



Electric Service Reliability in Pennsylvania

2014



ELECTRIC SERVICE RELIABILITY IN PENNSYLVANIA 2014

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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 metrics adopted by the Institute of Electrical and Electronic Engineers Inc. (IEEE). Those metrics 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.

Given the uncertainty of weather and other events that affect reliability performance, the Commission has stated EDCs shall set goals to achieve benchmark performance in order to prepare for times when unforeseen circumstances push the metrics above the benchmark.⁴ In recognition of these unforeseen circumstances, the PUC set the performance standard as the minimum level of EDC reliability performance. Reliability performance standards not in compliance may require an EDC to undergo additional scrutiny and may include a Corrective Action Plan or a credible analysis that would justify no corrective action was needed.

As mandated, EDCs report metrics⁵ using both a rolling 12-month average and a rolling three-year average. Table 1, below, provides a brief summary of the EDCs' performance for the rolling 12-month period ending December 31, 2014. More detailed analysis can be found in Section 4, *Statistical Utility Performance Data*.

In addition to monitoring EDCs' reliability performance, the Commission established inspection and maintenance standards for electric transmission and distribution systems.⁶ 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).

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 Docket No. M-00991220.

⁴ *Id.* at 25.

⁵ For an explanation of performance standards, see Section 2, page 4.

⁶ Docket No. L-00040167.

Table 1

2014 EDC Performance Scorecard											
Metrics achieved (GREEN)			Benchmark Metrics not achieved (YELLOW)				Standard Metrics not achieved (RED)				
		Rolling 12-Month									
		Benchmark Score					Standard Score				
EDC	¹ Metrics	² BM	Q1	Q2	Q3	Q4	³ STD	Q1	Q2	Q3	Q4
Large EDCs: STD = 20% above Benchmark											
Duquesne Light	CAIDI	108	121	111	100	102	130	121	111	100	102
	SAIDI	126	74	72	57	63	182	74	72	57	63
	SAIFI	1.17	0.61	0.65	0.57	0.62	1.40	0.61	0.65	0.57	0.62
Met-Ed (FE)	CAIDI	117	116	117	112	128	140	116	117	112	128
	SAIDI	135	126	113	116	141	194	126	113	116	141
	SAIFI	1.15	1.08	0.97	1.04	1.11	1.38	1.08	0.97	1.04	1.11
PECO	CAIDI	112	93	95	96	96	134	93	95	96	96
	SAIDI	138	76	79	82	82	198	76	79	82	82
	SAIFI	1.23	0.81	0.83	0.86	0.86	1.48	0.81	0.83	0.86	0.86
Penelec (FE)	CAIDI	117	112	109	128	118	141	112	109	128	118
	SAIDI	148	175	169	201	183	213	175	169	201	183
	SAIFI	1.26	1.56	1.55	1.57	1.55	1.52	1.56	1.55	1.57	1.55
Penn Power (FE)	CAIDI	101	136	111	110	106	121	136	111	110	106
	SAIDI	113	202	156	140	118	162	202	156	140	118
	SAIFI	1.12	1.48	1.41	1.28	1.11	1.34	1.48	1.41	1.28	1.11
PPL	CAIDI	145	153	151	174	180	174	153	151	174	180
	SAIDI	142	140	135	164	165	205	140	135	164	165
	SAIFI	0.98	0.91	0.89	0.94	0.92	1.18	0.91	0.89	0.94	0.92
West Penn (FE)	CAIDI	170	182	175	159	137	204	182	175	159	137
	SAIDI	179	212	204	173	139	257	212	204	173	139
	SAIFI	1.05	1.16	1.17	1.09	1.02	1.26	1.16	1.17	1.09	1.02
Small EDCs: STD = 35% above Benchmark											
Citizens'	CAIDI	105	81	45	103	88	141	81	45	103	88
	SAIDI	21	37	13	12	17	38	37	13	12	17
	SAIFI	0.2	0.46	0.29	0.12	0.19	0.27	0.46	0.29	0.12	0.19
Pike County	CAIDI	174	165	134	103	106	235	165	134	103	106
	SAIDI	106	364	439	294	224	194	364	439	294	224
	SAIFI	0.61	2.21	3.28	2.85	2.12	0.82	2.21	3.28	2.85	2.12
UGI	CAIDI	169	120	126	142	144	228	120	126	142	144
	SAIDI	140	84	91	69	63	256	84	91	69	63
	SAIFI	0.83	0.7	0.72	0.49	0.44	1.12	0.7	0.72	0.49	0.44
Wellsboro	CAIDI	124	68	76	90	75	167	68	76	90	75
	SAIDI	153	36	48	61	57	278	36	48	61	57
	SAIFI	1.23	0.53	0.63	0.68	0.77	1.66	0.53	0.63	0.68	0.77
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) - An EDC's attained performance baseline score prior to electric restructuring. Calculated by averaging the EDC's annual system-wide metrics over the five-year period directly prior to electric restructuring (1994 to 1998).										
³ STD	(Standard) - An EDC's upper limit performance value that must not be exceeded. Calculated by adding (20% for larger utilities or 35% for smaller utilities) of EDC's benchmark score to the EDC's baseline benchmark score.										

Section 1 – Introduction

Purpose

The report discusses the reliability performance of EDCs operating under the Commission’s jurisdiction, specifically focusing on the reliability of the electric distribution system.⁷

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).⁸ 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. 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.

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

The Commission set the performance standard as the minimum level of EDC reliability performance. Reliability Performance Standards that are not 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. Performance Standards that are not achieved during an assessment period will be followed up by the Commission to ensure there is not a systemic breakdown.

⁷ 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.

⁸ For more information on CAIDI and SAIFI, see Section 2.

Section 2 –Reliability Performance Measures

Reliability Performance Metrics

The Commission’s benchmarks and standards are based on four reliability performance metrics that have been adopted by the IEEE. The EDCs report metrics on a system-wide basis, rather than on a regional operating area basis. EDCs report the four reliability metrics on both a rolling 12-month average and a three-year calendar year average:

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 (less than 5 minutes) interruptions for every customer served during reporting period.

Note: EDCs are required to report MAIFI data provided the equipment capability is available to obtain relevant data.

Additional information and data is reported, including:

- Average number of customers served;
- Number of sustained customer interruption minutes;
- Number of customers affected by service interruptions;
- Breakdown and analysis of outage causes such as equipment failure, animal contact and contact with trees;⁹ and
- Reliability performance on a 5 percent of worst performing circuits and a corrective action plan to increase the reliability of these circuits.

Major Events

In order 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 metrics. The term “major event” is used to identify an abnormal event, such as a major storm, and is defined as either of the following:¹⁰

⁹ This information is collected and trended by EDCs to reduce customer outages and improve system reliability.

¹⁰ See 52 Pa. Code § 57.192

- An interruption of electric service resulting from conditions beyond the control of the EDC which affects at least 10 percent 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 metrics. Prior to excluding major event outage 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 performance **benchmark** represents the statistical average of the EDC's annual, system-wide, reliability performance index values for the five years from 1994-98. The benchmark serves as a reference point to compare and gauge an EDC's sustainable reliability performance, which should continually improve.

The performance **standard** is a numerical value representing an EDC's performance control limit established for each reliability index. Performance standards are based on individual EDC historical performance benchmarks. Both long-term (rolling three-year) and short-term (rolling 12-month) performance standards have been established for each EDC.

The performance rolling **12-month average** is 120 percent of the benchmark for the large EDCs and 135 percent for the small EDCs.¹¹ A greater degree of short-term latitude 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 percent of the benchmark for all EDCs. This performance standard was set at 10 percent 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 three-year average performance is measured against the standard at the end of each calendar year. The rolling three-year standard analysis contained in this report uses 2012, 2013 and 2014 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 CAIDI benchmark performance was determined to be 100 minutes and its rolling 12-month CAIDI standard is 120, which is 120% of benchmark. Evaluate an EDC's quarterly CAIDI score of 110, 90, and 140:

¹¹ Large EDCs currently include: Duquesne Light, Met-Ed, Penelec, Penn Power, PECO, PPL and West Penn. Small EDCs include: UGI, Citizens', Pike County and Wellsboro.

CAIDI of 110 evaluation: 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. The EDC will 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, may result in a Regulatory Non-Compliance Order being issued.

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

CAIDI of 140 evaluation: 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 Regulatory Non-Compliance Order being issued.

If any EDC's reliability performance does not meet Commission standards, the Commission may require a report discussing the reasons for not meeting the standard and the corrective measures the company is taking to improve performance.¹² In addition, Commission staff may initiate an investigation to determine whether an EDC is providing reliable service.¹³

Benchmarks and standards for EDC reliability performance and average reliability Metrics for 2014 are listed in Appendix 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.¹⁴ The time intervals for such inspections are detailed in Table 2, 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 2014 (effective January 2016 through December 2017) for Duquesne Light, PECO, PPL, Citizens', Pike County and Wellsboro.

¹² See 52 Pa. Code § 57.195(g).

¹³ See 52 Pa. Code § 57.197(a).

¹⁴ See 52 Pa. Code § 57.198.

- Filed in October 2013 (effective January 2015 through December 2016) for FirstEnergy (Met-Ed, Penelec, Penn Power and West Penn Power) and UGI.

The plans are subject to acceptance or rejection by the Commission. Most EDCs proposed modifications to the standards for some programs or parts of programs. Appendix B describes the exemptions that were requested by the EDCs and provides a summary of the explained justification for said exemptions.¹⁵

Table 2 - 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

Section 3 – 2013 Outage Response Review

Overview

With the exception of Citizens', UGI, and Penn Power; all Pennsylvania EDCs had at least one PUC reportable outage event in 2014.¹⁶ In 2014, a total of approximately 1.75 million customers were affected by weather-related reportable outages. Table 3, below, shows a breakdown of storm events in 2014:

¹⁵ See 52 Pa. Code § 57.198(c).

¹⁶ Service outages reports are required under 52 Pa. Code § 67.1. 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 days after the last customer is restored. The reporting threshold is service outages to 5 percent of total customers or 2,500 customers, whichever is less, for six or more consecutive hours.

Table 3 - Reportable Outage Events

EDC	Date	Customers Affected	Cause
PECO	02-03-14	48,019	Snow/Sleet/Wind
PECO	02-05-14	723,681	Winter Storm Nika
PPL	02-05-14	92,283	Winter Storm Nika
WEST PENN	02-05-14	8,118	Winter Storm Nika
MET-ED	02-05-14	135,688	Winter Storm Nika
WELLSBORO	02-06-14	6,242	Snow/Sleet/Wind
PPL	03-30-14	23,407	Wind
WEST PENN	06-11-14	19,326	Thunderstorm/Wind
PENELEC	06-19-14	27,208	Thunderstorm/Wind
PECO	07-03-14	180,277	Thunderstorm/Wind
PPL	07-03-14	21,040	Thunderstorm/Wind
WEST PENN	07-08-14	15,752	Thunderstorm/Wind
MET-ED	07-08-14	71,484	Thunderstorm/Wind
PENELEC	07-08-14	30,145	Thunderstorm/Wind
PPL	07-08-14	93,634	Thunderstorm/Wind
PECO	07-08-14	236,177	Thunderstorm/Wind
PIKE	08-21-14	4,297	Thunderstorm/Wind
PECO	11-02-14	40,597	Wind/Rain
DUQUESNE	11-24-14	30,885	Wind/Storm
WEST PENN	11-24-14	32,220	Wind/Snow
MET-ED	11-26-14	30,033	Wind/Snow
PPL	11-26-14	15,619	Wind/Snow
WEST PENN	12-25-14	7,143	Wind/Snow

In general, most of the reportable outages were resolved in about 1 day. Most outage events occurred in February and July, and were caused by high winds, snowstorms and severe thunderstorms. Both PECO and PPL had noteworthy storm events in February and July.

Review of Long-Duration Outage Event(s)

In 2014, PECO experienced the most severe storm-related outages. On Feb. 5, 2014, PECO experienced an extreme Ice Storm, Nika that left about 715,000 customers without power. Ice Storm Nika was the second most damaging storm in PECO's nearly 135 year history, exceeded only by Hurricane Sandy. The storm caused widespread damage across PECO's service territory during a 24 hour period. PECO restored 91 percent of all customers impacted in less than 72 hours; 98 percent of customers were restored within five days; and all customers were restored within seven days. More than 95 miles of wire, 520 poles, 2,505 cross arms, 302 transformers and 14,422 fuses were needed to repair the damage and restore service to customers. PECO

linemen, along with local contractors and linemen from nine states and Canada worked in adverse conditions to safely restore power to PECO territory customers.

PECO met with county emergency management officials to discuss lessons learned after Ice Storm Nika and implemented changes to their storm response and road closure processes as part of their self-assessment continual improvement program. PECO also continues to improve their Distribution Management System (DMS), Distribution Supervisory Control and Data Acquisition (SCADA) systems, Outage Management System (OMS), and to upgrade their distribution equipment in order to perform restoration activities more effectively.

Table 4, below, is a chart showing the top 5 PECO Storm Outage Events:

Table 4 - Reportable Outage Events

Storm Event Name	Date	Number of Customers out-of-service	Total days till last customer restored
Hurricane Sandy	October 2012	850,000	9 days
Ice Storm Nika	February 2014	715,000	7 days
Ice Breaker (PECO)	January 1994	550,000	5 days
Hurricane Isabel	September 2003	545,000	9 days
Hurricane Irene	August 2011	508,000	7 days

PECO also experienced back-to-back severe thunderstorms in July with high wind gusts that affected over 400,000 customers and lasted about 3 days each until all customers were restored.

PPL and Met-Ed were also impacted significantly by Ice Storm Nika. Over 92,000 PPL and 144,000 Met-Ed customers were affected, with some customer outages lasting several days. Ice Storm Nika’s outage count and duration met the major event threshold for PECO and Met-Ed, and was therefore excludable from the calculation of reliability statistics for those EDCs. Ice Storm Nika did not meet the 10 percent major event threshold for PPL and therefore, it was not excluded from PPL’s reliability statistics.

Section 4 –Statistical Utility Performance Data

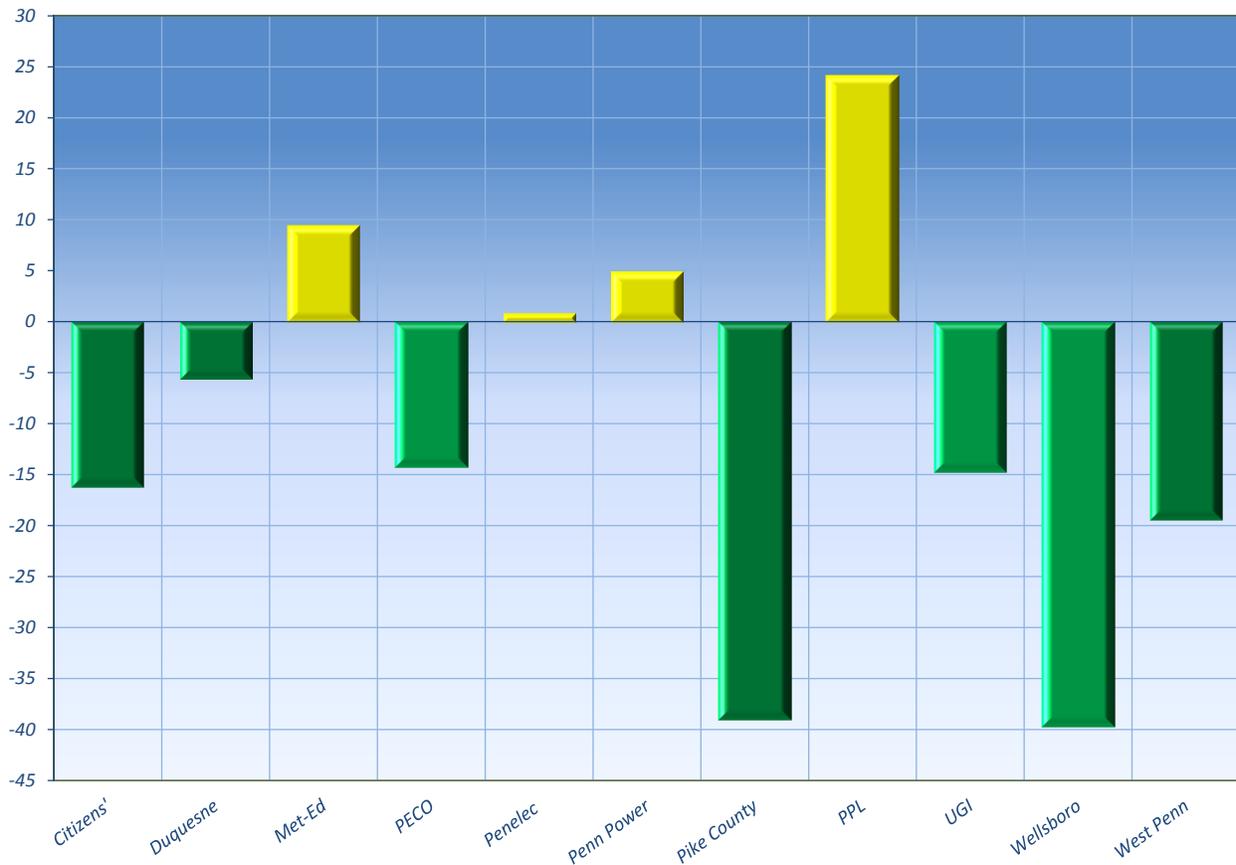
Statewide Summary

Rolling 12-month Benchmark Performance Compliance

The 2014 reliability data for 12-month performance compliance submitted by the 11 EDCs indicates:

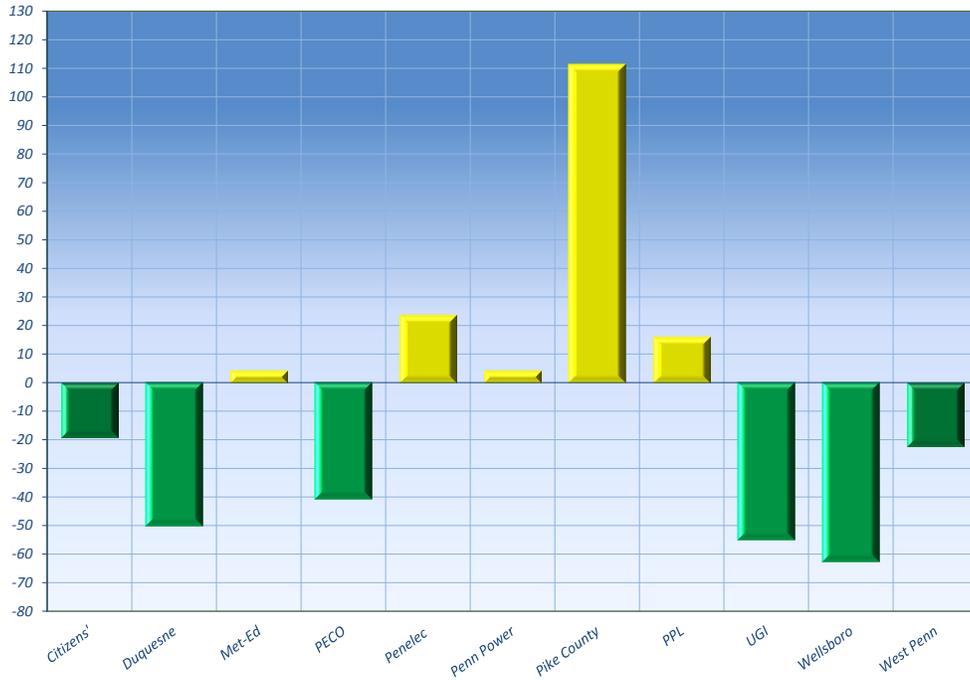
- Seven EDCs achieved the CAIDI benchmark, while four EDCs failed to achieve the CAIDI benchmark (Figure 1).
- Six EDCs achieved the SAIDI benchmark, while five EDCs failed to achieve the SAIDI benchmark (Figure 2).
- Nine EDCs achieved the SAIFI benchmark, while two EDCs failed to achieve the SAIFI benchmark (Figure 3).

Figure 1 – 2014 CAIDI Comparison (percent above or below benchmark)



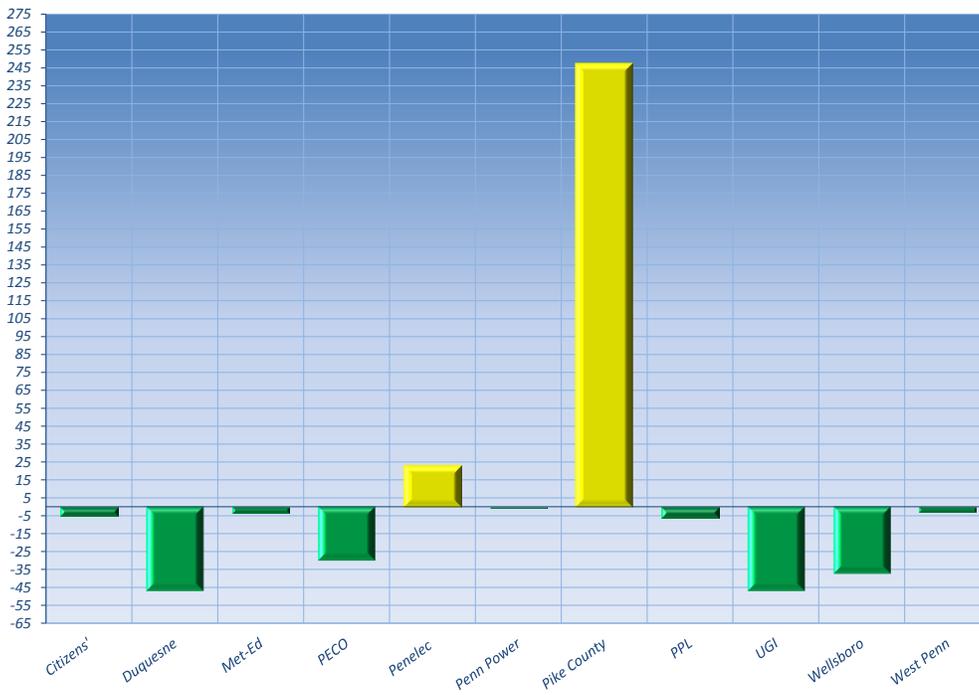
Note: The green bar shows the percentage successfully achieved below CAIDI benchmark performance metric. The yellow bar shows the percentage above the CAIDI benchmark that was not achieved. Actual data is shown in Appendix A.

