



# Electric Service Reliability in Pennsylvania

# 2012



# **ELECTRIC SERVICE RELIABILITY IN PENNSYLVANIA 2012**

August 2013

Published by:

Pennsylvania Public Utility Commission

PO Box 3265

Harrisburg, PA 17105-3265

[www.puc.pa.gov](http://www.puc.pa.gov)

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## *Executive Summary*

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The Electricity Generation Customer Choice and Competition Act mandated the Pennsylvania Public Utility Commission (PUC or Commission) ensure levels of reliability that existed prior to the restructuring of the electric utility industry continue in the new competitive markets.<sup>1</sup> 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.<sup>2</sup> The PUC also established reliability benchmarks and standards to measure the performance of each electric distribution company (EDC).<sup>3</sup>

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; and
- 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 those times when unforeseen circumstances push the metrics above the benchmark.<sup>4</sup> 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 the EDC to undergo additional scrutiny and may include a Corrective Action Plan or a credible analysis that would justify no corrective action needed.

As mandated, EDCs report metrics<sup>5</sup> using both a rolling 12-month average and a rolling 3-year average. Only one EDC, West Penn, failed to meet all three standard metrics for its rolling 12-month average. Three EDCs (PECO, UGI, and Wellsboro) met all three benchmark metrics for the rolling 12-month average. FirstEnergy Corp. subsidiaries (Met-Ed, Penelec, Penn Power and West Penn) only met one benchmark metric (Penn Power's rolling 3-year average SAIFI).

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

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<sup>1</sup>Act of Dec. 3, 1996, P.L. 802, No. 138, 66 Pa.C.S. Sec. 2801 et.seq.

<sup>2</sup>Docket No. L-00970120; 52 Pa. Code §§ 57.191-57.197.

<sup>3</sup>Docket No. M-00991220.

<sup>4</sup>Id. at 25.

<sup>5</sup>For an explanation of performance standards, see Section 2, page 4.

<sup>6</sup>Docket No. L-00040167.



*Table 1 EDCs' Progress Toward Achieving Established Metrics*

<b>2012 EDC Performance Scorecard</b>					
<b>O</b> - Benchmark metrics not achieved (YELLOW) <b>O</b> - Standard metrics not achieved (RED)					
<b>P</b> - metrics achieved (GREEN)		Rolling 12-Month		Rolling 3-Year	
EDC	*Metrics	Benchmark Score	Standard Score	Benchmark Score	Standard Score
Citizens'	CAIDI	O	P	O	O
	SAIDI	P	P	O	P
	SAIFI	P	P	P	P
Duquesne Light	CAIDI	O	P	P	P
	SAIDI	P	P	P	P
	SAIFI	P	P	P	P
Met-Ed	CAIDI	O	P	O	P
	SAIDI	O	P	O	P
	SAIFI	O	P	O	O
PECO	CAIDI	P	P	O	P
	SAIDI	P	P	P	P
	SAIFI	P	P	P	P
Penelec	CAIDI	O	P	O	O
	SAIDI	O	P	O	O
	SAIFI	O	P	O	P
Penn Power	CAIDI	O	P	O	O
	SAIDI	O	P	O	P
	SAIFI	O	P	P	P
Pike County	CAIDI	O	P	O	O
	SAIDI	P	P	O	O
	SAIFI	P	P	O	P
PPL	CAIDI	O	P	O	P
	SAIDI	O	P	O	P
	SAIFI	O	P	O	P
UGI	CAIDI	P	P	P	P
	SAIDI	P	P	P	P
	SAIFI	P	P	P	P
Wellsboro	CAIDI	P	P	P	P
	SAIDI	P	P	P	P
	SAIFI	P	P	P	P
West Penn	CAIDI	O	O	O	O
	SAIDI	O	P	O	P
	SAIFI	O	P	O	P

\***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.

## *Section 1 – Introduction*

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### *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.<sup>7</sup>

The data presented in this report comes from the quarterly and annual reliability reports submitted by the 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).<sup>8</sup> 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 that 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 those 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.

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<sup>7</sup> 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.

<sup>8</sup> For more information on CAIDI and SAIFI, see Section 2.

## *Section 2 –Reliability Performance Measures*

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### *Reliability Performance Metrics*

The Commission’s benchmarks and standards are based on four reliability performance metrics that have been adopted by the Institute of Electrical and Electronic Engineers Inc. (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 3-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:

- 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;<sup>9</sup> and
- Reliability performance on a five 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:<sup>10</sup>

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

<sup>10</sup> 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, the EDC is required to formally request to exclude that service interruptions for reporting purposes. The request must be accompanied by data which demonstrates why service interruption qualifies as a major event exclusion.

### *Benchmarks and Standards*

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 rolling **12-month standard** is 120 percent of the benchmark for the large EDCs and 135 percent for the small EDCs.<sup>11</sup> 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 rolling **three-year standard** 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 2010, 2011 and 2012 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: EDC reported CAIDI =143 minutes with CAIDI benchmark = 130 minutes, rolling 12-month CAIDI standard = 156 minutes.

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<sup>11</sup> 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.

Evaluation: Performance is considered acceptable since it was less than the 12-month CAIDI standard of 156 minutes

If CAIDI =120 minutes, then performance is better than historical average CAIDI benchmark performance and EDC has increased reliability for reporting period.

If CAIDI =180 minutes, then performance failed to meet both historical average CAIDI benchmark performance and rolling 12-month CAIDI standard. This would typically require EDC to submit a corrective action plan and 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.<sup>12</sup> In addition, Commission staff may initiate an investigation to determine whether an EDC is providing reliable service.<sup>13</sup>

Benchmarks and standards for EDC reliability performance and average reliability Metrics for 2012 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.<sup>14</sup> The regulation also sets forth minimum inspection and maintenance intervals for vegetation management, poles, overhead lines and substations.

The most recent biennial inspection and maintenance (I&M) plans for the periodic inspection, maintenance, repair and replacement of facilities were filed with the Commission on Oct. 1, 2011, by FirstEnergy (Met-Ed, Penelec and Penn Power), West Penn Power and UGI. These plans were effective on Jan. 1, 2013. I&M plans were filed by Duquesne Light, PECO, PPL, Citizens', Pike County and Wellsboro on Oct. 1, 2012 and will become effective Jan. 1, 2014. 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.<sup>15</sup>

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<sup>12</sup> See 52 Pa. Code § 57.195(g).

<sup>13</sup> See 52 Pa. Code § 57.197(a).

<sup>14</sup> See 52 Pa. Code § 57.198.

<sup>15</sup> See 52 Pa. Code § 57.198(c).



*Table 2 Inspection and Maintenance Intervals*

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

### *Section 3 – 2012 Outage Response Review*

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#### *Overview*

In October 2012, Hurricane Sandy caused more than 1.9 million electric outages in Pennsylvania, representing a major event that when ranked was the worst storm for many of the affected EDCs. Many of the customers affected experienced outages greater than 72 hours. With the exception of Penn Power and Citizens', all Pennsylvania EDCs had at least one PUC reportable outage event in 2012.<sup>16</sup> The significant events included: severe thunderstorms in late June<sup>17</sup> and late July and the impact of Hurricane Sandy in late October.

#### *Review of Long-Duration Outage Event(s)*

Although the Commission reviews EDC performance following every major storm event, long-duration events present an opportunity for additional review. Since a significant number of customers are impacted by power restoration activity, public safety is given the highest priority during power restoration operations. EDCs have recognized timely and accurate information and estimated restoration times are a challenge when communicating with customers, emergency management personnel and elected officials.

Lessons learned from Hurricane Irene in 2011 have helped to improve EDCs' communications as shown in the response during the June and July storms as well as Hurricane Sandy. EDCs continue the work to improve existing communication gaps. In 2012, the EDCs worked with county emergency management personnel more effectively and offered on-site liaisons where appropriate. EDCs also utilized social media in addition to traditional media outreach to better communicate with customers.

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<sup>16</sup> 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.

<sup>17</sup> These storms were part of the Derecho that devastated parts of the Midwest and U.S. Capitol region.

The PUC specifically evaluated the EDCs' response to Sandy and produced the report, *Summary Report of Outage Information Submitted by Electric Distribution Companies Affected by Hurricane Sandy October 29-31, 2012*.<sup>18</sup> Key findings in the report included:

- The power restoration of Sandy took about the same time as Irene even though there was increased infrastructure damage;
- The majority of EDCs successfully increased the use of social and traditional media to communicate with customers;
- All EDCs communicated more effectively with elected representatives and emergency management officials;
- The EDCs' daily conference call briefings with elected representatives and emergency officials were generally well received and beneficial, and the EDCs have worked to address issues related to the process and facilitation of the calls;
- The PUC daily conference call briefings with Lieutenant Governor's Office, Utility Presidents, and operational staff were beneficial;
- Staffing of county 911 centers and/or emergency operations centers with EDC Liaisons was beneficial and should be continued;
- There was difficulty in managing the estimated times of restoration (ETRs) for customers who experienced the longer-duration outages;
- There were far fewer issues handling peak call volume than in the response to Hurricane Irene;
- Met-Ed had a much higher percentage of informal complaints relating to ETRs and restoration information;
- Pre-staging and mobilization of work crews allowed an almost immediate restoration effort once the storm passed and
- There was some improvement in the overall performance of the historically worst performing circuits, in terms of outage duration and frequency.

After reviewing and analyzing reports, Commission staff offered EDCs the following seven recommendations that are being evaluated for implementation by the EDC Best Practice Working Group. Six of the seven recommendations are communications related. The other recommendation dealt with worst performing circuits. The recommendations were:

- Continue to enhance social and traditional media outlets to communicate with customers prior, during, and after a major storm. Enhancements should include websites and mobile

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<sup>18</sup> The report is available on the Commission website at: [http://www.puc.pa.gov/consumer\\_info/electricity.aspx](http://www.puc.pa.gov/consumer_info/electricity.aspx).

platforms for customers to report outages and acquire outage status updates. (EDC Best Practice Working Group addressing issue.)

- Develop a standard process to manage ETRs, especially for long-duration outages. (EDC Best Practice Working Group addressing issue.)
- Develop policies and processes to ensure customer communication is consistent and accurate during long-duration outages. (EDC Best Practice Working Group addressing issue and TUS following up with Met-Ed on specific issues.)
- Continue cooperation and communication with County 911 centers and Emergency Management Agencies (EMA). This includes having EDC Liaisons report to emergency facilities during a major storm. Establish at least a yearly meeting with emergency facilities to ensure everyone understands processes and response expectations and contact information is up to date. (EDC Best Practice Working Group addressing issue.)
- Continue phone briefings with State/Local Representatives and Emergency Managers. Mobilize and start briefings prior to major storms to ensure communication links are established. Establish a standard process for briefing. (EDC Best Practice Working Group addressing issue.)
- Continue efforts to respond to actual phone calls by customers during storm events. High customer call-in volumes to EDCs are sometimes responded to with a “busy signal” or “call back later” response.
- TUS will continue to work with EDCs on reducing the number of service outages attributable to the worst performing five percent of circuits (WPCs) and will work with EDCs to ensure these circuits (where possible) do not remain on the WPC list for more than four consecutive quarters.

## ***Section 4 –Statistical Utility Performance Data***

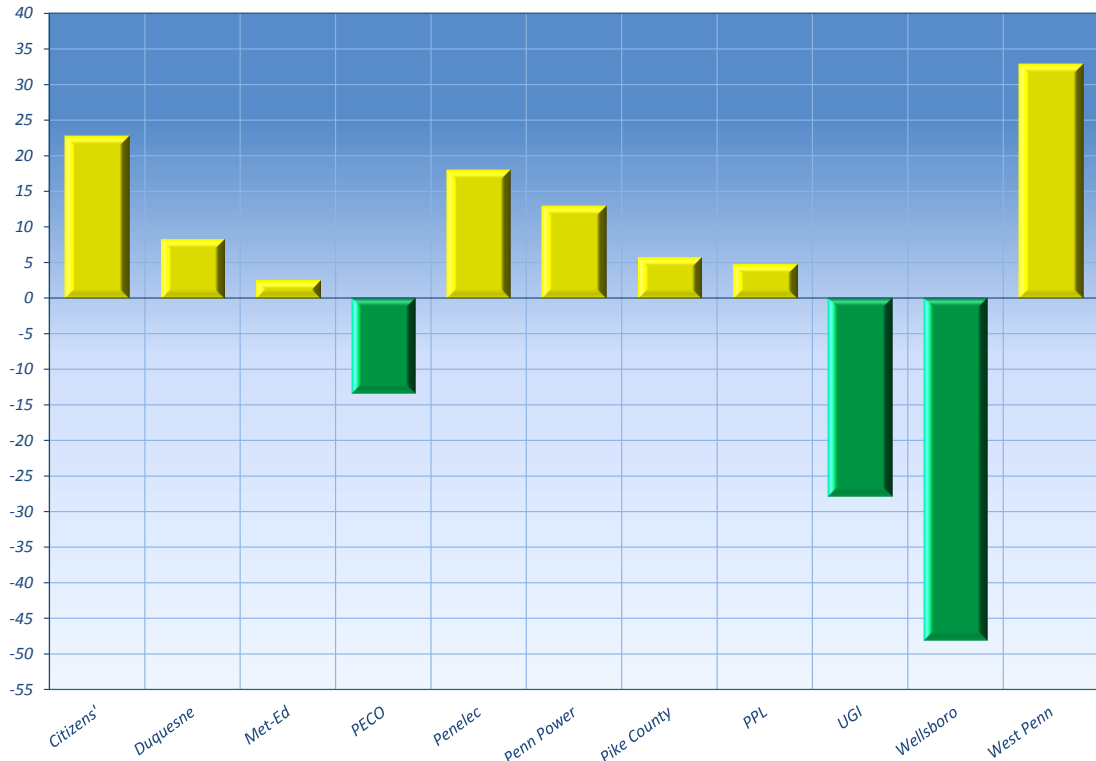
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### ***Statewide Summary***

The 2012 reliability data for the 12-month standard performance compliance submitted by the 11 EDCs indicates:

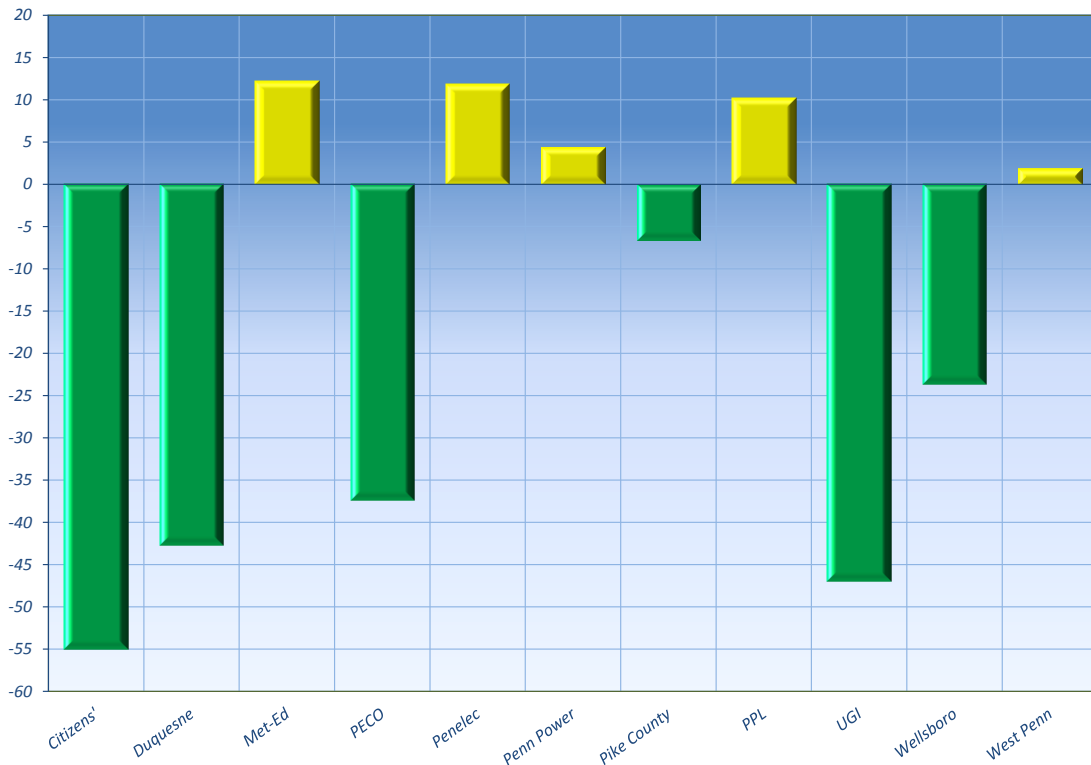
- 10 EDCs achieved CAIDI with three EDCs performing better than the benchmark (Figure 1).
- 11 EDCs achieved SAIDI with six EDCs performing better than the benchmark (Figure 1a).
- 11 EDCs achieved SAIFI with six EDCs performing better than the benchmark (Figure 2).

**Figure 1 – 2012 CAIDI Comparison (percent above or below benchmark)**



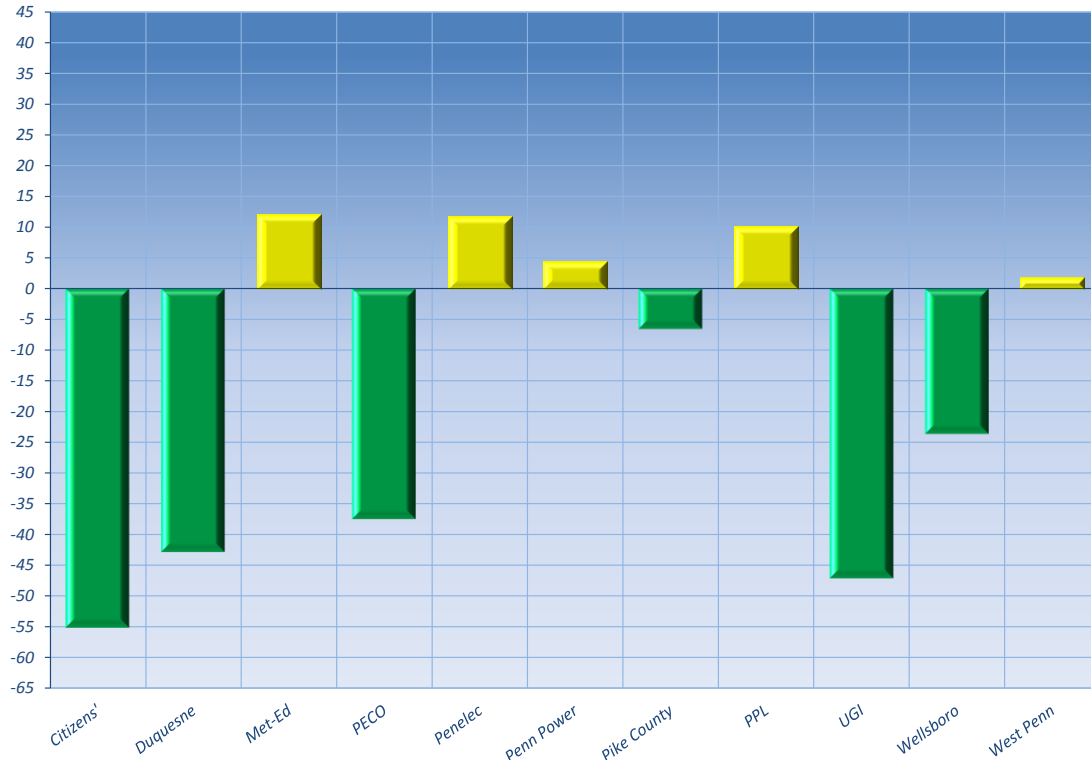
Note: The green bar shows the percentage successfully achieved below CAIDI benchmark performance metric. The yellow bar shows the percentage above the CAIDI benchmark that was not achieved.

**FIGURE 1a – 2012 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 SAIDI benchmark that was not achieved.

**FIGURE 2 – 2012 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.

Appendix A provides the actual 2012 reliability performance for individual EDCs and the benchmarks and standards for each reliability index.

The average reliability performance of EDCs for a three-year period also has been assessed, utilizing data from 2010, 2011 and 2012. Overall, the three-year average improved in the average number of outages experienced by customers (SAIFI), but deteriorated in the duration of outages (CAIDI). Five EDCs (Citizens', Penelec, Penn Power, Pike County and West Penn) failed to meet the rolling three-year CAIDI performance standard by 77 minutes total in 2012, compared to three EDCs and 45 minutes total in 2011. One EDC (Met-Ed) failed to meet the rolling three-year SAIFI performance standard by 0.07 in 2012, compared two EDCs in 2011. Two EDCs (Penelec, and Pike County) exceeded their SAIDI standards in 2012, compared to three EDCs in 2011. The individual 2010, 2011, and 2012 performance for the EDCs and the results of the three-year performance analysis are included in Appendix A.



The rolling 3-year results for the 11 EDCs not achieving compliance are:

	<b>Number of EDCs not achieving compliance</b>	<b>EDCs not achieving compliance</b>
<b>CAIDI Standard</b>	5	Citizens', Penelec, Penn Power, Pike County and West Penn
<b>CAIDI Benchmark</b>	8	Citizens', Met-Ed, PECO, Penelec, Penn Power, Pike County and West Penn
<b>SAIDI Standard</b>	2	Penelec and Pike County
<b>SAIDI Benchmark</b>	7	Citizens', Met Ed, Penelec, Penn Power, Pike County, PPL and West Penn
<b>SAIFI Standard</b>	1	Met-Ed
<b>SAIFI Benchmark</b>	5	Met-Ed, Penelec, Pike County, PPL and West Penn

In 2012, EDCs filed 19 requests for exclusion of major events. All but one of the requests was approved. 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 3-year average basis.

