

Filed Session of June 17, 2015



## **2014 ELECTRIC RELIABILITY PERFORMANCE REPORT**

**Electric Distribution Systems**  
**Office of Electric, Gas, and Water**  
**June 2015**

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	1
INTRODUCTION .....	3
2014 RELIABILITY PERFORMANCE.....	5
STATEWIDE.....	5
CON EDISON .....	9
NATIONAL GRID .....	14
NEW YORK STATE ELECTRIC AND GAS .....	16
ROCHESTER GAS AND ELECTRIC .....	18
CENTRAL HUDSON GAS AND ELECTRIC.....	20
ORANGE & ROCKLAND.....	22
PSEG-LI.....	24
APPENDIX .....	

## EXECUTIVE SUMMARY

The attached report presents the assessment by Department of Public Service Staff (Staff) of electric reliability performance in New York State for 2014. Staff primarily relies on two metrics commonly used in the industry to measure reliability performance: the System Average Interruption Frequency Index (SAIFI or frequency) and the Customer Average Interruption Duration Index (CAIDI or duration).<sup>1</sup> Frequency is influenced by factors such as system design, capital investment, maintenance, and weather.<sup>2</sup> Decisions made by utilities today on capital expenditures and maintenance policies, however, can take several years before being fully reflected in the frequency measure. Duration, on the other hand, is affected by work force levels, management of the workforce, and geography. Several means have been established to assist Staff in monitoring the levels of service. First, utilities are required to submit detailed monthly interruption data to the Public Service Commission (Commission).<sup>3</sup> Next, the Commission adopted Service Standards, which among other things, set minimum performance levels for both the frequency and duration of service interruptions for each major electric utility's operating divisions. Each utility performance is then compared with its Reliability Performance Mechanisms (RPMs) which is established in its rate order. The RPMs include company-wide targets for outage frequency and duration; some RPMs have additional measures to address specific concerns unique to an individual company. RPMs are designed such that companies are subject to negative revenue adjustments for failing to meet electric reliability targets. Con Edison met its network frequency target. The Company's network outage duration performance of 4.92 hours however was above the RPM target of 4.70 hours. As a result, the Company is subject to

---

<sup>1</sup> SAIFI is the average number of times that a customer is interrupted for five minutes or more during a year. CAIDI is the average interruption duration time in hours for those customers that experience an interruption during the year.

<sup>2</sup> For example, because the system of Consolidated Edison Company of New York, Inc. (Con Edison) includes many large, highly concentrated underground distribution networks that are generally less prone to interruptions than overhead systems, its interruption frequency is extremely low (better) as compared with other utilities.

<sup>3</sup> The regulated electric utilities consist of Con Edison, Central Hudson Gas & Electric Corporation (Central Hudson), New York State Electric & Gas Corporation (NYSEG), Niagara Mohawk Power Corporation d/b/a National Grid (National Grid), Rochester Gas and Electric Corporation (RG&E), and Orange & Rockland Utilities, Inc. (Orange & Rockland). PSEG-LI provides interruption data that is used to calculate statewide performance in this report.

a negative revenue adjustment of \$5 million for not meeting the RPM target.<sup>4</sup> Con Edison met both its radial frequency and duration targets. All other companies met both their frequency and duration RPM targets in 2014.<sup>5</sup> Unlike the other utilities, PSEG-LI does not have rate orders or RPMs set by the Commission, but has performance metrics associated with reliability set as part of an Operating Service Agreement. PSEG-LI's frequency and duration performance for 2014 is still under review.

In addition to Staff's review, the utilities are required to perform a reliability analysis. The utilities must submit a formal report by March 31 of each year containing detailed assessments of performance, including outage trends in a utility's various geographic regions, reliability improvement projects, analyses of worst-performing feeders, and corrective action plans where needed. Recent data is also compared with historic performances to identify positive or negative trends. Staff also reviews several other specific metrics that vary by utility to gauge electric reliability.

By compiling the interruption data provided by the individual utilities, the average frequency and duration of interruptions can be reviewed to assess the overall reliability of electric service in New York State. Staff is generally satisfied with the electric reliability performance across the State. Excluding major storms, the statewide interruption frequency for 2014 was the same as last year and the statewide five-year average (as shown in Figure 1 on page 6).<sup>6</sup> Statewide, the three major causes for interruptions were equipment failures, tree contacts, and accidents or events not under the utility's control. Except for NYSEG and Central Hudson, equipment failures were the main drivers for each utility's interruptions. NYSEG and Central Hudson reported tree contacts followed by accidents as the main drivers for interruptions in their service territories.

Overall we are satisfied with the statewide radial frequency performance. NYSEG's frequency performance has improved since last year and is below its RPM

---

<sup>4</sup> Con Edison filed its "Report on 2014 Performance under Electric Service Reliability Performance Mechanism" stating the Company has incurred a revenue adjustment of \$5 million.

<sup>5</sup> While not related to reliability, National Grid missed its project estimating target in its RPM and incurred a \$2 million negative revenue adjustment for 2014.

<sup>6</sup> Major Storm is defined as any storm which causes service interruptions of at least ten percent of customers in an operating area, or if the interruptions last for 24 hours or more. To help achieve a balance between service interruptions under a utility's control, such as equipment failures, and those which a utility's control is more limited, such as an ice storm, we review reliability data both including and excluding severe weather events.

target and better than its five-year average. RG&E's frequency performance was also below its RPM target. While National Grid, Central Hudson, and Orange & Rockland's frequency performance were above the five-year averages, they met their RPM targets. Con Edison has improved its radial frequency performance compared to last year and met its RPM target. The Company also met its RPM targets for system-wide network frequency even though its network performance was worse than the five-year average.

In 2014, the statewide duration performance, excluding major storms, was slightly longer than the statewide five-year average (as shown in Figure 2 on page 7). Central Hudson, National Grid, Orange & Rockland, and RG&E's duration performance improved when compared to 2013. Central Hudson and National Grid also showed improvement when compared to their five-year average. NYSEG's duration performance was slightly worst than last year's performance but better than its five-year average and RPM target. Overall Con Edison's system-wide duration performance was its worst performance since 2009. Staff documented concerns regarding Con Edison's radial duration performance in the Bronx and Queens in its reliability report last year. In 2014, Con Edison's radial duration improved in the Bronx, however, Queens was again unsatisfactory and worse than 2013. Network duration performance on a system wide basis was also unsatisfactory in 2014. As a result, Staff is working with the Company to develop corrective action plans to improve network duration performance. Items being discussed include promptly making temporary repairs that restore service to customers while the more time consuming permanent repairs are being completed, work force staffing plans, workforce management, and implementation schedules.

## **INTRODUCTION**

This report provides an overview of the electric reliability performance in New York State. Staff uses several means to monitor the levels of service reliability statewide and for each utility individually. First, the Commission's Rules and Regulations require utilities delivering electricity in New York State to collect and submit information to the Commission regarding electric service interruptions on a monthly

basis.<sup>7</sup> Next, the Commission adopted electric service standards addressing the reliability of electric service. The standards contain minimum acceptable performance levels for both the frequency and duration of service interruptions for each major electric utility's operating divisions. Then, company-wide performance expectations are set in RPMs established in the utilities' rate orders. The RPMs are designed such that companies are subjected to negative revenue adjustments for failing to meet electric reliability targets established for each utility in individual rate orders. There are no revenue adjustments for failure to meet a minimum level under the service standards; utilities are, however, required to include a corrective action plan as part of the annual report.

The interruption data provided to Staff enables Staff to calculate two primary performance metrics: SAIFI or frequency and CAIDI or duration. The information is grouped into 10 categories that delineate the nature of the cause of interruption (cause code).<sup>8</sup> Analysis of the cause code data enables the utilities and Staff to identify areas where increased capital investment or maintenance is needed. As an example, if a circuit were shown to be prone to lightning-caused interruptions, arrestors could be installed on that circuit to try to minimize the effect of future lightning strikes. In general, most of a utility's interruptions are a result of major storms, tree contacts, equipment failures, and accidents.<sup>9</sup> Staff maintains interruption information in a database that dates back to 1989, which enables it to observe trends. The Commission regulated utilities must submit a formal reliability report by March 31 of each year that compares data against both the system-wide RPM targets and the operating division targets established in the Commission's Service Standards.

The RPMs include company-wide targets for outage frequency and duration. Some RPMs have additional measures to address specific concerns unique to an individual company. Con Edison met its radial frequency and duration targets and its

---

<sup>7</sup> 16 NYCRR Part 97, Notification of Interruption of Service, requires utilities to keep detailed back-up data for six years.

<sup>8</sup> 16 NYCRR Part 97, Notification of Interruption of Service, specifies and defines the following ten cause codes that reflect the nature of the interruptions: major storms, tree contacts, overloads, operating errors, equipment failures, accidents, prearranged interruptions, customers equipment, lightning, and unknown. There are an additional seven cause codes used exclusively for Con Edison's underground network system.

<sup>9</sup> The accident cause code covers events not entirely within in the utilities' control including vehicular accidents, sabotage, and animal contacts. Lightning is reported under a separate cause code.

network frequency target but failed to meet its network outage duration target. All other companies met their RPM targets related to electric reliability performance, including those for frequency and duration. It should be noted that National Grid missed its project estimating target and incurred a \$2 million negative revenue adjustment for 2014.

## **2014 RELIABILITY PERFORMANCE**

The following sections provide a summary discussion of the reliability performance statewide and for each of the major utilities. Individual company discussions identify issues or actions within each company that influenced performance levels for 2014 and indicate company-specific trends where applicable. Each year, Staff prepares an Interruption Report summarizing the monthly interruption data submitted by utilities. The 2014 Interruption Report contains detailed interruption data for each utility and statewide statistics for the past five years. The Interruption Report for 2014 is attached as an Appendix.

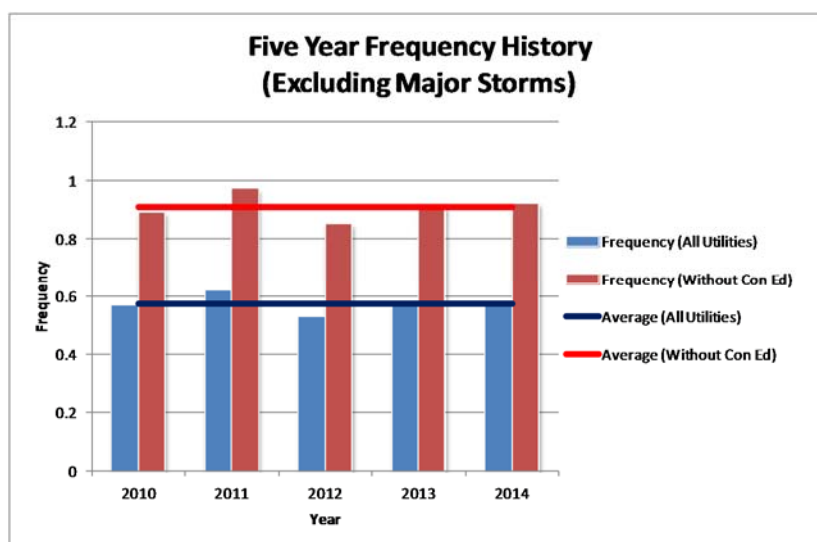
Interruption data is presented in two ways in this report – with major storms excluded and with major storms included. A major storm is defined by the Commission's regulations as any storm which causes service interruptions of at least 10 percent of customers in an operating area and/or interruptions with duration of 24 hours or more. Major storm interruptions are excluded from the data used in calculating performance levels for service standards and reliability performance mechanisms. The purpose of this policy is to achieve a balance between service interruptions under a utility's control, such as equipment failures and line maintenance, and those over which a utility's control is more limited, such as a severe ice storm or a heavy wet snowstorm. Reliability performance data inclusive of major storms reflects the actual customer experience during a year.

### **STATEWIDE**

For many years, Staff has been combining individual utility performance statistics into overall statewide statistics. By doing so Staff is able to evaluate the level of reliability provided statewide and identify statewide trends. Because Con Edison's

system includes many large, highly concentrated distribution networks that are generally less prone to interruptions than overhead systems, its interruption frequency is extremely low (better) as compared with other utilities. This, combined with the fact that it serves the largest number of customers in the state, typically results in a skewing of the performance measures. As a result, Staff examines and presents aggregated data both including and excluding Con Edison's data.

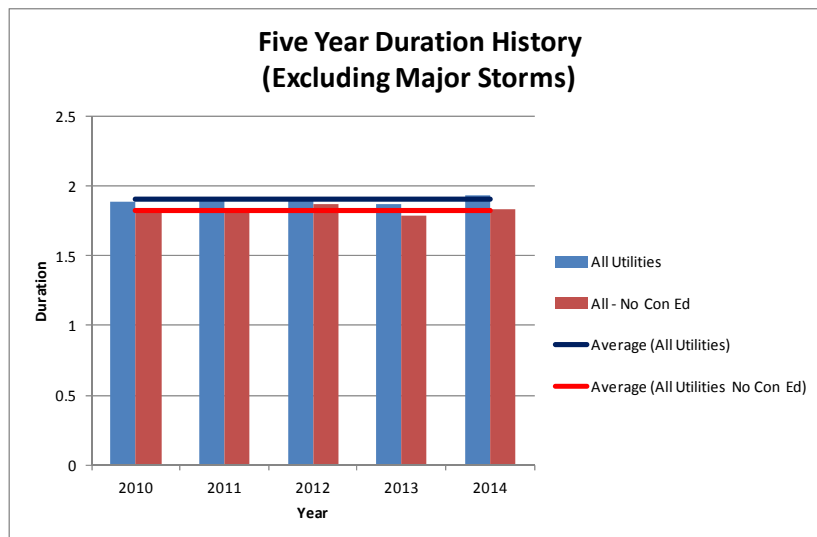
Statewide, as shown in Figure 1, the frequency of interruptions excluding major storms was 0.57 in 2014, which is the same as the statewide five-year averages. The frequency performance in 2014, for utilities other than Con Edison, is 0.92, the same as last year and slightly above the five-year average of 0.91.