FIGURE 2 – 2014 SAIDI Comparison (percent above or below benchmark)



Note: The green bar shows the percentage successfully achieved below SAIDI benchmark performance metric. The yellow bar shows the percentage above the SAIFI benchmark that was not achieved. Actual data is shown in Appendix A.

FIGURE 3 – 2014 SAIFI Comparison (percent above or below benchmark)



Note: The green bar shows the percentage successfully achieved below SAIFI benchmark performance metric. The yellow bar shows the percentage above the SAIFI benchmark that was not achieved. Actual data is shown in Appendix A.

Rolling 3-year Average Performance Compliance

Appendix A provides the actual 2014 12- month average and three-year average reliability performance metrics for individual EDCs.

One EDC (Penn Power) failed to meet the rolling three-year CAIDI performance standard by 9 minutes total in 2014, compared to Three EDCs (Penelec, Penn Power, and Pike County) by 70 minutes total in 2013.

Three EDCs (Citizens, Penelec, and Pike County) failed to meet the rolling three-year SAIFI performance standard by 0.49 outages total in 2014, compared to Four EDCs (Citizens', Penelec, Pike County and West Penn) by 0.36 outages total in 2013.

Three EDCs (Penelec, Penn Power, and Pike) failed to meet the rolling three-year SAIDI performance standard by 80 minutes total in 2014, compared to five EDCs (Citizens', Penelec, Penn Power, Pike County, and West Penn) by 116 minutes total in 2013.

Major Exclusion Request

In 2014, EDCs filed 19 requests for exclusion of major events. 18 requests were approved and one was denied. A major event exclusion request may be denied for a variety of reasons such as the event not meeting the 10 percent threshold of customers interrupted or the failure of equipment without supporting maintenance records. A brief description of each major event is provided in the individual EDC sections.

Utility-Specific Performance Data

The Commission compares reliability metrics on a quarterly basis, using data obtained for the preceding 12 months. This periodic assessment determines the current status of electric service reliability on an ongoing basis and is instrumental in identifying negative trends. The three-year average performance is measured at the end of each calendar year, using the average of the past three end-year metrics, 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 three-year average basis.

Citizens' Electric Company

Citizens' has an operating service area of about 41 square miles with about 6,881 customers. The electric system consists of one distribution substation and nine distribution feeder lines. In 2014, Citizens' experienced 1,306 customer interruptions and 115,083 minutes of interruption, which was a significant decrease from 2013 when customers experienced 3,153 interruptions and 256,087 minutes of interruption.

The 2014 reliability metrics exclude the following outage data related to three major events, which were approved by the Commission:¹⁷

- June 18, 2014 – Rain storm and wind gusts caused a tree to fall on power lines, affecting 987 customers.
- July 8, 2014 – Rain storm and wind gusts caused a tree to fall on power lines, affecting 2,460 customers.
- July 23, 2014 – Painting contractor using a rented lifting rig came into contact with power lines (non-fatality), affecting 1,358 customers.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Increased from 81 minutes in 2013 to 88 minutes in 2014; achieved benchmark by 16 percent.

Three-year average: Decreased from 112 minutes in 2013 to 99 minutes in 2014; achieved standard by 14 percent.

SAIDI

Rolling 12-month: Decreased from 37 minutes in 2013 to 17 minutes in 2014; achieved benchmark by 19 percent.

Three-year average: Decreased from 31 minutes in 2013 to 22 minutes in 2014; achieved standard by 13 percent.

SAIFI

Rolling 12-month: Decreased from 0.46 outages in 2013 to 0.19 outages in 2014; achieved benchmark by 5 percent.

Three-year average: Decreased from 0.30 outages in 2013 to 0.25 outages in 2014; failed to achieve standard by 12 percent.

Note: Smaller SAIFI values are typical for companies with fewer customers. Smaller systems tend to experience more variability in service outage data, which is captured in the development of historical. This data can only be used with the historical performance of Citizens' to assess reliability performance and actual values are not valid for comparisons among other EDCs.

Historical 12-month CAIDI and SAIFI trends are shown in Figure 4 and Figure 5. As displayed, Citizens' CAIDI and SAIFI were below benchmark for the last two rolling 12-month quarters of 2014.

Figure 6 shows the distribution of outage causes that occurred during 2014 as a percentage of total outages. Figure 7 shows the historical trend of the top three main outage causes. The most frequent outage causes were equipment, animals, and off right-of-way trees.

¹⁷ See Docket Nos. M-2013-2371424; M-2013-2366624; M-2013-2374113.

In 2014, Citizens' completed full integration of all substation controls with the SCADA system to provide real-time status, load, and other operational data. Citizens' will continue improvements to all smart grid systems in order to help manage outage events more effectively. Reliability improvements related to equipment will continue with the replacement of vintage type porcelain arrestors and cut-outs with polymer-based insulators. In 2014, Citizens' significantly increased its tree trimming operations since the Emerald Ash Borer Beetle is causing significant deterioration of ash trees throughout its territory. Additionally, the company is continuing its program whereby off right-of-way danger trees are identified and eliminated.

In the last two quarters of 2014, Citizens' attained below benchmark scores in every performance category. As a result, below benchmark performance scores are expected to continue in 2015.

Figure 4 Citizens' CAIDI (minutes)

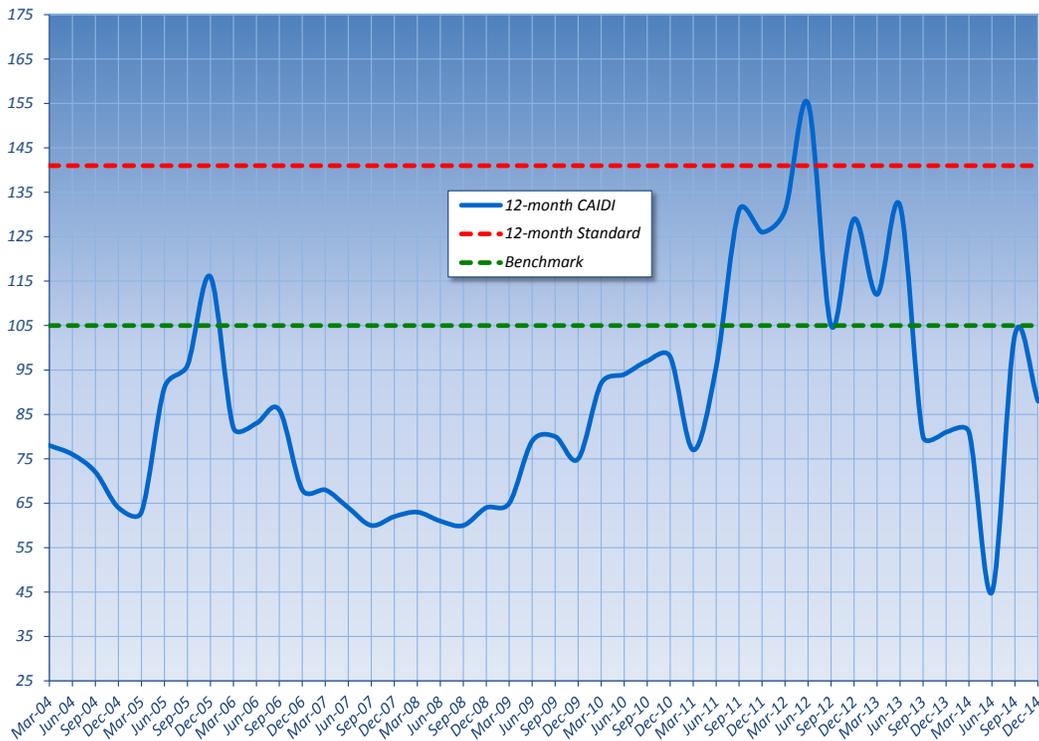


Figure 5 Citizens' SAIFI (interruptions per customer)

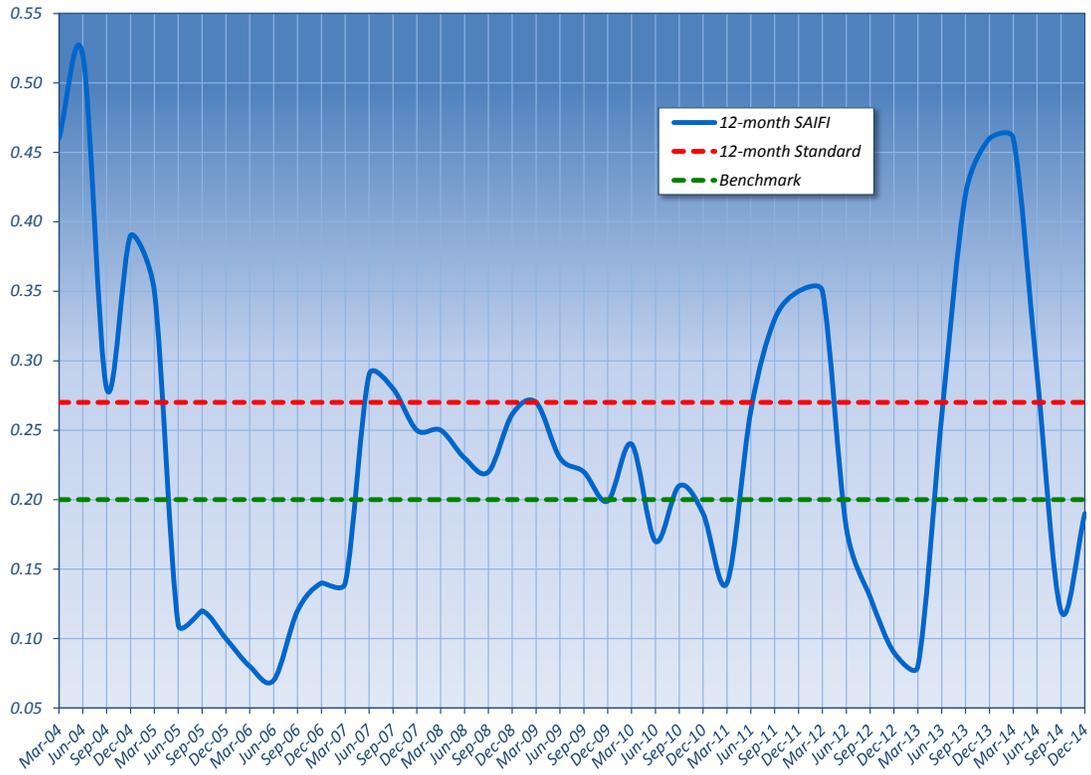


Figure 6 Citizens' Outage Causes (percent of total outages)

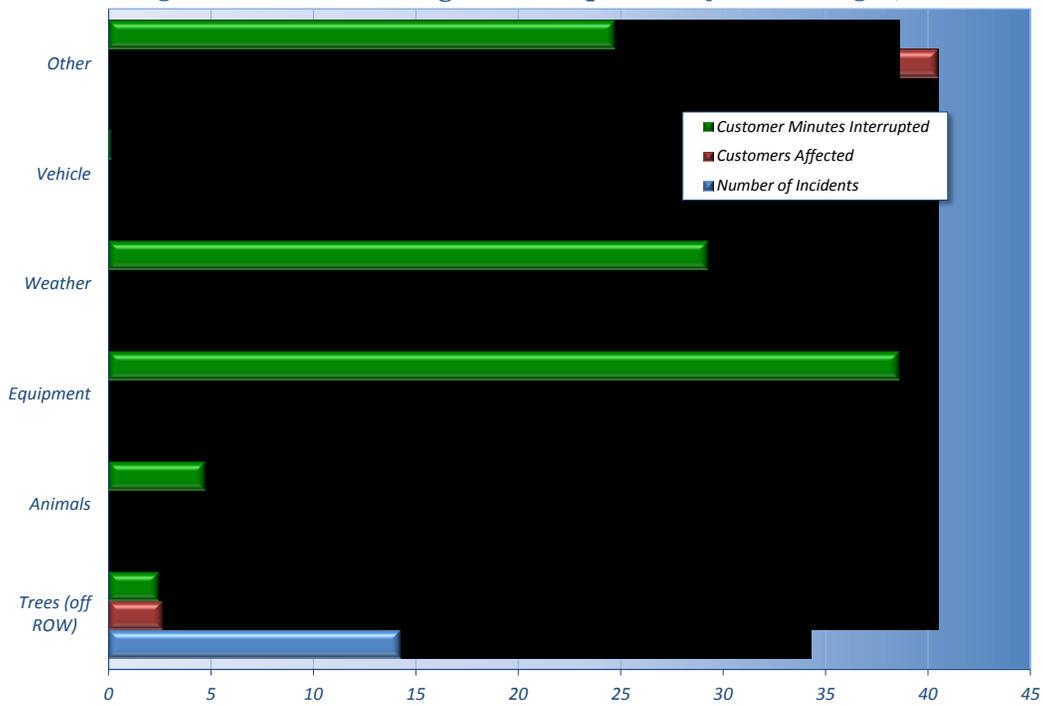
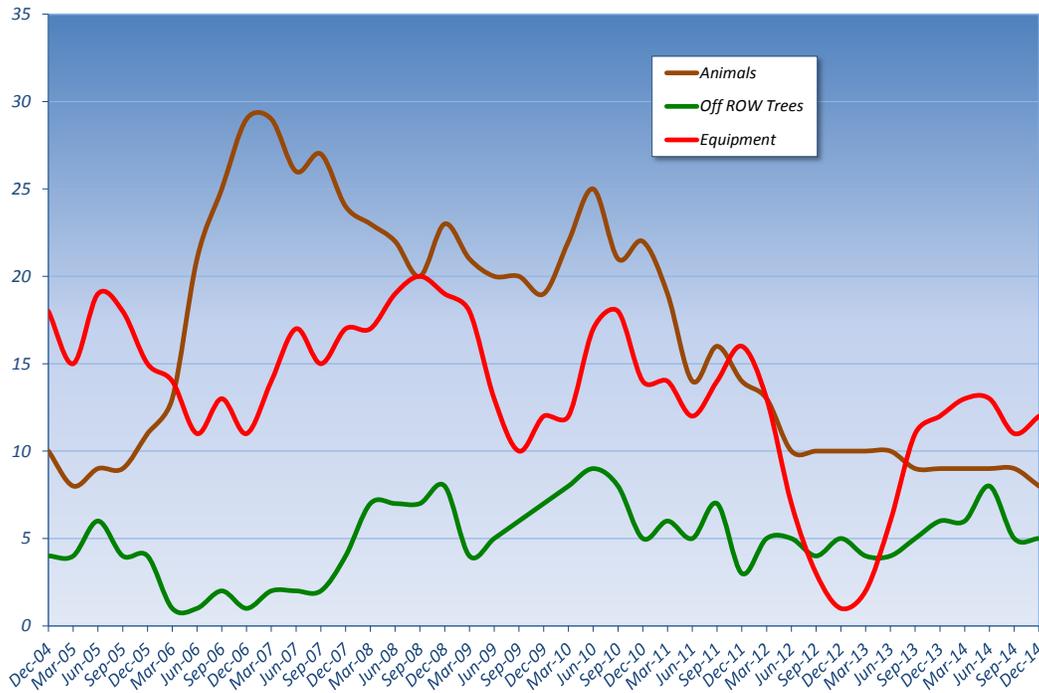


Figure 7 Citizens' Outage Tracking (number of incidents)



Duquesne Light Company

Duquesne has a service territory of about 817 square miles with a well-developed distribution system serving about 580,000 customers. In 2014, Duquesne experienced 4.4 million kilovolt-amps (kVA) interruptions and 450.5 million kVA-minutes of interruption, which was an improvement from 2013, when customers experienced 4.4 million kilovolt-amps (kVA) interruptions and 536.3 million kVA-minutes of interruption.

Duquesne had no major events in 2014.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Decreased from 121 minutes in 2013 to 102 minutes in 2014; achieved benchmark by 6 percent.

Three-year average: Decreased from 115 minutes in 2013 to 113 minutes in 2014; achieved standard by 5 percent.

SAIDI

Rolling 12-month: Decreased from 75 minutes in 2013 to 63 minutes in 2014; achieved benchmark by 50 percent.

Three-year average: Decreased from 84 minutes in 2013 to 72 minutes in 2014; achieved standard by 53 percent.

SAIFI

Rolling 12-month: No change from 0.62 outages in 2013 to 0.62 outages in 2014; achieved benchmark by 47 percent.

Three-year average: Decreased from 0.74 outages in 2013 to 0.67 outages in 2014; achieved standard by 51 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 8 and Figure 9. During the last two quarters of 2014, Duquesne was below benchmark for all performance categories. Average restoration time and outage frequency trended downward during the calendar year.

Figure 10 shows the distribution of outage causes that occurred during 2014 as a percentage of total outages. Figure 11 shows historical trend of the top three main outage causes. The most frequent outage causes were equipment failure, trees, and storms.

Duquesne continues to improve its reliability management work programs and systems. Duquesne installed Fault Current Indicators (FCI) on sections of underground line to help identify fault locations more quickly thereby reduce outage restoration times. Duquesne has installed pulse-reclosing protection technology on some of their 23 kV circuits. This type of recloser reduces the stress on the circuit components during a fault event, thereby reducing component damage and outage restoration times. Additionally, Duquesne has an enhanced its danger tree identification program, which should shorten outage durations by proactively identifying and eliminating targeted trees that could come into contact with the distribution system.

In the last two quarters of 2014, Duquesne attained below benchmark scores in every performance category. Below benchmark performance scores are expected to continue in 2015.

Figure 8 Duquesne CAIDI (minutes)

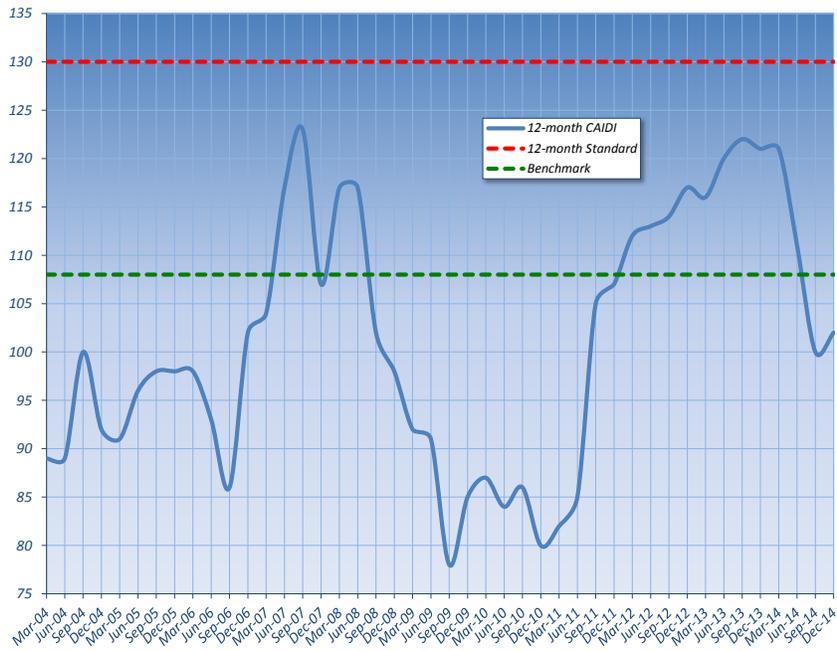


Figure 9 Duquesne SAIFI (interruptions per customer)

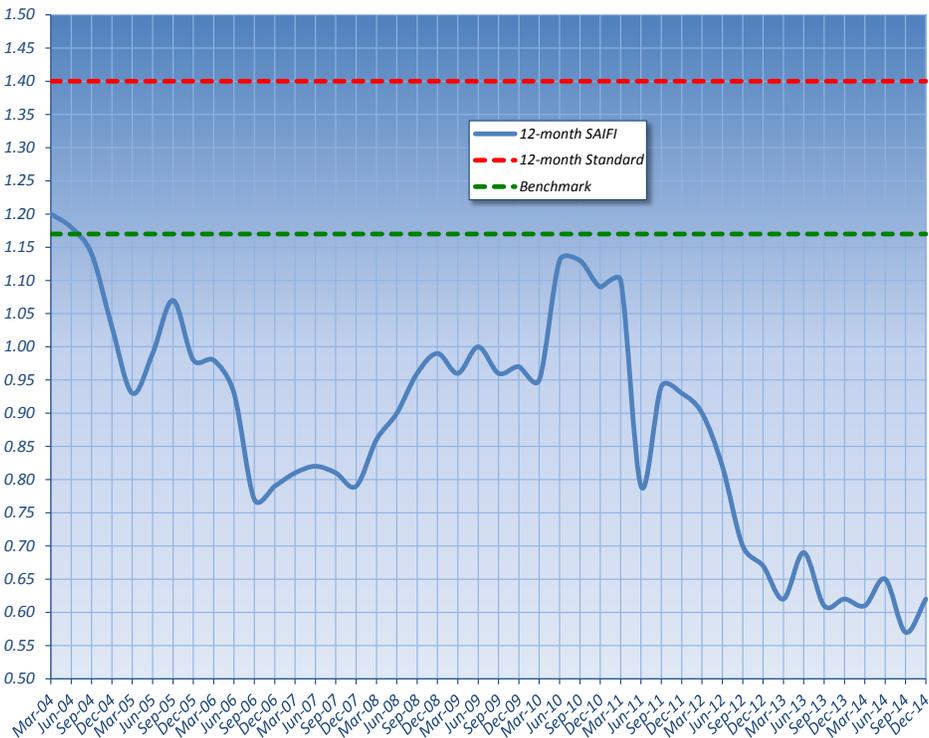
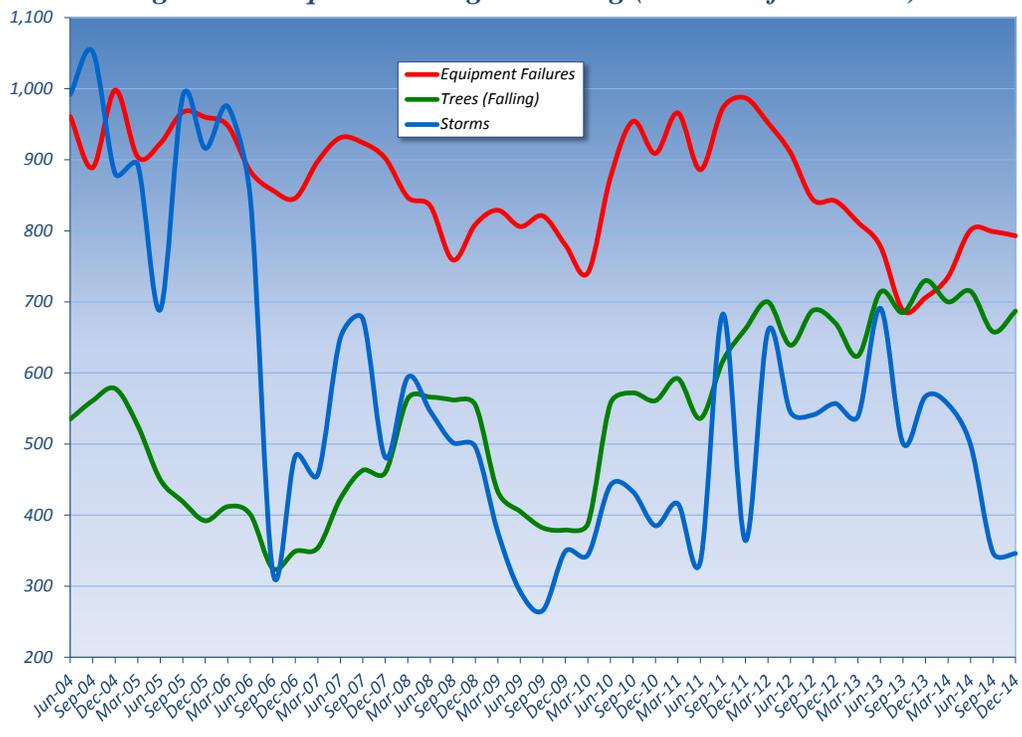


Figure 10 Duquesne Outage Causes (percent of total outages)



Figure 11 Duquesne Outage Tracking (number of incidents)



Metropolitan Edison Company

Met-Ed has a service territory of about 3,300 square miles that serves 552,000 customers. In 2014, Met-Ed experienced 610,606 customer interruptions and 2.53 million minutes of interruption, which was an increase from 2013, when customers experienced 598,111 customer interruptions and 1.53 million minutes of interruption.

