electric grid due to electrification for building heat and transportation, and to apply threat-based risk assessment to inform regional and state-level planning processes. The final deliverables include an internal presentation that outlines possible scenarios and considerations for the Commission and EDCs, and an associated public-facing executive summary. Those are expected at the end of calendar year 2025. While NREL is careful to note that it will not provide recommendations, per se, it will provide considerations as the Commission continues to develop policies and plans to address the resilience of EDCs in the face of increasing severe weather and climate change impacts.

²¹ More information on the state technical assistance programs can be found here: <https://emp.lbl.gov/deep-dive>.

Section 1 – Introduction

Purpose

This report discusses the reliability performance of EDCs operating under the Commission’s jurisdiction, specifically focusing on the reliability of the electric distribution system.²²

The data presented in this report comes from the quarterly and annual reliability reports submitted by EDCs pursuant to the Commission’s regulations. This data focuses on customer power restoration duration (CAIDI), average customer outage duration (SAIDI) and frequency of outages (SAIFI).²³ From these measures, this report provides an overview of the Commonwealth’s electric distribution reliability as well as individual analyses of the EDCs operating within Pennsylvania.

Background

The Electricity Generation Customer Choice and Competition Act mandates the Commission ensure the level of reliability that existed prior to the restructuring of the electric utility industry is maintained in the newly restructured markets.²⁴ In response to this mandate, the Commission adopted reporting requirements designed to monitor continuing safety, adequacy, and reliability of generation, transmission, and distribution of electricity in the Commonwealth.²⁵

The Commission also established reliability benchmark and standard values to measure the performance of each EDC.²⁶ Given the uncertainty of weather and other events that can affect reliability performance, the Commission has stated that EDCs should set goals to achieve consistent benchmark performance in order to prepare for times when unforeseen circumstances occasionally and briefly cause performance to exceed the benchmark threshold.²⁷ As mandated, enforcement of the 3-year rolling average standard began with the utilities’ filing of their 2006 annual reports. The 3-year performance standard only allows a deviation of 10% from the reliability index benchmark, as compared with the 20% or 35% deviations allowed by the 12-month performance standard.

The Commission set the performance standard as the occasional and brief maximum level an EDC can exceed the benchmark reliability performance value. Reliability performance values that are not considered in compliance require EDCs to provide an evaluation to the Commission that includes a Corrective Action Plan or a credible basis that would justify no corrective action is required. Reliability performance values that are not achieved during an assessment period will be followed up by the Commission. The inability of an EDC to achieve consistent compliance may result in an Order directing specific corrective actions.²⁸ Continuous noncompliance may

²² The high-voltage transmission system, nominally > 100 kV, is regulated by the Federal Energy Regulatory Commission (FERC). The electric distribution system is under the purview of the PUC.

²³ For more information on CAIDI, SAIDI and SAIFI, see Section 2.

²⁴ 66 Pa.C.S. § 2802(3).

²⁵ 52 Pa. Code § 57.195.

²⁶ 52 Pa. Code §§ 57.191-57.198.

²⁷ See, *Amended Reliability Benchmarks and Standards for the Electric Distribution Companies*, Order entered May 11, 2004, at Docket No. M-00991220, at 24.

²⁸ 52 Pa. Code § 57.197(a).

trigger additional scrutiny and potential compliance enforcement actions by the Commission's prosecutorial staff in the Bureau of Investigation and Enforcement, including penalties and fines.²⁹

Note that by the Order entered on Dec. 7, 2023, the Commission granted certain approvals and certificates of public convenience for the unification of the four FirstEnergy Company EDCs that operated in Pennsylvania (Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, and West Penn Power Company) into one EDC, FirstEnergy Pennsylvania Electric Company (FE PA).³⁰ The former EDCs are now rate districts of FE PA. FE PA assumed all responsibilities and requirements of the former EDCs, including, *inter alia*, for electric reliability (for reliability performance and the requirements of the former EDCs' Inspection and Maintenance Plans filed pursuant to 52 Pa. Code § 57.198).³¹ FE PA reports as one EDC but reports data for each rate district. In order to avoid confusion and to allow comparison to previous electric reliability reports, the FE PA rate districts are referred to as EDCs throughout this report.

Section 2 – Reliability Performance Measures

Reliability Performance Indices

The Commission's benchmarks and standards are based on four reliability performance indices that have been adopted by the IEEE. The EDCs report the indices on a system-wide basis, rather than on a regional operating area basis. EDCs report the four-reliability indices on both a rolling 12-month average and a 3-year calendar year average. Note that the Commission has only established benchmarks and standards metrics for each EDC for the CAIDI, SAIDI and SAIFI indices. The indices are defined as:

1. **CAIDI** (Customer Average Interruption Duration Index): Measures average power restoration time (by minutes) for every customer who lost power during reporting period.
2. **SAIDI** (System Average Interruption Duration Index): Measures average outage duration time (by minutes) for every customer served during reporting period.
3. **SAIFI** (System Average Interruption Frequency Index): Measures average frequency of power interruptions for every customer served during reporting period.
4. **MAIFI** (Momentary Average Interruption Frequency Index): Measures average frequency of momentary (five minutes or less) interruptions for every customer served during reporting period.³²

²⁹ 52 Pa. Code § 57.194(h)(1).

³⁰ See, *Joint Application of Metropolitan Edison Company, Pennsylvania Electric Company, Pennsylvania Power Company, West Penn Power Company, Keystone Appalachian Transmission Company, Mid-Atlantic Interstate Transmission, LLC, and FirstEnergy Pennsylvania Electric Company*, at Docket Nos. A-2023-3038771, et al.

³¹ *Id.* See also at the same Docket Nos., *Joint Petition for Approval of Settlement of All Issues*, filed Aug. 30, 2023, and *Recommended Decision of Administrative Law Judge Conrad A. Johnson and Administrative Law Judge Emily I. DeVoe*, dated Oct. 19, 2023.

³² EDCs are required to report MAIFI data, provided the equipment capability is available to obtain relevant data. Only Met-Ed, PECO, Penelec, Penn Power and PPL report MAIFI.

Additional information and data reported by EDCs:

- Average number of customers served.
- Number of sustained customer interruption minutes.
- Number of customers affected by service interruptions.
- Analysis of outage causes such as equipment failure, animal contact and contact with trees.³³
- Reliability performance on the 5% of worst performing circuits and a corrective action plan to increase the reliability of these circuits.

Major Events

To analyze and set measurable goals for electric service reliability performance, outage data is separated into either normal or abnormal periods. Only outages during normal event periods are used in calculating the reliability indices. The term “Major Event” is used to identify an abnormal event, such as a major storm, and is defined as either of the following:³⁴

- An interruption of electric service resulting from conditions beyond the control of the EDC which affects at least 10 % of the customers in the EDC’s service territory during the course of the event for a duration of five minutes or greater; or
- An unscheduled interruption of electric service resulting from an action taken by an EDC to maintain the adequacy and security of the electrical system.

Outage data relating to Major Events are to be excluded from the calculation of reliability indices. Prior to excluding major event data, an EDC is required to formally request to exclude those service interruptions for reporting purposes. The request must be accompanied by data that demonstrates why the service interruption qualifies as a major event exclusion.

Definitions: benchmark, standard, 12-month average, & 3-year average

The **benchmark** performance value represents the statistical average of the EDC’s annual, system-wide, reliability performance index values for the five years from 1994 through 1998. The benchmark value serves as an upper limit that EDCs should be consistently achieving to ensure reliability performance is considered satisfactory and acceptable.

The **standard** performance value represents an EDC’s performance upper control limit established to allow EDCs to exceed the benchmark performance value occasionally and briefly. Both long-term (rolling 3-year) and short-term (rolling 12-month) performance standards have been established for each EDC based on individual EDC historical performance benchmarks. The performance standard limit allows an EDC to exceed a benchmark limit occasionally and briefly. However, consistently exceeding benchmark performance, or exceeding the standard limit is an indication that the EDC’s performance is not satisfactory and requires additional scrutiny by the Commission.

³³ This information is collected and trended by EDCs to reduce customer outages and improve system reliability.

³⁴ See, 52 Pa. Code § 57.192.

The performance rolling **12-month average** is 120% of the benchmark for the large EDCs and 135% for the small EDCs.³⁵ A greater degree of short-term latitude for small EDCs recognizes that small EDCs have fewer customers and fewer circuits than large EDCs, potentially allowing a single event to have a more significant impact on the reliability performance of the small EDCs' distribution systems.

The performance rolling **3-year average** is 110% of the benchmark for all EDCs. This performance standard was set at 10% above the historical benchmark to ensure that the standard is no higher than the worst annual performance experienced during the years prior to the restructuring of the electric industry. The 3-year average performance is measured against the standard at the end of each calendar year. The rolling 3-year standard analysis contained in this report uses 2022, 2023 and 2024 calendar year data.

It is noted that a lower number for any index indicates better reliability performance, i.e., a lower frequency of outages or shorter outage duration. A higher number indicates worse performance.

Example: A large EDC's rolling 12-month **CAIDI benchmark** performance metric is 100 and associated **CAIDI standard** performance metric is 120 (which is 120% of benchmark). Evaluate an EDC's quarterly CAIDI score of 110, 90, and 140:

CAIDI of 110 evaluations: Performance is above **benchmark**, but below **standard**, and may require additional review and action if the EDC is chronically above **benchmark** score and trending toward exceeding **standard**. Upon Commission review, the EDC may be required to develop a Corrective Action Plan (CAP) and **additional PUC oversight will be taken to monitor effectiveness until performance is below benchmark**. In addition, this may result in a referral to the Bureau of Investigation & Enforcement (BIE) for further action.

CAIDI of 90 evaluations: Performance is considered excellent since CAIDI is below both **benchmark and standard**.

CAIDI of 140 evaluations: Performance is considered unacceptable since CAIDI is greater than both **benchmark and standard**. The EDC will be required to develop a Corrective Action Plan (CAP) and additional PUC oversight will be taken to monitor effectiveness until benchmark performance is achieved. In addition, may result in a referral to BIE for further action.

If any EDC's reliability performance does not meet Commission regulations, the Commission may require a report discussing the reasons for not meeting the regulation and the corrective measures the company is taking to improve performance.³⁶ In addition, Commission staff may initiate an investigation to determine whether an EDC is providing reliable service.³⁷

Benchmarks and standards for EDC reliability performance and actual reliability indices for 2023 are located in Appendix A.

³⁵ The large EDCs are Duquesne Light, Met-Ed, Penelec, Penn Power, PECO, PPL and West Penn. The Small EDCs are UGI, Citizens', Pike County and Wellsboro.

³⁶ See, 52 Pa. Code § 57.195(g).

³⁷ See, 52 Pa. Code § 57.197(a).

Inspection and Maintenance

EDCs are required to have a plan for periodic inspection and maintenance of poles, overhead conductors and cables, wires, transformers, switching devices, protective devices, regulators, capacitors, substations, and other facilities critical to maintaining an acceptable level of reliability.³⁸ The time intervals for such inspections are detailed in Table 1 below. The regulation also sets forth minimum inspection and maintenance intervals for vegetation management, poles, overhead lines and substations.

Listed below are the most recently filed biennial inspection and maintenance (I&M) plans for the periodic inspection, maintenance, repair and replacement of facilities:

- Filed in October 2024 (effective January 2026 through December 2027) for Duquesne, PECO, PPL, Citizens’, Pike, and Wellsboro.
- Filed in October 2023 (effective January 2025 through December 2026) for FE PA (Met-Ed, Penelec, Penn Power and West Penn) and UGI.

The plans are subject to acceptance or rejection by the Commission. Most EDCs proposed deviations to the standards for some programs or parts of programs. Appendix C describes the deviations that were requested by the EDCs and provides a summary of the explained justification for said deviations.³⁹

Table 1 – Inspection and Maintenance Intervals

Program	Interval
Vegetation Management	4-6 years
Pole Inspections	10-12 years
Overhead Distribution Line Inspections	1-2 years
Overhead Transformer Inspections	1-2 years
Above-Ground Pad-Mounted Transformer Inspections	5 years
Below-Ground Transformer Inspections	8 years
Recloser Inspections	8 years
Substation Inspections	5 weeks

³⁸ See, 52 Pa. Code § 57.198.

³⁹ See, 52 Pa. Code § 57.198(c).

Section 3 – 2023 Outage Response Review

Overview

Tables 2 and 3, below, present a breakdown of reportable outage events (ROEs)⁴⁰ summarized for 2024 (71 events) as compared to 2023 (49 events). The 71 ROEs in 2024 were the most ROEs in any year in the last 32 years (the first year that the Commission records date to is 1993).

Table 4 below, details the number of ROEs from 1994 through 2024. Note the number of ROEs that occurred during the benchmark period from 1994 through 1998, as compared to the number that occurred in each of the past 4 years and in the period 2003 through 2012. Some of the increase in ROEs could be due to aging infrastructure that is impacted by weather, but ROEs appear to be increasing in frequency for all EDCs, including those that have strong infrastructure improvement plans, as shown in Table 6 below. This information is highlighted to show that EDCs are expected to provide service at a level equal to or better than that provided during the benchmark period, regardless of whether ROEs are increasing on an annual basis due to severe weather.

Table 5 below details the number of customers affected by ROEs from 1994 through 2024. In 2024, a total of 2,882,795 customers were negatively affected by ROEs as compared to 1,670,056 customers in 2023, 1,396,669 customers in 2022, 1,964,501 in 2021, and 2,431,842 in 2020.

Note: The high level of customers affected in 2011, 2012, 2014, and 2018 are primarily due to a few high-impact events, such as Irene in 2011, Sandy in 2012, Nika in 2014, and Riley/Quinn in 2018.

Table 6 below, details the cumulative number of ROEs by EDC for the past 10 years (2015 through 2024).

⁴⁰ Service outages reports are required under 52 Pa. Code § 67.1. The reporting threshold for a 67.1 reportable outage event is five percent of total customers or 2,500 customers, whichever is less, for six or more consecutive hours. The reporting requirements are an initial phone call to the Commission when it is believed the threshold will be reached, followed by a written report 10 working days after the last customer is restored.

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Table 2 – 67.1 Reportable Outage Events Summary 2024

EDC	Date	Customers Affected	Cause
Met Ed	1/9/24	28,498	Heavy Rains & Winds
PECO	1/9/24	194,662	Heavy Rains & Winds
Penelec	1/9/24	112,452	Heavy Rains & Winds
PPL	1/9/24	56,953	Heavy Rains & Winds
Wellsboro	1/9/24	5,382	High Winds
West Penn	1/9/24	41,049	Heavy Rains & Winds
Met Ed	1/12/24	43,322	Heavy Rains & Winds
Penelec	1/12/24	52,463	Heavy Rains & Winds
PPL	1/12/24	93,638	Heavy Rains & Winds
West Penn	1/12/24	38,488	Heavy Rains & Winds
Met Ed	2/13/24	48,371	Winter Storm (Wet Snow)
PPL	2/13/24	128,308	Winter Storm (Wet Snow)
Met Ed	2/28/24	25,612	Heavy Rains & Winds
Penelec	2/28/24	29,785	Heavy Rains & Winds
PPL	2/28/24	34,325	Heavy Rains & Winds
Met Ed	3/10/24	44,822	Heavy Rains & Winds
PPL	3/10/24	46,040	Wind Event
PCL&P	3/11/24	2,500	Wind Event
Met Ed	3/23/24	7,827	Heavy Rains & Winds
PPL	3/23/24	13,365	Heavy Rains & Winds
Met Ed	4/2/24	26,768	Heavy Rains & Winds
PPL	4/2/24	71,718	Heavy Rains & Winds
PCL&P	4/3/24	390	Mixed Precipitation & Winds
PECO	4/3/24	30,259	Severe Tstorms
PPL	4/14/24	17,547	Heavy Rains & Winds
Penelec	4/16/24	20,326	Heavy Rains & Winds
West Penn	4/17/24	21,248	Severe Tstorms
DLC	4/17/24	18,244	Severe Tstorms
Met Ed	5/23/24	24,212	Severe Tstorms
PPL	5/23/24	23,718	Severe Tstorms
West Penn	5/26/24	10,740	Severe Tstorms
DLC	6/17/24	108,324	Microburst/Severe Tstorms
Penn Power	6/17/24	31,812	Severe Tstorms
West Penn	6/17/24	31,821	Severe Tstorms
PPL	6/21/24	51,217	Severe Tstorms
PECO	6/23/24	52,897	Heavy Rains & Winds
DLC	6/26/24	10,160	Tornadoes/Severe Tstorms
Met Ed	6/26/24	51,039	Severe Tstorms
PPL	6/26/24	114,581	Severe Tstorms
West Penn	6/26/24	21,649	Tornadoes/Severe Tstorms
DLC	7/10/24	12,240	Wind Event
West Penn	7/10/24	28,093	Wind Event
PECO	7/14/24	170,944	Severe Tstorms
PPL	7/15/24	78,561	Wind Event
UGI	7/15/24	4,709	Severe Tstorms
West Penn	7/15/24	16,283	Severe Tstorms & Winds
Met Ed	7/16/24	51,121	Severe Tstorms & Winds
Met Ed	8/3/24	10,780	Severe Tstorms & Heavy Rains
Met Ed	8/6/24	22,363	Severe Tstorms
Penn Power	8/6/24	23,951	Severe Tstorms

2024 Pennsylvania Electric Reliability Report

Table 2 (cont'd) – 67.1 Reportable Outage Events Summary 2024

EDC	Date	Customers Affected	Cause
PPL	8/6/24	21,577	Severe Tstorms
West Penn	8/6/24	19,232	Severe Tstorms
PECO	8/8/24	86,116	Severe Tstorms
Met Ed	8/9/24	34,750	Severe Tstorms
Penelec	8/9/24	22,265	TS Debby Remnants
PPL	8/9/24	61,180	TS Debby Remnants
DLC	9/6/24	9,201	Severe Tstorms
Met Ed	9/21/24	23,421	Severe Tstorms
West Penn	9/21/24	5,983	Heavy Rains & Winds
PPL	11/8/24	5,557	Wind Event
DLC	11/20/24	24,635	Severe Tstorms
West Penn	11/20/24	17,340	Severe Tstorms
Met Ed	11/21/24	16,654	Winter Storm (Snow)
Penelec	11/21/24	57,651	Winter Storm (Snow)
PPL	11/21/24	118,317	Winter Storm (Snow)
PECO	12/4/24	29,992	Heavy Rains & Winds
PPL	12/11/24	14,245	Heavy Rains, Winds, Snow
DLC	12/29/24	33,848	Severe Tstorms
Penelec	12/29/24	30,802	Heavy Rains & Winds
Penn Power	12/29/24	11,393	Heavy Rains & Winds
West Penn	12/29/24	33,059	Heavy Rains & Winds
Totals		2,882,795	

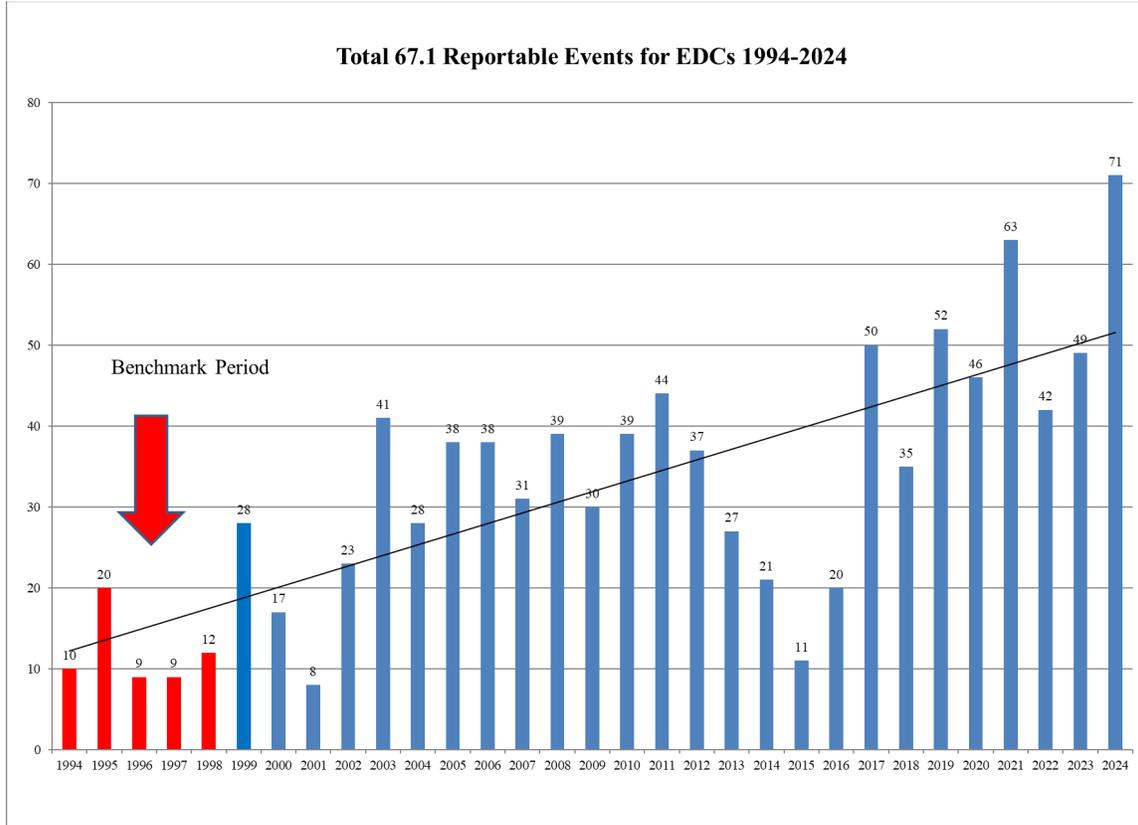
2024 Pennsylvania Electric Reliability Report

Table 3 – 67.1 Reportable Outage Events Summary 2023

EDC	Date	Customers Affected	Cause
PPL	2/21/23	13,770	Winter storm with heavy, wet snow
Penelec	3/3/23	50,057	Winter storm with rain, snow and ice
PPL	3/3/23	18,659	Wintery mix of rain & snow
West Penn	3/3/23	52,772	Winter storm with snow & ice
Penelec	3/6/23	9,402	Winter storm with heavy, wet snow
PPL	3/6/23	20,438	Winter storm with heavy, wet snow
DLC	3/25/23	62,276	Severe thunderstorms with high winds
Penelec	3/25/23	52,365	Severe thunderstorms with high winds
Penn Power	3/25/23	58,948	Severe thunderstorms with high winds
West Penn	3/25/23	61,090	Severe thunderstorms with high winds
DLC	4/1/23	67,383	Severe thunderstorms with high winds
Met-Ed	4/1/23	18,728	Severe thunderstorms with high winds
PECO	4/1/23	37,848	Severe thunderstorms with high winds
Penelec	4/1/23	115,095	Severe thunderstorms with high winds
Penn Power	4/1/23	49,977	Severe thunderstorms with high winds
PPL	4/1/23	24,323	Severe thunderstorms with high winds
Wellsboro	4/1/23	4,429	Severe thunderstorms with high winds
West Penn	4/1/23	111,285	Severe thunderstorms with high winds
Met-Ed	4/22/23	12,136	Severe thunderstorms with high winds
PPL	4/22/23	41,738	Severe thunderstorms with high winds
Penelec	5/7/23	5,220	Transmission line outage
PPL	6/3/23	17,851	Severe thunderstorms with high winds
PECO	6/25/23	81,325	Severe thunderstorms with high winds
West Penn	7/13/23	29,076	Severe thunderstorms with high winds
West Penn	7/20/23	21,173	Severe thunderstorms with high winds
Penelec	7/20/23	61,346	Severe thunderstorms with high winds
Met-Ed	7/21/23	8,386	Severe thunderstorms with high winds
Met-Ed	7/28/23	19,241	Severe thunderstorms with high winds
Met-Ed	8/7/23	69,434	Severe thunderstorms with high winds
PECO	8/7/23	49,879	Severe thunderstorms with high winds
PPL	8/7/23	58,870	Severe thunderstorms with high winds
PPL	8/12/23	11,284	Severe thunderstorms with high winds
West Penn	8/12/23	11,812	Severe thunderstorms with high winds
Penelec	8/12/23	19,888	Severe thunderstorms with high winds
Met-Ed	8/13/23	20,399	Severe thunderstorms with high winds
PPL	8/18/23	11,002	Severe thunderstorms with high winds
DLC	8/25/23	20,778	Severe thunderstorms with high winds
Penn Power	8/25/23	9,072	Severe thunderstorms with high winds
West Penn	8/25/23	52,401	Severe thunderstorms with high winds
Met-Ed	9/7/23	54,243	Severe thunderstorms with high winds
Penelec	9/7/23	16,214	Severe thunderstorms with high winds
PPL	9/7/23	60,127	Severe thunderstorms with high winds
UGI	9/7/23	6,867	Severe thunderstorms with high winds
PPL	9/9/23	14,657	Severe thunderstorms with high winds
PPL	9/23/23	17,644	Tropical Storm Ophelia remnants
Pike	10/9/23	1,905	Fallen tree on subtransmission serving substation
PPL	12/10/23	15,550	High rain & wind event
PPL	12/27/23	9,301	High rain & wind event
Met-Ed	12/28/23	12,392	High rain & wind event
Totals		1,670,056	

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Table 4 – Total 67.1 Reportable Events for EDCs 1994 through 2024



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Table 5 – Total Customers Affected by 67.1 Reportable Events 1994 through 2024

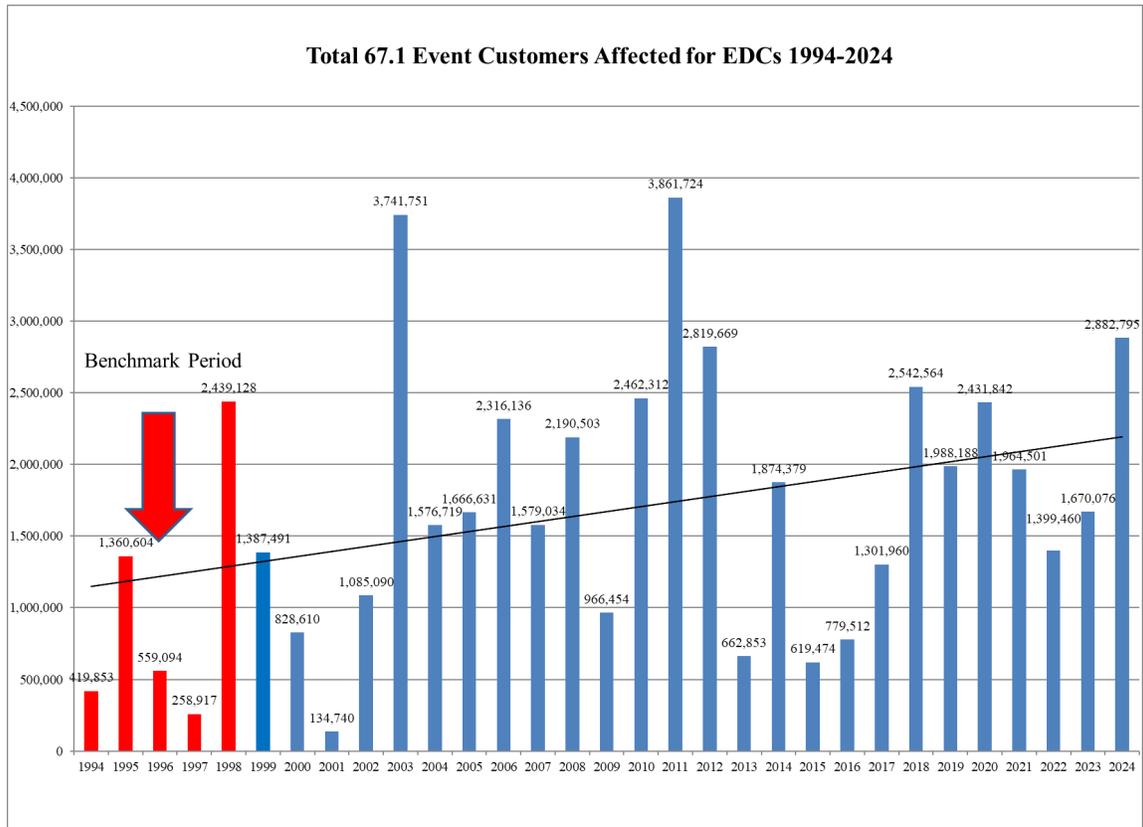
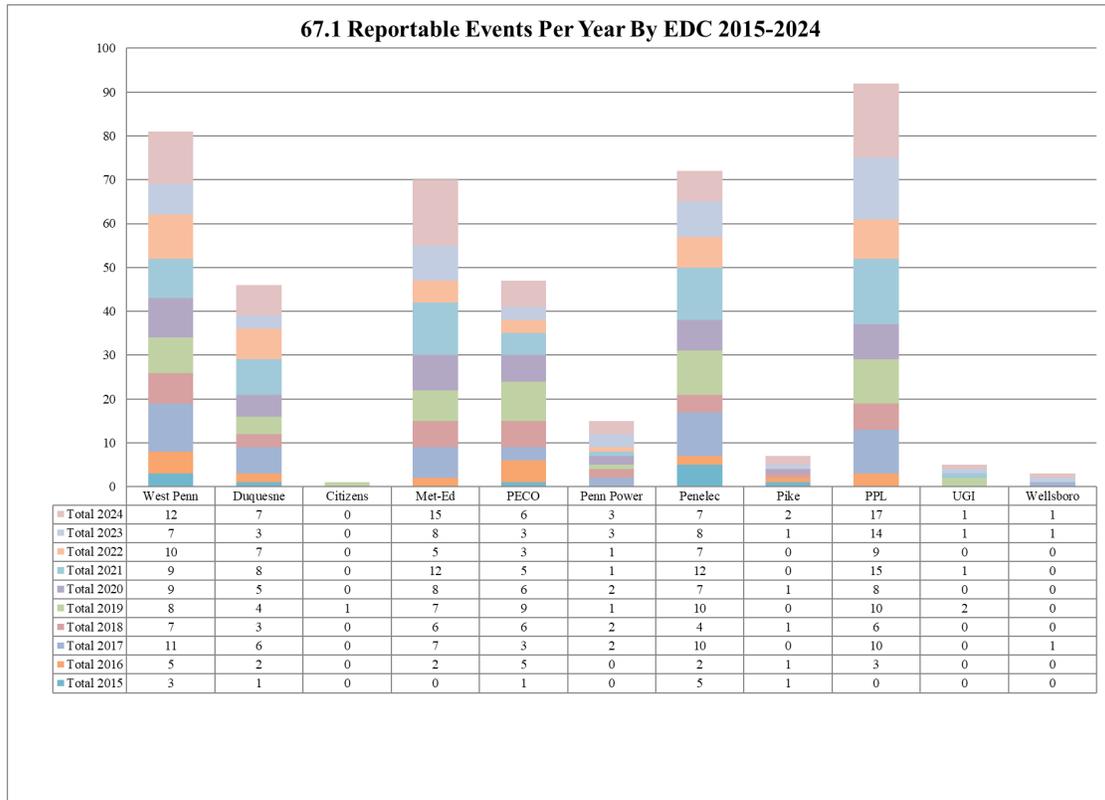


Table 6 – 67.1 Reportable Events by EDC 2015 through 2024



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Major Events

In 2024, the resilience of Pennsylvania’s electrical system was challenged with a substantial amount of severe storm activity as evidenced by the number of ROEs. Pennsylvania customers were also adversely affected in 2024 with approximately 696,292 customers impacted by Major Events as compared to 601,222 in 2023, 114,539 customers in 2022, and 177,115 customers in 2021. In 2024, there were 27 Major Event exclusion requests approved, as compared to 21 in 2023, 16 in 2022, and 22 in 2021. Note that Major Events are excludable from an EDC’s reliability indices and the additional customer outages and customer-minutes-interrupted are not added to the reliability indices.

Major Events for 2024 and 2023 are shown below in Tables 7 and 8, respectively.

Table 7 – Major Events for 2024

EDC	Date	Customers Affected	Cause	Total Customer Minutes Interrupted	Docket Number
Duquesne	6/17/24	108,324	Weather	481,738,959 kVA-Min.	M-2024-3050274
Citizen's	1/14/24	917	High Winds & Trees	120,342	M-2024-3045841
Citizen's	7/22/24	1,057	Animal Contact	72,356	M-2024-3050362
Citizen's	8/9/24	1,106	Heavy Rain	162,481	M-2024-3050667
Citizen's	8/25/24	771	Vehicle	83,268	M-2024-3051061
FE PA (Penelec)	1/9/24	112,452	Snow, Heavy Rain, and Strong Winds	42,905,779	M-2024-3047614
FE PA (Penn Power)	6/17/24	31,812	Storms with High Winds	16,111,637	M-2024-3050476
FE PA (Penn Power)	8/6/24	23,951	Thunderstorm	13,537,880	M-2024-3051416
PECO	1/9/24	194,662	High Winds, Lightning, and Rain	106,467,181	M-2025-3055030
PECO	7/16/24	170,944	High Winds	126,893,569	M-2024-3050784
Pike	1/7/24	765	Snow, Sleet and Rain	61,810	M-2024-3048740
Pike	2/16/24	2,138	High Winds & Tree	171,040	M-2024-3048773
Pike	3/11/24	2,506	High Winds	675,128	M-2024-3048774
Pike	11/25/24	1,926	Tree	362,495	M-2025-3053104
UGI	7/28/24	9,384	Transformer Failure	213,836	M-2024-3050881
UGI	7/15/24	8,302	Severe Storms	3,352,472	M-2024-3051257
UGI	6/21/24	6,373	Thunderstorm	1,097,330	M-2024-3050504
Wellsboro	1/9/24	5,382	High Winds & Trees	2,129,900	M-2024-3045442
Wellsboro	2/28/24	2,193	High Winds & Trees	185,742	M-2024-3047008
Wellsboro	5/2/24	1,735	Animal Contact	173,370	M-2024-3048843
Wellsboro	6/12/24	1,738	Equipment Failure	40,948	M-2024-3049542
Wellsboro	6/17/24	1,388	Animal Contact	199,183	M-2024-3049590
Wellsboro	6/20/24	1,738	Animal Contact	42,000	M-2024-3049705
Wellsboro	7/15/24	1,837	High Winds & Trees	1,223,750	M-2024-3050232
Wellsboro	10/13/24	1,078	High Winds & Tree	98,653	M-2024-3051624
Wellsboro	10/14/24	735	High Winds & Tree	62,340	M-2024-3051623
Wellsboro	11/28/24	1,078	High Winds & Tree	150,057	M-2024-3052366
27	Totals	696,292	Totals - not including Duquesne	210,127,366	

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Table 8 – Major Events for 2023

EDC	Date	Customers Affected	Cause	Total Customer Minutes Interrupted	Docket Number
Duquense	3/25/23	62,276	Weather	417,158,713 kVA-Min	M-2023-3039891
Duquense	4/1/23	67,383	Weather	234,650,099 kVA-Min	M-2023-3040024
Citizen's	4/1/23	801	High Winds & Tree	97,272	M-2023-3039579
Met-Ed	8/7/23	69,436	Storms with High Winds	93,209,582	M-2023-3043387
Penelec	4/1/23	126,310	Storms with High Winds	85,092,453	M-2023-3041217
Penn Power	3/25/23	59,706	Storms with High Winds	49,757,745	M-2022-3033267
Penn Power	4/1/23	49,977	Storms with High Winds	47,932,357	M-2023-3041218
Pike	10/9/23	1,905	Tree on Feeder	59,055	M-2024-3045929
Pike	12/4/23	1,614	Animal contact	272,766	M-2024-3045931
UGI	1/11/23	10,605	Animal contact (substation)	871,809	M-2023-3037981
UGI	9/7/23	6,867	Weather	2,767,551	M-2023-3043170.
Wellsboro	2/3/23	738	High Winds & Trees	49,406	M-2023-3038120
Wellsboro	2/21/23	3,703	High Winds & Trees	219,247	M-2023-3038408
Wellsboro	4/1/23	4,429	High Winds & Trees	1,493,292	M-2023-3039530
Wellsboro	7/27/23	1,723	High Winds & Trees	276,180	M-2023-3041938
Wellsboro	8/8/23	1,726	High Winds & Trees	55,519	M-2023-3042109
Wellsboro	9/22/23	1,124	Fault on Line	15,417	M-2023-3043239
Wellsboro	10/4/23	713	Conductor Failure	140,556	M-2023-3043416
Wellsboro	11/21/23	1,175	High Winds	239,049	M-2023-3044428
West Penn	3/3/23	17,626	Winter Storm	21,202,760	M-2023-3039911
West Penn	4/1/23	111,285	Storms with High Winds	61,088,108	M-2023-3041219
21	Totals	601,122	Totals - not including Duquesne	364,840,124	

Review of Long-Duration Outage Events

There were no long duration electric outage events (those with outages lasting six or more days) in 2024.⁴¹

⁴¹ We note that Duquesne and PECO each had an ROE which lasted over six days in terms of impact, but no customers were out of service for six or more days, *i.e.*, there were outages that occurred after the initial start date and time of the ROE due to additional storms or weather that were counted in the total number of customers that experienced an outage during the course of the ROE.

Section 4 – EDC Reliability Performance Data

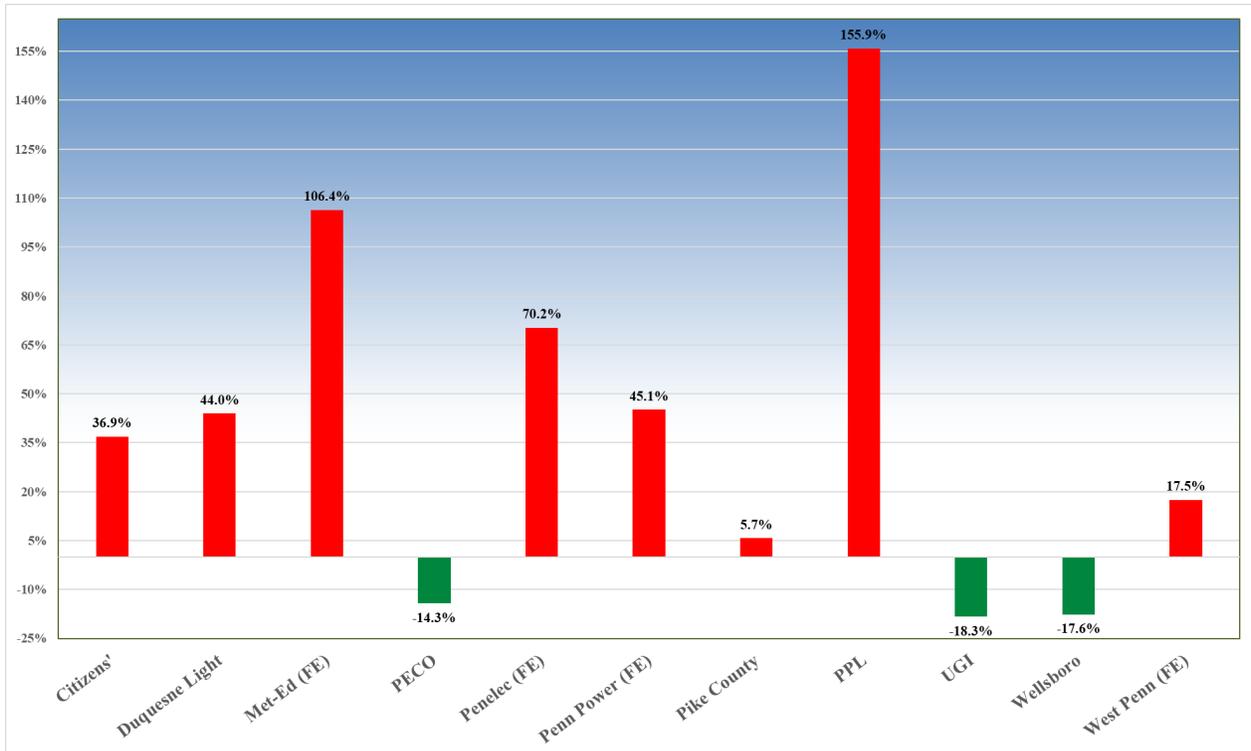
Statewide Summary

Rolling 12-month Benchmark Performance Compliance

The 2024 end-of-year reliability data for 12-month CAIDI, SAIDI, and SAIFI Benchmark performance compliance submitted by the 11 EDCs is presented below. **Note that a zero or negative percentage indicates positive performance at or below the benchmark.** The data indicates that:

- Three EDCs achieved the **CAIDI Benchmark**, while eight of the EDCs failed to achieve the CAIDI benchmark (Figure 1 below).
- Only three EDCs achieved the **SAIDI Benchmark**, while eight EDCs failed to achieve the SAIDI benchmark (Figure 2 below).
- Five EDCs achieved the **SAIFI Benchmark**, while six EDCs failed to achieve the SAIFI benchmark (Figure 3 below).