**Figure 1: Statewide Frequency Performance**

Figure 2 shows the historical statewide interruption duration index, excluding major storms. The 2014 overall statewide interruption duration index of 1.93 is longer than the 1.87 achieved in 2013; but is in line with the five-year average of 1.90. The statewide interruption duration index, excluding Con Edison, was 1.83 hours in 2014, which is greater than the 2013 duration index of 1.79 and generally consistent with the five-year average of 1.82.



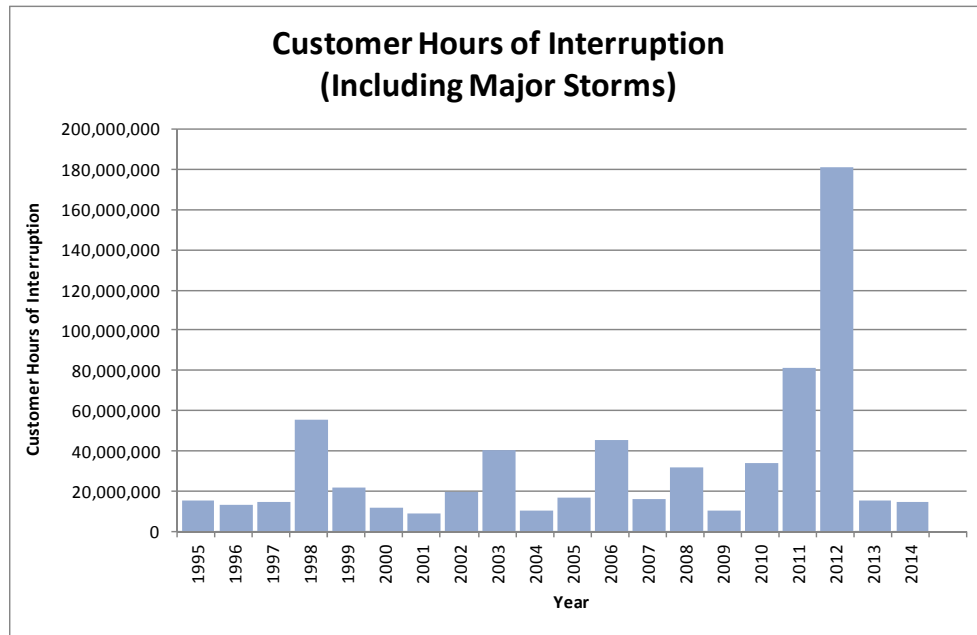


**Figure 2: Statewide Duration Performance**

Overall, 2014 was a moderately eventful year when considering severe weather effects. This can be seen in Figure 3. In November 2014, customers in New York experienced two events caused by back-to-back storms. The first storm was a lake effect storm that left parts of the Buffalo area with approximately seven feet of snow; the storm, however, did not have a significant impact on electric service. Shortly after that, the mid Hudson Valley experienced heavy wet snow that weighed down trees and wires causing nearly 1,000 individual repairs. Unfortunately the outages lasted into Thanksgiving, but were less than three days. In addition, numerous fronts crossed the State between June and August bringing severe storms and/or damaging winds. As a result, no company was required to file a storm report or scorecard with the Commission for an outage lasting longer than three days.<sup>10</sup> When including major storms, the 2014 statewide duration performance was 2.70. Excluding Con Edison, the statewide duration performances including major storms was 2.67. These measures are better than last years and the five-year averages before Hurricane Irene and Hurricane Sandy in 2011 and 2012 respectively. This indicates that in 2014, the overall length of interruptions including storms has been shorter. The 2014 customer hours of interruption are also at a more

<sup>10</sup> 16 NYCRR Part 97, Part 105.4, requires utilities to file storm reports for outages lasting longer than three days. These reports, as well as Staff's when they are completed, may be found on the Department's website: <http://www.dps.ny.gov>; see Case 13-E-0140, Proceeding on Motion of the Commission to Consider Utility Emergency Performance Metrics. Order Approving the Scorecard for Use by the Commission as a Guidance Document to Assess Electric Utility Response to Significant Outages (issued December 23, 2013).

typical level than those experienced in 2011 and 2012. Major storms in 2014, still accounted for 41% of customer-hours of interruptions and 16% of the overall number of customers affected.



**Figure 3: Customer Hours of Interruption (Including Major Storms)**

CON EDISON**Table 1: Con Edison's Historic Performance Excluding Major Storms**

Performance Metric	2010	2011	2012	2013	2014	Current RPM Target	5-Year Average
Network Systems <sup>11</sup>							
Frequency Customer Interruptions per 1,000 Customers	2.38	2.49	1.94	2.17	2.36	2.50	2.27
Duration Avg Interruption Hours	4.47	4.58	4.75	4.20	4.92	4.70	4.58
Radial System							
Frequency (SAIFI)	0.42	0.49	0.36	0.40	0.33	0.495	0.40
Duration (CAIDI)	1.95	2.12	2.02	2.02	1.83	2.04	1.99

Note: Data presented in red represents a failure to meet the RPM target for a given year.

Con Edison serves approximately 3.4 million customers in New York City and Westchester County. Electricity is supplied to 2.5 million customers by network systems. The remaining 900,000 customers are supplied by radial systems. The network system is mostly underground wires housed in conduits, where the radial system is mostly above-ground poles supporting overhead wires. The two systems are subject to different reliability metrics specifically designed for its configuration. The number of interruptions per 1,000 customers served and average interruption duration is used to gauge network performances, while the radial system is measured in the same manner as other utilities.

#### Network Systems Performance

Con Edison met its target for system wide network outage frequency in 2014. The Company had 2.36 network outages per 1,000 customers served, meeting its RPM target of 2.50. To minimize the frequency of customer outages, Con Edison's networks are designed with redundant electric supply paths. Individual service connections to customer premises, however, lack this redundancy. Grounds, short

<sup>11</sup> The SAIFI and CAIDI metrics used to measure network performance were replaced in 2009 with Network Outages per 1000 customers and Network Outage Duration, respectively. Network performances shown are consistent with Con Edison's RPM filings. The current RPM threshold standard for the Network Outages per 1000 customers metric is set at 2.50. The RPM threshold standard for the Network Outage Duration metric is set at 4.70.

circuits, or damaged conductors on these service connections account for 58% of interruptions for network customers. The second most frequent cause of network customer interruption is grounds, short circuits, or broken conductors on secondary street main cables, accounting for 37% of interruptions. The remaining network interruptions were coded as unknown, equipment, customer equipment, and accidents. Con Edison experiences network outages due to secondary burnouts and defective secondary mains. To address these issues, Con Edison is continuing with the deployment of dual layer cable which is more resilient to failure, and working on arc detection technology which may allow the removal of compromised components before failure.

With regard to network duration, Con Edison had its worst performance since 2009. The 2014 average network outage duration of 4.92 hours is above the RPM target of 4.70 hours. As a result, the Company will be subjected to a negative revenue adjustment of \$5 million for not meeting the RPM target.<sup>12</sup> The Company identified 12 separate cable failures with long interruption durations, three in Manhattan, four in Brooklyn, two in Queens, two in the Bronx, and one in Westchester that contributed to its poor network duration performance. Staff found Con Edison's network duration performance has shown a declining trend. Con Edison's annual reliability report, however, failed to provide explanations for the increase in restoration times for each region or specify detailed corrective action plans. As a result, Staff is working with the Company to develop corrective action plans to improve network duration performance. Items being discussed include promptly making temporary repairs that restore service to customers while the more time consuming permanent repairs are being completed, work force staffing plans, workforce management, and implementation schedules.

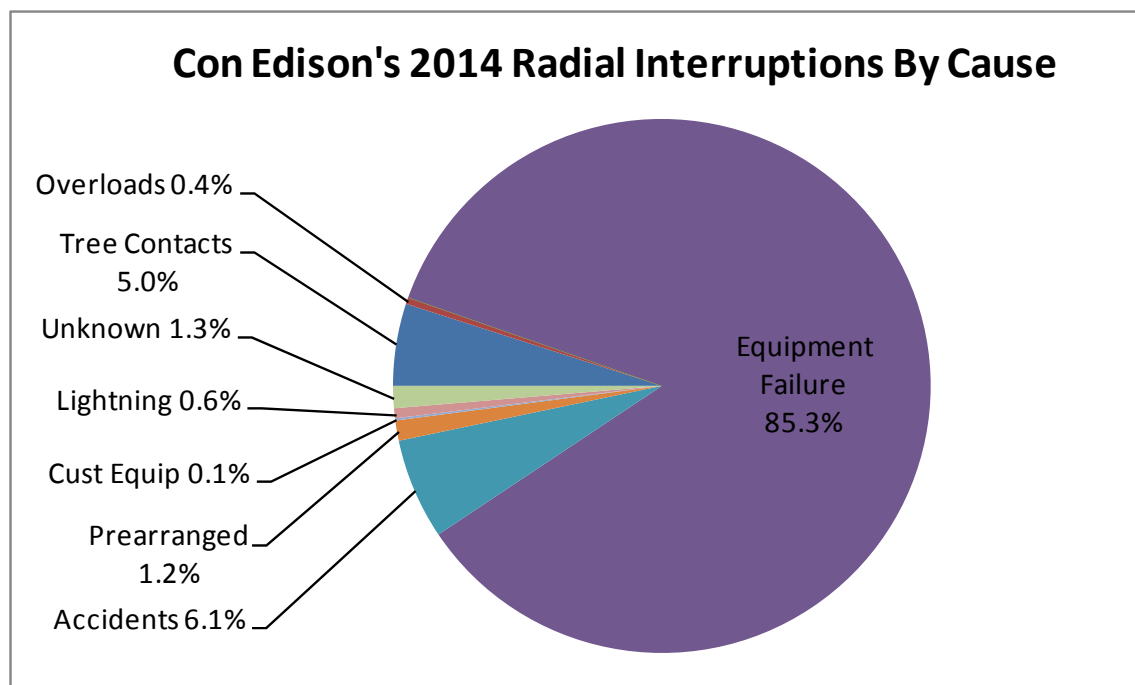
### Radial Performance

On its radial system, Con Edison met its system-wide RPM frequency target of 0.495 and its duration performance target of 2.04. In 2014, Con Edison's system-wide frequency performance of 0.334 and duration performance of 1.83 were the best performances over the last five years.

---

<sup>12</sup> Con Edison filed its "Report on 2014 Performance under Electric Service Reliability Performance Mechanism" which has yet to be presented to the Commission for final action.

Overall, the Company has improved performance in frequency compared to last year. As shown in Figure 4, apparatus or equipment failure is the major driver of customer outages on a radial system followed by accidents or events not under utilities control. Under the broad category of equipment failure, service line failures are the leading cause of customer interruption followed by open wire failures and overhead transformer trips. About 63% of radial interruptions are attributed to service line failures; whereas, open wire failure and overhead transformer trips account for 9% and 8% of equipment failure, respectively.



**Figure 4: Con Edison's 2014 Radial Interruptions by Cause  
(Excluding Major Storms)**

Con Edison indicates that enhancements to its 4kv system and installation of fuses and switches under its storm hardening and resiliency projects have helped to reduce outages. The Company reports that the installation of 22 fuses and eight switches in the Bronx and 248 fuses and eight switches in Queens has improved the radial frequency performance in both regions. The 2014 frequency performance in the Bronx and Queens are 0.279 and 0.271, compared to 0.620 and 0.287, respectively in 2013. This shows noticeable improvements and exceeds the performance of the previous four

years. The frequency performances in Westchester and Staten Island also improved in 2014 and are also better than the previous four years.

Last year, Staff documented concerns regarding the Company's radial duration performance in the Bronx and Queens. Accordingly, Staff monitored the Company's strategies to improve reliability performance in these operating areas. Through a series of meetings and correspondences a plan was outlined, including making temporary repairs that restore service to customers while the more time consuming permanent repairs are being completed; using crews from neighboring operating areas; using contractors to make certain repairs; and supplementing off-shift response crews with construction crews.

In 2014, Con Edison's radial duration for Bronx improved; however, Queens was worse than previous years and remains unsatisfactory. The Company reported radial underground residential distribution structure outages were the main drivers followed by a significant increase in the number of average jobs, and the extended time it takes crews to arrive on site to perform work. Con Edison's efforts to supplement response crews in Queens were not enough to shorten duration hours in these regions.

Moving forward, Con Edison plans to maintain consistent staffing levels around the clock within all response groups and to supplement off-shift response crews with overhead construction crews during the peak summer months. Con Edison believes these efforts will facilitate assembling and dispatching response crews to the work site faster and stabilize or reduce the total radial duration in the Bronx, Brooklyn, and Queens. The Company is also reinforcing its policy to promptly make temporary repairs that restore service to customers while the more time consuming permanent repairs are being completed. The Company is also planning on establishing an additional workout location in South Queens to address poor radial duration performance. A potential location was identified; however, the location would not be available for at least four years. Due to the time required for the additional workout location to be available Staff finds this solution unacceptable for the short-term. Consequently, Staff is working with the Company to identify additional interim radial duration improvement opportunities while developing the South Queens workout location.

### Storm Hardening

Con Edison has developed a storm hardening and resiliency plan to protect Con Edison's network system from severe flooding and winds such as those experienced during Hurricane Sandy. Con Edison's storm hardening and resiliency projects began in 2013 with the majority of these projects scheduled to conclude in 2016. Con Edison completed flood mitigation measures including the construction of concrete flood walls around critical equipment in substations; reworking underground networks in Manhattan to de-energize customers in flood zones during flooding events while continuing to provide service to other network customers outside of the flood zone; installation of submersible equipment in flood zones; and the installation of conduit seals and water tight flood doors in substations. These storm hardening and resiliency projects are intended to protect Con Edison's network system from severe flooding and winds such as those experienced during Hurricane Sandy. As a result, improvements in reliability performance metrics for 2014 from these storm hardening and resiliency measures are minimal.

In 2015, Con Edison will continue to replace underground non-submersible equipment with submersible equipment in flood zone areas. Other storm hardening projects planned for 2015 include the installation of network transformers; feeder reinforcement; elevating a critical substation control room and converting the substation to fiber optic based equipment; installing storm surge walls around eight substations in flood zones; and installing back-up generators at major electric facilities.