The 2014 reliability metrics exclude the following outage data related to two Commission approved major events:

- February 5, 2014 – Ice Storm Nika, affecting 135,688 customers.
- July 8, 2014 – Thunderstorm & high winds, affecting 69,632 customers.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Increased from 105 minutes in 2013 to 128 minutes in 2014; failed to achieve benchmark by 9 percent.

Three-year average: Increased slightly from 114 minutes in 2013 to 118 minutes in 2014; achieved standard by 9 percent.

SAIDI

Rolling 12-month: Increased from 115 minutes in 2013 to 141 minutes in 2014; failed to achieve benchmark by 4 percent.

Three-year average: No change from 137 minutes in 2013 to 137 minutes in 2014; achieved standard by 16 percent.

SAIFI

Rolling 12-month: Increased from 1.09 outages in 2013 to 1.11 outages in 2014; achieved benchmark by 4 percent.

Three-year average: Decreased from 1.20 outages in 2013 to 1.16 outages in 2014; achieve standard by 8 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 12 and Figure 13. The past year trend shows an increase in restoration times and outages frequency. In 2014, Met-Ed performed at or below benchmark in the first, second, and third quarters, however in the fourth quarter CAIDI and SAIDI scores increased slightly above the benchmark.

Figure 14 shows the distribution of causes of service outages that occurred during 2014 as a percentage of total outages. Figure 14 shows the top main outage causes, which shows that equipment failure is the most frequent cause of a power outage and customer minutes interrupted; but off right-of-way trees caused the most customer minutes interrupted.

Figure 15 shows a trend of outages causes; and equipment failure has been the most frequent cause of outages and the recent trend has been increasing.

Due to the somewhat negative trends in CAIDI and SAIFI, the PUC is monitoring Met-Ed's performance to ensure the negative trends do not continue. As part of its Reliability Improvement Plan (RIP), Met-Ed has listed the following:

- The company has done substantial improvement in outage management system and reliability upgrades to poor performing circuits.
- Tree trimming and danger tree operations have increased and improvements have been made but there are still opportunities for improvement, including in some of the rural and mountainous areas of Met-Ed which pose a challenge.
- The company continues to implement a series of reliability improvement initiatives to stormproof and harden their three-phase distribution system backbone including aggressive tree trimming and circuit-condition assessments.
- The company continues to install protective devices, such as fuses and reclosers across the entire system to minimize the amount of customers interrupted during an outage event.
- The company has been proactively replacing porcelain cutouts with polymer cutouts.
- The company continues to add SCADA devices that allow for prompt restoration during outages.
- The company has installed fault indicators that are designed to help linemen quickly locate the source of an outage.

Even though Met-Ed reliability performance was at or below benchmark for the first three quarters of 2014, the PUC will continue in 2015 to monitor Met-Ed's RIP to ensure below benchmark performance is again achieved and sustained.

Figure 12 Met-Ed CAIDI (minutes)

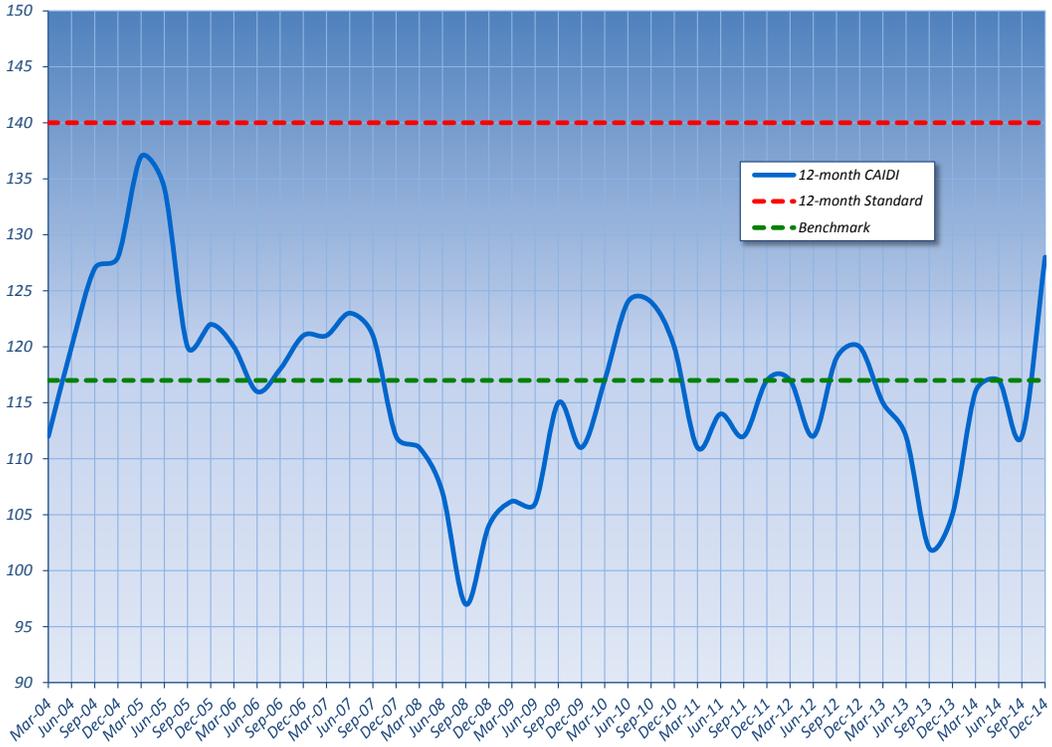


Figure 13 Met-Ed SAIFI (interruptions per customer)

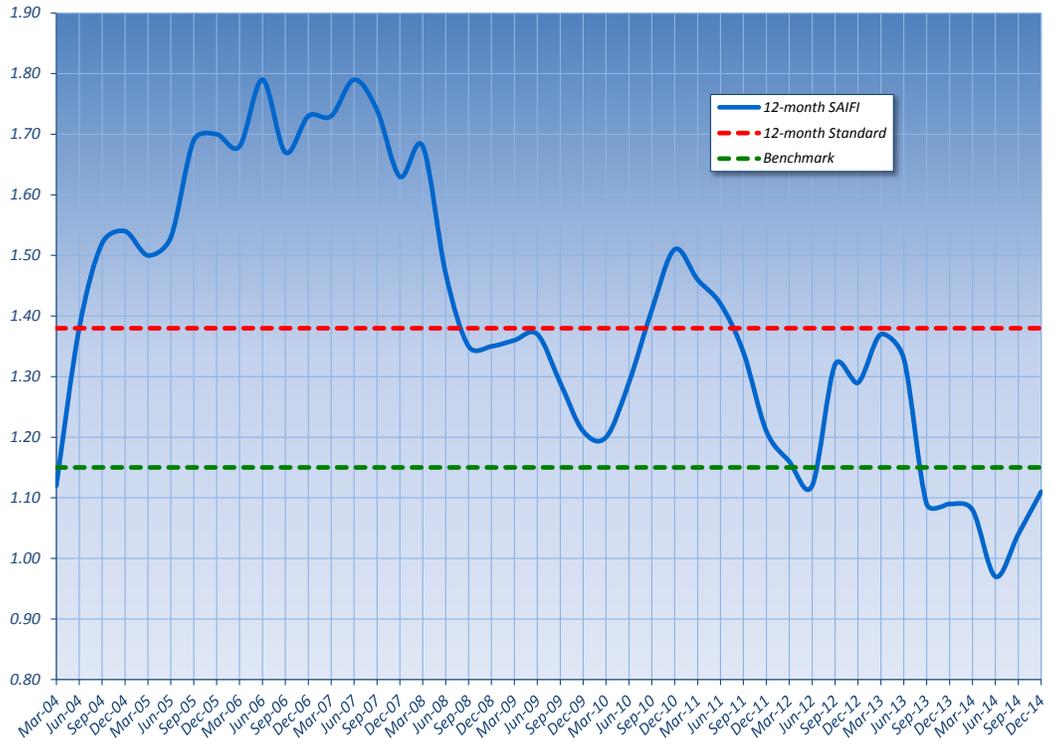


Figure 14 Met-Ed Outage Causes (percent of total outages)

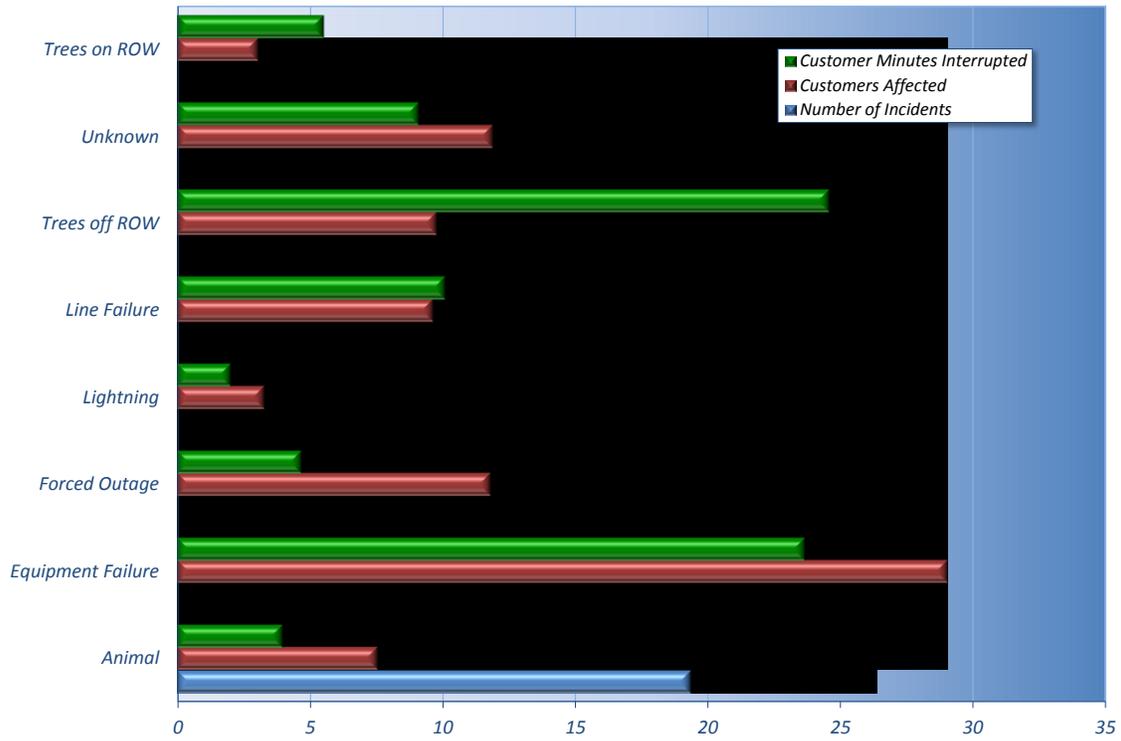
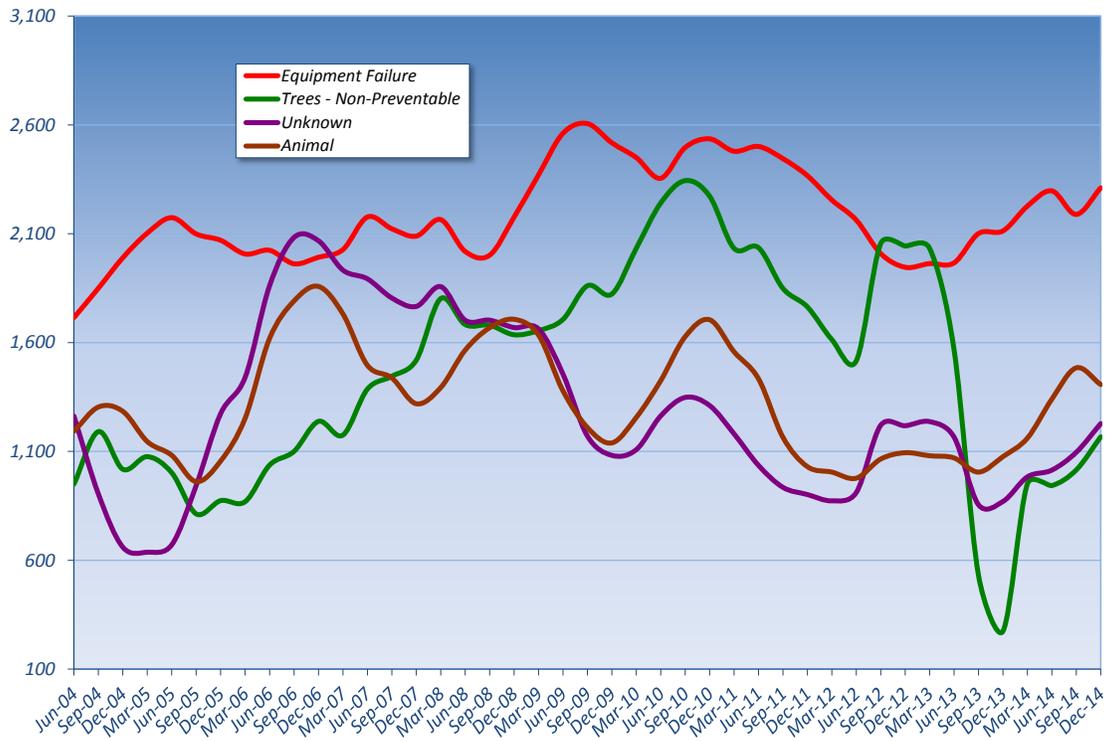


Figure 15 Met-Ed Outage Tracking (number of incidents)



PECO Energy Company

PECO has a service territory of about 2,100 square miles that serves a well-developed distribution system serving about 1.7 million customers. In 2014, PECO experienced 1.48 million customer interruptions and 141.6 million minutes of interruption, compared to 2013, when customers experienced 1.18 million customer interruptions and 108.2 million minutes of interruption.

The 2014 reliability metrics exclude the following outage data related to three Commission approved major events:

- Feb. 5, 2014 – Ice Storm Nika, affecting 723,681 customers.
- July 3, 2014 - Thunderstorm & high winds, affecting 180,277 customers.
- July 8, 2014 – Thunderstorm & high winds, affecting 236,177 customers.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Increased from 91 minutes in 2013 to 96 minutes in 2014; achieved benchmark by 14 percent.

Three-year average: Decreased from 108 minutes in 2013 to 95 minutes in 2014; achieved standard by 23 percent.

SAIDI

Rolling 12-month: Increased from 63 minutes in 2013 to 82 minutes in 2014; achieved benchmark by 41 percent.

Three-year average: Decreased from 97 minutes in 2013 to 73 minutes in 2014; achieved standard by 56 percent.

SAIFI

Rolling 12-month: Increased from 0.69 outages in 2013 to 0.86 outages in 2014; achieved benchmark by 30 percent.

Three-year average: Decreased from 0.87 outages in 2013 to 0.77 outages in 2014; achieved standard by 43 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 16 and Figure 17. The past year trend shows it is taking slightly more time to restore power outages and outages are occurring slightly more frequently. PECO has consistently sustained benchmark performance in every reliability category for the past two years.

Figure 18 shows the distribution of outage causes that occurred during 2014 as a percentage of total outages. Figure 19 shows the historical trend of the top three main outage causes. The most frequent outage cause is equipment failure.

In 2014, PECO continued to sectionalize circuits to minimize customers affected by faults. Reclosers were added throughout the service territory, and pulse-reclosers were also added to circuits to cause less stress to electrical components during a fault event. PECO continued to enhance reliability by installing microprocessor-based relay upgrades, fiber optic communications among substations, disturbance monitoring equipment across the transmission system, and modern computer systems for outage management (OMS), geographic information system (GIS), and distribution system real-time management (DMS). In addition, PECO implemented an expanded version of Advanced Metering Outage System (AMOS), which provides the ability to create, analyze and escalate customer outage events. As part of PECO's meter upgrade project, AMOS has been enhanced to support outage management of the new AMI meters. The tool provides better visibility of an outage, which can lead to targeted restoration efforts. In 2015, PECO will continue improving reliability as detailed in their Long Term Infrastructure Improvement Plan (LTIP) which focuses on increasing reliability and storm hardening projects.

PECO's performance has consistently sustained performance below benchmark.