Figure 1 – 2024 CAIDI Comparison (percent above or below benchmark)



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Figure 2 – 2024 SAIDI Comparison (percent above or below benchmark)

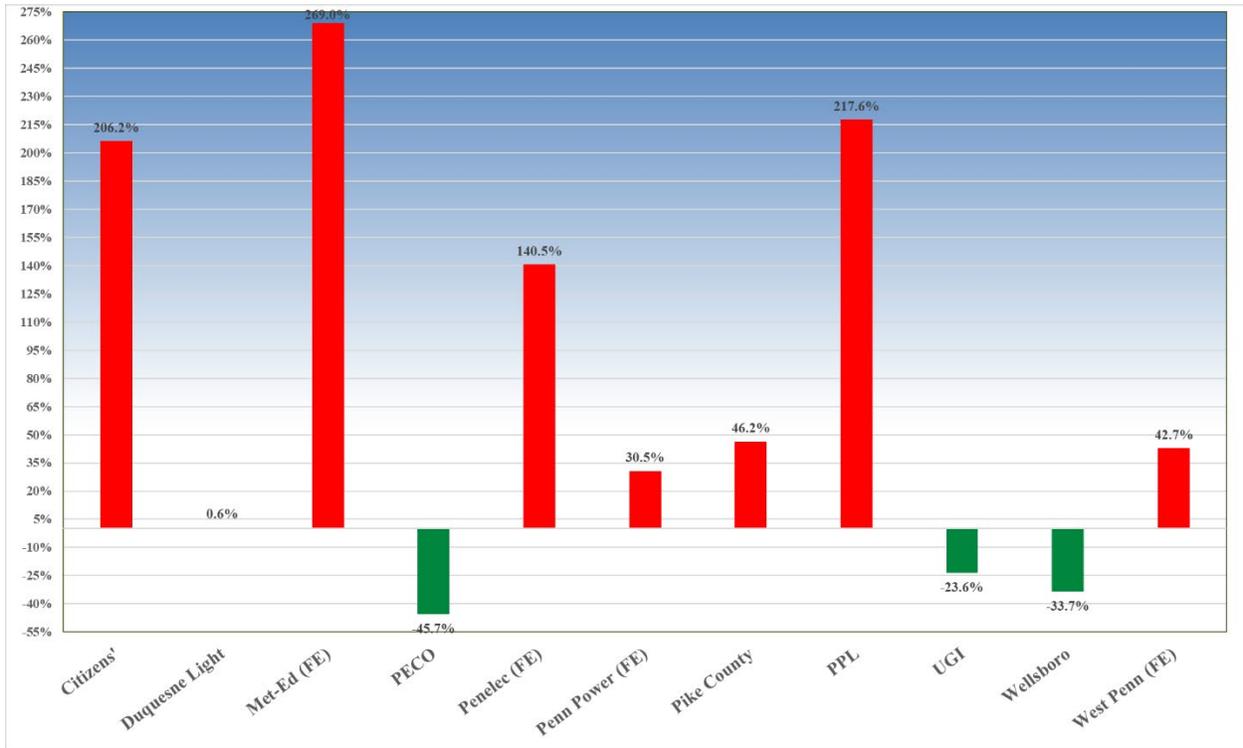
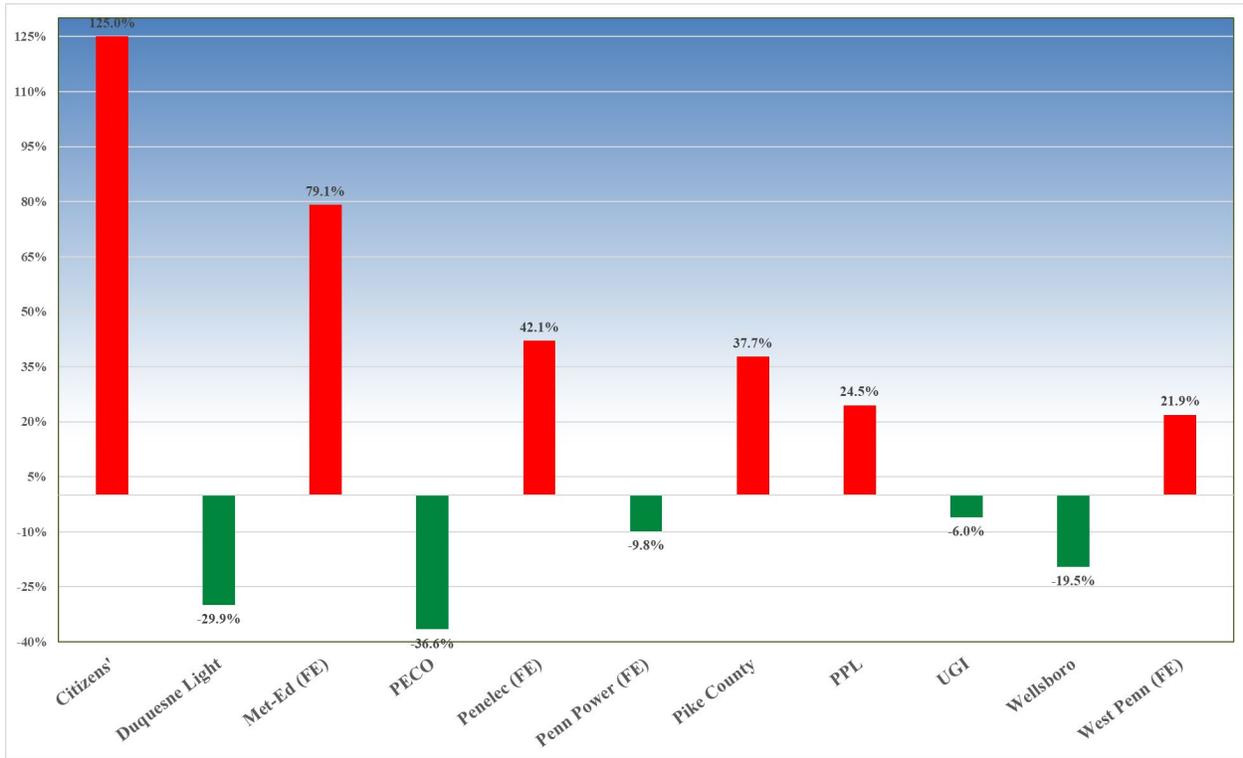


Figure 3 – 2024 SAIFI Comparison (percent above or below benchmark)



Rolling 3-year Average (2022 through 2024) Performance Compliance

Appendix A provides the 2023 results for the 12-month average and 3-year average reliability performance indices for individual EDCs.

Six EDCs (Duquesne Light, Met-Ed, Penelec, Penn Power, PPL, and West Penn) failed to meet the rolling 3-year **CAIDI performance standard**.

Five EDCs (Citizens', Met-Ed, Penelec, Pike County, and West Penn) failed to meet the rolling 3-year **SAIFI performance standard**.

Five EDCs (Citizens', Met-Ed, Penelec, PPL, and West Penn) failed to meet the rolling 3-year **SAIDI performance standard**.

Utility-Specific Performance Data

The Commission compares reliability indices on a quarterly basis, using data obtained for the preceding 12 months. This periodic assessment determines the status of electric service reliability on an ongoing basis and is instrumental in identifying negative trends. The 3-year average performance is measured at the end of each calendar year, using the average of the past three end-year indices, as indicated in Appendix A. The following sections provide a detailed description of the 11 EDCs' individual reliability performance on a rolling 12-month and 3-year average basis.

Citizens' Electric Company

Citizens' Electric Company (Citizens') has an operating service area of about 41 square miles with about 7,176 customers. The electric system consists of one distribution substation and nine distribution feeder lines.

In 2024, Citizen's experienced 3,209 customer interruptions and 461,213 CMI, as compared to 2,309 customer interruptions and 207,294 CMI in 2023; 1,947 customer interruptions and 195,608 CMI in 2022; 1,926 customer interruptions and 181,274 CMI in 2021; and 561 customer interruptions and 48,645 CMI in 2020.

Citizens' experienced four Major Events in 2024. The Major Events impacted over 3,851 customers, which is not reflected in the totals above.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Increased from 90 minutes in 2023 to 144 minutes in 2024; failed to achieve benchmark by 36.9%.

3-year average: Increased from 95 minutes in 2023 to 112 minutes in 2024; achieved standard by 3.0%.

SAIDI

Rolling 12-month: Increased from 29 minutes in 2023 to 64 minutes in 2024; failed to achieve benchmark by 206.2%.

3-year average: Increased from 27 minutes in 2023 to 40 minutes in 2024; failed to achieve standard by 61.1%.

SAIFI

Rolling 12-month: Increased from 0.32 outages in 2023 to 0.45 outages in 2024; failed to achieve benchmark by 125.0%.

3-year average: Increased from 0.29 outages in 2023 to 0.35 outages in 2023; failed to achieve standard by 57.6%.

CAIDI and SAIFI Performance

Historical rolling 12-month CAIDI and SAIFI benchmark reliability performance trends are shown below in Figures 4 and 5. Beginning in 2004, Citizens’ CAIDI performance has been overall positive for most years, but with worsening performance in 2024.²⁹ More management attention is needed to continue CAIDI performance below the “green” benchmark performance upper-control-limit-line. Citizens’ did see a very significant increase in the number of customers interrupted and CMI in 2024. However, the number of interruptions was not as high as it was in 2022 and 2021 when it experienced far less customers interrupted and CMI. Citizens’ may consider looking at further sectionalizing of the system to lessen the impacts of outage events, in addition to reducing outage events from occurring through storm hardening and vegetation management.

Beginning in 2004, Citizens’ SAIFI performance has been inconsistent. From the 4th quarter 2011 through the 4th quarter 2024, Citizens’ SAIFI performance has frequently been above the “green” benchmark performance upper-control-limit-line. Citizens’ SAIFI performance in 2020 was excellent and well below the benchmark. However, from 2021 through 2024, Citizens’ has not met the SAIFI benchmark. SAIFI has been trending upward past benchmark and has exceeded the 12-month standard. More management attention is needed to ensure consistent SAIFI performance is sustained below the “green” benchmark performance upper control-limit-line.

Outage Causes

Figure 6 below shows the top five reported 2024 outage-cause categories, as a percentage, for the following three distinct performance metrics: CMI, Customers Affected, and Number of Incidents. OROW trees, Vehicle and Other were the top causes for CMI. OROW trees, Weather and Equipment causes were the largest contributors to the number of incidents.

²⁹ Smaller CAIDI, SAIFI, and SAIDI benchmark values are typical for companies with fewer customers. While Citizens’ did not achieve benchmark for any of the three reliability indices in 2024, its indices values for 2024 are still much lower than that of all other EDCs.

Figure 7 below shows the historical trend of the top three main outage causes. OROW trees, Equipment, and Animals are the three most frequent outage causes that are significantly negatively affecting Citizens' distribution system reliability and resilience. Trees are the most frequent cause of EDC customer outages in Pennsylvania.

General Reliability

Citizens' noted that it experienced increases in all three reliability indices in 2024. Citizens' noted that 23 of the 59 interruption events in 2024 were due to OROW trees and that 73% of the CMI for OROW trees came from just four events in one area. Citizens' stated that it has since obtained permission from several property owners in the impacted area to clear back farther on private property to clear vegetation. Citizens' noted that it should be able to prevent additional outages from dead ash trees falling on its three-phase line.

Citizens' indicated that it was again recognized in 2024 as a "Tree Line USA" utility. This award from the National Arbor Day Foundation recognized Citizens' for the 22nd consecutive year for its use of nationally approved trimming techniques and procedures in its vegetation management program. The Company continues to partner with the Penn State Extension for its annual educational session. Citizens' noted that it continues to participate in and gather information from various industry best practices groups. These groups include members from diverse utility groups such as the Pennsylvania Rural Electric Association, the Energy Association of Pennsylvania, and the National Rural Electric Cooperative Association. The Company will continue to implement best practices defined by these groups as appropriate.

Conclusion

Citizens' achieved annual benchmark performance in CAIDI from 2018 through 2023. TUS expects Citizens' to attain benchmark performance again in the near future. Citizens' ability to trim further back from the ROW, as described above, should help with both SAIFI and CAIDI and reduce the number of incidents due to trees. Citizens' SAIFI performance has significantly declined over the past three years and continues to show signs of erratic performance. SAIDI performance has also deteriorated over the past two years and did not achieve standard for 2024. Citizens' should continue to refine its processes and methods to improve this performance.

The Commission recommends continued and increased efforts in vegetation management and emphasis on response times. The Commission recognizes overall Citizen's appears to be making improvements in CAIDI as witnessed by the data shown below. As can be seen in Figures 8 through 9 below, Citizens' will need to work to regain a positive trend for customers interrupted, CMI, and outages.

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Figure 4 – Citizens’ CAIDI (minutes)



Figure 5 – Citizens’ SAIFI (interruptions per customer)

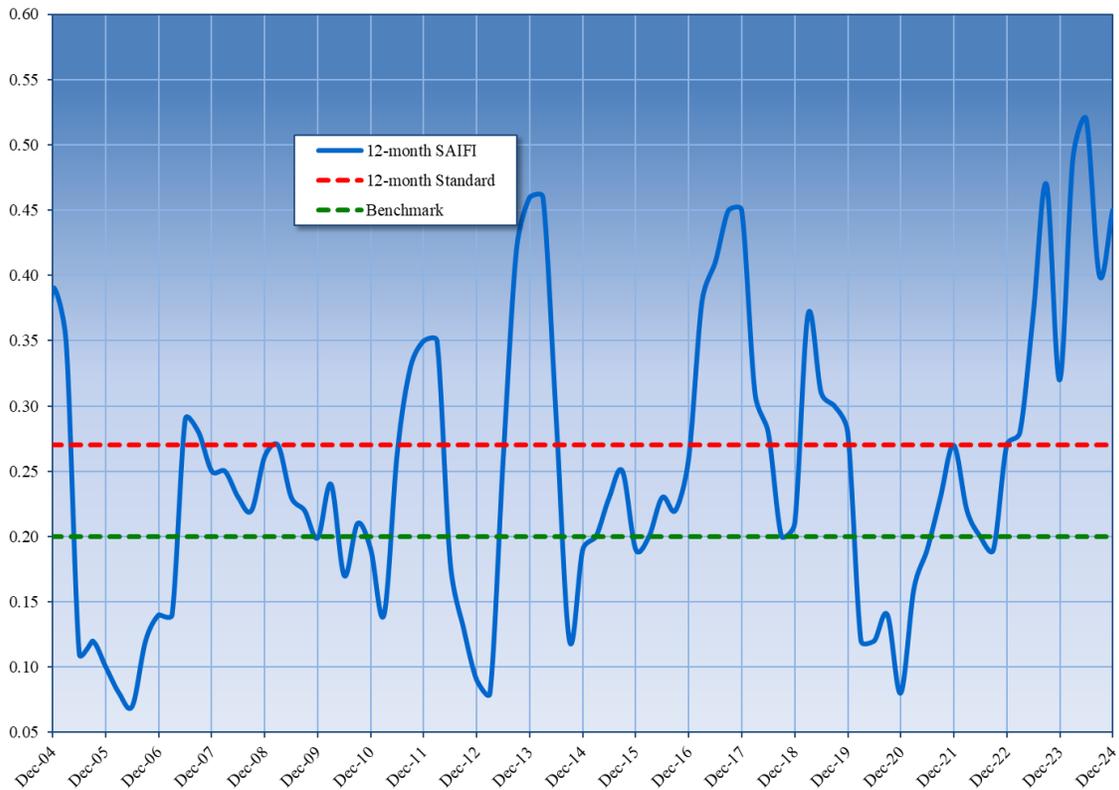


Figure 6 – Citizens’ Outage Causes (percent of total outages)

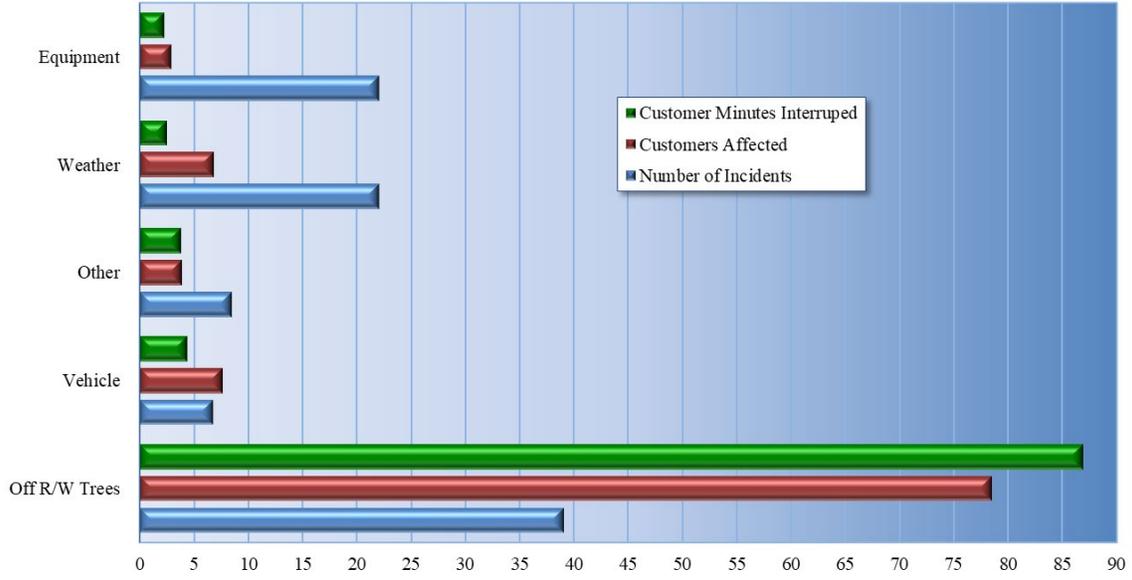


Figure 7 – Citizens’ Outage Cause Tracking (number of incidents)

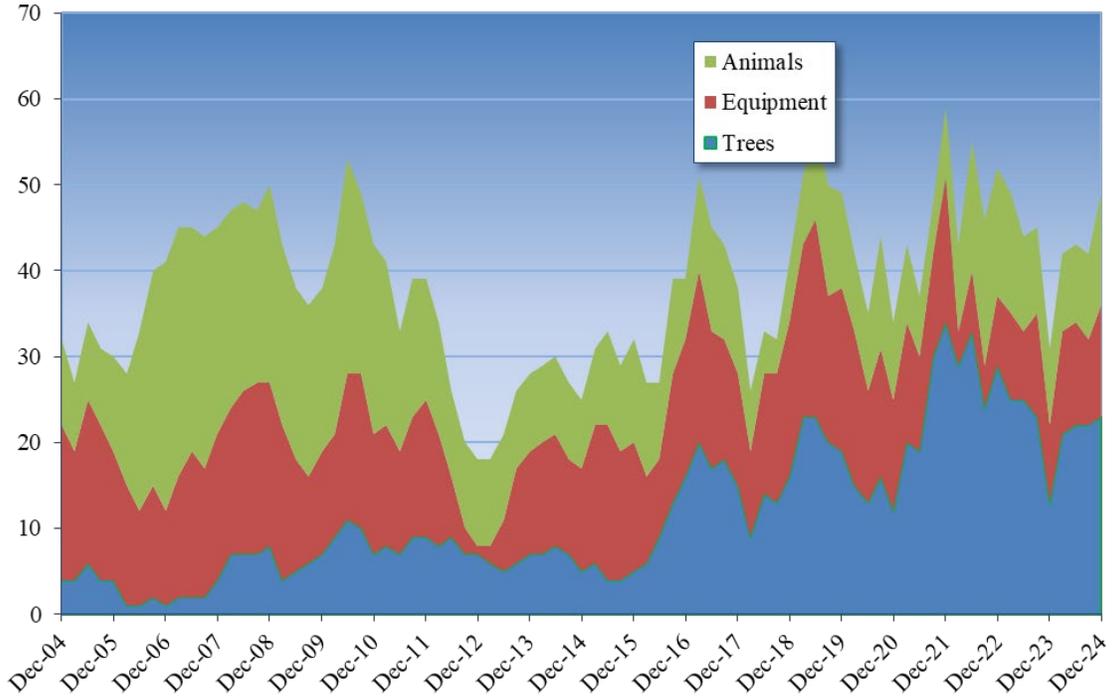


Figure 8 – Citizens’ Outage Tracking (number of Customers Interrupted)

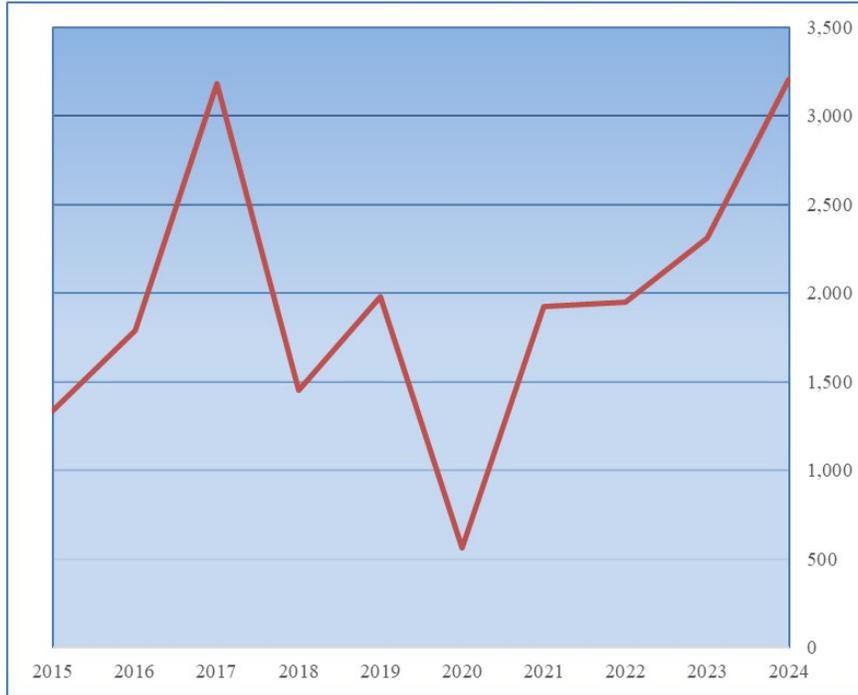


Figure 9 – Citizens’ Outage Tracking (Customer-Minutes of Interruptions, or CMI)

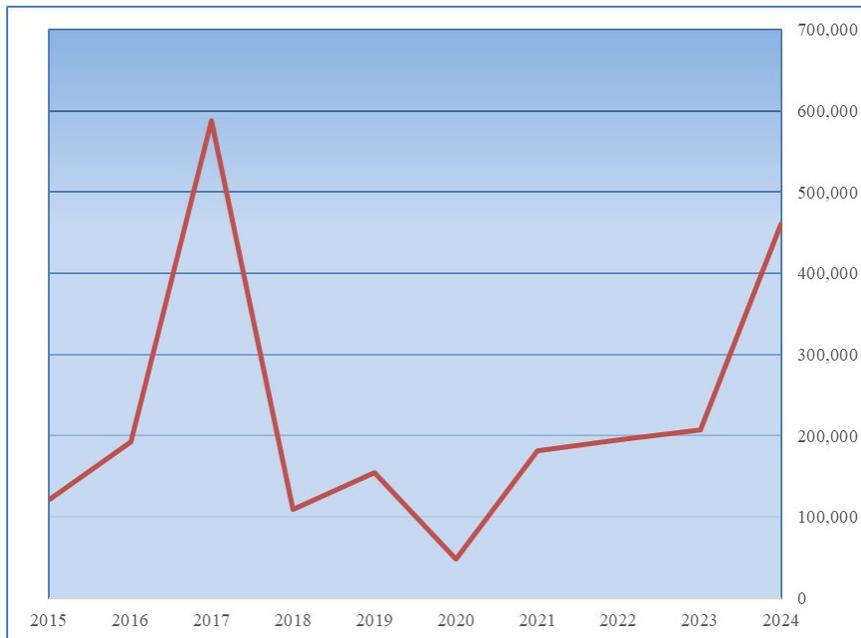
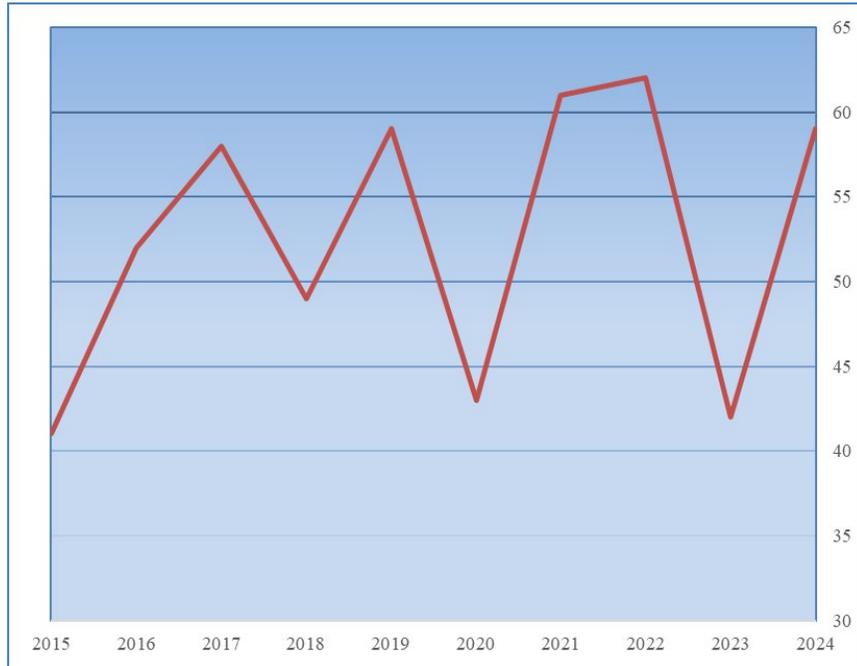


Figure 10 – Citizens’ Outage Tracking (number of interruptions annually)



Duquesne Light Company

Duquesne Light Company (Duquesne) has a service territory of about 817 square miles with a well-developed distribution system serving about 614,005 customers.

In 2024, Duquesne experienced 6.4 million kilovolt-amps (kVA) of customer interruptions and 1,003 million kVA-minutes of CMI as compared to: 4.5 million kVA of customer interruptions and 502 million kVA-minutes of CMI in 2023; 7.3 million kilovolt-amps (kVA) of customer interruptions and 1,060 million kVA-minutes of CMI in 2022; 7.3 million kVA customer interruptions and 1,355 million kVA-minutes of CMI in 2021; and 6.5 million kVA customer interruptions and 857 million kVA-minutes of CMI in 2020.

Duquesne experienced one Major Event in 2024. The Major Event impacted approximately 108,324 customers, which is not reflected in the totals above.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

- Rolling 12-month:** Increased from 110 minutes in 2023 to 156 minutes in 2024; failed to achieve benchmark by 44.0%.
- 3-year average:** Decreased from 148 minutes in 2023 to 137 minutes in 2024; failed to achieve standard by 15.3%.

SAIDI

- Rolling 12-month:** Increased from 63 minutes in 2023 to 127 minutes in 2024; failed to achieve benchmark by 0.6%.
- 3-year average:** Decreased from 123 minutes in 2023 to 108 minutes in 2024; achieved standard by 29.4%

SAIFI

- Rolling 12-month:** Increased from 0.57 outages in 2023 to 0.82 outages in 2024; achieved benchmark by 29.9%.
- 3-year average:** Decreased from 0.81 outages in 2023 to 0.77 outages in 2024; achieved standard by 40.3%.

CAIDI and SAIFI Performance

Historical rolling 12-month CAIDI and SAIFI benchmark reliability performance trends are shown in Figures 11 and 12 below. Duquesne’s CAIDI performance in 2024 worsened from its improved performance in 2023, as seen in Figure 11, and failed to achieve both benchmark and standard. Management should place significant emphasis upon achieving CAIDI results at or below the “green” benchmark performance upper-control-limit-line for CAIDI. CAIDI is an important factor in gauging an EDC’s response times to interruptions and thus will affect customer satisfaction in that area.

Beginning in 2004 and continuing through 2024, Duquesne’s annual SAIFI benchmark performance trend has generally been positive, as shown in Figure 12. This positive performance trend, below the benchmark performance upper-control-limit-line, had been sustained since 2004 by Duquesne, and is considered under control. Duquesne is considered an excellent SAIFI benchmark performer. The Commission commends Duquesne for that accomplishment and encourages use of distribution system automation systems (smart grid systems).

Outage Causes

Figure 13 below shows the top five reported 2024 outage-cause categories reported by Duquesne, as a percentage, for the following three distinct performance metrics: KVA Minutes Interrupted, KVA Interrupted, and Number of Incidents. Trees OROW were the top cause of outages and Storms were the top cause of CMI.

Figure 14 below shows the historical trend of the top three main outage causes. Trees and equipment failures are the two most frequent outage causes that are negatively affecting Duquesne’s distribution system reliability and resilience, as well as almost every EDC in Pennsylvania. Duquesne should continue to aggressively pursue cooperation with customers in removal of OROW vegetation that endangers distribution circuits. As noted by TUS in last year’s report, the reported outage-cause category of “Storms” should be reconsidered and eliminated to spread outages among more defined areas such as vegetation or equipment failures and such, as

it can be said that the category of “Storms” only reveals other system deficiencies, such as equipment failure and vegetation trimming deficiencies.

General Reliability

Duquesne noted that achieving outstanding performance in system reliability continues to be one of its most important long-term objectives. Duquesne’s Asset Management and System Planning groups perform ongoing analysis of reliability indices, root cause analysis of outages, and tracking and monitoring of other performance measures to identify improvement opportunities and optimize reliability. Duquesne stated that this long-term process includes making recommendations for capital projects such as circuit rehabilitation, new substations, and distribution circuits. This process also includes implementation of new advanced protection and coordination schemes on the distribution system that better localize customer outages and reduce momentary outages.

Duquesne stated that it continues its Emergent Work Process, which is used to identify problems, set priorities, and resolve reliability issues as quickly as possible. Duquesne field personnel perform daily field inspections and any abnormalities are logged into a database. This database is reviewed regularly and any high priority problems are identified and a course of action is determined. Analysis at the device level is used to identify small areas where customers have experienced multiple outages. Assessing only system-level or even circuit-level data may mask these isolated problems.

Duquesne indicated that its capital budget in 2024 included projects to meet customer service requests and projects targeting distribution reliability and resiliency, including pole replacement, circuit load relief and voltage improvement, circuit voltage conversions, underground residential development (URD) rehabilitation, aerial cable replacement, and construction of a new substation.

Duquesne noted the following specific programs, procedures, and ongoing maintenance activities supporting its reliability efforts:

- A Distribution Overhead Line Inspection Program, which includes infrared inspections that systematically identifies circuit problems for remedial action in advance of failure.
- Vegetation Management Maintenance Programs with the goal of reducing tree and branch failures through proactive pruning and removal to manage proper clearances. Duquesne finds that this program will help reduce the frequency of outages by addressing targeted tree failure conditions that typically result in physical damage to its facilities.
- An all-pulse-reclosing protection technology has been implemented on some 23kV circuits. This technology eliminates traditional “hard reclosing,” thereby making it easier and faster to conduct repairs and restore circuits to normal operation, which enables customers to be restored more quickly. This technology also reduces stress and damage on the entire circuit since the breaker is no longer required to trip, also contributing to the reduction in momentary outages to customers.

- Line maintenance work of various types is regularly performed in order to maintain distribution plant. This work includes replacement of cross arms, arrestors, insulators, and other equipment on the overhead system as well as inspections and remedial work on the underground system.
- Storm Preparedness Training is conducted each year and Storm Review Meetings are held following major events. These meetings focus on the successes and challenges of the most recent emergency service restoration effort. Service restoration process improvements are made as needed to improve response time and effectiveness during the next restoration effort.

Duquesne also noted that it is implementing its second LTIP to accelerate its infrastructure improvement program, which spans Jan. 1, 2023, through Dec. 31, 2028.

Conclusion

Trees OROW and Equipment Failure are the top two outage causes that substantially negatively affect electrical reliability to Duquesne customers and contributed to over 45.3% of the total number of incidents and 47.2% of lost CMI (Duquesne uses kVA-minutes interrupted) in 2024.

Trees, and especially OROW trees, continue to be a chronic problem for Duquesne, as well as every EDC in Pennsylvania. The Commission recommends continued and increased efforts in vegetation management and emphasis on response times.

As shown in Figures 15 through 17, for 2024, Duquesne experienced a reversal in its positive trend in its kVA interrupted, kVA minutes of interruption, and kVA interruptions. Duquesne should continue to implement its programs to ensure consistent reliability performance to return to its 2023 levels of performance.

Figure 18 below is included to indicate a growth in the number of customers served. Because Duquesne records their service indicators in kVA rather than customers individually, it is difficult to measure actual impact upon customers. However, the trends in kVA should equivocate to the impacts upon customers.

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Figure 11 – Duquesne CAIDI (minutes)

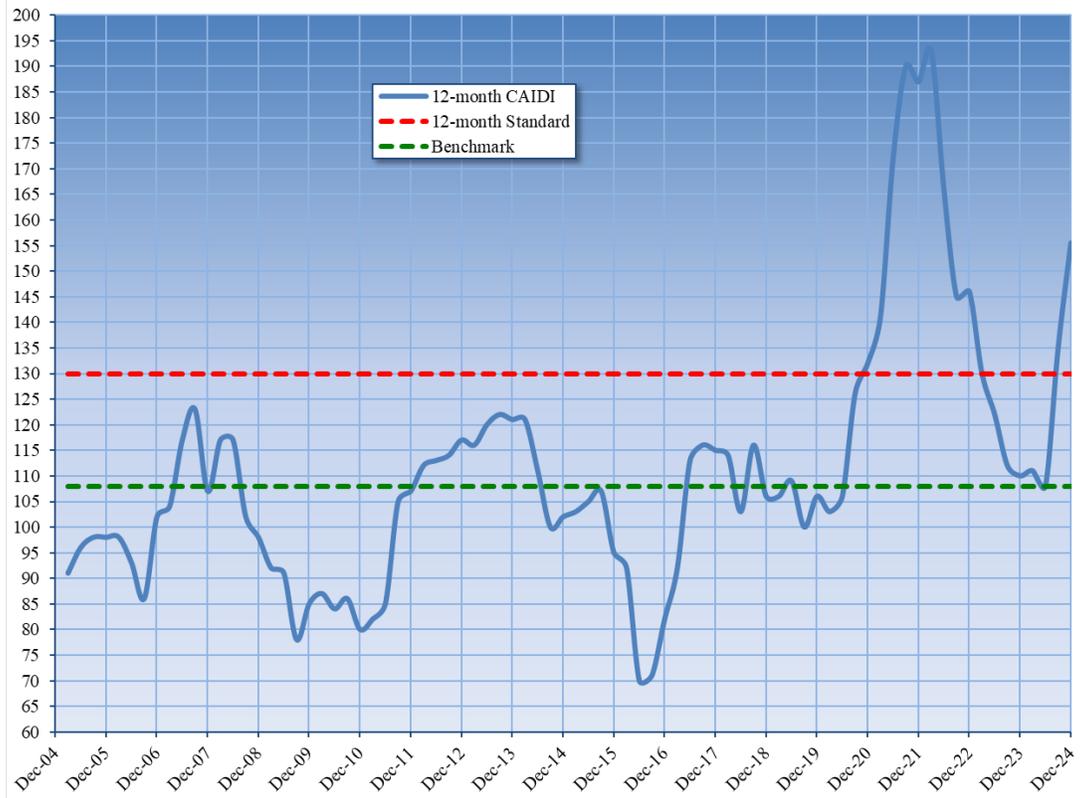
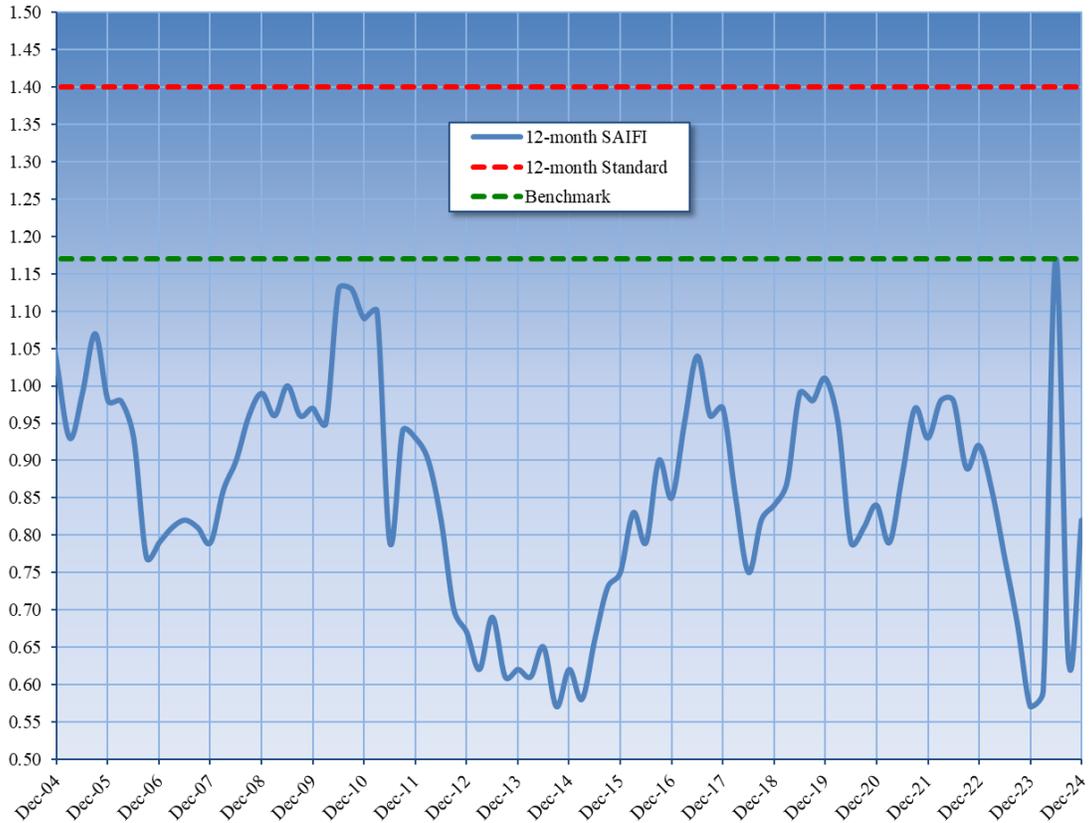


Figure 12 – Duquesne SAIFI (interruptions per customer)



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Figure 13 – Duquesne Outage Causes (percent of total outages)

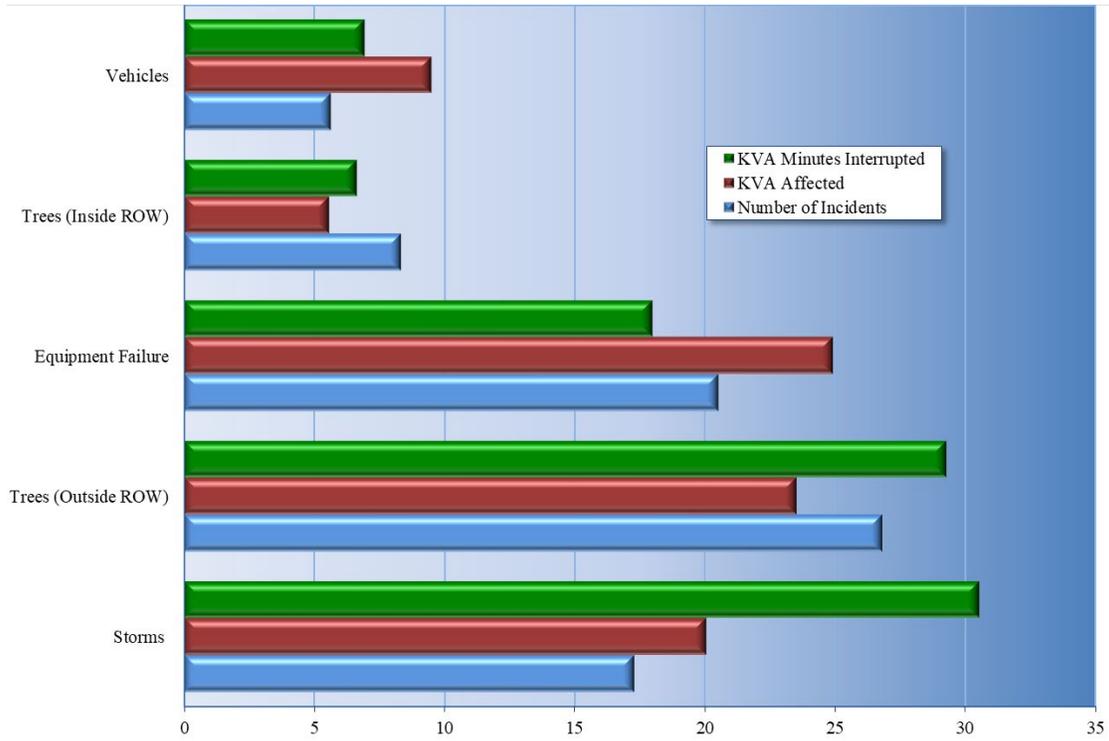


Figure 14 – Duquesne Outage Tracking (number of incidents)