With regard to its radial system, Con Edison will install sectionalizing switches; replace open wire with aerial or Hendrix cable; and selectively underground critical and poor storm performing circuits under its storm hardening and resiliency plans. These efforts will occur in 2015 and are expected to reduce interruptions throughout the year.

NATIONAL GRID**Table 2: National Grid's Historic Performance Excluding Major Storms**

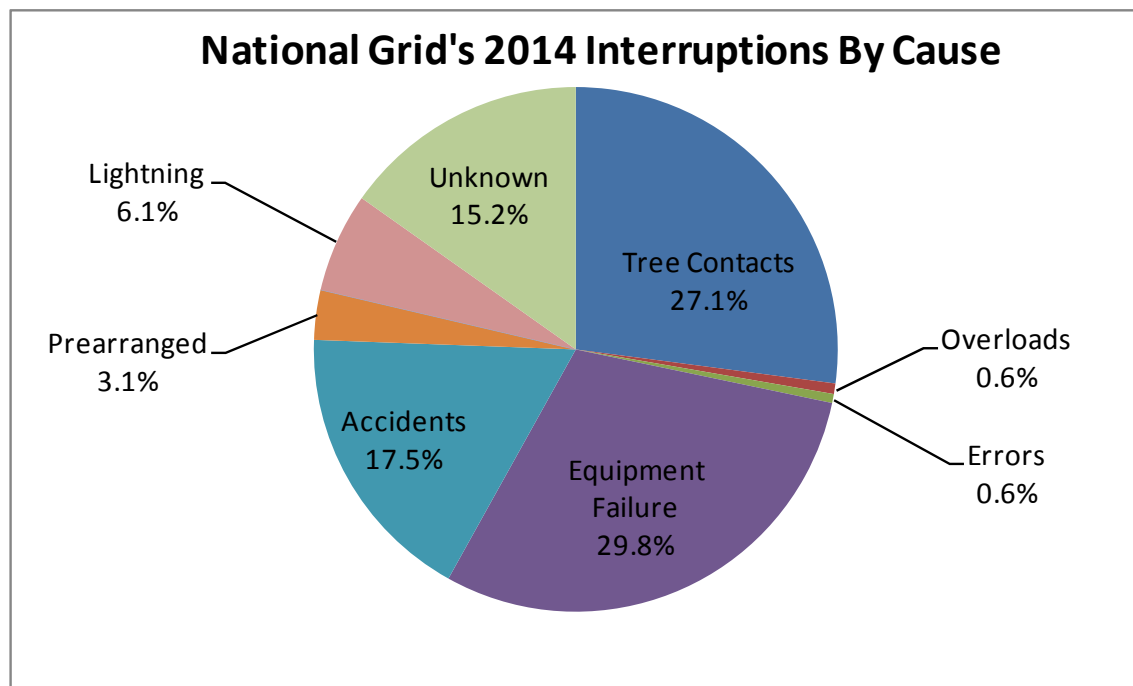
<b>Performance Metric</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>Current RPM Target</b>	<b>5-Year Average</b>
Frequency (SAIFI)	0.80	0.98	0.90	0.99	0.96	1.13	0.92
Duration (CAIDI)	1.98	1.95	2.04	1.96	1.94	2.05	1.97

National Grid serves approximately 1.6 million customers across upstate New York. The Company's territories include metropolitan areas, such as Albany, Buffalo, and Syracuse, as well as many rural areas in northern New York and the Adirondacks. For 2014, the Company met both of its RPM reliability targets. The 2014 frequency level of 0.96 is comparable to the five-year average, and is better than the RPM target of 1.13. The 2014 duration performance of 1.94 hours is the Company's best performance over the last five years and is 5% better than the target, of 2.05 hours. On a regional basis, the Frontier, Genesee, and Mohawk Valley Regions performed satisfactorily with respect to both the frequency and duration goals. The Capital and Southwest Regions had frequency indices better than their goals while the Central, Northeast, and Northern Regions all had duration indices better than their goals.

As shown in Figure 5, equipment failures, tree contacts, and accidents are the predominant causes of interruption throughout National Grid's service territory. Even though interruptions due to equipment failure had a 4% decrease when compared to 2013 and were 3% below the five-year average, they were the leading cause of interruptions in all but two regions of the National Grid service territory. In 2014, equipment failures system-wide accounted for approximately 30% of the interruptions, 35% of customers interrupted, and 39% of hours interrupted. The Company's Inspection and Maintenance Program provides increased reliability by addressing equipment issues found during inspections. National Grid also addresses the worst performing feeders in each region. Each of these feeders is analyzed to determine the root cause of unsatisfactory performance and a corrective action plan is developed. These action plans are expected to increase feeder reliability and reduce the number of customers affected by future



equipment failures. The customer benefits, including the extent to which reliability is increased, and the cost associated with these programs are reviewed quarterly by Staff.



**Figure 5: National Grid's 2014 Interruptions by Cause  
(Excluding Major Storms)**

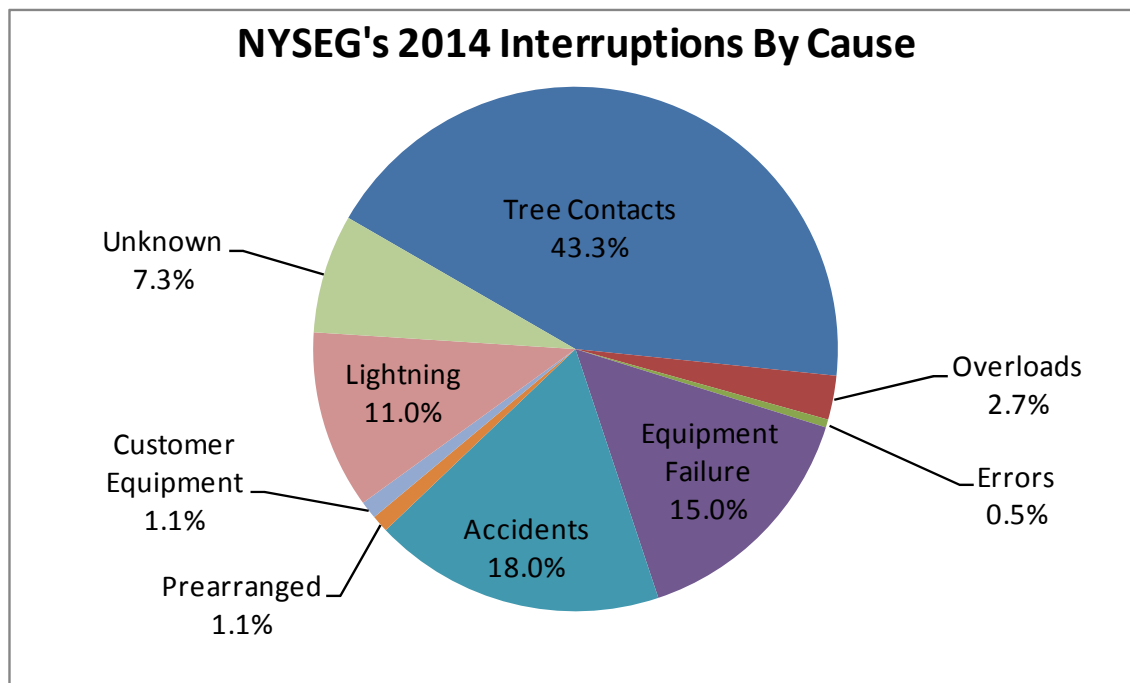
Tree contact interruptions were down 15% from 2013 and better than the five-year average. Customers interrupted and the length of outages due to tree contacts also decreased by 19% and 22% respectively in 2014 as compared to 2013. While tree contacts were still a significant portion of interruptions this year, the overall progress continues to be favorable. National Grid will continue to address tree contact issues through its vegetation management program which includes the aggressive removal of hazardous trees. Accidents were the third largest cause of interruptions in 2014. Interruptions due to accidents were up 22% over 2013. Vehicles incidents and animals were the largest contributors to the number of accident-related interruptions. National Grid investigates all poles that are involved in vehicle accidents to identify hazardous locations and relocates poles if considered necessary. The Company also installs animal guards on transformers impacted by animals while performing maintenance work and all new transformers have animal guards preinstalled.

NEW YORK STATE ELECTRIC AND GAS**Table 3: NYSEG's Historic Performance Excluding Major Storms**

<b>Performance Metric</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>Current RPM Target</b>	<b>5-Year Average</b>
Frequency (SAIFI)	1.14	1.20	0.98	1.10	1.03	1.20	1.09
Duration (CAIDI)	1.98	2.07	2.00	1.93	1.97	2.08	1.99

NYSEG serves approximately 862,000 customers across upstate New York. The Company serves a primarily rural area that covers approximately 40% of New York. Operating divisions are located in Auburn, Binghamton, Brewster, Elmira, Geneva, Hornell, Ithaca, Lancaster, Liberty, Lockport, Mechanicville, Oneonta, and Plattsburgh. For reliability reporting purposes, the Lockport Division is combined with Lancaster.

NYSEG's frequency performance of 1.03 has improved since last year and is better than the five-year average. The 2014 duration performance of 1.97 hours was slightly longer than last year's performance but in line with its five-year average of 1.99 hours. The Company met its RPM reliability targets of 1.20 for frequency and 2.08 for duration in 2014. On a divisional basis, the Binghamton, Brewster, Ithaca, Lancaster, Oneonta, and Plattsburgh Operating Divisions all had frequency and duration performances which were better than their established goals. The Auburn, Geneva, Hornell, Liberty, and Mechanicville Divisions had frequency indices better than their goals while the Elmira Division had a duration index better than its goal.



**Figure 6: NYSEG's 2014 Interruptions by Cause  
(Excluding Major Storms)**

As shown in Figure 6, tree contacts and accidents were the predominant causes of interruption throughout NYSEG's twelve operating divisions in 2014. NYSEG historically has a high tree-caused frequency rate when compared to the other New York State utilities. In the past, NYSEG's vegetation management practice was to only trim single phase distribution circuits on an as needed basis. Accordingly, a significant percentage of single-phased distribution circuits in NYSEG's service territory have not been fully trimmed or cleared. In 2014, NYSEG followed the 2014 Vegetation Management Plan which was filed with the Commission on December 2, 2013. The 2014 Vegetation Management Plan was a result of the Commission's October 1, 2013 Order<sup>13</sup> which addressed vegetation management and tree trimming on a company-wide basis. As a result of these efforts, the Company expects to complete trimming in the Brewster Division this year and in the Liberty Division by 2017. NYSEG's performance mechanisms are linked to a minimum quantity of distribution miles cleared on a calendar year basis remains in place. The Company exceeded its target of performing 2,700 miles

<sup>13</sup> Case 13-E-0117, New York State Electric & Gas Corporation - Petition for Authorization to Implement Full Cycle Distribution Vegetation Management, Order Denying Petition and Establishing Further Procedures (issued October 1, 2013).

of distribution clearing in 2014, achieving an actual total of 2,850 miles. In addition, the Company also met its targeted spending level of \$20 million for 2014. NYSEG will continue to focus on its distribution vegetation management efforts with the goal of long-term reductions in tree related interruptions.

#### ROCHESTER GAS AND ELECTRIC

**Table 4: RG&E's Historic Performance Excluding Major Storms**

<b>Performance Metric</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>Current RPM Target</b>	<b>5-Year Average</b>
Frequency (SAIFI)	0.69	0.87	0.74	0.73	0.76	0.90	0.76
Duration (CAIDI)	1.71	1.85	1.79	1.82	1.74	1.90	1.78

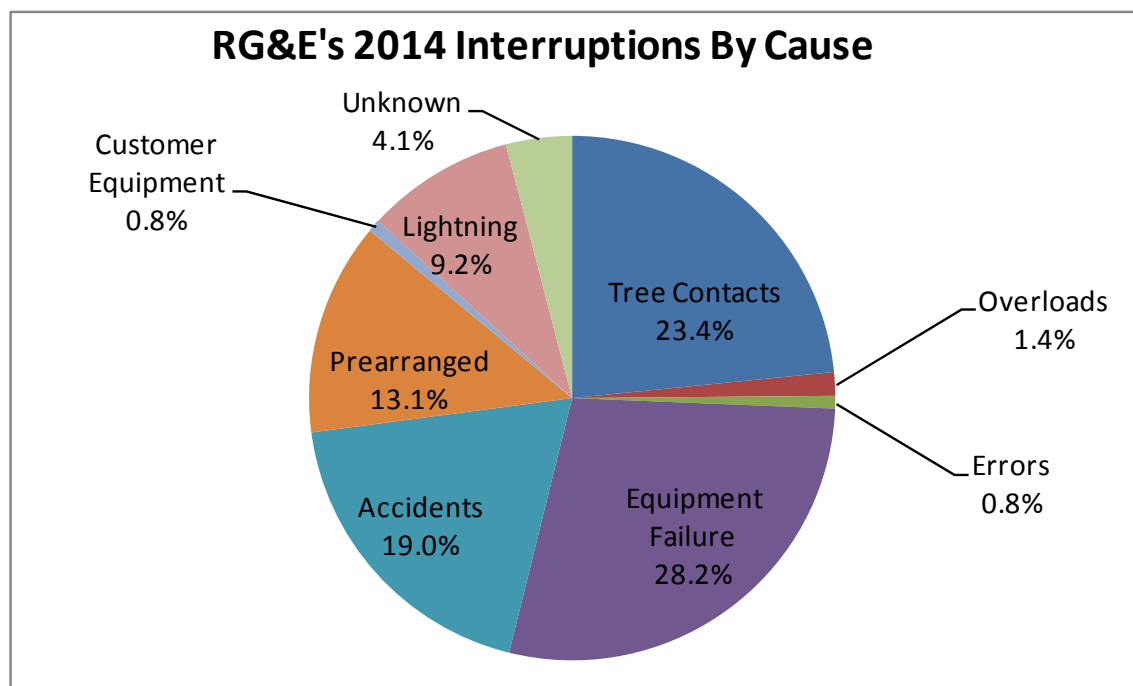
RG&E serves approximately 369,000 customers over its franchise area. The Company's territory is comprised of four service divisions: Canandaigua, Genesee Valley, Lakeshore, and Rochester, with the Rochester Division accounting for approximately 80% of its customer base. Consequently, RG&E's system-wide reliability statistics generally reflect those of the Rochester Division.