### *Citizens' Electric Company*

Citizens' has a relatively small operating service area with an electric system consisting of one distribution substation and nine distribution feeder lines. In 2012, Citizens' experienced 596 customer interruptions for a duration of 77,030 minutes (excluding major events), which was better than 2011 when customers experienced 2,390 interruptions for a duration of 300,660 minutes.

The 2012 reliability metrics calculation excludes the following outage data relating to three major events, which were approved by the Commission:<sup>19</sup>

<sup>19</sup> See Docket Nos. M-2012-2290152; M-2012-2304636; M-2012-2334030.

- February 16, 2012 - Car struck pole, affecting 697 customers.
- May 4, 2012 – Thunderstorms, affecting 986 customers.
- October 29, 2012 – Hurricane Sandy, affecting 799 customers.

### CAIDI/SAIDI/SAIFI Evaluation

#### **CAIDI**

**Rolling 12-month:** Increased slightly from 126 minutes in 2011 to 129 minutes in 2012; failed to achieve benchmark by 23 percent.

**Three-year average:** Increased from 100 minutes in 2011 to 118 minutes in 2012; failed to achieve standard by 2 percent.

#### **SAIDI**

**Rolling 12-month:** Decreased from 44 minutes in 2011 to 11 minutes in 2012; achieved benchmark by 48 percent.

**Three-year average:** Decreased from 26 minutes in 2011 to 24 minutes in 2012; achieved standard by 3 percent.

#### **SAIFI**

**Rolling 12-month:** Decreased from 0.35 outages in 2011 to 0.09 outages in 2012; achieved benchmark by 55 percent.

**Three-year average:** Decreased from 0.25 outages in 2011 to 0.21 outages in 2012; achieved standard by 5 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 access reliability performance and actual values are not valid for comparisons among other EDCs.*

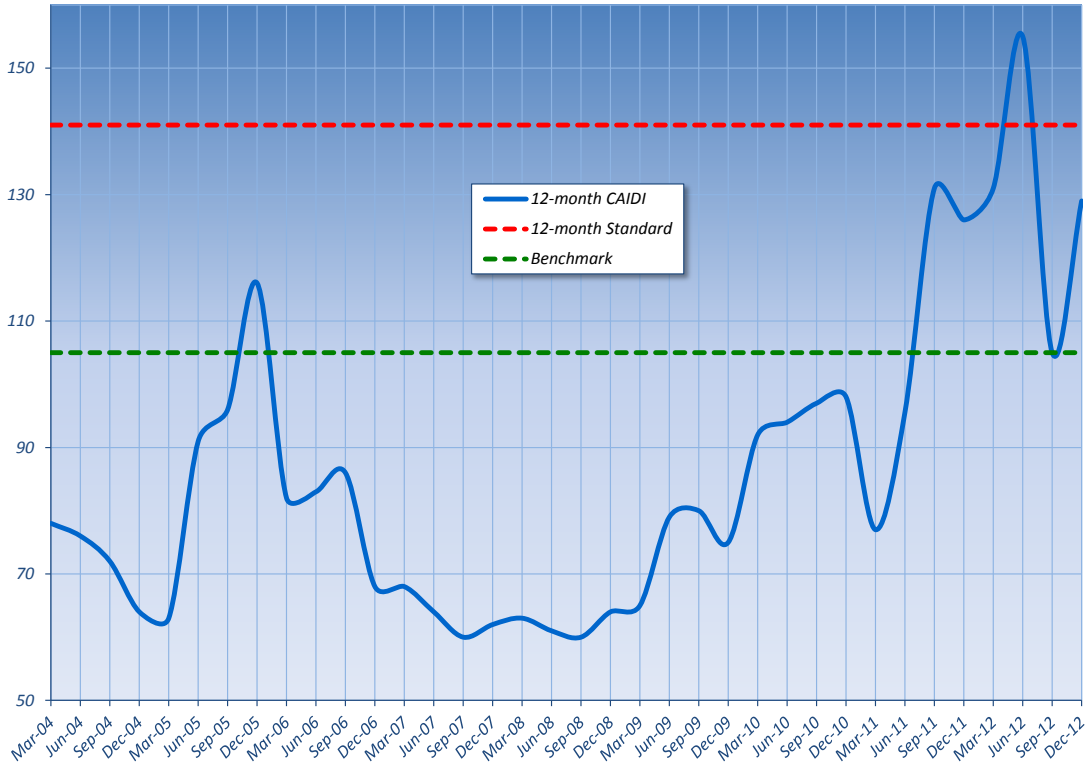
Historical 12-month CAIDI and SAIFI trends are shown in Figure 3 and Figure 4. The past-year trend shows it is taking longer to restore power, however, outages are occurring less frequently. Citizens' is continuing efforts to address issues regarding trees outside of the right-of-way as well as working with property owners to remove danger trees that may cause outages. While Citizens' CAIDI is back under the 12-month standard, the PUC will continue to monitor that the trend continues towards benchmark.

Figure 5 shows the distribution of outage causes that occurred during 2012 as a percentage of total outages. Figure 6 shows historical trend of the top three major outage causes. The most frequent outage causes were animals, weather and trees.

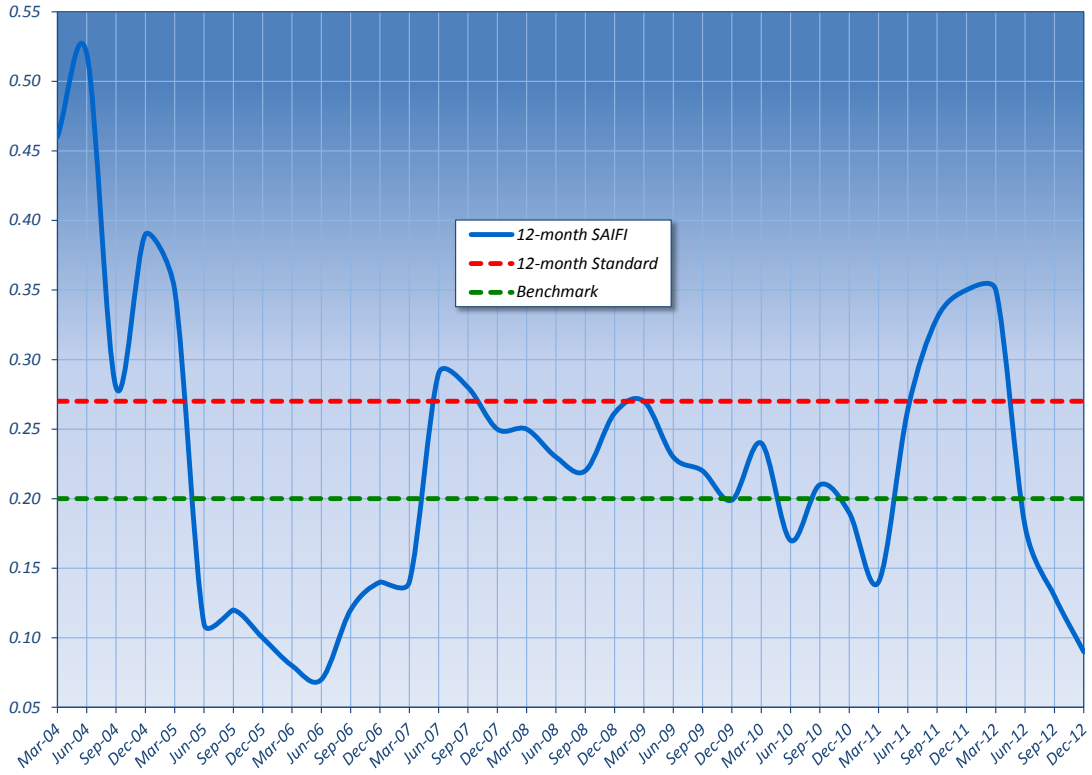
Weather caused 38 percent of Citizens' outages. In 2012, Citizens' upgraded its advanced metering infrastructure (AMI) system software, which will help access customer outages faster and improve power restoration performance. A new web and mobile portal was deployed that allows customers to report outages and receive outage updates.

Citizens' had been trending toward benchmark in their rolling 12-month CAIDI, but experienced an uptick in the final quarter of 2012. The PUC does not anticipate further review of Citizens' performance at this time as Citizens' has consistently been a benchmark performer in the past.

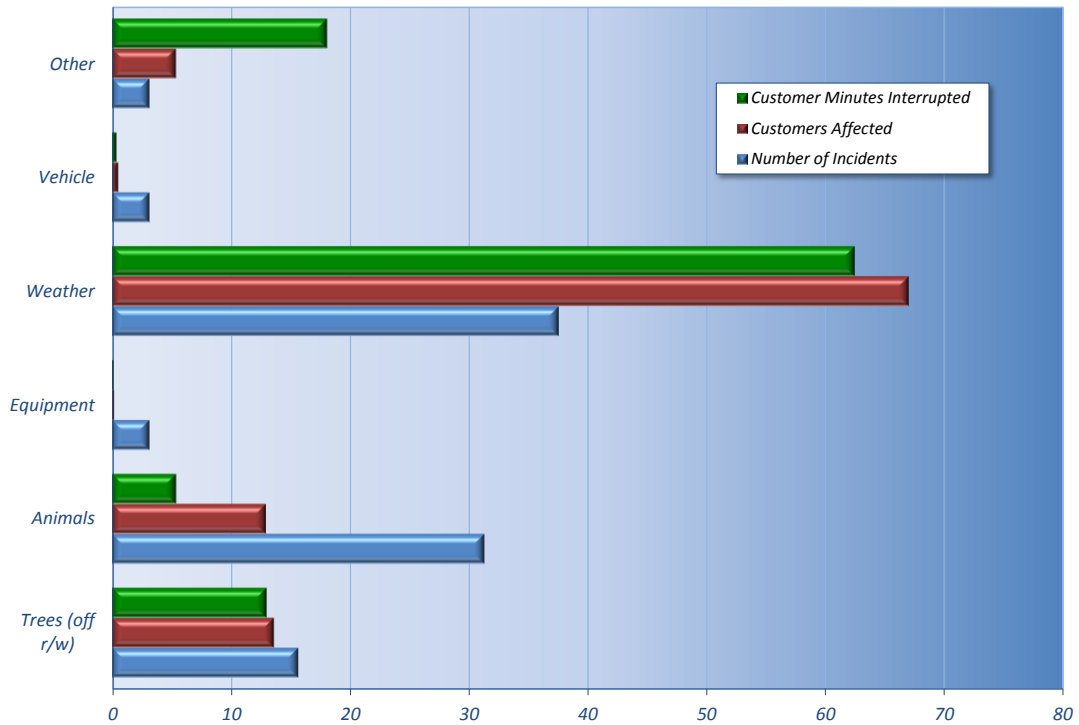
*Figure 2 Citizens' CAIDI (minutes)*



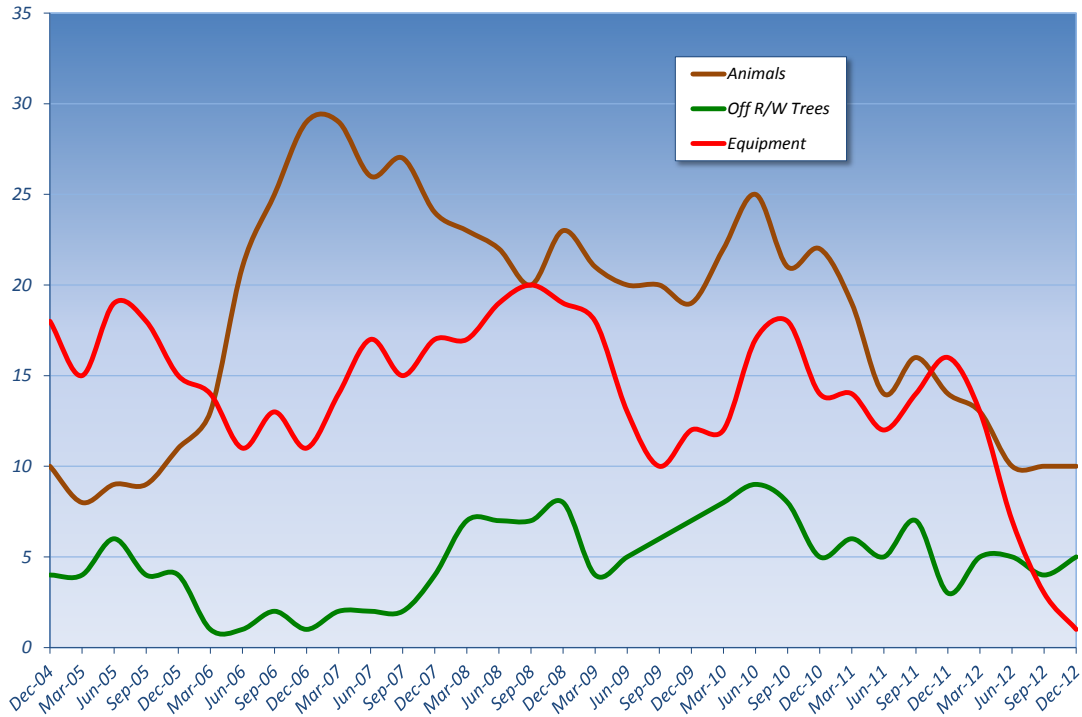
**Figure 3 Citizens' SAIFI (interruptions per customer)**



**Figure 4 Citizens' Outage Causes (percent of total outages)**



*Figure 5 Citizens' Outage Tracking (number of incidents)*



### *Duquesne Light Company*

In 2012, Duquesne experienced 4.8 million kilovolt-amps (kVA) interrupted for a duration of 560.1 million kVA-minutes – an improvement over 2011 where consumers experienced 6.6 million kVA interrupted for a duration of 700.3 million kVA-minutes. Duquesne did not report any major events in their service territory during 2012.

#### CAIDI/SAIDI/SAIFI Evaluation

##### **CAIDI**

**Rolling 12-month:** Increased from 107 minutes in 2011 to 117 minutes in 2012; failed to achieve benchmark by 8 percent.

**Three-year average:** Increased from 91 minutes in 2011 to 101 minutes in 2012; achieved standard by 15 percent.

##### **SAIDI**

**Rolling 12-month:** Decreased from 99 minutes in 2011 to 79 minutes in 2012; achieved benchmark by 37 percent.

**Three-year average:** Decreased from 89 minutes in 2011 to 88 minutes in 2012; achieved standard by 42 percent.

##### **SAIFI**

**Rolling 12-month:** Decreased from 0.93 outages in 2011 to 0.67 outages in 2012; achieved benchmark by 43 percent.



**Three-year average:** Decreased from 1.00 outages in 2011 to 0.90 outages in 2012; achieved standard by 31 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 7 and Figure 8. Figure 7 shows average restoration time (CAIDI) increased while the frequency of outages decreased (Figure 8). Duquesne's CAIDI has consistently been under benchmark in the past, but has been trending upwards over the last two calendar years. The PUC will continue to monitor Duquesne's CAIDI performance.

The past-year trend shows it is taking longer to restore power, however, outages are occurring less frequently. Figure 9 shows the distribution of outage causes that occurred during 2012 as a percentage of total outages. Figure 10 shows historical trend of the top three major outage causes. The most frequent outage causes were equipment failures, weather and trees, which continues a satisfactory historical trend.

Duquesne is continuing its emergency work process that is used to identify system problems, set priorities and resolve reliability issues as quickly as possible. Field personnel perform daily inspections and any abnormalities are entered into a database. The database is reviewed by the emergent work team and high priority problems are acted on promptly. This process is utilized to manage short-term issues while Duquesne continues their scheduled preventative and predictive maintenance to reduce service interruptions over the long term.

*Figure 6 Duquesne CAIDI (minutes)*

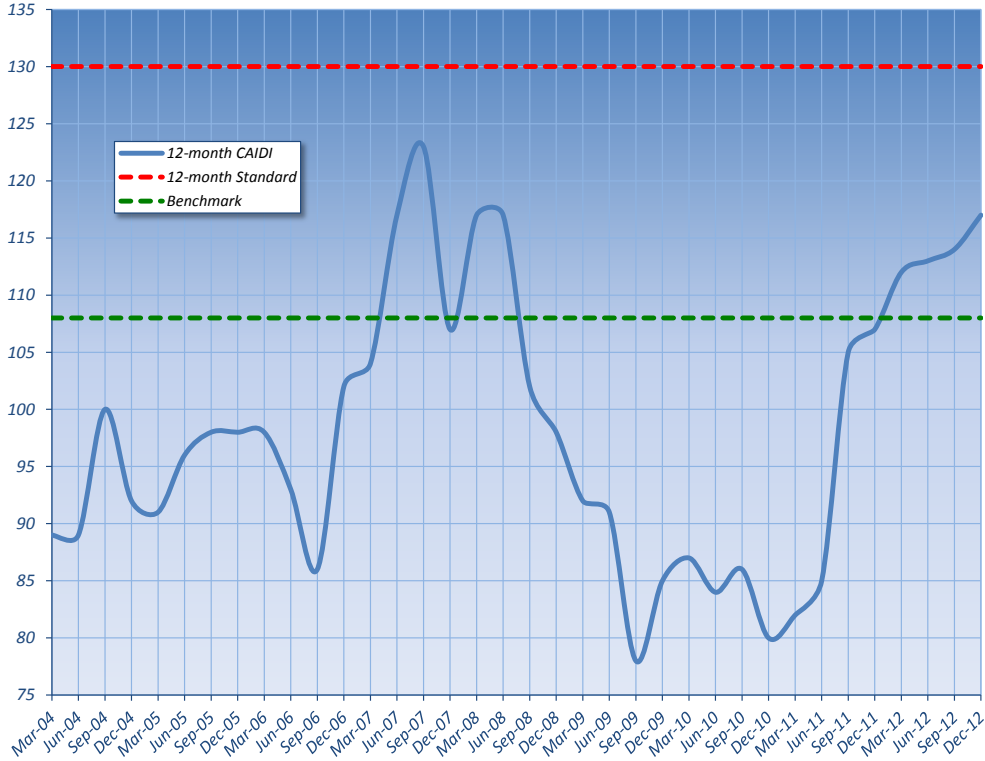
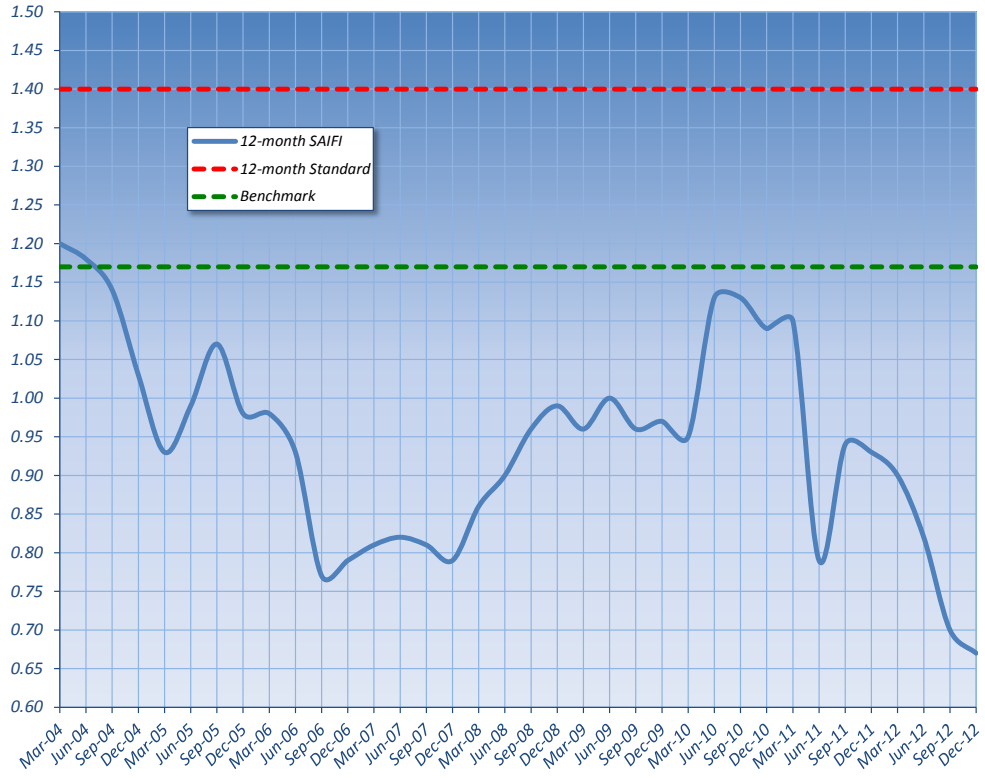
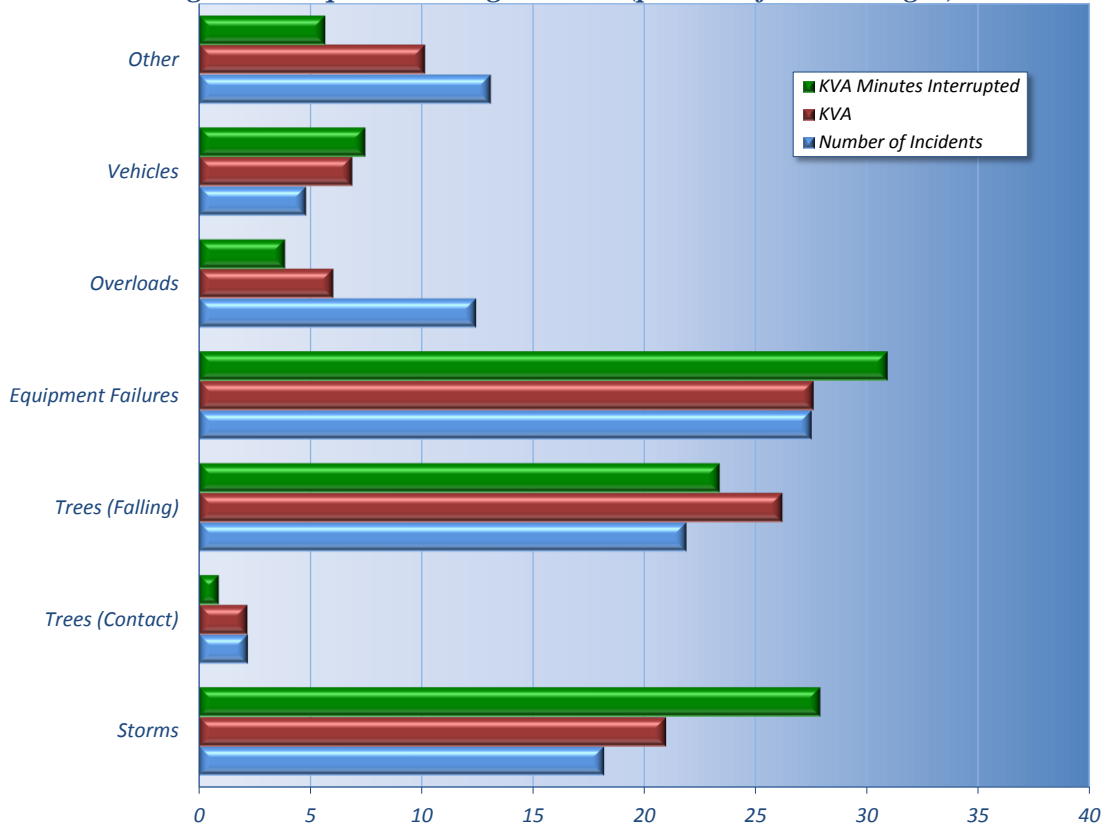


