



2016 ELECTRIC RELIABILITY PERFORMANCE REPORT

**Electric Distribution Systems
Office of Electric, Gas, and Water
June 2017**

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EXECUTIVE SUMMARY

The attached report presents the assessment by Department of Public Service Staff (Staff) of electric reliability performance in New York State for 2016. 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).¹ Frequency is influenced by factors such as system design, capital investment, maintenance, and weather.² 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).³ 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's performance is then compared with its Reliability Performance Mechanisms (RPMs), which is established in the most recent rate order for that utility. 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

¹ 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.

² 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.

³ 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.

subject to negative revenue adjustments for failing to meet electric reliability targets. Central Hudson met its corporate RPM target for duration but failed to meet its corporate RPM target for frequency; resulting in a negative revenue adjustment of approximately \$2.0 million.⁴ All other investor-owned electric utilities met both their frequency and duration RPM targets in 2016.⁵ Unlike the investor-owned 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 failed to meet its frequency metric.⁶

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 historic performance for the preceding five years, 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.

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. Excluding major storms, the statewide interruption frequency for 2016 was 8% worse than the previous year and 13.6% higher than the statewide five-year average (as shown in Figure 1 on page 7).⁷ Statewide, the

⁴ On May 5, 2017, Central Hudson has filed a petition to the Commission for exemption from the RPM revenue adjustment primarily citing, the infestation of the Emerald Ash Borer. This petition is under review and has not been acted on by the Commission.

⁵ While not directly related to reliability, National Grid also missed its project estimating target in its RPM and incurred a \$4 million negative revenue adjustment for 2016.

⁶ The estimated impact is approximately \$87,000, however the final value has not been agreed upon by LIPA, Department of Public Service, and PSEG-LI.

⁷ 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

three major causes for interruptions excluding storms were tree contacts, equipment failures, and accidents or events not under the utility's control. Equipment failures followed by tree contacts were the main drivers for Con Edison, RG&E, Orange & Rockland and PSEG-LI's interruptions. NYSEG and Central Hudson reported tree contacts followed by accidents as the main drivers for interruptions in their service territories. National Grid reported tree contacts followed by equipment failures.

Con Edison met its frequency RPM target for its radial distribution system and its performance is in line with the previous year and the five year average. Con Edison also met its RPM targets for system-wide network frequency even though its network performance was worse than the five-year average. RG&E was the only company for which the frequency performance was better than last year and better than its five-year average. While National Grid, NYSEG, and Orange & Rockland's frequency performance were worse than last year and their five-year averages, they met their RPM targets. Central Hudson and PSEG-LI failed to achieve their frequency targets for 2016.

In 2016, the statewide duration performance, excluding major storms, was 6.1 % better than last year and 2.7% better than the statewide five-year average (as shown in Figure 3 on page 8). All utilities met their duration targets. Con Edison's system-wide duration performance improved from 2015, with its network performance at its best in the last five years and radial performance improving 3% from 2015. National Grid, Orange & Rockland, PSEG-LI, and RG&E's duration performance also improved when compared to 2015. Orange & Rockland and PSEG-LI also showed improvement when compared to their five-year average. Central Hudson and NYSEG's duration performance were slightly worse than their performance in the previous year and five-year averages but better than their RPM target.

limited, such as an ice storm, we review reliability data both including and excluding severe weather events.

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.⁸ 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.⁹ Then, company-wide performance expectations are set in RPMs established in the Commission's rate orders for each utility. The RPMs are designed such that companies are subjected to negative revenue adjustments for failing to meet associated electric reliability targets.

The interruption data the utilities provided 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).¹⁰ 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,

⁸ 16 NYCRR Part 97, Notification of Interruption of Service, requires utilities to keep detailed back-up data for six years.

⁹ There are no revenue adjustments for failure to meet a minimum level under the electric service standards; utilities are, however, required to include a corrective action plan as part of the annual report.

¹⁰ 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.

equipment failures, and accidents.¹¹ Staff maintains interruption information in a database with records since 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.¹² Central Hudson met its corporate RPM target for duration, but failed to meet its corporate RPM target for frequency. All other investor-owned electric utilities met both their frequency and duration RPM targets in 2016. Unlike the investor-owned 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 met its duration metric but failed to meet its frequency metric.

2016 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 2016 and indicate company-specific trends where applicable. Each year, Staff prepares an Interruption Report summarizing the monthly interruption data submitted by New York's utilities. The 2016 Interruption Report contains detailed interruption data for each utility and statewide statistics for the past five years. The Interruption Report for 2016 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 in the Commission's

¹¹ 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.

¹² National Grid has a project estimating target, which it missed, resulting in a \$4 million negative revenue adjustment for 2016.

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. This exclusion achieves 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 overall 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. Since 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 0.67 in 2016, which is above the statewide five-year average of 0.59. The frequency performance in 2016, for all utilities other than Con Edison, is 1.07.

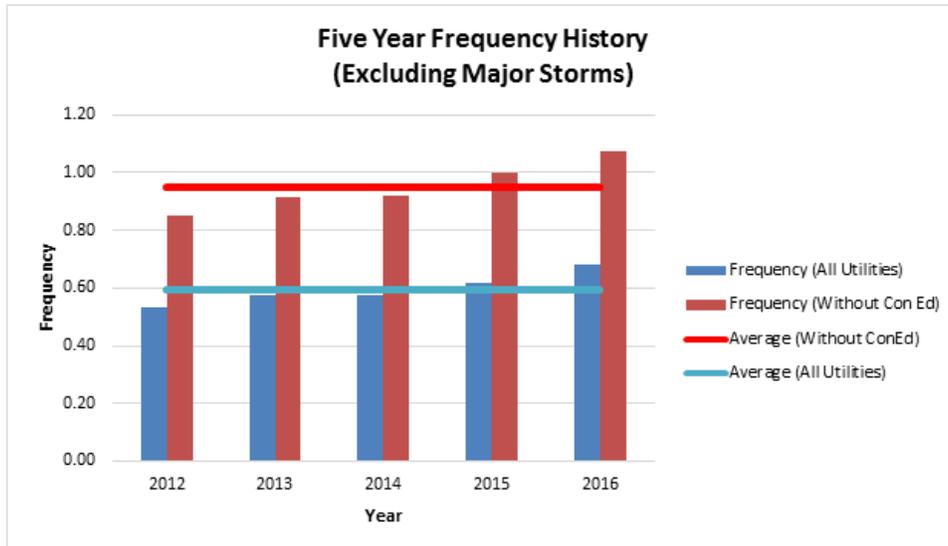


Figure 1: Statewide Frequency Performance

Overall, the frequency of outages was worse in 2016 than in previous years primarily due to outages resulting from tree contacts at several utilities. As shown in Figure 2, the frequency of tree related interruptions has been trending up over the last three years for Central Hudson, NYSEG, National Grid, and PSEG-LI. The largest contributors to tree related interruptions were limbs and trees outside the clearance zone; trees affected by diseases; and weather conditions such as rain, wind, and/or lightning.