For the past five years, RG&E has consistently maintained high levels of electric service reliability to its customers for both frequency and duration. In 2014, RG&E outperformed its corporate RPM targets of 0.90 for frequency and 1.90 for duration that were established in its most recent rate order. While RG&E met its reliability targets at the corporate level in 2014, only two of its four divisions, Rochester and Genesee, satisfied both the frequency and duration goals at the division level. The Genesee Division's duration improved over 30% from 2013 and is better than the five-year average.

The Lakeshore Division's duration was also better than the five-year average, showing an improvement of 35% over 2013. The division, however, missed its frequency goal primarily due to accidents and tree contacts. The Canandaigua Division met its frequency goal, but missed its duration goal. The division's duration goal was exceeded by outages caused by lightning followed by accidents. Corrective actions to

improve reliability performance in the Lakeshore and Canandaigua Divisions include tree trimming and more effective crew management.

Overall, the three major causes for interruptions throughout RG&E's service divisions were equipment failures, tree contacts, and accidents as shown in Figure 7. With regard to tree interruptions, RG&E will continue trimming distribution and transmission lines for hot spot and maintenance clearing. At the end of fiscal year 2015, RG&E is expected to have completed the last year of their first 5-year tree trimming cycle. Tree interruptions should continue to decline as the last remaining circuits are trimmed this year and the first year of the next 5-year cycle starts up in 2016. With regard to equipment failures, RG&E continues to thermographically inspect equipment on an as needed basis; if equipment failures continue to increase RG&E might need to implement a yearly thermographic inspection cycle program. The Company continues to review accident incidents to determine if changes or modifications to their systems can help mitigate accident-related outages.



**Figure 7: RG&E's 2014 Interruptions by Cause  
(Excluding Major Storms)**

CENTRAL HUDSON GAS AND ELECTRIC**Table 5: Central Hudson's Historic Performance Excluding Major Storms**

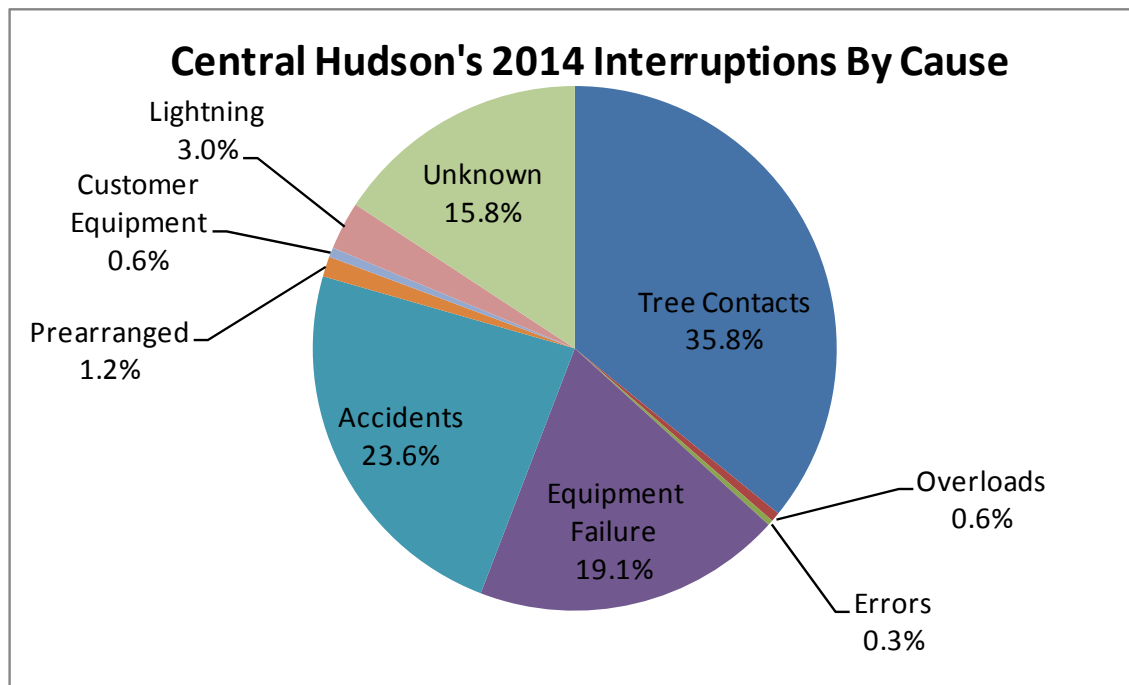
<b>Performance Metric</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>Current RPM Target</b>	<b>5-Year Average</b>
Frequency (SAIFI)	1.27	1.20	1.00	1.02	1.24	1.45	1.15
Duration (CAIDI)	2.42	2.26	2.38	2.30	2.27	2.50	2.33

Central Hudson serves approximately 300,000 customers in parts of the Hudson Valley Region. The operating divisions of Central Hudson are Catskill, Fishkill, Kingston, Newburgh, and Poughkeepsie. About 70% of Central Hudson's territory is within the Kingston, Newburgh, and Poughkeepsie Divisions.

In 2014, Central Hudson met its corporate RPM targets for both frequency and duration. Central Hudson's frequency performance of 1.24 in 2014 is in line with the 2010 and 2011 performance but worse than the performance in 2012 and 2013. The Company attributes this to two events that occurred when the system lacked its normal redundancy due to scheduled maintenance or capital work. Excluding these events from the statistics does not indicate any adverse trends. Central Hudson's duration performance in 2014 was 2.27, which is better than 2013 and the five-year average.

On a divisional level, the Fishkill, Poughkeepsie, and Newburgh Operating Divisions all had frequency indices which were better than their established goal of 1.20, while the Catskill and Kingston Operating Divisions had frequency indices over their goal of 1.00. The Catskill Division exceeded its frequency target by 61%, because of one transmission outage affecting approximately 22,000 customers for 3 hours. At the time of the outage the line was carrying more customers than normal due to maintenance on another line in the loop. The Catskill Division's frequency index would be 0.98 or 20% lower than the five-year average if the transmission outage were excluded. This outage also contributed approximately 5% to the corporate frequency index. The Kingston Division exceeded its frequency target by 76%, mainly due to tree contacts. Eight Kingston circuits are scheduled for trimming in 2015 along with five circuits carried over from the 2014 schedule. These circuits serve over 14,000 customers or approximately 23% of the district's total customer count. The scheduled trimming is expected to

significantly improve the tree related frequency index in the district. The Poughkeepsie Division met its duration target in 2014; the remaining four operating divisions had duration performances that were worse than their established individual district targets.



**Figure 8: Central Hudson's 2014 Interruptions by Cause  
(Excluding Major Storms)**

The pie chart shows that the majority of interruptions are caused by tree contacts. Tree contacts were 3% higher in 2014 compared to 2013 and 6% higher than the five-year average. The largest contributors to tree contact interruptions were limbs and trees outside the clearance zone; diseases affecting trees; and weather conditions such as rain, wind, and/or lightning. Tree interruptions have historically been the greatest driver of Central Hudson's electric service reliability. Over the past five years, tree contacts have accounted for approximately 39% of Central Hudson's non-storm interruptions. It is important to note, however, that the overall number of incidents involving trees has shown a decreasing trend since Central Hudson's adoption of improved vegetation management programs. Outages as a result of vehicle accidents and animal contacts increased compared to 2013. Central Hudson continues to install electronic reclosers so fewer customers would be impacted as a result of interruptions

caused by animal contacts. While equipment failures increased by 59% compared to 2013, this can be attributed to several one-time events discussed earlier. Central Hudson has been working on multiple programs and projects to increase its reliability performance. Among these projects are integration of remote communication for automatic load transfer switches, switched capacitors, breaker replacement, 14.4kV cable replacement, and distribution line infrared surveys of the three-phase mainline.

### ORANGE & ROCKLAND

**Table 6: O&R's Historic Performance Excluding Major Storms**

<b>Performance Metric</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>Current RPM Target</b>	<b>5-Year Average</b>
Frequency (SAIFI)	1.21	0.97	0.94	0.89	1.08	1.20	1.02
Duration (CAIDI)	<b>1.79</b>	1.61	1.68	1.62	1.62	1.85	1.66

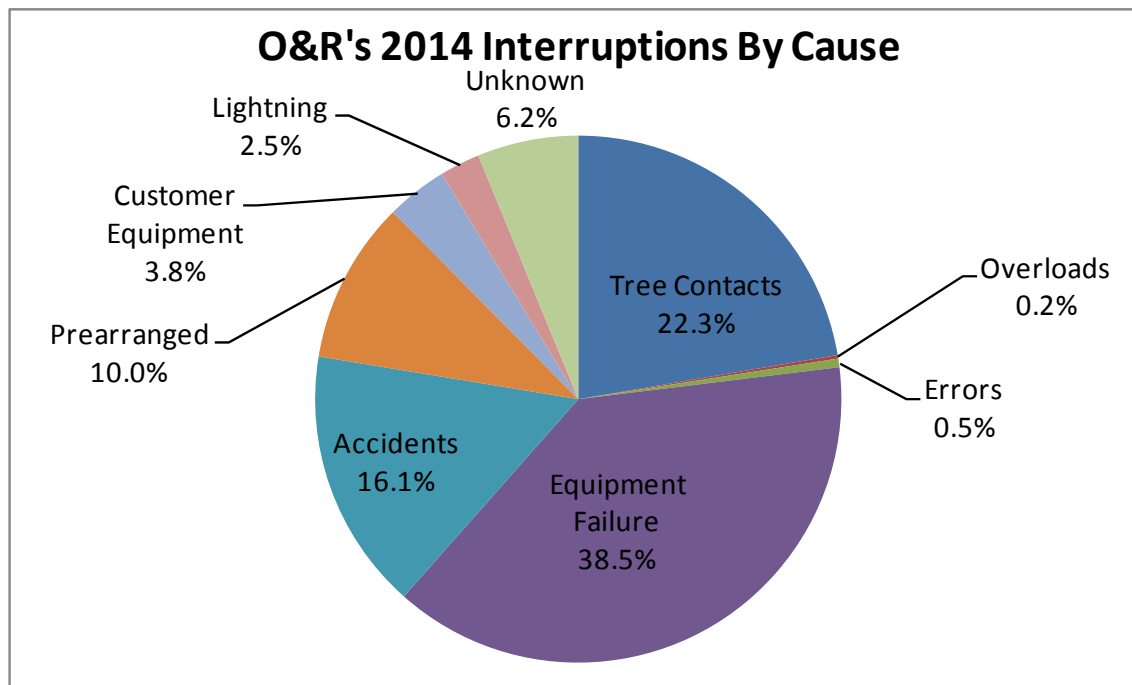
Note: Data presented in red represents a failure to meet the RPM target for a given year.

Orange & Rockland serves approximately 221,000 customers in three New York counties along the New Jersey and Pennsylvania border. In 2014, the Company's frequency performance was above the five-year average, but below the standard requirement. The Company's duration improved from 2013 and is better than the five-year average. On a divisional basis, all three divisions performed better than the service standards in both frequency and duration. In 2014, Orange & Rockland performed better than its RPM reliability targets of 1.20 for frequency and 1.85 for duration.

As shown in Figure 10, equipment failures and tree contacts were the major causes of interruptions. Interruptions due to equipment failure have increased over the past two years. The Company addresses reliability issues resulting from equipment failures through capital improvement/resiliency programs, such as cable replacement, distribution pole replacement programs, and upgrading and installing new substations. The goal of the Company's infrastructure improvement projects and service reliability programs is to decrease the frequency of interruptions by focusing on reducing and minimizing the large customer count interruptions. In addition to replacing aging equipment, any new or upgraded substation includes additional resiliency and reliability



characteristics, such as staggered circuit configurations and the use of spacer cables at substation exits. These improvements come from lessons learned in the aftermath of storms, such as Sandy and Irene.



**Figure 10: Orange & Rockland's 2014 Interruptions by Cause  
(Excluding Major Storms)**

With regard to tree contacts, the second leading cause of interruptions, the Company continues to have a comprehensive vegetation management/tree trimming program completed on a four year cycle. The number of tree interruptions increased slightly in 2014; however, the overall trend is decreasing. The Company has recently begun expanding the clearance standard for mainline conductors from the substation to the circuit's first mainline protective device. Over time, enhanced vegetation management efforts are expected to help reduce the number of tree related interruptions and impact on customers.