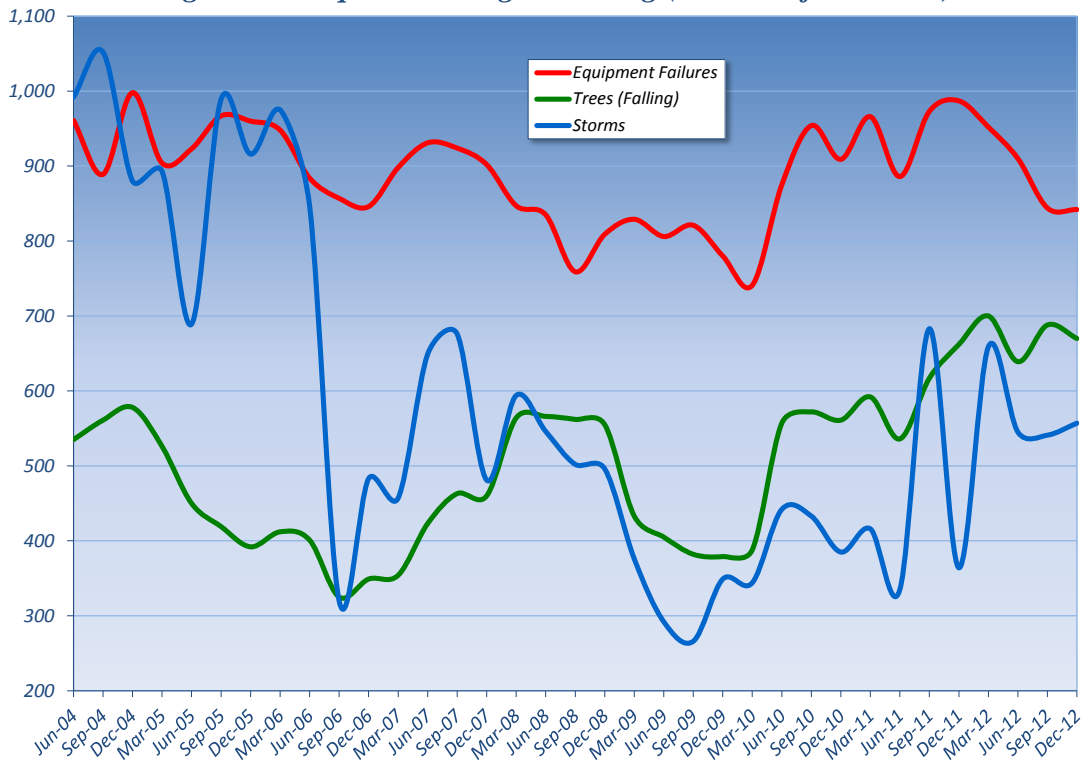
Figure 8 Duquesne SAIFI (interruptions per customer)



**Figure 9 Duquesne Outage Causes (percent of total outages)**



**Figure 10 Duquesne Outage Tracking (number of incidents)**



## *Metropolitan Edison Company*

Metropolitan Edison experienced 2.7 million customer interruptions for a total duration of 84.7 million minutes (excluding major events), which was worse than 2011 when consumers experienced 2.3 million interruptions for a total duration of 77.6 million minutes. The calculation of the 2012 reliability metrics excludes outage data relating to one major event, which was approved by the Commission.<sup>20</sup>

- October 29, 2012 – Hurricane Sandy, affecting 296,592 customers.

### **CAIDI/SAIDI/SAIFI Evaluation**

#### **CAIDI**

**Rolling 12-month:** Increased from 117 minutes in 2011 to 120 minutes in 2012; failed to achieve benchmark by 3 percent.

**Three-year average:** Increased slightly from 116 minutes in 2011 to 119 minutes in 2012; achieved standard by 8 percent.

#### **SAIDI**

**Rolling 12-month:** Increased from 142 minutes in 2011 to 155 minutes in 2012; failed to achieve benchmark by 15 percent.

**Three-year average:** Increased from 152 minutes in 2011 to 159 minutes in 2012; achieved standard by 2 percent.

#### **SAIFI**

**Rolling 12-month:** Increased from 1.21 outages in 2011 to 1.29 outages in 2012; failed to achieve benchmark by 12 percent.

**Three-year average:** Stayed even at 1.31 outages in 2011 to 1.34 outages in 2012; failed to achieve standard by 5 percent.

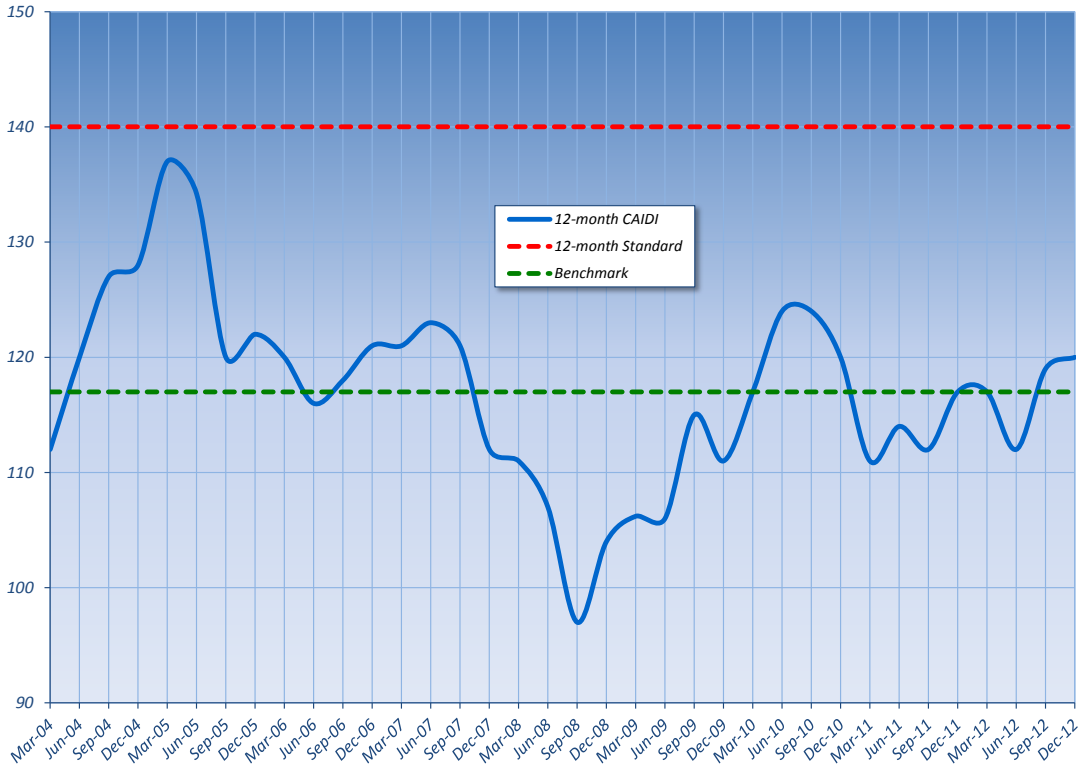
Historical 12-month CAIDI and SAIFI trends are shown on Figure 11 and Figure 12. The past-year trend shows it is taking longer to restore power and outages are more frequent. Figure 13 shows the distribution of causes of service outages that occurred during 2012 as a percentage of total outages. Figure 14 shows historical trend of the top two major outage causes, which were trees and equipment failure. Outages due to trees-non preventable increased slightly. Met-Ed continued 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. Met-Ed continues to add equipment such as fuses and reclosers to its distribution system while incorporating those devices into their automation system.

During the past 12 months, Met-Ed's average outage duration (CAIDI) increased and frequencies (SAIFI) increased. Met Ed's rolling 12-month CAIDI and SAIFI were trending downward and below benchmark until the last two quarters of 2012. The PUC expects the downward trend in CAIDI and SAIFI to resume in 2013.

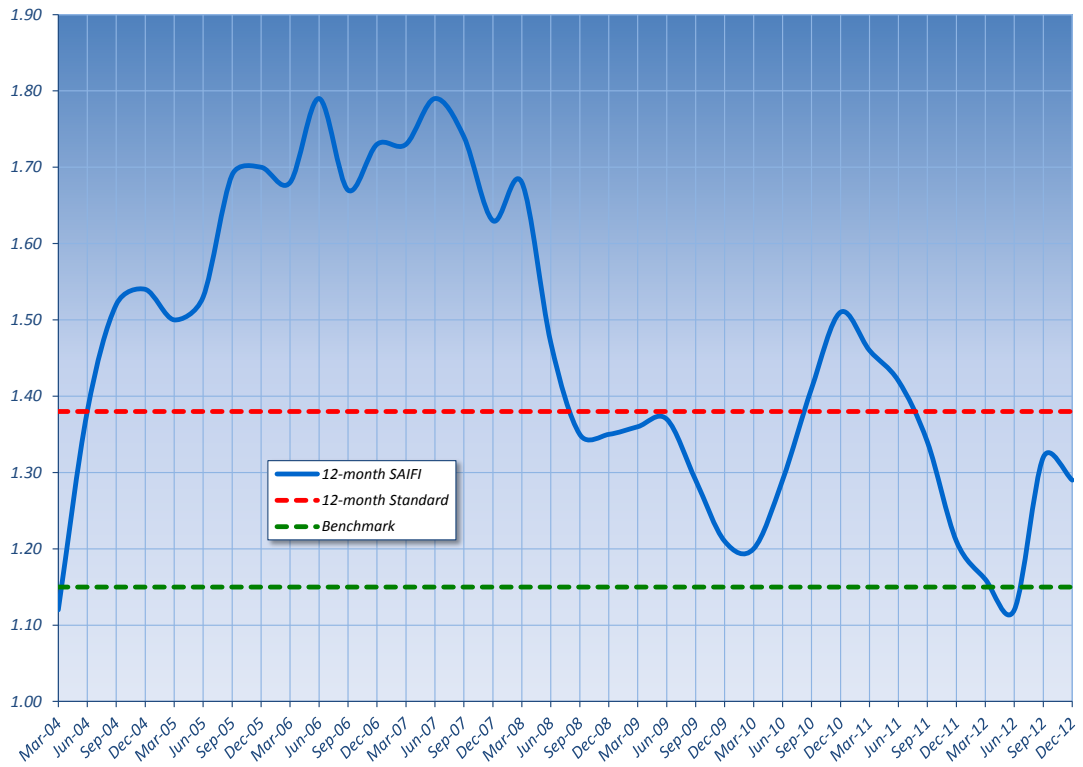
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<sup>20</sup> See Docket No. M-2013-2345421.

*Figure 11 Met-Ed CAIDI (minutes)*

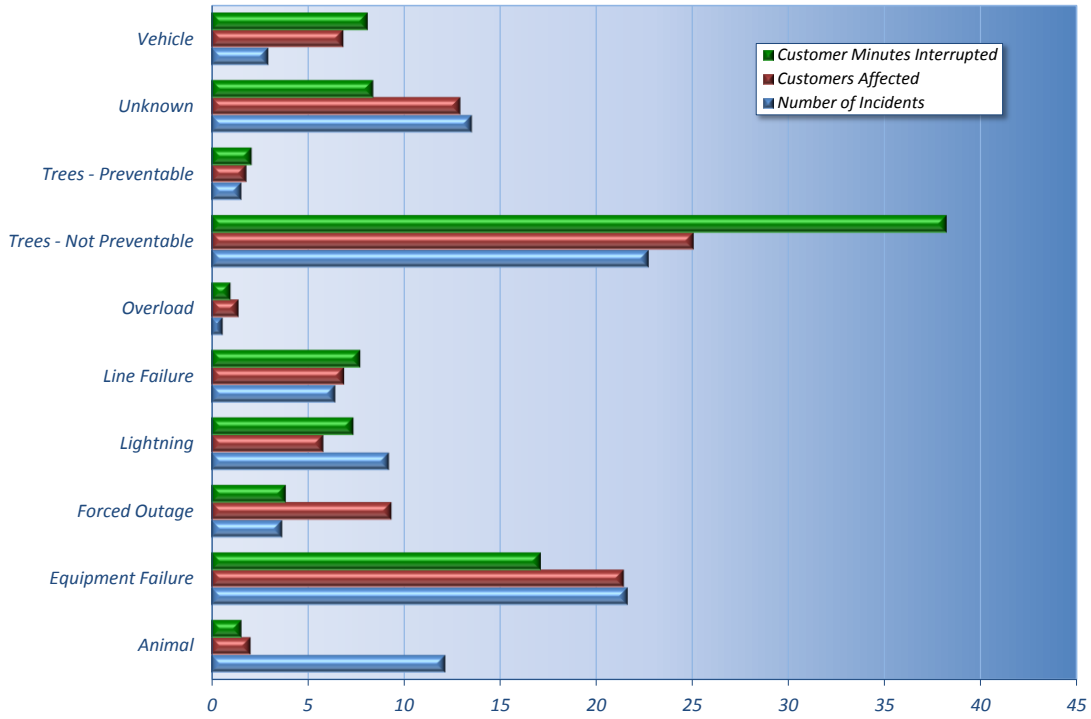


*Figure 12 Met-Ed SAIFI (interruptions per customer)*

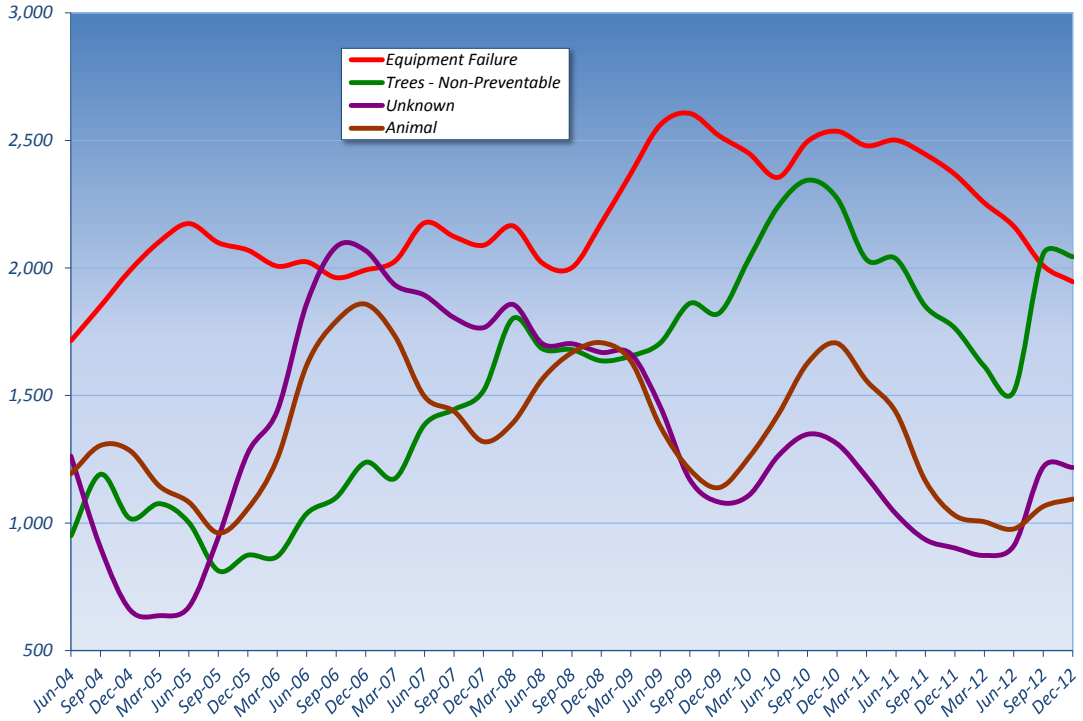




**Figure 13 Met-Ed Outage Causes (percent of total outages)**



**Figure 14 Met-Ed Outage Tracking (number of incidents)**



## *PECO Energy Company*

In 2012, PECO Energy experienced 1.3 million customer interruptions, with a duration of 126.7 million minutes (excluding major events), which was substantially better than 2011 when consumers experienced 1.9 million interruptions for a duration of 260.1 million minutes. The calculation of the 2012 reliability metrics excludes outage data relating to one major event, which was approved by the Commission.<sup>21</sup>

- October 29, 2012 – Hurricane Sandy, affecting 845,000 customers.

### **CAIDI/SAIDI/SAIFI Evaluation**

#### **CAIDI**

**Rolling 12-month:** Decreased from 135 minutes in 2011 to 97 minutes in 2012; achieved benchmark by 13 percent.

**Three-year average:** Decreased from 122 minutes in 2011 to 119 minutes in 2012; achieved standard by 3 percent.

#### **SAIDI**

**Rolling 12-month:** Decreased from 154 minutes in 2011 to 75 minutes in 2012; achieved benchmark by 46 percent.

**Three-year average:** Decreased from 131 minutes in 2011 to 122 minutes in 2012; achieved standard by 27 percent.

#### **SAIFI**

**Rolling 12-month:** Decreased from 1.14 outages in 2011 to 0.77 outages in 2012; achieved benchmark by 37 percent.

**Three-year average:** Decreased from 1.07 outages in 2011 to 1.00 outages in 2012; achieved standard by 26 percent.

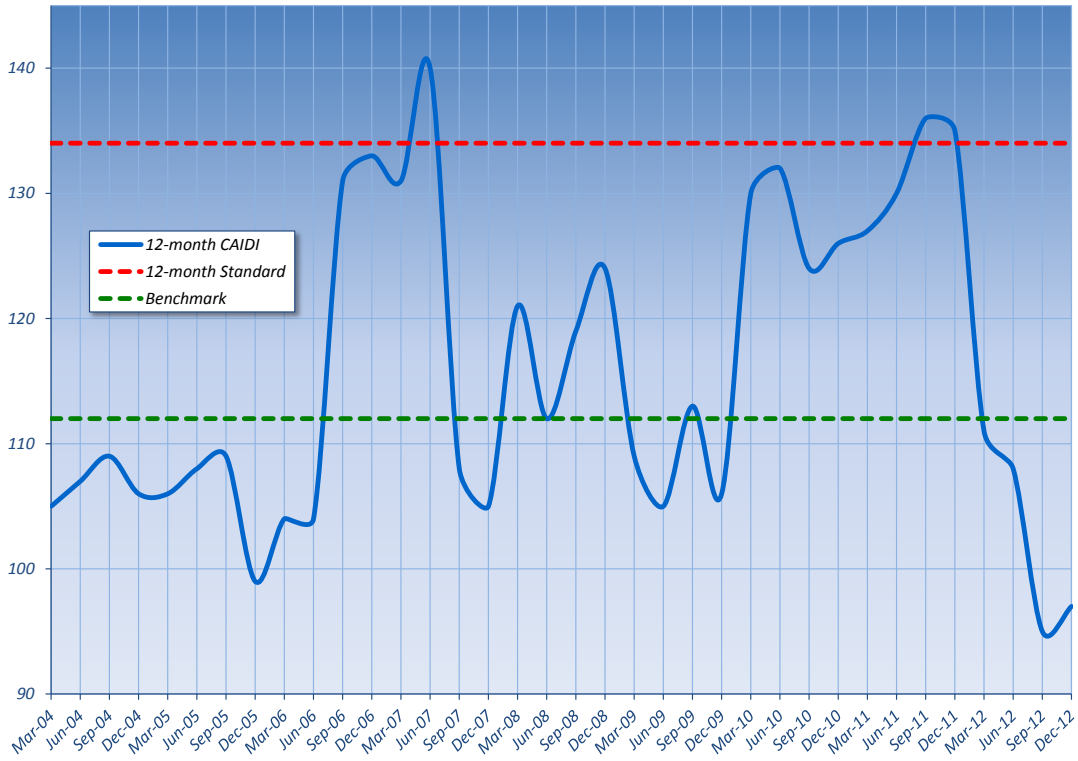
Historical 12-month CAIDI and SAIFI trends are shown on Figure 15 and Figure 16. The past-year trend shows it is taking longer to restore power, however, outages are occurring less frequently. Figure 17 shows the distribution of outage causes that occurred during 2012 as a percentage of total outages. Figure 18 shows historical trend of the top three major outage causes. The most frequent outage causes were equipment failure and vegetation, which continue to trend lower.

PECO continues with their supplemental vegetation management program to remove or prune trees between their normal scheduled vegetation management cycles. PECO's performance is excellent based on their performance trends, which are significantly below benchmark.