Figure 16 PECO CAIDI (minutes)

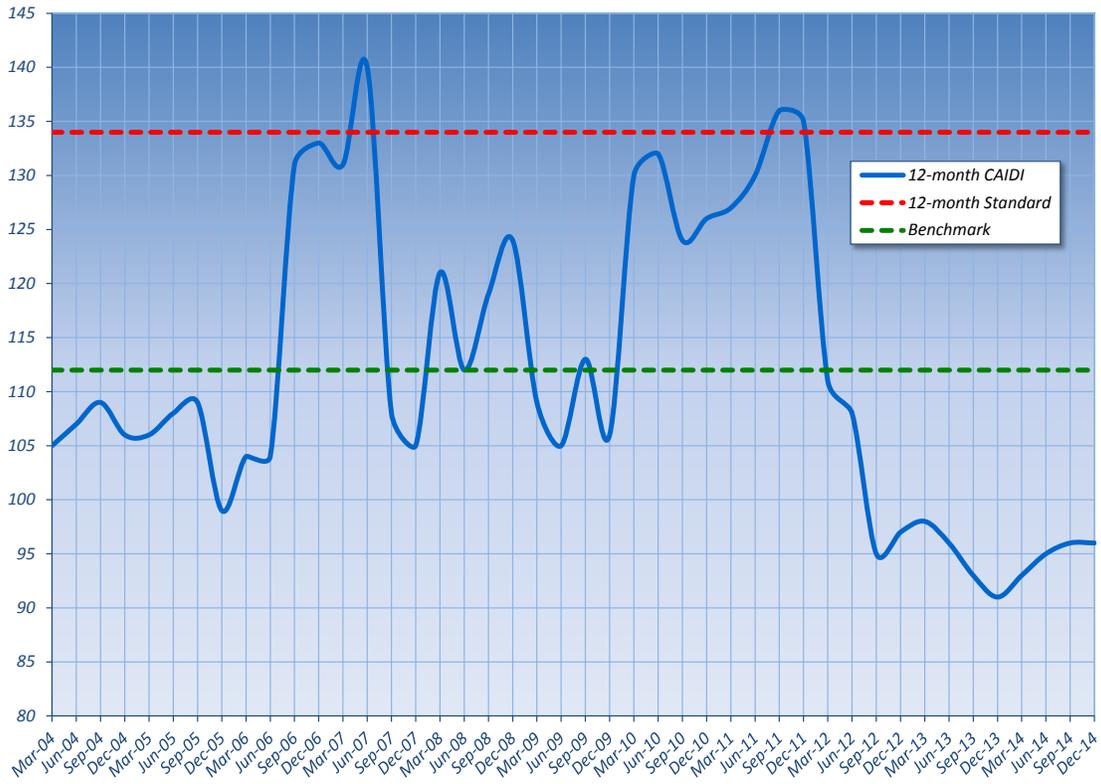


Figure 17 PECO SAIFI (interruptions per customer)

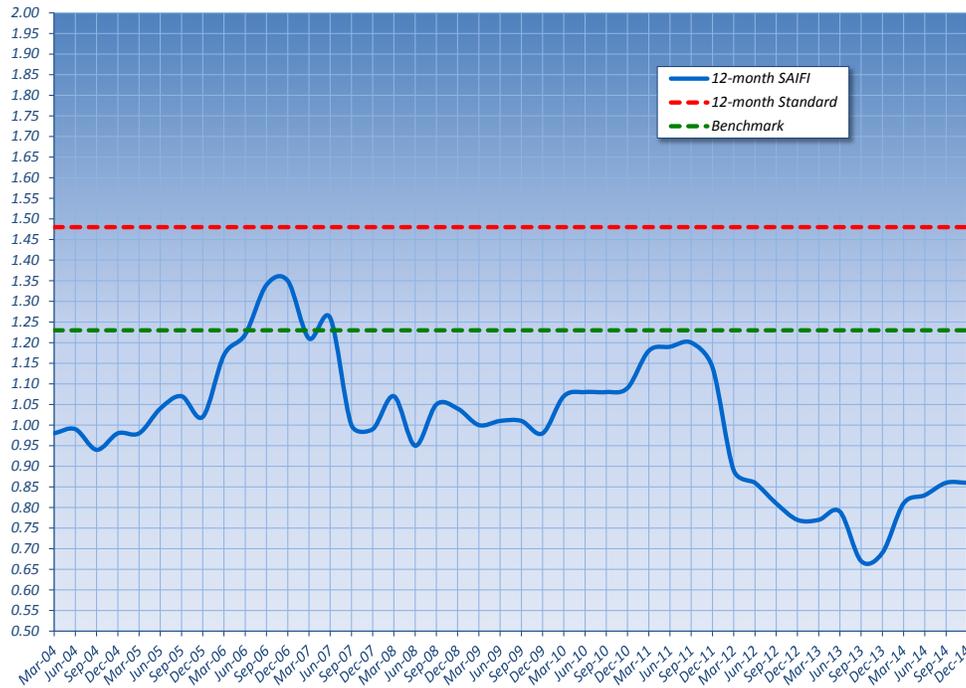


Figure 18 PECO Outage Causes (percent of total outages)

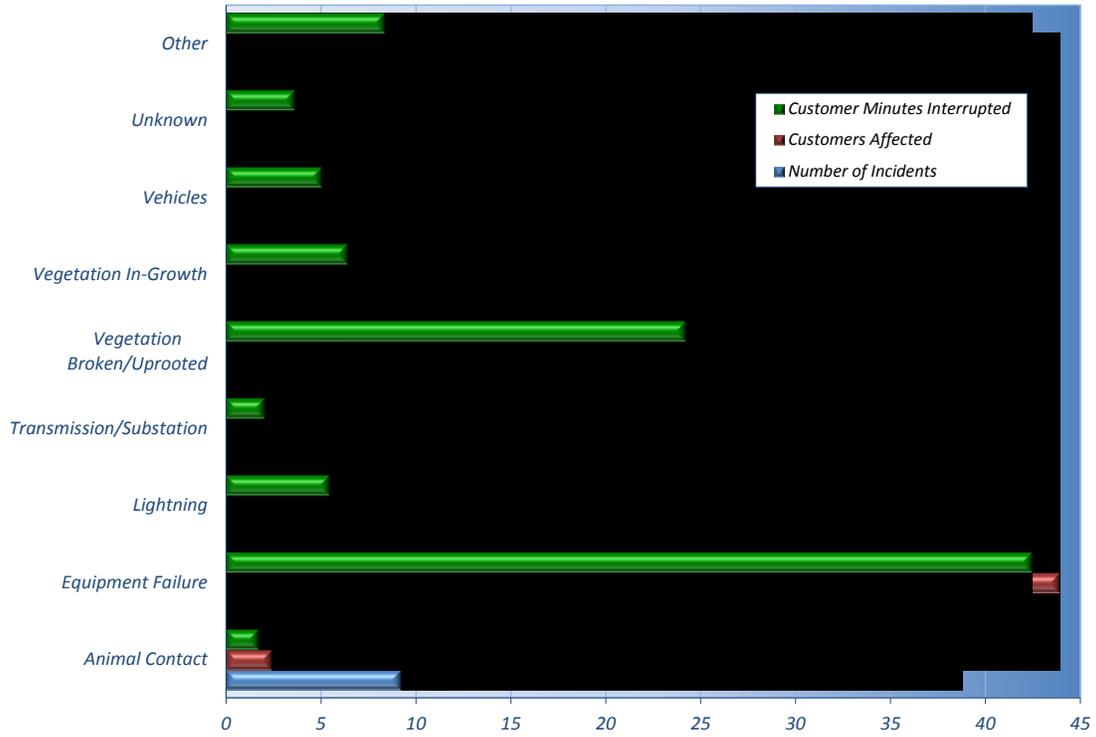
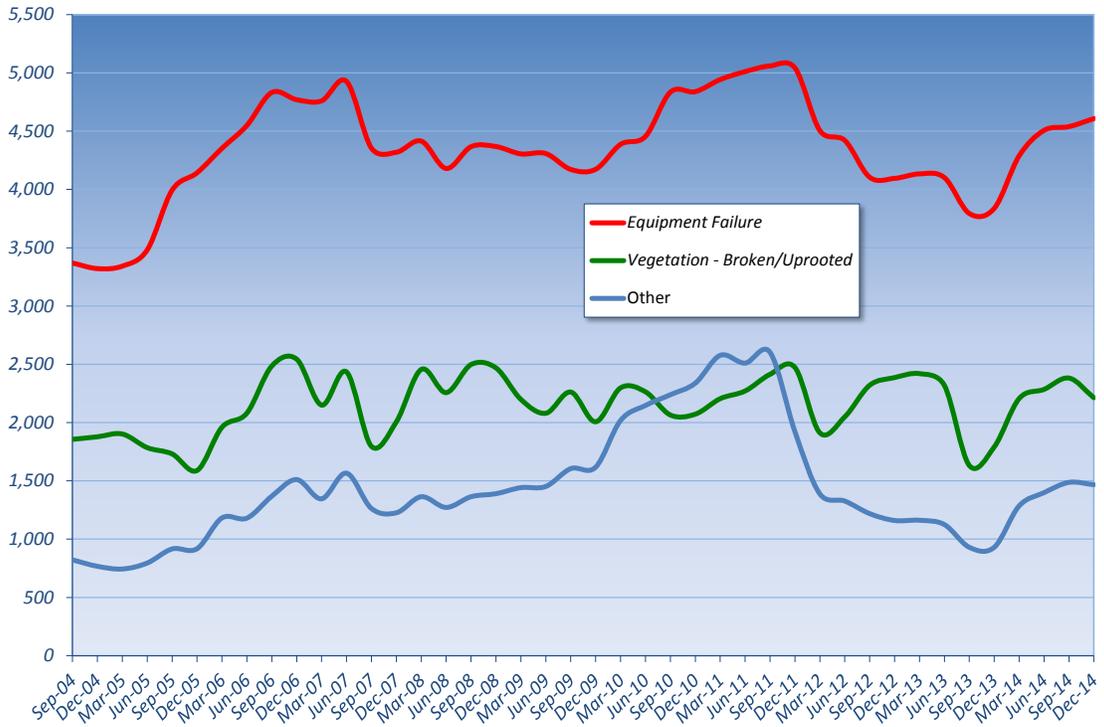


Figure 19 PECO Outage Tracking (number of incidents)



Pennsylvania Electric Company

Penelec has a service territory of about 17,600 square miles serving 582,000 customers. In 2014, Penelec experienced 903,429 customer interruptions and 2.68 million minutes of interruption, compared to 2013, when customers experienced 863,604 customer interruptions and 2.92 million minutes of interruption.

Penelec had no major events in 2014.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Increased from 117 minutes in 2013 to 118 minutes in 2014; and failed to achieve benchmark by 1%.

Three-year average: Decreased from 141 minutes in 2013 to 124 minutes in 2014; achieved standard by 4 percent.

SAIDI

Rolling 12-month: Increased from 174 minutes in 2013 to 183 minutes in 2014; failed to achieve benchmark by 24 percent

Three-year average: Decreased from 200 minutes in 2013 to 184 minutes in 2014; failed to achieve standard by 3 percent.

SAIFI

Rolling 12-month: Increased from 1.48 outages in 2013 to 1.55 outages in 2014; failed to achieve benchmark by 23 percent.

Three-year average: Increased from 1.43 outages in 2013 to 1.48 outages in 2014; failed to achieve standard by 7 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 20 and Figure 21. The CAIDI trend is approaching benchmark and the SAIFI trend is increasing. Figure 22 shows trees and equipment failures are both significant causes of outages and customer interruption minutes. Figure 23 shows a historical trend of the top main outage causes.

In 2014, the PUC began increased monitoring and assessment of Penelec's reliability performance due to Penelec's poor SAIFI performance. The PUC required Penelec to initiate a Corrective Action Plan (CAP). Penelec's CAP, or reliability improvement plan (RIP), is divided into four main components which include: targeted circuit rehabilitation; porcelain cutout replacement; sectionalizing and SCADA control; and accelerated enhanced vegetation management. Penelec has added an enhanced tree trimming component to its plan that will specifically address the large number of tree outages that occur mostly from healthy trees outside the right-of-way. Penelec continues to install additional radio controlled remote sectionalizing equipment on the distribution system to minimize customers affected by a fault.

Penelec has been consistently above benchmark for a number of years. In the last two quarters of 2014, Penelec was above benchmark in every reliability performance category. Tree outages are a significant problem effecting reliability performance. A significant effort is needed by Penelec, as an entire company, to drive reliability performance scores below benchmark. The PUC expects Penelec’s reliability performance to improve in 2015. There is an expectation that CAIDI will be below benchmark in 2015 with SAIDI and SAIFI trending towards benchmark.

Figure 20 Penelec CAIDI (minutes)

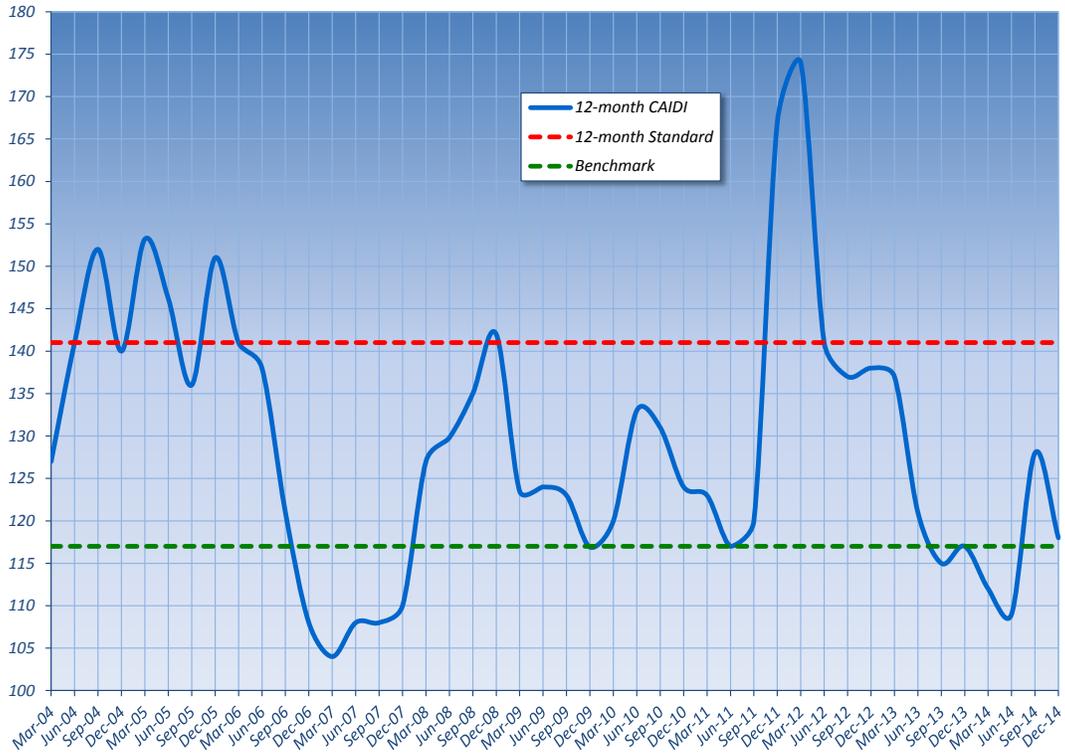


Figure 21 Penelec SAIFI (interruptions per customer)

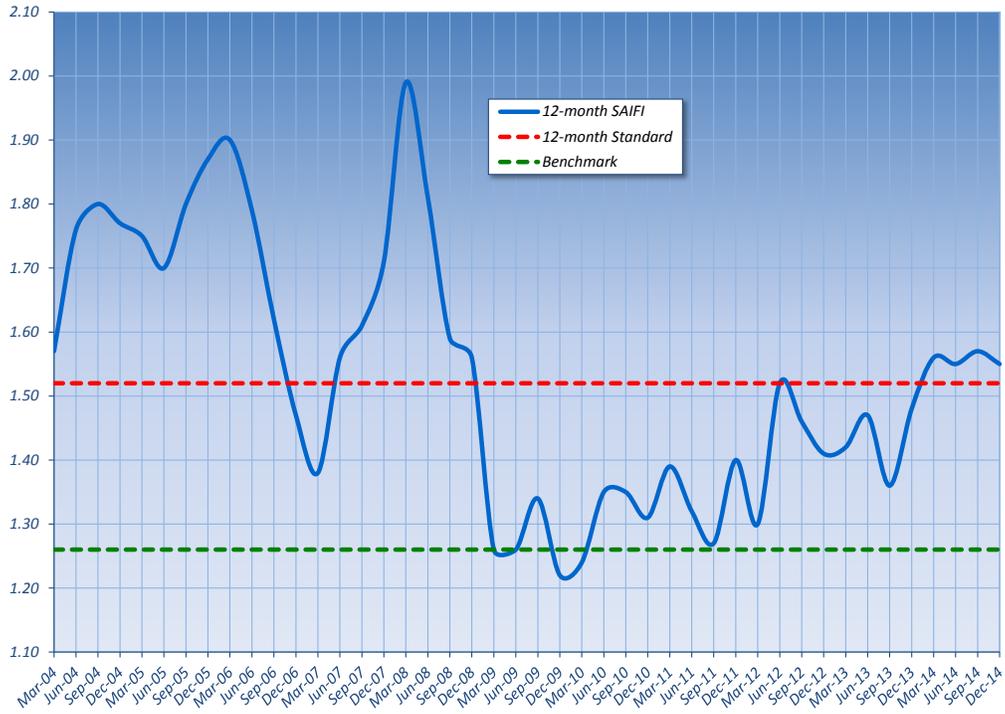


Figure 22 Penelec Outage Causes (percent of total outages)

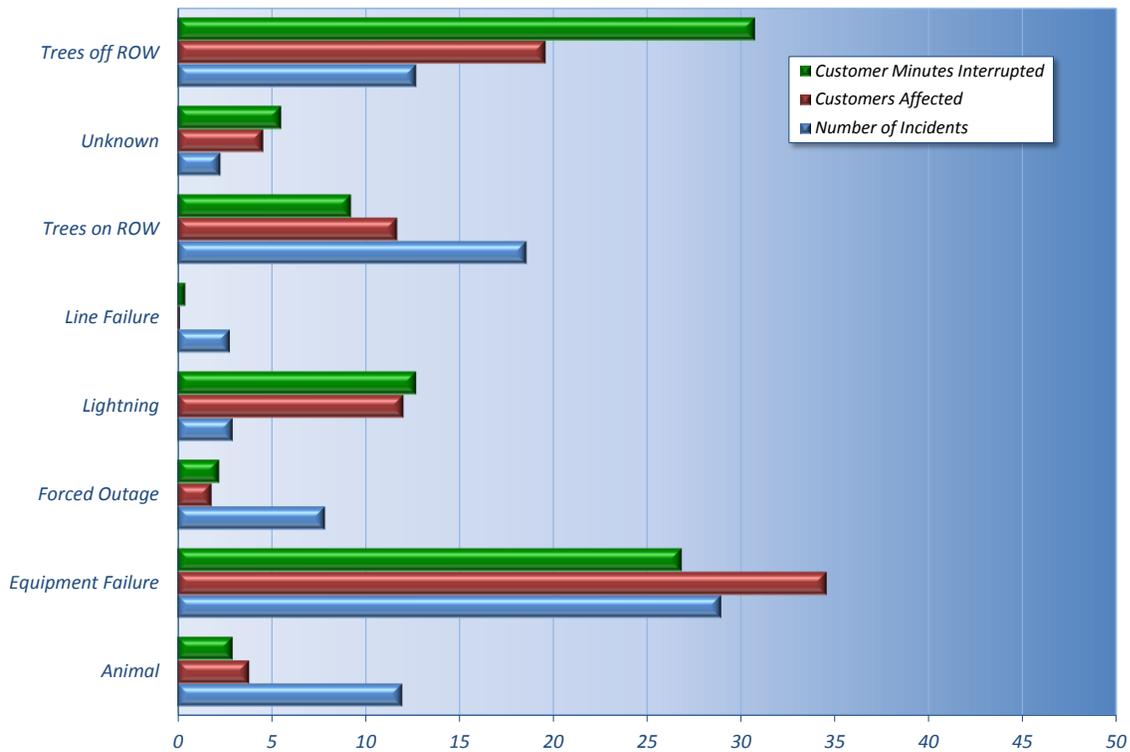
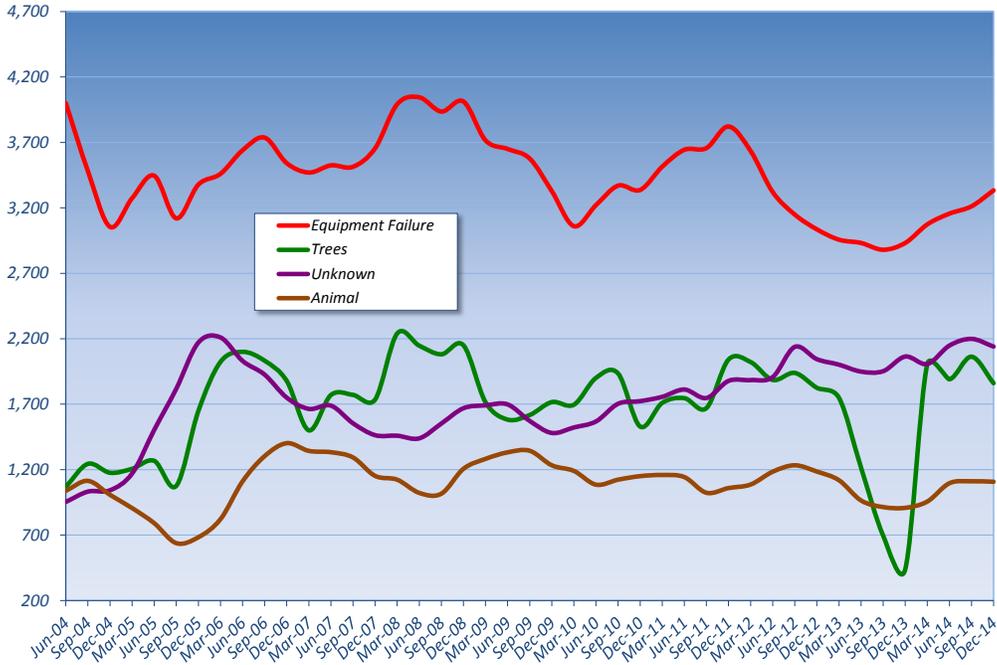


Figure 23 Penelec Outage Tracking (number of incidents)



Pennsylvania Power Company

Penn Power has a service territory of about 1,100 square miles that serves primarily 158,000 customers. In 2014, Penn Power experienced 175,271 customer interruptions and 721,189 minutes of interruption, which is significantly better than 2013, when customers experienced 214,133 customer interruptions and 1.19 million minutes of interruption.

Penn Power had no major events in 2014.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Decreased from 140 minutes in 2013 to 106 minutes in 2014; and failed to achieve benchmark by 5 percent.

Three-year average: Decreased from 131 minutes in 2013 to 120 minutes in 2014; and failed to achieve standard by 8 percent.

SAIDI

Rolling 12-month: Decreased from 188 minutes in 2013 to 118 minutes in 2014; and failed to achieve benchmark by 4 percent.

Three-year average: Decreased from 155 minutes in 2013 to 146 minutes in 2014; and failed to achieve standard by 8 percent.

SAIFI

Rolling 12-month: Decreased from 1.35 outages in 2013 to 1.11 outages in 2014; and achieved benchmark by 1 percent.

Three-year average: Increased from 1.18 outages in 2013 to 1.21 outages in 2014; and achieved standard by 2 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 24 and Figure 25. Figure 26 shows the distribution of outage causes that occurred during 2014 as a percentage of total outages. Tree-related incidents are the most significant cause of customer minutes interrupted and number of customers effected by an outage in 2014.

Figure 27 shows the historical trend of the top three main outage causes. The most frequent outage cause was trees.

In early 2014, the PUC began increased monitoring and assessment of Penn Power's reliability due to their poor CAIDI performance. The PUC required Penn Power to initiate a Corrective Action Plan (CAP).

Penn Power's CAP, or Reliability Improvement Plan (RIP), incorporates projects and programs to enhance overall reliability. The plan is structured into six main components, which include targeted removal of off corridor trees; installation of supervisory control and data acquisition (SCADA) and adaptive relaying; deployment of procedural enhancements to speed up restoration; installation of circuit ties, loops or sources; rehabilitation of distribution and transmission lines; and installation of SCADA motor operated air break (MOAB) line switches.

Additionally, Penn Power implemented an enhanced tree trimming program to address the large number of tree outages that occur mostly from healthy trees outside the right-of-way. Penn Power plans to continue off corridor tree removals in 2015. Penn Power has also initiated procedural enhancements targeted at improving reliability. Items to speed up restoration such as the staging of critical materials for quick access, the installation of remote circuit monitors, and the dispatching of both trouble and line crews to outages on selected circuits in remote areas have been initiated.