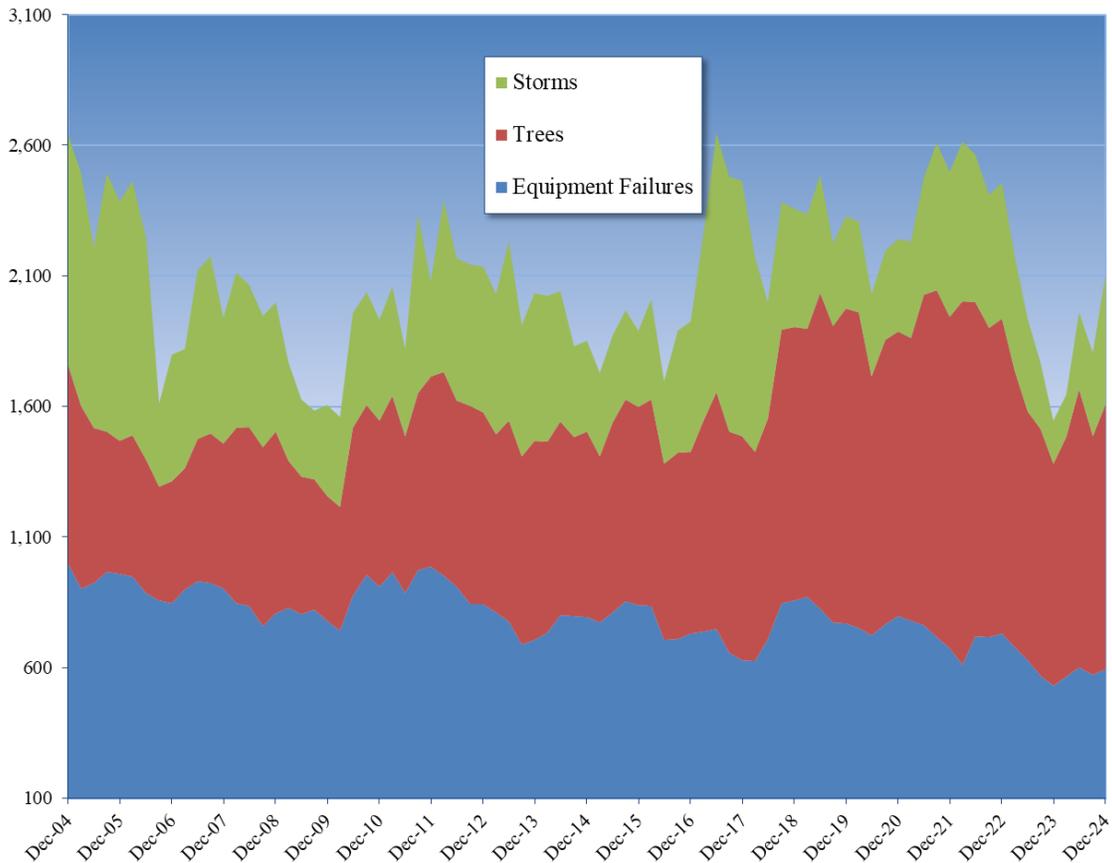


Figure 15 – Duquesne Outage Tracking (number of KVA Interrupted)



Figure 16 – Duquesne Outage Tracking (KVA-Minutes of Interruptions, or CMI)

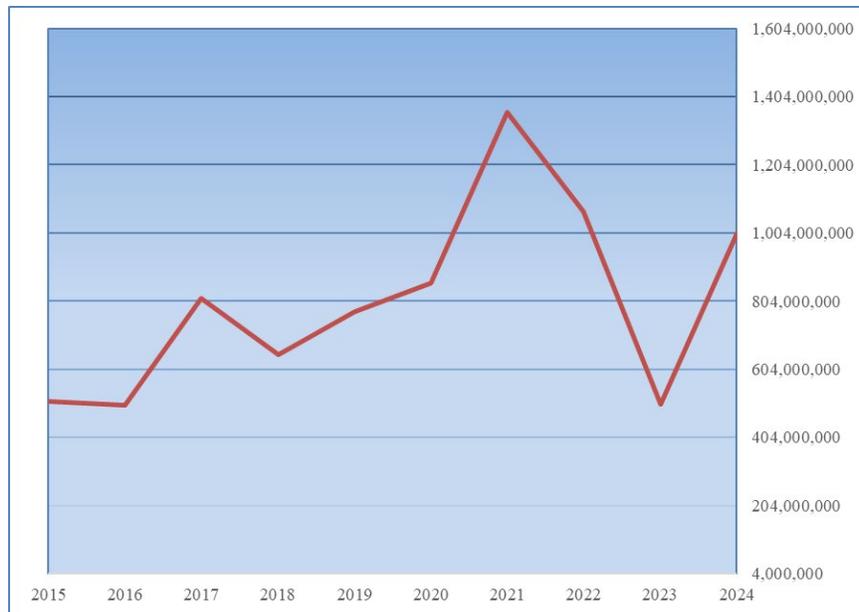


Figure 17 – Duquesne Outage Tracking (number of interruptions annually)

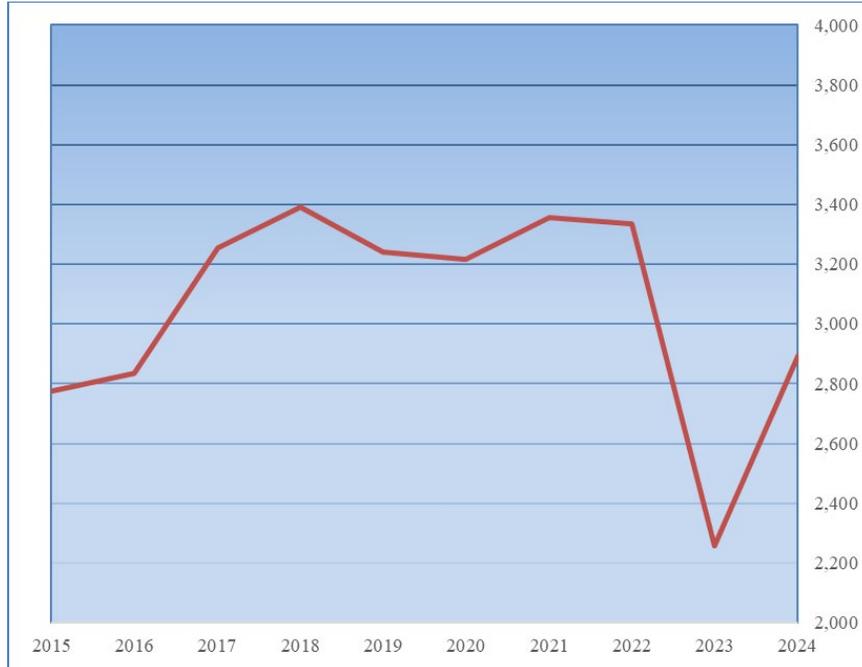
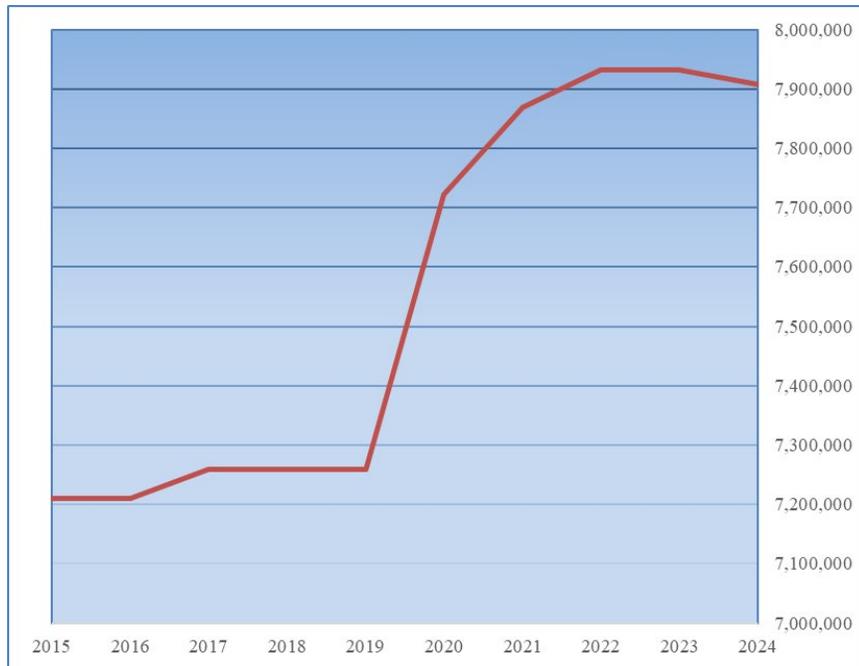


Figure 18 – Duquesne kVA Served (may reflect the number of customers served)



FE PA Companies

General Reliability

Overall, the FE PA Rate Districts experienced mixed results in reliability performance. While Penn Power and West Penn showed improvement in CAIDI, both still fell short of benchmark. Both had what could be considered acceptable SAIFI performance, but West Penn’s SAIFI was slightly above standard. Met-Ed and Penelec, however, both worsened in CAIDI and SAIFI and failed to make the rolling 12-month performance standard by significant amounts.

FE PA is executing its third LTIP beginning in 2025. Pursuant to the Commission Order approving FE PA’s second LTIP,⁴² in April 2025 FE PA provided a cost effectiveness report (FE Report) for its second LTIP that reported on its achieved LTIP goals.⁴³ The FE Report indicated that FE PA fell short of their projected SAIDI and SAIFI benefit goals, but found that the LTIP still provided reductions in SAIDI and SAIFI. Table 4 below details the projected versus actual SAIDI and SAIFI benefits for FE PA’s second LTIP by rate district.⁴⁴ Note that the totals are weighted averages of the four rate districts based on the number of customers. FE PA is also required to provide a similar report upon the completion of its third LTIP.

Table 4: FE PA Second LTIP Benefits

Rate District	Approved Capital Investment (\$M)	Projected SAIDI Benefit	Projected SAIFI Benefit	Actual Capital Investment (\$M)	Actual SAIDI Benefit	Actual SAIFI Benefit
Met-Ed	\$152.60	78.89	0.55	\$178.38	43.63	0.225
Penelec	\$199.75	47.26	0.66	\$239.69	24.71	0.201
Penn Power	\$72.38	36.60	0.17	\$86.59	11.29	0.051
West Penn	\$146.97	64.12	0.38	\$176.32	23.74	0.163
FE PA Total	\$571.70	61.12	0.49	\$680.98	32.41	0.189

Table 5 below details FE PA’s expected SAIDI and SAIFI benefits for its third LTIP by rate district and in total, which is also a weighted average based on the number of customers.⁴⁵

⁴² See, *Petition of Metropolitan Edison Company, et al., for Approval of its Long-Term Infrastructure Improvement Plan*, at Docket Nos. P-2019-3012618, et al., Order entered January 16, 2020.

⁴³ See, *FirstEnergy Pennsylvania Electric Company Cost Effectiveness Report*, filed April 30, 2025, at Docket Nos. P-2019-3012618, et al.

⁴⁴ *Id.*, at 7.

⁴⁵ See, *Petition of FirstEnergy Pennsylvania Electric Company for Approval of its Third Long-Term Infrastructure Improvement Plan*, at Docket No. P-2024-3050269, Order entered December 19, 2024, page 29.

Table 5: FE PA Third LTIP Benefits

Rate District	Projected SAIFI	Projected SAIDI	Customers Served
Met-Ed	0.108	17.07	574,433.00
Penn Power	0.020	0.67	173,936.00
Penelec	0.204	33.75	576,176.00
West Penn	0.170	43.58	723,023.00
Total	0.144	29.72	2,047,568.00

FE PA has also committed to certain reliability improvements through the Joint Petition for Approval of Settlement of All Issues (Settlement) for FE PA’s base rate case at Docket No. R-2024-3047068. The Settlement, *inter alia*, included a commitment by FE PA to a cumulative improvement in reliability that results in a reduction of the weighted average SAIDI by 3.5% and SAIFI by 2.5% by January 1, 2028, three years following the effective date of rates on January 1, 2025. Again, the percentages are a weighted average of the four rate districts by customer count. As further clarification, the improvements are to be measured using the actual year-ended December 31, 2027, performance results as compared to the three-year averages as published in the 2023 PUC Electric Reliability Report, assuming similar weather for that three-year average time period. FE PA also clarified that the reliability performance goals of the Settlement were primarily based on an increased vegetation management budget and not necessarily the benefits of the third LTIP.⁴⁶

Using the customer numbers in Table 5, above, FE PA’s weighted average 2023 three-year averages for SAIFI and SAIDI are 1.37 and 270, respectively. The weighted average benchmark SAIFI and SAIDI are 1.14 and 152.33, respectively, and the weighted average standard SAIFI and SAIDI are 1.37 and 218.87, respectively. Thus, if FE PA achieves, at a minimum, the 2.5% SAIFI and 3.5% SAIDI reductions by the end of 2027, the weighted averages for SAIFI and SAIDI would be 1.34 and 260.58, respectively. Those results would still not achieve benchmark but would achieve standard for SAIFI. TUS expects that the combined impact of the additional vegetation management budget and third LTIP should, in theory, bring FE PA’s reliability performance, at least on a weighted average level, to approximate benchmark SAIFI performance. FE PA, like all other EDCs, is struggling with CAIDI, which impacts the SAIDI performance. As noted in the Executive Summary and Conclusion sections of this report, EDCs must take steps to address the worsening performance for CAIDI.

⁴⁶ *Id.*, page 27.

FE PA exhibited a very slight improvement in reliability performance in 2023 as compared to 2022. However, all four EDCs continue to struggle to achieve benchmark performance for any of the three reliability indices, with the exception of Penn Power's SAIFI.

FE PA utilizes core programs in its four rate districts to support cost-effective and reliable service. These programs include, but are not limited to:

- **Inspection and Maintenance (I&M):** FE PA's I&M practices are designed to assist in determining the need for, and prioritization of, the repair or replacement of distribution system components and facilities. Poles showing incipient decay or poles that are thirty-five years old or older will be manually bored or inspected by the use of a Resistograph. The Resistograph is a sophisticated electronically controlled drill that provides increased accuracy, when compared to manual drilling, in measuring the relative density of wood in timber structures. Driven by a drill motor, a long, thin needle is inserted into the wood pole in order to assess its density, structural integrity, and shell thickness.
- **Vegetation Management:** FE PA performs vegetation management on its distribution circuits in order to promote the continued safe and reliable operation of its distribution system. The vegetation management program specification is designed to support line reliability, maintain access, make repairs, or restore service and to support safe and reliable service. The vegetation management program specification prunes vegetation to achieve required cycle clearance, with all circuits on four to five years of cycle clearance, which includes: removing selected incompatible trees within the clearing zone corridor; removing certain defective limbs that are overhanging primary conductors; controlling selected incompatible brush mechanically or using herbicide, or both; relieving limbs causing mechanical strain on secondary/service lines; and removing targeted OROW priority trees that are dead, dying, diseased, and leaning or significantly encroaching the corridor.
 - Portions of a circuit that experience high customer interruption minutes due to vegetation-caused outages may be targeted to include the removal of certain healthy limbs which overhang primary conductors based on tree species and condition.
 - In response to damage caused by the Emerald Ash Borer, a program to proactively remove OROW Ash Trees has been 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 to 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):** FE PA noted that 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:** FE PA noted that 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:** FE PA 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.
- **LTIP:** the FE PA rate districts first began to execute their respective LTIP programs in 2016. These plans include expenditures and programs designed to adequately maintain and improve the efficiency, safety, adequacy, and reliability of the distribution system. FE PA's third LTIP, beginning in 2025, focuses on two areas: asset health and outage exposure. Asset health focuses on maintaining the system in a state of good repair while outage exposure focuses on minimizing the impact of customer outages. The third LTIP includes initiatives and expenditures within these two focus areas that are designed to maximize sustained reliability over the long term.

FE PA noted that in addition to the reliability programs above, it also utilizes various strategies to efficiently respond to customer and equipment outages. These include, but are not limited to:

- **Minimizing Outage Impact:** FE PA noted that it incorporates design philosophies that support grid operation resulting in maximized reliability. These philosophies include instantaneous breaker tripping on select circuits, circuit sectionalizing devices, and remote device operation (such as supervisory control and data acquisition) to minimize the impact of an outage when possible.
- **Storm Exercises:** Each FE PA performs an annual storm exercise. FE PA noted that a well-designed exercise provides a low-risk environment to test and validate capabilities, familiarize personnel with plans, procedures, roles and responsibilities, and foster meaningful interaction and communication across internal and external organizations.
- **Summer Readiness:** FE PA noted that Summer is the time when most electric utilities experience the highest system loads and most damaging storms. In order to prepare for this period of the year, FE PA performed summer readiness activities such as capacitor inspections, substation inspections, transmission system reliability and capability review, and post-storm reviews to identify and disseminate lessons learned after significant events.
- **Smart Meters:** FE PA has completed mass deployment of smart meters to customers across Pennsylvania. FE PA noted that smart meter installation is a step toward a more modernized electric system that will enable automated meter readings. Smart meters also assist during outage restoration periods, especially when there are a significant number of single customer outages, by allowing the FE PA to ping the meter to determine if a customer's service has been restored.

- Incident Command System (ICS): FE PA has been utilizing a more formalized ICS structure, which is designed to enable effective and efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organization. By expanding the use of ICS, FE PA notes that its incident response ability is improved, and reliability is enhanced by utilizing a common system for incident response personnel (both intrastate and interstate).

FE PA indicated that to support best industry practices, it participates in various external organizations such as the Electric Power Research Institute, the IEEE, and the EAP, which focus on topics like reliability, power quality, regulatory issues, distribution planning, vegetation management, risk mitigation, distributed energy resources and more. To ensure continuous improvement, FE PA noted that it has a team comprised of reliability engineers to perform an internal review of reliability projects, expenditures, and performance, and to develop an overarching strategy for long-term reliability maintenance and improvements.

Other reliability initiatives noted by FE PA include analyzing its outage data to develop solutions for improving reliability. To address outages caused by trees, FE PA 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 targeted OROW priority trees. FE PA noted that it is limited in its ability to legally address OROW vegetation management. However, FE PA identifies OROW priority trees for removal that are dead, dying, diseased, leaning, and significantly encroaching the corridor when customer consent is obtained or easement rights permit. Trees identified as a potential cause of a future outage are removed to prevent an interruption of electrical service to FE PA customers. FE PA continues its program to mitigate trees subject to damage from the Emerald Ash Borer.

To reduce the likelihood of equipment failure outages, FE PA follows I&M programs that set forth schedules for regular inspections of distribution and substation facilities. These programs are geared towards specific components such as capacitors, poles, circuits, transformers, radio-controlled switches, substations, and reclosers. Equipment identified is repaired or replaced as appropriate.

Metropolitan Edison Company

Metropolitan Edison Company (Met-Ed) has a service territory of about 3,300 square miles that serves about 581,491 customers.

In 2024, Met-Ed experienced 1,199,572 customer interruptions and 289.7 million CMI as compared to: 739,898 customer interruptions and 149.2 million CMI in 2023; 760,672 customer interruptions and 121.8 million CMI in 2022; 772,644 customer interruptions and 133.4 million CMI in 2021; 724,138 customer interruptions and 108.4 million CMI in 2020.

Met-Ed experienced no Major Events in 2024.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

- Rolling 12-month:** Increased from 202 minutes in 2023 to 242 minutes in 2024; failed to achieve benchmark by 106.4%.
- 3-year average:** Increased from 178 minutes in 2023 to 201 minutes in 2024; failed to achieve standard by 55.9%.

SAIDI

- Rolling 12-month:** Increased from 257 minutes in 2023 to 498 minutes in 2024; failed to achieve benchmark by 269.0%.
- 3-year average:** Increased from 234 minutes in 2023 to 322 minutes in 2024; failed to achieve standard by 97.6%.

SAIFI

- Rolling 12-month:** Increased from 1.27 outages in 2023 to 2.06 outages in 2024; failed to achieve benchmark by 79.1%.
- 3-year average:** Increased from 1.31 outages in 2023 to 1.55 outages in 2024; failed to achieve standard by 22.0%.

CAIDI and SAIFI Performance

Historical rolling 12-month CAIDI and SAIFI benchmark reliability performance trends are shown in Figures 19 and 20 below. Met-Ed reported a MAIFI of 0.453 for 2024. Beginning in 2004, Met-Ed’s CAIDI performance trend has been worsening, and from 2013 to present has been trending significantly upward. Met-Ed’s 2024 rolling 12-month CAIDI is above both the benchmark and standard upper-control-limit-lines. More management attention is needed to address the recent poor CAIDI performance and return the trend line below the “green” benchmark performance upper-control-limit-line. Vegetation control may improve repair times by reducing larger and more damaging foliage contacts and overhanging canopy trees and limbs including off right of way trees. Staffing levels must also be carefully managed to ensure timely response to events.

Beginning in 2004, Met-Ed ‘s SAIFI performance, as seen in Figure 20 below, has been erratic and frequently above the benchmark. From 2007 onward, the overall trend has been continually above benchmark, except for a brief period in 2013 through 2014 when Met-Ed’s performance was positive and below the “green” benchmark performance upper-control-limit-line. As of December 2024, SAIFI was well above the “red” standard performance upper-control limit-line. By all measures this shows the continuation of unacceptable performance.

Outage Causes

Figure 21 below shows the top five reported outage cause categories in 2024, as a percentage, for the following three distinct performance metrics: CMI, Customers Affected, and Number of Incidents. OROW Trees and equipment failure were the top causes of outages and CMI. Approximately 60% of CMI was caused by OROW Trees and Equipment Failure.

Figure 22 below shows the historical trend of the top three outage causes. Trees and Equipment Failure are the two most frequent causes of power outages that are significantly negatively affecting Met-Ed's distribution system reliability and resilience, as well as every EDC in Pennsylvania.

Conclusion

Trees and Equipment Failure are the top two outage causes that are substantially negatively affecting electrical reliability to Met-Ed's customers. Beginning in 2004, Met-Ed's CAIDI and SAIFI benchmark performance has been inconsistent and frequently out-of-control. Met-Ed's overall CAIDI performance trend is troubling, with a continuing trend above benchmark and standard performance upper-control-limit-lines. Met-Ed has not achieved benchmark performance for SAIFI since 2014. The Commission recommends that increased management attention is needed to bring Met-Ed's failing reliability performance back into control and to sustain the trend line below the "green" benchmark performance upper-control-limit-line. The Commission expects to see improvement in reliability for FE PA as it executes its third LTIIP over the next five years, especially as it relates to CAIDI.

The Commission recommends increased efforts in vegetation management and emphasis on response times. As noted in the FE PA Companies section above, TUS expects that the combined impact of the additional vegetation management budget and third LTIIP to improve FE PA's reliability performance as a whole. However, attention is clearly needed on the Met-Ed rate district's territory to improve the customer experience.

The Commission recognizes that, overall, Met-Ed's reliability performance is declining as witnessed by the data shown below. As can be seen in Figures 23 through 25 below, there is a significant increase in the number of customers interrupted, CMI and outages since 2015.

2024 Pennsylvania Electric Reliability Report

Figure 19 – Met-Ed CAIDI (minutes)

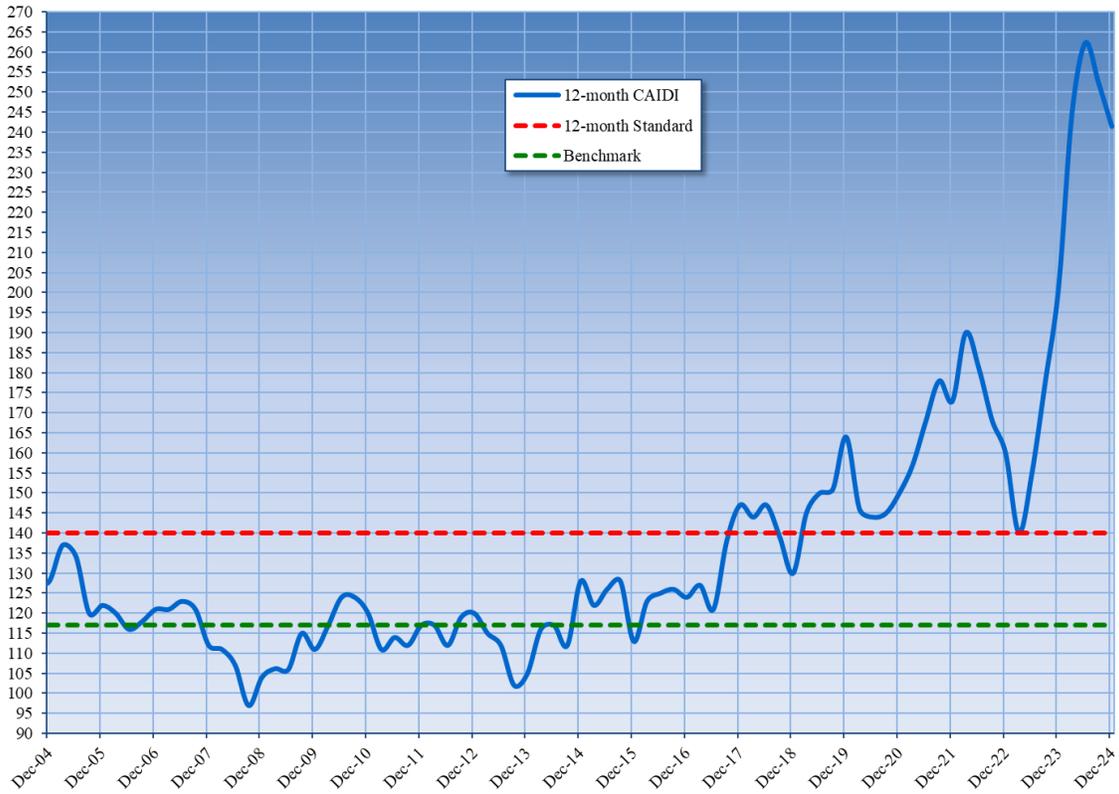
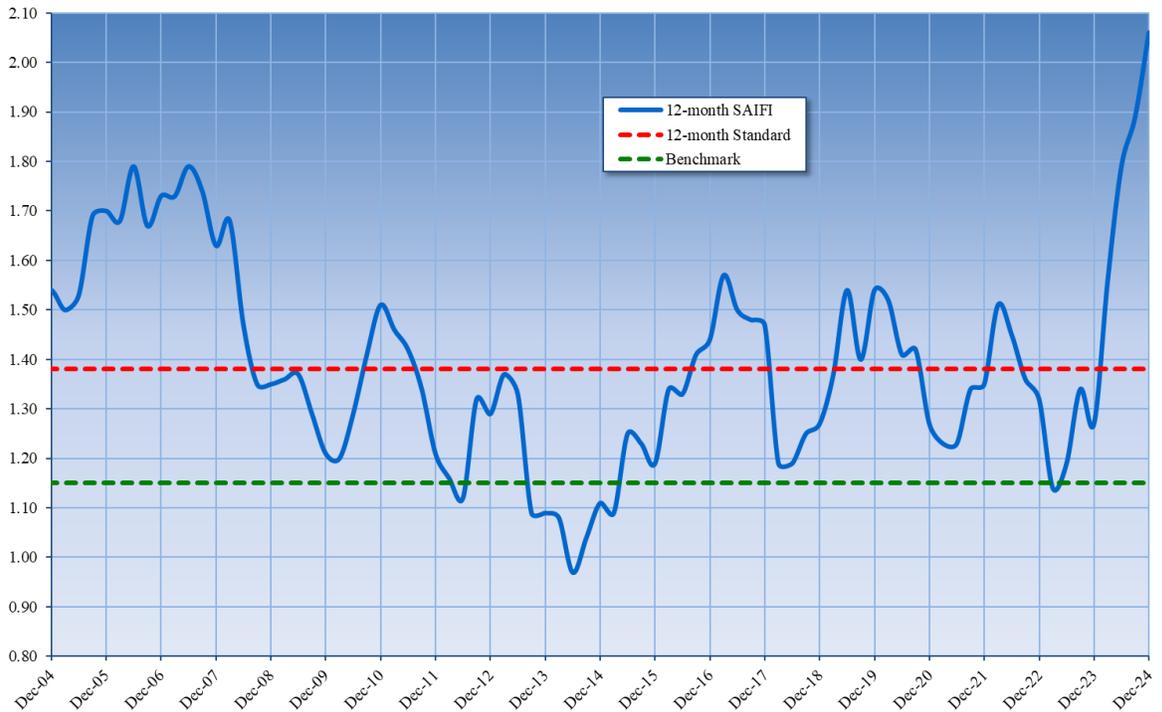


Figure 20 – Met-Ed SAIFI (interruptions per customer)



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Figure 21 – Met-Ed Causes (percent of total outages)

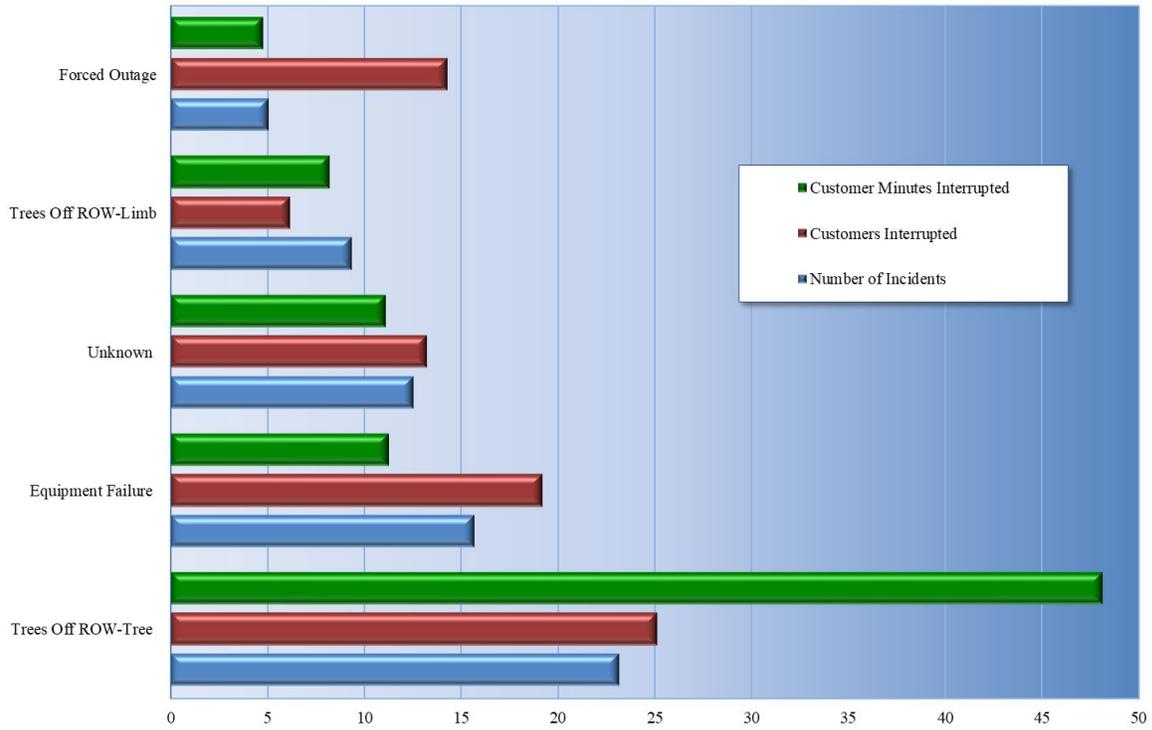


Figure 22 – Met-Ed Outage Tracking (number of incidents)

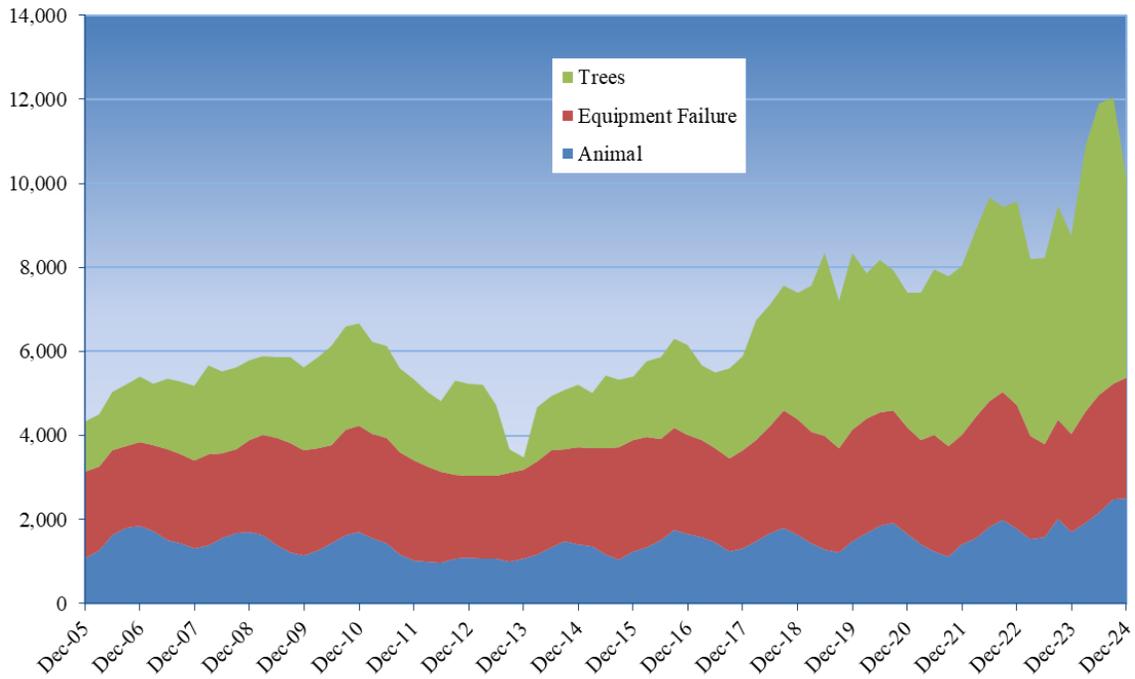


Figure 23 – Met-Ed Outage Tracking (number of customers interrupted)

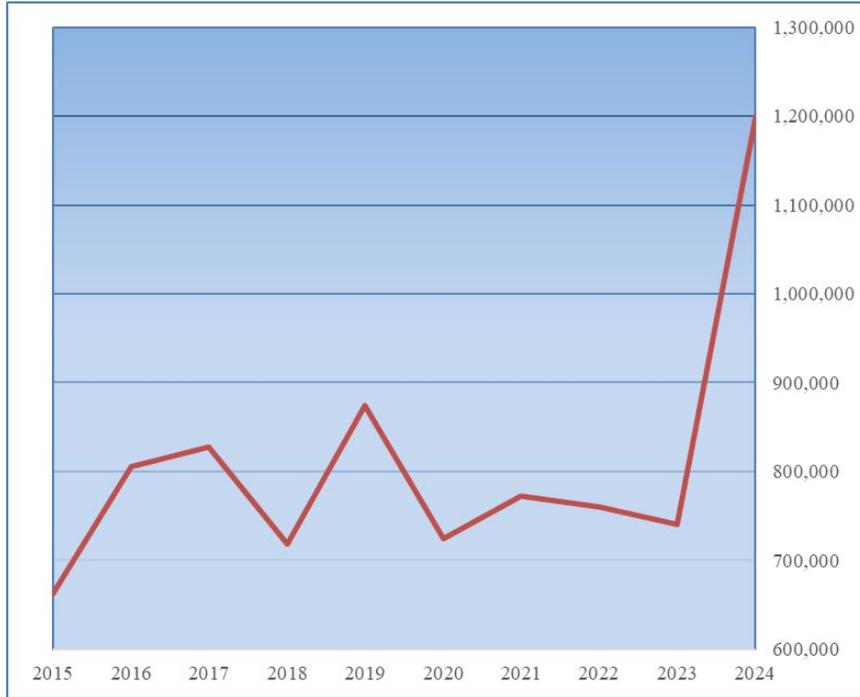


Figure 24 – Met-Ed Outage Tracking (Customer-Minutes of Interruptions, or CMI)

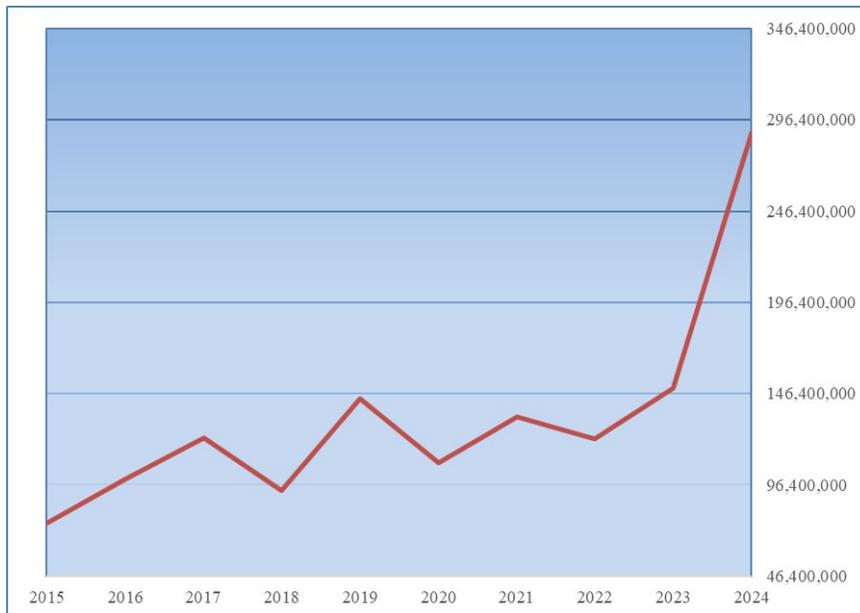
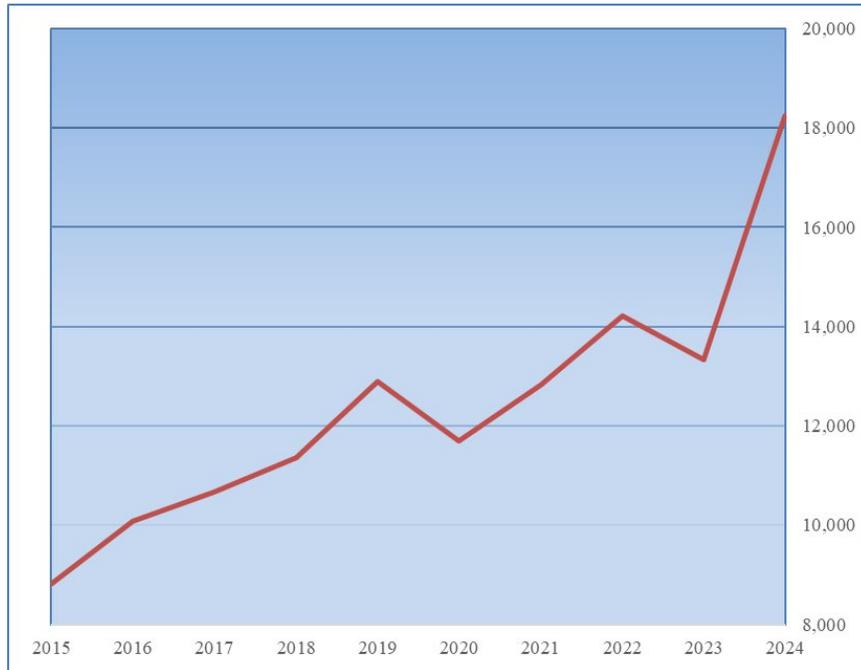


Figure 25 – Met-Ed Outage Tracking (number of interruptions annually)



Pennsylvania Electric Company

Pennsylvania Electric Company (Penelec) has a service territory of about 17,600 square miles serving approximately 592,129 customers.

In 2024, Penelec experienced 1,058,034 interruptions and 210.7 million CMI as compared to: 938,093 interruptions and 177.5 million CMI in 2023; 1,062,923 interruptions and 211.1 million CMI in 2022; 1,065,004 customer interruptions and 160.5 million CMI in 2021; and 914,716 customer interruptions and 124.1 million CMI in 2020.

Penelec experienced one Major Event in 2024. The Major Event impacted 112,452 customers, which is not reflected in the totals above.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Increased from 189 minutes in 2023 to 199 minutes in 2024; failed to achieve benchmark by 70.2%.

3-year average: Increased from 180 minutes in 2023 to 196 minutes in 2024; failed to achieve standard by 51.8%.

SAIDI

Rolling 12-month: Increased from 303 minutes in 2023 to 356 minutes in 2024; failed to achieve benchmark by 140.5%

3-year average: Increased from 315 minutes in 2023 to 341 minutes in 2024; failed to achieve standard by 90.5%.