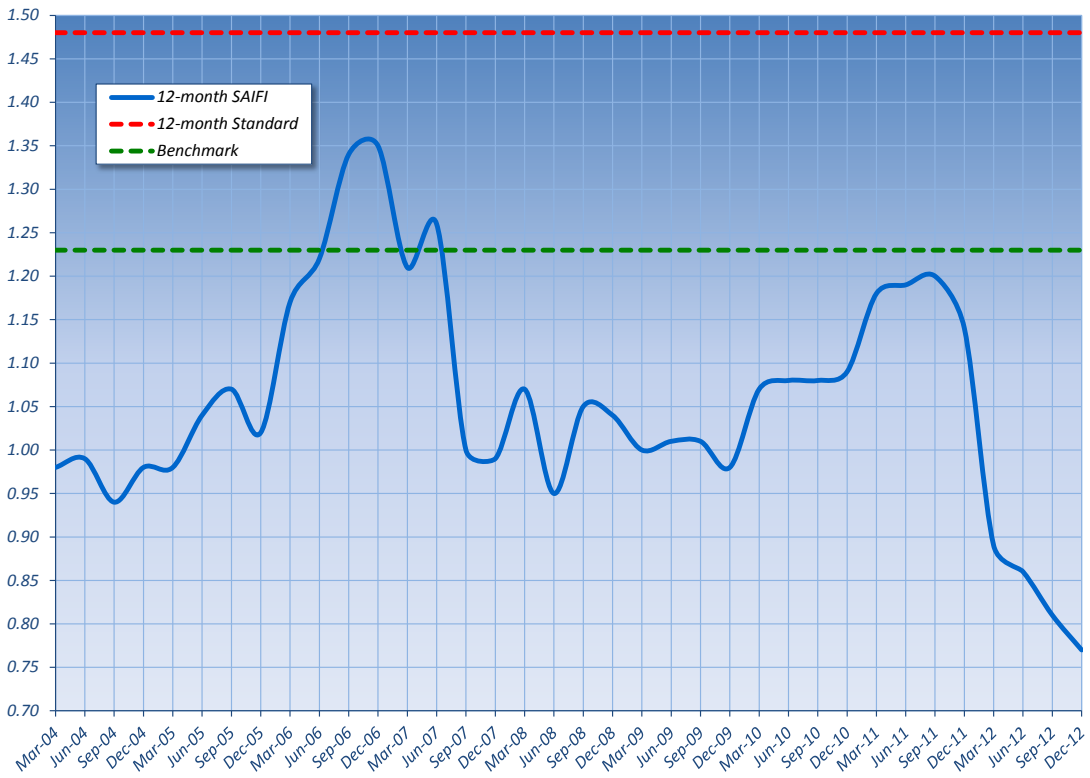
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<sup>21</sup> Docket No. M-2012-2337070.

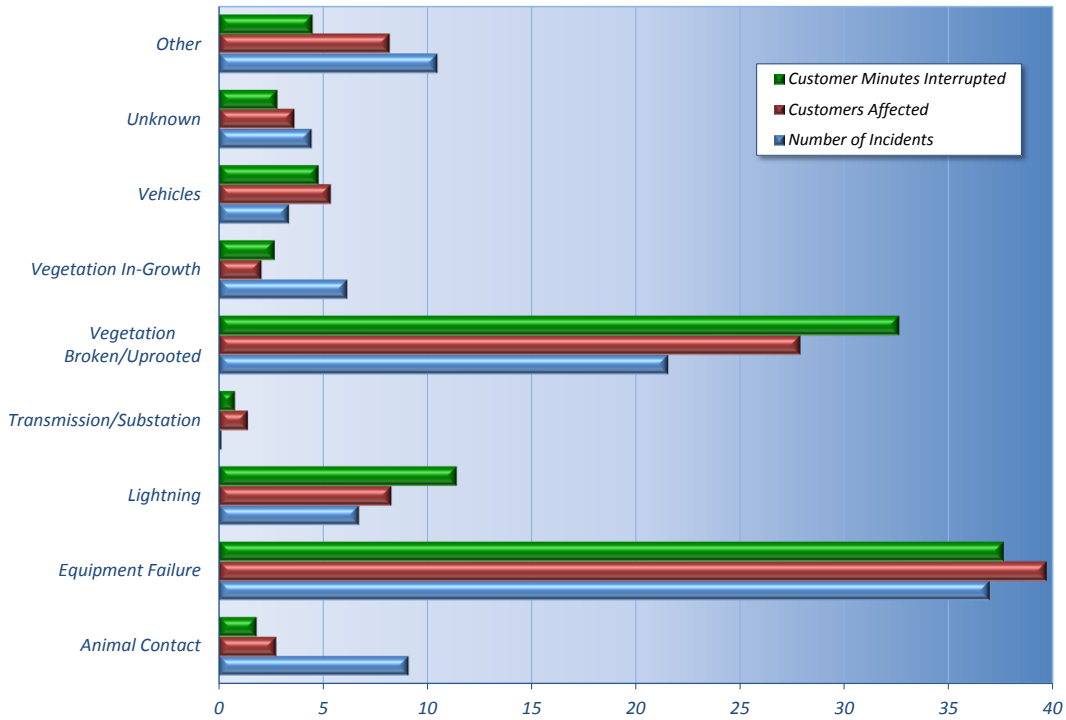
**Figure 15 PECO CAIDI (minutes)**



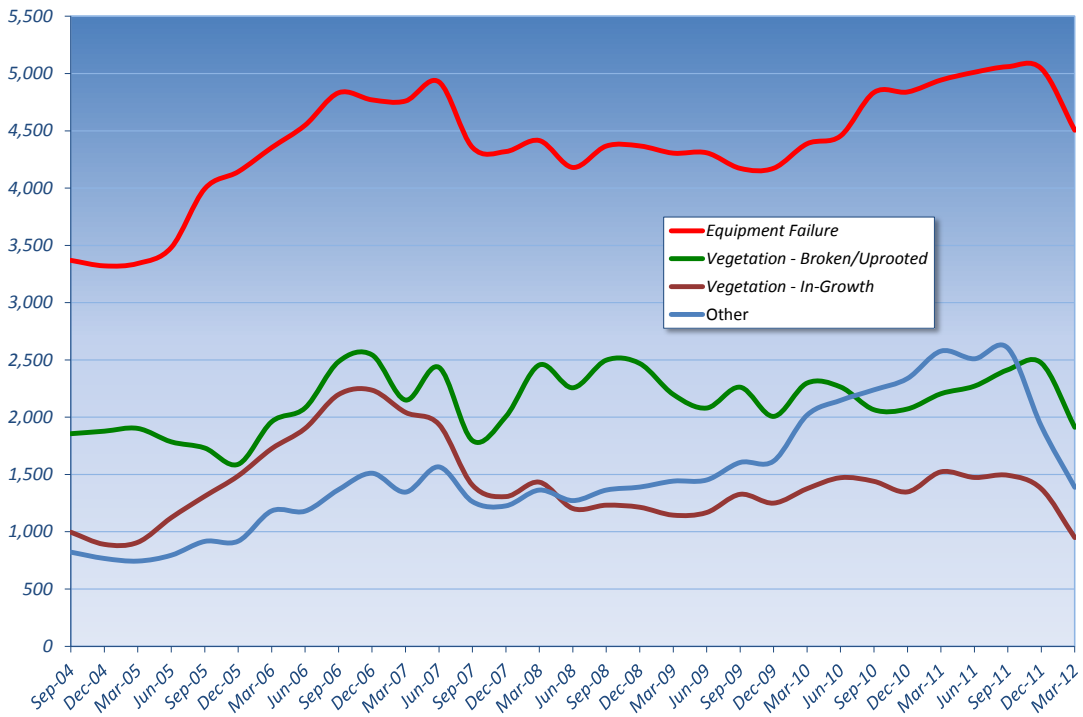
**Figure 16 PECO SAIFI (interruptions per customer)**



**Figure 17 PECO Outage Causes (percent of total outages)**



**Figure 18 PECO Outage Tracking (number of incidents)**



## *Pennsylvania Electric Company*

In 2012, Penelec experienced 822,950 customer interruptions for a duration of 2.7 million minutes (excluding major events) which was better than 2011 when consumers experienced 817,910 interruptions for a duration of 3.8 million minutes. The 2012 reliability metrics excludes outage data for two major events, which were approved by the Commission.<sup>22</sup>

- July 26, 2012 - Thunder storms, affecting 106,492 customers.
- October 29, 2012 – Hurricane Sandy, affecting 96,856 customers.

### **CAIDI/SAIDI/SAIFI Evaluation**

#### **CAIDI**

**Rolling 12-month:** Decreased slightly from 167 minutes in 2011 to 138 minutes in 2012; failed to achieve benchmark by 18 percent.

**Three-year average:** Increased from 136 minutes in 2011 to 143 minutes in 2012; failed to achieve standard by 11 percent.

#### **SAIDI**

**Rolling 12-month:** Decreased from 233 minutes in 2011 to 194 minutes in 2012; failed to achieve benchmark by 31 percent

**Three-year average:** Increased from 179 minutes in 2011 to 196 minutes in 2012; failed to achieve standard by 10 percent.

#### **SAIFI**

**Rolling 12-month:** Stayed even from 1.4 outages in 2011 to 1.4 outages in 2012; failed to achieve benchmark by 12 percent.

**Three-year average:** Increased from 1.31 outages in 2011 to 1.37 outages in 2012; achieved standard by 1 percent.

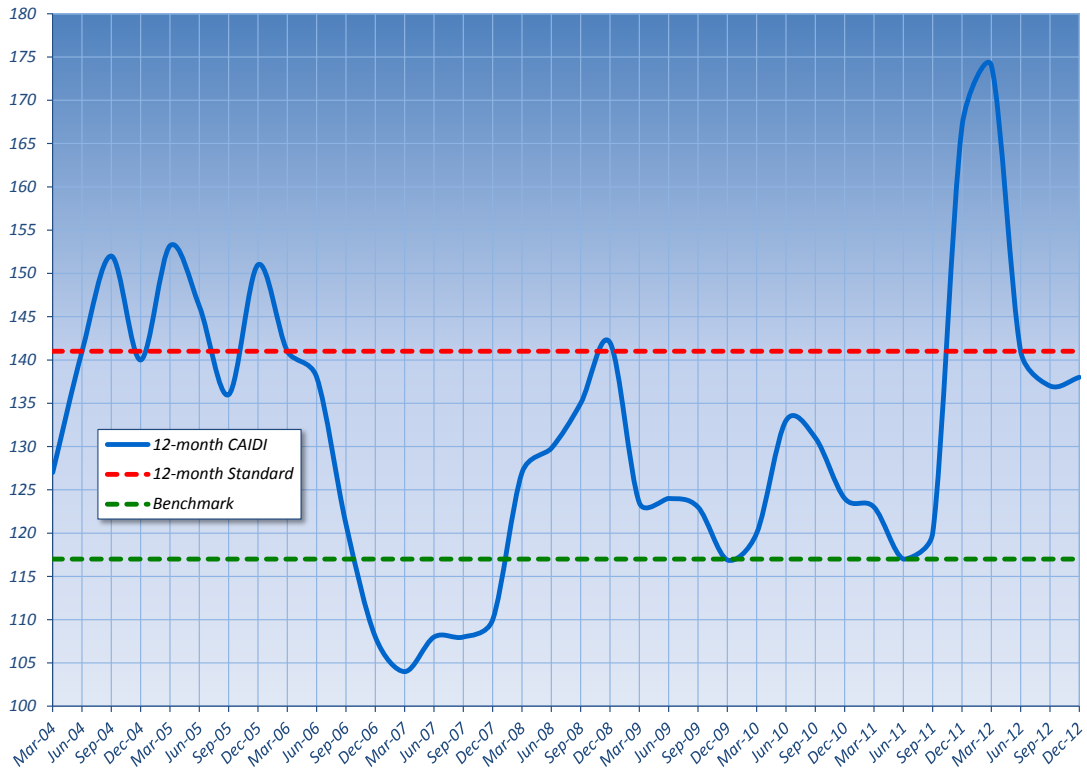
Historical 12-month CAIDI and SAIFI trends are shown on Figure 19 and Figure 20. Figure 21 shows the distribution of outage causes as a percentage of total outages. Figure 22 shows historical trend of the top two major outage causes, which were trees and equipment failure. Penelec continues its full circuit-protection coordination program, which includes adding protective devices to circuits experiencing an abnormal number of outages. Penelec continues to inspect and replace damaged equipment as well as installing radio-controlled switches to enable more flexibility in restoring power more efficiently. Penelec is utilizing vegetation control efforts to reduce off corridor tree and overhanging tree issues.

Penelec's large upward movement of CAIDI in 2011 was due to Hurricane Irene, a non-excludable event for Penelec. Prior to Irene, Penelec's CAIDI was near benchmark. Penelec's CAIDI and SAIFI have begun a progression down below standard for 2012. The PUC expects Penelec's CAIDI will continue downward since the Irene impacts have rolled off.

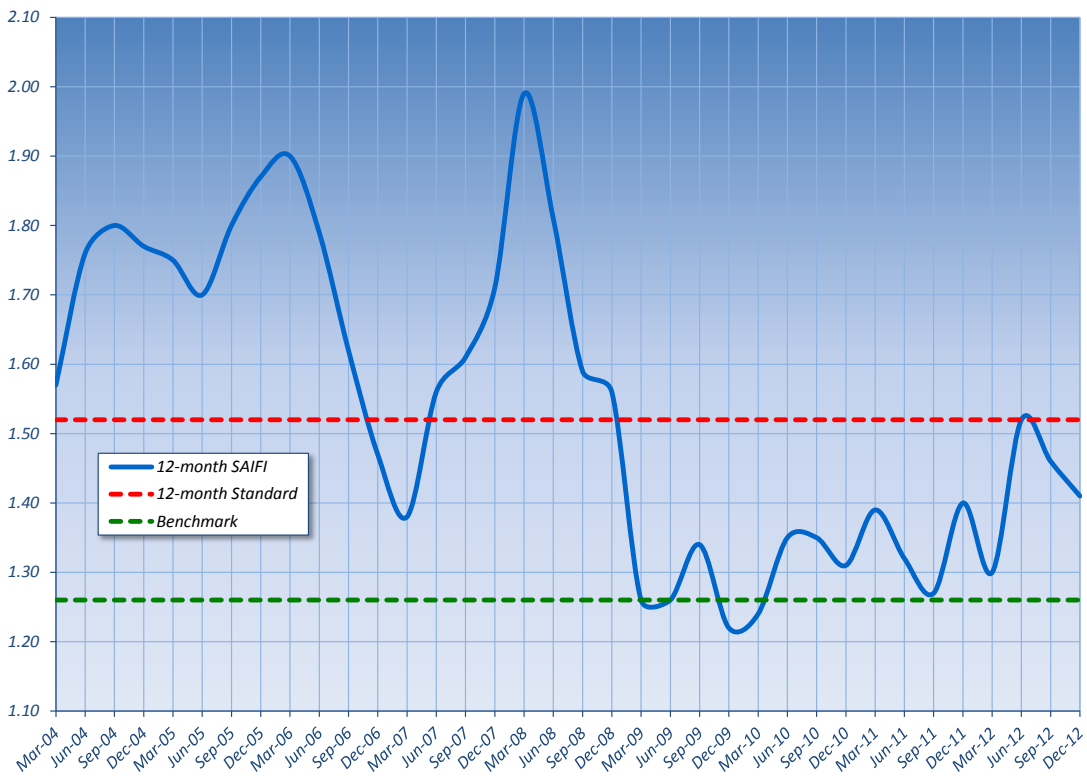
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<sup>22</sup> Docket Nos. M-2012-2329613; M-2013-2345426.

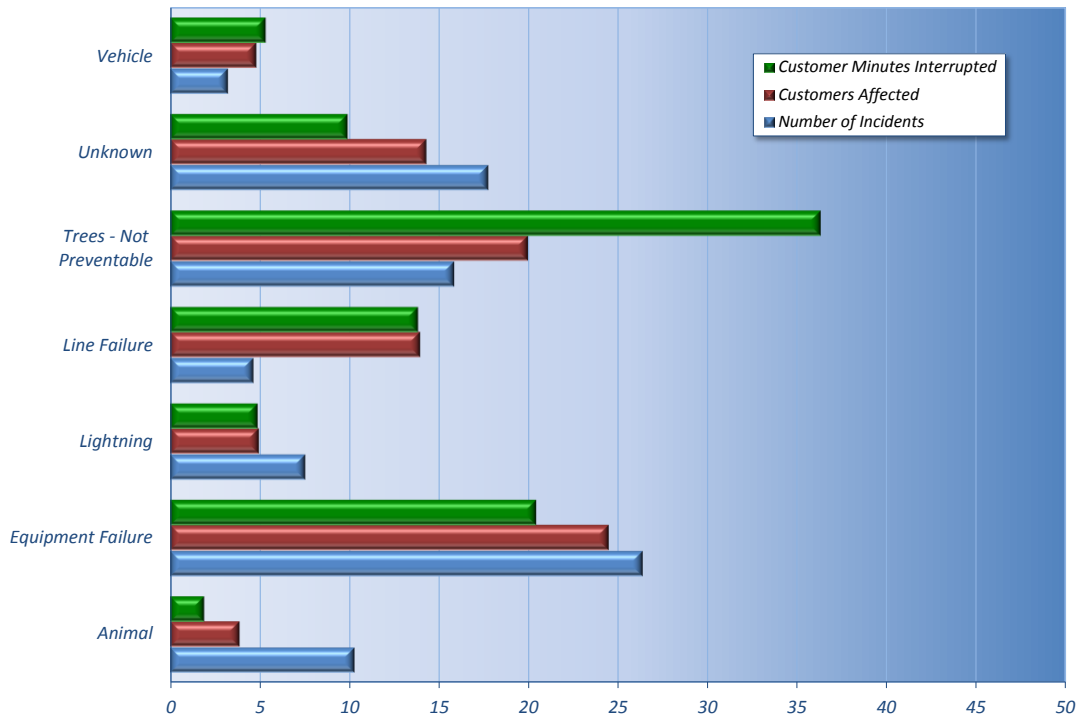
**Figure 19 Penelec CAIDI (minutes)**



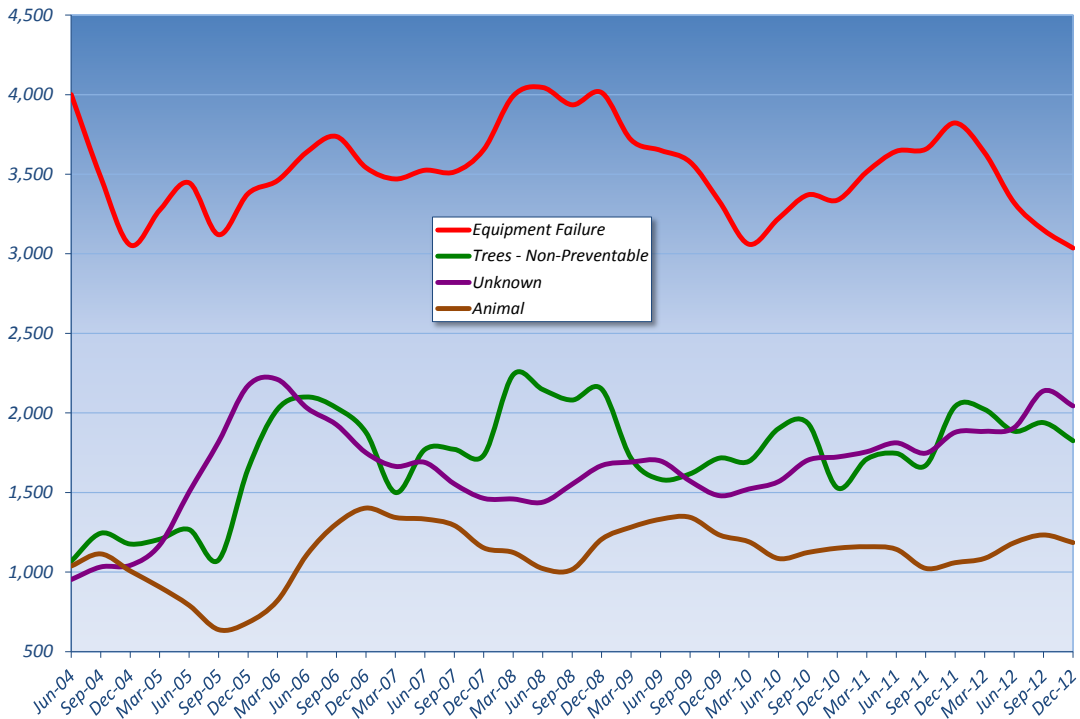
**Figure 20 Penelec SAIFI (interruptions per customer)**



**Figure 21 Penelec Outage Causes (percent of total outages)**



**Figure 22 Penelec Outage Tracking (number of incidents)**



## *Pennsylvania Power Company*

In 2012, Penn Power experienced 184,126 customer interruptions for a duration of 848,537 minutes (excluding major events), which was slightly better than 2011 when consumers experienced 163,657 interruptions for a duration of 858,255 minutes. Penn Power did not report any major events in their service territory during 2012.

### **CAIDI/SAIDI/SAIFI Evaluation**

#### **CAIDI**

**Rolling 12-month:** Decreased from 138 minutes in 2011 to 114 minutes in 2012; failed to achieve benchmark by 13 percent.

**Three-year average:** Remained unchanged at 116 minutes in 2012; failed to achieve standard by 4 percent.

#### **SAIDI**

**Rolling 12-month:** Decreased from 143 minutes in 2011 to 133 minutes in 2012; failed to achieve benchmark by 18 percent.