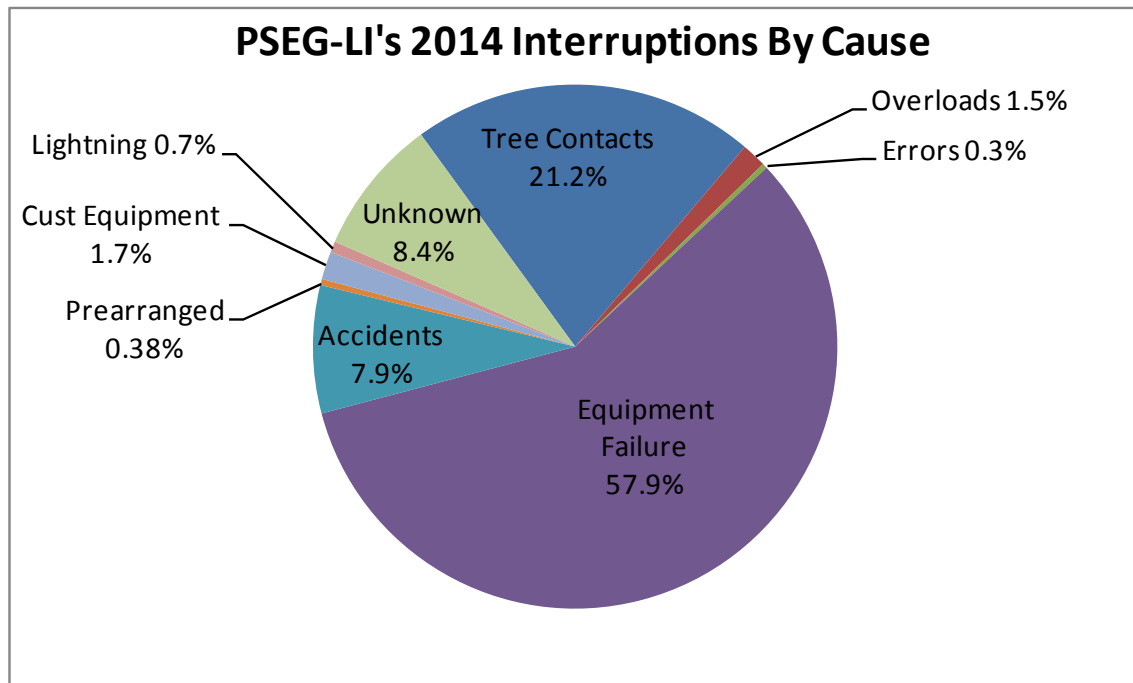
PSEG-LI**Table 7: PSEG-LI's Historic Performance Excluding Major Storms**

<b>Performance Metric</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>Current RPM Target</b>	<b>5-Year Average</b>
Frequency (SAIFI)	0.73	0.75	0.67	0.71	0.72	0.90	0.72
Duration (CAIDI)	1.11	1.14	1.26	1.13	1.36	1.40	1.20

PSEG-LI serves approximately 1,110,000 customers on Long Island. The utility's territory includes Nassau County, Suffolk County, and the Rockaway Peninsula. PSEG-LI began operating and maintaining the electric system on Long Island on January 1, 2014. Prior to PSEG-LI, National Grid was operating the system and it supplied interruption data to the Department to assist in its statewide analysis.

In 2014, the Company's frequency of interruptions was 0.72, which is the same as the five-year average. The leading causes of interruptions are equipment failures, tree contacts, and accidents. The duration performance of PSEG-LI in 2014 was 1.36 hours, which is 20% higher than it was in 2013. PSEG-LI has been tracking interruption data using an outage management system (OMS) that was put into service last summer. The OMS should provide system operators and repair crews with more specific and actionable information to manage outages and restorations resulting in improved duration performance. Unlike the other utilities, PSEG-LI does not have rate orders or RPMs set

by the Commission. Instead, performance metrics were set as part of an Operating Service Agreement (OSA). The frequency and duration performance of 0.72 and 1.36, respectively, are still under review for 2014.



**Figure 12: PSEG-LI's 2014 Interruptions by Cause  
(Excluding Major Storms)**

As is the case with most overhead distribution utilities, equipment failures and trees are the major causes of outages. PSEG-LI, however, has a larger percentage of equipment failures than the upstate distribution utilities. With respect to equipment failures, PSEG-LI is developing reliability centered maintenance practices for all asset classes. The maintenance program will aid in directing maintenance dollars to areas or projects that will improve reliability and benefit the most customers. Additional corrective actions to improve restoration times center on minimizing affected customers when prearranged outages are necessary and accurate record keeping related to closing out jobs. Beginning in 2014, PSEG-LI has a new tree trimming program with the focus on improving distribution vegetation management and reducing tree related outages. Changes include trimming all distribution circuits on a four year cycle instead of the current three, five, or seven year cycle based on circuit type and expanding the “trim box” or the clearance around the wires.

PSEG-LI will soon begin a series of storm hardening and resiliency projects under a \$730 million FEMA grant awarded to LIPA. The projects are intended to improve system resilience and mitigate the impact of future storms. The incremental

capital expenditures are projected to take place through 2019. The projects includes elevating substations, hardening transmission lines, installation of Automatic Sectionalizing Units, and hardening mainline distribution circuits. Similar to the Con Edison discussion, storm hardening projects are meant to protect the electric system from major storms and improvements in reliability performance may be nominal.

# The 2014 Interruption Report

Office of Electric, Gas, and Water  
June 2015

**ATTACHMENT**  
**Definitions and Explanations of Terms Used in The**  
**Statewide Electric Service Interruption Report**

**Interruption** is the loss of service for five minutes or more.

**Customer Hours** is the time a customer is without electric service.

**Customers Affected** is the number of customers without electric service.

**Customer Served** is the number of customers as of the last day of the current year. For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.

**Frequency (SAIFI)** measures the average number of interruptions experienced by customers served by the utility. It is the customers affected divided by the customers served at the end of the previous year.

**Duration (CAIDI)** measures the average time that an affected customer is out of electric service. It is the customer hours divided by the customers affected.

**Availability (SAIDI)** is the average amount of time a customer is out of service during a year. It is the customer hours divided by the number of customers served at the end of the year. Mathematically it is SAIFI multiplied by CAIDI.

**Interruptions per 1,000 Customers Served** is the number of interruptions divided by the number of customers served at the end of the previous year, divided by 1,000.

**Major Storm** is defined as any storm which causes service interruptions of at least ten percent of customers in an operating area, or if the interruptions last for 24 hours or more.

**Operating Area** is the geographical subdivision of each electric utilities franchise territory. These are also called regions, divisions, or districts.

Most of the data is presented in two ways, with major storms included and major storms excluded. Major storms tend to distort a utility's performance trend. Tables and graphs that exclude major storms illustrate interruptions that are under a utility's control. It portrays a utility's system facilities under normal conditions, although this can be misleading because interruptions during "normal" bad weather are included and it is difficult to analyze from year to year.

The first two tables show frequency and duration indices for the last five years for each utility and Statewide with and without Con Edison data. Much of the Con Edison distribution system consists of a secondary network. In a secondary network, a customer is fed multiple supplies, significantly reducing the probability of interruptions.

**COMPARISON OF SERVICE RELIABILITY INDICES  
(EXCLUDING MAJOR STORMS)**

	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>5 YR AVG</b>
<b>CHGE</b>						
FREQUENCY	1.27	1.20	1.00	1.02	1.24	1.15
DURATION	2.42	2.26	2.38	2.30	2.27	2.33
<b>CONED</b>						
FREQUENCY	0.13	0.15	0.10	0.12	0.11	0.12
DURATION	2.57	2.71	2.39	2.67	3.02	2.67
<b>PSEG-LI</b>						
FREQUENCY	0.73	0.75	0.67	0.71	0.72	0.72
DURATION	1.11	1.14	1.26	1.13	1.36	1.20
<b>NAT GRID</b>						
FREQUENCY	0.80	0.98	0.90	0.99	0.96	0.92
DURATION	1.98	1.95	2.04	1.96	1.94	1.97
<b>NYSEG</b>						
FREQUENCY	1.14	1.20	0.98	1.10	1.03	1.09
DURATION	1.98	2.07	2.00	1.93	1.97	1.99
<b>O&amp;R</b>						
FREQUENCY	1.21	0.97	0.94	0.89	1.08	1.02
DURATION	1.79	1.61	1.68	1.62	1.62	1.66
<b>RG&amp;E</b>						
FREQUENCY	0.69	0.87	0.74	0.73	0.76	0.76
DURATION	1.71	1.85	1.79	1.82	1.74	1.78
<b>STATEWIDE (WITHOUT CONED)</b>						
FREQUENCY	0.89	0.97	0.85	0.92	0.92	0.91
DURATION	1.82	1.82	1.87	1.79	1.83	1.82
<b>STATEWIDE (WITH CONED)</b>						
FREQUENCY	0.57	0.62	0.53	0.57	0.57	0.57
DURATION	1.89	1.91	1.91	1.87	1.93	1.90

\*\* Customer Served is the number of customers as of the last day of the current year.  
For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.

**COMPARISON OF SERVICE RELIABILITY INDICES  
(INCLUDING MAJOR STORMS)**

	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>5 YR AVG</b>
<b>CHGE</b>						
FREQUENCY	2.61	2.71	1.80	1.06	1.62	1.96
DURATION	10.94	15.95	8.55	2.36	3.74	8.31
<b>CONED</b>						
FREQUENCY	0.23	0.26	0.38	0.13	0.11	0.22
DURATION	15.05	15.45	71.91	2.71	3.09	21.64
<b>PSEG-LI</b>						
FREQUENCY	1.04	1.36	1.84	0.89	0.76	1.18
DURATION	1.84	9.69	22.55	1.65	1.42	7.43
<b>NAT GRID</b>						
FREQUENCY	0.98	1.48	1.13	1.39	1.17	1.23
DURATION	2.46	5.03	2.67	3.61	2.87	3.33
<b>NYSEG</b>						
FREQUENCY	1.84	2.44	1.85	1.41	1.34	1.78
DURATION	4.09	9.86	12.63	2.34	2.97	6.38
<b>O&amp;R</b>						
FREQUENCY	1.79	2.12	1.86	1.02	1.19	1.60
DURATION	4.76	15.32	34.66	2.06	2.40	11.84
<b>RG&amp;E</b>						
FREQUENCY	0.77	1.05	0.92	0.91	0.85	0.90
DURATION	2.18	1.99	3.01	2.75	2.32	2.45
<b>STATEWIDE (WITHOUT CONED)</b>						
FREQUENCY	1.29	1.72	1.51	1.19	1.10	1.36
DURATION	4.09	8.92	13.52	2.76	2.67	6.39
<b>STATEWIDE (WITH CONED)</b>						
FREQUENCY	0.84	1.10	1.03	0.73	0.68	0.88
DURATION	5.35	9.58	22.70	2.75	2.70	8.62

\*\* Customer Served is the number of customers as of the last day of the current year.  
For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.



**STATEWIDE (WITHOUT CON ED)**

Excluding Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	54,310	53,557	49,827	52,863	53,723	52,856
Number of Customer-Hours	7,197,156	7,868,243	7,086,646	7,321,410	7,535,840	7,401,859
Number of Customers Affected	3,962,829	4,319,688	3,799,744	4,090,130	4,117,993	4,058,077
Number of Customers Served	4,447,050	4,452,075	4,468,023	4,466,568	4,480,215	4,462,786
Average Duration Per Customer Affected (CAIDI)	1.82	1.82	1.87	1.79	1.83	1.82
Average Duration Per Customers Served (SAIDI)	1.62	1.77	1.59	1.64	1.69	1.66
Interruptions Per 1000 Customers Served	12.21	12.04	11.19	11.83	12.03	11.86
Number of Customers Affected Per Customer Served (SAIFI)	0.89	0.97	0.85	0.92	0.92	0.91

**STATEWIDE (WITH CON ED)**

Excluding Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	68,221	68,719	60,526	66,804	69,761	66,806
Number of Customer-Hours	8,284,480	9,195,778	7,914,335	8,380,016	8,622,433	8,479,408
Number of Customers Affected	4,385,672	4,809,183	4,145,730	4,487,270	4,477,702	4,461,111
Number of Customers Served	7,738,793	7,772,888	7,806,754	7,815,448	7,842,402	7,795,257
Average Duration Per Customer Affected (CAIDI)	1.89	1.91	1.91	1.87	1.93	1.90
Average Duration Per Customers Served (SAIDI)	1.07	1.19	1.02	1.07	1.10	1.09
Interruptions Per 1000 Customers Served	8.84	8.88	7.79	8.56	8.93	8.60
Number of Customers Affected Per Customer Served (SAIFI)	0.57	0.62	0.53	0.57	0.57	0.57

\*\* Customer Served is the number of customers as of the last day of the current year.

For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.

**STATEWIDE (WITHOUT CON ED)**

Including Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	72,135	97,586	88,800	63,885	62,009	76,883
Number of Customer-Hours	23,466,391	68,027,851	90,905,843	14,653,454	13,143,565	42,039,421
Number of Customers Affected	5,741,806	7,630,118	6,721,953	5,315,365	4,930,250	6,067,898
Number of Customers Served	4,447,050	4,452,075	4,468,023	4,466,568	4,480,215	4,462,786
Average Duration Per Customer Affected (CAIDI)	4.09	8.92	13.52	2.76	2.67	6.39
Average Duration Per Customers Served (SAIDI)	5.28	15.30	20.42	3.28	2.94	9.44
Interruptions Per 1000 Customers Served	16.22	21.94	19.95	14.30	13.88	17.26
Number of Customers Affected Per Customer Served (SAIFI)	1.29	1.72	1.51	1.19	1.10	1.36

**STATEWIDE (WITH CON ED)**

Including Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	91,471	120,005	116,263	78,024	78,437	96,840
Number of Customer-Hours	34,693,862	81,434,151	181,026,042	15,785,340	14,299,036	65,447,686
Number of Customers Affected	6,487,588	8,498,092	7,975,227	5,732,710	5,303,933	6,799,510
Number of Customers Served	7,738,793	7,772,888	7,806,754	7,815,448	7,842,402	7,795,257
Average Duration Per Customer Affected (CAIDI)	5.35	9.58	22.70	2.75	2.70	8.62
Average Duration Per Customers Served (SAIDI)	4.49	10.52	23.29	2.02	1.82	8.43
Interruptions Per 1000 Customers Served	11.85	15.51	14.96	9.99	10.04	12.47
Number of Customers Affected Per Customer Served (SAIFI)	0.84	1.10	1.03	0.73	0.68	0.88

\*\* Customer Served is the number of customers as of the last day of the current year.

For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.

**CENTRAL HUDSON**

Excluding Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	7,762	6,293	5,566	5,497	6,608	6,345
Number of Customer-Hours	922,392	814,052	716,105	708,055	844,753	801,071
Number of Customers Affected	380,489	359,769	301,232	307,889	371,442	344,164
Number of Customers Served	299,557	299,971	300,537	299,591	300,225	299,976
Average Duration Per Customer Affected (CAIDI)	2.42	2.26	2.38	2.30	2.27	2.33
Average Duration Per Customers Served (SAIDI)	3.07	2.72	2.39	2.36	2.82	2.67
Interruptions Per 1000 Customers Served	25.82	21.01	18.56	18.29	22.06	21.15
Number of Customers Affected Per Customer Served (SAIFI)	1.27	1.20	1.00	1.02	1.24	1.15

**CENTRAL HUDSON**

Including Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	11,994	12,076	8,603	5,665	8,160	9,300
Number of Customer-Hours	8,597,567	12,930,372	4,620,086	751,644	1,810,447	5,742,023
Number of Customers Affected	785,806	810,464	540,447	318,352	483,848	587,783
Number of Customers Served	299,557	299,971	300,537	299,591	300,225	299,976
Average Duration Per Customer Affected (CAIDI)	10.94	15.95	8.55	2.36	3.74	8.31
Average Duration Per Customers Served (SAIDI)	28.60	43.16	15.40	2.50	6.04	19.14
Interruptions Per 1000 Customers Served	39.90	40.31	28.68	18.85	27.24	31.00
Number of Customers Affected Per Customer Served (SAIFI)	2.61	2.71	1.80	1.06	1.62	1.96

\*\* Customer Served is the number of customers as of the last day of the current year.