As Figure 24 reinforces, Penn Power's CAIDI has been continually above benchmark for a number of years. Penn Power has only achieved benchmark for CAIDI in 2 of the past 44 rolling 12-month quarters. As mentioned above, in the past year, a significant improvement plan was executed by Penn Power to make immediate reliability improvements and in 2014 the performance trend started to drive performance scores toward benchmark. In the fourth quarter, Penn Power attained a SAIFI score below benchmark, while CAIDI scores are still above benchmark. However, if the current trend continues, the PUC expects Penn Power will achieve below benchmark scores in all reliability metrics in 2015.

Figure 24 Penn Power CAIDI (minutes)

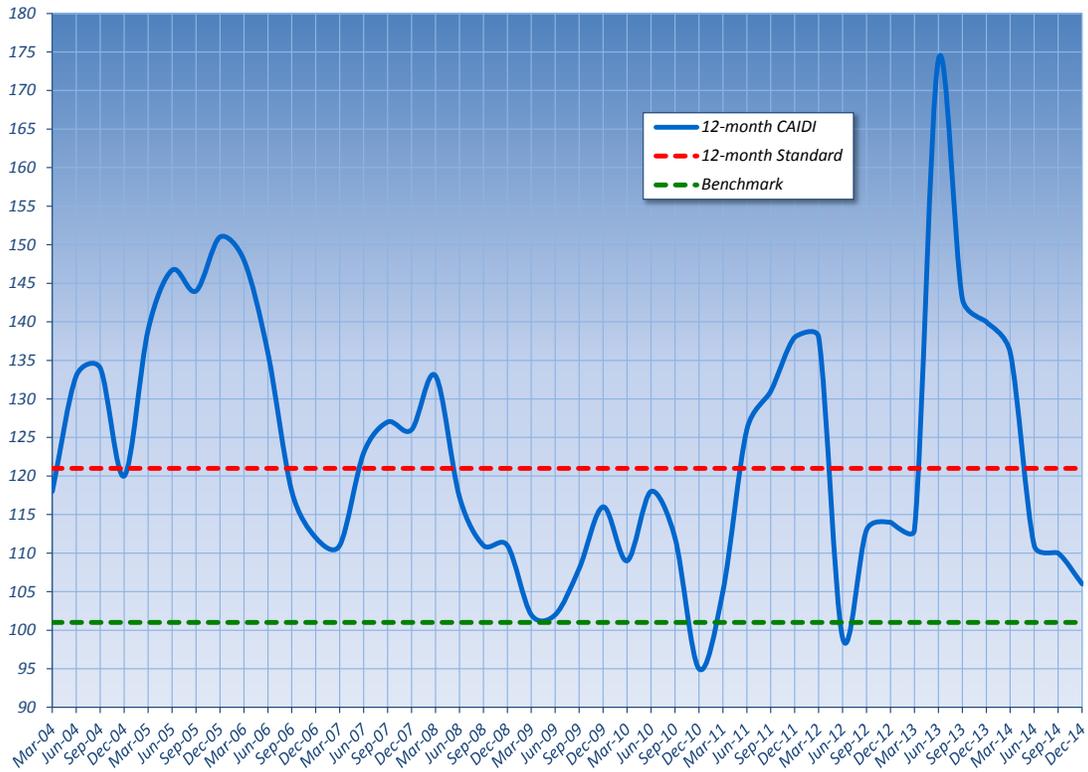


Figure 25 Penn Power SAIFI (interruptions per customer)

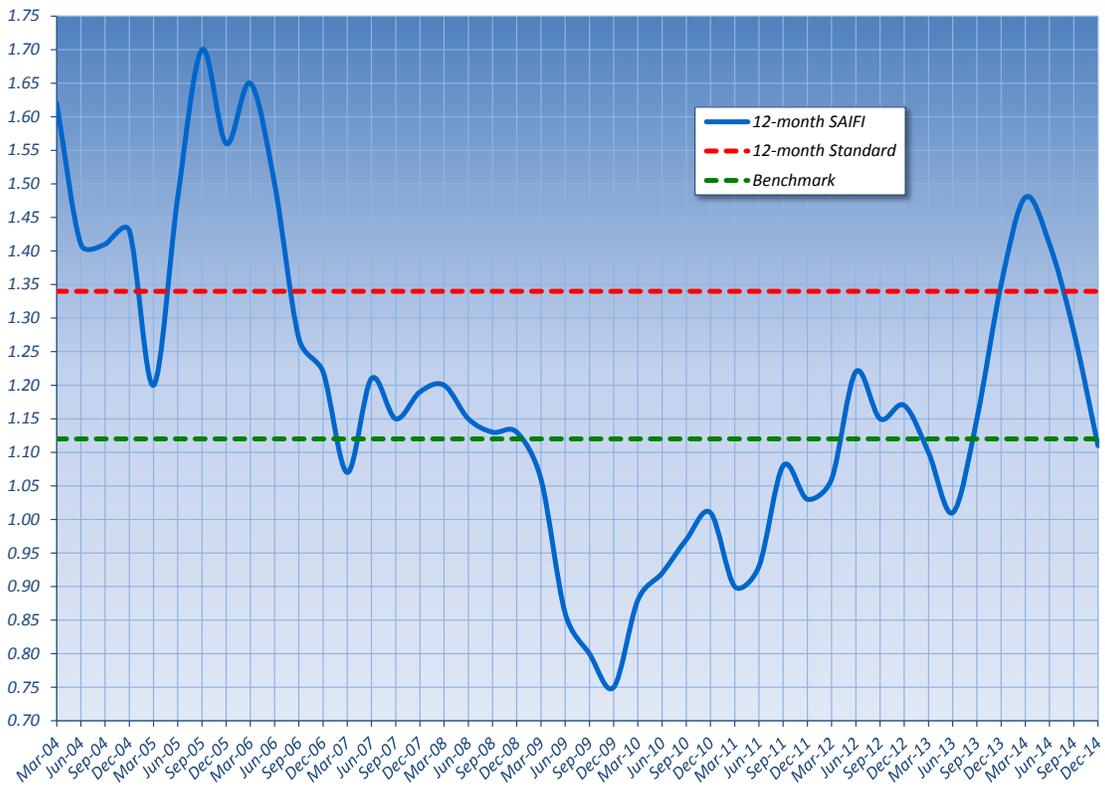


Figure 26 Penn Power Outage Causes (percent of total outages)

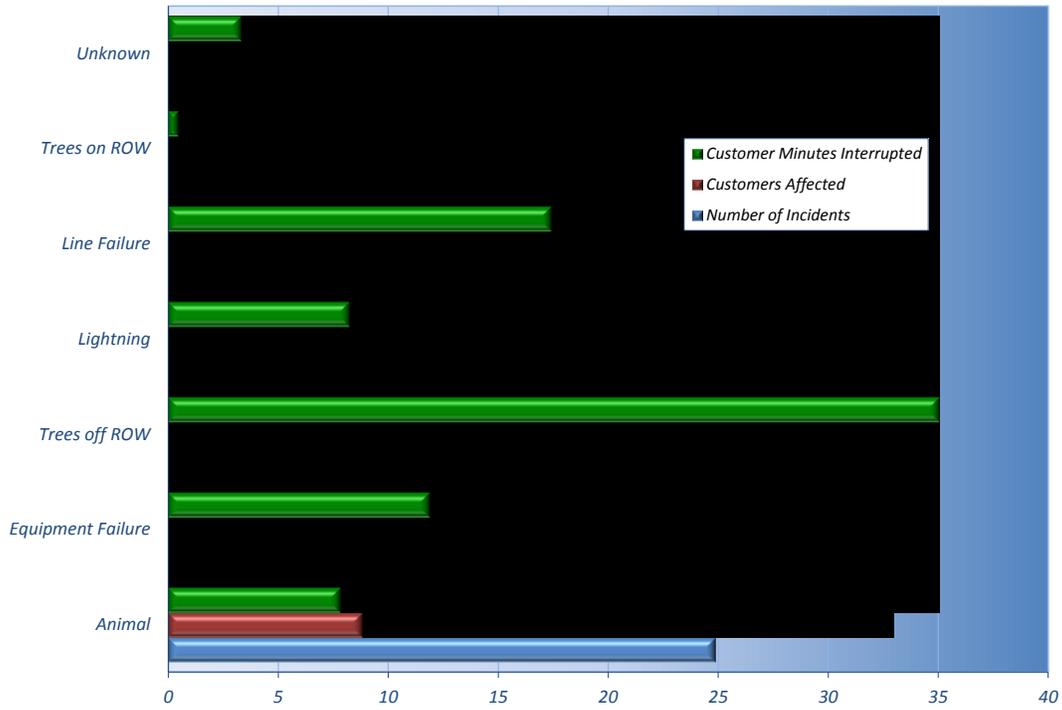
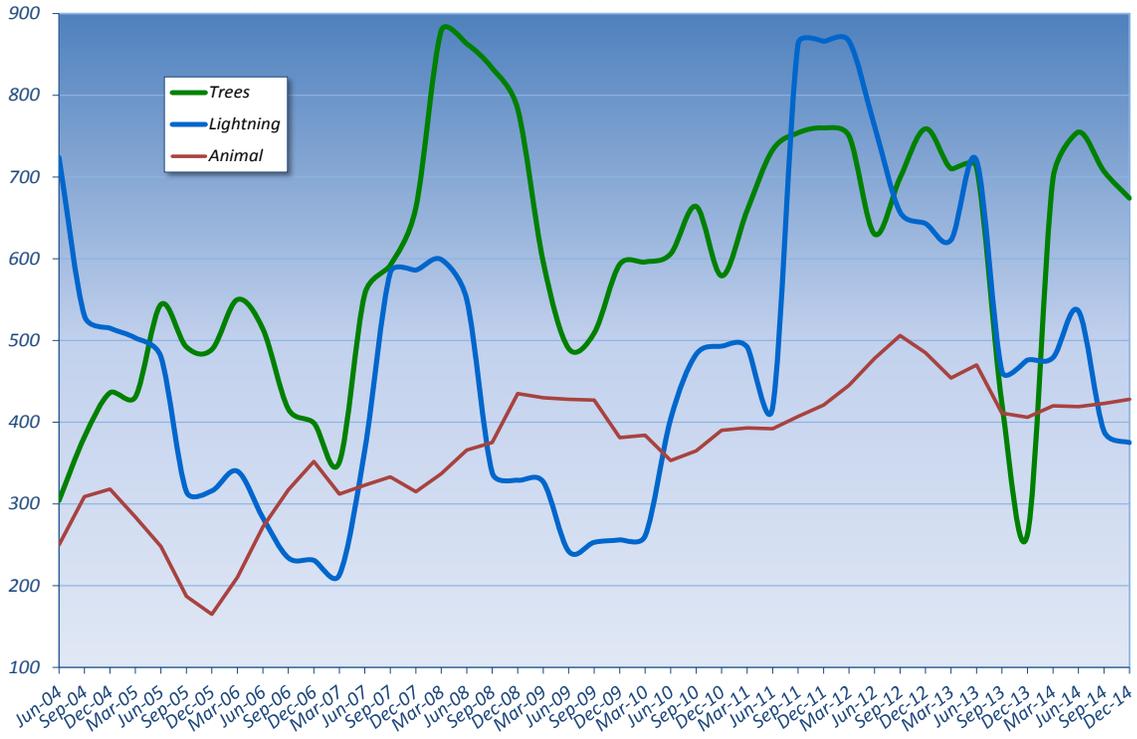


Figure 27 Penn Power Outage Tracking (number of incidents)



Pike County Light & Power Company

Pike has a relatively small operating service area with about 4,429 customers in 44 square miles. Pike County is primarily fed from two 34.5-kilovolt (kV) feeders supplied from New York substations and the eastern portion of Pike County service territory is fed by two 13.2 kV feeders from Matamoras Substation.

In 2014, Pike experienced 9,542 customer interruptions and 1.01 million minutes of interruption, compared to 2013 when customers experienced 5,449 interruptions and 1.14 million minutes of interruption.

The 2014 reliability metrics exclude the following outage data related to five Commission-approved major events:

- July 2, 2014 – Lightning Storm, affecting 2,526 customers.
- July 6, 2014 – Tree contact, affecting 2,522 customers.
- Aug, 21, 2014 – Lightning storm, affecting 4,297 customers.
- Sept, 11, 2014 – Motor vehicle, affecting 2,281 customers.
- Nov, 26, 2014 – Snow storm, affecting 4,497 customers.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Decreased from 209 minutes in 2013 to 106 minutes in 2014; and achieved benchmark by 39 percent.

Three-year average: Decreased from 230 minutes in 2013 to 166 minutes in 2014; and achieved standard by 13 percent.

SAIDI

Rolling 12-month: Increased from 188 minutes in 2013 to 224 minutes in 2014; failed to achieve benchmark by 111 percent.

Three-year average: Increased from 191 minutes in 2013 to 194 minutes in 2014; failed to achieve standard by 50 percent.

SAIFI

Rolling 12-month: Increased from 1.21 outages in 2013 to 2.12 outages in 2014; failed to achieve benchmark by 250 percent.

Three-year average: Increased from 0.84 outages in 2013 to 1.3 outages in 2014; failed to achieve standard by 94 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 28 and Figure 29. Pike's CAIDI score is below benchmark. However, Pike's SAIDI and SAIFI scores are significantly above benchmark. Figure 30 shows the distribution of outage causes that occurred during 2014 as a percentage of total outages. Figure 31 shows the historical trend of the top two main outage causes. The most frequent outage causes were trees and equipment failure.

In early 2014, the PUC began increased monitoring and assessment of Pike's reliability due to poor SAIFI and SAIDI performance. The PUC required Pike to initiate a Corrective Action Plan (CAP).

Three electric delivery system improvement projects are being considered for Pike's service territory in the next five years as part of their CAP. These projects will provide a parallel path for Line 7 immediately exiting the Matamoras Substation, allowing for better reliability to downstream customers. The five-year plan calls for a one half mile section of conductor behind the Matamoras substation to be upgraded and re-routed, which will improve backup for the head end portion of radial Line 7 and reduce the exposure of the line by 1.5 miles. In 2013, Pike commenced a mainline parallel path to Line 7 along Old Milford Road from Roberts Lane to approximately Pocono Drive, in order to improve reliability. In 2015, this mainline will continue along Old Milford Road to about Whetfield Drive, and then back to Route 6 (US 209) in 2017. From 2018 to 2020, an underground line along US Route 209 will connect the right-of-way (ROW) behind the Matamoras Station to the Old Milford Road mainline, and provide a backup for the radial Line 7 to Milford. The parallel path will provide switchable backup for an area of this circuit where the majority of the interruptions have historically occurred, and the upgraded conductor will improve capacity and reliability for the foreseeable future.

Pike's SAIFI performance has been significantly worse the past two years. In the past year, Pike has been trending slightly towards benchmark, but until reliability projects are completed in the next 5 years, along with effective tree management, Pike's SAIFI improvement may be modest in the next couple of years. Pike is somewhat limited in the upfront capital that can be expended on projects due to their small customer base.

Figure 28 Pike County CAIDI (minutes)

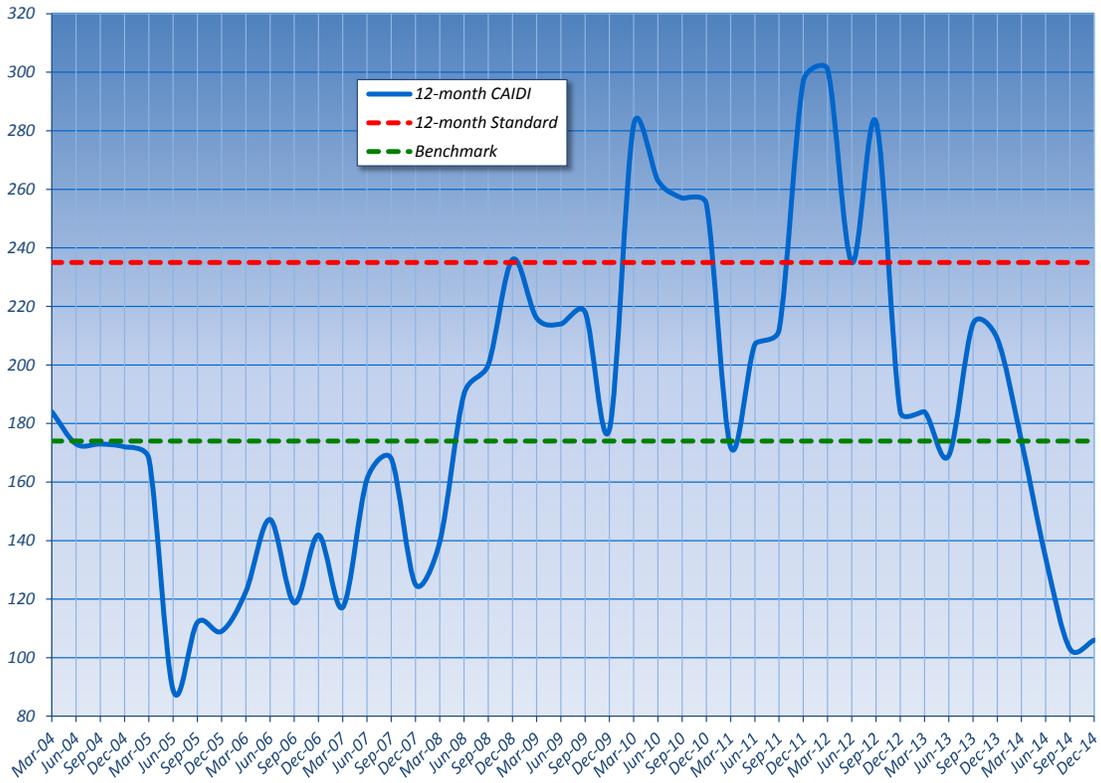


Figure 29 Pike County SAIFI (interruptions per customer)

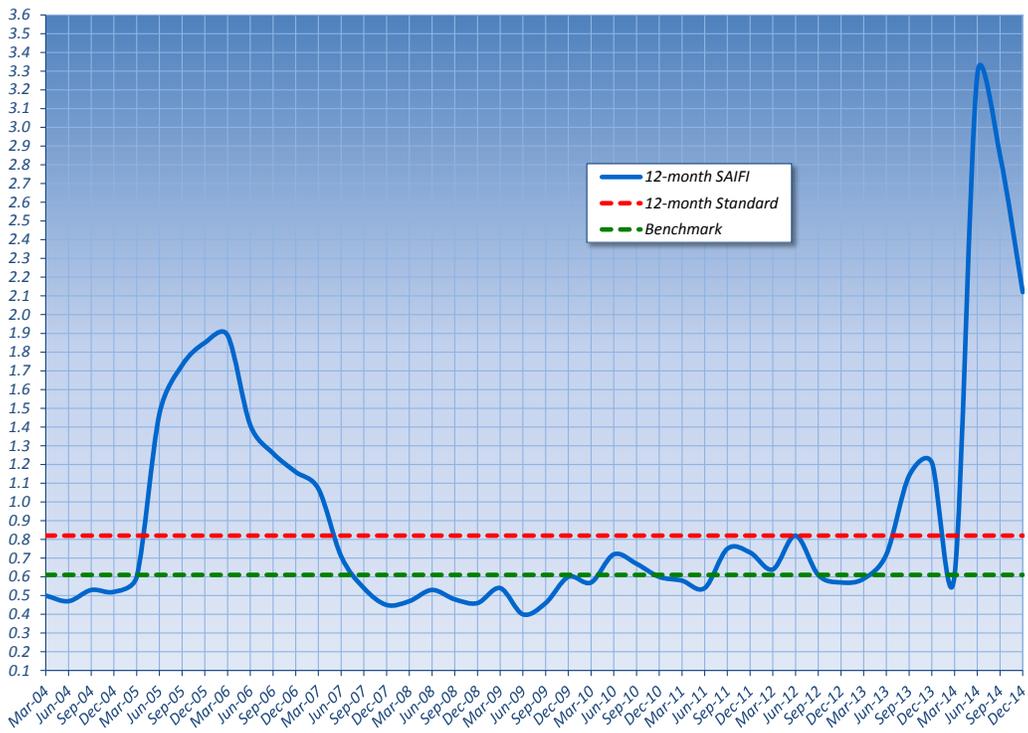


Figure 30 Pike County Outage Causes (percent of total outages)