**Three-year average:** Increased from 108 minutes in 2011 to 124 minutes in 2012; achieved standard by 9 percent.

#### **SAIFI**

**Rolling 12-month:** Increased from 1.03 outages in 2011 to 1.17 outages in 2012; failed to achieve benchmark by 5 percent.

**Three-year average:** Increased from 0.93 outages in 2011 to 1.07 outages in 2012; achieved standard by 13 percent.

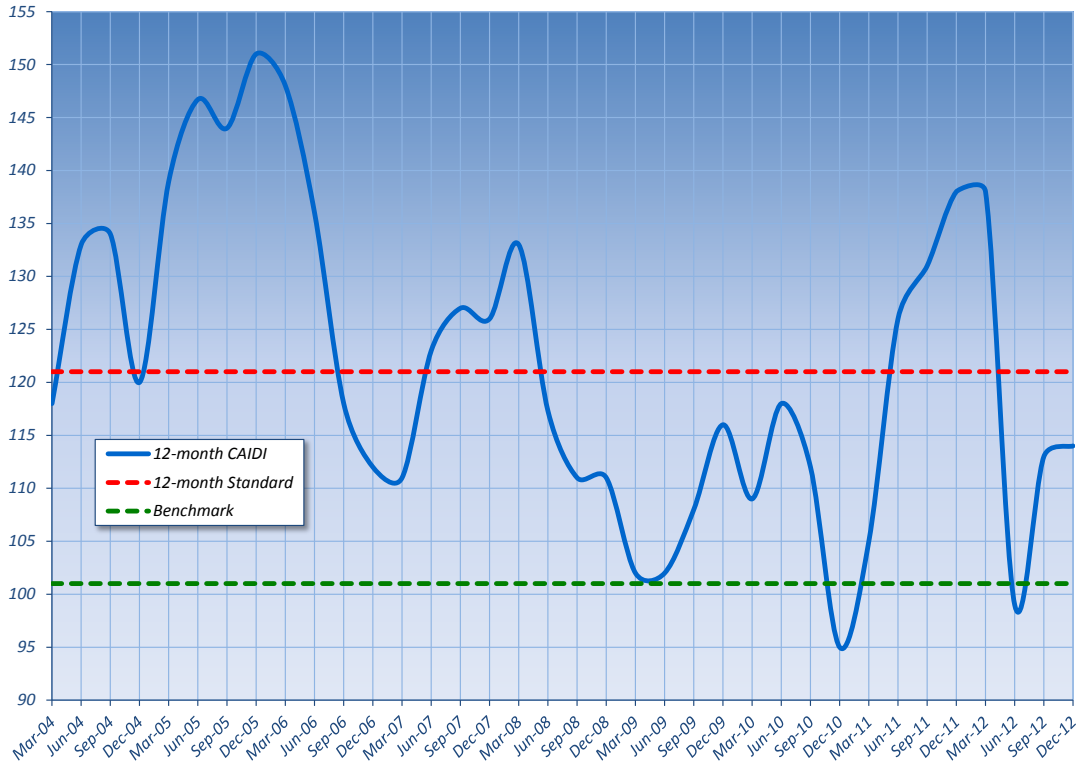
Historical 12-month CAIDI and SAIFI trends are shown on Figure 23 and Figure 24. Figure 25 shows the distribution of outage causes that occurred during 2012 as a percentage of total outages. Figure 26 shows historical trend of the top two major outage causes. The most frequent outage causes were lightning and trees, which are trending significantly higher.

Penn Power continues its program of installing protective devices to reduce the size and impact of outages as well as aggressive tree trimming. Penn Power has also instituted some shift coverage of responder workers to improve response times and reduce outage durations.

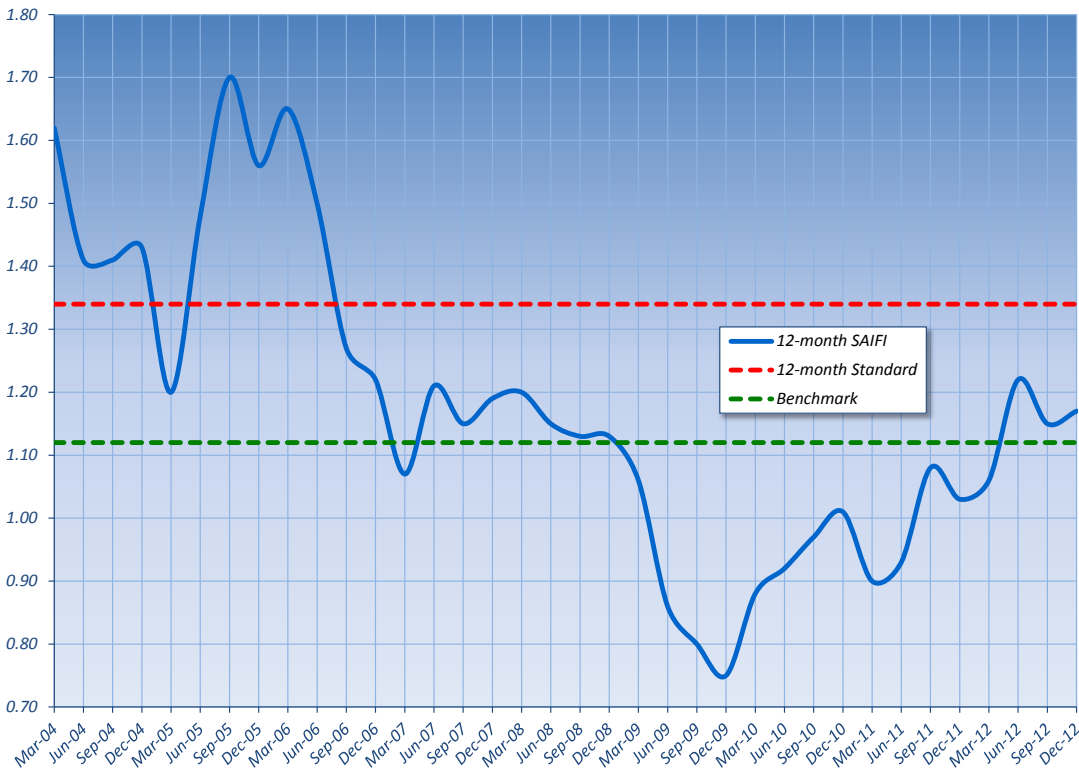
Penn Power's significant increase in rolling 12-month CAIDI in late 2011 and early 2012 was due to several non-excludable storm events as well as a 2011 substation vandalism incident that caused an extended outage for about 4,000 customers. Penn Power's CAIDI has since trended downward back to under standard. Penn Power's SAIDI is well under standard, but was previously under benchmark (Figure 24). Penn Power should strive to bring both measures back to under benchmark.



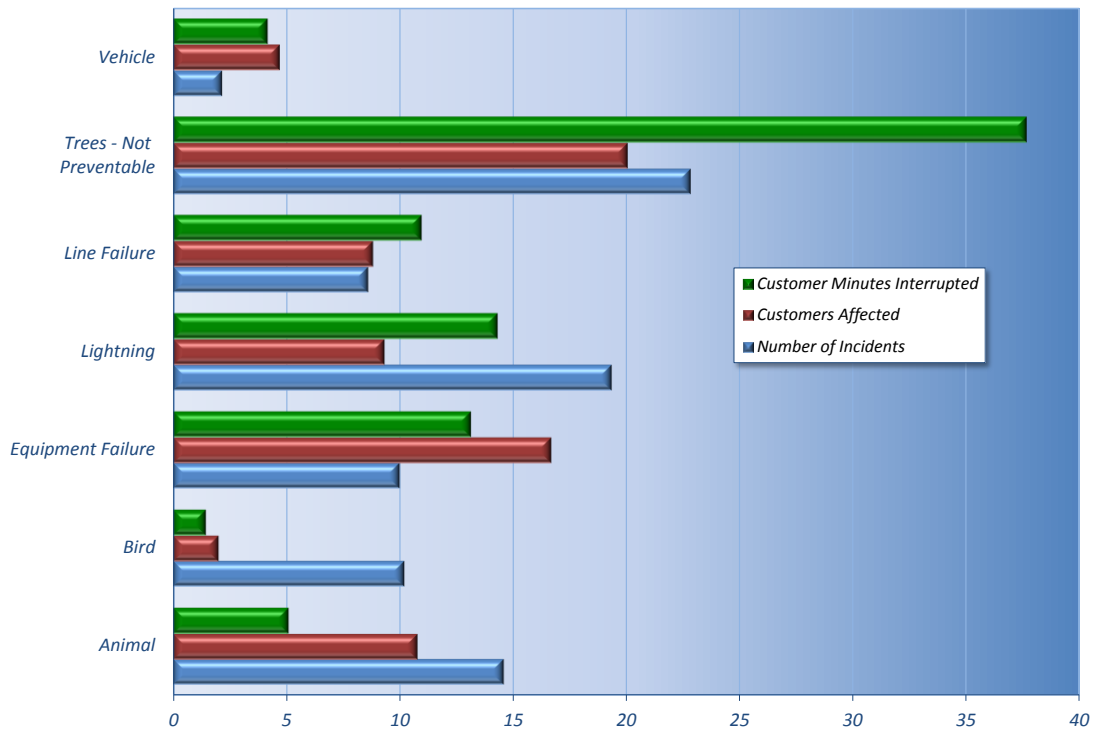
**Figure 23 Penn Power CAIDI (minutes)**



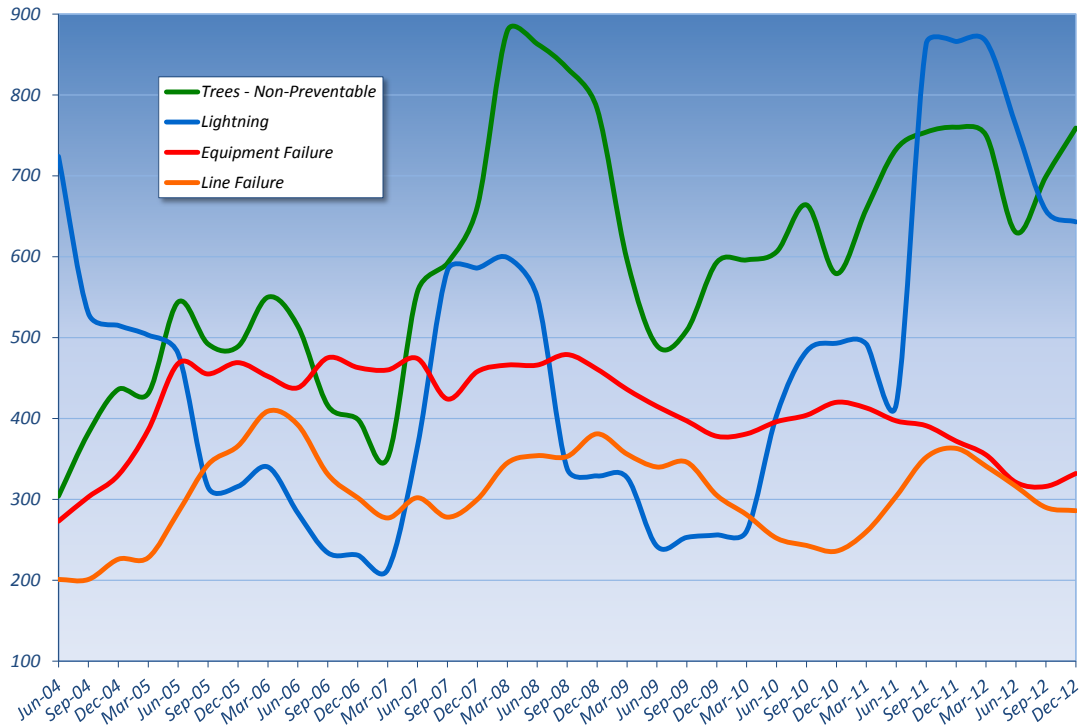
**Figure 24 Penn Power SAIFI (interruptions per customer)**



**Figure 25 Penn Power Outage Causes (percent of total outages)**



**Figure 26 Penn Power Outage Tracking (number of incidents)**



## *Pike County Light & Power Company*

Pike County is primarily fed from two 34.5-kilovolt feeders supplied from New York substations. With that, sustained interruptions are usually few and affect small clusters of customers. However, it usually takes a longer time per customer to restore service. In 2012, Pike County experienced 2,542 customer interruptions for a duration of 468,931 minutes (excluding major events) which was much better than 2011 when consumers experienced 3,268 interruptions for duration of 969,660 minutes.

The calculation of the 2012 reliability Metrics excludes outage data relating to one (1) major event, which was approved by the Commission.<sup>23</sup>

- October 29, 2012 – Hurricane Sandy, affecting 4,487 customers.

### **CAIDI/SAIDI/SAIFI Evaluation**

#### **CAIDI**

**Rolling 12-month:** Decreased from 297 minutes in 2011 to 184 minutes in 2012; failed to achieve benchmark by 6 percent.

**Three-year average:** Negligibly increased from 243 minutes in 2011 to 245 minutes in 2012; failed to achieve standard by 27 percent.

#### **SAIDI**

**Rolling 12-month:** Decreased from 216 minutes in 2011 to 105 minutes in 2012; achieved benchmark by 1 percent.

**Three-year average:** Remained unchanged at 158; failed to achieve standard by 23 percent.

#### **SAIFI**

**Rolling 12-month:** Decreased from 0.73 outages in 2011 to 0.57 outages in 2012; achieved benchmark by 7 percent.

**Three-year average:** Decreased slightly from 0.64 outages in 2011 to 0.63 outages in 2012; achieved standard by 6 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 27 and Figure 28. Figure 29 shows the distribution of outage causes that occurred during 2012 as a percentage of total outages. Figure 30 shows historical trend of the top two major outage causes. The most frequent outage causes were trees and equipment failure. Outages due to trees have trended significantly lower in 2012 while equipment failure trended slightly upward. Pike County completed its 2012 vegetation management cycle with the next three-year cycle scheduled for 2015. Pike also assisted municipalities in the removal of hazard trees. Pike completed a post-Sandy patrol to address any vegetation related issues. Pike County's CAIDI numbers have steadily improved over the past four quarters as effects of the 2011 non-excludable weather events have rotated off the rolling 12-months.

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<sup>23</sup> See Docket No. M-2013-2374633.

Figure 27 Pike County CAIDI (minutes)

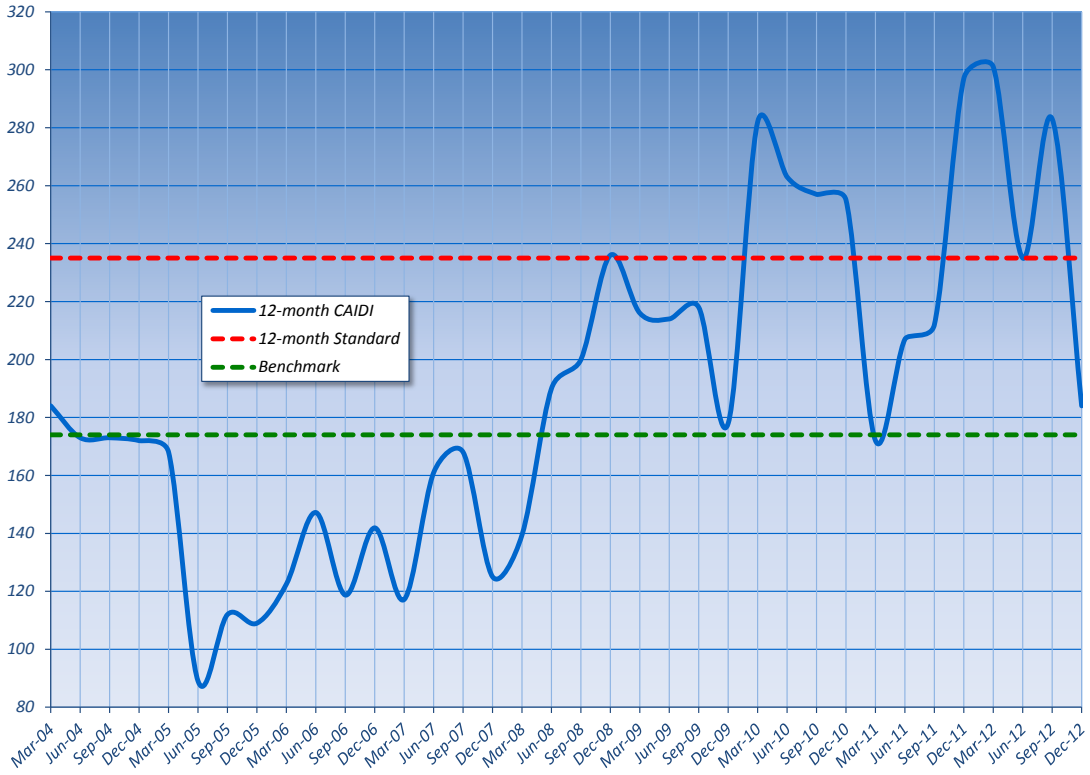
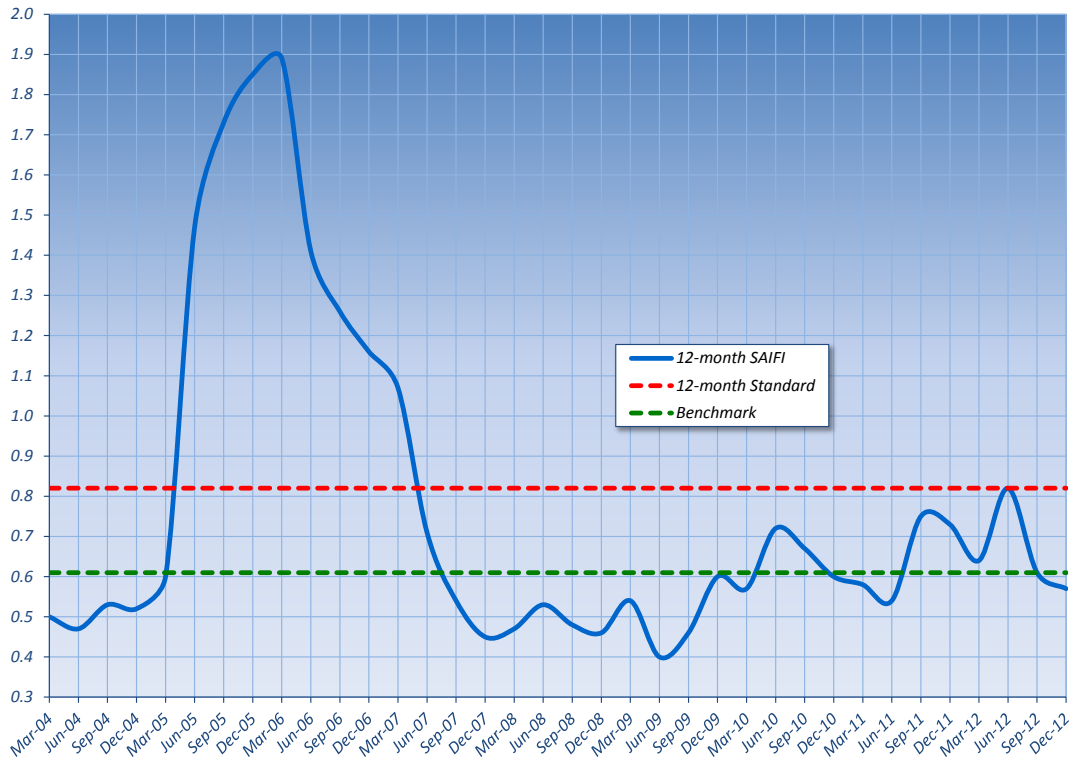
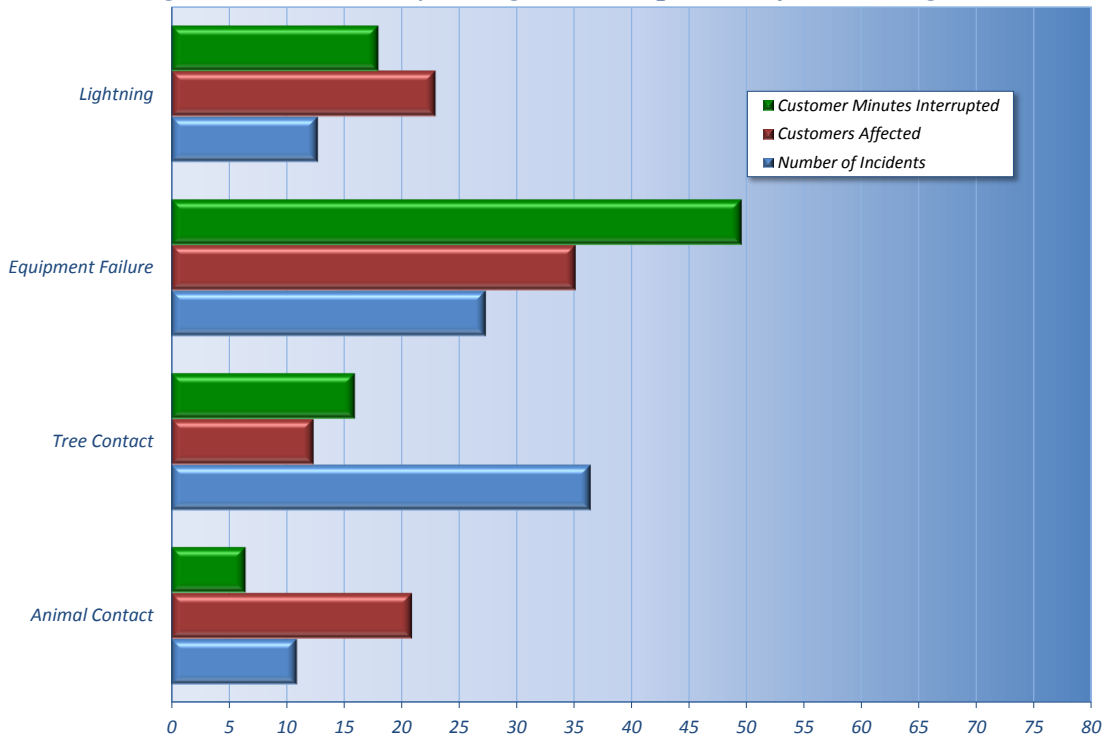