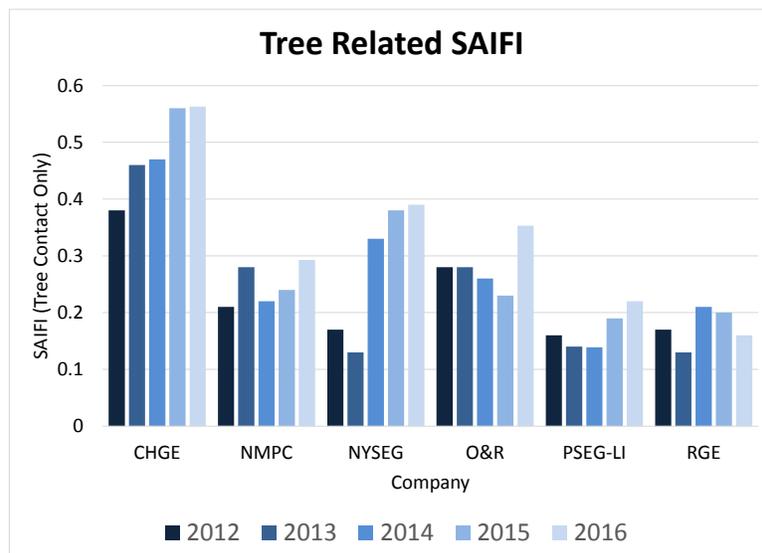


Figure 2: Tree Related SAIFI

Figure 3 shows the historical statewide interruption duration index, excluding major storms. The 2016 overall statewide interruption duration index of 1.85

hours is better than 2015 and the statewide five-year average of 1.90 hours. In fact this was the best duration performance since 2009. The statewide interruption duration index, excluding Con Edison, was 1.79 hours in 2016, which is better than the 2015 duration index of 1.88 hours and the statewide five-year average of 1.83 hours. The utilities, on a statewide basis, have been performing steadily with regard to duration performance.

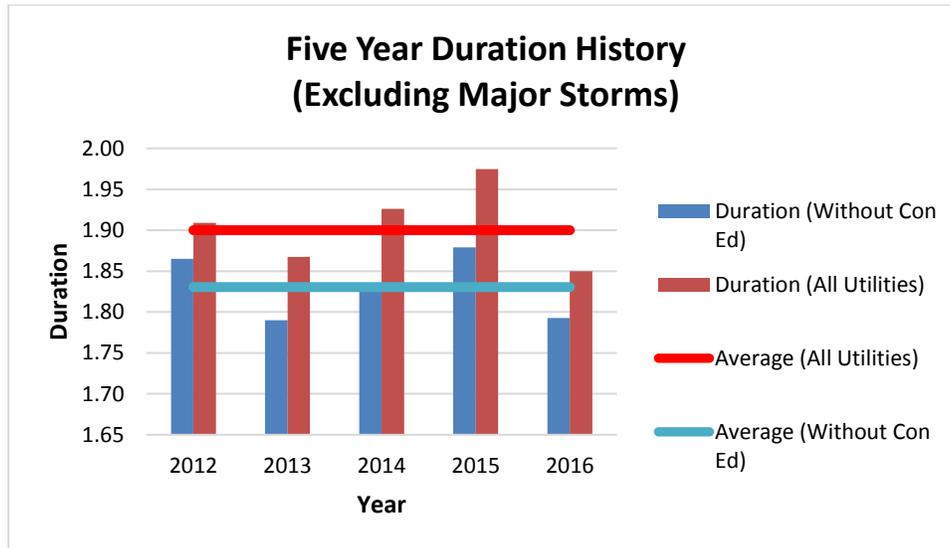


Figure 3: Statewide Duration Performance

As can be seen in Figure 4, in calendar year 2016 fewer weather events were categorized as major storms. 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.¹³ When including major storms, the 2016 statewide duration performance was 2.28, which was better than the five-year average. Excluding Con Edison, the statewide duration performances including major storms was 2.25, which is also better than the five-year average. Major storms in 2016 accounted for approximately 31% of customer-hours of interruptions and 15% of the overall number of customers affected.

¹³ 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).

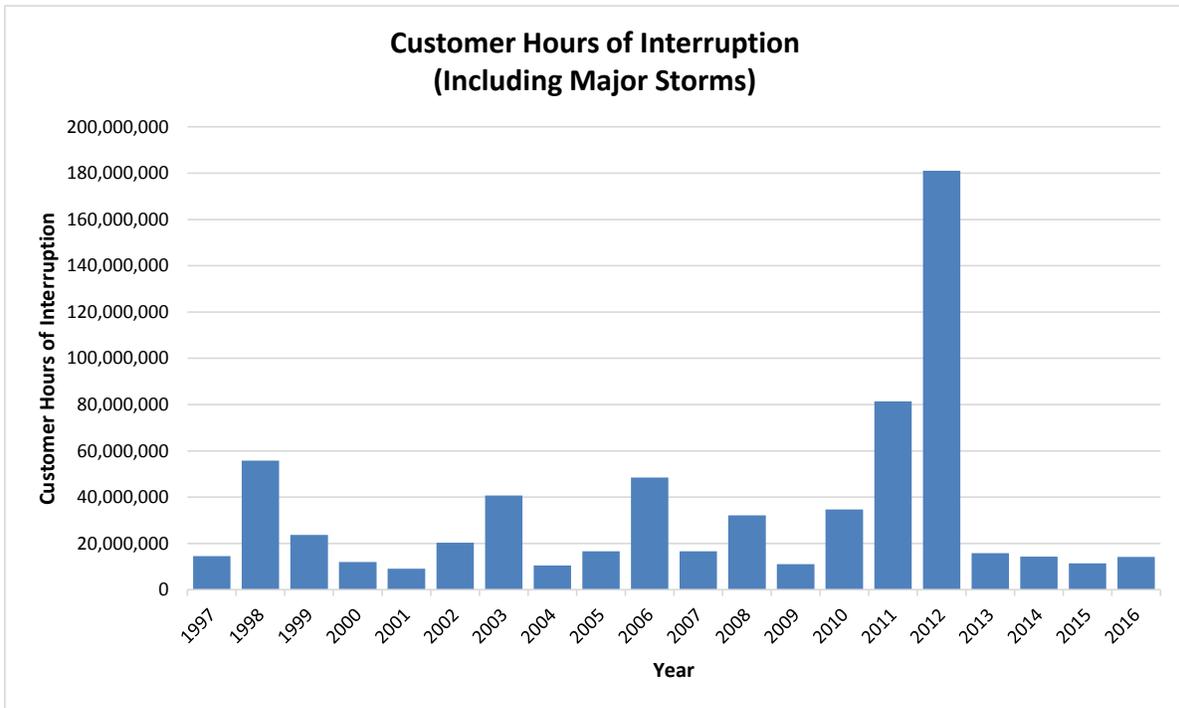


Figure 4: Customer Hours of Interruption (Including Major Storms)

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

Performance Metric	2012	2013	2014	2015	2016	Current RPM Target	5-Year Average
Network Systems							
Frequency Customer Interruptions per 1,000 Customers	1.94	2.17	2.36	2.30	2.26	2.50	2.21
Duration Avg Interruption Hours	4.75	4.20	4.92	4.58	4.16	4.70	4.52
Radial System							
Frequency (SAIFI)	0.36	0.40	0.33	0.35	0.427	0.495	0.373
Duration (CAIDI)	2.02	2.02	1.83	1.95	1.89	2.04	1.94

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, while the remaining 900,000 customers are supplied by radial systems. The network system is mostly underground wires housed in conduits, whereas the radial system is mostly above-ground poles supporting overhead wires. The two systems are subject to different reliability metrics specifically designed for their configurations. 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

For network outage frequency, the company met its RPM target of 2.50 in 2016, with a performance of 2.26. For network outage duration, the company met its RPM target of 4.70 with a performance of 4.16. Con Edison's network performance for both frequency and duration in 2016 improved from its performance in the previous year, with the company's network outage duration performance at its best in the past five-year period and second best since it began using this metric. The company continues to see improvements in reliability from action plans implemented in the middle of 2015. These

initiatives include the relocation of crews in Brooklyn/Queens to the Cleveland Street yard to provide support for outage restoration in the southeastern part of Brooklyn/Queens; creation of the metric dashboard to aid in resource allocation; creation of a training document emphasizing the use of temporary repairs such as bridging and shunts as quick restoration methods; and application of administrative controls such as daily review of significant outages by the control centers and monthly meetings with all the regions in distribution engineering. All of these mentioned initiatives contributed to the 2% reduction in network outage frequency and the 9% reduction in network average outage duration experienced from 2015-2016.