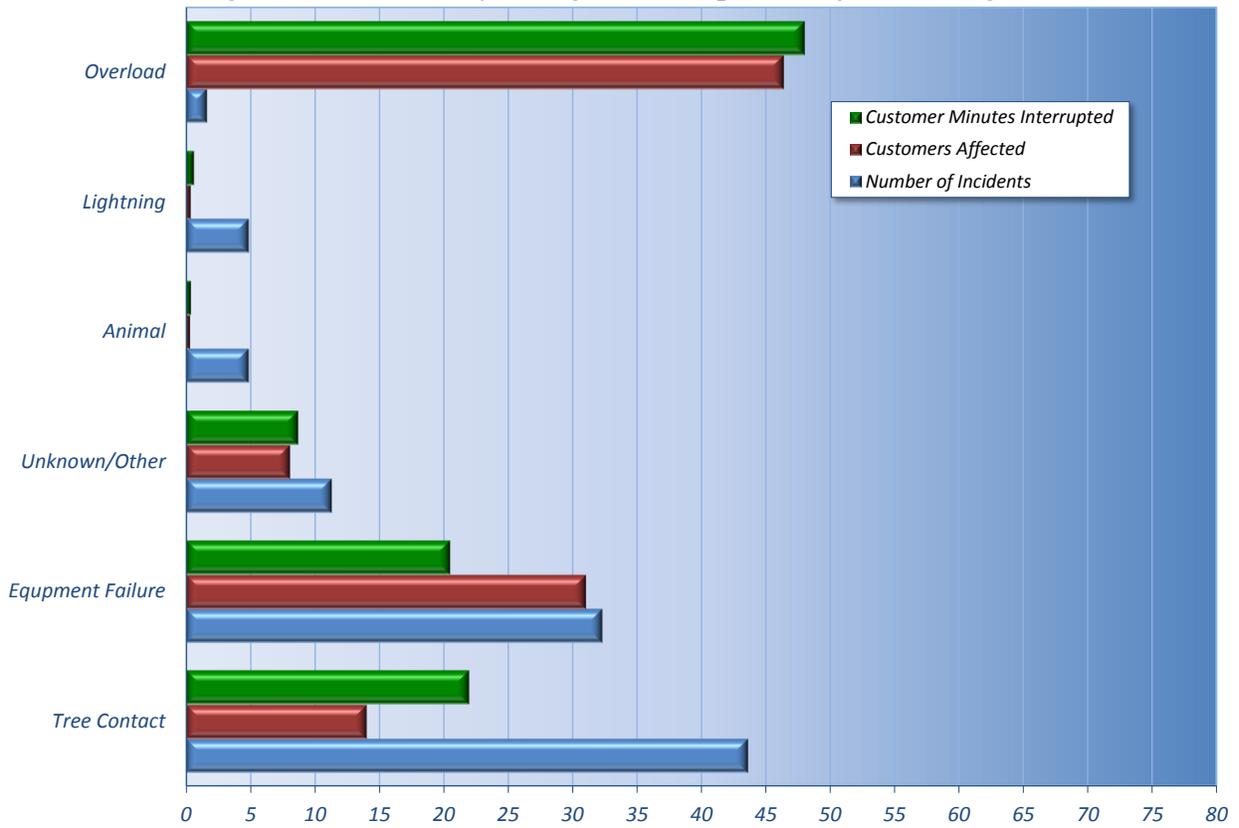
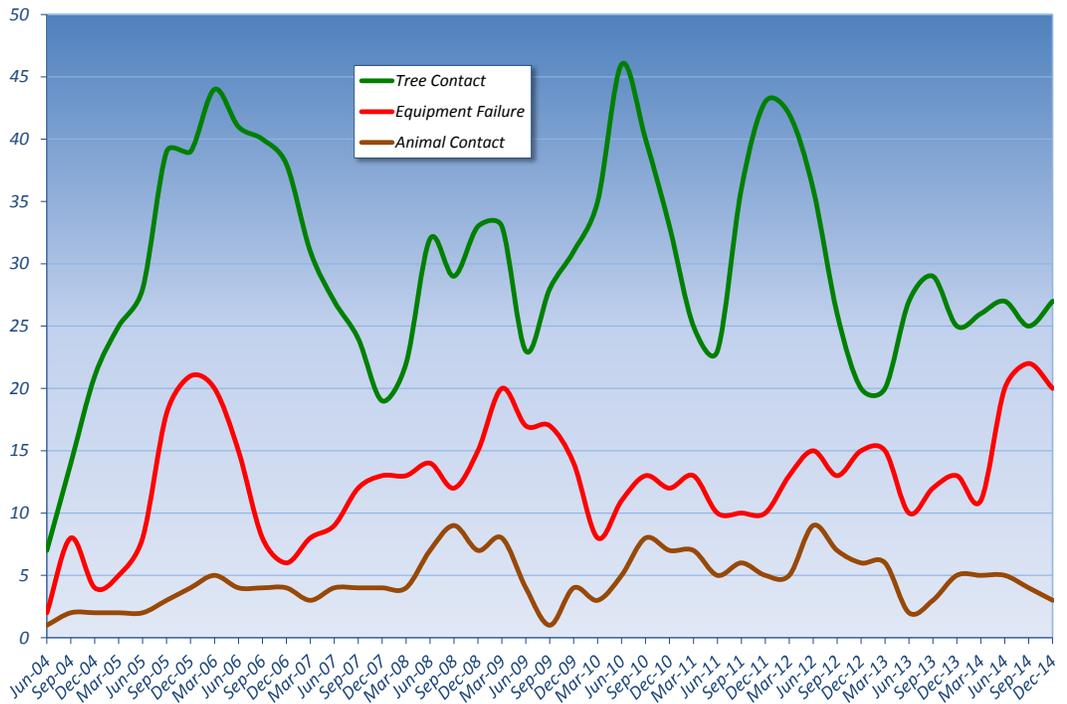


Figure 31 Pike County Outage Tracking (number of incidents)



PPL Electric Utilities Corporation

PPL has a service territory of about 10,000 square miles and serves 1.4 million customers. In 2014, PPL experienced 1.28 million customer interruptions and 230.75 million minutes of interruption, which is a significant increase from 2013, when customers experienced 1.1 million customer interruptions and 123.6 million minutes of interruption.

PPL had no major events in 2014, although the Ice Storm Nika in February 2014 had a significant impact on PPL's reliability statistics.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Increased from 108 minutes in 2013 to 180 minutes in 2014; and failed to achieve benchmark by 24 percent.

Three-year average: Increased from 137 minutes in 2013 to 147 minutes in 2014; achieved standard by 8 percent.

SAIDI

Rolling 12-month: Increased from 89 minutes in 2013 to 165 minutes in 2014; and failed to achieve benchmark by 16 percent.

Three-year average: Increased from 138 minutes in 2013 to 139 minutes in 2014; achieved standard by 19 percent.

SAIFI

Rolling 12-month: Increased from 0.82 outages in 2013 to 0.92 outages in 2014; achieved benchmark by 6 percent.

Three-year average: Decreased from 0.99 outages in 2013 to 0.94 outages in 2014; achieved benchmark by 13 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 32 and Figure 33. The recent trend is that outages are less frequent, but of a longer duration. Figure 34 shows the distribution of outage causes that occurred during 2014 as a percentage of total outages. Figure 35 shows a historical trend of the top three main outage causes. The most frequent outage causes were trees and equipment failure, which have been trending upward during this reporting period.

In 2015 the PUC will increase monitoring of PPL's CAIDI performance. However, it should be noted that PPL's CAIDI would be below benchmark (143 minutes) if Ice Storm Nika was an excludable major event.

Since trees are generally the most common cause of power outages, PPL enhanced its tree trimming operations in 2014 by executing ground to sky trimming on multi-phase circuits, and accelerated its efforts to identify and remove danger trees outside of the right-of-way. PPL also changed its construction specifications to install taller and thicker poles that provide a higher

design strength in an area that is identified as having significant tree threats that cannot be mitigated through tree trimming. The overall intent is to reduce pole breaks due to vegetation, which can lead to extended outage times to make repairs.

PPL continues to add Fuses/Reclosers/Automatic Switches to the distribution system. In 2015, PPL will begin replacing existing three-phase hydraulic reclosers with communication-enabled vacuum circuit reclosers. The strategy allows for remote operation of these devices, in addition to remote monitoring to facilitate the move toward condition based maintenance.

In 2014, PPL initiated a program to substantially improve the lightning performance of several 69 kV transmission lines by installing lightning arresters. They are designed to protect against the majority of the lightning strikes a line could see in a given year. Transmission lines targeted were those most prone to lightning-related outages and those that have seen the most lightning activity over the last several years.

PPL's SAIFI score was below benchmark in 2014. However, CAIDI and SAIDI were above benchmark and improvement is needed. In 2015, the PUC will continue to monitor PPL's performance and expects CAIDI and SAIFI scores to begin trending toward benchmark again.

Figure 32 PPL CAIDI (minutes)

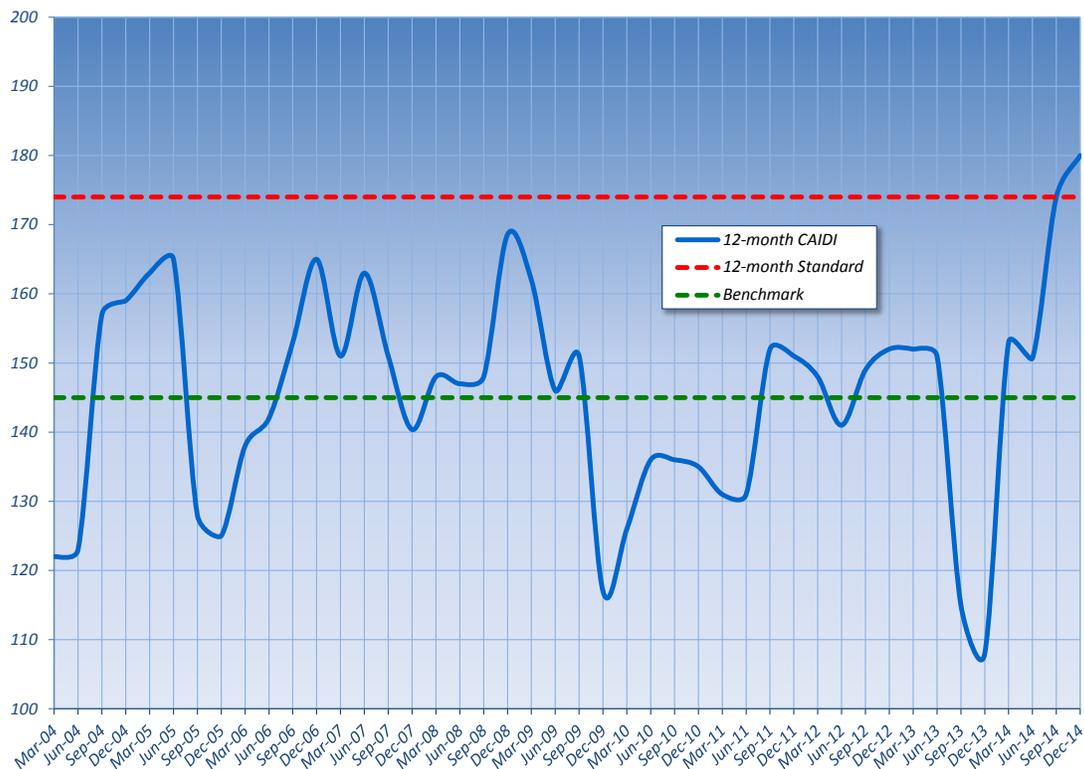


Figure 33 PPL SAIFI (interruptions per customer)

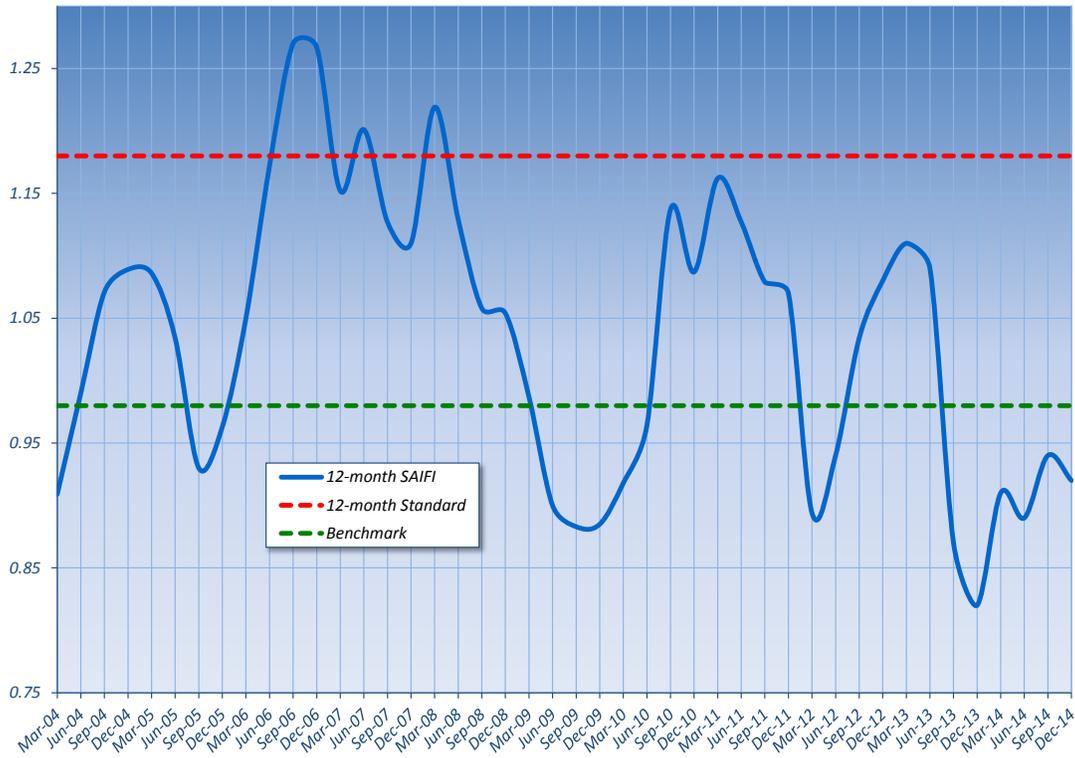


Figure 34 PPL Outage Causes (percent of total outages)

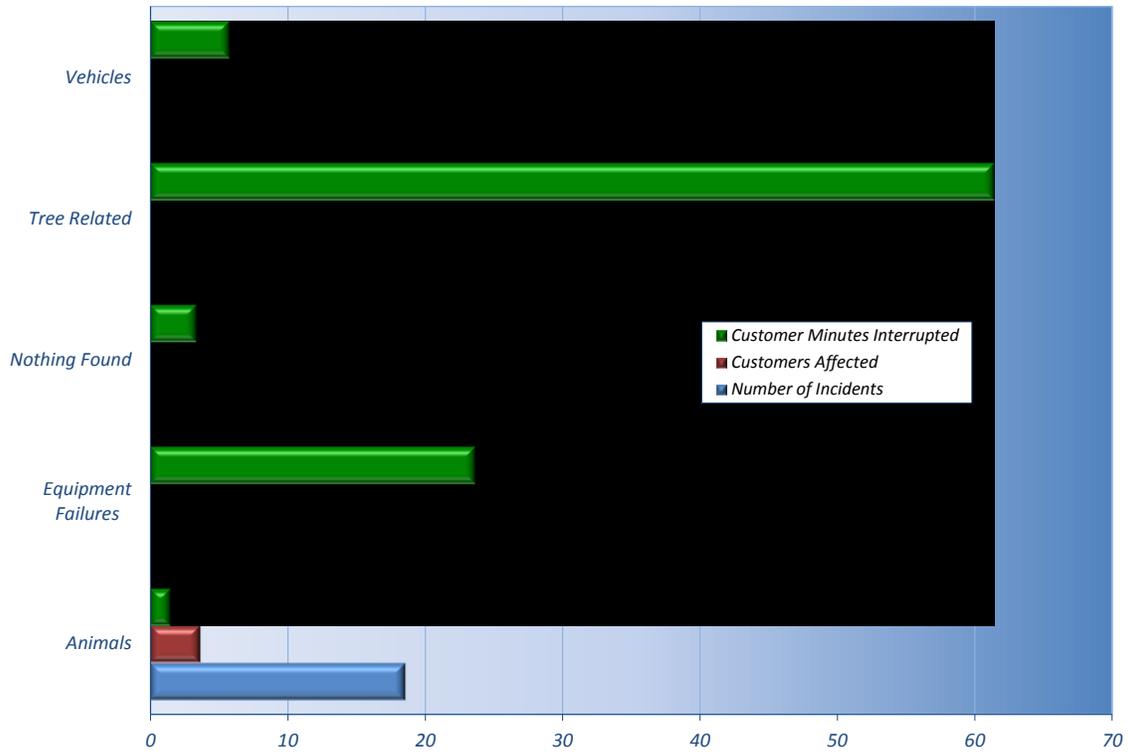
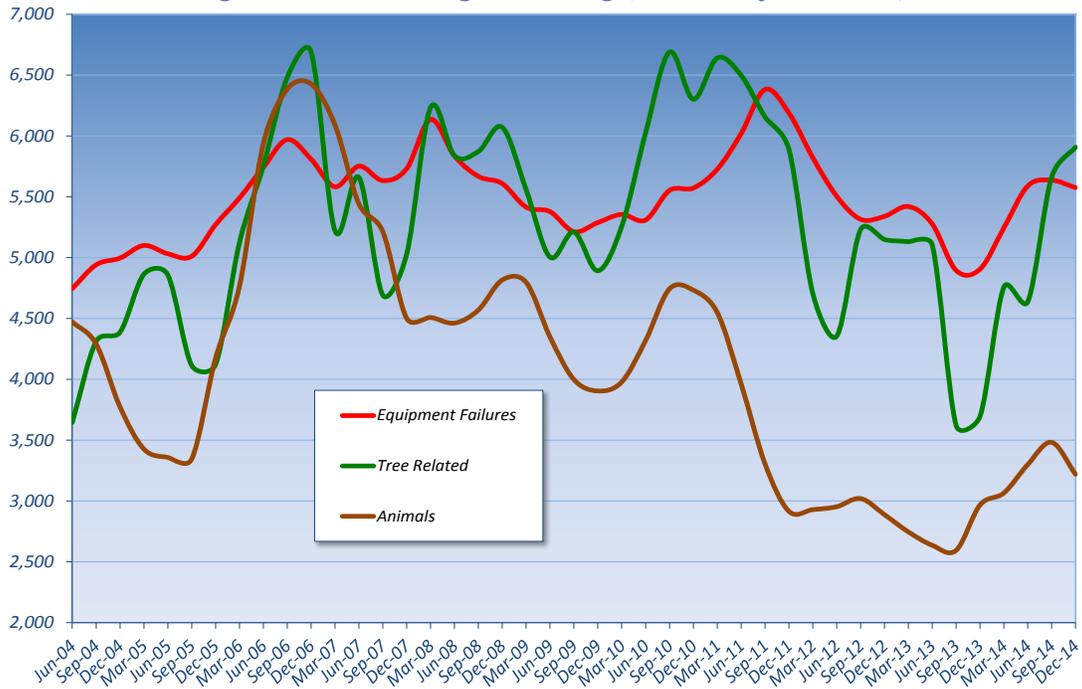


Figure 35 PPL Outage Tracking (number of incidents)



UGI Utilities Inc.

UGI has a service territory of about 410 square miles and serves about 61,200 customers. In 2014, UGI experienced 26,885 customer interruptions and 3.86 million minutes of interruption, which is a significant reduction from 2013, when customers experienced 47,899 customer interruptions and 5.3 million minutes of interruption.

The 2014 reliability metrics exclude the following outage data related to the Commission approved major event:

- July 8, 2014 - thunderstorm and tornado, affecting 15,082 customers.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Increased from 110 minutes in 2013 to 144 minutes in 2014; achieved benchmark by 15 percent.

Three-year average: Increased from 120 minutes in 2013 to 125 minutes in 2014; achieved standard by 33 percent.

SAIDI

Rolling 12-month: Decreased from 85 minutes in 2013 to 63 minutes in 2014; achieved benchmark by 55 percent.

Three-year average: Decreased from 87 minutes in 2013 to 67 minutes in 2014; achieved standard by 60 percent.

SAIFI

Rolling 12-month: Decreased from 0.77 outages in 2013 to 0.44 outages in 2014; achieved benchmark by 47 percent.

Three-year average: Decreased from 0.72 outages in 2013 to 0.55 outages in 2014; achieved standard by 40 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 36 and Figure 37. Figure 38 shows the distribution of outage causes that occurred during 2014 as a percentage of total outages. Figure 39 shows the historical trend of main outage causes. The most frequent outage causes were trees and equipment failure, which are trending lower.

UGI will continue to improve and enhance their reliability by executing 3 main programs:

The first program is the Danger Tree Mitigation Program that will identify and address off right of way trees that pose a threat to its transmission and distribution lines. In addition, UGI will continue the practice of “ground to sky” trimming on multi-phase circuits and on single phase lines where appropriate.

The second program is the Line segmentation Program that focuses on identifying locations to install fuses, disconnects, and other devices to limit the number customers affected when line damage occurs and enable field personnel to restore service to customers on unaffected line segments through switching before repairs are made.

The third program is the Line Relocations Program that will move distribution lines from troublesome off road locations to road side rights of way.

UGI’s reliability metrics continue to trend down and are significantly below benchmark.