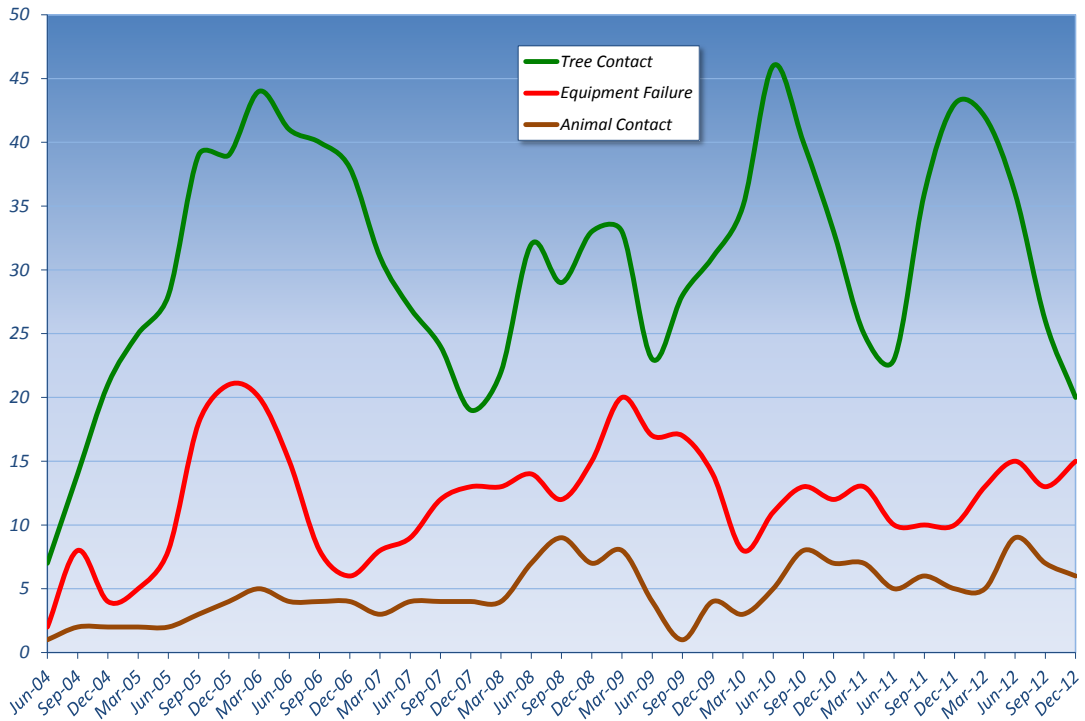
Figure 28 Pike County SAIFI (interruptions per customer)



**Figure 29 Pike County Outage Causes (percent of total outages)**



**Figure 30 Pike County Outage Tracking (number of incidents)**



## *PPL Electric Utilities Corporation*

In 2012, PPL experienced 1.5 million customer interruptions for a duration of 228.1 million minutes (excluding major events), which was slightly worse than 2011 when consumers experienced 1.5 million interruptions for a duration of 225.1 million minutes. The calculation of the 2012 reliability metrics excludes outage data relating to one major event, which was approved by the Commission.<sup>24</sup>

- October 29, 2012 – Hurricane Sandy, affecting 523,936 customers.

### **CAIDI/SAIDI/SAIFI Evaluation**

#### **CAIDI**

**Rolling 12-month:** Increased slightly from 151 minutes in 2011 to 152 minutes in 2012; failed to achieve benchmark by 5 percent.

**Three-year average:** Increased from 134 minutes in 2011 to 146 minutes in 2012; achieved standard by 9 percent.

#### **SAIDI**

**Rolling 12-month:** Increased from 162 minutes in 2011 to 164 minutes in 2012; failed to achieve benchmark by 16 percent.

**Three-year average:** Increased from 138 minutes in 2011 to 158 minutes in 2012; achieved standard by 8 percent.

#### **SAIFI**

**Rolling 12-month:** Increased from 1.07 outages in 2011 to 1.08 outages in 2012; failed to achieve benchmark by 10 percent.

**Three-year average:** Increased from 1.02 outages in 2011 to 1.08 outages in 2012; achieved its standard of 1.08.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 31 and Figure 32. The recent trend is that outages are more frequent and lasting longer. Figure 33 shows the distribution of outage causes that occurred during 2012 as a percentage of total outages. Figure 34 shows historical trend of the top two major outage causes. The most frequent outage causes were trees and equipment failure, which have been trending downward during this reporting period.

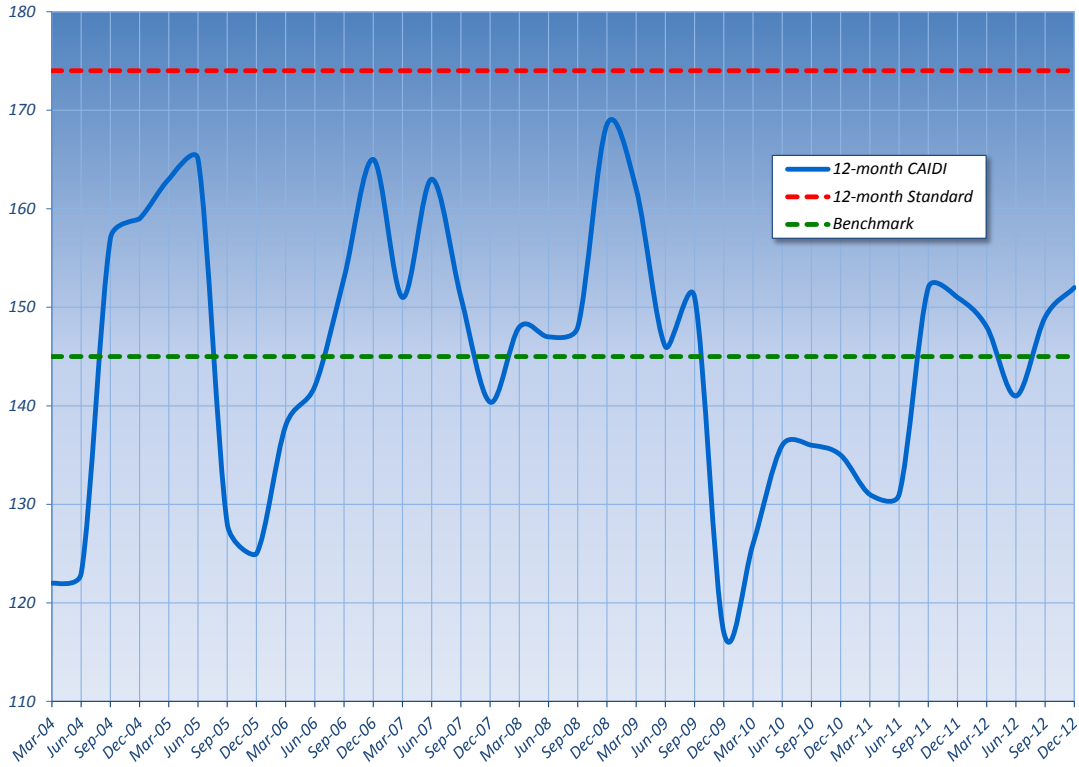
PPL continues implementing lessons learned from Hurricane Sandy such as improving the emergency response plan; developing a restoration playbook; and upgrading its outage management system. PPL also changed its tree-caused outage calculation with the hopes that the new methodology will lead to an improvement in preventing tree-related outages. PPL provided information on tree related outages so Figure 34 accurately portrays the 8-year historical trend.

PPL's CAIDI and SAIFI are both below standard, however, both measures have been trending upwards during the past three calendar years.

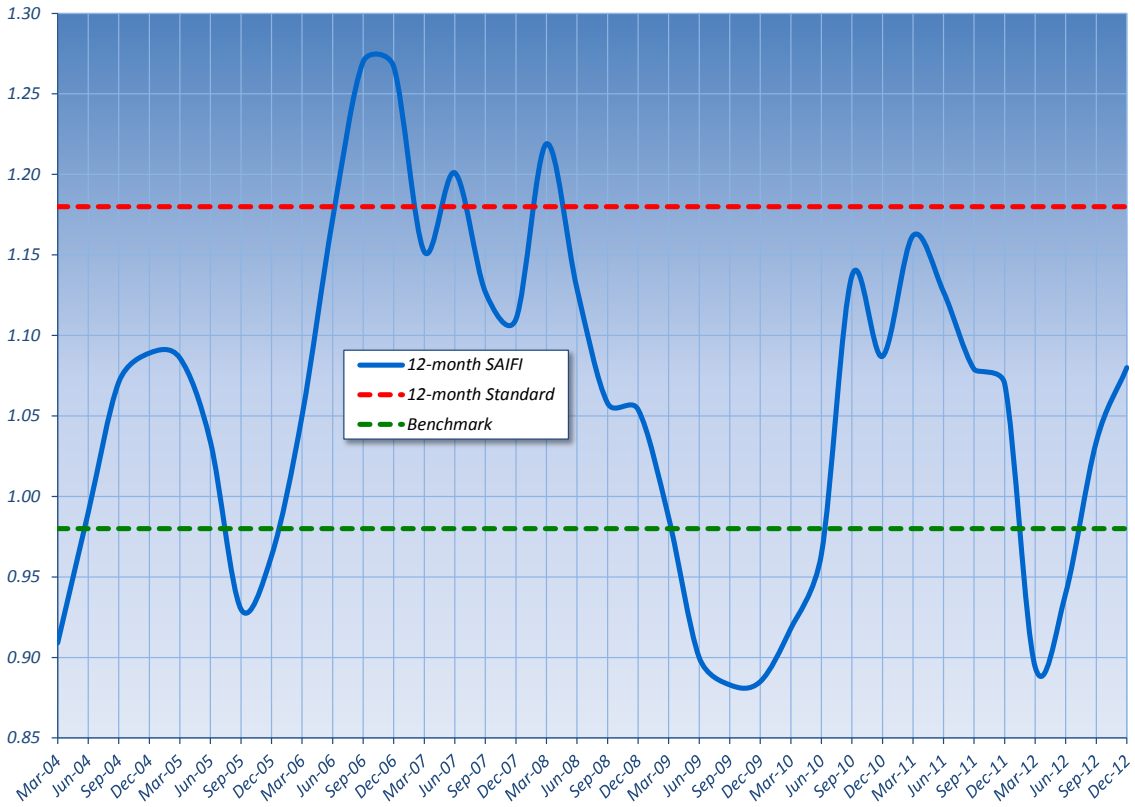
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<sup>24</sup> See Docket No. M-2012-2336347.

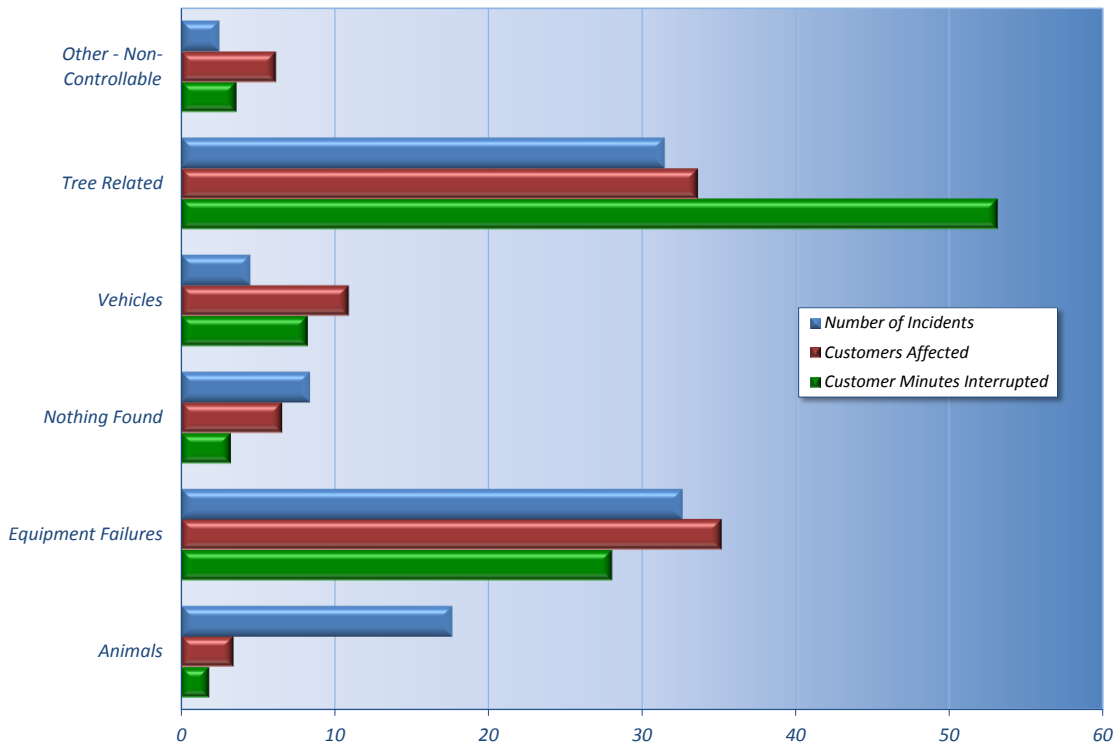
**Figure 31 PPL CAIDI (minutes)**



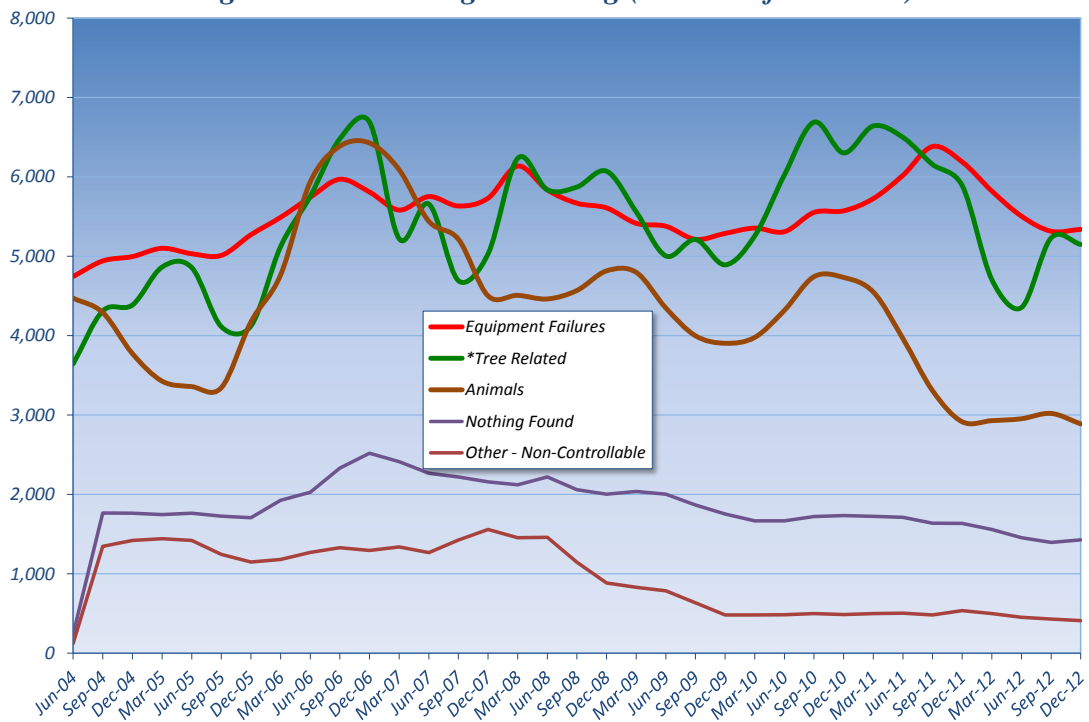
**Figure 32 PPL SAIFI (interruptions per customer)**



**Figure 33 PPL Outage Causes (percent of total outages)**



**Figure 34 PPL Outage Tracking (number of incidents)**





## *UGI Utilities Inc.*

In 2012, UGI experienced 27,417 customer interruptions for a duration of 3.3 million minutes (excluding major events), which was substantially better than 2011 when consumers experienced 58,821 interruptions for a duration of 7.5 million minutes. The calculation of the 2012 reliability metrics excludes outage data relating to two major events, which were approved by the Commission.<sup>25</sup>

- August 9, 2012 - Lightning storms, affecting 7,498 customers.
- October 29, 2012 – Hurricane Sandy, affecting more than 17,000 customers.

### **CAIDI/SAIDI/SAIFI Evaluation**

#### **CAIDI**

**Rolling 12-month:** Decreased from 128 minutes in 2011 to 122 minutes in 2012; achieved benchmark by 28 percent.

**Three-year average:** Increased from 111 minutes in 2011 to 116 minutes in 2012; achieved standard by 38 percent.

#### **SAIDI**

**Rolling 12-month:** Decreased from 121 minutes in 2011 to 54 minutes in 2012; achieved benchmark by 61 percent.

**Three-year average:** Decreased from 83 minutes in 2011 to 74 minutes in 2012; achieved standard by 56 percent.

#### **SAIFI**

**Rolling 12-month:** Decreased from 0.95 outages in 2011 to 0.44 outages in 2012; achieved benchmark by 47 percent.

**Three-year average:** Decreased from 0.73 outages in 2011 to 0.62 outages in 2012; achieved standard by 32 percent.

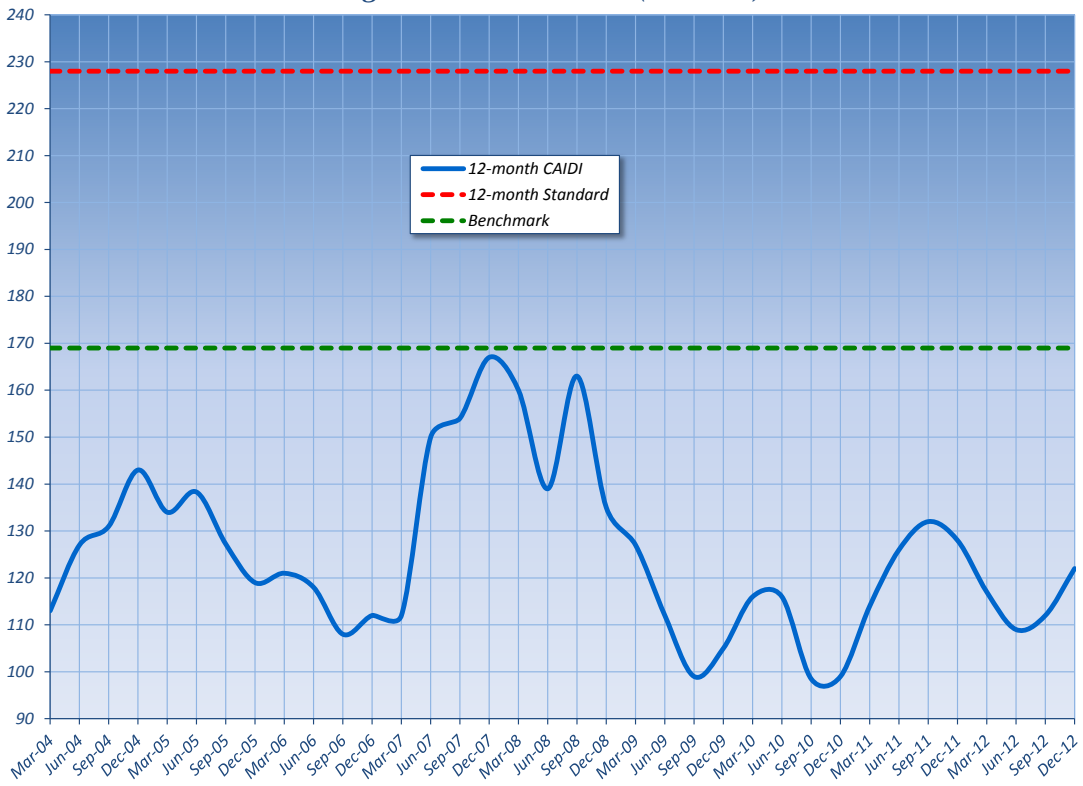
Historical 12-month CAIDI and SAIFI trends are shown on Figure 35 and Figure 36. Figure 37 shows the distribution of outage causes that occurred during 2012 as a percentage of total outages. Figure 38 shows historical trend of the top two major outage causes. The most frequent outage causes were trees and equipment failure, which are trending lower.

UGI is implementing an automated outage management system (OMS) that is expected to be in-service in late 2013. The OMS will aid in outage assessment, prioritization and communication. UGI's performance is excellent based on their performance trends, which are significantly below benchmark.