Looking at regional performance, all of Con Edison's regions saw improvements in frequency and duration from 2015. Frequency performance improved between 25% and 28% in Bronx, Westchester, Brooklyn, and Queens, and 42% in Manhattan. Duration performance improved up to 5% in Bronx, Westchester, and Manhattan, and 13% and 27% in Brooklyn and Queens, respectively. The company continued to invest in relief and reliability programs, which included establishing 12 new feeders in Manhattan's new Midtown West network, relieving 26 underground distribution network transformers, installing almost 11,000 manhole and service box covers, and rebuilding 164 underground secondary distribution structures. While the 2015 action plans and continued relief and reliability programs have had a positive impact on Con Edison's 2016 network reliability performance, the company must remain diligent with its efforts to improve its performance.

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 with performances of 0.427 and 1.89, respectively. The company's frequency performance was worse than last year's, while its duration performance slightly improved. As shown in Figure 5, most interruptions were caused by company equipment failure, tree contacts, and accidents outside the company's control. The increases to the frequency performance were largely driven by interruptions caused by outages that occurred during non-excludable heat wave storms in July and August and equipment failures.

On the regional level, Con Edison’s Brooklyn and Staten Island frequency performance improved by 1% and 11%, respectively, since 2015. On the other hand, the frequency performance for Bronx, Westchester, and Queens in 2016 was worse than the 2015 values. Westchester had the greatest increase in radial outage frequency, with a 55% increase from the 2015 value. Bronx had a 34% increase in frequency and Queens’ frequency performance increased by 15% compared to last year’s.

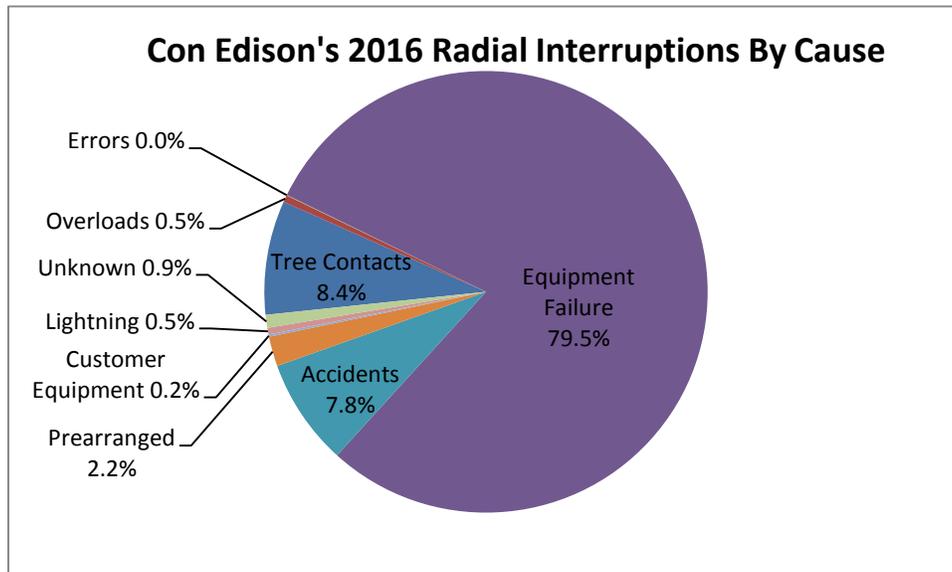


Figure 5: Con Edison’s 2016 Radial Interruptions by Cause (Excluding Major Storms)

With respect to its regional performance, the company’s 2016 radial duration was worse than its 2015 levels in every region except Staten Island. Both Brooklyn and Queens saw a decrease in performance during the month of September due to a heat spell followed by rain and thunderstorms. Westchester performance was driven by storms during the heat waves of July and August, and a snowstorm in December. Staten Island, the only region not to see an increase in duration, had its best performance over the last five years. The improvement in duration performance on Staten Island is attributable to the completion of several reliability projects on the 33kV and 4kV distribution systems, including upgrading or replacing cable spans, transformers, and poles.

Con Edison concluded its four-year storm hardening and resiliency efforts in 2016. Through this effort, sectionalizing devices, remotely operated switches, fuses,

breakaway connectors, and loops were installed to reduce the number of customers affected during a feeder outage. Other measures included pole upgrades and conversion of open wire to aerial cable. According to Con Edison, in 2016, approximately 118,710 interruptions were avoided throughout its service territory due to the reclosers and fuses installed as part of the storm hardening project. Staff expects to continue to see improvements in Con Edison's reliability performance as a result of the completed storm hardening projects.

NATIONAL GRID

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

Performance Metric	2012	2013	2014	2015	2016	Current RPM Target	5-Year Average
Frequency (SAIFI)	0.90	0.99	0.96	1.02	1.05	1.13	0.98
Duration (CAIDI)	2.04	1.96	1.94	2.04	2.02	2.05	2.00

National Grid's territory in New York is composed of the following eight regions: Capital, Central, Frontier, Genesee, Mohawk Valley, Northeast, Northern, and Southwest. The company serves approximately 1.6 million customers across these regions. For 2016, the Company met both of its RPM reliability targets. The 2016 frequency level of 1.04 is 7% above the five-year average, but is below the RPM target of 1.13. The 2016 duration performance of 2.02 hours is an improvement over the previous year and is in line with the five-year average. National Grid has met the RPM target of 2.05 hours for duration.

On a regional basis, for the Frontier and Genesee Regions the company's actual frequency results were better than the goals. For the Capital, Central, Mohawk Valley, Northeast, Southwest, and Northern Regions, the company missed its frequency goals. Only the Genesee Region performed satisfactorily with respect to both the frequency and duration goals, while the Northeast and Southwest were the only regions to miss both regional goals.

As shown in Figure 6, tree contacts at 31%, equipment failure at 27% and accidents at 18% are the predominant causes of interruptions throughout National Grid's

service territory. In recent years the leading cause of interruptions has been either equipment failure or tree contacts, with each accounting for approximately 30% of total customer interruptions. While tree contacts continue to be a significant portion of interruptions this year, tree fell interruptions accounted for 80% of all tree interruptions. The increase in tree interruptions can be attributed to minor storm events and the impact of the Emerald Ash Borer infestation. National Grid continues to address tree contact issues through its vegetation management program, which includes the aggressive removal of hazardous trees. In January, National Grid began implementing its proactive Emerald Ash Borer program to address tree related outages. The company is also proposing to implement a multi-year program to address Emerald Ash infestation in its pending rate case.¹⁴

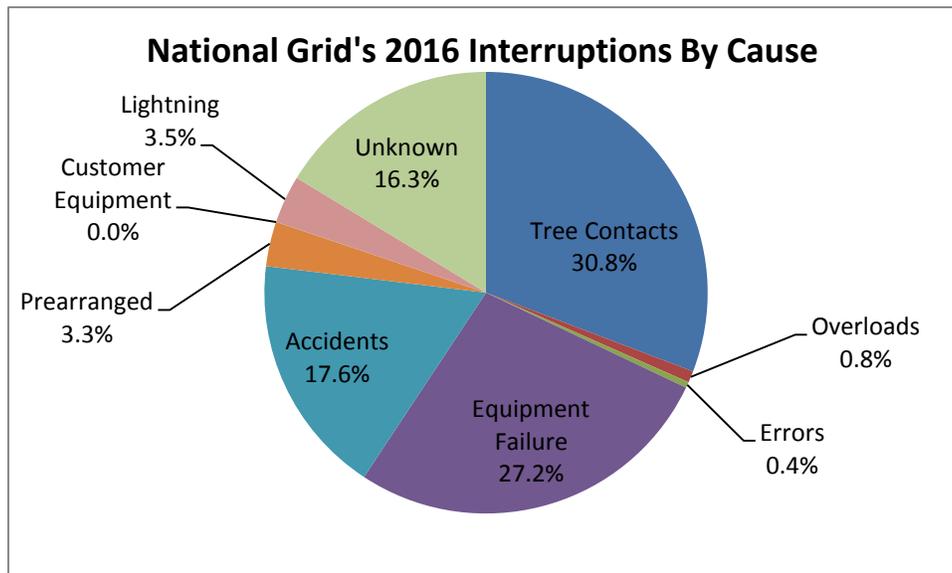


Figure 6: National Grid’s 2016 Interruptions by Cause (Excluding Major Storms)