Figure 36 UGI CAIDI (minutes)

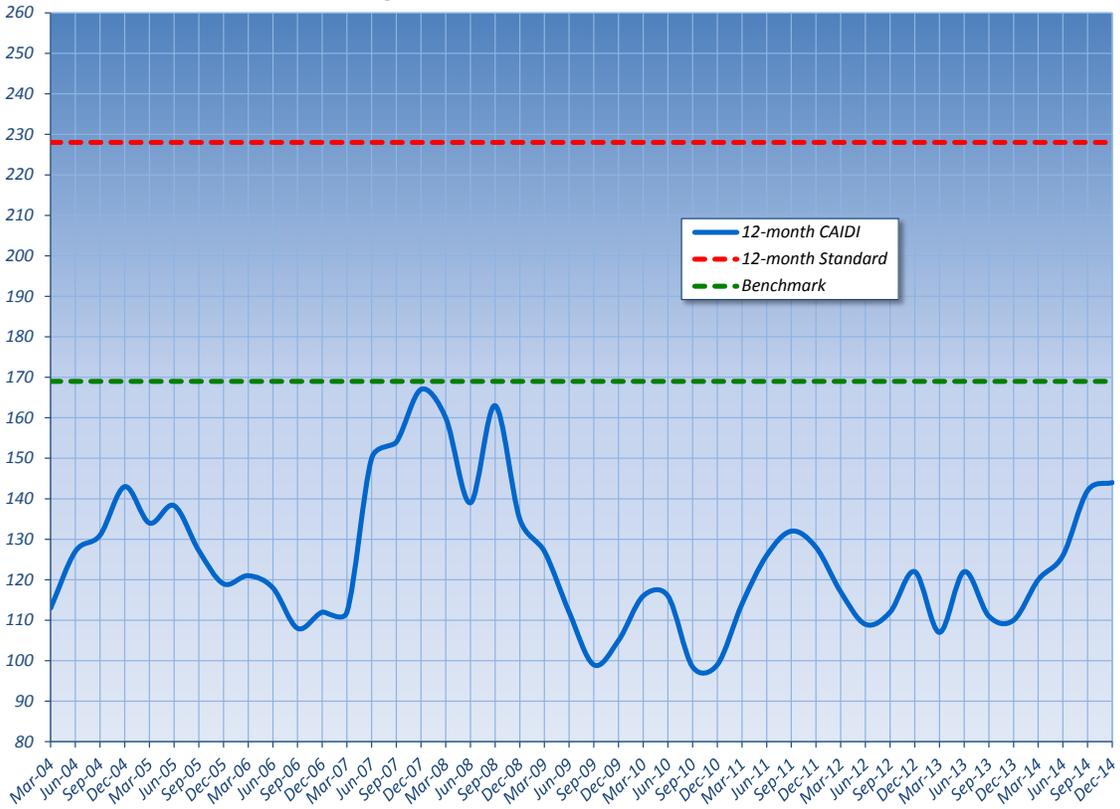


Figure 37 UGI SAIFI (interruptions per customer)

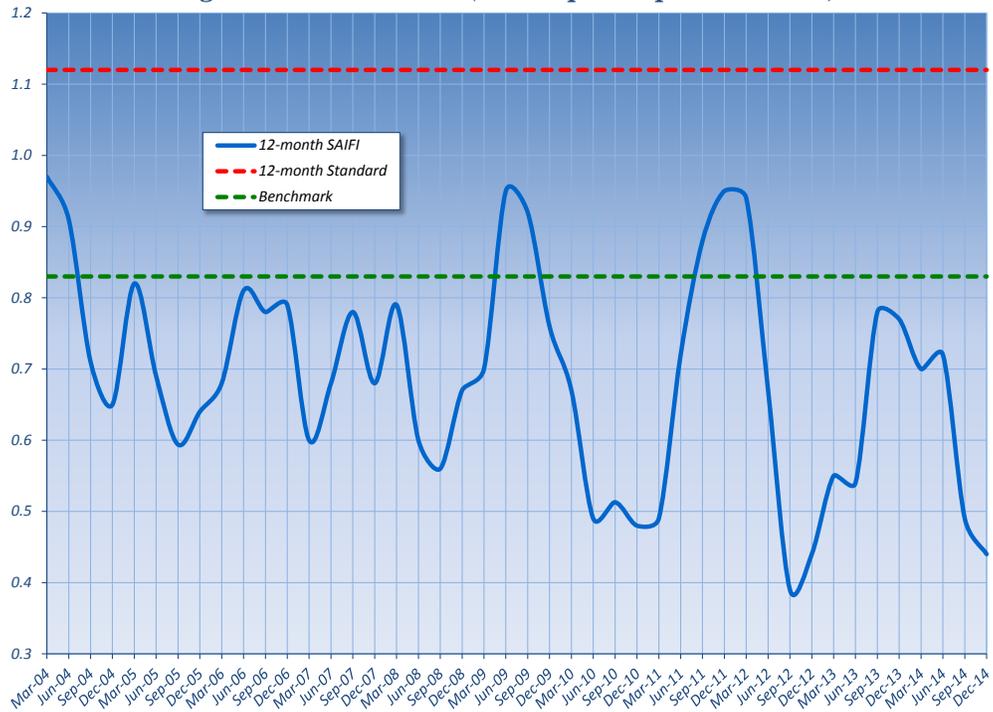


Figure 38 UGI Outage Causes (percent of total outages)

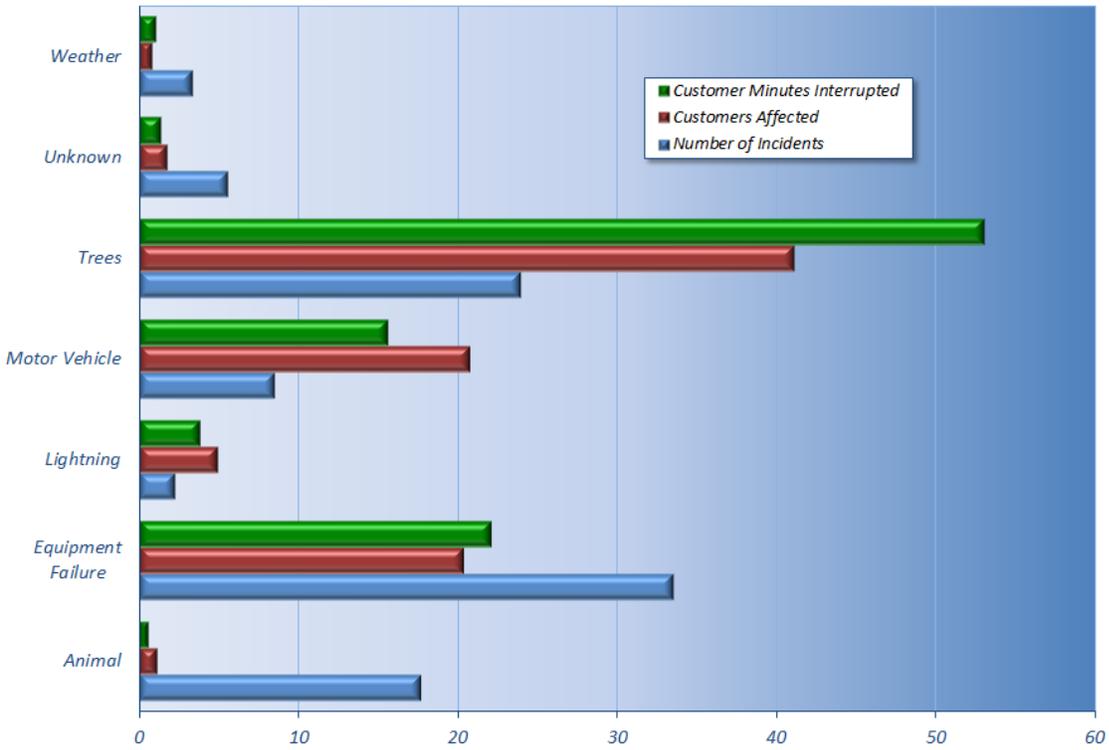
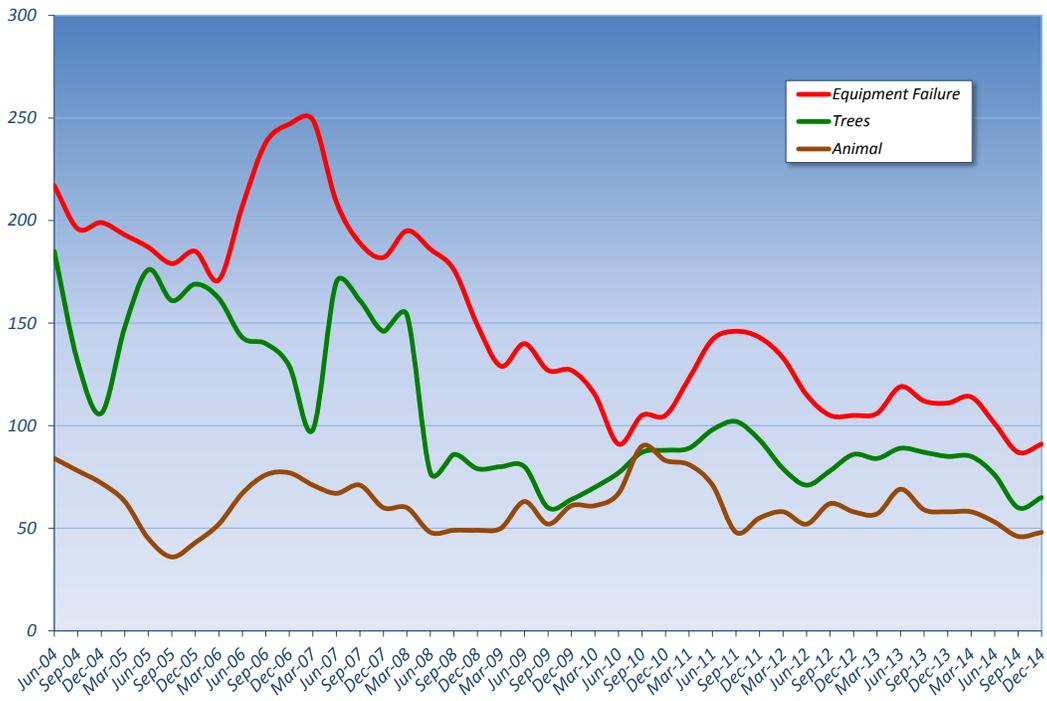


Figure 39 UGI Outage Tracking (number of incidents)



Wellsboro Electric Company

Wellsboro has a service territory of about 178 square miles and serves about 6,272 customers. In 2014, Wellsboro experienced 3,828 customer interruptions and 367,505 minutes of interruption, which is an increase from 2013, when customers experienced 3,461 customer interruptions and 242,422 minutes of interruption.

The 2014 reliability metrics exclude the following outage data related to four Commission approved major events:

- Feb. 1, 2014 - Gunshot damaged conductor, affecting 636 customers.
- Feb. 6, 2014 - Loss of FirstEnergy Transmission line, affecting 6,242 customers.
- July 23, 2014 - Thunderstorm, affecting 5,986 customers.
- Oct. 23, 2014 - Off right-of-way tree on feeder line, affecting 700 customers.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Increased from 70 minutes in 2013 to 75 minutes in 2014; achieved benchmark by 40 percent.

Three-year average: Increased slightly from 69 minutes in 2013 to 70 minutes in 2014 and achieved standard by 49 percent.

SAIDI

Rolling 12-month: Increased from 39 minutes in 2013 to 57 minutes in 2014; achieved benchmark by 63 percent.

Three-year average: Decreased from 73 minutes in 2013 to 52 minutes in 2014; achieved standard by 72 percent.

SAIFI

Rolling 12-month: Increased from 0.56 outages in 2013 to 0.77 outages in 2014; achieved benchmark by 37 percent.

Three-year average: Decreased from 1.04 outages in 2013 to 0.76 outages in 2014 and achieved standard by 44 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 40 and Figure 41. Figure 42 shows the distribution of outage causes as a percentage of total outages. Figure 43 shows the historical trend of main outage causes. The most frequent outage causes were equipment failure and animals, which are trending higher.

Wellsboro is continuing its programs to maintain electric reliability. Several capital improvement projects were completed in 2014, and a voltage conversion project was started and

will continue for the next several years. Overhead and underground fault indicators are continuing to be installed on various parts of the system to enable faster fault location. In 2015, over 200 wooden distribution poles will be replaced. To further enhance reliability, outage data is reviewed and measures are taken to correct or enhance an identified condition, such as adding animal guards, insulating transformers riser conductor, installation of self-protected transformers and the replacement of porcelain cutouts.

Wellsboro’s performance is significantly below benchmark.

Figure 40 Wellsboro CAIDI (minutes)

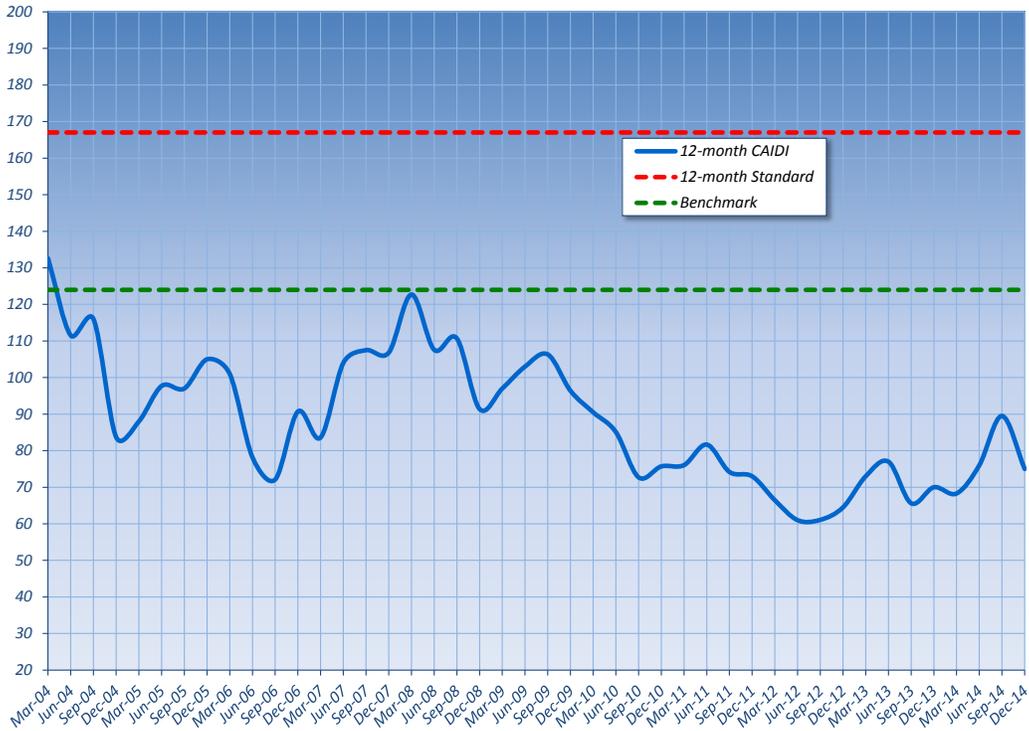


Figure 41 Wellsboro SAIFI (interruptions per customer)

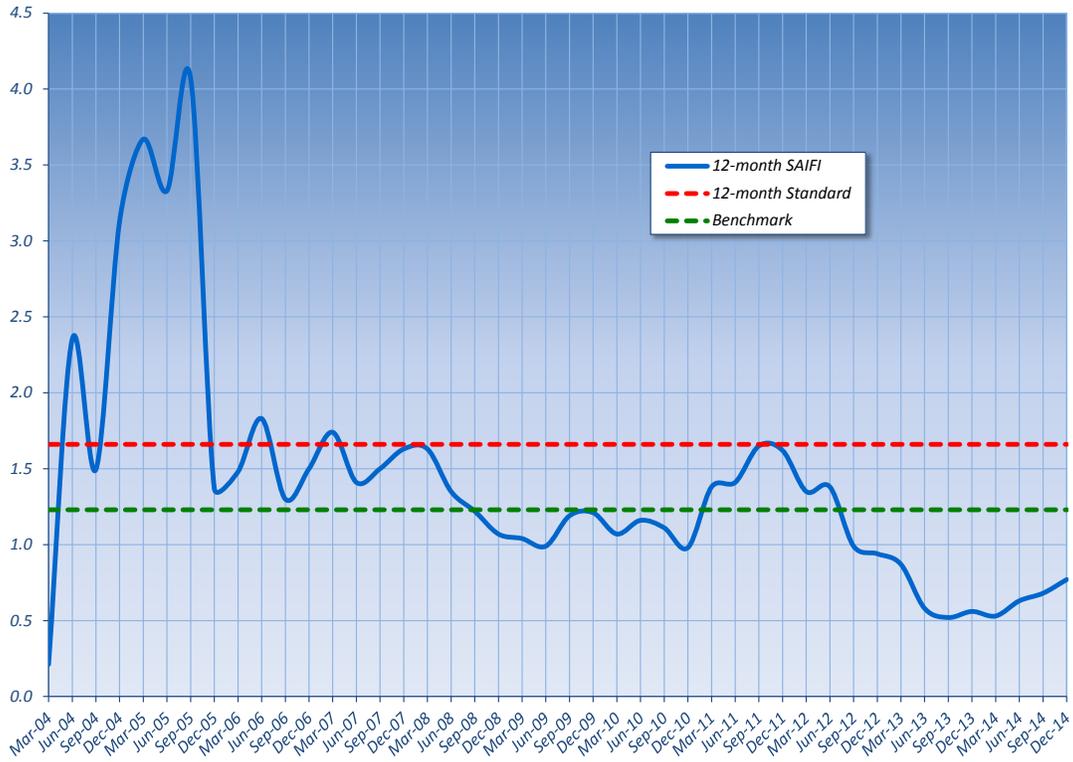


Figure 42 Wellsboro Outage Causes (percent of total outages)

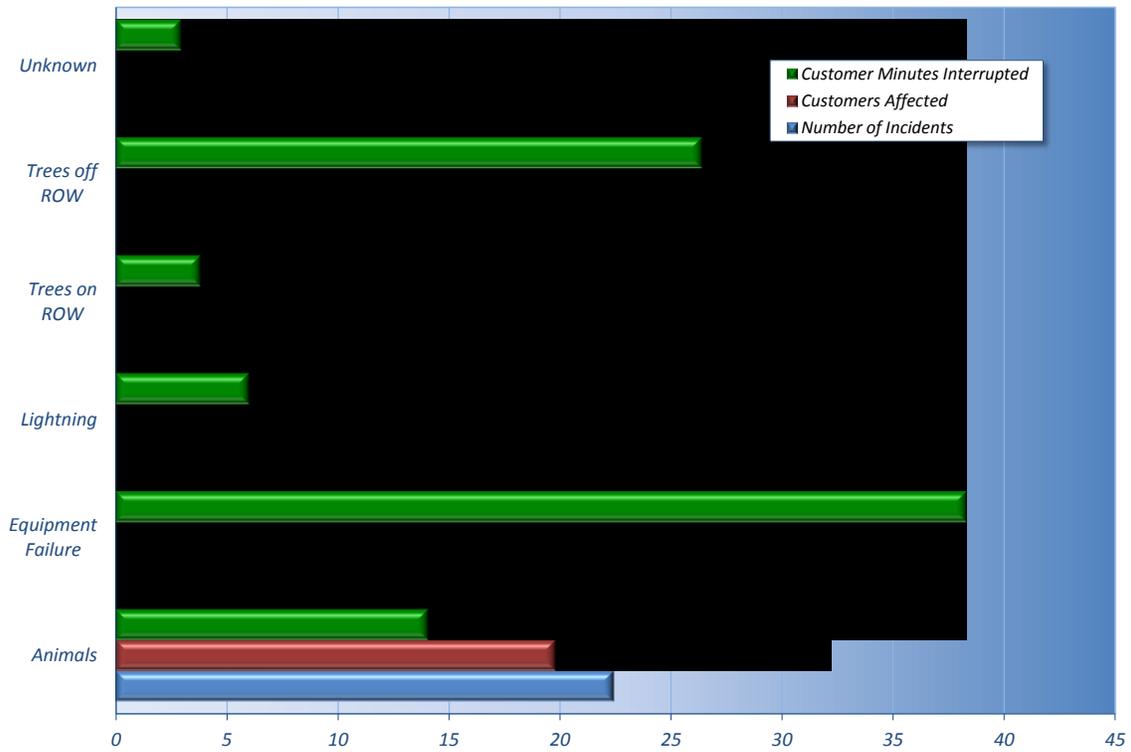
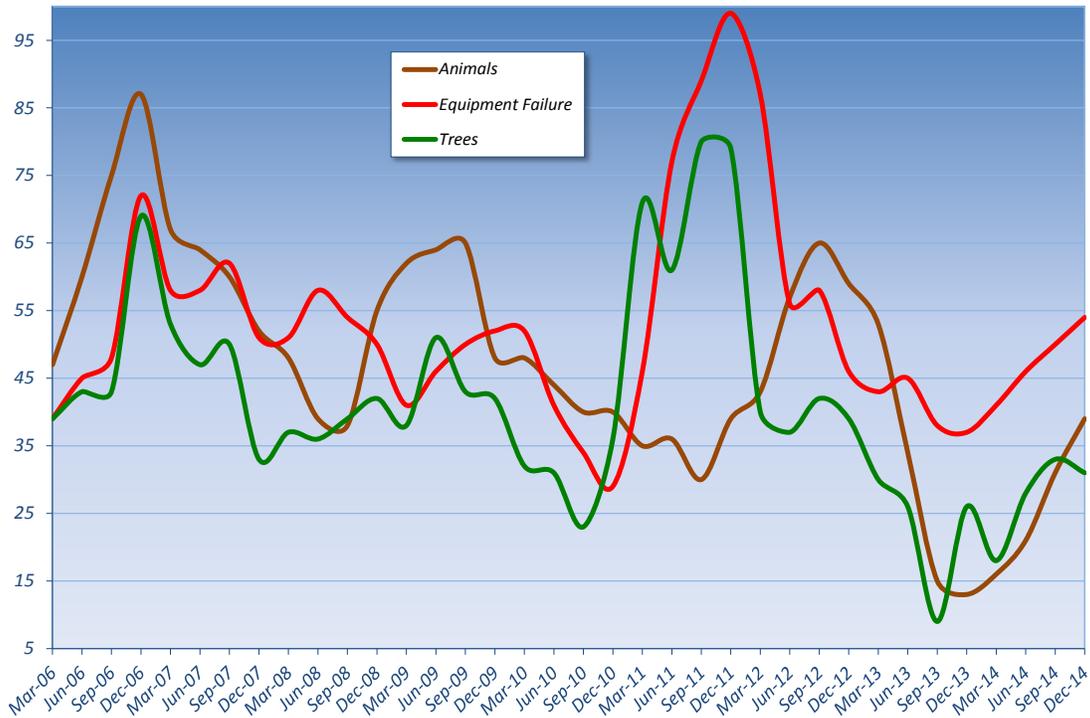


Figure 43 Wellsboro Outage Tracking (number of incidents)



West Penn Power Company

West Penn has a service territory of about 10,400 square miles and serves about 712,000 customers. In 2014, West Penn experienced 722,597 customer interruptions and 99.20 million minutes of interruption, which is a significant decrease from 2013, when customers experienced 863,104 customer interruptions and 157.8 million minutes of interruption.

West Penn had no major events in 2014.

CAIDI/SAIDI/SAIFI Evaluation

CAIDI

Rolling 12-month: Decreased from 183 minutes in 2013 to 137 minutes in 2014; and achieved benchmark by 19 percent.

Three-year average: Decreased from 187 minutes in 2013 to 182 minutes in 2014; and achieved standard by 3 percent.

SAIDI

Rolling 12-month: Decreased from 222 minutes in 2013 to 139 minutes in 2014; and achieved benchmark by 22 percent.

Three-year average: Decreased from 225 minutes in 2013 to 201 minutes in 2014; and achieved standard by 8 percent.

SAIFI

Rolling 12-month: Decreased from 1.21 outages in 2013 to 1.02 outages in 2014; and achieved benchmark by 3 percent.