SAIFI

Rolling 12-month: Increased from 1.60 outages in 2023 to 1.79 outages in 2024; failed to achieve benchmark by 42.1%.

3-year average: Decreased from 1.76 outages in 2023 to 1.74 outages in 2024; failed to achieve standard by 25.2%.

CAIDI and SAIFI Performance

Historical rolling 12-month CAIDI and SAIFI benchmark reliability performance trends are shown below in Figures 33 and 34. Penelec reported a MAIFI of 0.708 for 2024. Beginning in 2004, Penelec's CAIDI performance trend has been inconsistent and frequently out of control. In 2021, Penelec's rolling 12-month CAIDI increased to just at the standard performance upper-control-limit-line and has failed to achieve standard performance since then. With CAIDI performance at this level, Penelec is required to assert more management attention to address the inconsistent performance and return CAIDI performance trend line to below the "green" benchmark performance upper-control-limit-line. Improved response times and shortened repair times will prove essential to maintaining CAIDI at or below the benchmark level. It is believed that management must focus upon improving CAIDI. The Commission expects improved response and repair times and thus improved CAIDI values.

Beginning in 2004, Penelec's SAIFI performance trend has been inconsistent and frequently outside of acceptable tolerances. From 2008 through 2022, the overall trend has been continually trending negative with slight improvement in 2023. Penelec's 2024 SAIFI is again well above standard. Penelec's overall SAIFI performance trend is outside of acceptable limits, even with its improved SAIFI performance in 2023. Management must direct more attention to the poor SAIFI performance and work to move the trend line to a point below the "green" benchmark performance upper-control-limit-line. Focus upon automatic sectionalizing, auto transfer and smart grid may well prove to move and maintain SAIFI below the benchmark. Improved vegetation management is also a key to improving service reliability.

Outage Causes

Figure 35 below shows the top five reported outage-cause categories in 2024, as a percentage, for the following three distinct performance metrics: CMI, Customers Affected, and Number of Incidents. Trees OROW, Ice, and Equipment Failure were the leading causes of CMI. Trees OROW and Equipment Failure were the leading causes of the number of outage incidents.

Figure 36 below shows the historical trend of the top three outage causes. Equipment failure and trees are the two most frequent outage causes that are significantly negatively affecting Penelec's distribution system reliability and resilience, as well as almost every EDC in Pennsylvania.

Conclusion

Trees and Equipment Failure are the top two outage causes that negatively affect electrical reliability to Penelec customers. In 2024, trees and equipment failure outage causes contributed to over 33% of the total number of outage incidents and over 46% of CMI.

Beginning in 2004, Penelec’s CADI and SAIFI benchmark performance has been erratic and frequently outside of acceptable tolerances. Reliability indices at these current levels are unacceptable and FE PA through its third LTIP and improved vegetation management program needs to address the inconsistent CAIDI and SAIFI performance and sustain the trend line below the “green” benchmark performance upper-control-limit-line.

The Commission recommends increased efforts in vegetation management, increased utilization of LTIP processes, and emphasis on improving response times.

The Commission recognizes that, overall, Penelec reliability performance is declining as witnessed by the data shown below. As Figures 37 through 39 below indicate, Penelec’s performance, while slightly improving in 2023, is still well below that of its performance in 2015.

Figure 33 – Penelec CAIDI (minutes)

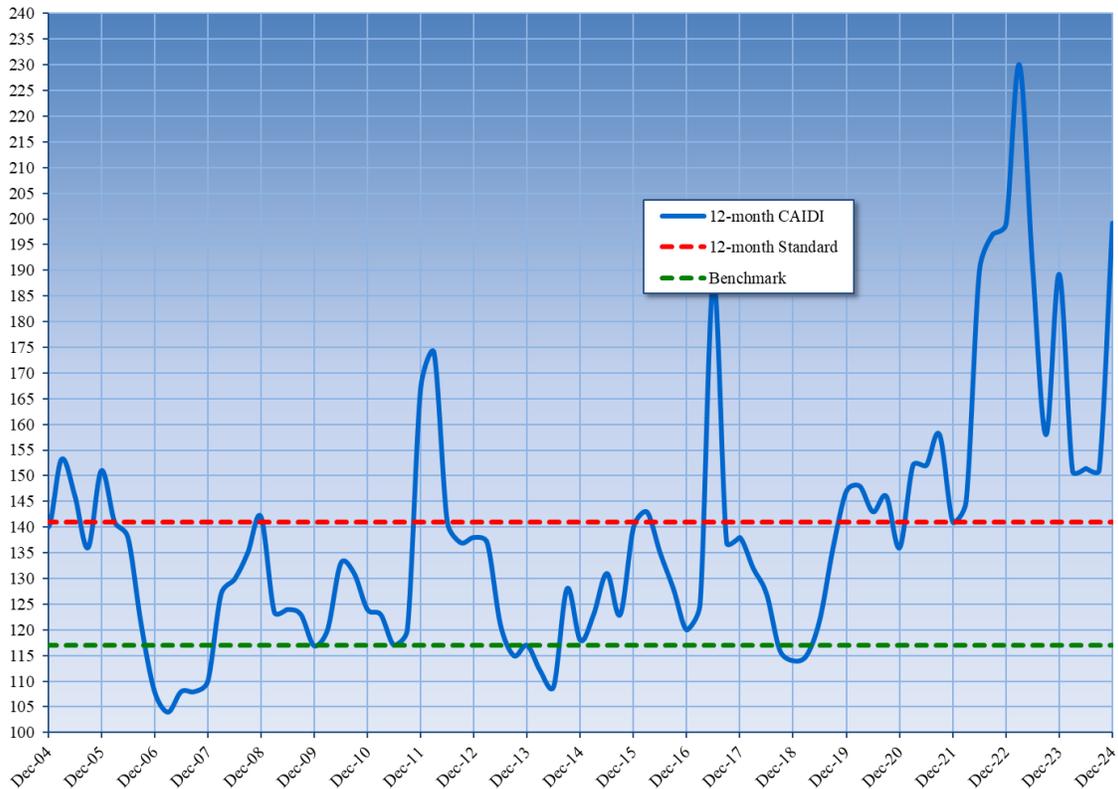
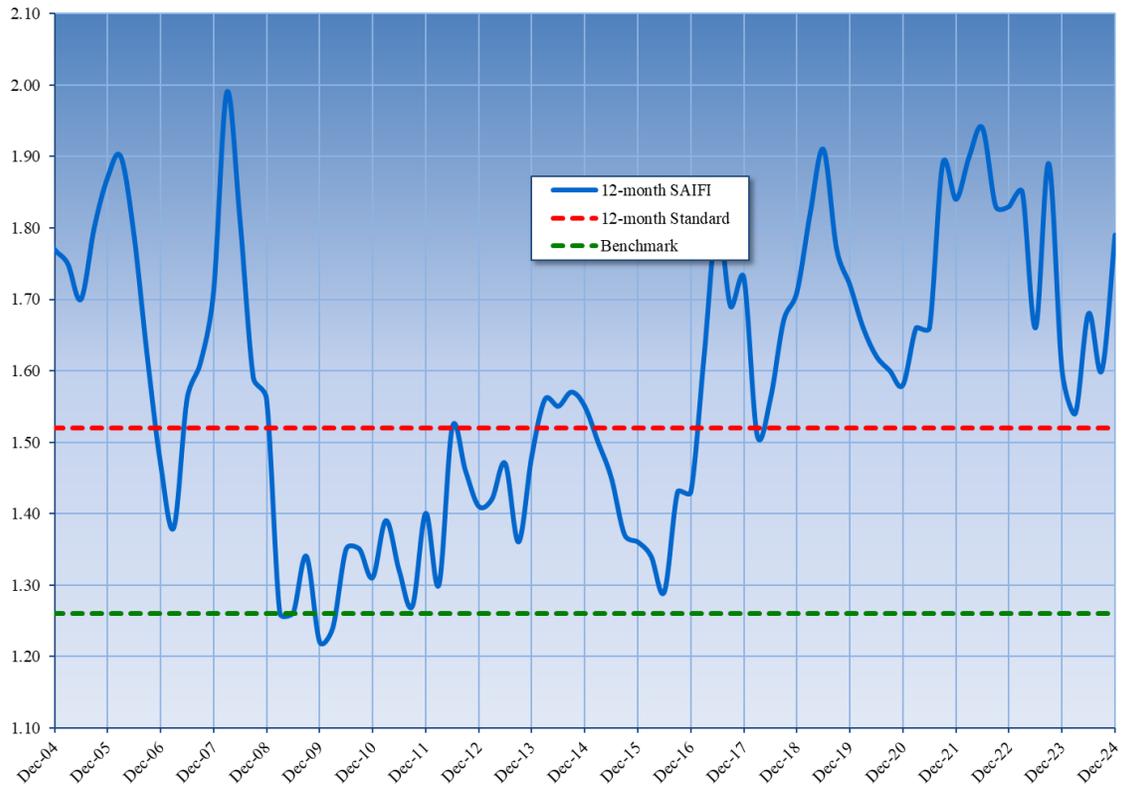


Figure 34 – Penelec SAIFI (interruptions per customer)



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Figure 35 – Penelec Outage Causes (percent of total outages)

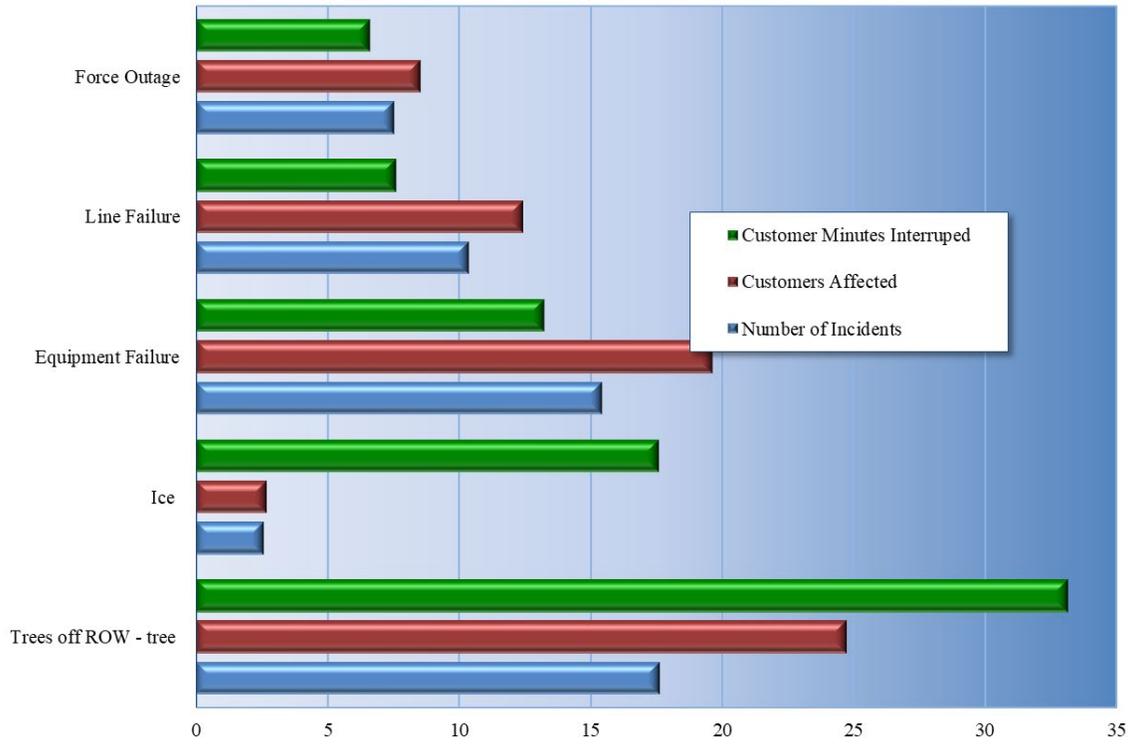


Figure 36 – Penelec Outage Tracking (number of incidents)

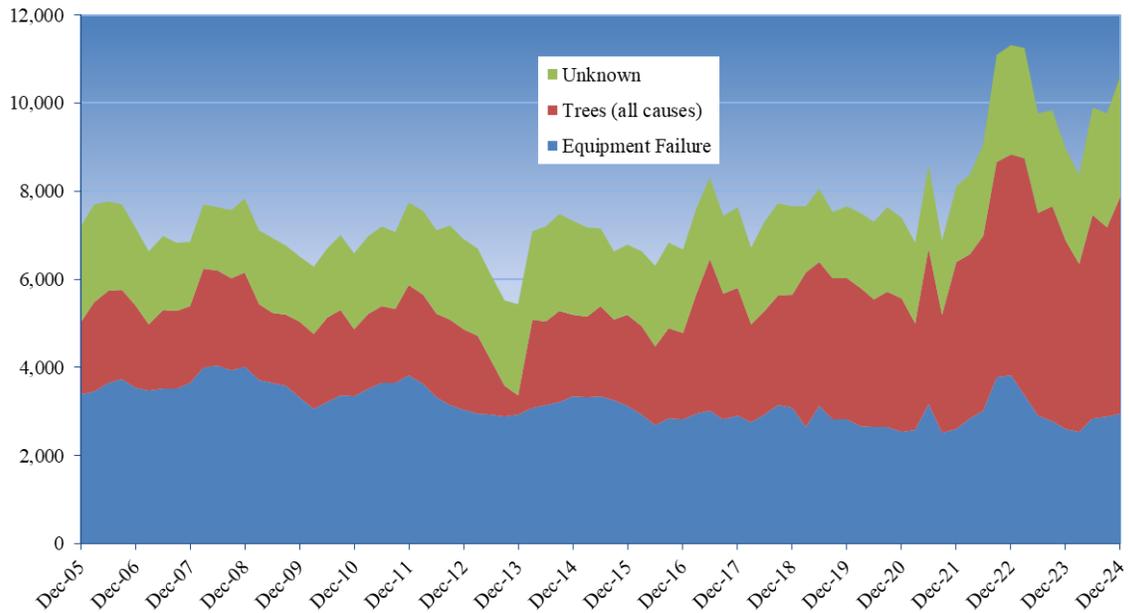


Figure 37 – Penelec Outage Tracking (number of Customers Interrupted)

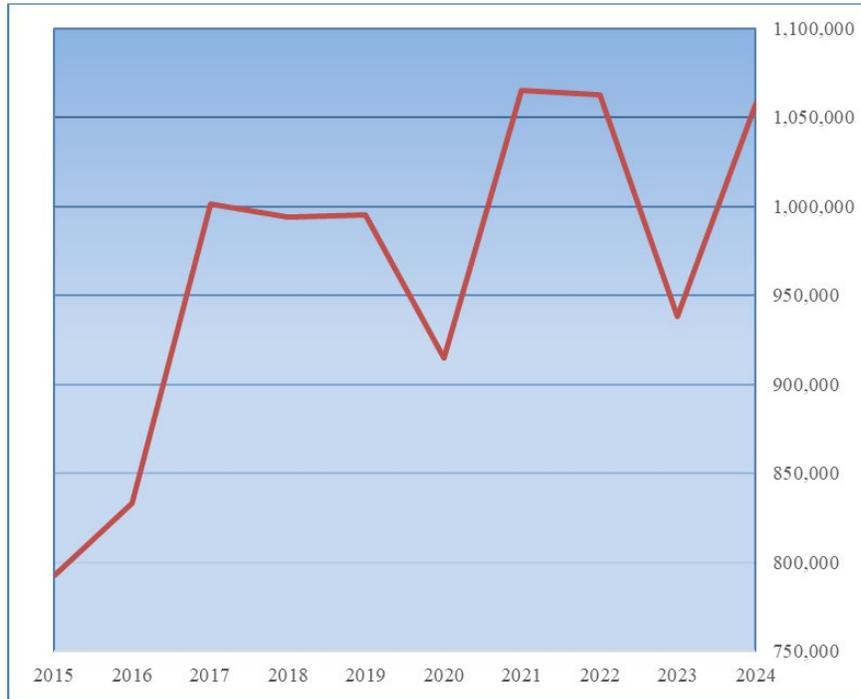


Figure 38 – Penelec Outage Tracking (Customer-Minutes of Interruptions, or CMI)

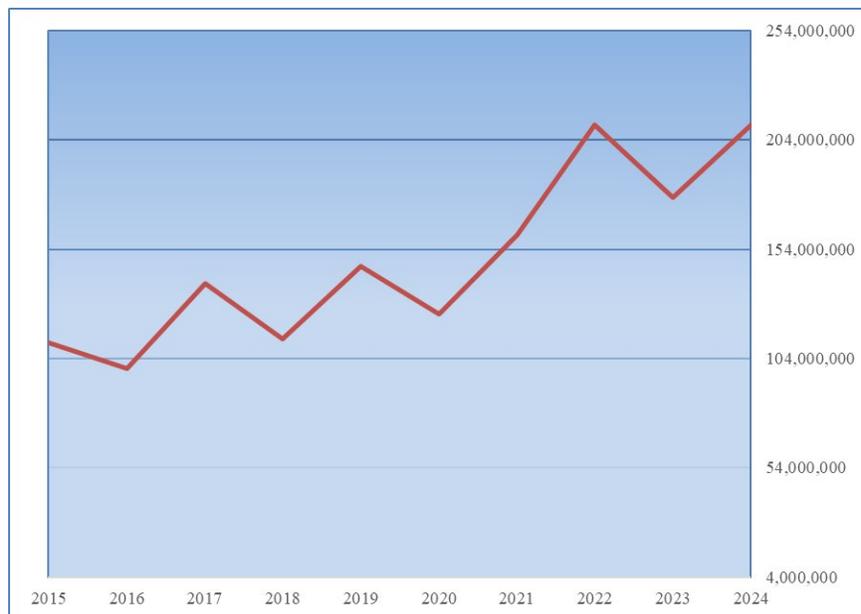
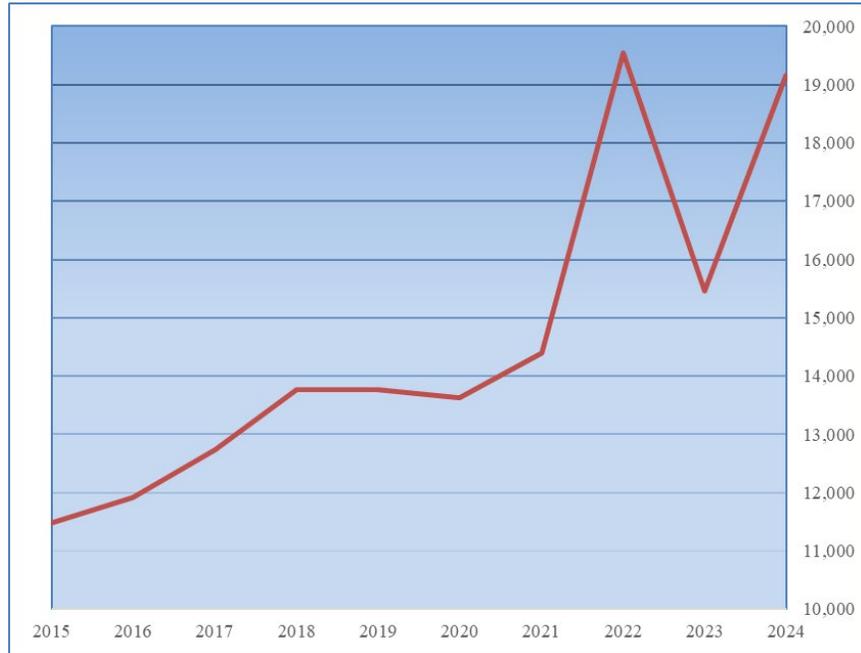


Figure 39 – Penelec Outage Tracking (number of interruptions annually)



Pennsylvania Power Company

Pennsylvania Power Company (Penn Power) has a service territory of about 1,100 square miles that serves approximately 175,356 customers.

In 2024, Penn Power experienced 176,436 customer interruptions and 25.9 million CMI, as compared to: 132,740 customer interruptions and 20.8 million CMI in 2023; 166,749 customer interruptions and 22.3 million CMI in 2022; 166,681 customer interruptions and 21.6 million CMI in 2021; and 159,907 customer interruptions and 29.6 million CMI in 2020.

Penn Power experienced one Major Event in 2024. The Major Event impacted 31,812 customers, which is not reflected in the totals above.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

- Rolling 12-month:** Decreased from 157 minutes in 2023 to 147 minutes in 2024; failed to achieve benchmark by 45.1%.
- 3-year average:** Increased from 140 minutes in 2023 to 146 minutes in 2024; failed to achieve standard by 31.3%.

SAIDI

- Rolling 12-month:** Increased from 121 minutes in 2023 to 147 minutes in 2024; failed to achieve benchmark by 30.5%.
- 3-year average:** Increased from 128 minutes in 2023 to 134 minutes in 2024; achieved standard by 1.5%.

SAIFI

- Rolling 12-month:** Increased from 0.78 outages in 2023 to 1.01 outages in 2024; achieved benchmark by 9.8%.
- 3-year average:** Increased from 0.92 outages in 2023 to 0.93 outages in 2024; achieved standard by 24.7%.

CAIDI and SAIFI Performance

Historical rolling 12-month CAIDI and SAIFI benchmark reliability performance trends are shown below in Figures 40 and 41. Penn Power reported a MAIFI of 0.040 for 2024. Beginning in 2016, Penn Power’s CAIDI performance trend has been inconsistent and frequently outside of acceptable tolerances. Penn Power’s rolling 12-month CAIDI has been trending higher and frequently exceeding the “red” standard performance upper-control-limit-line. CAIDI performance is currently above the 12-month benchmark and standard performance levels. The Commission expects more management attention to address the inconsistent performance and sustain the trend line below the “green” benchmark performance upper-control-limit-line. Improved response times and shortened repair times may well prove essential to maintaining CAIDI at or below the benchmark level. It is suggested that management focus upon improving these aspects of Penn Power’s operations.

Penn Power’s SAIFI performance for 2024 continued its benchmark performance from 2023 and finished at a level below the benchmark upper control limit line. FE PA management should continue to focus attention to ensure consistent SAIFI performance is sustained thus ensuring the trend line remains below the “green” benchmark performance upper-control-limit-line.

Outage Causes

Figure 42 below shows the top five outage cause categories in 2024, as a percentage, for the following three distinct performance metrics: CMI, Customers Affected, and Number of Incidents. Trees OROW, and Line Failure were the leading cause of CMI and customers affected. Over 56.2% of CMI was caused by Trees OROW and Trees OROW-Limb.

Figure 43 below shows the historical trend of the top three outage causes. Trees, Animal, and Line Failure were the three most frequent causes of power outages for Penn Power. Most EDCs have equipment failure and trees as the two most frequent outage causes. Penn Power should examine its animal guarding and protections to reduce outages caused by animals and birds.

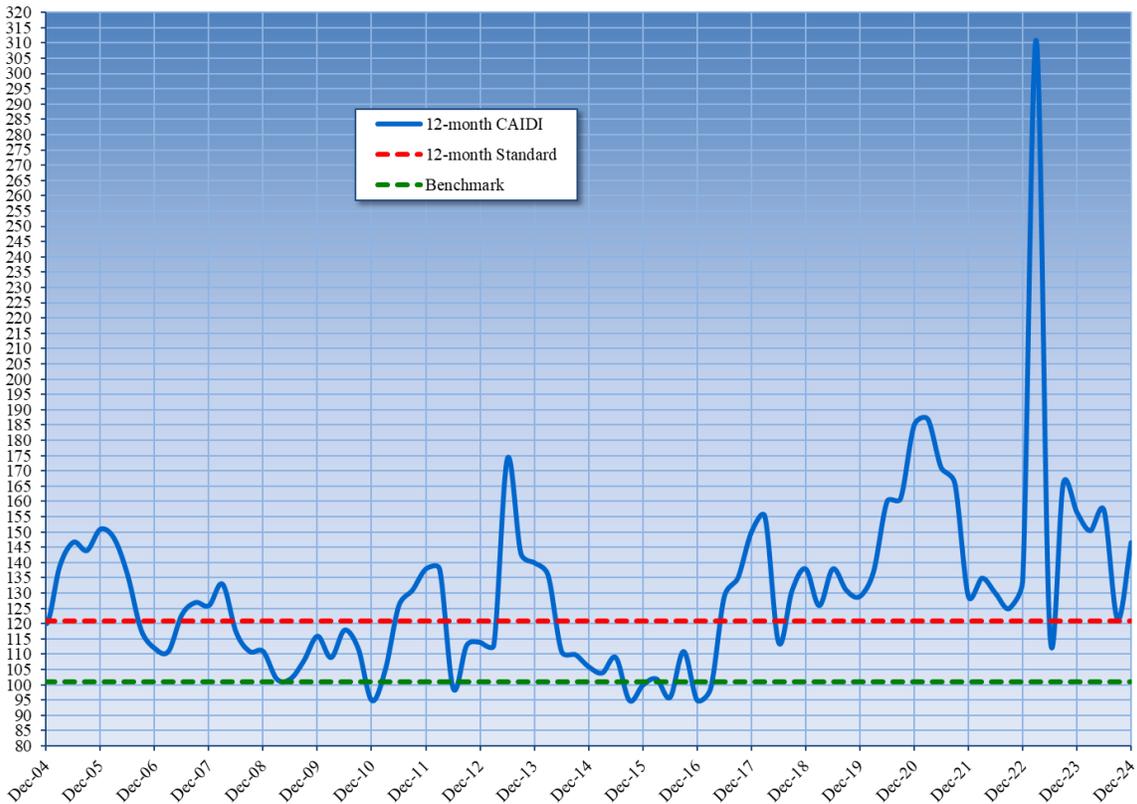
Conclusion

Trees OROW and Line Failure are the top two outage causes that substantially negatively affect electrical reliability to Penn Power customers in terms of CMI and total customers impacted.

Beginning in 2004, Penn Power’s CAIDI and SAIDI benchmark performance has been inconsistent. FE PA through its third LTIP will need to address the inconsistent CAIDI performance to reduce outage lengths and SAIDI performance to sustain the trend line below the “green” benchmark performance upper-control-limit-line. The Commission recommends continued and increased efforts in vegetation management and emphasis on response times.

The Commission recognizes that, overall, Penn Power’s reliability performance struggles most with the duration of outages. While fewer customers are being interrupted annually, customers are out of service longer and possibly more frequently. As can be seen in Figure 44 below, the number of Penn Power’s customers interrupted annually is trending downward. However, as shown in Figure 45 below, CMI is still higher than it was in 2015. With the recent exception of 2023, Figure 46 indicates an overall and steady increase in actual interruption events from 2015 through 2024.

Figure 40 – Penn Power CAIDI (minutes)



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Figure 41 – Penn Power SAIFI (interruptions per customer)

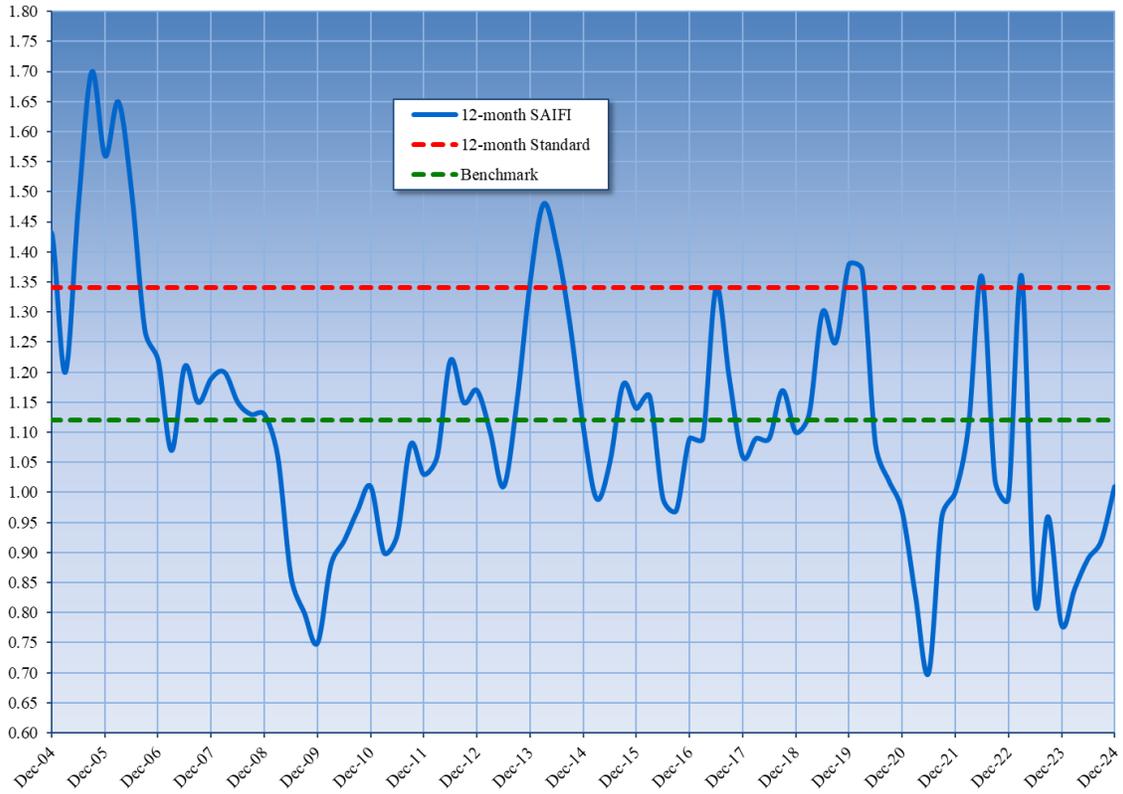


Figure 42 – Penn Power Outage Causes (percent of total outages)

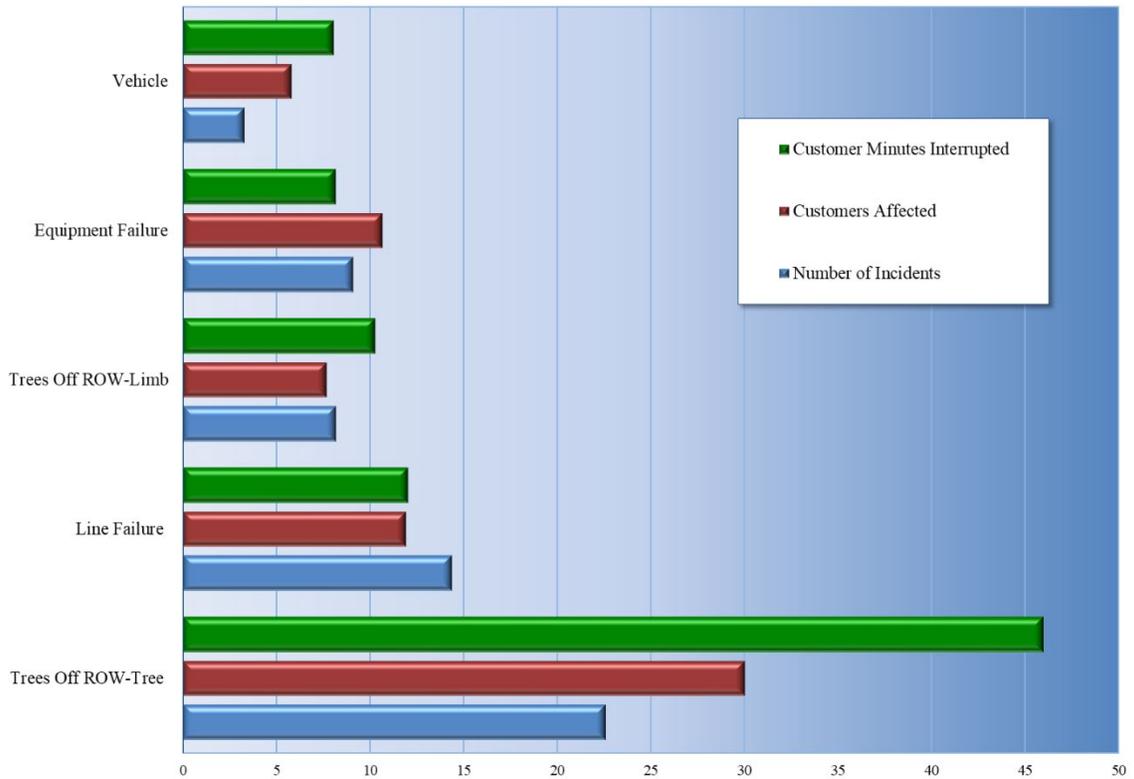


Figure 43 – Penn Power Outage Tracking (number of incidents)

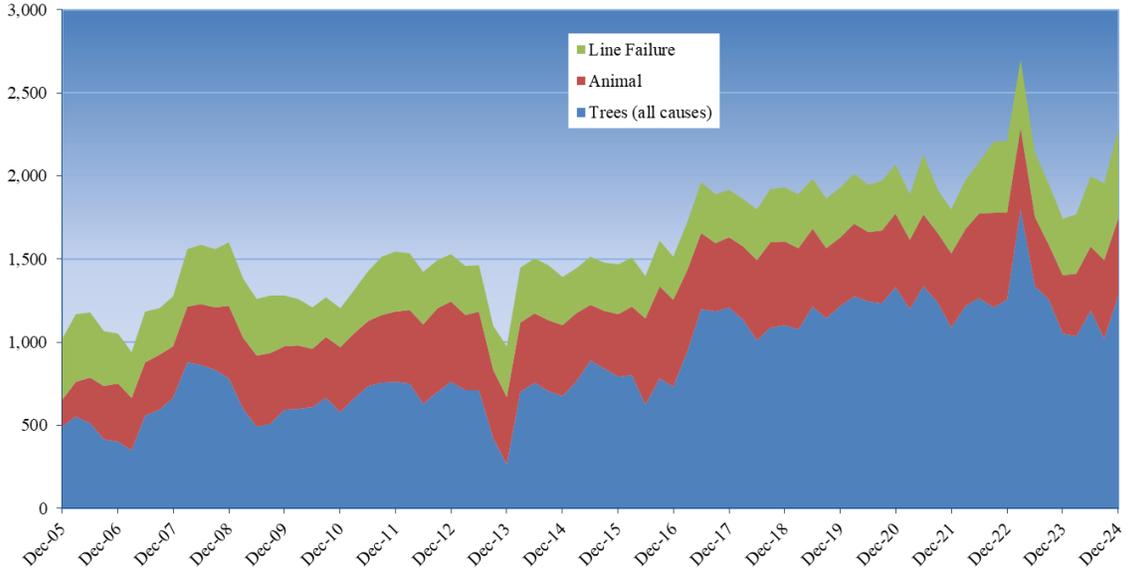


Figure 44 – Penn Power Outage Tracking (number of Customers Interrupted)

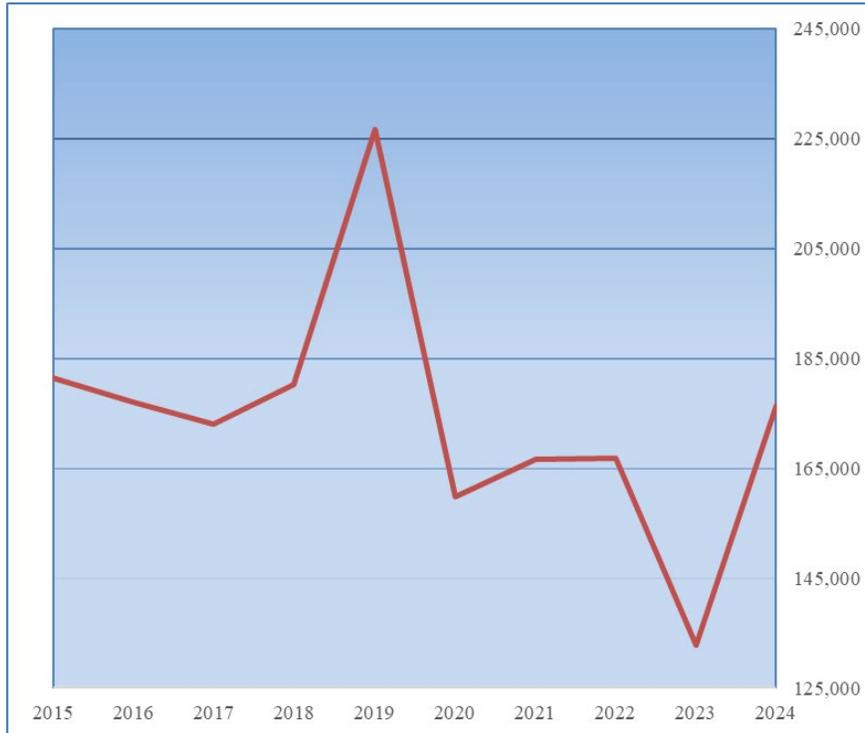
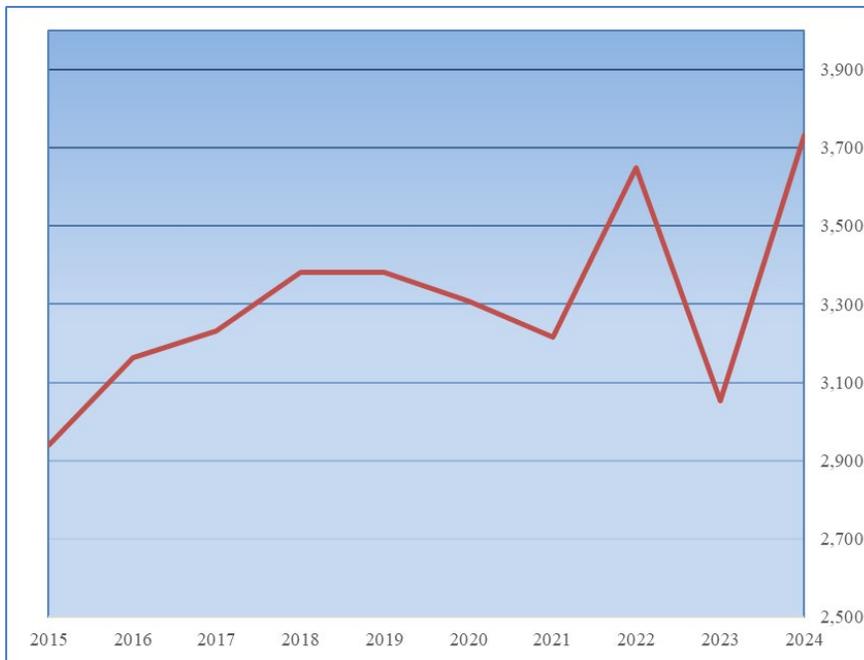


Figure 45 – Penn Power Outage Tracking (Customer-Minutes of Interruptions CMI)



Figure 46 – Penn Power Outage Tracking (number of interruptions annually)



West Penn Power Company

West Penn Power Company (West Penn) has a service territory of about 10,400 square miles and serves about 727,426 customers.

In 2024, West Penn experienced 930,429 customer interruptions and 185.9 million CMI as compared to: 779,396 customer interruptions and 207.5 million CMI in 2023; 957,562 customer interruptions and 264.3 million CMI in 2022; 910,590 customer interruptions and 174.5 million CMI in 2021; and 806,924 customer interruptions and 173.9 million CMI in 2020.

West Penn experienced no Major Events in 2024.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

- Rolling 12-month:** Decreased from 266 minutes in 2023 to 200 minutes in 2024; failed to achieve benchmark by 17.5%.
- 3-year average:** Increased from 245 minutes in 2023 to 247 minutes in 2024; failed to achieve standard by 32.2%.

SAIDI

- Rolling 12-month:** Decreased from 285 minutes in 2023 to 255 minutes in 2024; failed to achieve benchmark by 42.7%.
- 3-year average:** Increased from 297 minutes in 2023 to 301 minutes in 2024; failed to achieve standard by 38.9%.

SAIFI

- Rolling 12-month:** Increased from 1.07 outages in 2023 to 1.28 outages in 2024; failed to achieve benchmark by 21.9%.
- 3-year average:** Remained the same at 1.22 outages in 2024; failed to achieve standard by 5.5%.

CAIDI and SAIFI Performance

Historical rolling 12-month CAIDI and SAIFI benchmark reliability performance trends are shown in Figures 75 and 76 below. West Penn's CAIDI performance has historically been erratic. However, from 2014 through part of 2019, CAIDI had been positively below the "green" benchmark performance upper-control-limit-line. Beginning in March 2020, West Penn's rolling 12-month CAIDI increased above the benchmark upper-control-limit-line and 10 minutes above the standard. In 2021, West Penn's CAIDI returned to below the rolling 12-month standard, but still above benchmark. Beginning early 2022, and continuing through the remainder of 2023, CAIDI increased to an unacceptable level of 266 minutes. West Penn's CAIDI in 2024 achieved the standard, but did not achieve benchmark. FE PA management attention is required to return West Penn to the positive CAIDI trend it has previously exhibited between 2014 and 2019. Improved response times and shortened repair times may well prove essential to maintaining CAIDI at or below the benchmark level. The Commission recognizes that with the introduction

of more system automation the CAIDI index becomes more representative of actual customer interruption duration.