National Grid 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

¹⁴ Case 17-E-0238, National Grid - Electric Service (filed April 28, 2017). This proceeding has not been acted on by the Commission.

failures. National Grid also uses its Inspection and Maintenance Program to identify and correct equipment issues. Accidents continue to be the third largest cause of interruptions, with instances up from 2015 and the five year average. National Grid continues to investigate all poles that are involved in vehicle accidents to identify hazardous locations and relocates poles if considered necessary. The company also continues to install 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

Performance Metric	2012	2013	2014	2015	2016	Current RPM Target	5-Year Average
Frequency (SAIFI)	0.98	1.09	1.03	1.17	1.19	1.20	1.09
Duration (CAIDI)	2.00	1.93	1.97	1.97	2.02	2.08	1.98

NYSEG serves approximately 878,800 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 1.19 is slightly worse than its performance in 2015, 1.17, but still below its RPM target of 1.20. One large factor contributing to this year-over-year rise is an increase in small storm events in multiple NYSEG Operating Divisions during 2016. NYSEG experienced over 30 storm events that were not large enough to be classified as Major Storms. Despite the increase in customer interruptions NYSEG has responded to them adequately.

The company met its RPM target of 2.08 for duration in 2016. The 2016 duration performance of 2.02 hours was slightly longer than the previous year’s performance, but in line with the five-year average of 1.98 hours. On a divisional basis, the Binghamton, Elmira, Ithaca, and Liberty Divisions all had frequency and duration performances which were better than the company’s established goals. The Geneva,

Lancaster, Mechanicville, and Plattsburgh Divisions had frequency performances better than the goals, but duration performances worse than the goals; while the Brewster and Oneonta Divisions had a duration performance better than the goals, but frequency performances worse than the goals. The Auburn and Hornell Divisions both had frequency and duration performances worse than the goals.

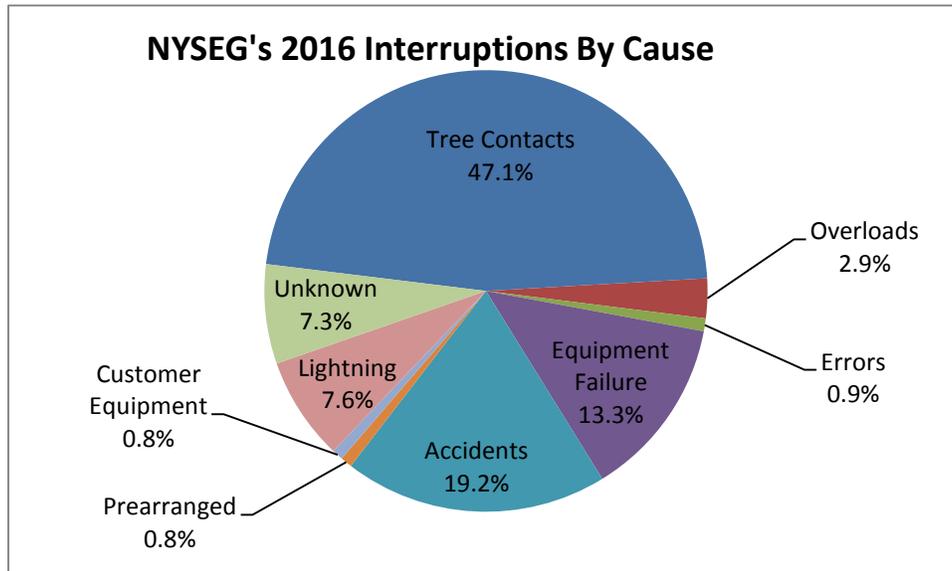


Figure 7: NYSEG's 2016 Interruptions by Cause (Excluding Major Storms)

As shown in Figure 7, tree contacts and accidents were the predominant causes of interruption throughout NYSEG's twelve divisions in 2016. NYSEG historically has a high tree-caused frequency rate when compared to the other New York State utilities. In 2016, NYSEG continued to follow 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,¹⁵ which addressed vegetation management and tree trimming on a company-wide basis. As a result of these efforts, the company completed its first 5-year trimming cycle in the Brewster Division at the end of 2015 and trimmed an additional 200 miles in 2016. The Brewster and Liberty Divisions continue to be focus areas for NYSEG due to the tree

¹⁵ Case 13-E-0117, NYSEG - Petition for Authorization to Implement Full Cycle Distribution Vegetation Management, Order Denying Petition and Establishing Further Procedures (issued October 1, 2013).

density in these areas. NYSEG however continues to trim trouble areas in the other divisions. Vegetation performance mechanisms remain in place requiring NYSEG to trim an established minimum quantity of distribution circuit-miles per calendar year. The company saw an increase in tree related outages even though it met its target miles of distribution trimming in 2016; as set forth in the company's 2015 Rate Case Joint Proposal, which was adopted by the Commission.¹⁶ NYSEG will continue to focus on its distribution vegetation management efforts with the goal of long-term reductions in tree related interruptions. With regard to accidents, NYSEG continues to review accidents to determine if changes or modifications to their systems can help mitigate accident-related outages. In high accident locations NYSEG is looking to relocate poles or add reflective tape around poles to make them more visible.

ROCHESTER GAS AND ELECTRIC

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

Performance Metric	2012	2013	2014	2015	2016	Current RPM Target	5-Year Average
Frequency (SAIFI)	0.74	0.73	0.76	0.75	0.58	0.90	0.71
Duration (CAIDI)	1.79	1.82	1.74	1.82	1.79	1.90	1.79

RG&E serves approximately 371,000 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. Accordingly, 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 2016, RG&E outperformed its corporate RPM targets of 0.90 for frequency and 1.90 for duration that were established in its rate order. While RG&E met its reliability targets at the corporate level in 2016, on a divisional basis only the Rochester Division satisfied

¹⁶ Case 15-E-0283, NYSEG - Electric Service, Order Approving Electric and Gas Rate Plans in Accord with Joint Proposal (issued June 15, 2016).

both the frequency and duration goals at the division level. The Canandaigua, Genesee and Lakeshore Divisions all had frequency performances better than the goals, but durations performances were worse than the goals. The Genesee and Canandaigua Division’s duration performances both improved from 2015 and are better than the five-year averages.

Overall, the three major causes for interruptions throughout RG&E’s Service Divisions were equipment failures, tree contacts, and accidents as shown in Figure 8. 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 2016, RG&E completed the first year of its second five-year tree trimming cycle. RG&E continues to perform its vegetation management goals, trimming 1,103 distribution miles 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 accidents to determine if changes or modifications to their systems can help mitigate accident-related outages. In high accident locations RG&E is looking to relocate poles or add reflective tape around poles to make them more visible.