For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.

**CON ED (SYSTEM)**

Excluding Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	13,911	15,162	10,699	13,941	16,038	13,950
Number of Customer-Hours	1,087,325	1,327,534	827,689	1,058,605	1,086,594	1,077,549
Number of Customers Affected	422,843	489,495	345,986	397,140	359,709	403,035
Number of Customers Served	3,291,743	3,320,813	3,338,731	3,348,880	3,362,187	3,332,471
Average Duration Per Customer Affected (CAIDI)	2.57	2.71	2.39	2.67	3.02	2.67
Average Duration Per Customers Served (SAIDI)	0.33	0.40	0.25	0.32	0.32	0.33
Interruptions Per 1000 Customers Served	4.25	4.61	3.22	4.18	4.79	4.21
Number of Customers Affected Per Customer Served (SAIFI)	0.13	0.15	0.10	0.12	0.11	0.12

**CON ED (SYSTEM)**

Including Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	19,336	22,419	27,463	14,139	16,428	19,957
Number of Customer-Hours	11,227,471	13,406,300	90,120,199	1,131,886	1,155,472	23,408,266
Number of Customers Affected	745,782	867,974	1,253,274	417,345	373,683	731,612
Number of Customers Served	3,291,743	3,320,813	3,338,731	3,348,880	3,362,187	3,332,471
Average Duration Per Customer Affected (CAIDI)	15.05	15.45	71.91	2.71	3.09	21.64
Average Duration Per Customers Served (SAIDI)	3.43	4.07	27.14	0.34	0.35	7.07
Interruptions Per 1000 Customers Served	5.91	6.81	8.27	4.23	4.91	6.03
Number of Customers Affected Per Customer Served (SAIFI)	0.23	0.26	0.38	0.13	0.11	0.22

**CON ED (NETWORK)**

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	7,434	8,151	4,758	7,574	10,085	7,600
Number of Customer-Hours	370,405	419,830	187,740	348,433	543,202	373,922
Number of Customers Affected	54,555	61,450	29,645	45,294	63,019	50,793
Number of Customers Served	2,403,818	2,439,565	2,454,427	2,461,468	2,473,101	2,446,476
Average Duration Per Customer Affected (CAIDI)	6.79	6.83	6.33	7.69	8.62	7.25
Average Duration Per Customers Served (SAIDI)	0.16	0.17	0.08	0.14	0.22	0.15
Interruptions Per 1000 Customers Served	3.12	3.39	1.95	3.09	4.10	3.13
Number of Customers Affected Per Customer Served (SAIFI)	0.023	0.026	0.012	0.018	0.026	0.021

\*\* Customer Served is the number of customers as of the last day of the current year.

For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.

**CON ED (RADIAL)**

Excluding Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	6,477	7,011	5,941	6,367	5,953	6,350
Number of Customer-Hours	716,920	907,704	639,949	710,172	543,391	703,627
Number of Customers Affected	368,288	428,045	316,341	351,846	296,690	352,242
Number of Customers Served	887,925	881,248	884,304	887,412	889,086	885,995
Average Duration Per Customer Affected (CAIDI)	1.95	2.12	2.02	2.02	1.83	1.99
Average Duration Per Customers Served (SAIDI)	0.81	1.02	0.73	0.80	0.61	0.79
Interruptions Per 1000 Customers Served	7.31	7.90	6.74	7.20	6.71	7.17
Number of Customers Affected Per Customer Served (SAIFI)	0.42	0.48	0.36	0.40	0.33	0.40

**CON ED (RADIAL)**

Including Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	11,902	14,268	22,705	6,565	6,343	12,357
Number of Customer-Hours	10,857,066	12,986,469	89,932,459	783,453	612,270	23,034,343
Number of Customers Affected	691,227	806,524	1,223,629	372,051	310,664	680,819
Number of Customers Served	887,925	881,248	884,304	887,412	889,086	885,995
Average Duration Per Customer Affected (CAIDI)	15.71	16.10	73.50	2.11	1.97	21.88
Average Duration Per Customers Served (SAIDI)	12.25	14.63	102.05	0.89	0.69	26.10
Interruptions Per 1000 Customers Served	13.43	16.07	25.76	7.42	7.15	13.97
Number of Customers Affected Per Customer Served (SAIFI)	0.78	0.91	1.39	0.42	0.35	0.77

\*\* Customer Served is the number of customers as of the last day of the current year.

For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.

**NATIONAL GRID**

Excluding Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	13,822	14,442	13,506	14,160	13,271	13,840
Number of Customer-Hours	2,529,126	3,048,983	2,926,731	3,102,175	2,979,765	2,917,356
Number of Customers Affected	1,277,727	1,564,208	1,434,256	1,585,651	1,537,355	1,479,839
Number of Customers Served	1,595,037	1,601,552	1,603,982	1,607,502	1,608,164	1,603,247
Average Duration Per Customer Affected (CAIDI)	1.98	1.95	2.04	1.96	1.94	1.97
Average Duration Per Customers Served (SAIDI)	1.59	1.91	1.83	1.93	1.85	1.82
Interruptions Per 1000 Customers Served	8.69	9.05	8.43	8.83	8.26	8.65
Number of Customers Affected Per Customer Served (SAIFI)	0.80	0.98	0.90	0.99	0.96	0.92

**NATIONAL GRID**

Including Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	15,571	20,881	16,440	19,069	16,377	17,668
Number of Customer-Hours	3,824,438	11,882,312	4,811,549	8,047,050	5,374,356	6,787,941
Number of Customers Affected	1,553,727	2,363,763	1,804,502	2,232,186	1,874,011	1,965,638
Number of Customers Served	1,595,037	1,601,552	1,603,982	1,607,502	1,608,164	1,603,247
Average Duration Per Customer Affected (CAIDI)	2.46	5.03	2.67	3.61	2.87	3.33
Average Duration Per Customers Served (SAIDI)	2.41	7.45	3.00	5.02	3.34	4.24
Interruptions Per 1000 Customers Served	9.79	13.09	10.27	11.89	10.19	11.05
Number of Customers Affected Per Customer Served (SAIFI)	0.98	1.48	1.13	1.39	1.17	1.23

\*\* Customer Served is the number of customers as of the last day of the current year.

For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.

**NYSEG**

Excluding Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	9,777	10,272	9,424	10,022	9,925	9,884
Number of Customer-Hours	1,934,747	2,127,891	1,675,701	1,814,646	1,738,911	1,858,379
Number of Customers Affected	975,375	1,028,868	839,427	940,750	884,683	933,821
Number of Customers Served	856,474	854,682	858,396	855,347	867,392	858,458
Average Duration Per Customer Affected (CAIDI)	1.98	2.07	2.00	1.93	1.97	1.99
Average Duration Per Customers Served (SAIDI)	2.25	2.48	1.96	2.11	2.03	2.16
Interruptions Per 1000 Customers Served	11.39	11.99	11.03	11.68	11.60	11.51
Number of Customers Affected Per Customer Served (SAIFI)	1.14	1.20	0.98	1.10	1.03	1.09

**NYSEG**

Including Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	14,976	19,743	17,850	11,729	12,332	15,326
Number of Customer-Hours	6,445,599	20,636,612	19,975,449	2,830,224	3,391,684	10,655,914
Number of Customers Affected	1,576,105	2,093,127	1,581,500	1,210,993	1,143,341	1,521,013
Number of Customers Served	856,474	854,682	858,396	855,347	867,392	858,458
Average Duration Per Customer Affected (CAIDI)	4.09	9.86	12.63	2.34	2.97	6.38
Average Duration Per Customers Served (SAIDI)	7.51	24.09	23.37	3.30	3.97	12.45
Interruptions Per 1000 Customers Served	17.44	23.05	20.88	13.66	14.42	17.89
Number of Customers Affected Per Customer Served (SAIFI)	1.84	2.44	1.85	1.41	1.34	1.78

\*\* Customer Served is the number of customers as of the last day of the current year.

For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.

**PSEG-LI**

Excluding Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	17,180	16,767	15,625	17,672	17,721	16,993
Number of Customer-Hours	905,031	959,212	945,305	890,558	1,096,861	959,393
Number of Customers Affected	811,969	842,816	752,311	791,039	805,693	800,766
Number of Customers Served	1,117,281	1,115,815	1,118,610	1,115,781	1,113,474	1,116,192
Average Duration Per Customer Affected (CAIDI)	1.11	1.14	1.26	1.13	1.36	1.20
Average Duration Per Customers Served (SAIDI)	0.81	0.86	0.85	0.80	0.98	0.86
Interruptions Per 1000 Customers Served	15.41	15.01	14.00	15.80	15.88	15.22
Number of Customers Affected Per Customer Served (SAIFI)	0.73	0.75	0.67	0.71	0.72	0.72

**PSEG-LI**

Including Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	22,867	37,368	39,026	21,401	18,586	27,850
Number of Customer-Hours	2,125,507	14,715,268	46,371,469	1,648,627	1,210,714	13,214,317
Number of Customers Affected	1,153,884	1,519,331	2,056,428	997,229	853,209	1,316,016
Number of Customers Served	1,117,281	1,115,815	1,118,610	1,115,781	1,113,474	1,116,192
Average Duration Per Customer Affected (CAIDI)	1.84	9.69	22.55	1.65	1.42	7.43
Average Duration Per Customers Served (SAIDI)	1.91	13.17	41.56	1.47	1.09	11.84
Interruptions Per 1000 Customers Served	20.51	33.45	34.98	19.13	16.66	24.94
Number of Customers Affected Per Customer Served (SAIFI)	1.04	1.36	1.84	0.89	0.76	1.18

\*\* Customer Served is the number of customers as of the last day of the current year.

For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.



**O&R**

Excluding Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	2,897	2,661	2,652	2,449	3,226	2,777
Number of Customer-Hours	472,939	338,760	347,689	316,486	387,054	372,585
Number of Customers Affected	263,752	211,048	206,798	195,880	238,230	223,142
Number of Customers Served	218,545	219,385	220,129	220,813	221,579	220,090
Average Duration Per Customer Affected (CAIDI)	1.79	1.61	1.68	1.62	1.62	1.66
Average Duration Per Customers Served (SAIDI)	2.17	1.55	1.58	1.44	1.75	1.70
Interruptions Per 1000 Customers Served	13.29	12.18	12.09	11.13	14.61	12.66
Number of Customers Affected Per Customer Served (SAIFI)	1.21	0.97	0.94	0.89	1.08	1.02

**O&R**

Including Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	3,646	4,223	3,326	2,570	3,398	3,433
Number of Customer-Hours	1,857,491	7,106,724	14,130,288	460,209	633,345	4,837,611
Number of Customers Affected	389,937	463,940	407,678	223,754	263,634	349,789
Number of Customers Served	218,545	219,385	220,129	220,813	221,579	220,090
Average Duration Per Customer Affected (CAIDI)	4.76	15.32	34.66	2.06	2.40	11.84
Average Duration Per Customers Served (SAIDI)	8.52	32.52	64.41	2.09	2.87	22.08
Interruptions Per 1000 Customers Served	16.72	19.32	15.16	11.67	15.39	15.65
Number of Customers Affected Per Customer Served (SAIFI)	1.79	2.12	1.86	1.02	1.19	1.60

\*\* Customer Served is the number of customers as of the last day of the current year.

For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.

**RG&E**

Excluding Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	2,872	3,122	3,054	3,063	2,972	3,017
Number of Customer-Hours	432,921	579,346	475,116	489,490	488,496	493,074
Number of Customers Affected	253,517	312,979	265,720	268,921	280,590	276,345
Number of Customers Served	360,156	360,670	366,369	367,534	369,381	364,822
Average Duration Per Customer Affected (CAIDI)	1.71	1.85	1.79	1.82	1.74	1.78
Average Duration Per Customers Served (SAIDI)	1.18	1.61	1.32	1.34	1.33	1.36
Interruptions Per 1000 Customers Served	7.86	8.67	8.47	8.36	8.09	8.29
Number of Customers Affected Per Customer Served (SAIFI)	0.69	0.87	0.74	0.73	0.76	0.76