Beginning in 2004, West Penn's SAIFI performance trend has been erratic. From 2017 through 2020, West Penn's SAIFI performance had been moving toward benchmark level. West Penn's SAIFI did show improvement in 2023, but FE PA needs to apply a significant effort to ensure SAIFI performance at or below the benchmark level, as evidenced by West Penn's rolling 12-month 2024 SAIFI, which did not achieve standard performance.

Outage Causes

Figure 77 below shows the top five reported outage cause categories for 2024, as a percentage, for the following three distinct performance metrics: CMI, Customers Affected, and Number of Incidents. Trees OROW and Unknown were the leading causes of CMI. About 50% of CMI is caused by Trees OROW. Such a high number of outages and CMI attributed to Unknown is troubling as this does not help West Penn to understand the cause behind an event and where to target reliability and resiliency investments. West Penn management should target reducing the number of outages and events attributed to the Unknown category.

Figure 78 below shows historical trends of the top three main outage causes. Trees and Equipment Failure are the two most impactful outage causes that are significantly negatively affecting West Penn's distribution system reliability and resilience, as well as most every EDC in Pennsylvania.

Conclusion

West Penn's SAIFI and SAIDI performance continue to need much more management effort to establish a trend line heading downward to a point below the "green" benchmark performance upper-control-limit-line. It is recommended that West Penn utilize increased efforts in vegetation management and on improving outage response times. West Penn would do well to maximize their third LTIIP efforts to increase storm hardening and increase automatic sectionalizing.

As can be seen in Figures 79 through 81, West Penn exhibited some improvement in CMI, but experienced setbacks in number of customers impacted by outages and in the number of interruption events.

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Figure 75 – West Penn CAIDI (minutes)

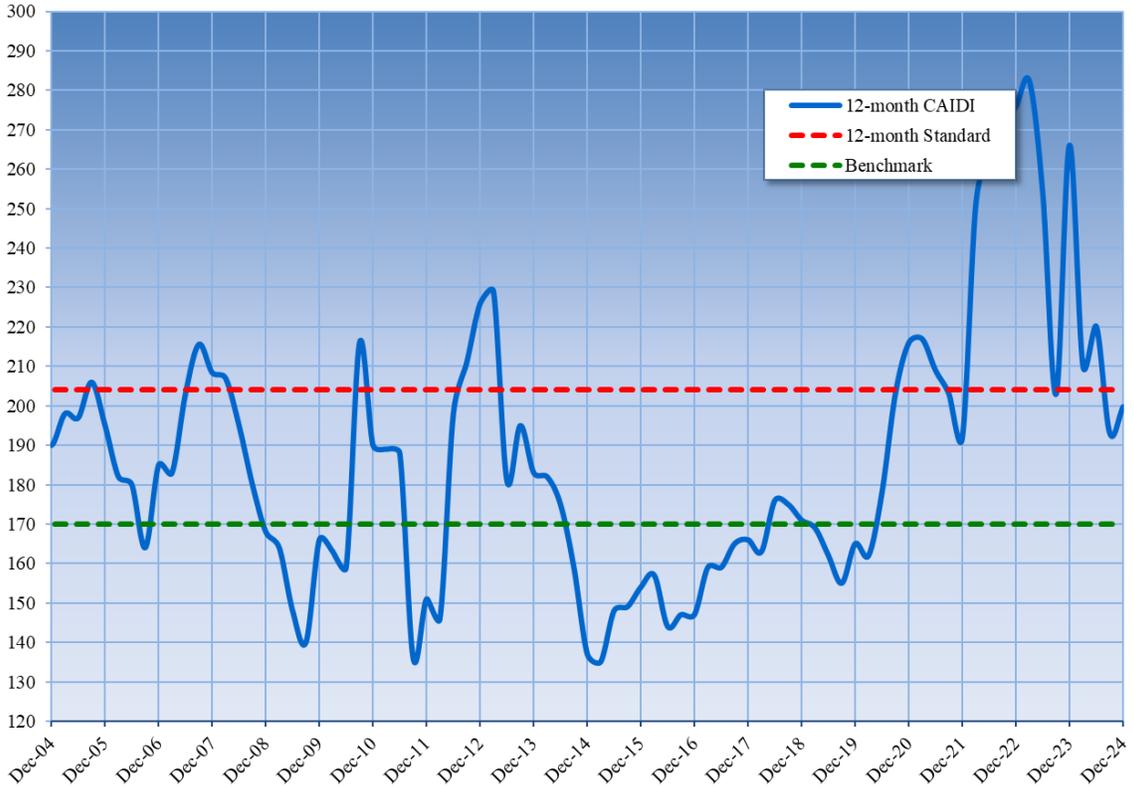
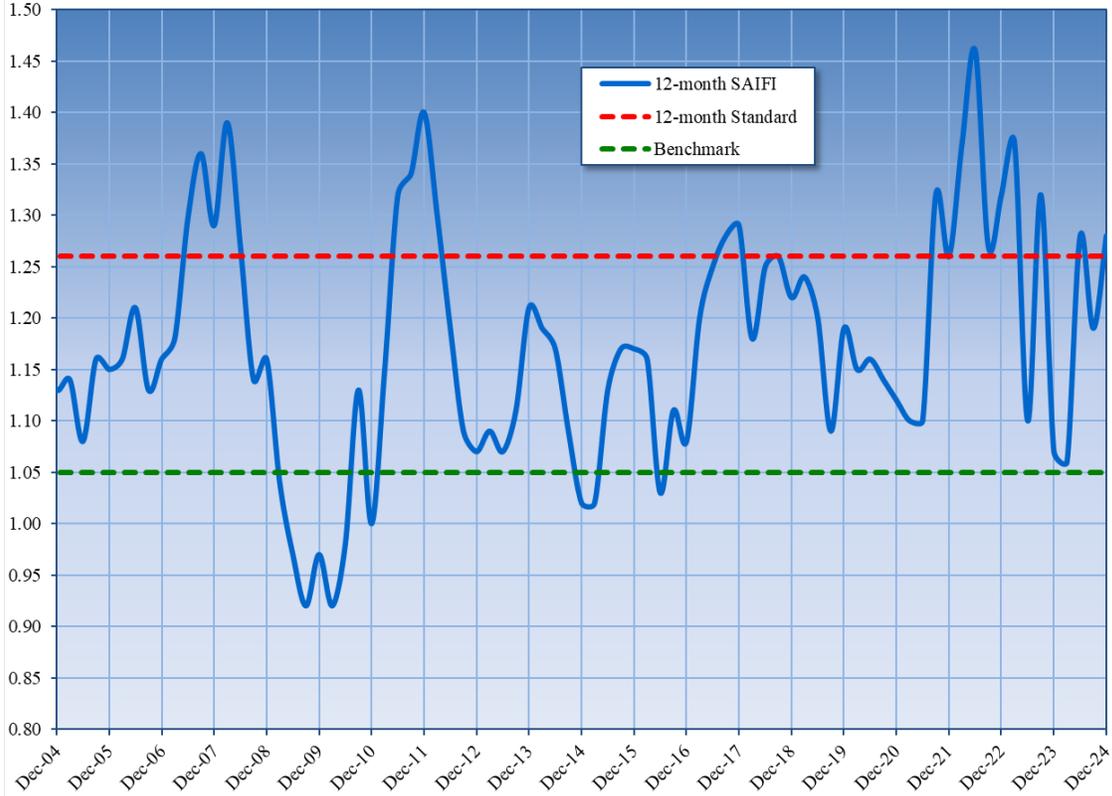


Figure 76 – West Penn SAIFI (interruptions per customer)



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Figure 77 – West Penn Outage Causes (percent of total outages)

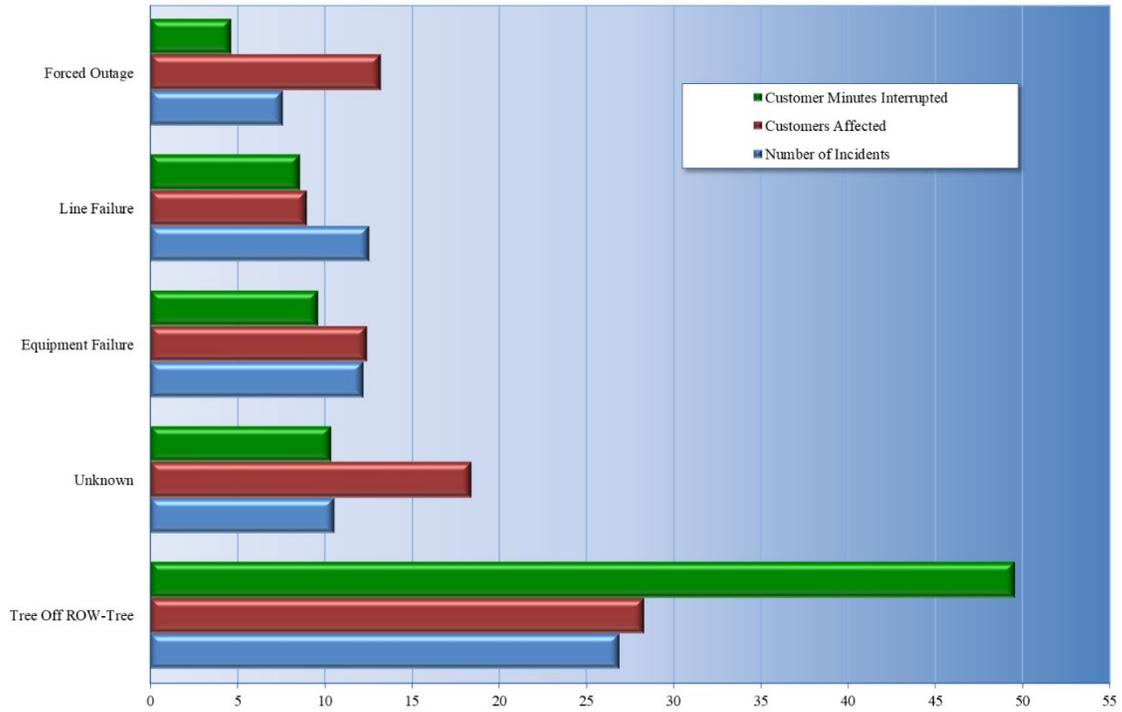


Figure 78 – West Penn Outage Tracking (number of incidents)

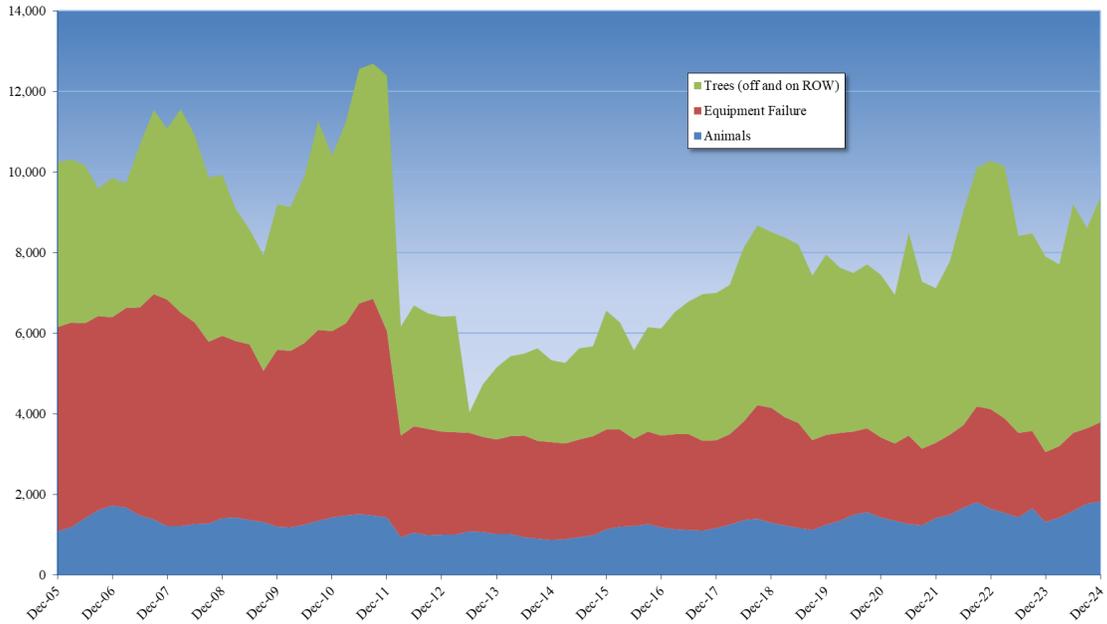


Figure 79 – West Penn Outage Tracking (number of Customers Interrupted)

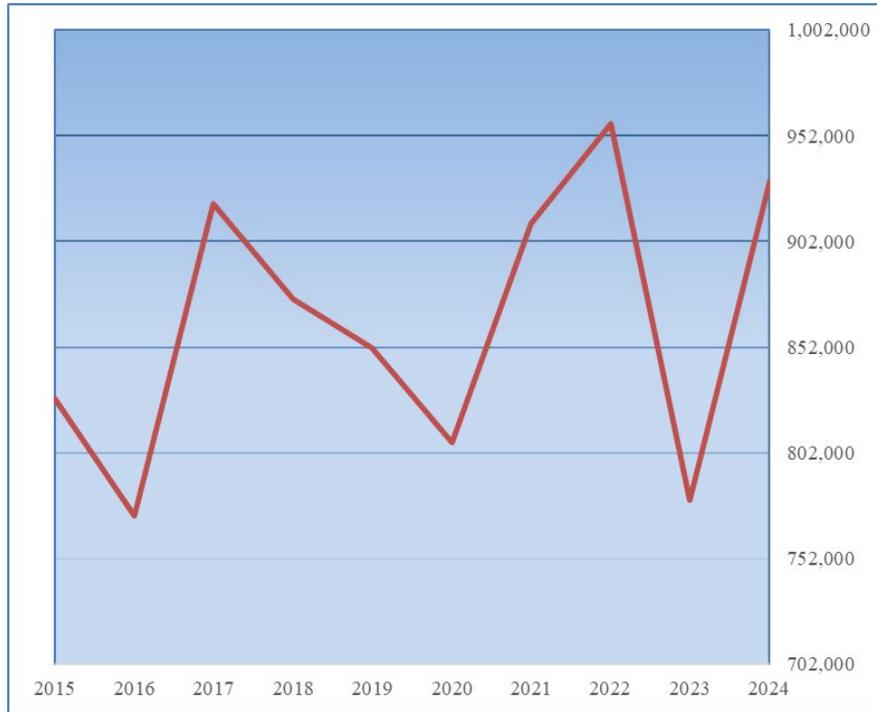
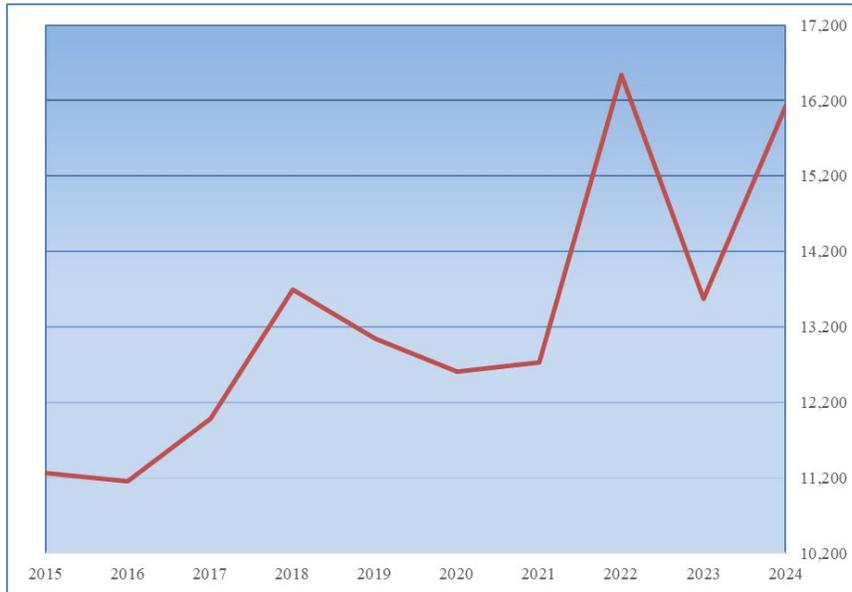


Figure 80 – West Penn Outage Tracking (Customer-Minutes of Interruptions CMI)



Figure 81 – West Penn Outage Tracking (number of interruptions annually)



PECO Energy Company

PECO Energy Company (PECO) has a service territory of about 2,000 square miles that serves a well-developed distribution system serving about 1.67 million customers.

In 2024, PECO experienced 1.3 million customer interruptions and 125 million CMI as compared to 1.3 million customer interruptions and 174 million CMI in 2023; 1.2 million customer interruptions and 119 million CMI in 2022; 1.48 million customer interruptions and 275 million CMI in 2021; and 1.51 million customer interruptions and 203 million CMI in 2020.

PECO experienced two Major Events in 2024. The Major Events impacted 365,606 customers, which is not reflected in the totals above.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Decreased from 138 minutes in 2023 to 96 minutes in 2024; achieved benchmark by 14.3%.

3-year average: Decreased from 141 minutes in 2023 to 111 minutes in 2024; achieved standard by 9.8%.

SAIDI

Rolling 12-month: Decreased from 103 minutes in 2023 to 75 minutes in 2024; achieved benchmark by 45.7%.

3-year average: Decreased from 113 minutes in 2023 to 83 minutes in 2024; achieved standard by 50.3%.

SAIFI

Rolling 12-month: Increased from 0.74 outages in 2023 to 0.78 outages in 2024; achieved benchmark by 36.6%.

3-year average: Decreased from 0.78 outages in 2023 to 0.74 outages in 2024; achieved standard by 44.9%.

CAIDI and SAIFI Performance

Historical rolling 12-month CAIDI and SAIFI benchmark reliability performance trends are shown in Figures 26 and 27 below. PECO reported a MAIFI of 0.90 for 2024. PECO's CAIDI performance has been inconsistent beginning in December 2018. PECO achieved benchmark performance for CAIDI in 2024, but failed to achieve benchmark and standard in 2019, 2021, and 2023. Management should continue to work on improving PECO's CAIDI performance in 2025 to achieve consistent performance levels. As noted in the Executive Summary of this report, skilled staffing levels and response times should be examined for areas to improve CAIDI, among other actions such as improved vegetation management.

Beginning in December 2012, PECO's SAIFI benchmark performance trend has been positive, as shown below on Figure 27. This positive performance trend, below the benchmark performance upper-control-limit-line, has been consistently achieved by PECO, and is considered under control. PECO is considered an excellent SAIFI benchmark performer.

Outage Causes

Figure 28 below shows the reported 2024 outage-cause categories, as a percentage, for the following three distinct performance metrics: CMI, Customers Affected, and Number of Incidents. Vegetation-Broken/Uprooted was the top cause of CMI, number of incidents, and customers affected.

Figure 29 below shows historical trends of the top three main outage causes. Equipment failure and Vegetation (all categories) are the two most frequent outage causes that are significantly and negatively affecting PECO's distribution system reliability and resilience, as well as nearly every EDC in Pennsylvania.

General Reliability

PECO noted that it ensures reliable electric service through a comprehensive approach involving a transmission and distribution system designed and built to standards. PECO stated that it deploys an all-encompassing equipment and vegetation maintenance program across the entire territory. PECO noted that it continues to execute its second LTIIP, which runs through 2025, in addition to other additional capital investments in order to construct reliability-related improvements.

PECO noted that when a storm or other emergency arises, an appropriate emergency response team is assembled via cell phone, email, and Microsoft Teams notification. The trained team performs per the specifications of a thorough, documented, tested emergency response procedure, quickly escalating the magnitude of the response when required, and communicating with the public and government agencies. PECO noted that, if necessary, pre-established agreements with local contractors and neighboring utilities are exercised to augment PECO Energy's workforce. PECO also stated that access to further supplemental resources has been maintained with the North Atlantic Mutual Assistance Group and the Bureau of Safety and Environmental Enforcement (BSEE).

PECO stated that outages due to equipment and trees are being addressed through PECO's LTIP and other reliability programs. PECO explained that equipment is replaced based on observed trends under reliability programs and obsolescence. PECO noted that most customer interruptions caused by trees came from broken branches and tree trunks or uprooted trees (37.9% of all customer interruptions), as opposed to ingrowth (5.0% of all outage customer interruptions). PECO noted that it continues to address ash tree failures caused by emerald ash borers (invasive insects that cause ash tree deaths) with a vegetation management program to mitigate the threat to its facilities and customer reliability.

In addition, PECO noted that it has observed an increase in dead and declining ash trees near its electrical facilities. Emerald ash borers are known to be concentrated in the eastern United States and have infested areas across the PECO territory. PECO stated that limb and tree failures caused by emerald ash borers are expected to continue through much of this decade. PECO stated that its execution of enhanced vegetation maintenance on circuit segments identified through annual reliability performance assessments mitigates risks to facilities and customer reliability.

Conclusion

PECO's CAIDI performance improved in 2024, but management attention is needed to ensure consistent CAIDI results. PECO has sustained SAIFI benchmark performance and is considered an excellent SAIFI benchmark performer. TUS finds that PECO, like many of the Pennsylvania EDCs, should re-examine and potentially increase efforts to manage vegetation and review staffing and response times to ensure CAIDI issues are addressed.

The Commission recognizes that, overall, PECO's service to its customers is improving and currently registers as one of the best efforts by an EDC in Pennsylvania. PECO's improvement and current efforts can be witnessed by the data shown below.

As can be seen in Figure 30 below, the number of PECO customers interrupted annually is generally trending downward. As shown in Figure 31 below, CMI is also trending downward, despite the uptick in 2023, and has improved over the past four years. Figure 32 below shows a general positive trend in actual interruption events since 2019, even with the uptick in 2024. The Commission recognizes this as a positive achievement and recommends that PECO's efforts continue.

2024 Pennsylvania Electric Reliability Report

Figure 26 – PECO CAIDI (minutes)

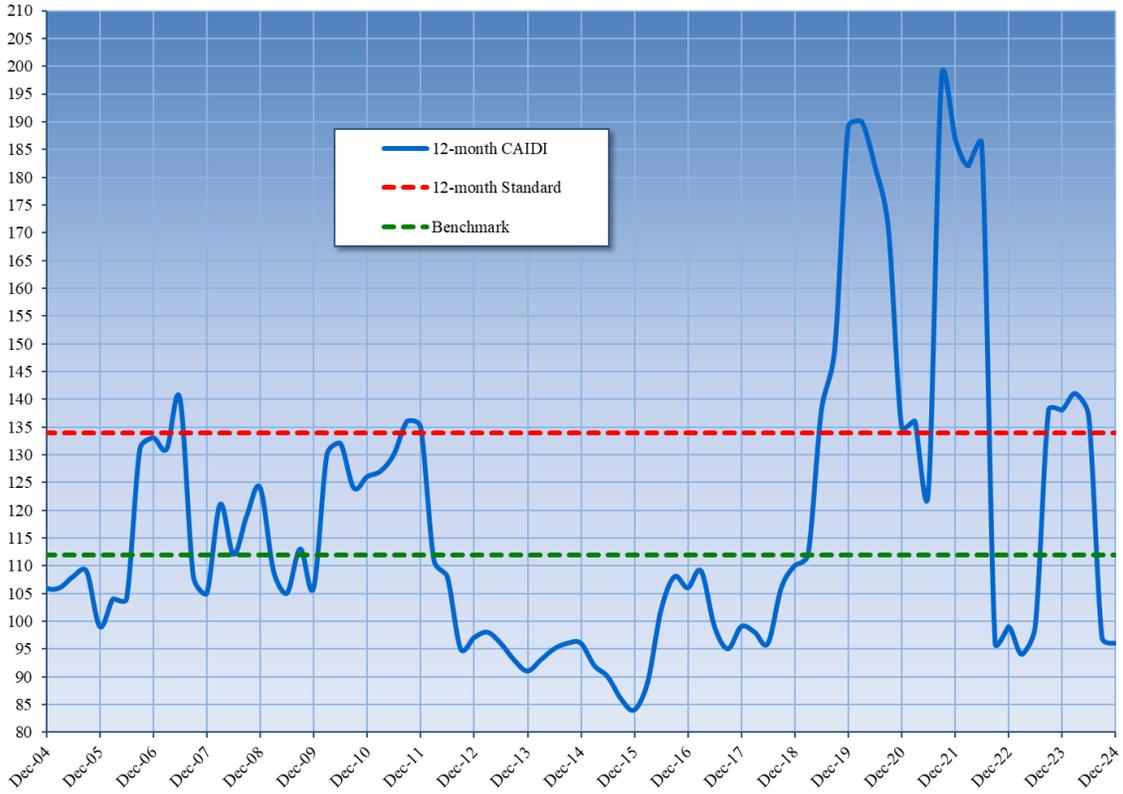


Figure 27 – PECO SAIFI (interruptions per customer)

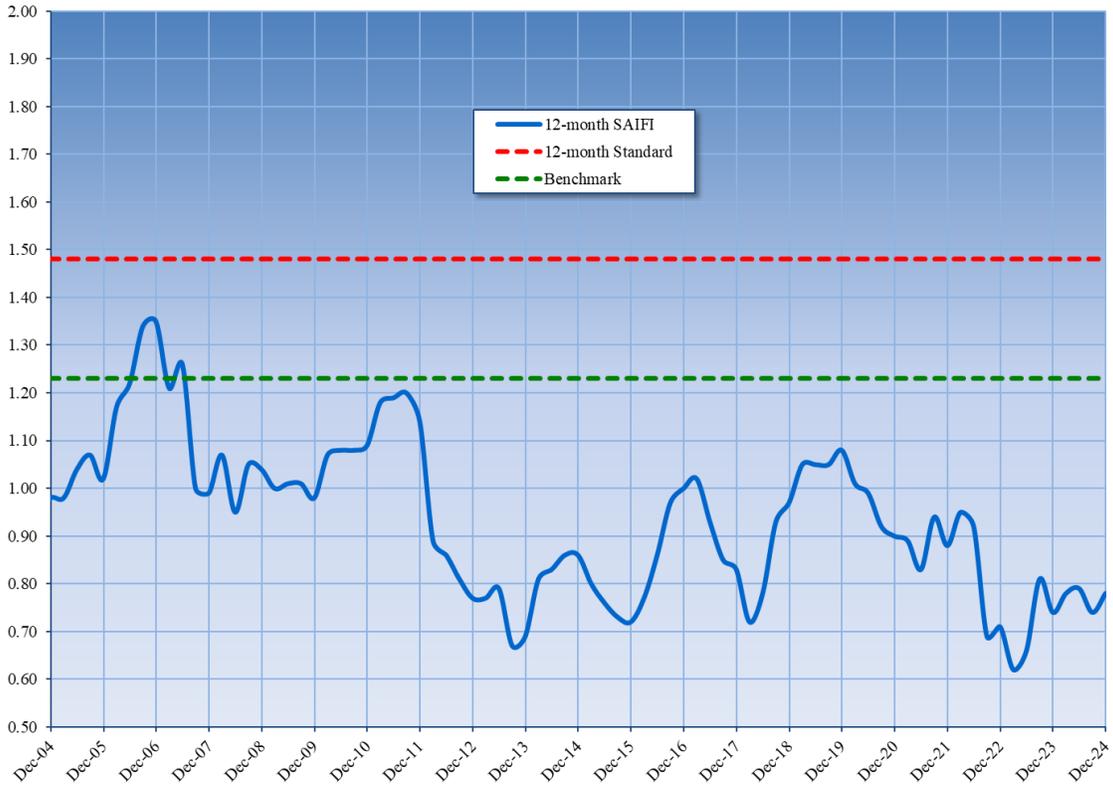


Figure 28 – PECO Outage Causes (percent of total outages)

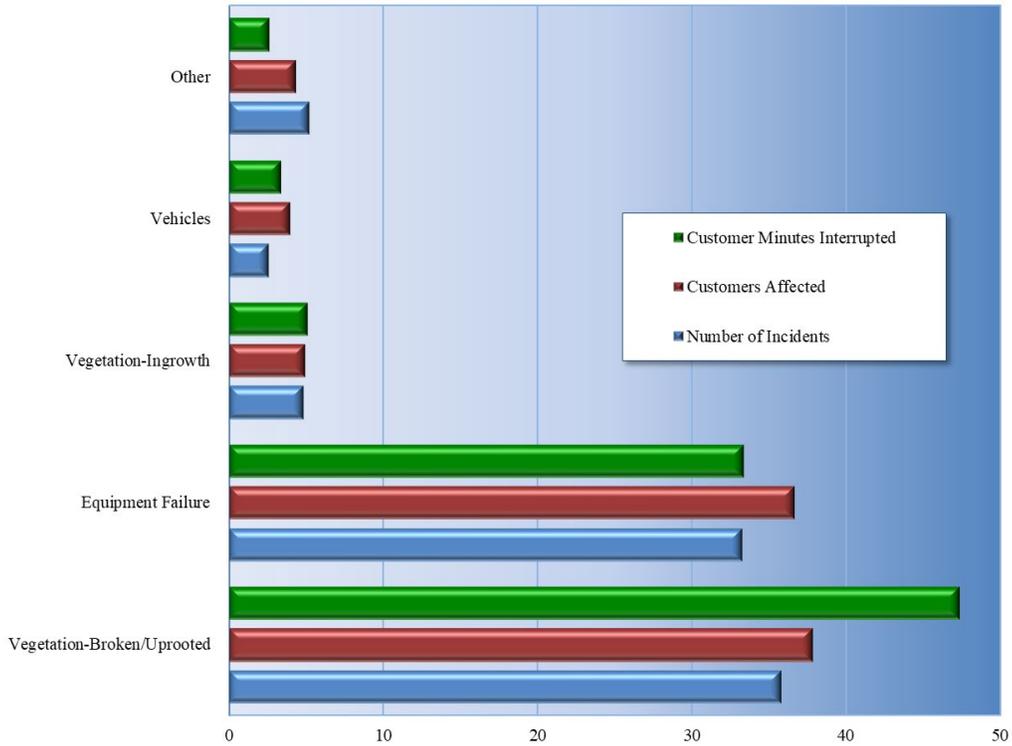


Figure 29 – PECO Outage Tracking (number of incidents)

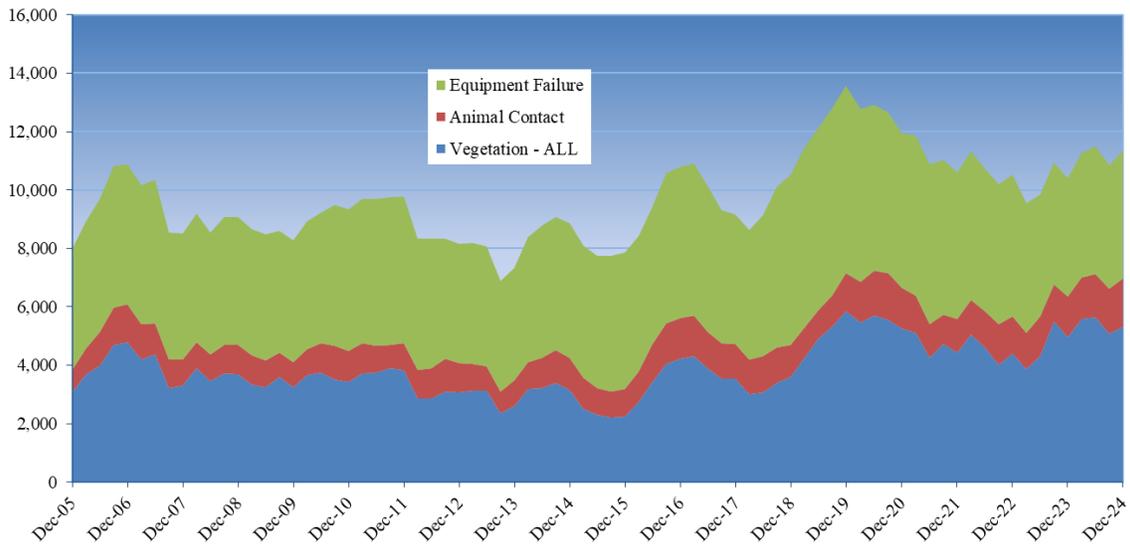


Figure 30 – PECO Outage Tracking (number of Customers Interrupted)

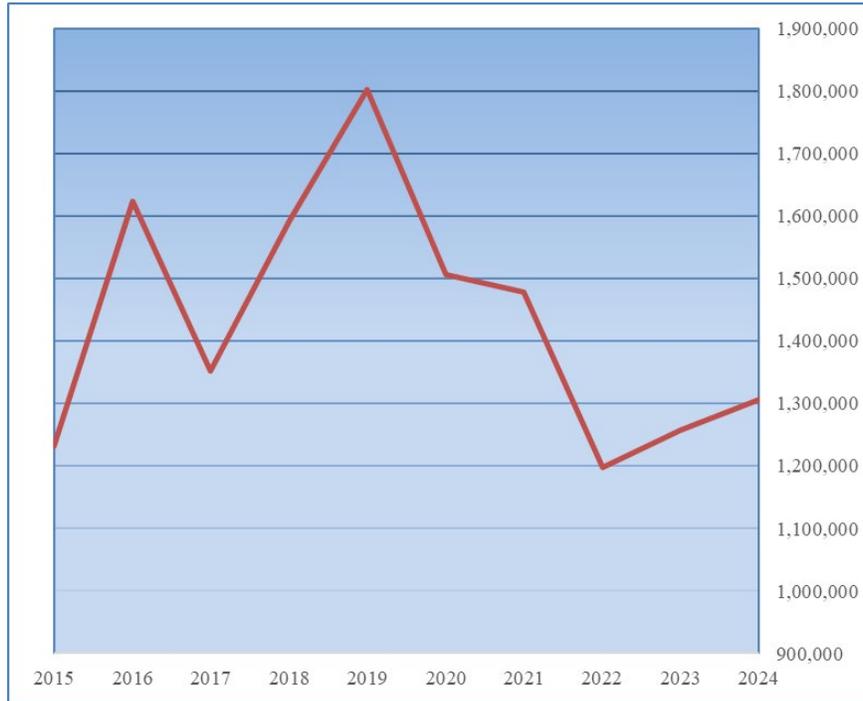


Figure 31 – PECO Outage Tracking (Customer-Minutes of Interruptions, or CMI)

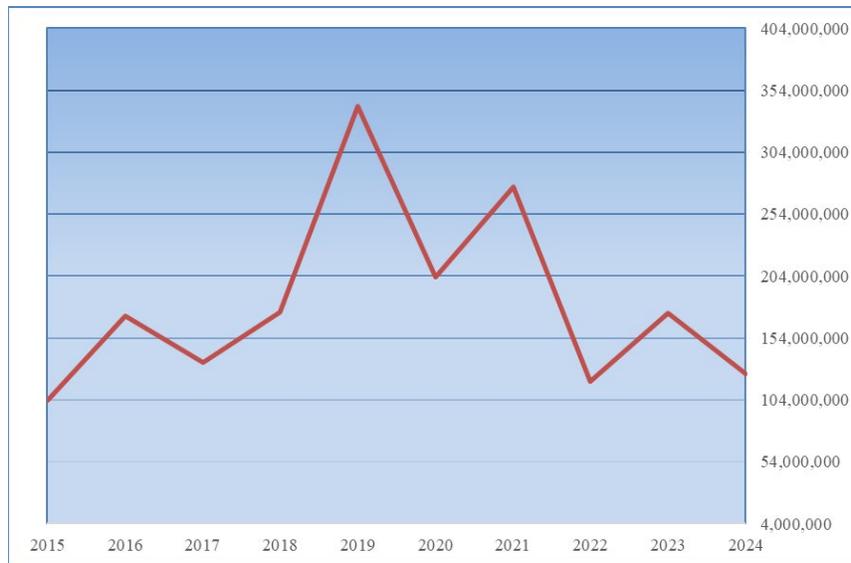
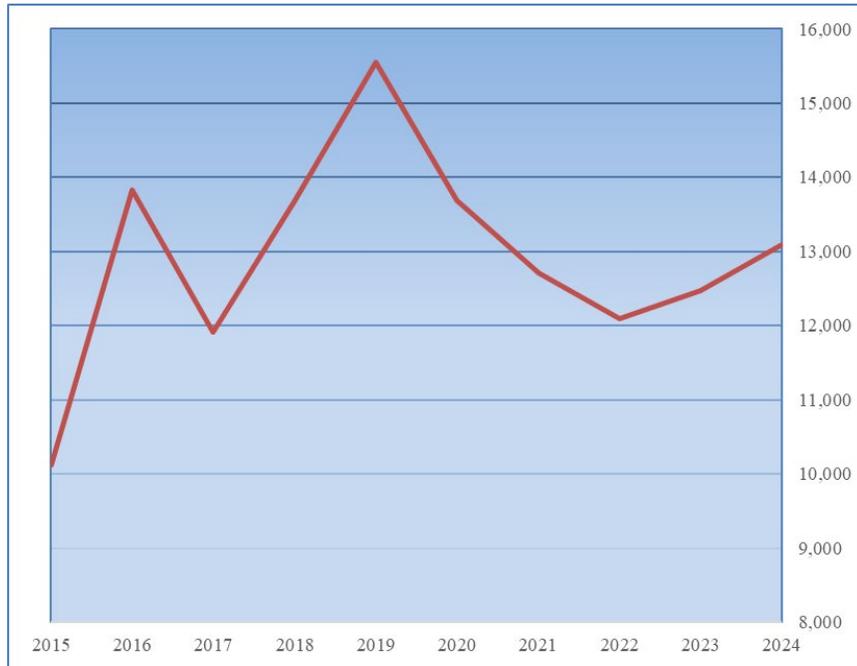


Figure 32 – PECO Outage Tracking (number of interruptions annually)



Pike County Light & Power Company

Pike County Light & Power Company (Pike) has a relatively small operating service area of approximately 44 square miles with about 5,318 customers. The Pike service territory is primarily fed from two 34.5 kV feeders that originate from Orange and Rockland Utilities (ORU). The Borough of Matamoras is served by two 13.2 kV feeders from a substation with backup tie capability to distribution circuitry from ORU. The substation is normally fed by a 34.5 kV feed from ORU circuit 116-2-34, with backup service being provided by ORU 34.5 kV circuit 116-434 through an automatic transfer scheme at the substation. The western portion of the Pike service territory is supplied by a radial feed from the ORU circuit 116-4-34.

In 2024, Pike experienced 4,490 customer interruptions and 826,239 CMI as compared to: 4,584 customer interruptions and 437,709 CMI in 2023; 2,646 customer interruptions and 420,975 CMI in 2022; 6,890 customer interruptions and 1,058,853 CMI in 2021; and 2,356 customer interruptions and 432,428 CMI in 2020.

Pike experienced four Major Events in 2024. The Major Events impacted 7,335 customers, which is not reflected in the totals above

CAIDI/SAIDI/SAIFI EVALUATION

CAIDI

Rolling 12-month: Increased from 95 minutes in 2023 to 184 minutes in 2024; failed to achieve benchmark by 5.7%.

3-year average: Increased from 136 minutes in 2023 to 146 minutes in 2024, achieved standard by 24.0%.

SAIDI

Rolling 12-month: Increased from 82 minutes in 2023 to 155 minutes in 2024; failed to achieve benchmark by 46.2%.

3-year average: Decreased from 126 minutes in 2023 to 105 minutes in 2024; achieved standard by 18.3%.

SAIFI

Rolling 12-month: Decreased from 0.86 outages in 2023 to 0.84 outages in 2024; failed to achieve benchmark by 37.7%.

3-year average: Decreased from 0.92 outages in 2023 to 0.73 outages in 2024; failed to achieve standard by 9.5%.

CAIDI/SAIDI/SAIFI Performance

Historical rolling 12-month CAIDI and SAIFI benchmark reliability performance trends are shown in Figures 47 and 48 below. From 2004 through 2019, Pike’s CAIDI performance had been erratic and frequently above the “green” benchmark performance upper-control-limit-line and “red” 12-month standard. Pike’s CAIDI performance improved during late 2019 as it returned to benchmark levels, and from 2020 through 2024 it remained near or even below the benchmark. More management attention is needed to ensure consistent CAIDI performance is sustained below the “green” benchmark performance upper-control-limit-line. The Commission views CAIDI as an important indication of an EDC’s ability to respond to, repair and return to service customers that are experiencing an electric service outage.

Pike’s SAIFI performance trend has been overall positive during the years of 2015 through 2022. However, in 2023 and 2024, Pike’s SAIFI exceeded the 12-month standard. Significant management attention is needed to maintain SAIFI performance below the “green” benchmark performance upper-control-limit-line. The Commission generally views SAIFI performance as an indicator of an EDC’s system hardening and outage resistance. Coupled with the weather conditions experienced, it demonstrates the ability to withstand outages.

Outage Causes

Figure 49 below shows the top five reported outage cause categories in 2024, as a percentage, for the following three distinct performance metrics: CMI, Customers Affected, and Number of Incidents. Tree Contact and Equipment Failure created the greatest number of incidents. Loss of Feed and Tree Contact caused the most CMI. Approximately 46% of incidents are caused by Tree Contact. While Pike cannot necessarily control the loss of feed from ORU, Pike should review any possible solutions to minimize impacts from the loss of feed.