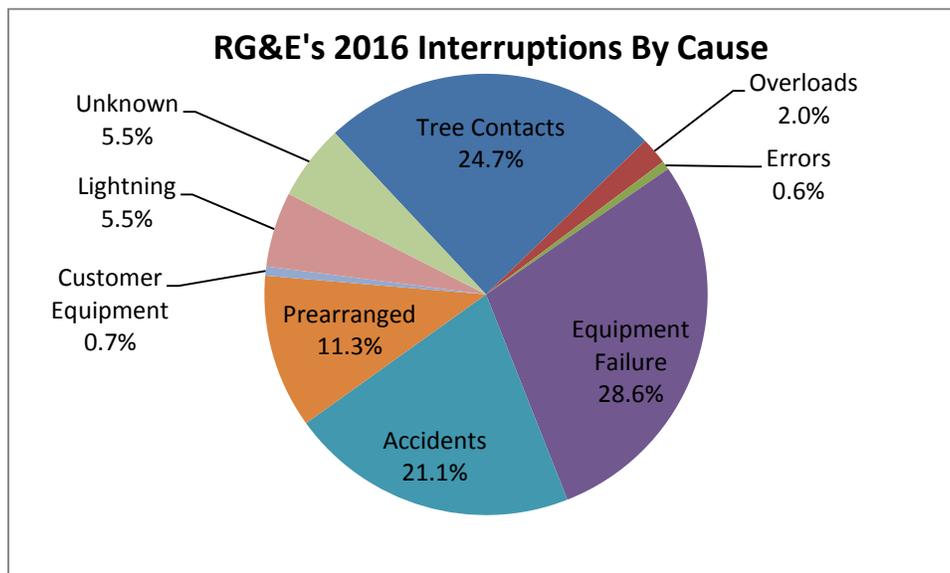


Figure 8: RG&E’s 2016 Interruptions by Cause (Excluding Major Storms)

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

Performance Metric	2012	2013	2014	2015	2016	Current RPM Target	5-Year Average
Frequency (SAIFI)	1.00	1.02	1.24	1.28	1.34	1.30	1.18
Duration (CAIDI)	2.38	2.30	2.27	2.07	2.33	2.50	2.27

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

In 2016, Central Hudson met its corporate RPM target for duration, however it failed to meet the target for frequency. Central Hudson's frequency performance of 1.34 in 2016 follows a deteriorating trend after having good performance in 2012 and 2013. On May 5, 2017, Central Hudson has filed a petition to the Commission for exemption from the RPM revenue adjustment, related to the impacts of hazard trees resulting from the infestation of the Emerald Ash Borer.¹⁷ Central Hudson's duration performance in 2016 was 2.33, which is slightly above its five-year average.

On a divisional level, the Poughkeepsie and Newburgh Operating Divisions had actual frequency indices better than the established goal of 1.20. The Catskill and Kingston Operating Divisions had frequency indices worse than the goal of 1.00, while the Fishkill Operating Division had a frequency index over its goal of 1.20. The Catskill Division exceeded its frequency target by 29% in part due to one breaker operation malfunction affecting three circuits of approximately 4,885 customers. The Kingston Division exceeded its frequency target by 79%, mainly due to tree contacts. This trend of increased tree contacts is largely attributed to the effects of the invasive Emerald Ash Borer infestation on local Ash tree populations. The Fishkill Division exceeded its frequency target by 9%, which can be attributed to numerous factors including a motor vehicle accident that caused a breaker lockout affecting 5,073 customers, an equipment

¹⁷ This petition has not been acted on by the Commission.

failure at the Shenandoah Substation, which affected 3,802 customers, and a 26% increase in tree-related outages when compared with 2015.

Central Hudson met the distribution targets for its Catskill and Newburgh Divisions in 2016. The remaining three districts, Fishkill, Poughkeepsie, and Kingston, had duration performances that were worse than the established individual district targets. Tree related outages, which increased 26% from the previous year, were the main driver increasing duration hours in all three districts. Central Hudson performed similarly in regards to duration performance when compared with past years.

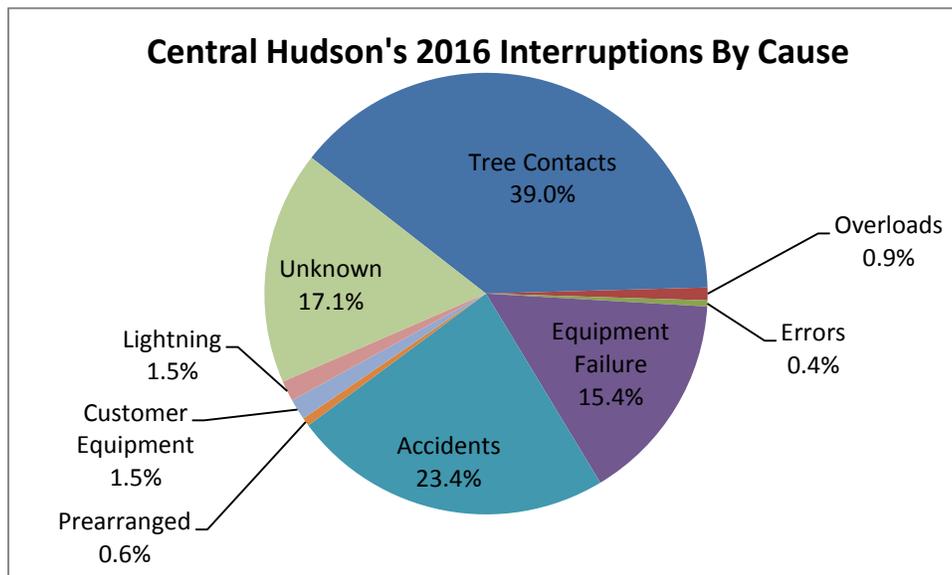


Figure 9: Central Hudson’s 2016 Interruptions by Cause (Excluding Major Storms)

The pie chart in Figure 9 shows that the majority of interruptions are caused by tree contacts. Tree contact interruptions had a noticeable increase of 26% when compared with 2015. The largest contributors to tree contact interruptions were limbs and trees outside the clearance zone; trees affected by diseases; and minor storms 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-related outages have been trending upwards due to the impact of minor storms hitting the region, Dutch elm disease, and invasive species such as Emerald Ash Borer. To mitigate the impacts of tree related outages, Central Hudson is looking to take proactive steps including developing a supplementary danger tree vegetation management program

focusing on removing diseased ash trees both inside and outside the right of way that are a direct threat to Central Hudson infrastructure. Central Hudson also continues to conduct assessments for each outage that causes a breaker lockout. The goal is to identify trends related to failure mode, condition, species, and location to develop a process for identification and removal of danger trees. Outages as a result of vehicle accidents and animal contacts increased by 5% compared to 2015. Central Hudson continues to install animal guards and electronic reclosers so fewer customers would be impacted as a result of interruptions caused by animal contacts. Equipment failures increased by 7% when compared to 2015. In response to this increase, Central Hudson has begun to deploy infrared cameras to supplement annual inspections to proactively detect failing components. Central Hudson has continued 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, cable replacement, and distribution line infrared surveys of the three-phase mainline.

ORANGE & ROCKLAND

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

Performance Metric	2012	2013	2014	2015	2016	Current RPM Target	5-Year Average
Frequency (SAIFI)	0.94	0.89	1.08	1.01	1.06	1.20	1.00
Duration (CAIDI)	1.68	1.62	1.62	2.44	1.70	1.85	1.81

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

Orange & Rockland serves approximately 223,000 customers in three New York counties along the New Jersey and Pennsylvania border. In 2016, the company's frequency performance was above the five-year average and was slightly higher than last year, but was below the RPM target of 1.20. The company's duration performance was also below the RPM target and more in line with historic performances.