Three-year average: Decreased from 1.23 outages in 2013 to 1.10 outages in 2014; and achieved standard by 5 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 44 and Figure 45. CAIDI and SAIFI are both below benchmark for the first time in 4 years. The past-year trend shows it is taking less time to restore power outages and outages are less frequent. Figure 46 shows the distribution of outage causes that occurred during 2014 as a percentage of total outages. Figure 47 shows the historical trend of the main outage causes. The top two known causes were trees and equipment failure.

West Penn will continue to enhance reliability by continually improving and executing certain reliability programs and processes. West Penn plans to continue overhead circuit, pole, and capacitor inspections. West Penn will also conduct worst performing circuit reviews, main line hardware reviews, complete circuit coordination reviews, remote circuit monitoring, customers experiencing multiple interruption review, and outage cause analysis trending.

West Penn's Vegetation Management Program plans to further enhance reliability based on cycle tree trimming. West Penn has instituted a danger tree program, which consists of removing or significantly reducing in height, diseased, or damaged trees located outside the boundary of the right-of-way that may pose a threat to distribution system. Trees affected by the Emerald Ash Borer will also be identified and removed. West Penn also continues to perform patrols from the substation to the first protective device to identify potential danger trees and any overhead hardware at risk of failing.

West Penn has also employed a formalized circuit lockout review process. This review allows dispatch, engineering, and the field personnel to identify both proactive and reactive solutions to reduce outages. Examples of these solutions include the installation of cutouts on un-fused taps, additional circuit tie capabilities, and modified coordination of protective devices

West Penn attained, in the last quarter of 2014, below benchmark scores in every performance category. This is the first time in four years that West Penn was below benchmark in all performance categories. In 2015, the PUC will continue to perform additional monitoring to ensure the reliability improvement trend continues in a manner that will sustain performance below benchmark.

Figure 44 West Penn CAIDI (minutes)

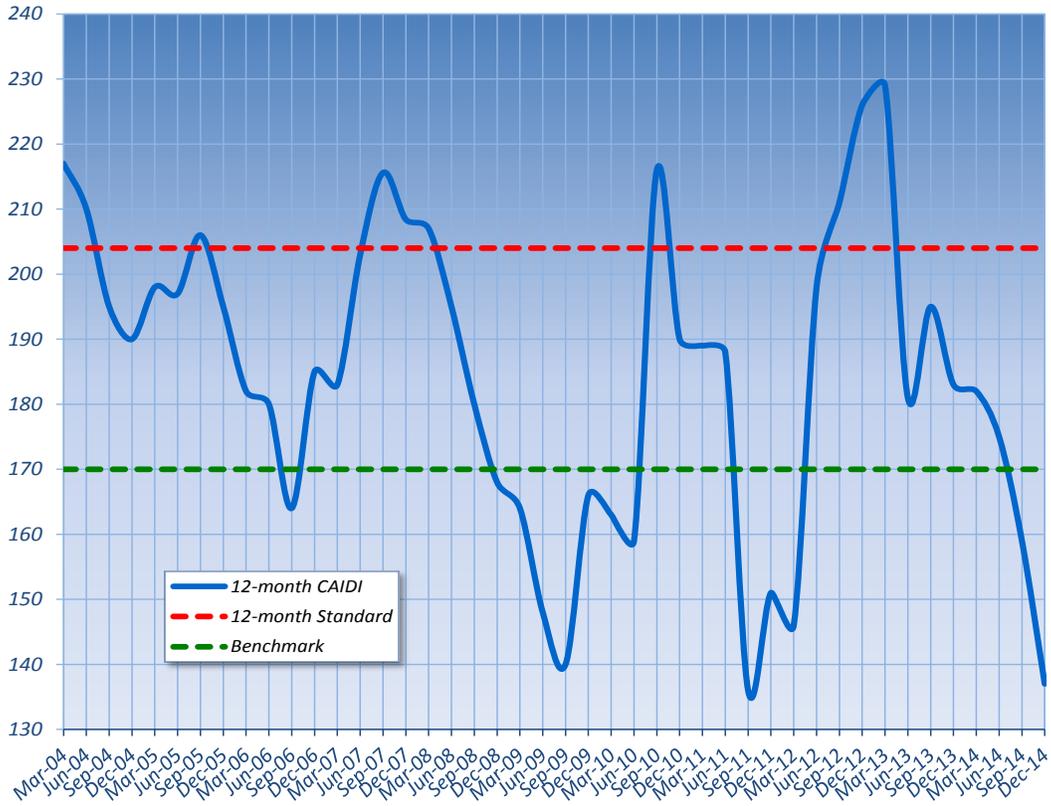


Figure 45 West Penn SAIFI (interruptions per customer)

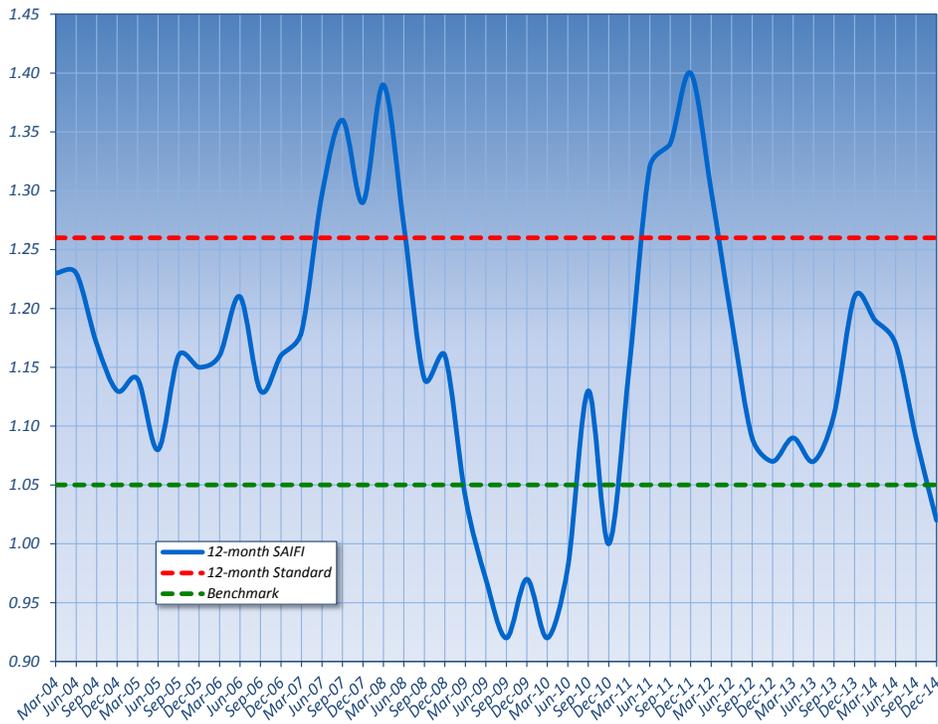


Figure 46 West Penn Outage Causes (percent of total outages)

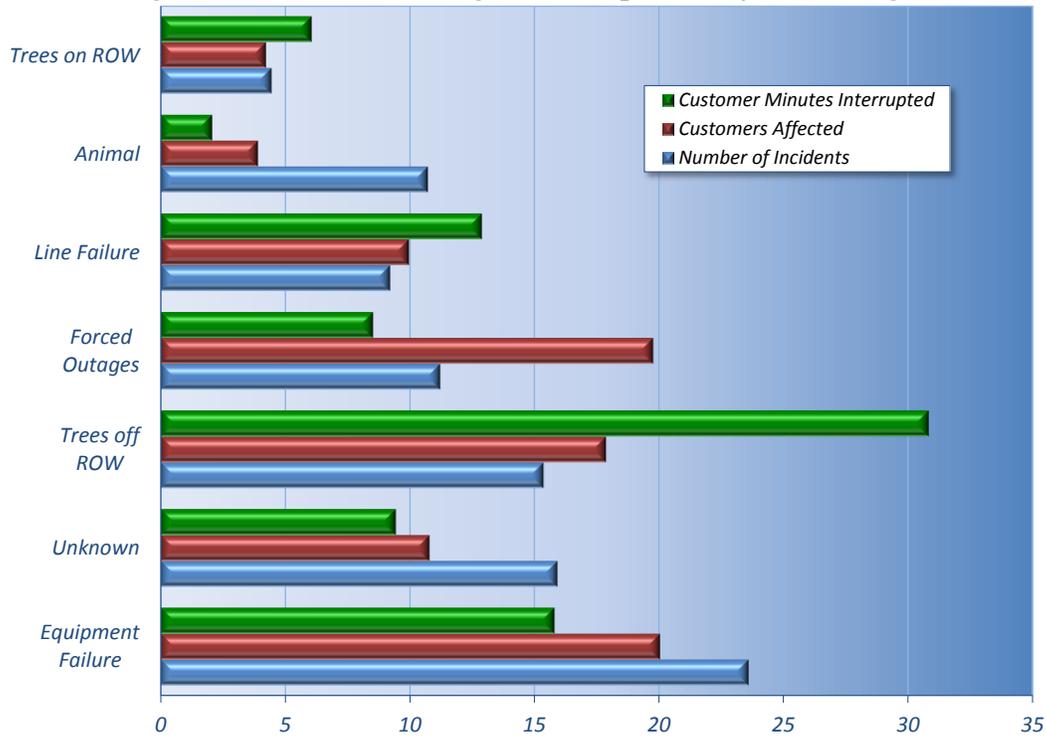
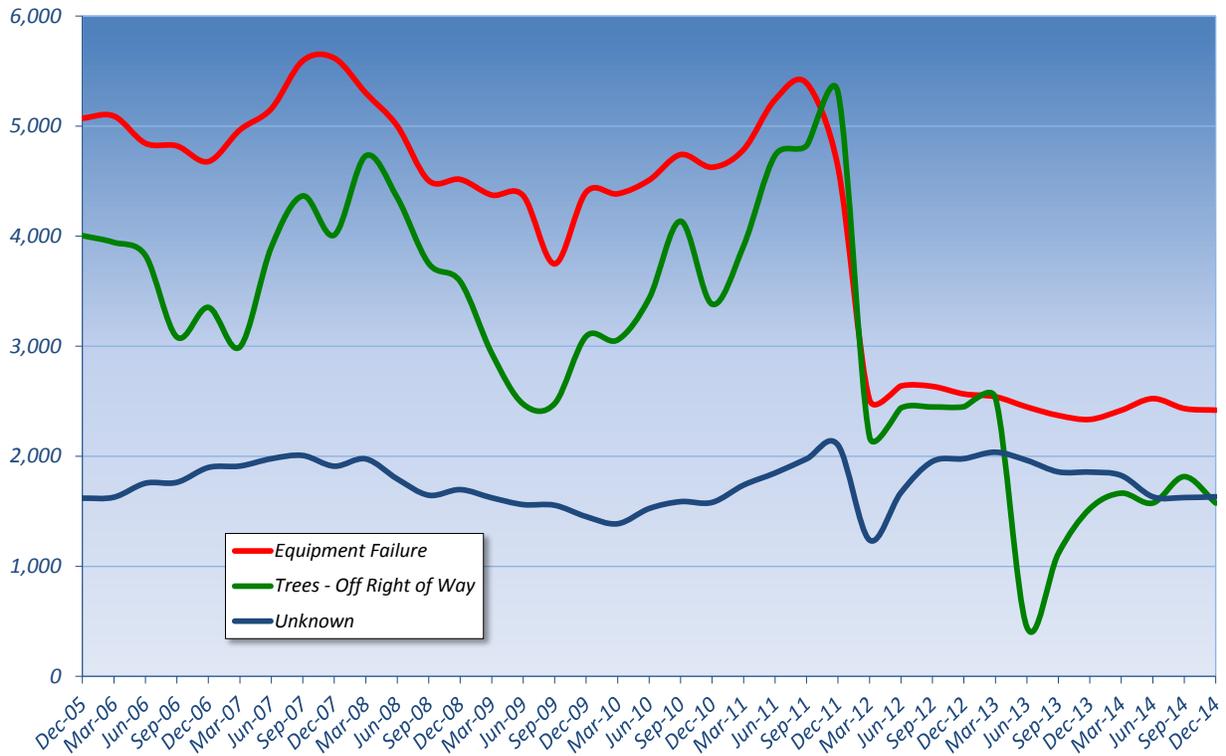


Figure 47 West Penn Outage Tracking (number of incidents)



Section 5– Conclusion

The Electricity Generation Customer Choice and Competition Act of 1996 mandates that the Commission ensure that levels of reliability that existed prior to the restructuring of the electric utility industry continue in the new competitive markets. In response, the PUC adopted reporting requirements designed to ensure the continuing safety, adequacy and reliability of the generation, transmission and distribution of electricity in the Commonwealth. The Commission also established reliability benchmarks and standards with which to measure the performance of each EDC, and standards for the inspection and maintenance of electric distribution facilities.

In general, every utility struggles with danger trees outside its right-of-way boundaries. These trees are a significant threat to electric reliability and cause significant damage to the distribution system during storms. As a result, the restoration process is very slow and costly to ratepayers. Improvement in this area can substantially improve electric reliability and the long term cost of tree trimming can be drastically reduced.

EDCs make an effort to work with private residents to remove or trim off right-of-way trees before they become a problem. In the long term, two areas could be addressed that would decrease costs to the ratepayer and increase safety and reliability; especially during a major storm event. The PUC will ask the EDC Best Practices Group to take up the issue of off ROW trees and to consider the following areas:

1. EDCs could seek more authority to effectively and efficiently address the process of eliminating danger trees in areas outside the EDC right-of-way.
2. A process could be established where stakeholders work toward limits on future right-of-way tree planting, including such measures as slow growth and low growth trees that do not grow to the height of power lines.

Within the past 5 years, there has been a substantial increase in the installation of automated devices which aid in sectionalizing distribution circuits during fault conditions. As a result, customers should start to realize the reliability benefits of these actions. Additionally, there has been an increase in tree trimming activity beyond historic levels. It is expected that this should also reduce damage to the electric system during storms and contribute to a general overall reduction in the amount of outages in Pennsylvania.

We believe EDC performance is trending in a positive and improving direction, and we expect more EDCs to achieve reliability performance scores below the benchmark in 2015.

The PUC believes that EDCs should set internal goals to consistently achieve reliability performance scores below benchmark for normal or “blue-sky” days. It is suggested that EDCs consider implementing an internal goal of maintaining their reliability metrics about 20% below benchmark during “blue sky” days. Such a goal may provide a cushion within the reliability metrics to absorb storms and unforeseen system events and still achieve benchmark performance.

The PUC will continually monitor EDC improvement plans and implement corrective action plans when an EDC's reliability performance metrics regularly exceed benchmark.

The Commission strives to ensure satisfactory electric service reliability in Pennsylvania through its oversight of EDC reliability performance, review of Inspection & Maintenance Plans, and work with EDCs to facilitate the exchange of best practices.

Appendix A – Electric Reliability Metrics

12-Month Average Electric Reliability Indices for 2014

Customer Average Interruption Duration Index (CAIDI)- min/yr/cust				% Above (+) or Below (-) Benchmark	% Above (+) or Below (-) Standard
EDC	Dec-14	Benchmark	Standard		
Citizens'	88	105	141	-16.2	-37.6
Duquesne Light	102	108	130	-5.6	-21.5
Met-Ed (FE)	128	117	140	9.4	-8.6
PECO	96	112	134	-14.3	-28.4
Penelec (FE)	118	117	141	0.9	-16.3
Penn Power (FE)	106	101	121	5.0	-12.4
Pike County	106	174	235	-39.1	-54.9
PPL	180	145	174	24.1	3.4
UGI	144	169	228	-14.8	-36.8
Wellsboro	75	124	167	-39.8	-55.3
West Penn (FE)	137	170	204	-19.4	-32.8
System Average Interruption Frequency Index (SAIFI)- outages/yr/cust				% Above (+) or Below (-) Benchmark	% Above (+) or Below (-) Standard
EDC	Dec-14	Benchmark	Standard		
Citizens'	0.19	0.20	0.27	-5.0	-29.6
Duquesne Light	0.62	1.17	1.40	-47.0	-55.7
Met-Ed (FE)	1.11	1.15	1.38	-3.5	-19.6
PECO	0.86	1.23	1.48	-30.1	-41.9
Penelec (FE)	1.55	1.26	1.52	23.0	2.0
Penn Power (FE)	1.11	1.12	1.34	-0.9	-17.2
Pike County	2.12	0.61	0.82	247.5	158.5
PPL	0.92	0.98	1.18	-6.1	-22.0
UGI	0.44	0.83	1.12	-47.0	-60.7
Wellsboro	0.77	1.23	1.66	-37.4	-53.6
West Penn (FE)	1.02	1.05	1.26	-2.9	-19.0
System Average Interruption Duration Index (SAIDI)- min/yr/cust				% Above (+) or Below (-) Benchmark	% Above (+) or Below (-) Standard
EDC	Dec-14	Benchmark	Standard		
Citizens'	17	21	38	-19.0	-55.3
Duquesne Light	63	126	182	-50.0	-65.4
Met-Ed (FE)	141	135	194	4.4	-27.3
PECO	82	138	198	-40.6	-58.6
Penelec (FE)	183	148	213	23.6	-14.1
Penn Power (FE)	118	113	162	4.4	-27.2
Pike County	224	106	194	111.3	15.5
PPL	165	142	205	16.2	-19.5
UGI	63	140	256	-55.0	-75.4
Wellsboro	57	153	278	-62.5	-79.4
West Penn (FE)	139	179	257	-22.3	-45.9

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.

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.

Three-Year Average Electric Reliability Indices for 2012-2014

<i>Customer Average Interruption Duration Index (CAIDI)-min/yr/cust</i>				<i>3-Year Average</i>	<i>3-Year Standard</i>	<i>% Above (+) or Below (-) Standard</i>
<i>EDC</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>			
<i>Citizens'</i>	129	81	88	99	115	-13.6
<i>Duquesne Light</i>	117	121	102	113	119	-4.8
<i>Met-Ed (FE)</i>	120	105	128	118	129	-8.8
<i>PECO</i>	97	91	96	95	123	-23.0
<i>Penelec (FE)</i>	138	117	118	124	129	-3.6
<i>Penn Power (FE)</i>	114	140	106	120	111	8.1
<i>Pike County</i>	184	209	106	166	192	-13.4
<i>PPL</i>	152	108	180	147	160	-8.3
<i>UGI</i>	122	110	144	125	186	-32.6
<i>Wellsboro</i>	65	70	75	70	136	-48.7
<i>West Penn (FE)</i>	226	183	137	182	187	-2.7
<i>System Average Interruption Frequency Index (SAIFI)-outages/yr/cust</i>				<i>3-Year Average</i>	<i>3-Year Standard</i>	<i>% Above (+) or Below (-) Standard</i>
<i>EDC</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>			
<i>Citizens'</i>	0.09	0.46	0.19	0.25	0.22	12.1
<i>Duquesne Light</i>	0.67	0.62	0.62	0.64	1.29	-50.6
<i>Met-Ed (FE)</i>	1.29	1.09	1.11	1.16	1.27	-8.4
<i>PECO</i>	0.77	0.69	0.86	0.77	1.35	-42.7
<i>Penelec (FE)</i>	1.41	1.48	1.55	1.48	1.39	6.5
<i>Penn Power (FE)</i>	1.17	1.35	1.11	1.21	1.23	-1.6
<i>Pike County</i>	0.57	1.21	2.12	1.30	0.67	94.0
<i>PPL</i>	1.08	0.82	0.92	0.94	1.08	-13.0
<i>UGI</i>	0.44	0.77	0.44	0.55	0.91	-39.6
<i>Wellsboro</i>	0.94	0.56	0.77	0.76	1.35	-44.0
<i>West Penn (FE)</i>	1.07	1.21	1.02	1.10	1.16	-5.2
<i>System Average Interruption Duration Index (SAIDI)-min/yr/cust</i>				<i>3-Year Average</i>	<i>3-Year Standard</i>	<i>% Above (+) or Below (-) Standard</i>
<i>EDC</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>			
<i>Citizens'</i>	11	37	17	22	25	-13.3
<i>Duquesne Light</i>	79	75	63	72	153	-52.7
<i>Met-Ed (FE)</i>	155	115	141	137	163	-16.0
<i>PECO</i>	75	63	82	73	167	-56.1
<i>Penelec (FE)</i>	194	174	183	184	179	2.6
<i>Penn Power (FE)</i>	133	188	118	146	136	7.6
<i>Pike County</i>	105	253	224	194	129	50.4
<i>PPL</i>	164	89	165	139	172	-19.0
<i>UGI</i>	54	85	63	67	170	-60.4
<i>Wellsboro</i>	60	39	57	52	185	-71.7
<i>West Penn (FE)</i>	241	222	139	201	217	-7.5

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

Appendix B – Modifications to Inspection and Maintenance Intervals

Modifications to Inspection and Maintenance (I&M) Intervals (Group 1) Submitted October 2013, effective January 1, 2015- December 31, 2016

Company	Exemption Requested	Justification
FirstEnergy including 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.
FirstEnergy including Penelec, Penn Power, Met-Ed and West Penn Power	Distribution overhead line inspections – 5 year rather than 1 to 2-year cycle	Approved previously in the Jan. 1, 2013- Dec. 31, 2014 I&M Plan.
FirstEnergy including Penelec, Penn Power, Met-Ed and West Penn Power	Overhead transformer inspections – 5 year rather than 1 to 2-year cycle	Approved previously in the Jan. 1, 2013- Dec. 31, 2014 I&M Plan.
UGI	None	n/a

***Modifications to Inspection and Maintenance Intervals (Group 2) Submitted October 2012,
effective January 1, 2014- December 31, 2015***

Company	Exemption 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
Pike County	Pole loading calculations	Approved previously in the Jan. 1, 2012- Dec.31, 2013 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
PPL	Transformer inspections	Approved previously in the Jan. 1, 2012- Dec. 31, 2013 I&M Plan
Wellsboro	Pole loading calculations	Approved previously in the Jan. 1, 2012- Dec.31, 2013 I&M Plan