Figure 50 below shows the historical trend of the top three main outage causes. Tree Contact is the most frequent outage cause that is significantly negatively affecting Pike’s distribution system reliability and resilience, as well as most every EDC in Pennsylvania.

General Reliability

Pike noted that, historically, the majority of outages, customers affected, and customer-minutes of interruption are the result of vegetation contacts. As noted above, in 2024 “Loss of feed” caused the most CMI. Pike noted that, even though these outages affect a small number of Pike customers, the restoration is out of the control of Pike, and thus results in longer periods of restoration.

Pike noted that it has been effective in removing danger trees, but that, in recent years, external environmental factors such as the emerald ash borer have increased the risk associated with tree contact outages to Pike’s distribution system. Pike stated that it prioritizes and aggressively removes danger trees within utility ROW zones and works with individual customers and municipalities to remove those that exist OROW. Pike noted that it also works with Milford Borough’s and Matamoras Borough’s Shade Tree Commissions and PennDOT to address danger trees that represent a hazard to the public as well as the Pike’s electrical system located within and outside of ROW areas.

Specific to its outages caused by loss of feed, Pike noted that it has stepped up its communications with the impacted customers, keeping them informed of the conditions and expectations. In addition, Pike indicated that it communicates hourly during the outages with ORU for updated estimated restore times and status.

Conclusion

From 2019 through 2023, Pike had improved CAIDI performance. However, Pike did exceed the 12-month standard level for SAIFI in 2021, 2023, and 2024. It is expected that Pike will direct more management attention to SAIFI and maintain levels below the “green” benchmark performance upper-control-limit-line. Consistent management attention is needed in the future to sustain the CAIDI trend line below the “green” benchmark performance upper control-limit-line. The Commission recommends continued and increased efforts in vegetation management and use of LTIIP funding to improve system hardening and resiliency.

The Commission recognizes that, overall, Pike appears to have somewhat stabilized its reliability performance, as witnessed by the data shown above and below. Pike should continue to strive to achieve consistency in its reliability performance.

As can be seen in Figure 51 below, the number of Pike’s customers interrupted annually is on a very slight upward trend. As shown in Figures 52 and 53 below, CMI and actual interruption events spiked upward in 2024 but were generally maintaining their level up to 2023.

2024 Pennsylvania Electric Reliability Report

Figure 47 – Pike County CAIDI (minutes)

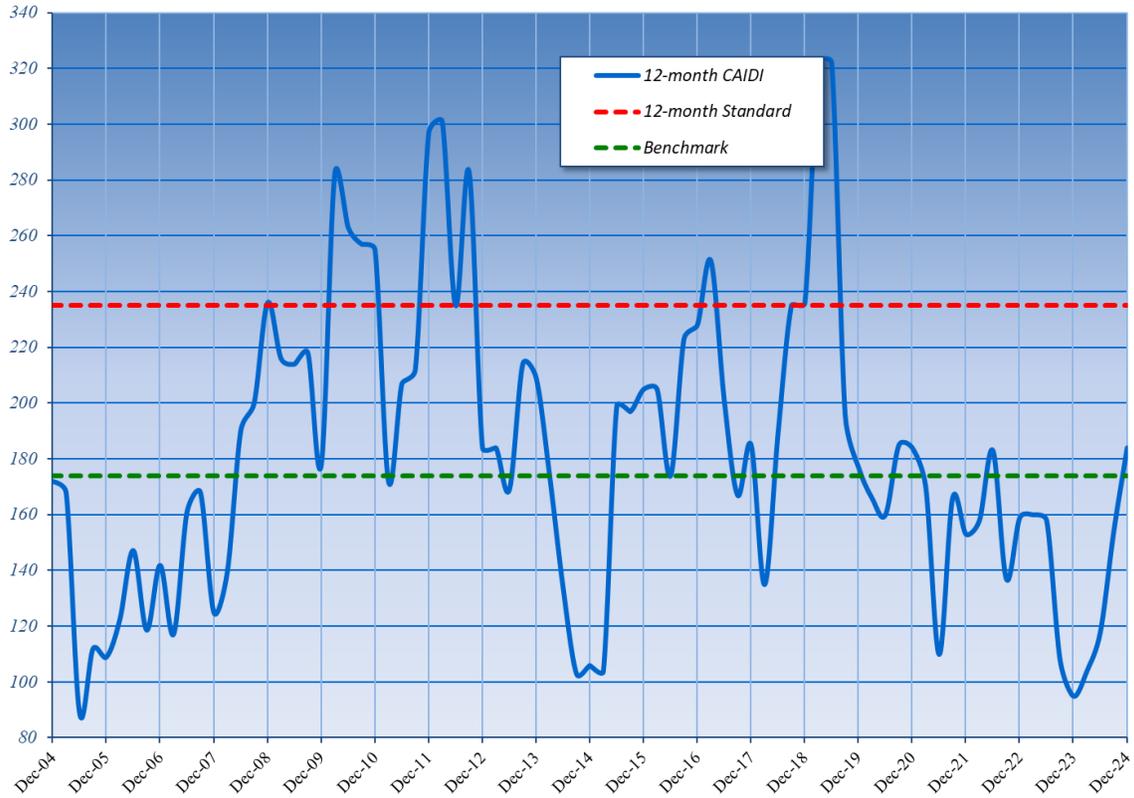


Figure 48 – Pike County SAIFI (interruptions per customer)

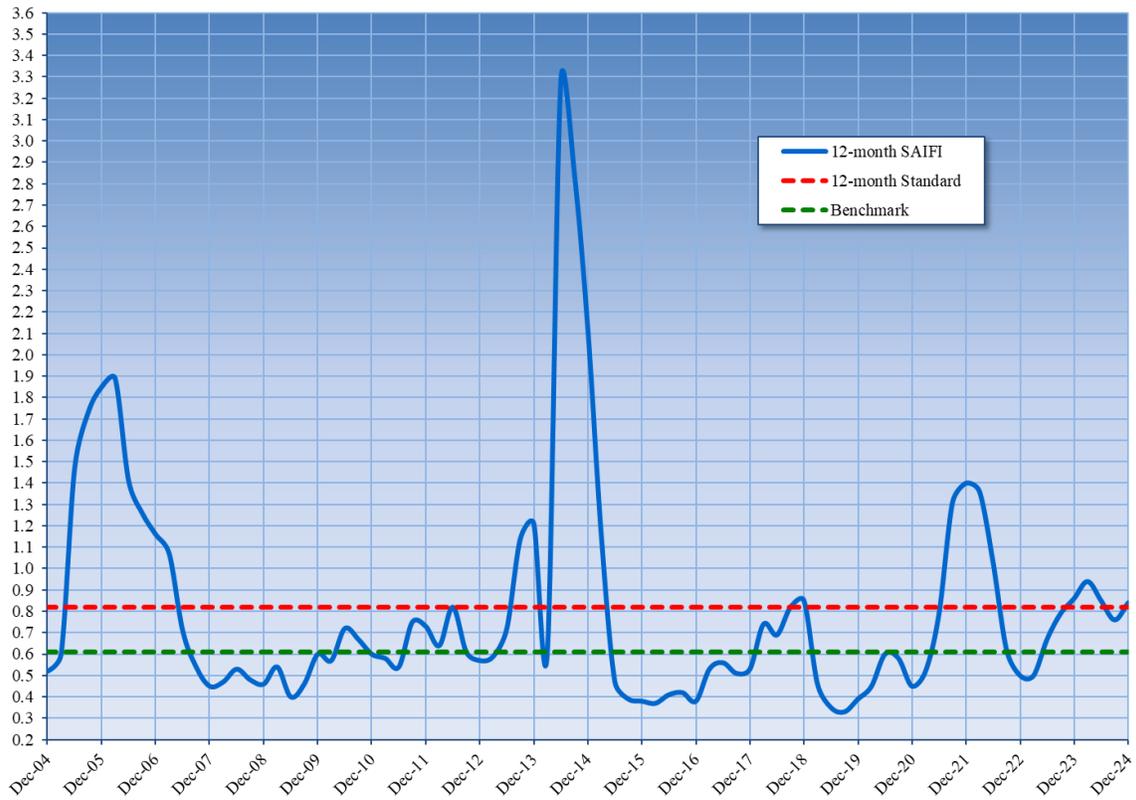


Figure 49 – Pike County Outage Causes (percent of total outages)

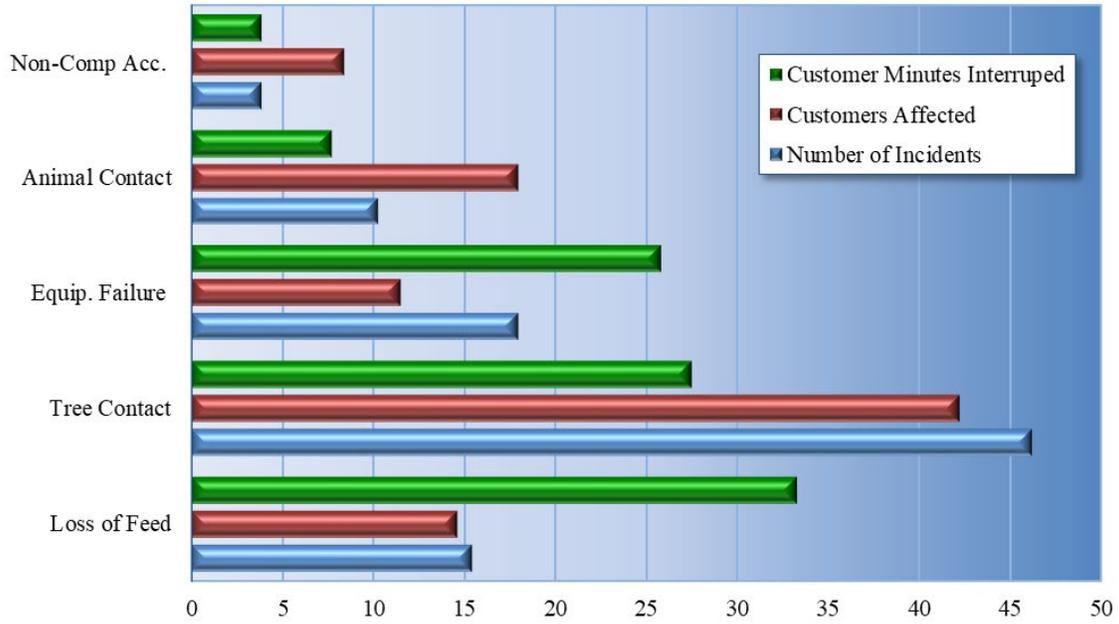


Figure 50 – Pike County Outage Tracking (number of incidents)

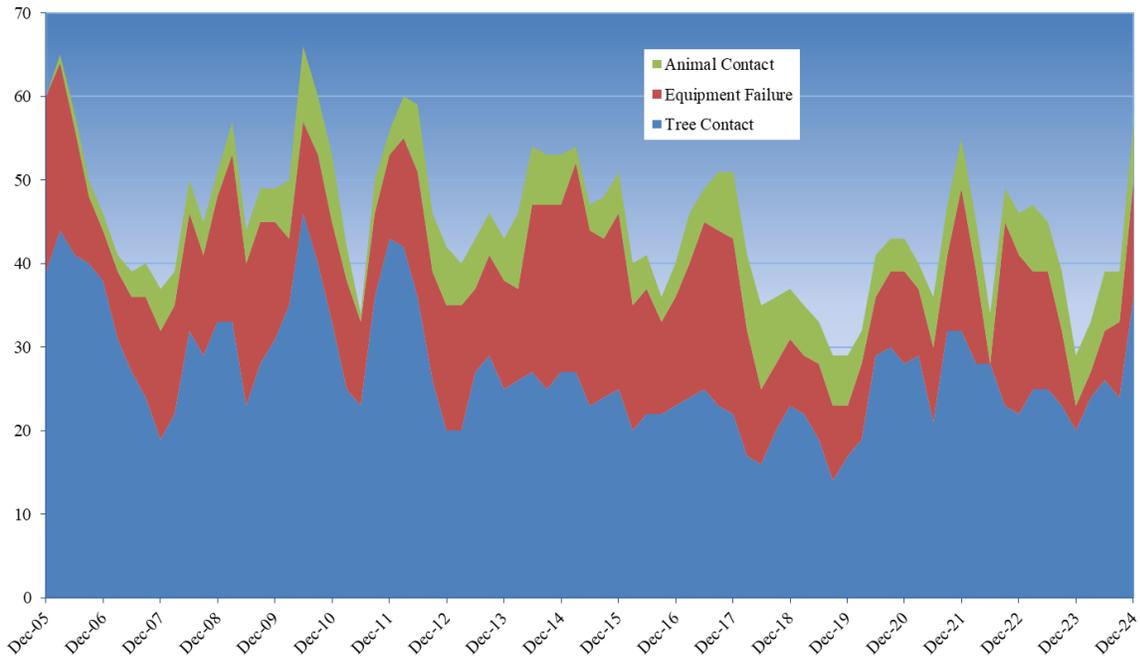


Figure 51 – Pike County Outage Tracking (number of Customers Interrupted)

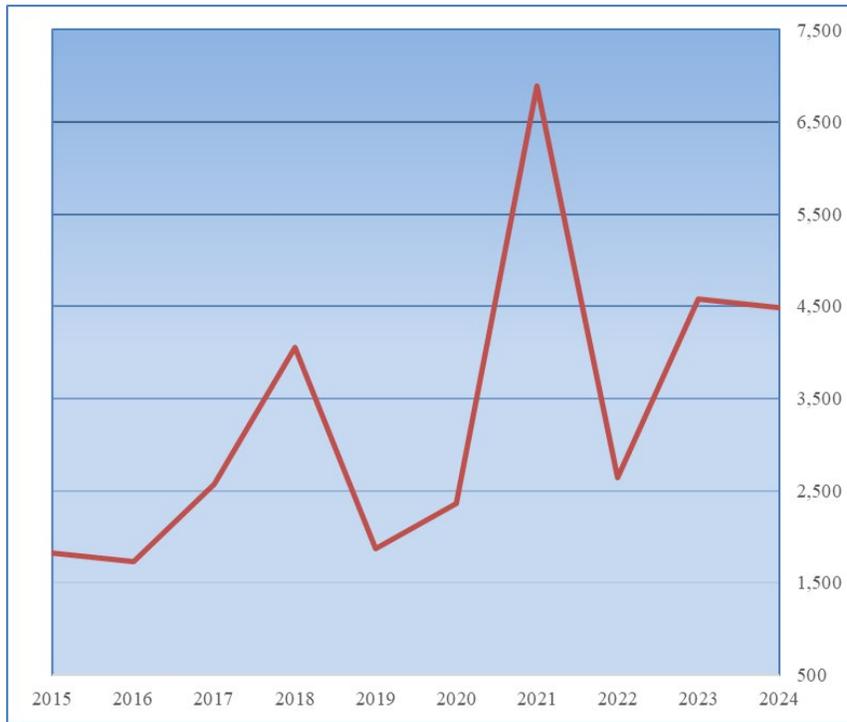


Figure 52 – Pike County Outage Tracking (Customer-Minutes of Interruptions CMI)

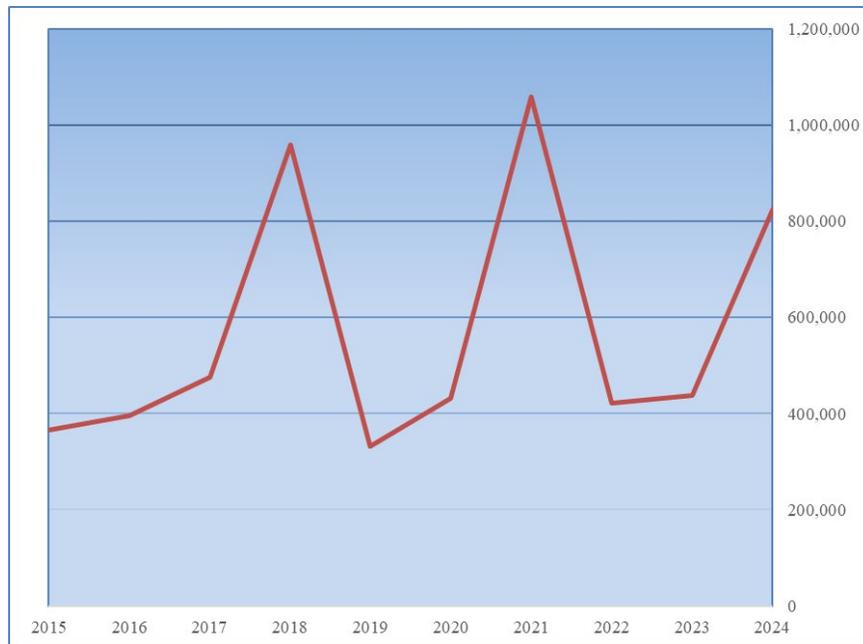
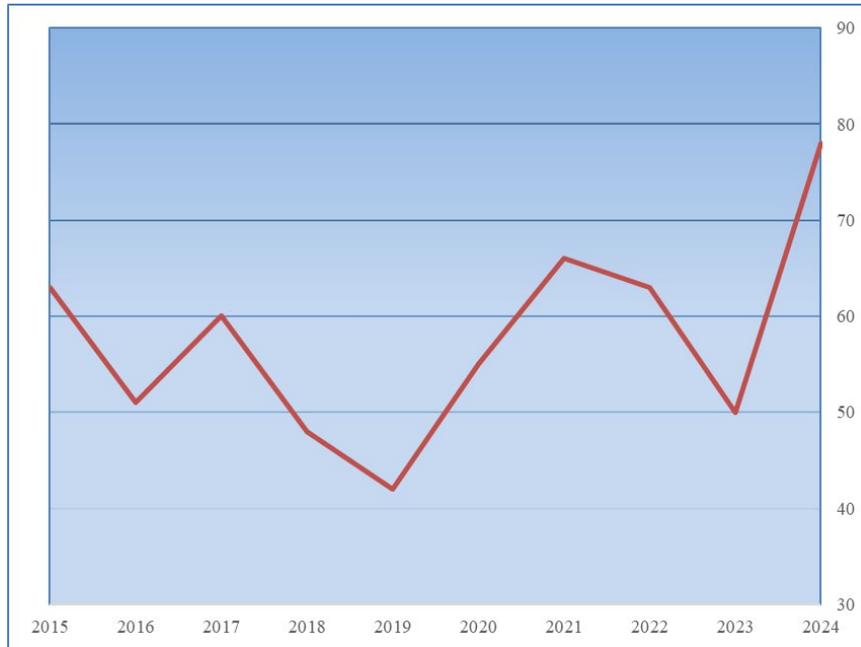


Figure 53 – Pike County Outage Tracking (number of interruptions annually)



PPL Electric Utilities Corporation

PPL Electric Utilities Corporation (PPL) has a service territory of about 10,000 square miles and serves approximately 1.47 million customers.

In 2024, PPL experienced 1.8 million customer interruptions and 663.8 million CMI as compared to: 1.1 million customer interruptions and 214.4 million CMI in 2023; 1.3 million customer interruptions and 206.4 million CMI in 2022; 1.2 million customers interruptions and 245.4 million CMI in 2021; and 1.2 million customers interruptions and 166.4 million customer-minutes in 2020.

PPL did not experience a Major Event in 2024.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Increased from 189 minutes in 2023 to 371 minutes in 2024; failed to achieve benchmark by 155.9%.

3-year average: Increased from 180 minutes in 2023 to 241 minutes in 2024; failed to achieve standard by 50.8%.

SAIDI

Rolling 12-month: Increased from 147 minutes in 2023 to 451 minutes in 2024; failed to achieve benchmark by 217.6%.

3-year average: Increased from 153 minutes in 2023 to 247 minutes in 2024; achieved standard by 43.4%.

SAIFI

Rolling 12-month: Increased from 0.78 outages in 2023 to 1.22 outages in 2024; failed to achieve benchmark by 24.5%.

3-year average: Increased from 0.85 outages in 2023 to 0.96 outages in 2024; achieved standard by 11.4%.

CAIDI and SAIFI Performance

Historical rolling 12-month CAIDI and SAIFI benchmark reliability performance trends are shown in Figures 54 and 55 below. PPL reported a MAIFI of 9.7 for 2024. Beginning in 2004, PPL had generally achieved standard and benchmark performance for CAIDI. However, PPL failed to achieve standard for CAIDI in both 2023 and 2024. Management should intensify its efforts to improve CAIDI performance and return performance to levels consistently below the “green” benchmark performance upper-control-limit line. The Commission views CAIDI as an indicator of an EDC’s ability to respond to, repair and return to service customers following an outage. It is understood that with the improved system automation that the CAIDI index will show increases. However, the very use of system automation by an EDC tends to make CAIDI a more valuable indicator of customer outage times and hence actual response to customer interruptions.

Beginning in December 2013, PPL’s SAIFI benchmark performance trend had been positive, as shown in Figure 55 below. However, PPL failed to achieve standard in 2024. As noted below and seen in Section 3 above, PPL experienced a record number of ROEs in 2024. TUS notes that due to the high number of storm events, and the fact that PPL had no Major Events excluded from reliability indices, it is expected that 2024 was an aberration for PPL. Given PPL’s reliability performance since 2013, which was benchmark for SAIFI and acceptable for CAIDI, unless it experiences levels of storm activity similar to 2024, TUS expects PPL to return to form in 2025 and 2026. However, if the level of storm activity does not lessen, PPL will need to undertake measures to storm harden and increase resiliency to match any “new normal” level of weather.

PPL experienced 17 ROEs in 2024, which is the most it has experienced since 1993 (the first year that the Commission records date to is 1993). PPL noted that 581.9 million of its 663.8 million CMI in 2024 was due to the ROEs.

Outage Causes

Figure 56 below shows the top five reported outage cause categories in 2024, as a percentage, for the following three distinct performance metrics: CMI, Customers Affected, and Number of Incidents. Trees were the top cause of outages and customer minutes interrupted. Approximately 85% of CMI and 58% of incidents are caused by trees. Notably, PPL’s transmission and distribution expenses for vegetation management in 2024 were 69% higher than budgeted. In addition to increased vegetation trimming, as noted in this report’s Executive Summary, PPL should also examine other means to harden infrastructure from vegetation, including from OROW vegetation.

Figure 57 below shows the historical trend of the top three main outage causes. Tree Related and Equipment Failures are the two most frequent outage causes that are significantly negatively affecting PPL's distribution system reliability and resilience, as well as almost every EDC in Pennsylvania.

General Reliability

PPL noted that it experienced 11 storms of 600 cases or higher, including six storms of over 1,000 cases in 2024. PPL explained that this contributed to it failing to meet benchmark SAIFI for first time in over a decade. PPL noted that its weather-normalized IEEE SAIFI finished at 0.66, which it believes illustrates the outsized effect of storms. PPL also indicated that its SAIDI was severely impacted by storm CMI in 2024, which was just below 300% higher than the next worst year (2023).

PPL stated that it continues to drive high levels of reliability performance for SAIFI through programs such as:

- A commitment to providing safe, reliable, affordable service to our customers.
- A focus on storm hardening.
- Strategic vegetation management.
- Implementation of proactive fault sensing.
- Continued strategic investment in distribution automation technology such as:
 - Multi and single-phase Smart Grid Initiatives.
 - Increased leverage of PPL's Automated Distribution Management System (ADMS).
 - Full implementation of PPL's Fault Isolation and System Restoration (FISR) technology, which has automatically restored more than 1.9 million customers since 2015.
- Strategic data-driven reliability investments including asset replacement, and system improvements that include storm hardening standards.
- An increased focus on remediating momentary outages before they become permanent outages.
- Continued focus on outage response improvements.
- Moving to data-driven, condition-based maintenance programs.

In terms of CAIDI, PPL noted that storms impacted its performance as its weather-normalized IEEE CAIDI was 137, which would be below the benchmark of 145. PPL noted several initiatives it continues to evaluate to improve CAIDI performance. Some of these strategic areas include:

- Optimizing resource planning and scheduling.
- Setting Restore vs. Repair strategy early on in storm response.
- Resource Strategy/Optimization.
- Resource scheduling and prearranging resource availability.
- Leveraging data technology to isolate impact and dispatching of resources needed to address outages.

Conclusion

Tree Related and Equipment Failures are the top two outage causes that negatively affect electrical reliability to PPL customers. As noted above, PPL’s CAIDI performance in 2024 was above both benchmark and standard. Management attention is required to move CAIDI performance below the “green” benchmark performance upper-control-limit line. CAIDI is a measure of customer restoration that in terms of the duration of the experienced outage and can be improved by decreased response and repair times. PPL also did not achieve SAIFI in 2024, which is anomalous, given PPL’s reliability performance over the past decade.

The Commission recommends continued and increased efforts in vegetation management, equipment replacement and upgrades through the LTIP, and a continuing emphasis on improving response times.

As can be seen in Figures 58 through 60 below, prior to 2024, PPL had been improving or maintaining performance for customers interrupted, CMI, and interruption events. Hopefully, PPL will exhibit a return to form for 2025 and 2026.

Figure 54 – PPL CAIDI (minutes)

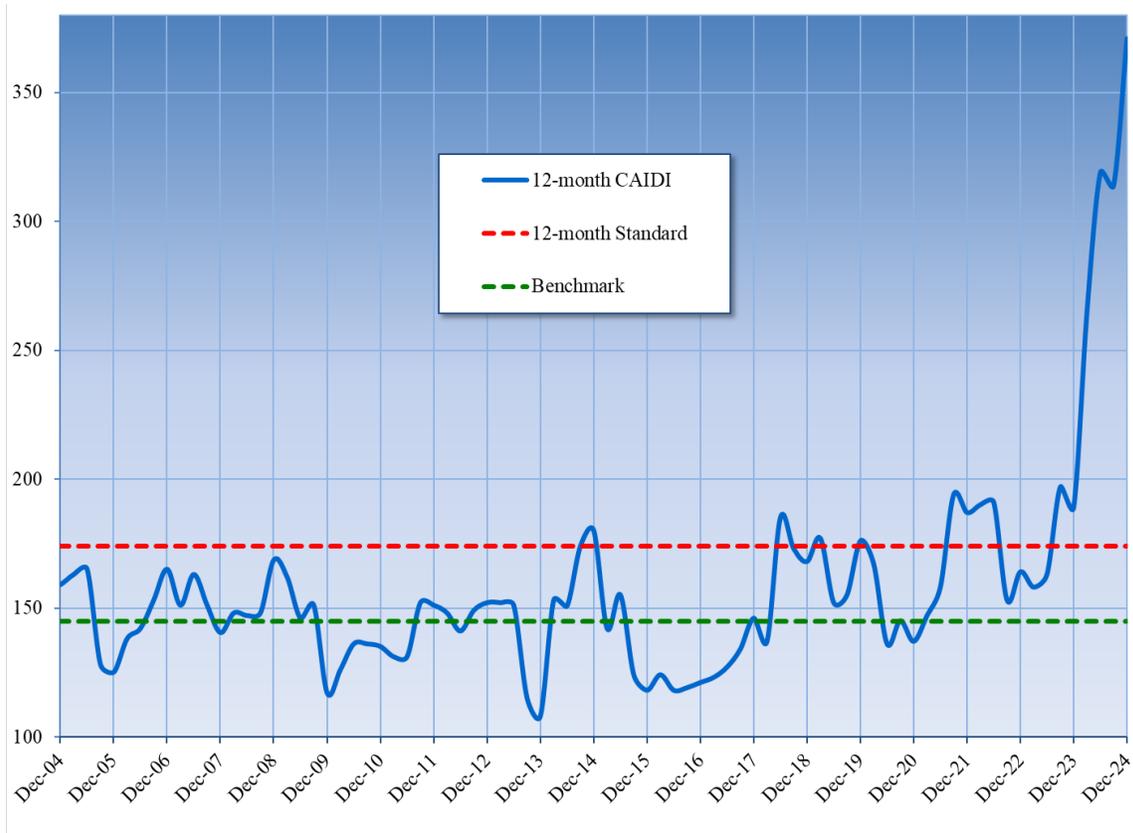


Figure 55 – PPL SAIFI (interruptions per customer)



Figure 56 – PPL Outage Causes (percent of total outages)

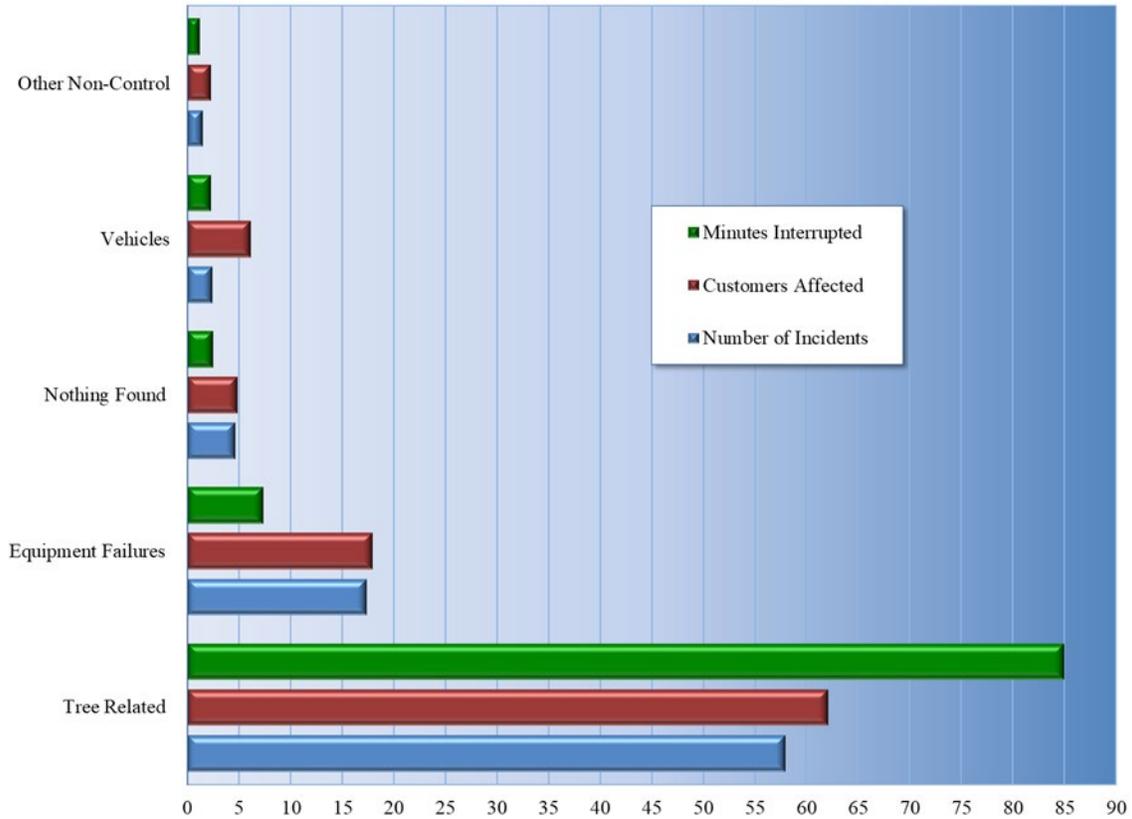


Figure 57 – PPL Outage Tracking (number of incidents)

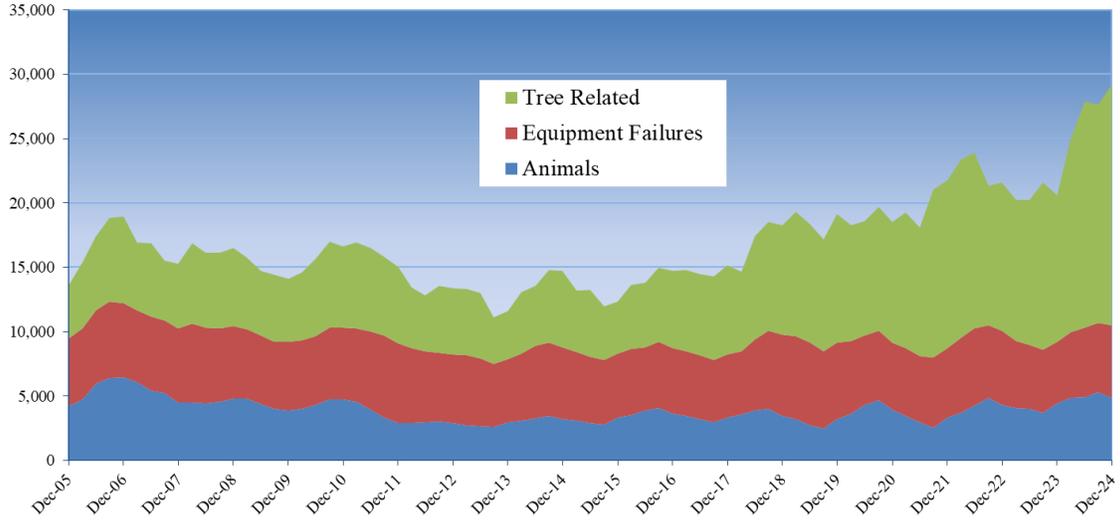


Figure 58 – PPL Outage Tracking (number of Customers Interrupted)

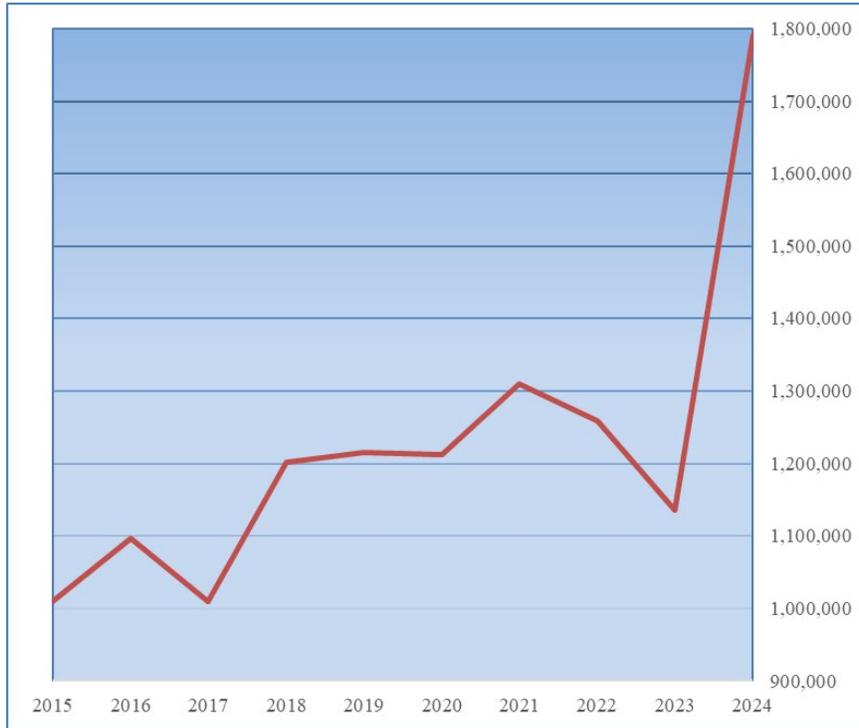


Figure 59 - PPL Outage Tracking (Customer-Minutes of Interruptions CMI)

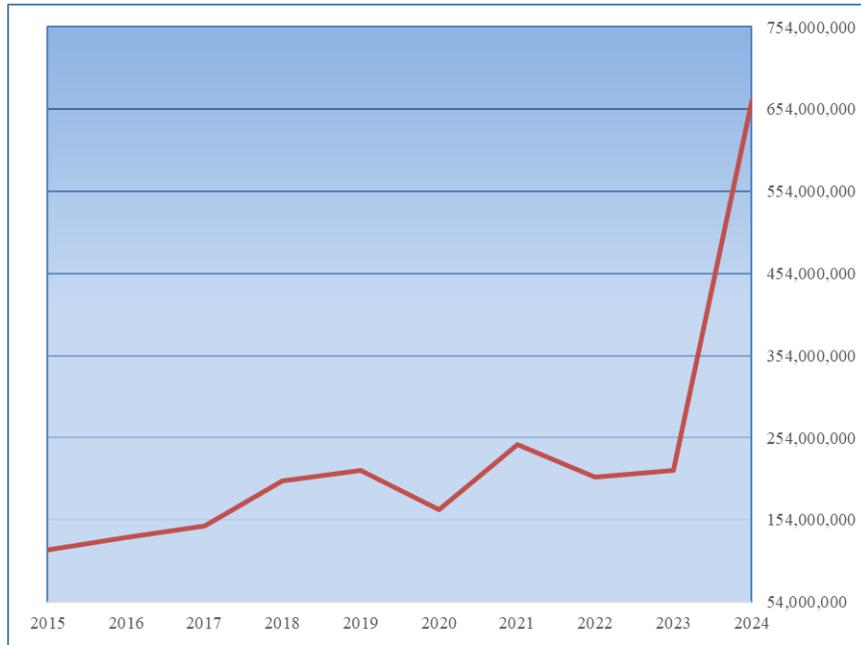
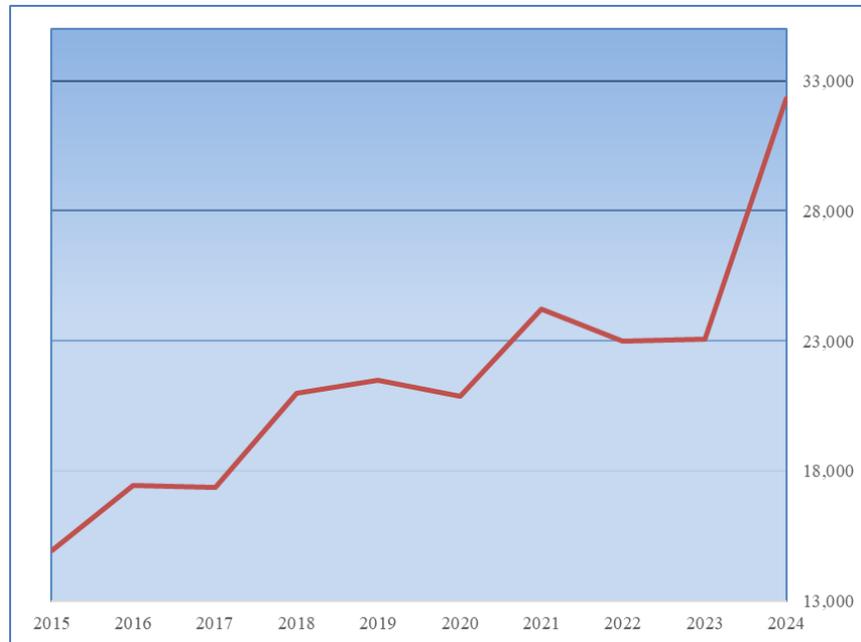


Figure 60 – PPL Outage Tracking (number of interruptions annually)



UGI Utilities Inc.

UGI Utilities, Inc., (UGI) has a service territory of about 410 square miles and serves about 62,634 customers.

In 2024, UGI experienced 48,640 customer interruptions and 6.7 million CMI in 2024 as compared to: 33,872 customer interruptions and 3.8 million CMI in 2023; 54,075 customer interruptions and 8.4 million CMI in 2022; 58,992 customer interruptions and 7.9 million CMI in 2021; and 25,110 customer interruptions and 4.1 million CMI in 2020.

UGI experienced three Major Events in 2024. The Major Events impacted 24,059 customers, which is not reflected in the totals above.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

- Rolling 12-month:** Increased from 112 minutes in 2023 to 138 minutes in 2024; achieved benchmark by 18.3%.
- 3-year average:** Increased from 134 minutes in 2023 to 135 minutes in 2024; achieved standard by 27.2%.

SAIDI

- Rolling 12-month:** Increased from 61 minutes in 2023 to 107 minutes in 2024; achieved benchmark by 23.6%.
- 3-year average:** Decreased from 108 minutes in 2023 to 101 minutes in 2024; achieved standard by 40.6%.

SAIFI

- Rolling 12-month:** Increased from 0.54 outages in 2023 to 0.78 outages in 2023; achieved benchmark by 6.0%.
- 3-year average:** Decreased from 0.79 outages in 2023 to 0.73 outages in 2024; achieved standard by 19.8%.

CAIDI and SAIFI Performance

Historical rolling 12-month CAIDI and SAIFI performance trends are shown below in Figures 61 and 62. UGI achieved benchmark for all three reliability indices in 2024. This is a continuation of UGI's benchmark performance in 2023.

Continued management attention is needed to keep CAIDI and SAIFI performance consistently below the "green" benchmark performance upper-control-limit-line.

Outage Causes

Figure 63 below shows the top five reported outage cause categories in 2024, as a percentage, for the following three distinct performance metrics: CMI, Customers Affected, and Number of

Incidents. Trees, Motor Vehicle, and Equipment Failure were the leading causes of CMI and number of incidents. Over 77% of CMI and 57% of incidents were caused by Trees.