**RG&E**

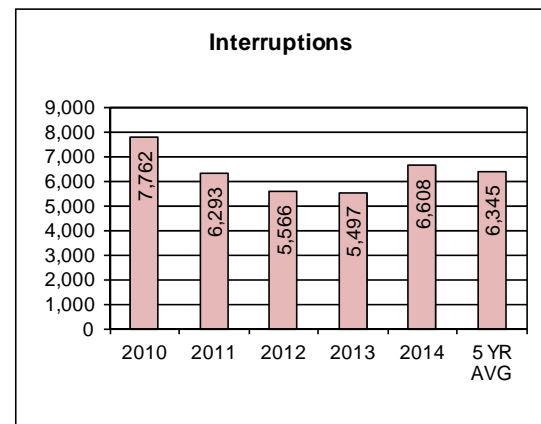
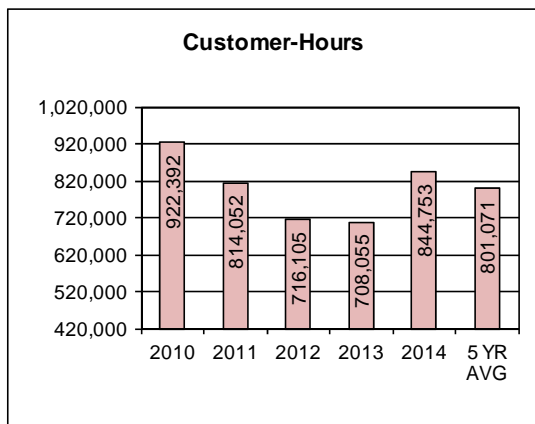
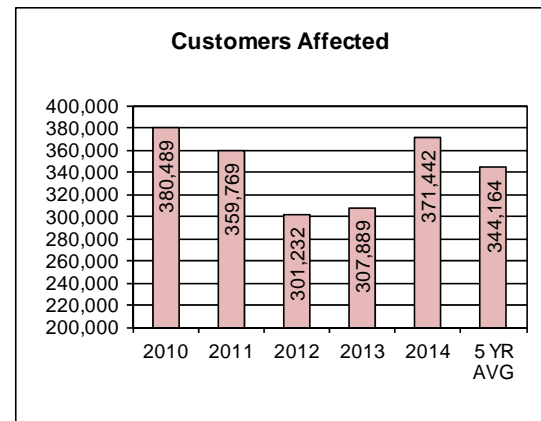
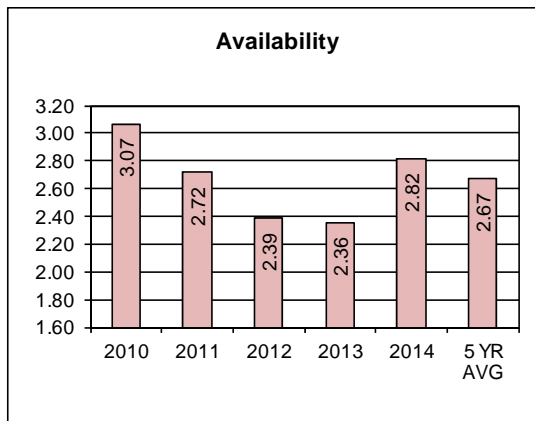
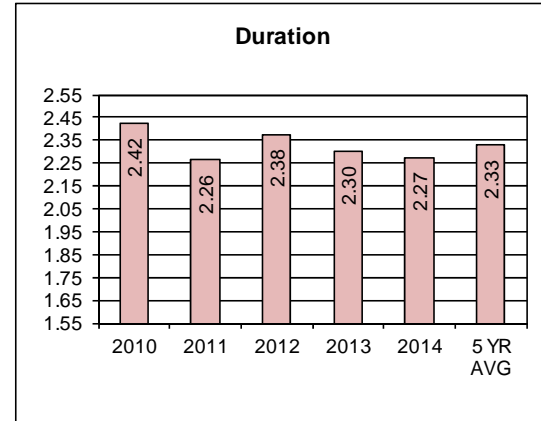
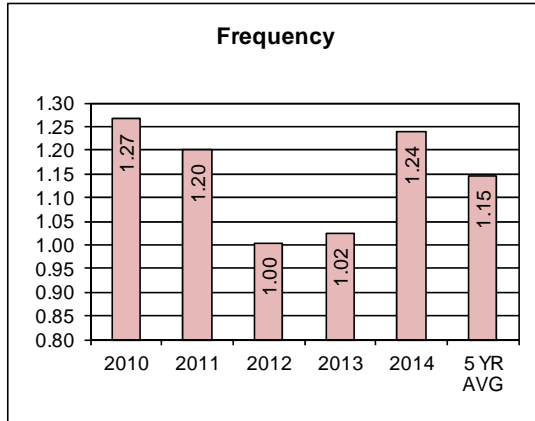
Including Major Storms

	2010	2011	2012	2013	2014	5 YR AVG
Number of Interruptions	3,081	3,295	3,555	3,451	3,156	3,308
Number of Customer-Hours	615,789	756,563	997,001	915,700	723,019	801,614
Number of Customers Affected	282,347	379,493	331,398	332,851	312,207	327,659
Number of Customers Served	360,156	360,670	366,369	367,534	369,381	364,822
Average Duration Per Customer Affected (CAIDI)	2.18	1.99	3.01	2.75	2.32	2.45
Average Duration Per Customers Served (SAIDI)	1.68	2.10	2.76	2.50	1.97	2.20
Interruptions Per 1000 Customers Served	8.43	9.15	9.86	9.42	8.59	9.09
Number of Customers Affected Per Customer Served (SAIFI)	0.77	1.05	0.92	0.91	0.85	0.90

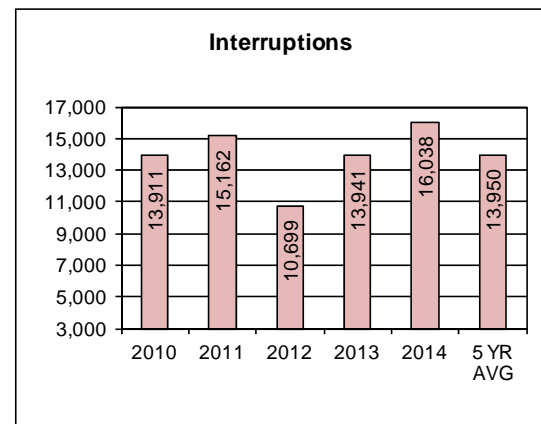
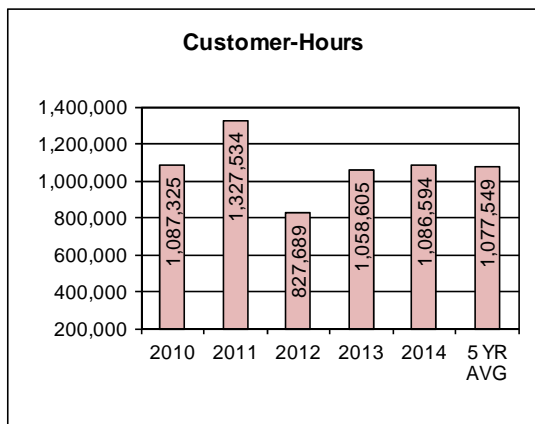
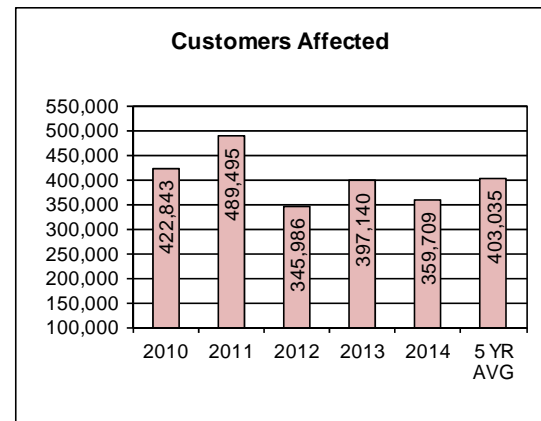
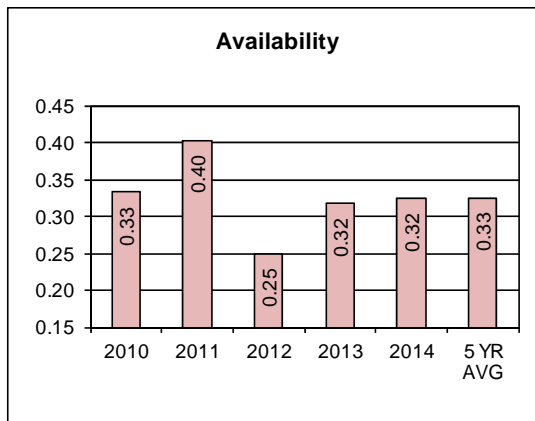
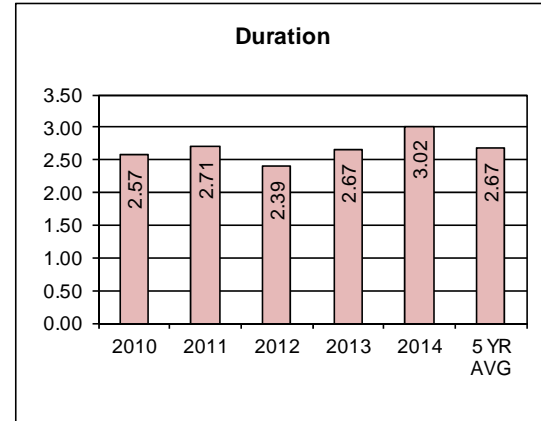
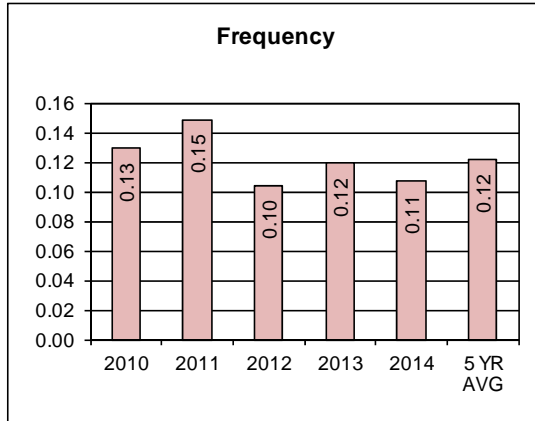
\*\* Customer Served is the number of customers as of the last day of the current year.

For example, for the calendar year of 2014, customers served is the number of customers as of December 31, 2014. For indices using customers served, the previous year is used.

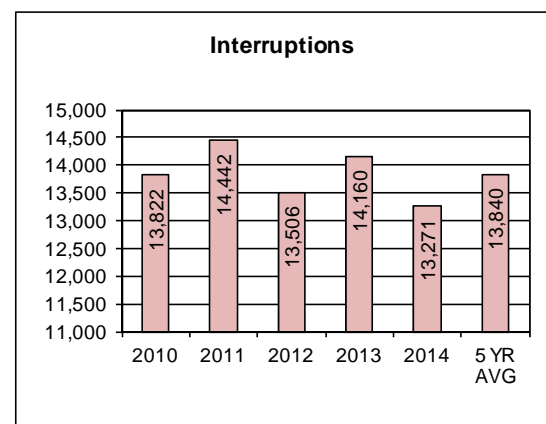
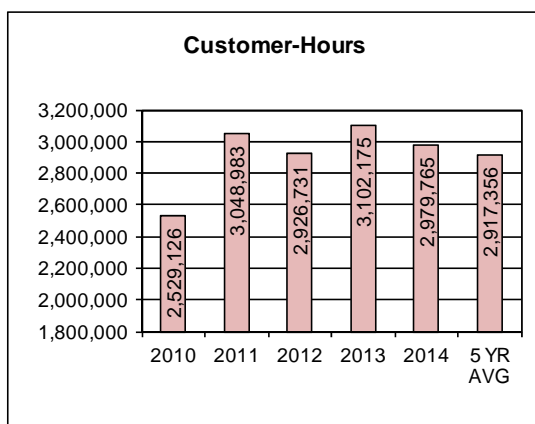
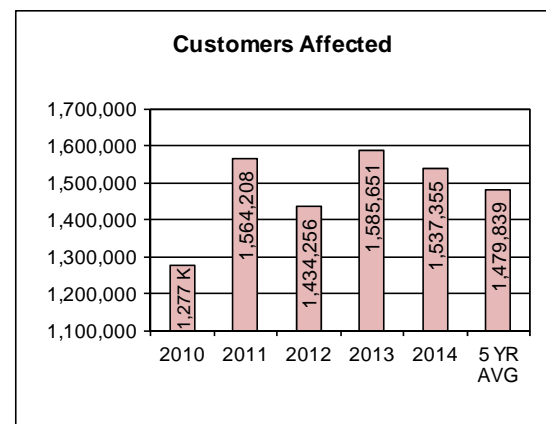
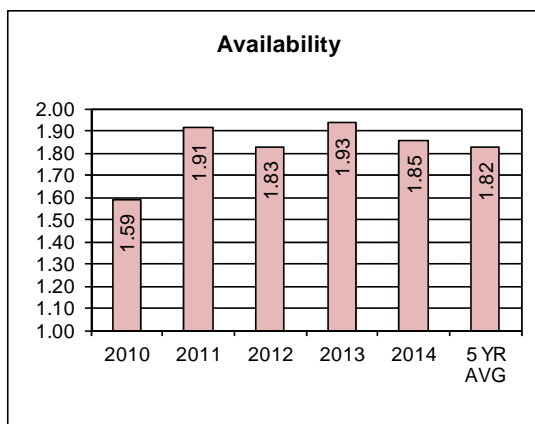
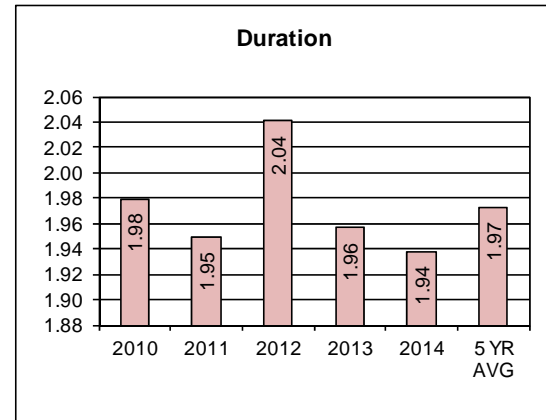
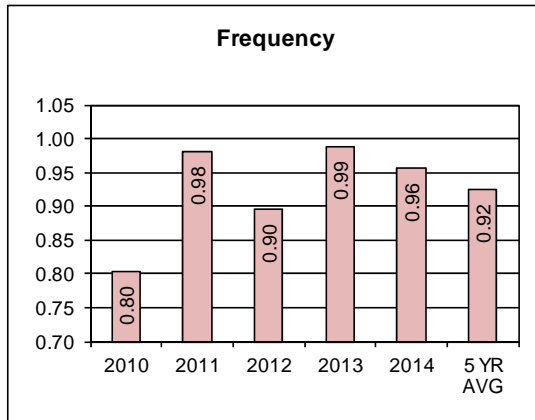
### Central Hudson Gas and Electric (Excluding Major Storms)