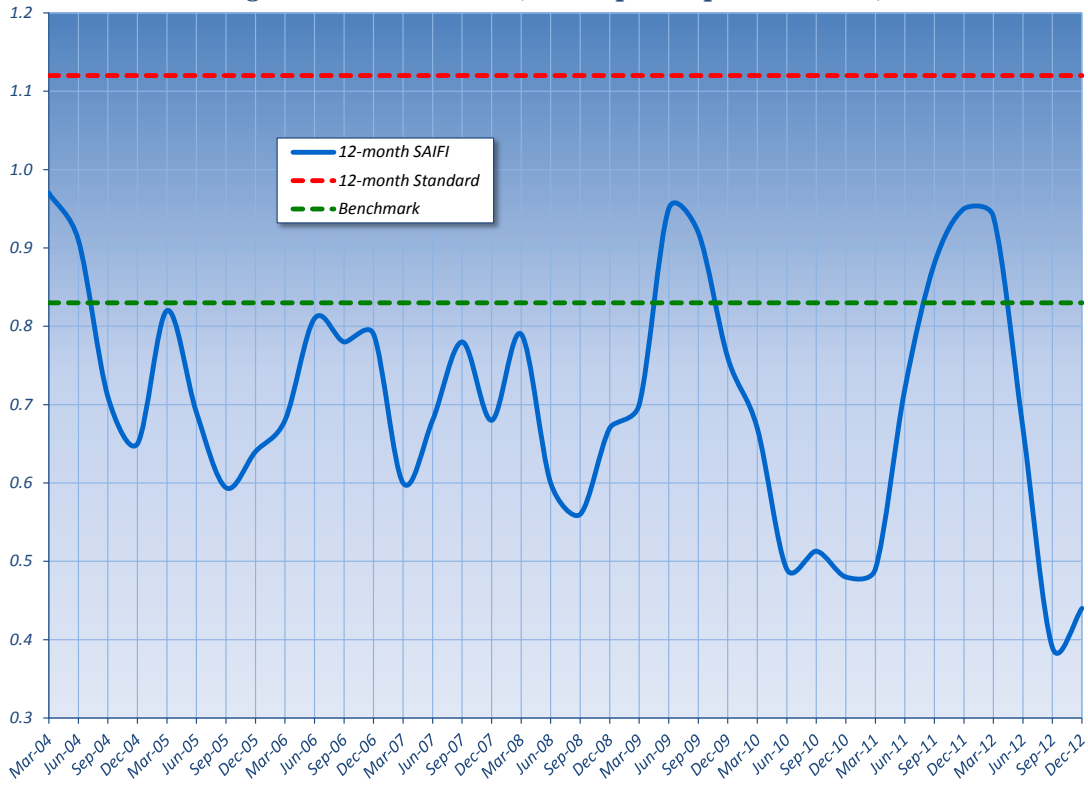
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<sup>25</sup> See Docket Nos. M-2012-2321715; M-2012-2335286.

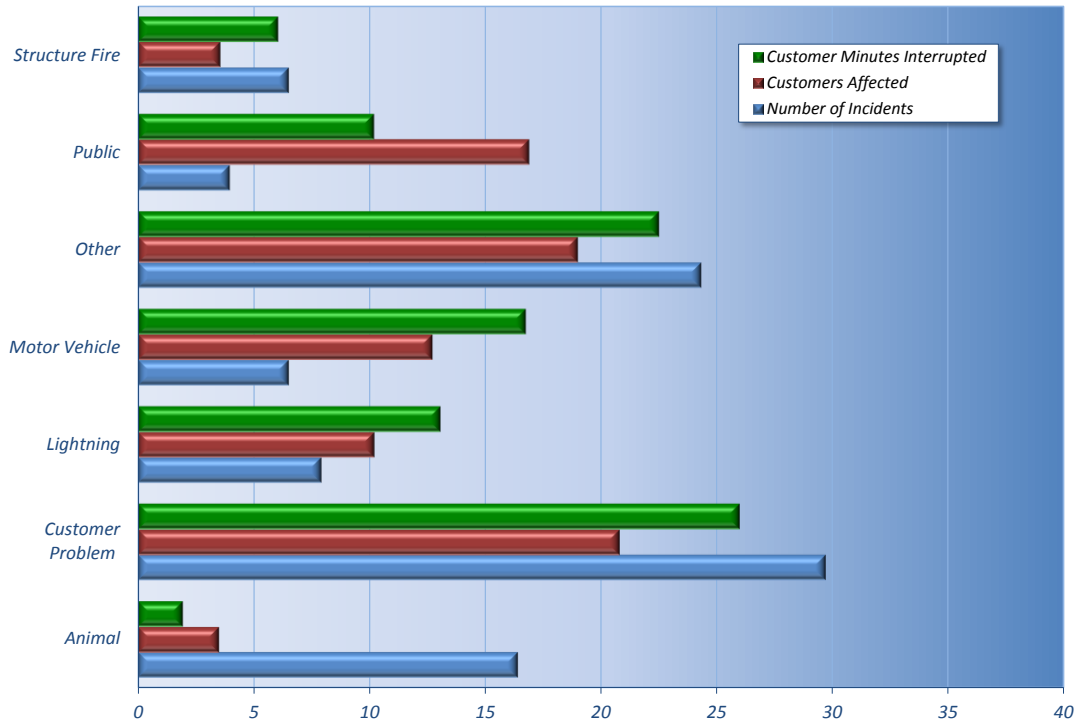
**Figure 35 UGI CAIDI (minutes)**



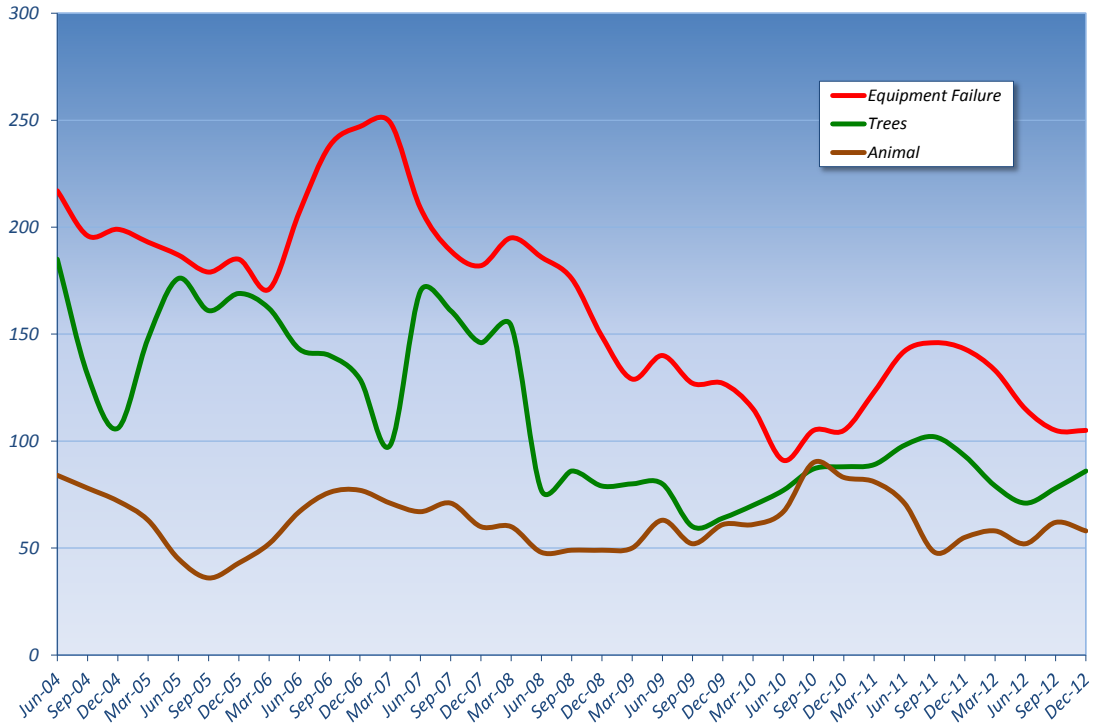
**Figure 36 UGI SAIFI (interruptions per customer)**



**Figure 37 UGI Outage Causes (percent of total outages)**



**Figure 38 UGI Outage Tracking (number of incidents)**



## *Wellsboro Electric Company*

In 2012, Wellsboro experienced 5,573 customer interruptions for a duration of 370,906 minutes (excluding major events), which was substantially better than 2011 when consumers experienced 9,978 interruptions for a duration of 731,645 minutes. The 2012 reliability metrics calculation excludes outage data relating to seven major events, which were approved by the Commission.<sup>26</sup>

- February 18, 2012 – Vehicle hit pole, affecting 621 customers.
- April 23, 2012 - Heavy snow, affecting 2,019 customers.
- July 26, 2012 – Lightning storm, affecting 1,432 customers.
- August 3, 2012 – Vehicle hit pole, affecting 755 customers.
- September 5, 2012 – 115kV FirstEnergy transmission loss, affecting 6,174 customers.
- September 18, 2012 – Tree fell on line, affecting 2,041 customers.
- October 29, 2012 – Hurricane Sandy, affecting 1,820 customers.

### **CAIDI/SAIDI/SAIFI Evaluation**

#### **CAIDI**

**Rolling 12-month:** Decreased from 73 minutes in 2011 to 65 minutes in 2012; achieved benchmark by 48 percent.

**Three-year average:** Decreased from 82 minutes in 2011 to 71 minutes in 2012 and achieved standard by 48 percent.

#### **SAIDI**

**Rolling 12-month:** Decreased from 119 minutes in 2011 to 60 minutes in 2012; achieved benchmark by 61 percent.

**Three-year average:** Decreased from 103 minutes in 2011 to 84 minutes in 2012; achieved standard by 54 percent.

#### **SAIFI**

**Rolling 12-month:** Decreased from 1.62 outages in 2011 to 0.94 outages in 2012; achieved benchmark by 24 percent.

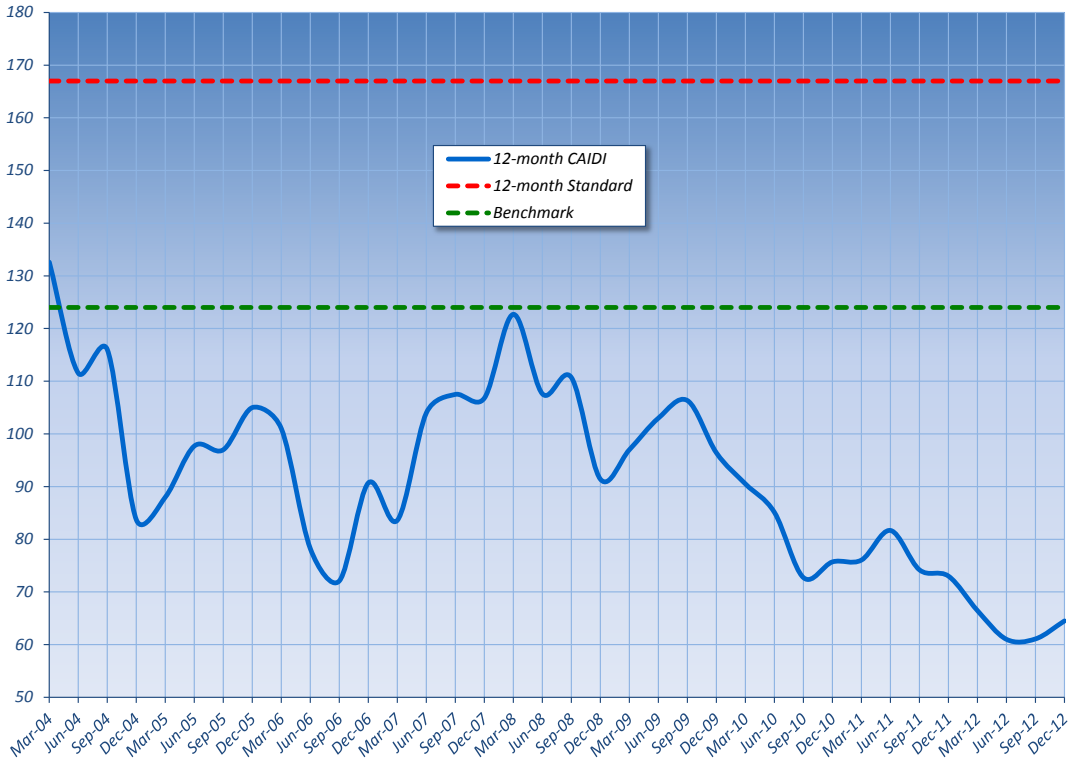
**Three-year average:** Decreased from 1.27 outages in 2011 to 1.18 outages in 2012 and achieved standard by 13 percent.

Historical 12-month CAIDI and SAIFI trends are shown on Figure 39 and Figure 40. Figure 41 shows the distribution of outage causes as a percentage of total outages. Figure 42 shows historical trend of the top two major outage causes. The most frequent outage cause was related to animals. Wellsboro now is installing animal guards on poles where a distribution transformer is installed and where customers are experiencing multiple outages due to animal contacts.

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<sup>26</sup> See Docket Nos. M-2012-2290823; M-2012-2303433; M-2012-2319518; M-2012-2318996; M-2012-2324652; M-2012-2325997; M-2012-2290152.

**Figure 39 Wellsboro CAIDI (minutes)**



**Figure 40 Wellsboro SAIFI (interruptions per customer)**

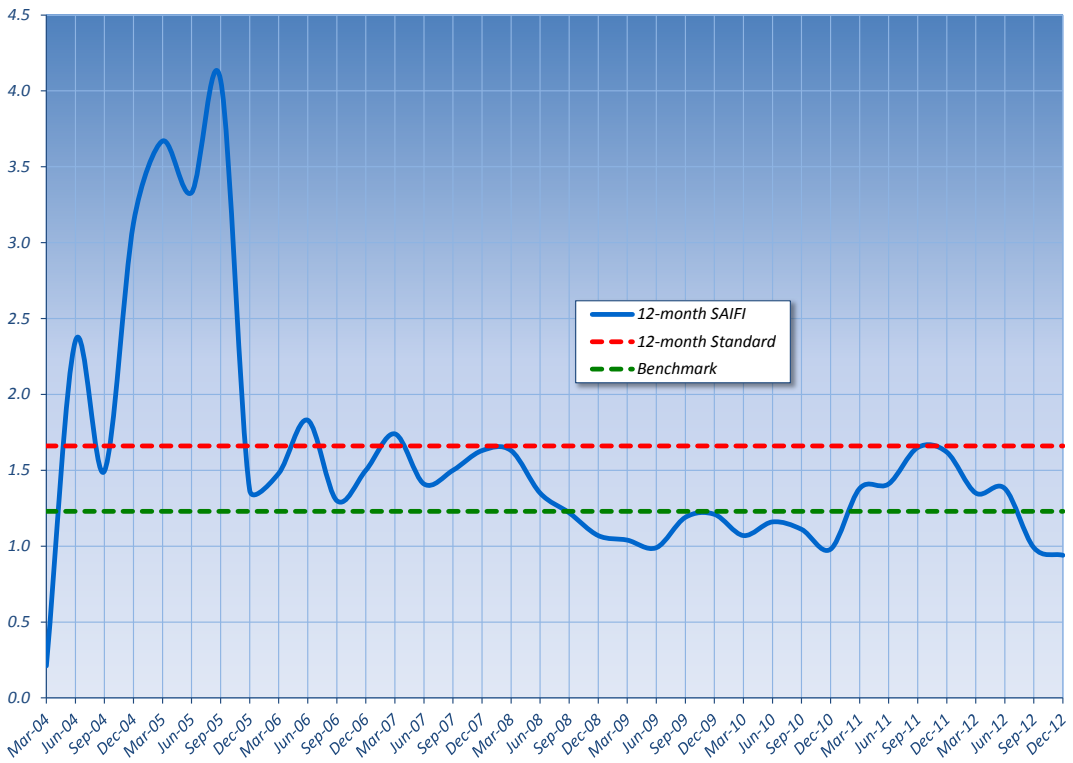


Figure 41 Wellsboro Outage Causes (percent of total outages)

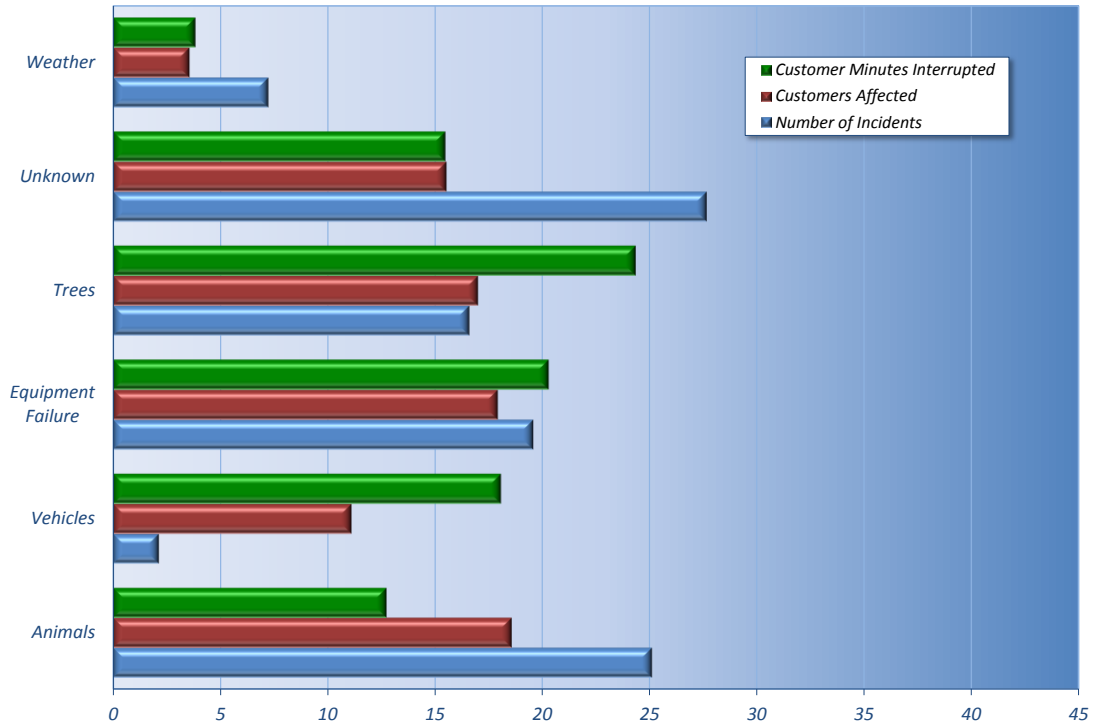
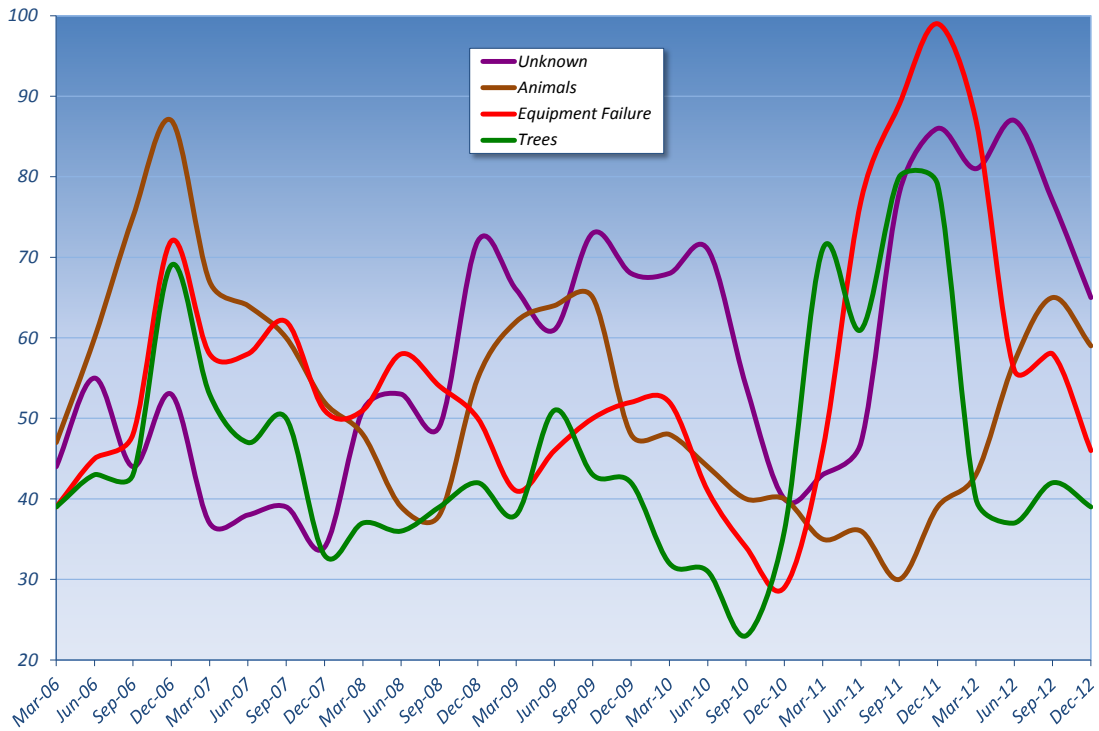


Figure 42 Wellsboro Outage Tracking (number of incidents)



## *West Penn Power Company*

In 2012, West Penn experienced 753,301 customer interruptions for a duration of 170.5 million minutes (excluding major events), which was worse than 2011 when consumers experienced 1 million interruptions for a duration of 151.2 million minutes. The 2012 reliability metrics calculation excludes outage data relating to one major event, which was approved by the Commission:<sup>27</sup>

- July 26, 2012 – Lightning storm, affecting 80,438 customers.

### **CAIDI/SAIDI/SAIFI Evaluation**

#### **CAIDI**

**Rolling 12-month:** Increased from 151 minutes in 2011 to 226 minutes in 2012; failed to achieve benchmark by 33 percent.

**Three-year average:** Increased from 169 minutes in 2011 to 189 minutes in 2012; failed to achieve standard by 1 percent.

#### **SAIDI**

**Rolling 12-month:** Increased from 211 minutes in 2011 to 241 minutes in 2012; failed to achieve benchmark by 35 percent.

**Three-year average:** Increased from 188 minutes in 2011 to 214 minutes in 2012; achieved standard by 1 percent.

#### **SAIFI**

**Rolling 12-month:** Decreased from 1.4 outages in 2011 to 1.07 outages in 2012; failed to achieve benchmark by 2 percent.