Figure 64 below shows the historical trend of the top three main outage causes. Trees, Animal and Equipment Failure are the three most frequent outage causes that are significantly negatively affecting UGI's distribution system reliability and resilience. As noted previously in this report, trees and equipment failures are the prominent causes of outages experienced by almost every EDC in Pennsylvania.

General Reliability

Overall, UGI continued its benchmark performance from 2023. UGI noted that it has targeted programs to address the issues that cause the most number of outage incidents on its system: vegetation, equipment failures, motor vehicles, and animals.

UGI noted that it has identified opportunities to reduce the duration and extent of outages originating from all outage causes using technology-based solutions and additional circuit sectionalizing. UGI noted that it continues to increase sectionalizing capabilities and prepare the distribution network to accommodate a future fault location, isolation and service restoration (FLISR) system that can self-heal by isolating faulted line sections and restoring the undamaged portions, leading to fewer customer interruptions.

In the beginning of fiscal-year 2024, UGI acquired a FLISR controller to begin integrating into three-phase reclosers and run a small-scale pilot to test the technology. UGI also noted that remote control capability continues being integrated into existing transmission Motor Operated Air-Breaks to allow expedited sectionalizing and recovery of the transmission system following disturbances. UGI stated that it continues to expand the number of devices available in the distribution SCADA system which allows System Operators to monitor and control an expanding number of devices across the UGI system.

Conclusion

UGI has continued to improve its CAIDI and SAIFI performance over the past four years. Management focus should be on sustaining the CAIDI and SAIFI trend lines below the "green" benchmark performance upper-control-limit-lines. The Commission recommends continued and increased efforts in vegetation management and increased emphasis on response times.

As shown by Figures 65 through 67 below, UGI's improving trends in customers interrupted, CMI, and interruption events reversed some in 2024. While still achieving benchmark for all three reliability indices in 2024, UGI should continue to utilize its LTIP and vegetation management programs to ensure it continues to improve.

Figure 61 – UGI CAIDI (minutes)

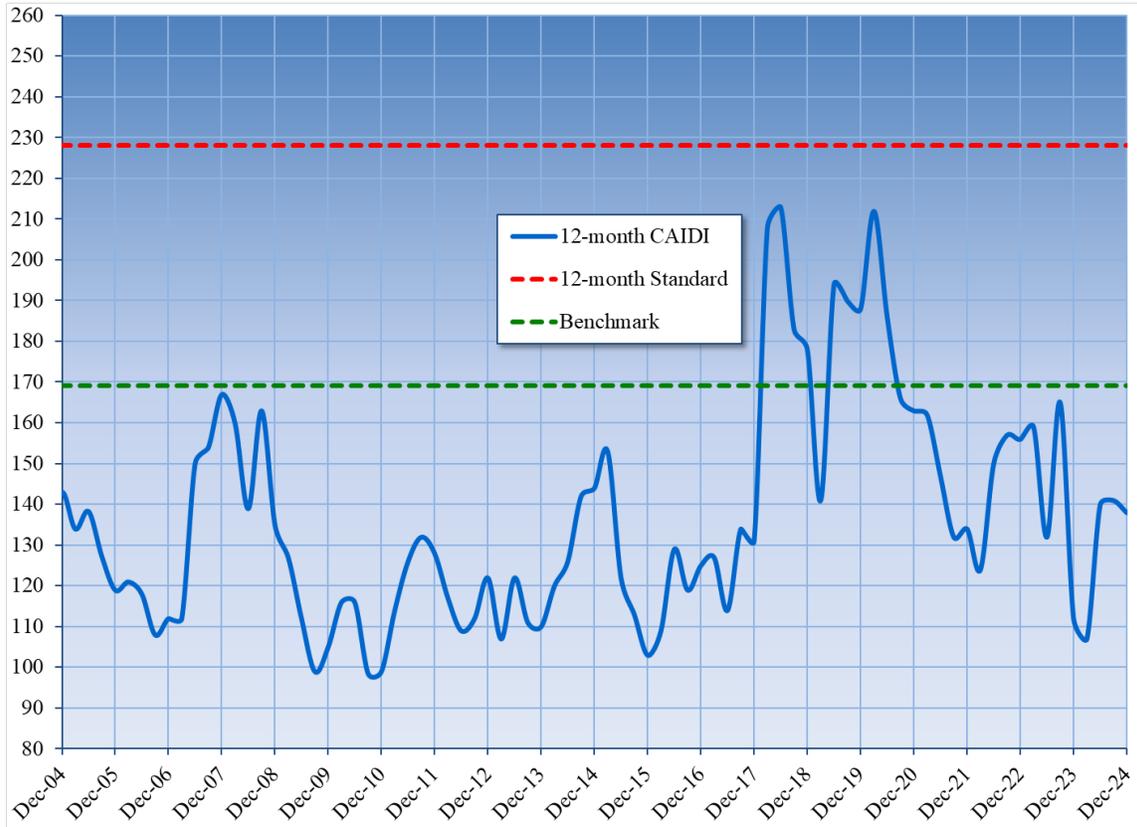


Figure 62 – UGI SAIFI (interruptions per customer)

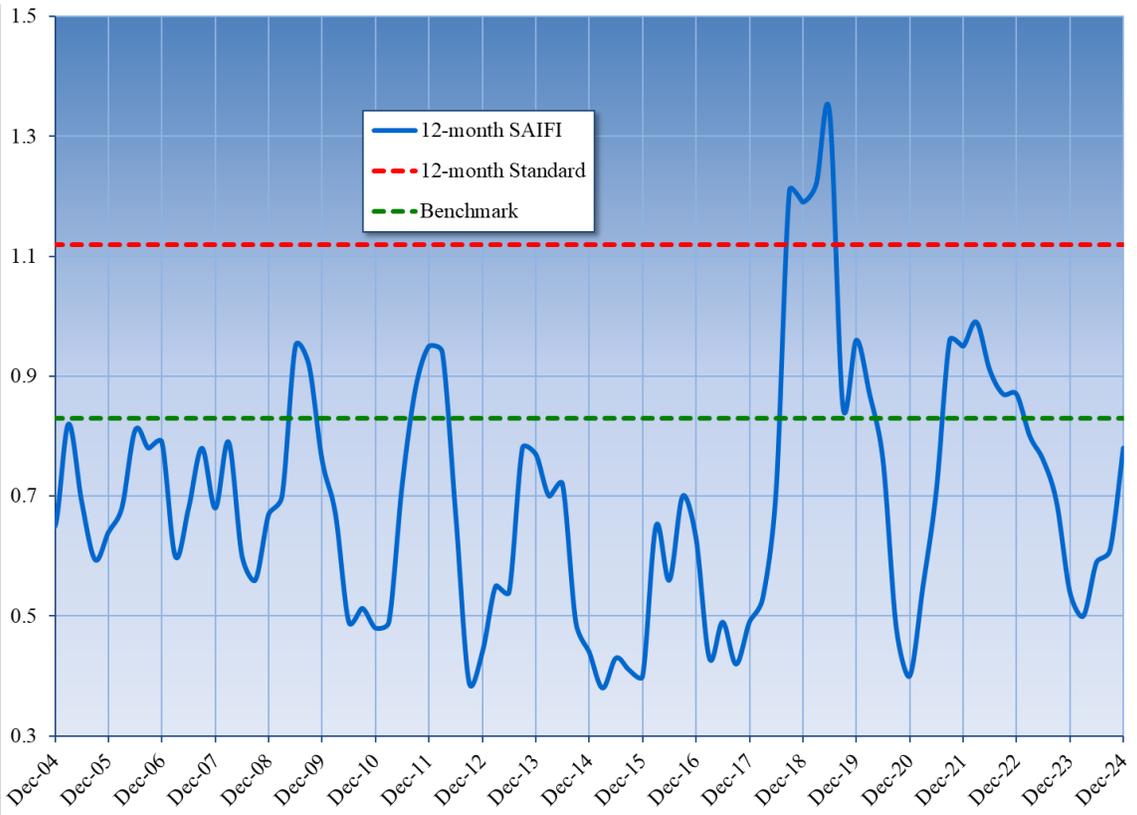


Figure 63 – UGI Outage Causes (percent of total outages)

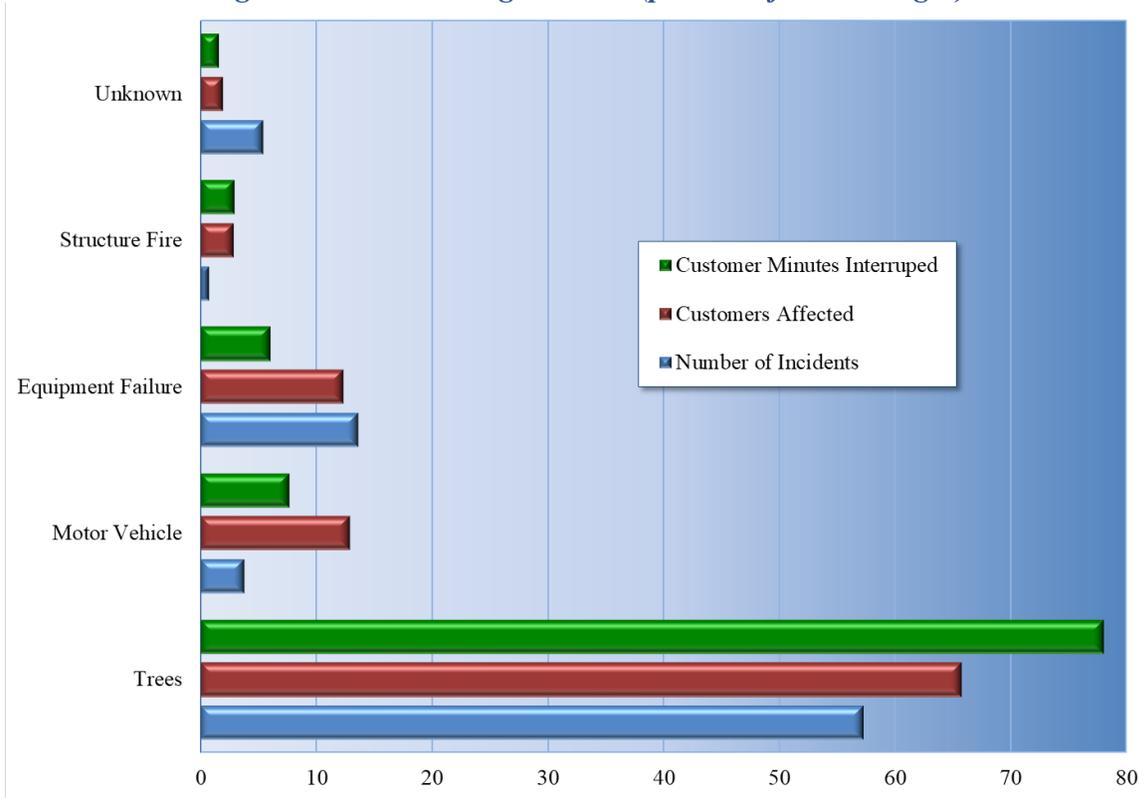


Figure 64 – UGI Outage Tracking (number of incidents)

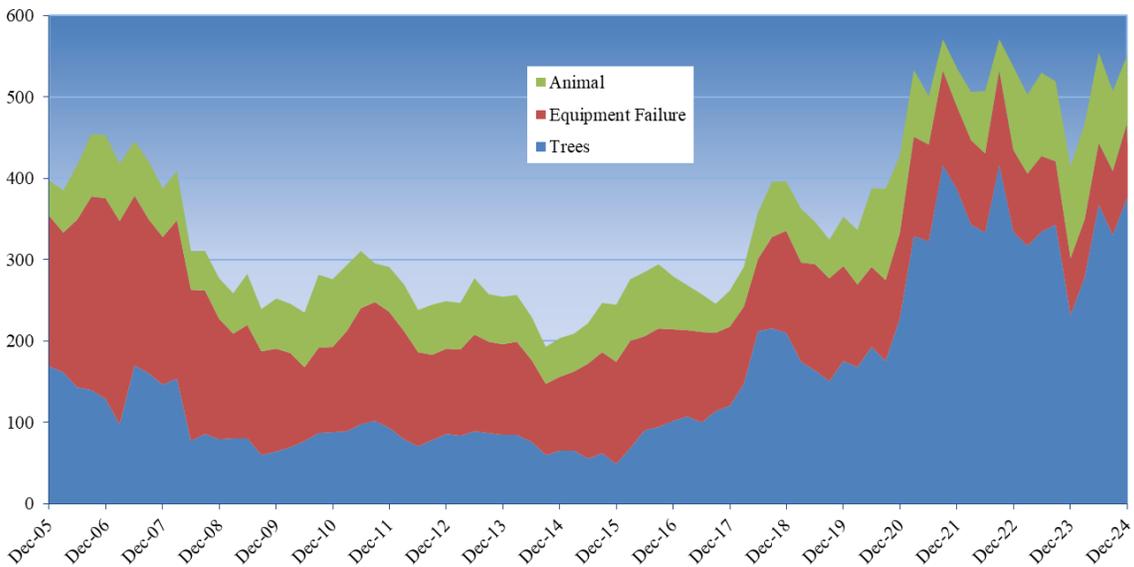


Figure 65 – UGI Outage Tracking (number of Customers Interrupted)

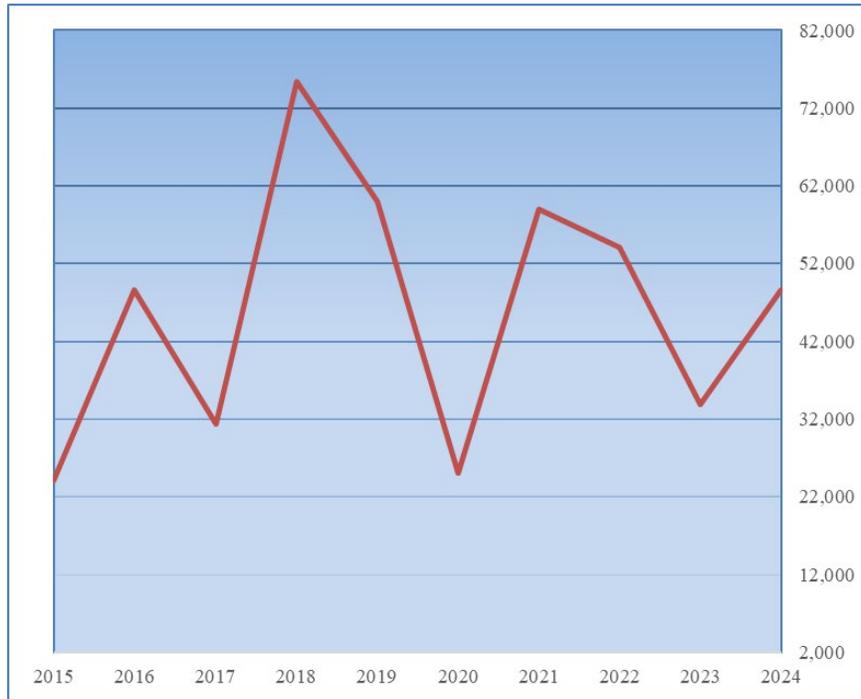


Figure 66 – UGI Outage Tracking (Customer-Minutes of Interruptions, or CMI)

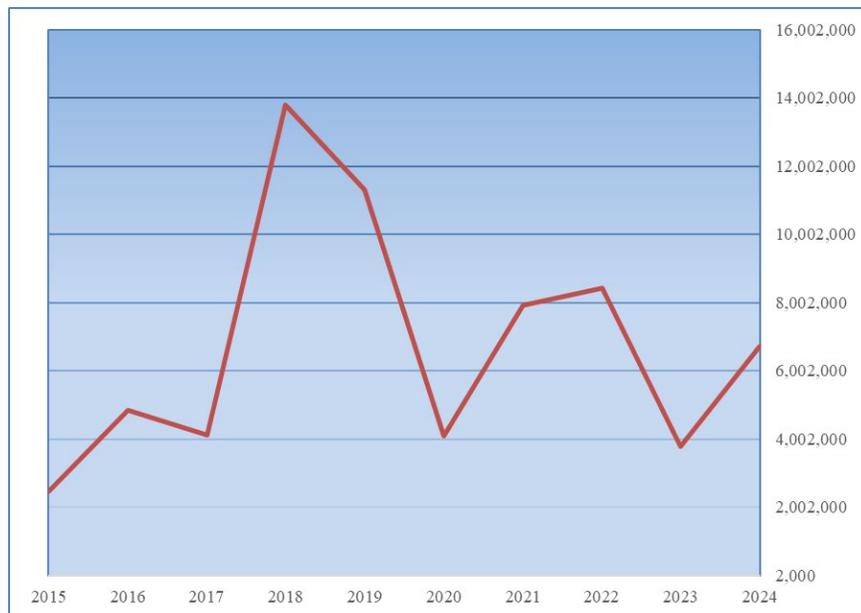
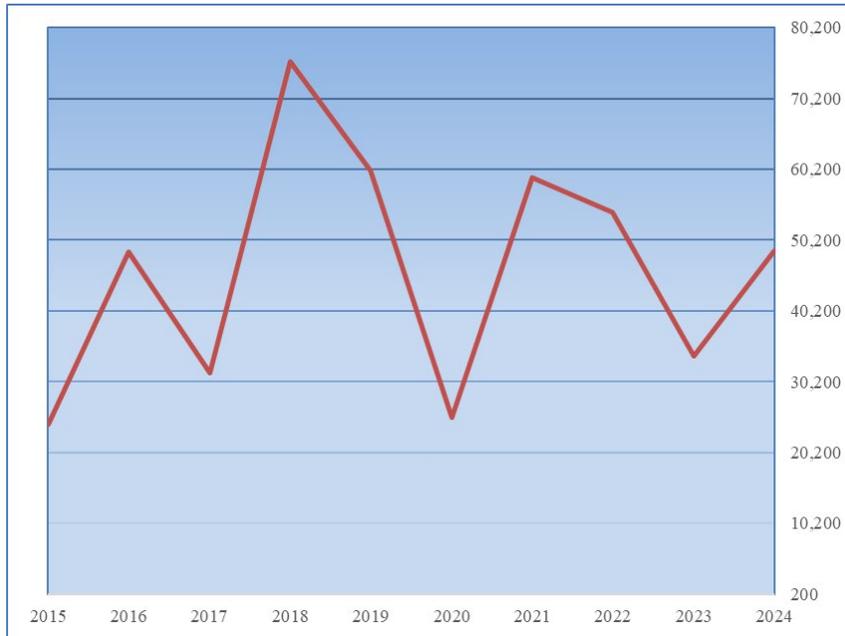


Figure 67 – UGI Outage Tracking (number of interruptions annually)



Wellsboro Electric Company

Wellsboro Electric Company (Wellsboro) has a service territory of about 178 square miles and serves about 6,496 customers.

In 2024, Wellsboro experienced 6,432 customer interruptions and .66 million CMI as compared to: 8,822 customer interruptions and 1 million CMI in 2023; 7,024 customer interruptions and 0.92 million CMI in 2022; 5,922 customer interruptions and 0.85 million CMI in 2021; and 7,543 customer interruptions and 0.7 million CMI in 2020.

Wellsboro experienced 10 Major Events in 2024. The Major Events impacted 18,902 customers, which is not reflected in the totals above.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

- Rolling 12-month:** Decreased from 114 minutes in 2023 to 102 minutes in 2024; achieved benchmark by 17.6%
- 3-year average:** Decreased from 129 minutes in 2023 to 115 minutes in 2024; achieved standard by 15.2%.

SAIDI

- Rolling 12-month:** Decreased from 155 minutes in 2023 to 102 minutes in 2024; achieved benchmark by 33.7%.

3-year average: Decreased from 143 minutes in 2023 to 133 minutes in 2024; achieved standard by 28.2%.

SAIFI

Rolling 12-month: Decreased from 1.37 outages in 2023 to 0.99 outages in 2024; achieved benchmark by 19.5%.

3-year average: Increased from 1.13 outages in 2023 to 1.15 outages in 2024; achieved standard by 14.8%.

CAIDI and SAIFI Performance

Historical rolling 12-month CAIDI and SAIFI reliability performance trends are shown in Figures 68 and Figure 69 below. Wellsboro’s CAIDI and SAIFI performance improved in 2024 as shown to be below the “green” benchmark performance upper-control-limit-line. Increased management attention is needed to ensure CAIDI and SAIFI performance is consistently at or below benchmark.

Outage Causes

Figure 70 below shows the top five reported outage cause categories for 2024, as a percentage, for the following three distinct performance metrics: CMI, Customers Affected, and Number of Incidents. Trees OROW were the top cause of CMI. Over 83% of CMI is caused by Trees OROW.

Figure 71 below shows the historical trend of the leading three main outage causes. Trees (all causes) and Animals are the two most frequent outage causes.

General Reliability

Wellsboro noted that it will continue tree trimming 70 to 75 miles of conductor per year which amounts to a circuit or a portion of a circuit each year. Wellsboro noted that it maintains a tree-trimming cycle of approximately five years. Wellsboro stated that it identified hot spot trimming on the downtown three phase portion of its system. Danger trees were identified for both ROW and OROW during the year and urgent removals were dealt with immediately. Wellsboro noted that other danger trees are prioritized and removed as funding is available.

Wellsboro stated that it reconnected seven miles of line in 2024 in addition to other group operated switches that it installed in order to create tie points in the system. Wellsboro noted that it plans to reconnector another three miles of line and work to build another tie point in 2025. Wellsboro noted that this will provide reliability to the circuits allowing an alternate feed.

Wellsboro noted that it continues to participate in and gather information from various industry best practice groups. These groups include members from diverse utility groups such as the Pennsylvania Rural Electric Association, the Energy Association of Pennsylvania, and the National Rural Electric Cooperative Association. Wellsboro noted that it will continue to implement best practices defined by these groups as appropriate.

Conclusion

Wellsboro achieved benchmark performance for CAIDI and SAIFI in 2024. However, Wellsboro also experienced 10 Major Events in 2024 and the impacts of those events were excluded from those reliability indices. Wellsboro should continue to implement its reliability improvement plans to reduce the impact of severe weather to avoid Major Events and large customer disruption events. More management attention is also needed to sustain SAIFI below the “green” benchmark performance level.

As shown in Figures 72 through 75 below, Wellsboro is seeing a positive trend in terms of customers interrupted, CMI, and outages. Wellsboro should continue to examine and install locations for sectionalizing of circuits in order to lessen the number of customers impacted by events. However, while sectionalizing may reduce the number of customers impacted by an outage, Wellsboro should be cognizant that it could possibly lead to increased CAIDI as the outages may be of longer duration. The Commission finds that in this regard, the CAIDI index is becoming more realistic of the customer’s experienced interruption duration, rather than a general average as determined by aggregate data. As this occurs, the drivers of this index (response times, repair times, and overall restoration times), will have more effect on the results.

Figure 68 – Wellsboro CAIDI (minutes)

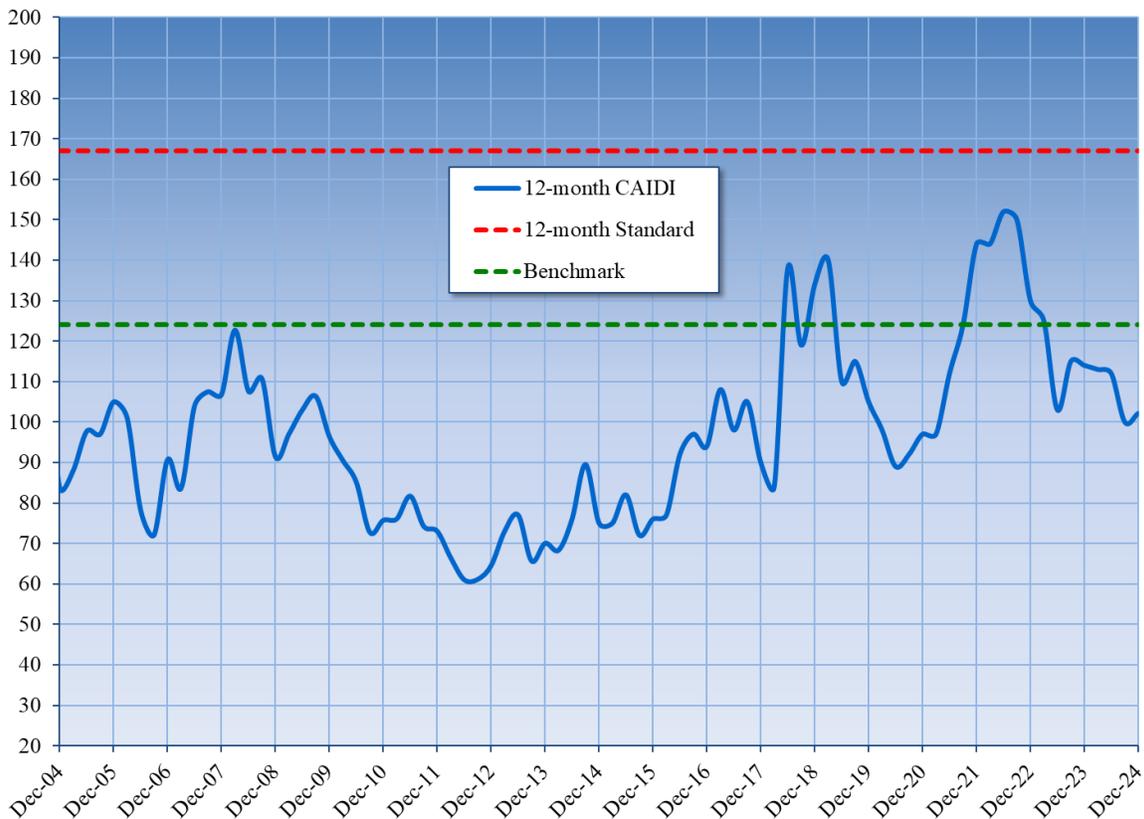


Figure 69 – Wellsboro SAIFI (interruptions per customer)

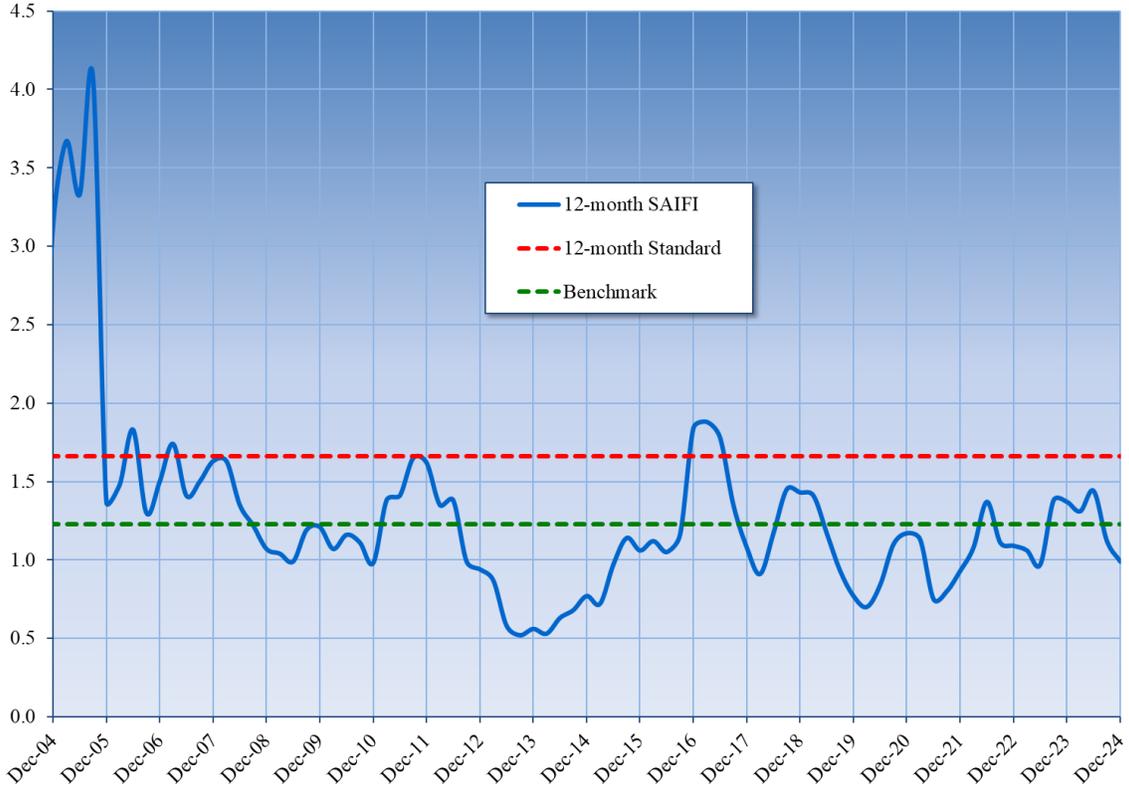


Figure 70 – Wellsboro Outage Causes (percent of total outages)

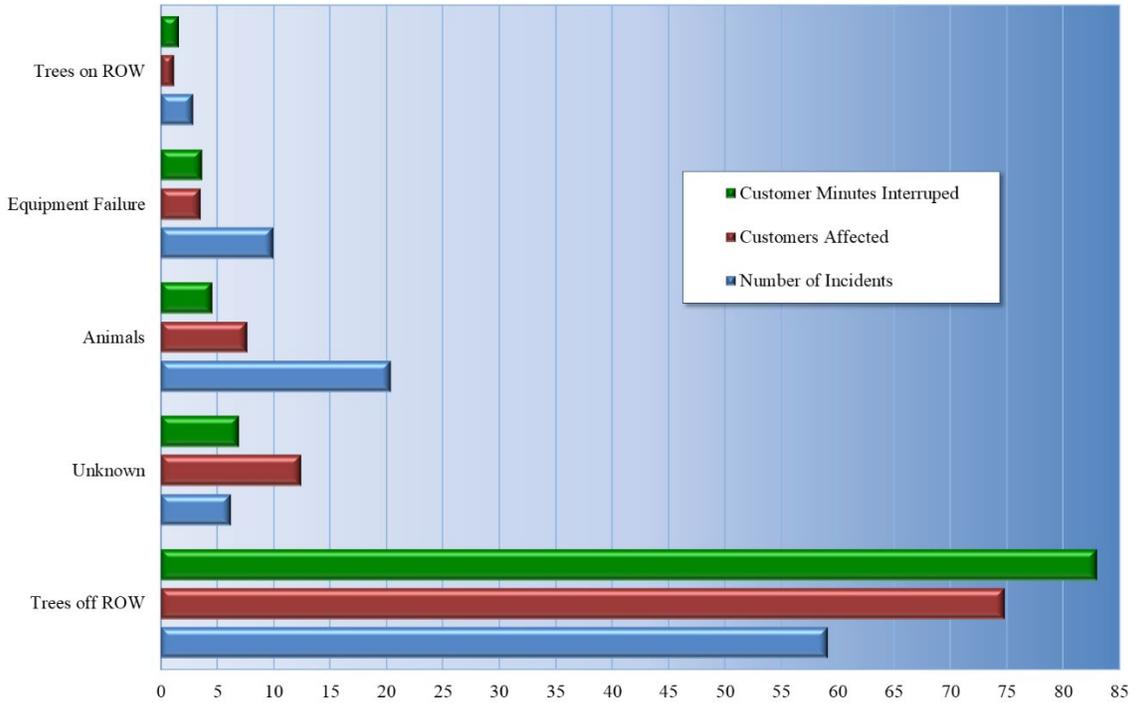


Figure 71 – Wellsboro Outage Tracking (number of incidents)

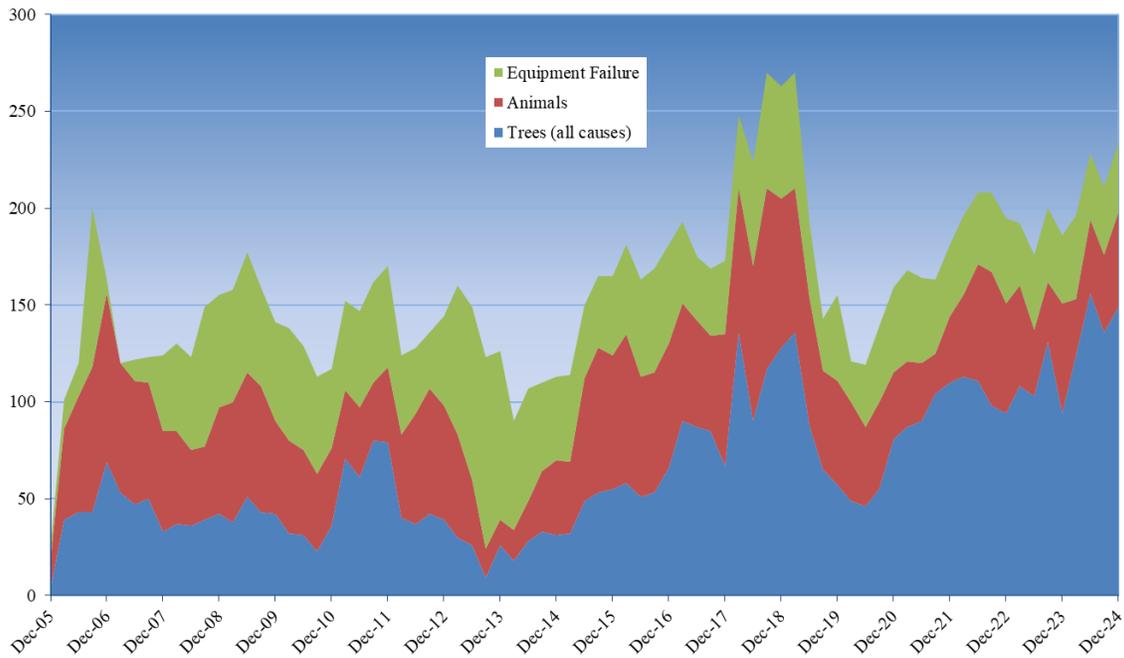


Figure 72 – Wellsboro Outage Tracking (number of Customers Interrupted)

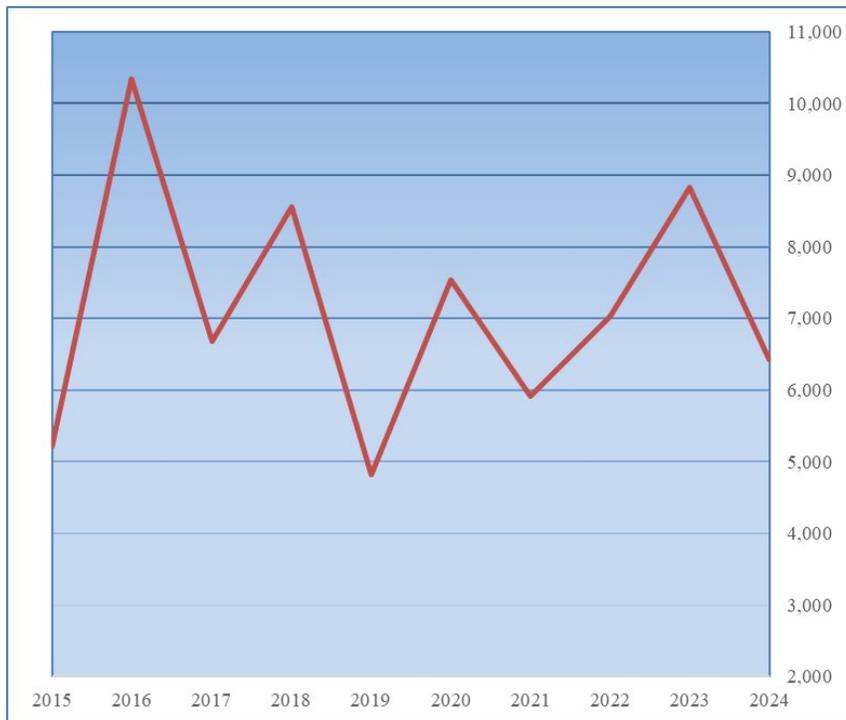


Figure 73 – Wellsboro Outage Tracking (Customer-Minutes of Interruptions CMI)

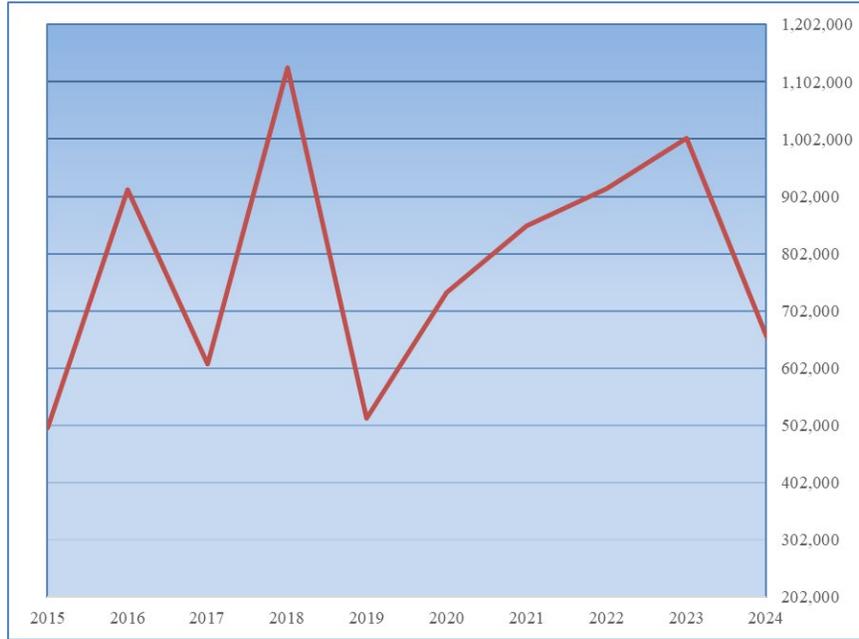
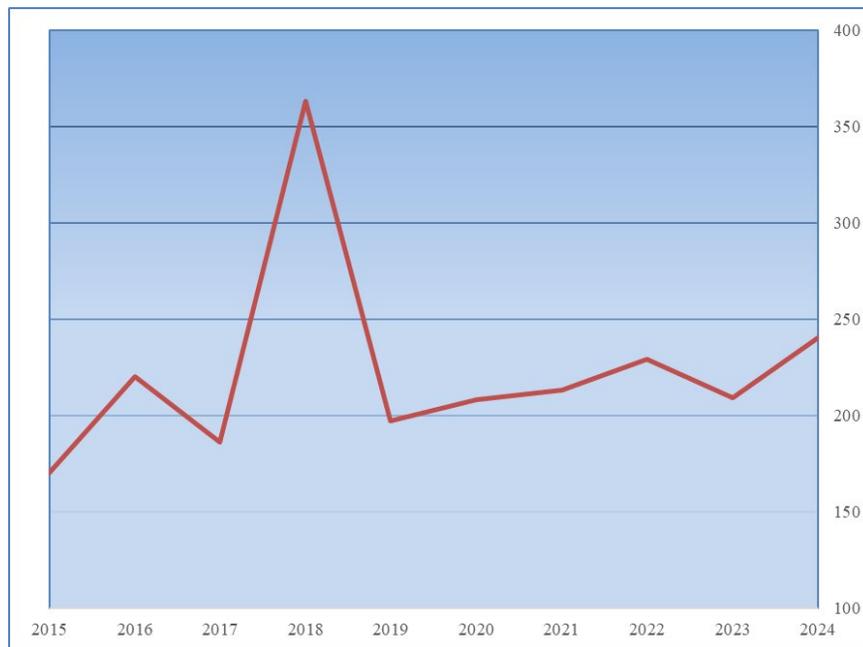


Figure 74 – Wellsboro Outage Tracking (number of interruptions annually)



Section 5 – Conclusion

Based on the information in this report and its Appendices, it can be seen that with few exceptions (Pike County and Wellsboro) EDCs saw the trend since 2019 in the improvement in number of customers interrupted reverse significantly. Also, all EDCs in 2024 had increased numbers of outages, *i.e.*, outage events that lead to customer experiencing sustained outages. With the exception of PECO, Wellsboro, and West Penn, CMI increased for EDCs in 2024. Given the record number of ROEs, it is perhaps expected that overall reliability performance would decline in 2024. However, as shown in each EDC's section above and Figures 82 through 84, below, customers interrupted, CMI, and outages have in aggregate exhibited a declining performance trend since 2015.

Of the seven large EDCs, only PECO achieved CAIDI benchmark performance for the rolling 12-months ending in December 2024. Of the four small EDCs, only two (UGI and Wellsboro) achieved CAIDI benchmark for all four rolling 12-month quarters of 2024. Overall, EDCs have demonstrated worsening CAIDI performance for the past three years. CAIDI is an important measure as it relates to the average duration of a service outage. TUS views CAIDI as an important index because it is a measure of resiliency and thus a good measure of an EDC's customer service. TUS notes that CAIDI is highly dependent upon the EDCs ability to respond to outages and restoration times. EDCs will be expected to improve worsening CAIDI. As noted in the Executive Summary, as the EDCs install more sectionalizing devices (reclosers, etc.) that reduce the number of customers impacted by a sustained outage, it could possibly lead to increased CAIDI as the outages may be of longer duration. TUS finds that in this regard, the CAIDI index is becoming more realistic of the customer's experienced interruption duration, rather than a general average as determined by aggregate data. In effect, CAIDI is moving toward being more realistic and representative of the average customer interruption length. As this occurs, the improvement of the drivers of this index such as response times, repair times, and overall restoration times, will have more effect on the results. As noted in the Executive Summary, improvements in CAIDI are associated with response times to outage events and to effecting repairs in a timely manner. EDCs should review skilled staffing levels and staff and contractor response times and availability, especially after normal work hours, to ensure service outages are restored as quickly and safely as possible.