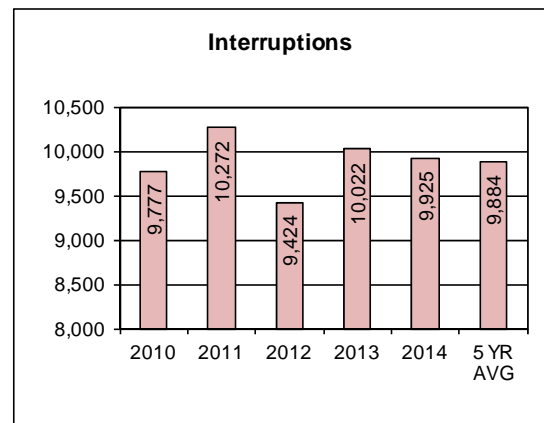
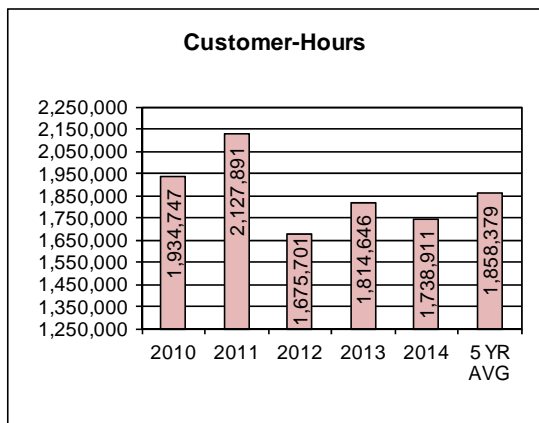
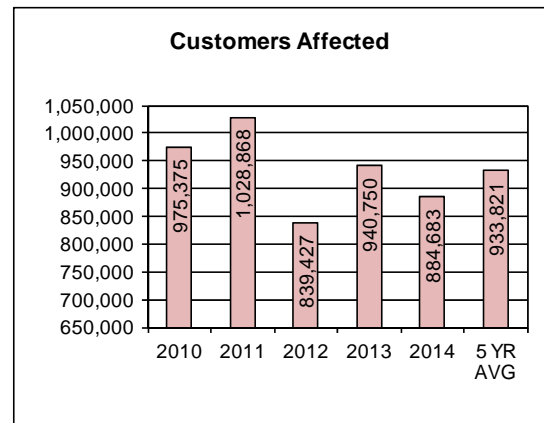
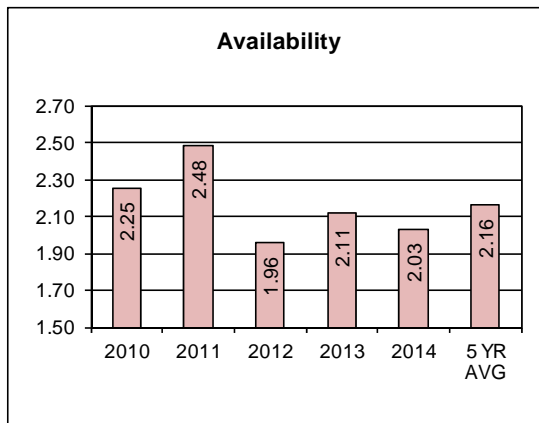
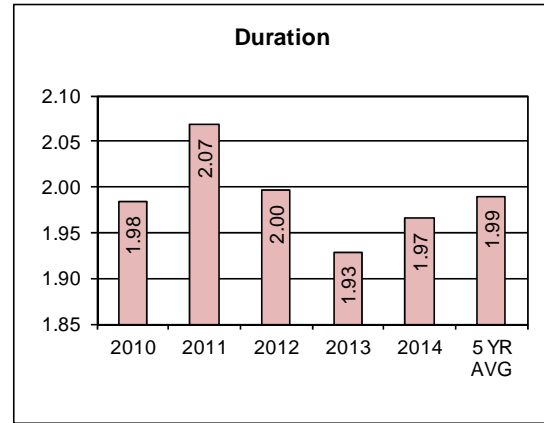
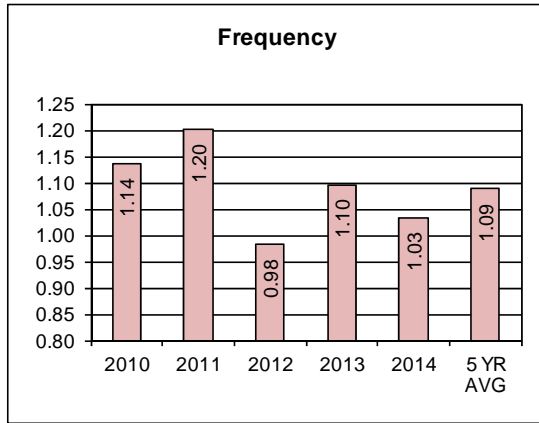
### Con Edison – System (Excluding Major Storms)



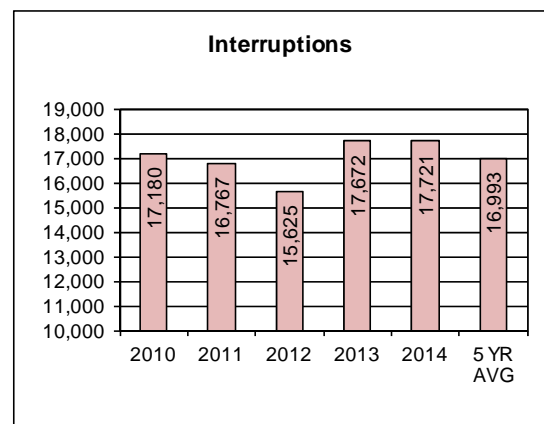
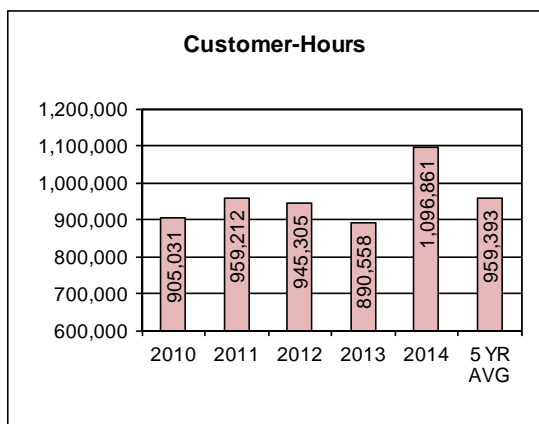
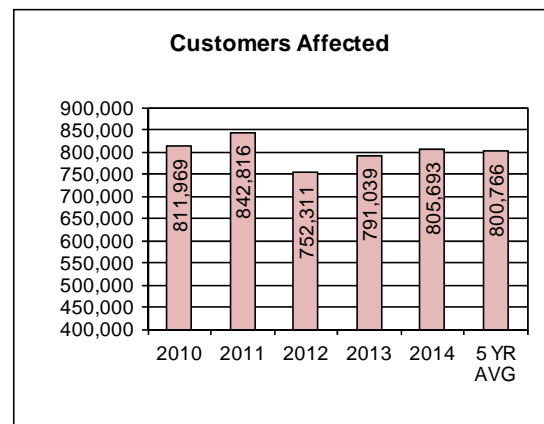
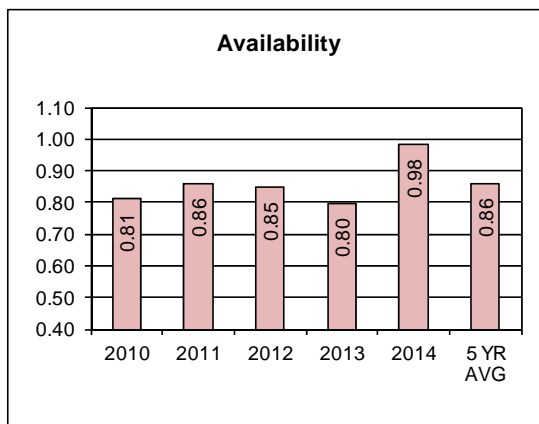
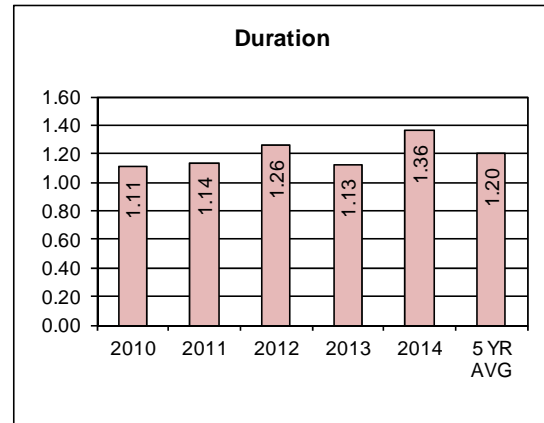
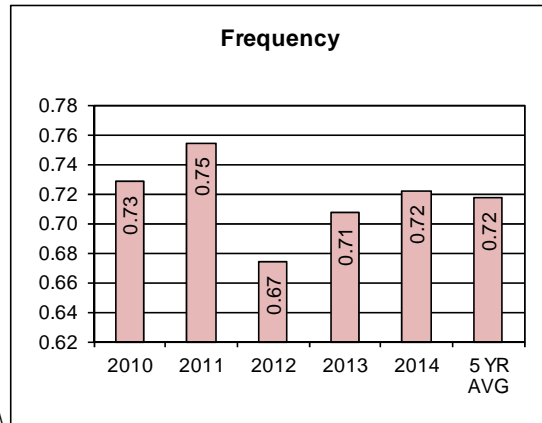
### National Grid (Excluding Major Storms)



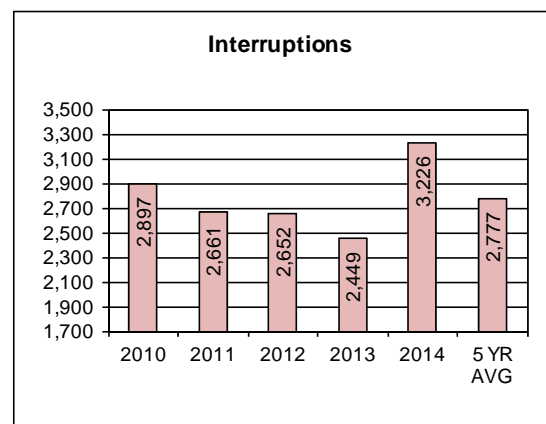
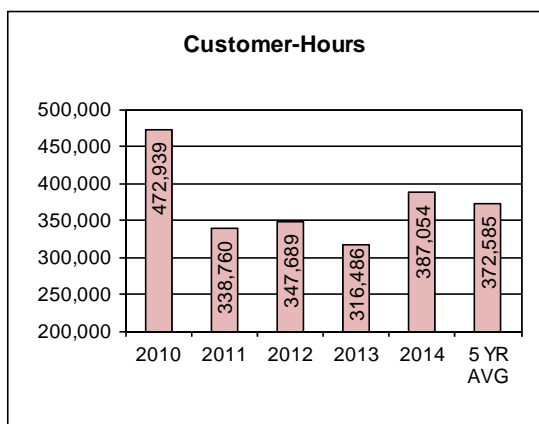
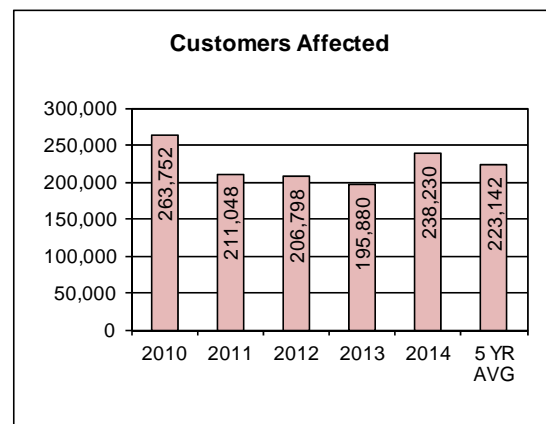
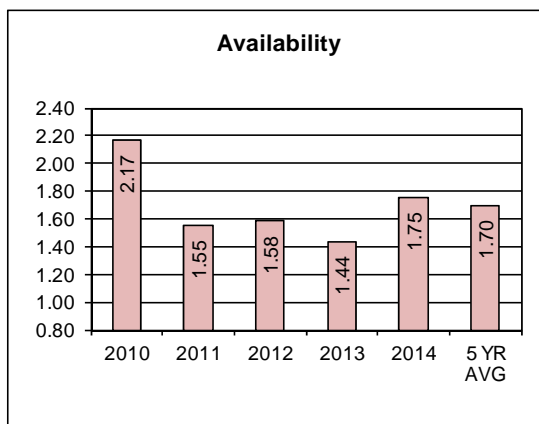
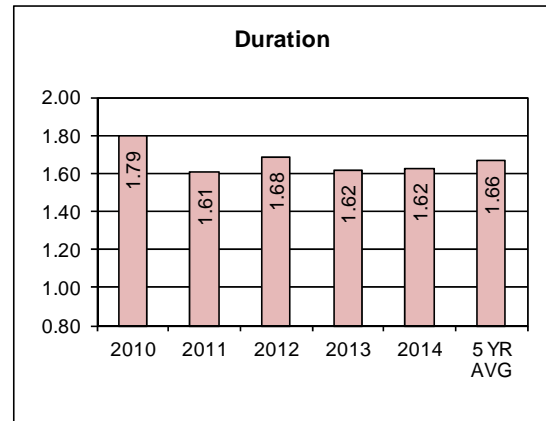
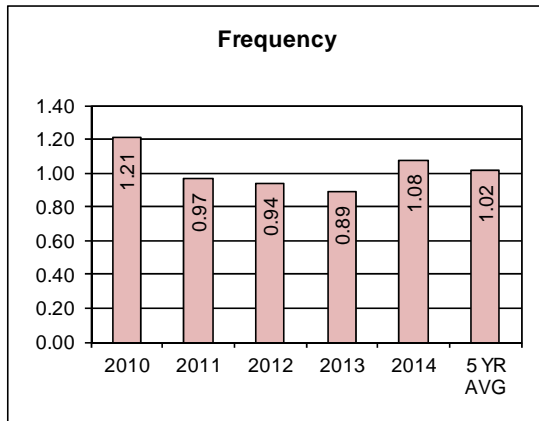
### New York State Electric and Gas (Excluding Major Storms)



### PSEG-LI (Excluding Major Storms)



### Orange & Rockland Utilities (Excluding Major Storms)





### Rochester Gas and Electric (Excluding Major Storms)