As shown in Figure 10, equipment failures and tree contacts continue to be the major causes of interruptions. Interruptions due to equipment failure have improved

slightly compared to 2015. The majority of equipment failures were overhead splices; this category saw a large increase over 2015. The company states that this was due to the number of heat waves the territory experienced. While the number of days above 90 degrees was about the same as in 2015, 2016 saw more sequential days of high temperatures. 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.

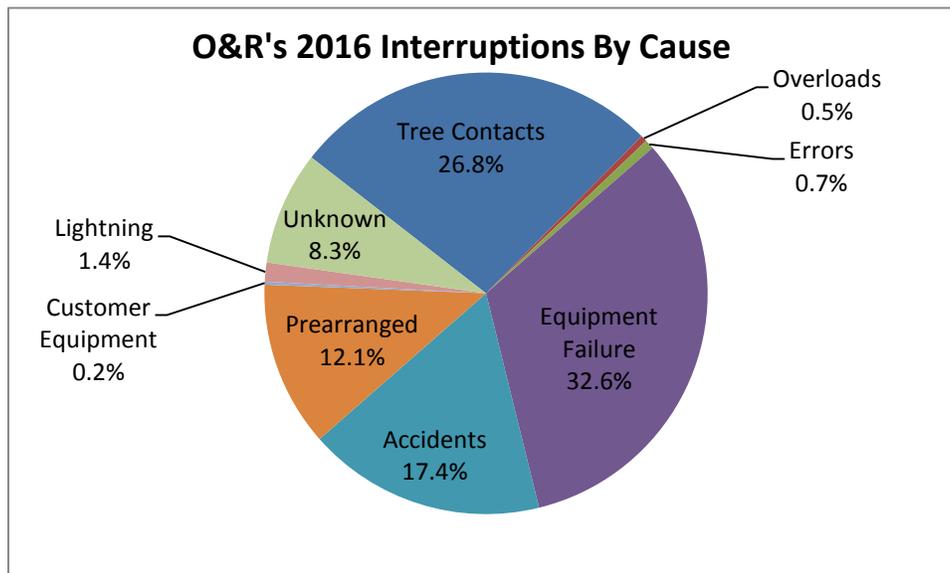


Figure 10: Orange & Rockland’s 2016 Interruptions by Cause (Excluding Major Storms)

The number of interruptions due to tree contact was significantly higher in 2016 than in 2015. In 2016 there were 865 tree related outages compared to 665 in 2015. This is the highest number of tree related outages in the last five years. All three divisions showed an increase in tree related outages. The most significant increase in tree

related outages was in the Eastern Division; the increase was attributed to multiple specific dates where weather events that could not be excluded caused large increases in tree-related outages. February, July, and August had weather events that resulted in the number of tree related outages for those months to double compared to 2015. The company continues to have a comprehensive vegetation management/tree trimming program, which is completed on a 4-year cycle. Enhanced vegetation management efforts are expected to reduce the number of tree related interruptions and the impact on customers.

Overall, the company performed well in 2016. It met both the SAIFI and CAIDI target metrics and showed improvement on one of the major causes of outages, equipment failure. Outages caused by tree contact increased in 2016 by about 200 occurrences or 30%.

PSEG-LI

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

Performance Metric	2012	2013	2014	2015	2016	Current OSA Target	5-Year Average
Frequency (SAIFI)	0.67	0.71	0.72	0.84	1.11	0.91	0.81
Duration (CAIDI)	1.26	1.13	1.36	1.31	1.14	1.42	1.23

PSEG-LI serves approximately 1,140,000 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 operated the system and it supplied interruption data to the Department to assist in its statewide analysis. 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 PSEG LI's Amended Operating Service Agreement (OSA) with the Long Island Power Authority.¹⁸

¹⁸ Amended and Restated Operations Services Agreement between Long Island Lighting Company d/b/a LIPA and PSEG Long Island LLC, Dated as of December 31, 2013. (<http://www.lipower.org/papers/agreements.html>)

In 2016, PSEG-LI had one of its better years and met its OSA target for duration. The frequency of interruptions was 1.11, which for the second year in a row is worse than the previous year and the five-year average. The company missed its target for frequency in 2016; the estimated performance metrics impact is approximately \$87,000.¹⁹ The leading causes of interruptions are equipment failures, tree contacts, and accidents. The duration performance of PSEG-LI in 2016 was 1.14 hours, which is an improvement over last year.

The pie chart shows equipment failures are the leading cause of interruptions followed by tree contacts and accidents.

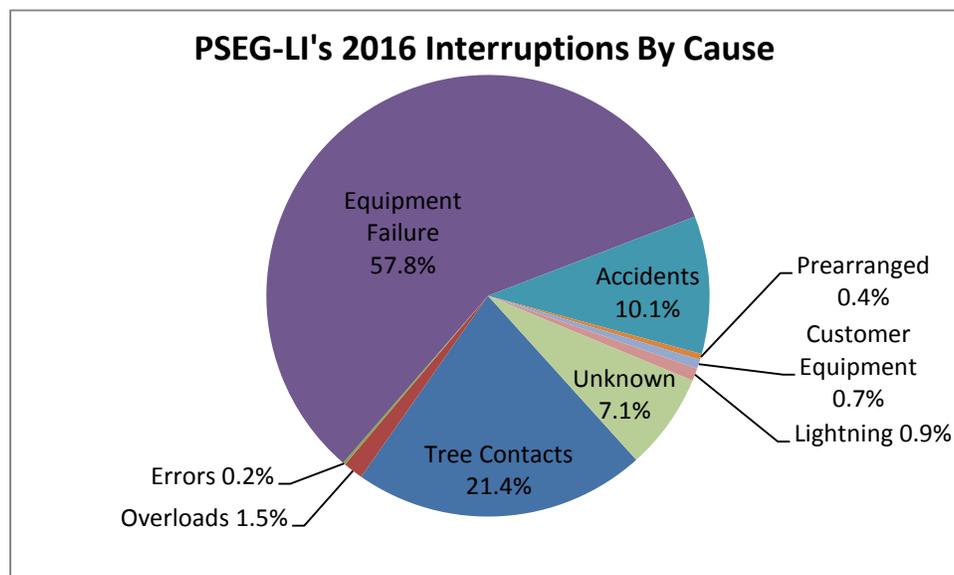


Figure 11: PSEG-LI’s 2016 Interruptions by Cause (Excluding Major Storms)

PSEG-LI through multiple programs is proactively taking steps to improve its frequency results in the future. In 2017, PSEG LI will implement over \$230 million in capital projects and over \$55 million on preventative maintenance programs, including tree trimming. PSEG-LI’s FEMA Hardening Program consist of rebuilding circuits damaged significantly during major storm events including pole upgrades, wire replacement with tree resistant designs, and increased sectionalizing devices to minimize

¹⁹ The final value has not been agreed upon by LIPA, Department of Public Service, and PSEG-LI.

customers interrupted in the event of a fault. In addition to the 63 circuits and 190 circuit miles completed in 2016, PSEG-LI plans to complete work on 309 miles and 128 circuits for in 2017. PSEG-LI also plans on replacing 28 station breakers in 2017, which will improve the reliability of these devices for fault clearing and reclosing.

For the last three years PSEG-LI has improved its tree trimming program to increase the clearance to overhead wires and increase the removal of hazard trees. PSEG-LI will complete its four year cycle of enhanced tree trimming in 2017 by completing 2,863 miles on 261 circuits. PSEG-LI also holds internal bi-weekly reliability meetings where results are reviewed, issues discussed, and when appropriate corrective actions will be coordinated. PSEG-LI has already taken steps to prioritize work and resources in 2017 based on these bi-weekly discussions.