As seen in Appendix B, only three of the 11 EDCs achieved benchmark for SAIFI in all rolling 12-month quarters in 2024, as compared to four in 2023, three in 2022, and five in 2021. In 2020, six of the EDCs achieved benchmark for SAIFI in all of the rolling 12-month quarters. In 2024, five of the 11 EDCs achieved the rolling 12-month SAIFI standard in all four rolling 12-month quarters, as compared to six in 2023, five in 2022, seven in 2021 and eight in 2020. TUS views SAIFI as an important index to focus on improving as it relates directly to the number of service outages experienced by a customer. Reducing service outages from occurring in the first place is crucial to improving reliability performance.

For all EDCs except Duquesne, approximately 6.53 million customers experienced interruptions in 2024, as compared to approximately 5.03 million in 2023, 5.47 million in 2022, 5.78 million in 2021 and 5.36 million in 2020. Duquesne calculates customer outages as kVA disrupted, rather

than individual customers. Duquesne saw approximately 6.45 million kVA interrupted in 2024, which was a significant increase from the 4.5 million kVA interrupted in 2023, but lower than that experienced in 2022 and 2021. Duquesne saw approximately 7.3 million kVA interrupted in both 2022 and 2021. Customer interruption data for all EDCs (excluding Duquesne) can be seen in figure 82 below. As shown in Figure 83 below, total CMI for all EDCs (except Duquesne) increased significantly to 1.51 billion in 2024, as compared to 948 million in 2023, 954 million in 2022, 1.02 billion in 2021, and 811 million in 2020. TUS notes that of the 1.51 billion CMI in 2024 (excluding Duquesne), approximately 44% (664 million) of that was from PPL (to put this in proper context, PPL has 27.5% of the total customers, excluding Duquesne).

As noted above, EDCs continue to experience increasing numbers of outages annually. Outages have increased from an annual level of 60,218 in 2015 to 103,683 in 2024 (excluding Duquesne), which is an increase of approximately 72%. See Figure 84 below. The number of PA EDC customers served (excluding Duquesne) has only increased from 5,192,839 in 2015 to 5,294,772 in 2024, or approximately 1.7%, as shown in figure 85 below.

EDCs are experiencing a significant increase in vegetation-caused outages since 2015. In December 2015 there were 14,462 outages attributed to vegetation issues. By December 2024 the annual figure had risen to 42,120 outages attributed to vegetation problems, which is an increase of approximately 191%. See Figure 86 below.

As noted in Section 3 of this report, EDCs experienced 71 reportable outage events (ROEs) in 2024. EDCs had 49 ROEs in 2023, 42 ROEs in 2022, and 63 ROEs in 2021. The 71 ROEs in 2024 were the highest number reported to the Commission since 1994 (the first year of the five-year benchmarking period). All of the ROEs were caused by weather impacts on the EDC distribution systems. Noting this fact is not to excuse a slip in reliability performance of the EDCs, but rather to reiterate the importance of EDCs continuing to invest in reliability improvement and resiliency to weather events as noted below.

Another factor in reducing the number of events is the improvement of vegetation management by the EDCs. TUS expects all EDCs to review their vegetation management programs as vegetation issues are the number one cause of service outages for EDCs. TUS believes that EDCs should review their vegetation management programs to ensure that expenditures and procedures are most efficiently and effectively directed at the main cause of service outages. EDCs should also collaborate through associations like the Energy Association of Pennsylvania and discuss emerging technologies and methodologies for vegetation management, such as artificial intelligence, satellite-based data, and other creative “outside-the-box” thinking beyond just trimming vegetation on a set periodicity.

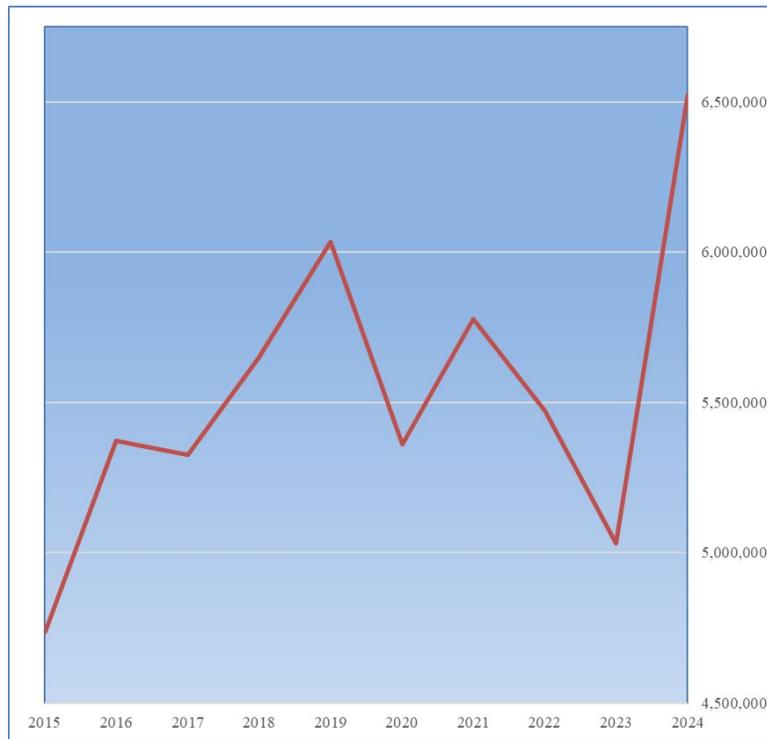
TUS reiterates its recommendations in the Executive Summary. EDCs can address OROW vegetation issues by working to improve the reliability and resilience of their facilities within the ROW. EDCs should consider utilizing methodologies to protect conductors within the ROW from hazards that may come from OROW, such as targeted undergrounding, covered overhead conductors, and hybrid undergrounding. EDCs could utilize LTIPs and fully projected future test years in base rate cases to propose such initiatives, even as pilot programs, and receive feedback from stakeholders on costs versus expected benefits.

TUS further recommends that EDCs evaluate the impact of increasingly severe weather on their systems and look to increase resiliency to such events. TUS suggests that EDCs may utilize academic and climate resources already in Pennsylvania for such evaluation and in planning mitigation methodologies. EDCs may want to partner with universities and/or climate modeling entities to better understand vulnerabilities at the regional and local level and to better target mitigation and resiliency investments.

EDCs should also look at the total costs that a sustained outage may have on customers and society and consider these factors in any cost/benefit analysis. For example, an updated version of the Interruption Cost Estimate (ICE) Calculator was recently released and provides EDCs and other stakeholders a way to understand costs of service outages and to estimate benefits of reliability investments.⁴⁷

The EDCs have tools in the proverbial toolbox to propose resilience and storm hardening investments (LTIIPs and fully projected future test years in base rate cases) and EDCs should maximize those opportunities while balancing the potential cost to ratepayers.

Figure 82 – ALL EDCs (except Duquesne) Customers Interrupted



⁴⁷ More information on the ICE Calculator is available here: <https://icecalculator.com/>, where it is noted that the ICE Calculator is a reliability planning tool designed for electric utilities, government organizations, and other entities interested in estimating interruption costs and/or the benefits associated with reliability improvements in the United States. The tool was developed by Lawrence Berkeley National Laboratory and Resource Innovations, Inc. The update to the ICE Calculator was supported through direct funding by sponsoring electric utilities as well as the U.S. Department of Energy.

Figure 83 – ALL EDCs (except Duquesne) Customer-Minutes of Interruptions, or CMI

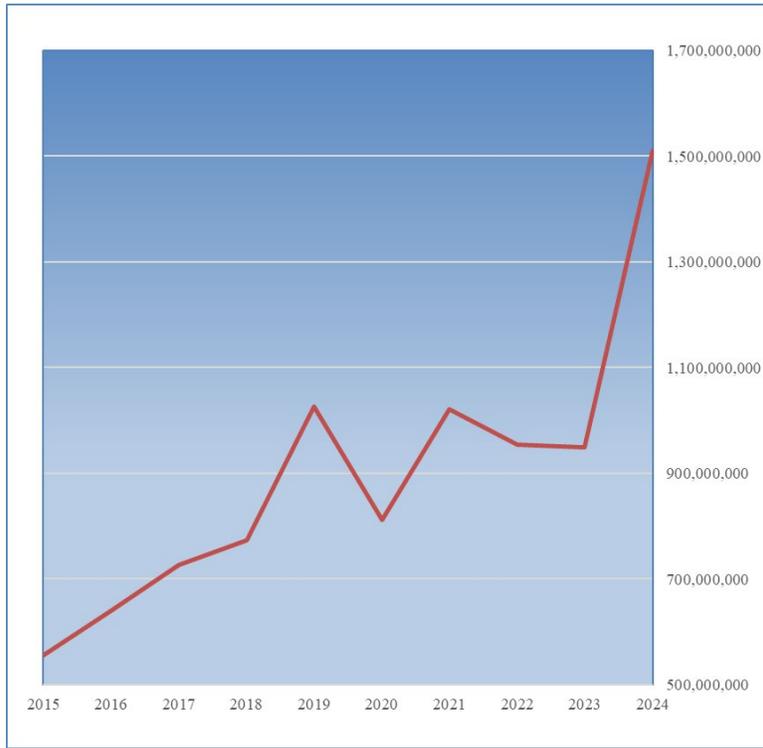


Figure 84 – ALL EDCs (except Duquesne) Number of Interruptions Annually

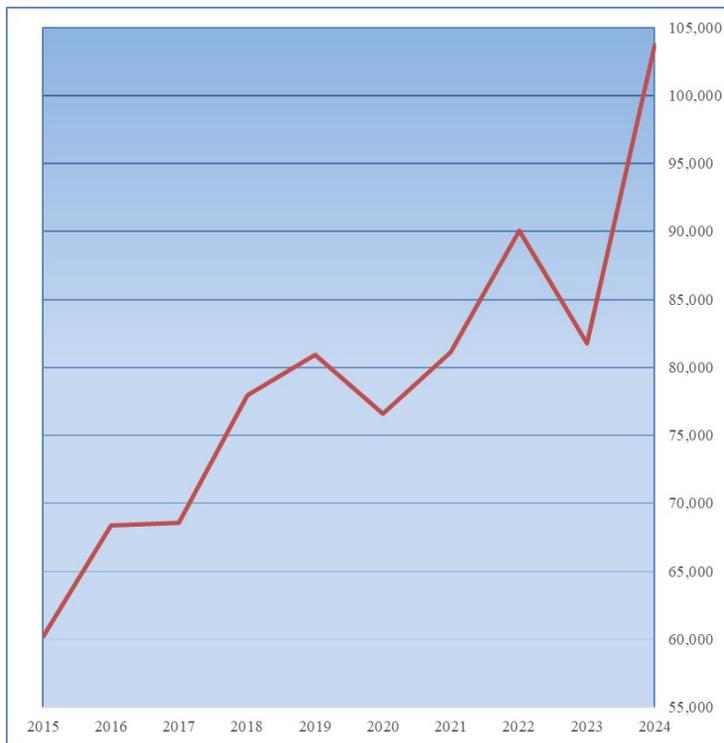


Figure 85 – ALL EDCs (except Duquesne) Number of Customers Served⁴⁸

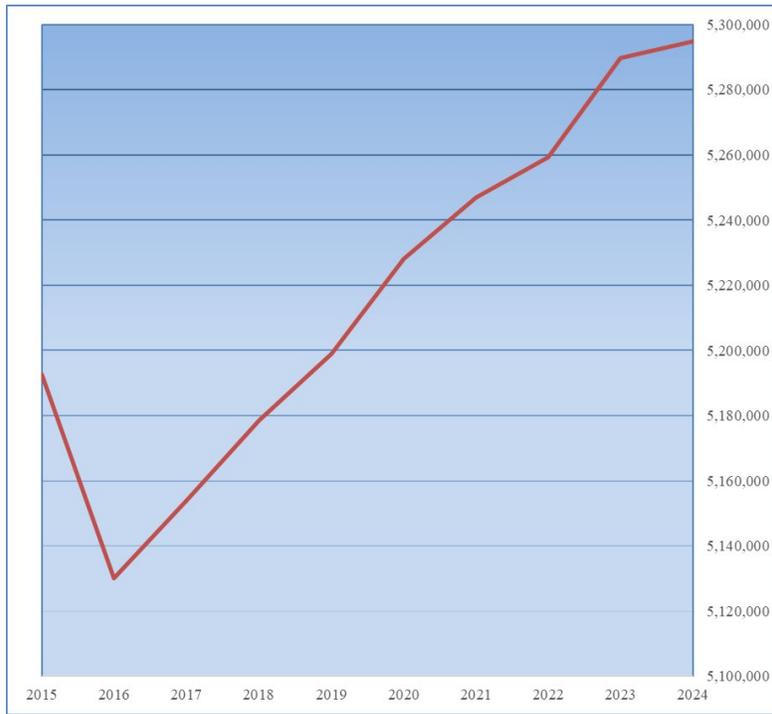
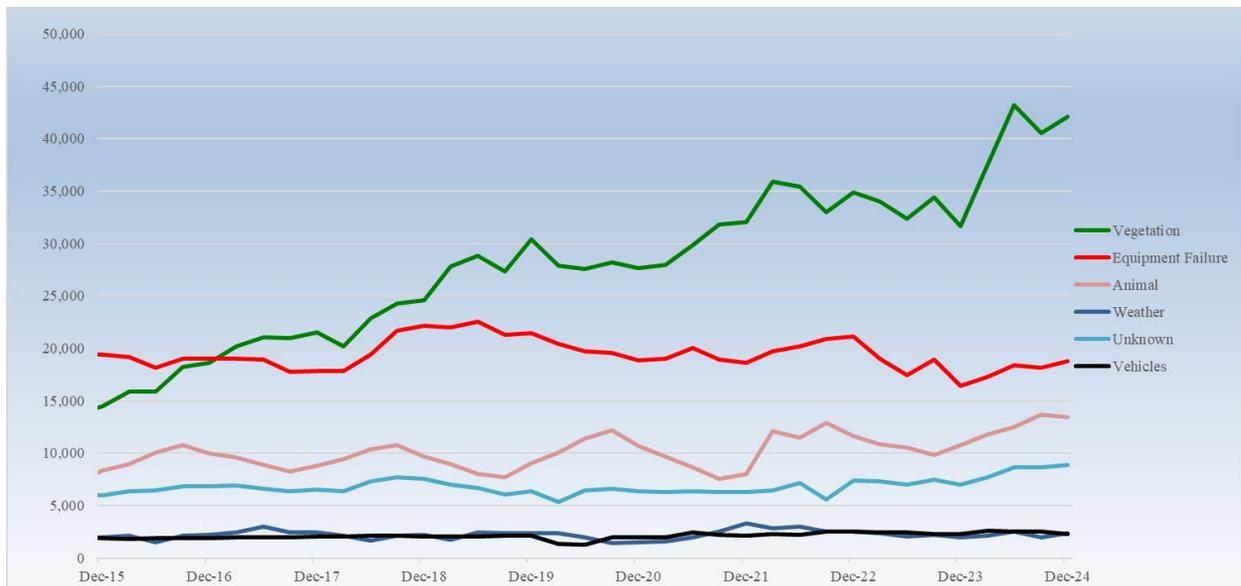


Figure 86 – Outage Causes ALL EDCs as Reported by EDCs for 2015-2024



⁴⁸ The drop in customers in 2016 was primarily due to PECO's effort to remove inactive accounts with their GIS update.

Appendix A – Electric Reliability Indices

12-Month Average Electric Reliability Indices for 2024

<i>Customer Average Interruption Duration Index (CAIDI)- min/yr/cust</i>				<i>% Above (+) or</i>	<i>% Above (+) or</i>
<i>EDC</i>	<i>Dec-24</i>	<i>Benchmark</i>	<i>Standard</i>	<i>Below (-) Benchmark</i>	<i>Below (-) Standard</i>
<i>Citizens'</i>	144	105	141	36.9%	1.9%
<i>Duquesne Light</i>	156	108	130	44.0%	19.6%
<i>Met-Ed (FE)</i>	242	117	140	106.4%	72.5%
<i>PECO</i>	96	112	134	-14.3%	-28.4%
<i>Penelec (FE)</i>	199	117	141	70.2%	41.3%
<i>Penn Power (FE)</i>	147	101	121	45.1%	21.1%
<i>Pike County</i>	184	174	235	5.7%	-21.7%
<i>PPL</i>	371	145	174	155.9%	113.2%
<i>UGI</i>	138	169	228	-18.3%	-39.5%
<i>Wellsboro</i>	102	124	167	-17.6%	-38.8%
<i>West Penn (FE)</i>	200	170	204	17.5%	-2.1%
<i>System Average Interruption Frequency Index (SAIFI)- outages/yr/cust</i>				<i>% Above (+) or</i>	<i>% Above (+) or</i>
<i>EDC</i>	<i>Dec-24</i>	<i>Benchmark</i>	<i>Standard</i>	<i>Below (-) Benchmark</i>	<i>Below (-) Standard</i>
<i>Citizens'</i>	0.45	0.20	0.27	125.0%	66.7%
<i>Duquesne Light</i>	0.82	1.17	1.40	-29.9%	-41.4%
<i>Met-Ed (FE)</i>	2.06	1.15	1.38	79.1%	49.3%
<i>PECO</i>	0.78	1.23	1.48	-36.6%	-47.3%
<i>Penelec (FE)</i>	1.79	1.26	1.52	42.1%	17.8%
<i>Penn Power (FE)</i>	1.01	1.12	1.34	-9.8%	-24.6%
<i>Pike County</i>	0.84	0.61	0.82	37.7%	2.4%
<i>PPL</i>	1.22	0.98	1.18	24.5%	3.4%
<i>UGI</i>	0.78	0.83	1.12	-6.0%	-30.4%
<i>Wellsboro</i>	0.99	1.23	1.66	-19.5%	-40.4%
<i>West Penn (FE)</i>	1.28	1.05	1.26	21.9%	1.6%
<i>System Average Interruption Duration Index (SAIDI)- min/yr/cust</i>				<i>% Above (+) or</i>	<i>% Above (+) or</i>
<i>EDC</i>	<i>Dec-24</i>	<i>Benchmark</i>	<i>Standard</i>	<i>Below (-) Benchmark</i>	<i>Below (-) Standard</i>
<i>Citizens'</i>	64	21	38	206.2%	69.2%
<i>Duquesne Light</i>	127	126	182	0.6%	-30.3%
<i>Met-Ed (FE)</i>	498	135	194	269.0%	156.8%
<i>PECO</i>	75	138	198	-45.7%	-62.1%
<i>Penelec (FE)</i>	356	148	213	140.5%	67.1%
<i>Penn Power (FE)</i>	147	113	162	30.5%	-9.0%
<i>Pike County</i>	155	106	194	46.2%	-20.1%
<i>PPL</i>	451	142	205	217.6%	120.0%
<i>UGI</i>	107	140	256	-23.6%	-58.2%
<i>Wellsboro</i>	102	153	278	-33.7%	-63.5%
<i>West Penn (FE)</i>	255	179	257	42.7%	-0.6%

Note: **GREEN** = better than benchmark; **RED** = worse than standard; **BLACK** = between benchmark and standard.

Performance Benchmark. An EDC's performance benchmark is calculated by averaging the EDC's annual, system-wide reliability performance indices over the five-year period directly prior to the implementation of electric restructuring (1994 to 1998). The benchmark is the level of performance that the EDC should strive to achieve and maintain.

2024 Pennsylvania Electric Reliability Report

Three-Year Average Electric Reliability Indices for 2022-2024

<i>Customer Average Interruption Duration Index (CAIDI)-min/yr/cust</i>				<i>3-Year</i>	<i>3-Year</i>	<i>% Above (+) or</i>
<i>EDC</i>	<i>2022</i>	<i>2023</i>	<i>2024</i>	<i>Average</i>	<i>Standard</i>	<i>Below (-) Standard</i>
<i>Citizens'</i>	<i>101</i>	<i>90</i>	<i>144</i>	<i>112</i>	115	<i>-3.0%</i>
<i>Duquesne Light</i>	<i>146</i>	<i>110</i>	<i>156</i>	<i>137</i>	119	<i>15.3%</i>
<i>Met-Ed (FE)</i>	<i>160</i>	<i>202</i>	<i>242</i>	<i>201</i>	129	<i>55.9%</i>
<i>PECO</i>	<i>99</i>	<i>138</i>	<i>96</i>	<i>111</i>	123	<i>-9.8%</i>
<i>Penelec (FE)</i>	<i>199</i>	<i>189</i>	<i>199</i>	<i>196</i>	129	<i>51.8%</i>
<i>Penn Power (FE)</i>	<i>134</i>	<i>157</i>	<i>147</i>	<i>146</i>	111	<i>31.3%</i>
<i>Pike County</i>	<i>159</i>	<i>95</i>	<i>184</i>	<i>146</i>	192	<i>-24.0%</i>
<i>PPL</i>	<i>164</i>	<i>189</i>	<i>371</i>	<i>241</i>	160	<i>50.8%</i>
<i>UGI</i>	<i>156</i>	<i>112</i>	<i>138</i>	<i>135</i>	186	<i>-27.2%</i>
<i>Wellsboro</i>	<i>130</i>	<i>114</i>	<i>102</i>	<i>115</i>	136	<i>-15.2%</i>
<i>West Penn (FE)</i>	<i>276</i>	<i>266</i>	<i>200</i>	<i>247</i>	187	<i>32.2%</i>
<i>System Average Interruption Frequency Index (SAIFI)-outages/yr/cust</i>				<i>3-Year</i>	<i>3-Year</i>	<i>% Above (+) or</i>
<i>EDC</i>	<i>2022</i>	<i>2023</i>	<i>2024</i>	<i>Average</i>	<i>Standard</i>	<i>Below (-) Standard</i>
<i>Citizens'</i>	<i>0.27</i>	<i>0.32</i>	<i>0.45</i>	<i>0.35</i>	0.22	<i>57.6%</i>
<i>Duquesne Light</i>	<i>0.92</i>	<i>0.57</i>	<i>0.82</i>	<i>0.77</i>	1.29	<i>-40.3%</i>
<i>Met-Ed (FE)</i>	<i>1.32</i>	<i>1.27</i>	<i>2.06</i>	<i>1.55</i>	1.27	<i>22.0%</i>
<i>PECO</i>	<i>0.71</i>	<i>0.74</i>	<i>0.78</i>	<i>0.74</i>	1.35	<i>-44.9%</i>
<i>Penelec (FE)</i>	<i>1.83</i>	<i>1.60</i>	<i>1.79</i>	<i>1.74</i>	1.39	<i>25.2%</i>
<i>Penn Power (FE)</i>	<i>0.99</i>	<i>0.78</i>	<i>1.01</i>	<i>0.93</i>	1.23	<i>-24.7%</i>
<i>Pike County</i>	<i>0.50</i>	<i>0.86</i>	<i>0.84</i>	<i>0.73</i>	0.67	<i>9.5%</i>
<i>PPL</i>	<i>0.87</i>	<i>0.78</i>	<i>1.22</i>	<i>0.96</i>	1.08	<i>-11.4%</i>
<i>UGI</i>	<i>0.87</i>	<i>0.54</i>	<i>0.78</i>	<i>0.73</i>	0.91	<i>-19.8%</i>
<i>Wellsboro</i>	<i>1.09</i>	<i>1.37</i>	<i>0.99</i>	<i>1.15</i>	1.35	<i>-14.8%</i>
<i>West Penn (FE)</i>	<i>1.32</i>	<i>1.07</i>	<i>1.28</i>	<i>1.22</i>	1.16	<i>5.5%</i>
<i>System Average Interruption Duration Index (SAIDI)-min/yr/cust</i>				<i>3-Year</i>	<i>3-Year</i>	<i>% Above (+) or</i>
<i>EDC</i>	<i>2022</i>	<i>2023</i>	<i>2024</i>	<i>Average</i>	<i>Standard</i>	<i>Below (-) Standard</i>
<i>Citizens'</i>	<i>28</i>	<i>29</i>	<i>64</i>	<i>40</i>	25	<i>61.1%</i>
<i>Duquesne Light</i>	<i>134</i>	<i>63</i>	<i>127</i>	<i>108</i>	153	<i>-29.4%</i>
<i>Met-Ed (FE)</i>	<i>211</i>	<i>257</i>	<i>498</i>	<i>322</i>	163	<i>97.6%</i>
<i>PECO</i>	<i>71</i>	<i>103</i>	<i>75</i>	<i>83</i>	167	<i>-50.3%</i>
<i>Penelec (FE)</i>	<i>364</i>	<i>303</i>	<i>356</i>	<i>341</i>	179	<i>90.5%</i>
<i>Penn Power (FE)</i>	<i>133</i>	<i>121</i>	<i>147</i>	<i>134</i>	136	<i>-1.5%</i>
<i>Pike County</i>	<i>79</i>	<i>82</i>	<i>155</i>	<i>105</i>	129	<i>-18.3%</i>
<i>PPL</i>	<i>142</i>	<i>147</i>	<i>451</i>	<i>247</i>	172	<i>43.4%</i>
<i>UGI</i>	<i>135</i>	<i>61</i>	<i>107</i>	<i>101</i>	170	<i>-40.6%</i>
<i>Wellsboro</i>	<i>142</i>	<i>155</i>	<i>102</i>	<i>133</i>	185	<i>-28.2%</i>
<i>West Penn (FE)</i>	<i>364</i>	<i>285</i>	<i>255</i>	<i>301</i>	217	<i>38.9%</i>

Note: **GREEN** = better than standard; **RED** = worse than standard.

Performance Standard. An EDC's performance standard is a numerical value that represents the minimal performance allowed for each reliability index for a given EDC. Performance standards are based on a percentage of each EDC's historical performance benchmarks.

Appendix B – Reliability Performance Scorecard Results 2022-2024

2024 EDC Performance Scorecard												
Metrics achieved	GREEN	Benchmark Metrics not achieved					YELLOW	Standard Metrics not achieved				RED
		Rolling 12-Month										
		Benchmark Score					Standard Score					
EDCs	¹ Metrics	² BM	Q1	Q2	Q3	Q4	³ STD	Q1	Q2	Q3	Q4	
Large EDCs												
Duquesne Light	CAIDI	108	111	108	135	156	130	111	108	135	156	
	SAIDI	126	66	126	85	127	182	66	126	85	127	
	SAIFI	1.17	0.59	1.17	0.63	0.82	1.40	0.59	1.17	0.63	0.82	
PECO	CAIDI	112	141	137	97	96	134	141	137	97	96	
	SAIDI	138	110	109	72	75	198	110	109	72	75	
	SAIFI	1.23	0.78	0.79	0.74	0.78	1.48	0.78	0.79	0.74	0.78	
PPL	CAIDI	145	265	319	314	371	174	265	319	314	371	
	SAIDI	142	260	364	355	451	205	260	364	355	451	
	SAIFI	0.98	0.98	1.14	1.13	1.22	1.18	0.98	1.14	1.13	1.22	
Met-Ed (FirstEnergy)	CAIDI	117	245	262	252	242	140	245	262	252	242	
	SAIDI	135	383	408	478	498	194	383	408	478	498	
	SAIFI	1.15	1.56	1.79	1.89	2.06	1.38	1.56	1.79	1.89	2.06	
Penelec (FirstEnergy)	CAIDI	117	151	151	151	199	141	151	151	151	199	
	SAIDI	148	233	254	241	356	213	233	254	241	356	
	SAIFI	1.26	1.54	1.68	1.60	1.79	1.52	1.54	1.68	1.60	1.79	
Penn Power (FirstEnergy)	CAIDI	101	150	157	122	147	121	150	157	122	147	
	SAIDI	113	127	141	112	147	162	127	141	112	147	
	SAIFI	1.12	0.84	0.89	0.92	1.01	1.34	0.84	0.89	0.92	1.01	
West Penn (FirstEnergy)	CAIDI	170	210	220	193	200	204	210	220	193	200	
	SAIDI	179	224	282	229	255	257	224	282	229	255	
	SAIFI	1.05	1.06	1.28	1.19	1.28	1.26	1.06	1.28	1.19	1.28	
Small EDCs												
Citizens'	CAIDI	105	102	128	132	144	141	102	128	132	144	
	SAIDI	21	50	66	53	64	38	50	66	53	64	
	SAIFI	0.20	0.49	0.52	0.40	0.45	0.27	0.49	0.52	0.40	0.45	
Pike County	CAIDI	174	104	118	154	184	235	104	118	154	184	
	SAIDI	106	99	100	116	155	194	99	100	116	155	
	SAIFI	0.61	0.94	0.85	0.76	0.84	0.82	0.94	0.85	0.76	0.84	
UGI	CAIDI	169	107	140	141	138	228	107	140	141	138	
	SAIDI	140	54	83	86	107	256	54	83	86	107	
	SAIFI	0.83	0.50	0.59	0.61	0.78	1.12	0.50	0.59	0.61	0.78	
Wellsboro	CAIDI	124	113	112	100	102	167	113	112	100	102	
	SAIDI	153	147	161	112	102	278	147	161	112	102	
	SAIFI	1.23	1.31	1.44	1.12	0.99	1.66	1.31	1.44	1.12	0.99	
¹ CAIDI	(Customer Average Interruption Duration Index) - Measures average power restoration time (minutes) for every customer who lost power during this year.											
SAIDI	(System Average Interruption Duration Index) - Measures average outage duration time (minutes) for every customer served during this year.											
SAIFI	(System Average Interruption Frequency Index) - Measures average frequency of power interruptions for every customer served during this year.											
² BM	(Benchmark) - EDC's attained performance baseline score prior to electric restructuring. Calculated by averaging historical performance metrics over the five-year period directly prior to electric restructuring (1994 to 1998).											
³ STD	(Standard) - EDC's upper limit performance value. CAIDI STD & SAIFI STD is calculated by multiplying BM by 120% for large EDCs and 135% for small EDCs. SAIDI STD is calculated by multiplying CAIDI STD x SAIFI STD.											

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2023 EDC Performance Scorecard													
Metrics achieved	GREEN	Benchmark Metrics not achieved					YELLOW	Standard Metrics not achieved					RED
Rolling 12-Month													
Benchmark Score													
Standard Score													
EDCs	¹ Metrics	² BM	Q1	Q2	Q3	Q4	³ STD	Q1	Q2	Q3	Q4		
Large EDCs													
Duquesne Light	CAIDI	108	130	122	112	110	130	130	122	112	110		
	SAIDI	126	111	95	76	63	182	111	95	76	63		
	SAIFI	1.17	0.86	0.77	0.68	0.57	1.40	0.86	0.77	0.68	0.57		
PECO	CAIDI	112	94	99	138	138	134	94	99	138	138		
	SAIDI	138	59	65	112	103	198	59	65	112	103		
	SAIFI	1.23	0.62	0.66	0.81	0.74	1.48	0.62	0.66	0.81	0.74		
PPL	CAIDI	145	158	163	197	189	174	158	163	197	189		
	SAIDI	142	125	132	172	147	205	125	132	172	147		
	SAIFI	0.98	0.79	0.81	0.87	0.78	1.18	0.79	0.81	0.87	0.78		
Met-Ed (FirstEnergy)	CAIDI	117	140	155	178	202	140	140	155	178	202		
	SAIDI	135	160	185	237	257	194	160	185	237	257		
	SAIFI	1.15	1.14	1.19	1.34	1.27	1.38	1.14	1.19	1.34	1.27		
Penelec (FirstEnergy)	CAIDI	117	230	190	158	189	141	230	190	158	189		
	SAIDI	148	425	317	299	303	213	425	317	299	303		
	SAIFI	1.26	1.85	1.66	1.89	1.60	1.52	1.85	1.66	1.89	1.60		
Penn Power (FirstEnergy)	CAIDI	101	311	117	166	157	121	311	117	166	157		
	SAIDI	113	422	96	159	121	162	422	96	159	121		
	SAIFI	1.12	1.36	0.82	0.96	0.78	1.34	1.36	0.82	0.96	0.78		
West Penn (FirstEnergy)	CAIDI	170	282	254	203	266	204	282	254	203	266		
	SAIDI	179	386	280	268	285	257	386	280	268	285		
	SAIFI	1.05	1.37	1.10	1.32	1.07	1.26	1.37	1.10	1.32	1.07		
Small EDCs													
Citizens'	CAIDI	105	95	84	92	90	141	95	84	92	90		
	SAIDI	21	27	31	43	29	38	27	31	43	29		
	SAIFI	0.20	0.28	0.37	0.47	0.32	0.27	0.28	0.37	0.47	0.32		
Pike County	CAIDI	174	160	158	108	95	235	160	158	108	95		
	SAIDI	106	81	107	85	82	194	81	107	85	82		
	SAIFI	0.61	0.50	0.67	0.79	0.86	0.82	0.50	0.67	0.79	0.86		
UGI	CAIDI	169	159	132	165	112	228	159	132	165	112		
	SAIDI	140	127	100	113	61	256	127	100	113	61		
	SAIFI	0.83	0.80	0.76	0.69	0.54	1.12	0.80	0.76	0.69	0.54		
Wellsboro	CAIDI	124	125	103	115	114	167	125	103	115	114		
	SAIDI	153	133	100	158	155	278	133	100	158	155		
	SAIFI	1.23	1.06	0.97	1.38	1.37	1.66	1.06	0.97	1.38	1.37		
¹ CAIDI	(Customer Average Interruption Duration Index) - Measures average power restoration time (minutes) for every customer who lost power during this year.												
SAIDI	(System Average Interruption Duration Index) - Measures average outage duration time (minutes) for every customer served during this year.												
SAIFI	(System Average Interruption Frequency Index) - Measures average frequency of power interruptions for every customer served during this year.												
² BM	(Benchmark) - EDC's attained performance baseline score prior to electric restructuring. Calculated by averaging historical performance metrics over the five-year period directly prior to electric restructuring (1994 to 1998).												
³ STD	(Standard) - EDC's upper limit performance value. CAIDI STD & SAIFI STD is calculated by multiplying BM by 120% for large EDCs and 135% for small EDCs. SAIDI STD is calculated by multiplying CAIDI STD x SAIFI STD.												

2024 Pennsylvania Electric Reliability Report

2022 EDC Performance Scorecard												
Metrics achieved	GREEN	Benchmark Metrics not achieved					YELLOW	Standard Metrics not achieved				RED
		Rolling 12-Month										
		Benchmark Score					Standard Score					
EDCs	¹ Metrics	² BM	Q1	Q2	Q3	Q4	³ STD	Q1	Q2	Q3	Q4	
Large EDCs												
Duquesne Light	CAIDI	108	193	166	145	146	130	193	166	145	146	
	SAIDI	126	190	162	130	134	182	190	162	130	134	
	SAIFI	1.17	0.98	0.98	0.89	0.92	1.40	0.98	0.98	0.89	0.92	
PECO	CAIDI	112	182	186	96	99	134	182	186	96	99	
	SAIDI	138	173	170	67	71	198	173	170	67	71	
	SAIFI	1.23	0.95	0.92	0.69	0.71	1.48	0.95	0.92	0.69	0.71	
PPL	CAIDI	145	190	191	153	164	174	190	191	153	164	
	SAIDI	142	185	183	125	142	205	185	183	125	142	
	SAIFI	0.98	0.97	0.96	0.82	0.87	1.18	0.97	0.96	0.82	0.87	
Met-Ed (FirstEnergy)	CAIDI	117	190	181	168	160	140	190	181	168	160	
	SAIDI	135	288	262	229	211	194	288	262	229	211	
	SAIFI	1.15	1.51	1.45	1.36	1.32	1.38	1.51	1.45	1.36	1.32	
Penelec (FirstEnergy)	CAIDI	117	145	190	197	199	141	145	190	197	199	
	SAIDI	148	275	369	360	364	213	275	369	360	364	
	SAIFI	1.26	1.90	1.94	1.83	1.83	1.52	1.90	1.94	1.83	1.83	
Penn Power (FirstEnergy)	CAIDI	101	135	130	125	134	121	135	130	125	134	
	SAIDI	113	149	176	128	133	162	149	176	128	133	
	SAIFI	1.12	1.11	1.36	1.02	0.99	1.34	1.11	1.36	1.02	0.99	
West Penn (FirstEnergy)	CAIDI	170	251	266	271	276	204	251	266	271	276	
	SAIDI	179	344	388	344	364	257	344	388	344	364	
	SAIFI	1.05	1.37	1.46	1.27	1.32	1.26	1.37	1.46	1.27	1.32	
Small EDCs												
Citizens'	CAIDI	105	98	112	98	101	141	98	112	98	101	
	SAIDI	21	22	22	19	28	38	22	22	19	28	
	SAIFI	0.20	0.22	0.20	0.19	0.27	0.27	0.22	0.20	0.19	0.27	
Pike County	CAIDI	174	158	183	137	159	235	158	183	137	159	
	SAIDI	106	215	188	85	79	194	215	188	85	79	
	SAIFI	0.61	1.36	1.03	0.62	0.50	0.82	1.36	1.03	0.62	0.50	
UGI	CAIDI	169	124	150	157	156	228	124	150	157	156	
	SAIDI	140	122	136	136	135	256	122	136	136	135	
	SAIFI	0.83	0.99	0.91	0.87	0.87	1.12	0.99	0.91	0.87	0.87	
Wellsboro	CAIDI	124	144	152	150	130	167	144	152	150	130	
	SAIDI	153	155	207	166	142	278	155	207	166	142	
	SAIFI	1.23	1.08	1.37	1.11	1.09	1.66	1.08	1.37	1.11	1.09	
¹ CAIDI	(Customer Average Interruption Duration Index) - Measures average power restoration time (minutes) for every customer who lost power during this year.											
SAIDI	(System Average Interruption Duration Index) - Measures average outage duration time (minutes) for every customer served during this year.											
SAIFI	(System Average Interruption Frequency Index) - Measures average frequency of power interruptions for every customer served during this year.											
² BM	(Benchmark) - EDC's attained performance baseline score prior to electric restructuring. Calculated by averaging historical performance metrics over the five-year period directly prior to electric restructuring (1994 to 1998).											
³ STD	(Standard) - EDC's upper limit performance value. CAIDI STD & SAIFI STD is calculated by multiplying BM by 120% for large EDCs and 135% for small EDCs. SAIDI STD is calculated by multiplying CAIDI STD x SAIFI STD.											

Appendix C – Deviations to Inspection and Maintenance Intervals

Deviations to Inspection and Maintenance Intervals (Group 2) Submitted October 2024, effective Jan. 1, 2026 – Dec. 31, 2027

Company	Deviation Requested	Justification
Citizens'	Pole loading calculations	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan.
Duquesne	Pole loading calculations	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan
Duquesne	Overhead line inspections	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan
Duquesne	Overhead transformer inspections	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan
Duquesne	Above-ground pad-mounted transformers	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan
PECO	Pole loading calculations	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan
PECO	Above-ground pad-mounted transformers	Approved previously in the Jan. 1, 2020- Dec. 31, 2021, I&M Plan
Pike County	Pole loading calculations	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan
Pike County	Overhead line inspections	Approved in the Jan. 1. 2026-Dec. 31, 2027, I&M Plan
PPL	Pole loading calculations	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan
PPL	Overhead line inspections	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan and modified in the Jan. 1, 2026-Dec. 31, 2027, I&M Plan
PPL	Overhead transformer inspections	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan and modified in the Jan. 1, 2026-Dec. 31, 2027, I&M Plan
PPL	Pad mounted and belowground transformer inspections	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan and modified in the Jan. 1, 2026-Dec. 31, 2027, I&M Plan
PPL	Recloser inspections	Approved previously in the Jan. 1, 2014- Dec. 31, 2015, I&M Plan
PPL	Substation inspections	Provisional approved in the Jan. 1, 2017- Dec. 31, 2018, I&M Plan (docket M-2009-2094773)
Wellsboro	Pole loading calculations	Approved previously in the Jan. 1, 2012- Dec. 31, 2013, I&M Plan
Wellsboro	Overhead line inspections	Approved in the Jan. 1. 2026-Dec. 31, 2027, I&M Plan

Deviations to Inspection and Maintenance (I&M) Intervals (Group 1) Submitted October 2023, effective Jan. 1, 2025 – Dec. 31, 2026

Company	Deviation Requested	Justification
FE PA: Penelec, Penn Power, Met- Ed, and West Penn Power	Pole loading calculations	Approved previously in the Jan. 1, 2013- Dec. 31, 2014, I&M Plan.
UGI Electric	Pole loading calculations	Approved previously in the Jan. 1, 2021-Dec. 31, 2022, I&M Plan.



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