**Three-year average:** Increased from 1.12 outages in 2011 to 1.16 outages in 2012; achieved standard by 0.3 percent.

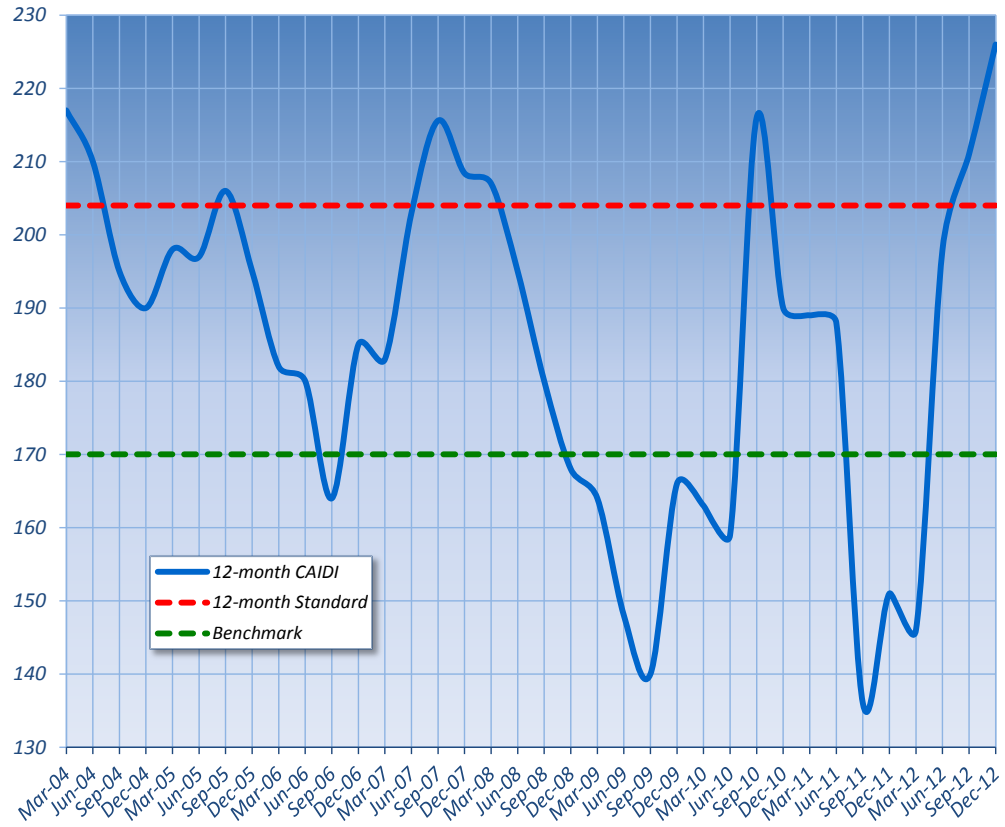
Historical 12-month CAIDI and SAIFI trends are shown on Figure 43 and Figure 44. The past-year trend shows it is taking longer to restore power; however, outages are occurring less frequently. Figure 45 shows the distribution of outage causes that occurred during 2012 as a percentage of total outages. Figure 46 shows historical trend of the top three major outage causes, which were trees, equipment failure and weather. These outage causes are significantly trending downward.

West Penn's CAIDI has been over standard for the past two rolling 12-month quarterly reports. Its SAIFI also is over standard in four of the past eight quarters. West Penn's fourth quarter 2012 CAIDI is more than 10 percent above the standard. As can be seen in Figure 43, this is not the first large upswing in CAIDI in the past eight years. West Penn noted that the increase was primarily due to the late June thunderstorms and the effects of Hurricane Sandy. The PUC is working with West Penn on an improvement plan to address CAIDI.

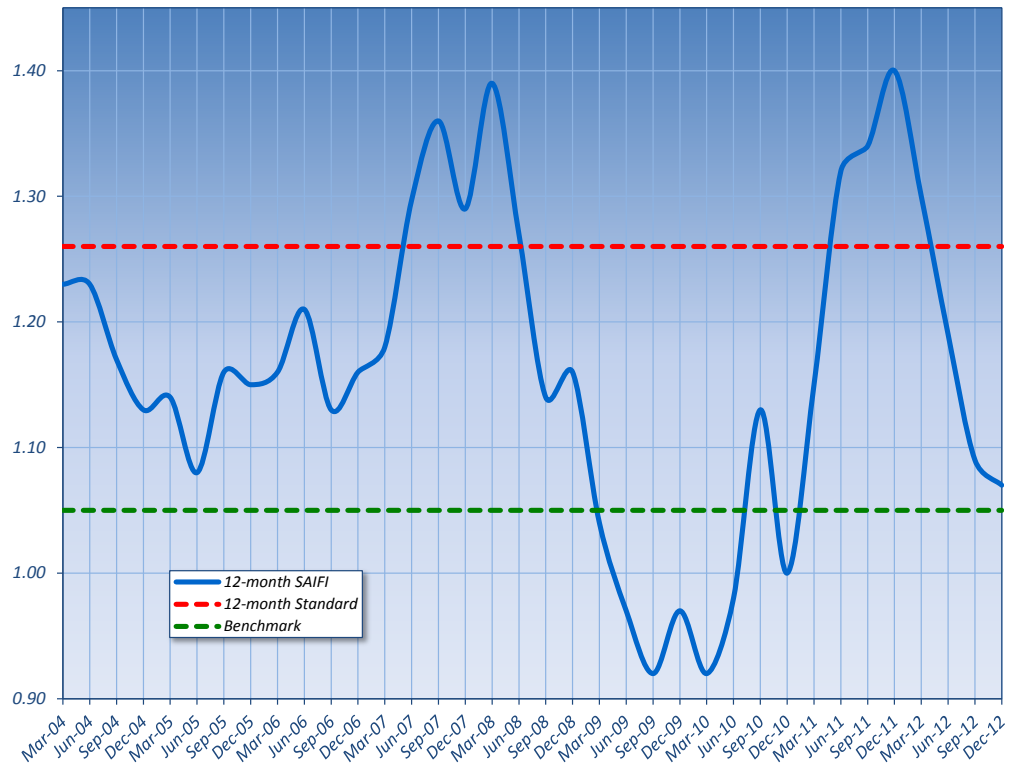
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<sup>27</sup> See Docket No. M-2012-2329712.

**Figure 43 West Penn CAIDI (minutes)**

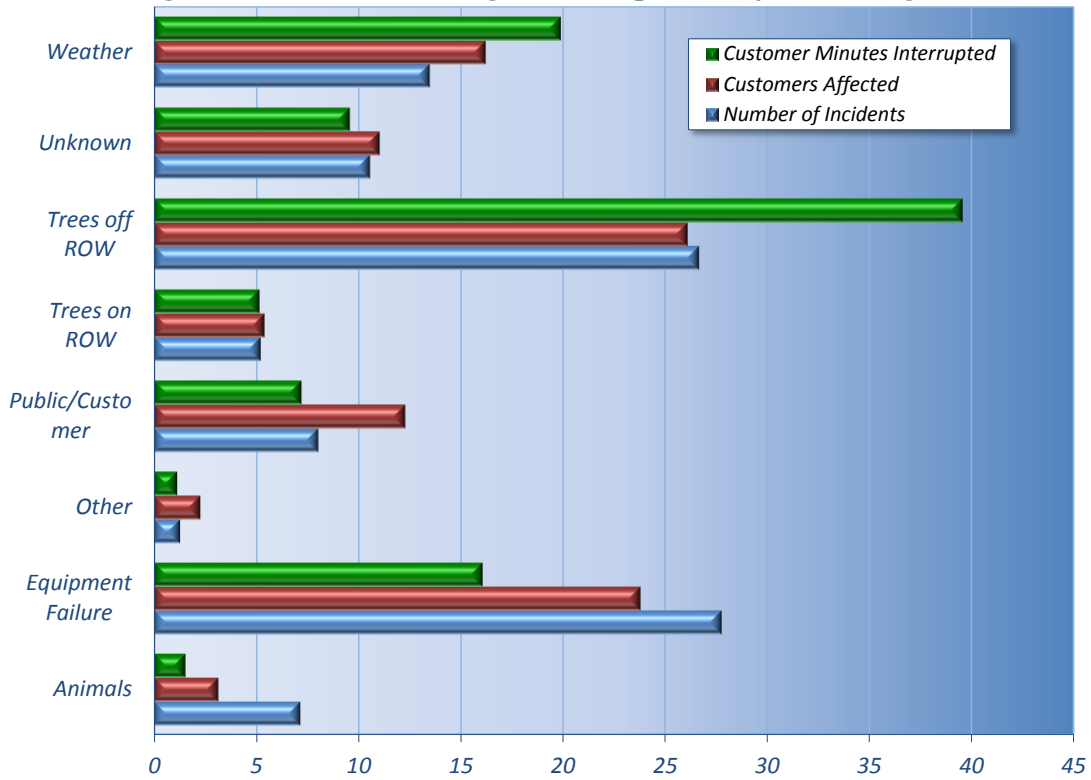


**Figure 44 West Penn SAIFI (interruptions per customer)**

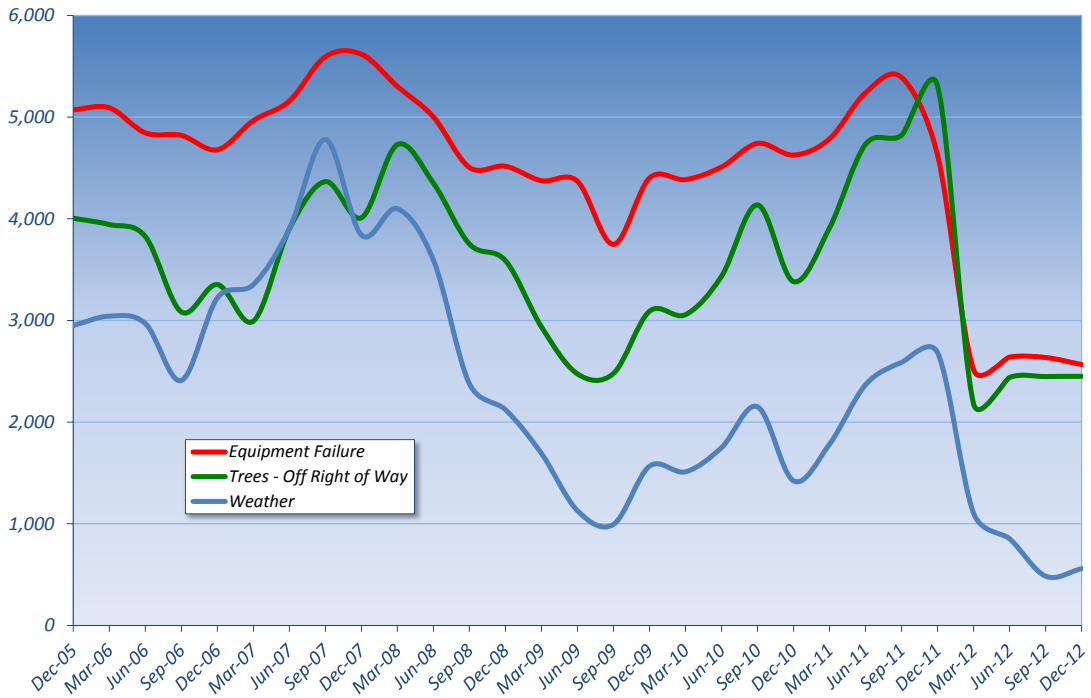




**Figure 45 West Penn Outage Causes (percent of total outages)**



**Figure 46 West Penn Outage Tracking (number of incidents)**



## *Section 5– Conclusion*

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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.

Given the uncertainty of weather and other events that can affect reliability performance, the PUC has stated that EDCs should set goals to achieve benchmark performance or better to allow for those times when unforeseen circumstances push the metrics above the benchmark. In recognition of these unforeseen circumstances, the Commission set the performance standard as the minimum level of EDC reliability performance. The standard is the level of performance beyond which the company must either justify its poor performance or provide information on corrective measures. Performance that does not meet the standard for any reliability measure may be the threshold for triggering additional scrutiny and potential compliance enforcement actions.

In 2012, 10 of the 11 EDCs achieved compliance with the 12-month Customer Average Interruption Duration Index (CAIDI) Standard. Three EDCs performed better than the 12-month CAIDI benchmark. Standard compliance has improved over 2011 when four EDCs were above the standard.

All 11 EDCs achieved compliance with the 12-month System Average Interruption Duration Index (SAIDI) Standard. Six EDCs performed better than the 12-month SAIDI benchmark. Standard compliance has improved over 2011 when three EDCs were above the standard.

All 11 EDCs achieved compliance with the 12-month System Average Interruption Frequency Index (SAIFI) Standard. Six EDCs performed better than the 12-month SAIFI benchmark. Standard compliance has improved over 2011 when two EDCs were above the standard.

The Commission will continue to monitor the reliability of electric service in Pennsylvania through ongoing oversight of utility performance and enforcement of inspection and maintenance standards. Commission staff will continue with detailed reviews of each EDC's inspection and maintenance plan. Commission staff also is working with the EDCs to facilitate the exchange of best practices. For those EDCs not meeting their standards or their benchmarks, Commission staff will work with the EDCs to ensure future standard compliance and a drive towards benchmark performance.

## Appendix A – Electric Reliability Metrics

### 12-Month Average Electric Reliability Indices for 2012

Customer Average Interruption Duration Index (CAIDI)- min/yr/cust				% Above (+) or Below (-) Benchmark	% Above (+) or Below (-) Standard
EDC	Dec-12	Benchmark	Standard		
Citizens'	129	105	141	22.9	-8.5
Duquesne Light	117	108	130	8.3	-10.0
Met-Ed (FE)	120	117	140	2.6	-14.3
PECO	97	112	134	-13.4	-27.6
Penelec (FE)	138	117	141	17.9	-2.1
Penn Power (FE)	114	101	121	12.9	-5.8
Pike County	184	174	235	5.7	-21.7
PPL	152	145	174	4.8	-12.6
UGI	122	169	228	-27.8	-46.5
Wellsboro	65	124	167	-48.0	-61.4
West Penn (FE)	226	170	204	32.9	10.8

System Average Interruption Frequency Index (SAIFI)- outages/yr/cust				% Above (+) or Below (-) Benchmark	% Above (+) or Below (-) Standard
EDC	Dec-12	Benchmark	Standard		
Citizens'	0.09	0.20	0.27	-55.0	-66.7
Duquesne Light	0.67	1.17	1.40	-42.7	-52.1
Met-Ed (FE)	1.29	1.15	1.38	12.2	-6.5
PECO	0.77	1.23	1.48	-37.4	-48.0
Penelec (FE)	1.41	1.26	1.52	11.9	-7.2
Penn Power (FE)	1.17	1.12	1.34	4.5	-12.7
Pike County	0.57	0.61	0.82	-6.6	-30.5
PPL	1.08	0.98	1.18	10.2	-8.5
UGI	0.44	0.83	1.12	-47.0	-60.7
Wellsboro	0.94	1.23	1.66	-23.6	-43.4
West Penn (FE)	1.07	1.05	1.26	1.9	-15.1

System Average Interruption Duration Index (SAIDI)- min/yr/cust				% Above (+) or Below (-) Benchmark	% Above (+) or Below (-) Standard
EDC	Dec-12	Benchmark	Standard		
Citizens'	11	21	38	-47.6	-71.1
Duquesne Light	79	126	182	-37.3	-56.6
Met-Ed (FE)	155	135	194	14.8	-20.1
PECO	75	138	198	-45.7	-62.1
Penelec (FE)	194	148	213	31.1	-8.9
Penn Power (FE)	133	113	162	17.7	-17.9
Pike County	105	106	194	-0.9	-45.9
PPL	164	142	205	15.5	-20.0
UGI	54	140	256	-61.4	-78.9
Wellsboro	60	153	278	-60.5	-78.3
West Penn (FE)	241	179	257	34.6	-6.2

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 2010-2012

<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>2010</i>	<i>2011</i>	<i>2012</i>			
<i>Citizens'</i>	98	126	129	<b>118</b>	115	<b>2.3</b>
<i>Duquesne Light</i>	80	107	117	<b>101</b>	119	<b>-14.8</b>
<i>Met-Ed (FE)</i>	120	117	120	<b>119</b>	129	<b>-7.8</b>
<i>PECO</i>	126	135	<b>97</b>	<b>119</b>	123	<b>-3.0</b>
<i>Penelec (FE)</i>	124	167	138	<b>143</b>	129	<b>10.9</b>
<i>Penn Power (FE)</i>	95	138	114	<b>116</b>	111	<b>4.2</b>
<i>Pike County</i>	253	297	184	<b>245</b>	192	<b>27.4</b>
<i>PPL</i>	135	151	152	<b>146</b>	160	<b>-8.8</b>
<i>UGI</i>	99	128	<b>122</b>	<b>116</b>	186	<b>-37.5</b>
<i>Wellsboro</i>	76	73	<b>65</b>	<b>71</b>	136	<b>-47.7</b>
<i>West Penn (FE)</i>	190	151	<b>226</b>	<b>189</b>	187	<b>1.1</b>
<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>2010</i>	<i>2011</i>	<i>2012</i>			
<i>Citizens'</i>	0.19	0.35	<b>0.09</b>	<b>0.21</b>	0.22	<b>-4.5</b>
<i>Duquesne Light</i>	1.09	0.93	<b>0.67</b>	<b>0.90</b>	1.29	<b>-30.5</b>
<i>Met-Ed (FE)</i>	1.51	1.21	1.29	<b>1.34</b>	1.27	<b>5.2</b>
<i>PECO</i>	1.09	1.14	<b>0.77</b>	<b>1.00</b>	1.35	<b>-25.9</b>
<i>Penelec (FE)</i>	1.31	1.40	1.41	<b>1.37</b>	1.39	<b>-1.2</b>
<i>Penn Power (FE)</i>	1.01	1.03	1.17	<b>1.07</b>	1.23	<b>-13.0</b>
<i>Pike County</i>	0.60	0.73	<b>0.57</b>	<b>0.63</b>	0.67	<b>-5.5</b>
<i>PPL</i>	1.09	1.07	1.08	<b>1.08</b>	1.08	<b>0.0</b>
<i>UGI</i>	0.48	0.95	<b>0.44</b>	<b>0.62</b>	0.91	<b>-31.5</b>
<i>Wellsboro</i>	0.98	1.62	<b>0.94</b>	<b>1.18</b>	1.35	<b>-12.6</b>
<i>West Penn (FE)</i>	1.00	1.40	1.07	<b>1.16</b>	1.16	<b>-0.3</b>
<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>2010</i>	<i>2011</i>	<i>2012</i>			
<i>Citizens'</i>	18	44	<b>11</b>	<b>24</b>	25	<b>-2.7</b>
<i>Duquesne Light</i>	87	99	<b>79</b>	<b>88</b>	153	<b>-42.3</b>
<i>Met-Ed (FE)</i>	181	142	155	<b>159</b>	163	<b>-2.2</b>
<i>PECO</i>	137	154	<b>75</b>	<b>122</b>	167	<b>-26.9</b>
<i>Penelec (FE)</i>	162	233	194	<b>196</b>	179	<b>9.7</b>
<i>Penn Power (FE)</i>	95	143	133	<b>124</b>	136	<b>-9.1</b>
<i>Pike County</i>	153	216	<b>105</b>	<b>158</b>	129	<b>22.5</b>
<i>PPL</i>	147	162	164	<b>158</b>	172	<b>-8.3</b>
<i>UGI</i>	48	121	<b>54</b>	<b>74</b>	170	<b>-56.3</b>
<i>Wellsboro</i>	74	119	<b>60</b>	<b>84</b>	185	<b>-54.3</b>
<i>West Penn (FE)</i>	191	211	241	<b>214</b>	217	<b>-1.2</b>

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 2011, effective January 1, 2013- December 31, 2014***

<b>Company</b>	<b>Exemption Requested</b>	<b>Justification</b>
<b>FirstEnergy including Penelec, Penn Power, Met-Ed and West Penn Power</b>	Pole loading calculations	Approved previously in the January 1, 2011-December 31, 2012 I&M Plan.
<b>FirstEnergy including Penelec, Penn Power, Met-Ed and West Penn Power</b>	Distribution overhead line inspections – 5 year rather than 1 to 2-year cycle	Approved previously in the January 1, 2011-December 31, 2012 I&M Plan.
<b>FirstEnergy including Penelec, Penn Power, Met-Ed and West Penn Power</b>	Overhead transformer inspections – 5 year rather than 1 to 2-year cycle	Approved previously in the January 1, 2011-December 31, 2012 I&M Plan.
<b>UGI</b>	None	n/a

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

<b>Company</b>	<b>Exemption Requested</b>	<b>Justification</b>
<b>Citizens'</b>	Pole loading calculations	Approved previously in the January 1, 2012-December 31, 2013 I&M Plan.
<b>Duquesne</b>	Pole loading calculations	Approved previously in the January 1, 2012-December 31, 2013 I&M Plan
<b>Duquesne</b>	Overhead line inspections	Approved previously in the January 1, 2012-December 31, 2013 I&M Plan
<b>Duquesne</b>	Overhead transformer inspections	Approved previously in the January 1, 2012-December 31, 2013 I&M Plan
<b>Duquesne</b>	Above-ground pad-mounted transformers	Approved previously in the January 1, 2012-December 31, 2013 I&M Plan
<b>PECO</b>	Pole loading calculations	Approved previously in the January 1, 2012-December 31, 2013 I&M Plan
<b>Pike County</b>	Pole loading calculations	Approved previously in the January 1, 2012-December 31, 2013 I&M Plan
<b>PPL</b>	Pole loading calculations	Approved previously in the January 1, 2012-December 31, 2013 I&M Plan
<b>PPL</b>	Overhead line inspections	Approved previously in the January 1, 2012-December 31, 2013 I&M Plan
<b>PPL</b>	Transformer inspections	Approved previously in the January 1, 2012-December 31, 2013 I&M Plan
<b>Wellsboro</b>	Pole loading calculations	Approved previously in the January 1, 2012-December 31, 2013 I&M Plan