The 2016 Interruption Report

**Office of Electric, Gas, and Water
June 2017**

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 2016, customers served is the number of customers as of December 31, 2016. 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)**

	2012	2013	2014	2015	2016	5 YR AVG
CHGE						
FREQUENCY	1.00	1.02	1.24	1.28	1.34	1.18
DURATION	2.38	2.30	2.27	2.07	2.33	2.27
CONED						
FREQUENCY	0.10	0.12	0.11	0.11	0.13	0.11
DURATION	2.39	2.67	3.02	3.11	2.49	2.73
PSEG-LI						
FREQUENCY	0.67	0.71	0.72	0.84	1.11	0.81
DURATION	1.26	1.13	1.36	1.31	1.14	1.23
NAT GRID						
FREQUENCY	0.90	0.99	0.96	1.02	1.05	0.98
DURATION	2.04	1.96	1.94	2.04	2.02	2.00
NYSEG						
FREQUENCY	0.98	1.10	1.03	1.17	1.19	1.09
DURATION	2.00	1.93	1.97	1.97	2.02	1.98
O&R						
FREQUENCY	0.94	0.89	1.08	1.01	1.06	0.99
DURATION	1.68	1.62	1.62	2.44	1.70	1.81
RG&E						
FREQUENCY	0.74	0.73	0.76	0.75	0.58	0.71
DURATION	1.79	1.82	1.74	1.82	1.79	1.79
STATEWIDE (WITHOUT CONED)						
FREQUENCY	0.85	0.92	0.92	1.00	1.07	0.95
DURATION	1.87	1.79	1.83	1.88	1.79	1.83
STATEWIDE (WITH CONED)						
FREQUENCY	0.53	0.57	0.57	0.62	0.67	0.59
DURATION	1.91	1.87	1.93	1.97	1.85	1.90

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

	2012	2013	2014	2015	2016	5 YR AVG
CHGE						
FREQUENCY	1.80	1.06	1.62	1.38	1.45	1.46
DURATION	8.55	2.36	3.74	2.09	2.51	4.17
CONED						
FREQUENCY	0.38	0.13	0.11	0.11	0.14	0.17
DURATION	71.91	2.71	3.09	3.14	2.67	32.88
PSEG-LI						
FREQUENCY	1.84	0.89	0.76	1.00	1.34	1.17
DURATION	22.55	1.65	1.42	1.95	1.46	8.23
NAT GRID						
FREQUENCY	1.13	1.39	1.17	1.06	1.18	1.18
DURATION	2.67	3.61	2.87	2.07	2.41	2.77
NYSEG						
FREQUENCY	1.85	1.41	1.34	1.28	1.57	1.48
DURATION	12.63	2.34	2.97	2.14	2.89	5.07
O&R						
FREQUENCY	1.86	1.02	1.19	1.01	1.21	1.25
DURATION	34.66	2.06	2.40	2.44	1.96	11.75
RG&E						
FREQUENCY	0.92	0.91	0.85	0.87	0.70	0.84
DURATION	3.01	2.75	2.32	2.14	2.09	2.48
STATEWIDE (WITHOUT CONED)						
FREQUENCY	1.51	1.19	1.10	1.09	1.28	1.23
DURATION	13.52	2.76	2.67	2.08	2.25	5.14
STATEWIDE (WITH CONED)						
FREQUENCY	1.03	0.73	0.68	0.67	0.79	0.78
DURATION	22.70	2.75	2.70	2.16	2.28	7.76

STATEWIDE (WITHOUT CON ED)

Excluding Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	49,827	52,863	53,723	53,551	57,960	53,585
Number of Customer-Hours	7,086,646	7,321,410	7,535,845	8,408,508	8,636,377	7,797,757
Number of Customers Affected	3,799,744	4,090,130	4,117,993	4,474,728	4,815,522	4,259,623
Number of Customers Served	4,468,023	4,466,568	4,480,215	4,494,878	4,517,887	4,485,514
Average Duration Per Customer Affected (CAIDI)	1.87	1.79	1.83	1.88	1.79	1.83
Average Duration Per Customers Served	1.59	1.64	1.69	1.88	1.92	1.74
Interruptions Per 1000 Customers Served	11.19	11.83	12.03	11.95	12.89	11.95
Number of Customers Affected Per Customer Served (SAIFI)	0.85	0.92	0.92	1.00	1.07	0.95

STATEWIDE (WITH CON ED)

Excluding Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	60,526	66,804	69,760	70,017	71,704	67,762
Number of Customer-Hours	7,914,335	8,380,016	8,624,342	9,582,883	9,710,475	8,842,410
Number of Customers Affected	4,145,730	4,487,270	4,478,047	4,852,363	5,246,331	4,641,948
Number of Customers Served	7,806,754	7,815,448	7,842,410	7,880,054	7,928,059	7,854,545
Average Duration Per Customer Affected (CAIDI)	1.91	1.87	1.93	1.97	1.85	1.90
Average Duration Per Customers Served	1.02	1.07	1.10	1.22	1.23	1.13
Interruptions Per 1000 Customers Served	7.79	8.56	8.93	8.93	9.10	8.63
Number of Customers Affected Per Customer Served (SAIFI)	0.53	0.57	0.57	0.62	0.67	0.59

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

For example, for the calendar year of 2016, customers served is the number of customers as of December 31, 2016. For indices using customers served, the previous year is used.

STATEWIDE (WITHOUT CON ED)

Including Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	88,800	63,885	62,009	56,723	66,790	67,641
Number of Customer-Hours	90,905,843	14,653,454	13,143,570	10,190,618	12,917,487	28,362,194
Number of Customers Affected	6,721,953	5,315,365	4,930,250	4,892,482	5,738,707	5,519,751
Number of Customers Served	4,468,023	4,466,568	4,480,215	4,494,878	4,517,887	4,485,514
Average Duration Per Customer Affected (CAIDI)	13.52	2.76	2.67	2.08	2.25	5.14
Average Duration Per Customers Served	20.42	3.28	2.94	2.27	2.87	6.32
Interruptions Per 1000 Customers Served	19.95	14.30	13.88	12.66	14.86	15.08
Number of Customers Affected Per Customer Served (SAIFI)	1.51	1.19	1.10	1.09	1.28	1.23

STATEWIDE (WITH CON ED)

Including Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	116,263	78,024	78,436	73,468	80,994	85,437
Number of Customer-Hours	181,026,042	15,785,340	14,300,945	11,381,657	14,148,142	47,328,425
Number of Customers Affected	7,975,227	5,732,710	5,304,278	5,271,638	6,199,042	6,096,579
Number of Customers Served	7,806,754	7,815,448	7,842,410	7,880,054	7,928,059	7,854,545
Average Duration Per Customer Affected (CAIDI)	22.70	2.75	2.70	2.16	2.28	7.76
Average Duration Per Customers Served	23.29	2.02	1.83	1.45	1.80	6.03
Interruptions Per 1000 Customers Served	14.96	9.99	10.04	9.37	10.28	10.88
Number of Customers Affected Per Customer Served (SAIFI)	1.03	0.73	0.68	0.67	0.79	0.78

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

For example, for the calendar year of 2016, customers served is the number of customers as of December 31, 2016. For indices using customers served, the previous year is used.

CENTRAL HUDSON

Excluding Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	5,566	5,497	6,608	6,387	7,407	6,293
Number of Customer-Hours	716,105	708,055	844,753	797,184	938,066	800,833
Number of Customers Affected	301,232	307,889	371,442	384,364	402,140	353,413
Number of Customers Served	300,537	299,591	300,225	300,647	302,432	300,686
Average Duration Per Customer Affected (CAIDI)	2.38	2.30	2.27	2.07	2.33	2.27
Average Duration Per Customers Served	2.39	2.36	2.82	2.66	3.12	2.66
Interruptions Per 1000 Customers Served	18.56	18.29	22.06	21.27	24.64	20.93
Number of Customers Affected Per Customer Served (SAIFI)	1.00	1.02	1.24	1.28	1.34	1.18

CENTRAL HUDSON

Including Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	8,603	5,665	8,160	6,587	7,802	7,363
Number of Customer-Hours	4,620,086	751,644	1,810,447	867,550	1,096,082	1,829,162
Number of Customers Affected	540,447	318,352	483,848	414,932	436,716	438,859
Number of Customers Served	300,537	299,591	300,225	300,647	302,432	300,686
Average Duration Per Customer Affected (CAIDI)	8.55	2.36	3.74	2.09	2.51	4.17
Average Duration Per Customers Served	15.40	2.50	6.04	2.89	3.65	6.08
Interruptions Per 1000 Customers Served	28.68	18.85	27.24	21.94	25.95	24.49
Number of Customers Affected Per Customer Served (SAIFI)	1.80	1.06	1.62	1.38	1.45	1.46

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

For example, for the calendar year of 2016, customers served is the number of customers as of December 31, 2016. For indices using customers served, the previous year is used.

CON ED (SYSTEM)

Excluding Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	10,699	13,941	16,037	16,466	13,744	14,177
Number of Customer-Hours	827,689	1,058,605	1,088,498	1,174,375	1,074,098	1,044,653
Number of Customers Affected	345,986	397,140	360,054	377,635	430,809	382,325
Number of Customers Served	3,338,731	3,348,880	3,362,195	3,385,176	3,410,172	3,369,031
Average Duration Per Customer Affected (CAIDI)	2.39	2.67	3.02	3.11	2.49	2.73
Average Duration Per Customers Served	0.25	0.32	0.33	0.35	0.32	0.31
Interruptions Per 1000 Customers Served	3.22	4.18	4.79	4.90	4.06	4.21
Number of Customers Affected Per Customer Served (SAIFI)	0.10	0.12	0.11	0.11	0.13	0.11

CON ED (SYSTEM)

Including Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	27,463	14,139	16,427	16,745	14,204	17,796
Number of Customer-Hours	90,120,199	1,131,886	1,157,376	1,191,039	1,230,655	18,966,231
Number of Customers Affected	1,253,274	417,345	374,028	379,156	460,335	576,828
Number of Customers Served	3,338,731	3,348,880	3,362,195	3,385,176	3,410,172	3,369,031
Average Duration Per Customer Affected (CAIDI)	71.91	2.71	3.09	3.14	2.67	32.88
Average Duration Per Customers Served	27.14	0.34	0.35	0.35	0.36	5.63
Interruptions Per 1000 Customers Served	8.27	4.23	4.91	4.98	4.20	5.28
Number of Customers Affected Per Customer Served (SAIFI)	0.38	0.13	0.11	0.11	0.14	0.17

CON ED (NETWORK)

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	4,758	7,574	10,080	10,523	6,980	7,983
Number of Customer-Hours	187,740	348,433	543,158	569,966	348,053	399,470
Number of Customers Affected	29,645	45,294	63,013	67,966	46,918	50,567
Number of Customers Served	2,454,427	2,461,468	2,473,101	2,497,705	2,510,320	2,479,404
Average Duration Per Customer Affected (CAIDI)	6.33	7.69	8.62	8.39	7.42	7.90
Average Duration Per Customers Served	0.08	0.14	0.22	0.23	0.14	0.16
Interruptions Per 1000 Customers Served	1.95	3.09	4.10	4.25	2.79	3.22
Number of Customers Affected Per Customer Served (SAIFI)	0.01	0.02	0.03	0.03	0.02	0.02

** Customer Served is the number of customers as of the last day of the current year.
For example, for the calendar year of 2016, customers served is the number of customers as of December 31, 2016. For indices using customers served, the previous year is used.

CON ED (RADIAL)

Excluding Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	5,941	6,367	5,957	5,943	6,764	6,194
Number of Customer-Hours	639,950	710,171	545,339	604,408	726,044	645,182
Number of Customers Affected	316,341	351,846	297,041	309,669	383,891	331,758
Number of Customers Served	884,304	887,412	889,094	887,471	899,852	889,627
Average Duration Per Customer Affected (CAIDI)	2.02	2.02	1.84	1.95	1.89	1.94
Average Duration Per Customers Served	0.73	0.80	0.61	0.68	0.82	0.73
Interruptions Per 1000 Customers Served	6.74	7.20	6.71	6.68	7.62	6.96
Number of Customers Affected Per Customer Served (SAIFI)	0.36	0.40	0.33	0.35	0.43	0.37

CON ED (RADIAL)

Including Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	22,705	6,565	6,347	6,222	7,224	9,813
Number of Customer-Hours	89,932,460	783,452	614,218	621,073	882,602	18,566,761
Number of Customers Affected	1,223,629	372,051	311,015	311,190	413,417	526,260
Number of Customers Served	884,304	887,412	889,094	887,471	899,852	889,627
Average Duration Per Customer Affected (CAIDI)	73.50	2.11	1.97	2.00	2.13	35.28
Average Duration Per Customers Served	102.05	0.89	0.69	0.70	0.99	20.87
Interruptions Per 1000 Customers Served	25.76	7.42	7.15	7.00	8.14	11.03
Number of Customers Affected Per Customer Served (SAIFI)	1.39	0.42	0.35	0.35	0.47	0.59

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

For example, for the calendar year of 2016, customers served is the number of customers as of December 31, 2016. For indices using customers served, the previous year is used.

NATIONAL GRID

Excluding Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	13,506	14,160	13,271	13,385	13,978	13,660
Number of Customer-Hours	2,926,731	3,102,175	2,979,765	3,343,062	3,398,634	3,150,073
Number of Customers Affected	1,434,256	1,585,651	1,537,355	1,640,947	1,684,257	1,576,493
Number of Customers Served	1,603,982	1,607,502	1,608,164	1,609,787	1,622,512	1,610,389
Average Duration Per Customer Affected (CAIDI)	2.04	1.96	1.94	2.04	2.02	2.00
Average Duration Per Customers Served	1.83	1.93	1.85	2.08	2.11	1.96
Interruptions Per 1000 Customers Served	8.43	8.83	8.26	8.32	8.68	8.48
Number of Customers Affected Per Customer Served (SAIFI)	0.90	0.99	0.96	1.02	1.05	0.98

NATIONAL GRID

Including Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	16,440	19,069	16,377	13,789	16,104	16,356
Number of Customer-Hours	4,811,549	8,047,050	5,374,356	3,543,893	4,597,543	5,274,878
Number of Customers Affected	1,804,502	2,232,186	1,874,011	1,711,850	1,906,370	1,905,784
Number of Customers Served	1,603,982	1,607,502	1,608,164	1,609,787	1,622,512	1,610,389
Average Duration Per Customer Affected (CAIDI)	2.67	3.61	2.87	2.07	2.41	2.77
Average Duration Per Customers Served	3.00	5.02	3.34	2.20	2.86	3.28
Interruptions Per 1000 Customers Served	10.27	11.89	10.19	8.57	10.00	10.16
Number of Customers Affected Per Customer Served (SAIFI)	1.13	1.39	1.17	1.06	1.18	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 2016, customers served is the number of customers as of December 31, 2016. For indices using customers served, the previous year is used.

NYSEG

Excluding Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	9,424	10,022	9,925	10,628	10,375	10,075
Number of Customer-Hours	1,675,701	1,814,646	1,738,911	1,992,932	2,108,879	1,866,214
Number of Customers Affected	839,427	940,750	884,683	1,012,506	1,042,453	943,964
Number of Customers Served	858,396	855,347	867,392	875,383	879,066	867,117
Average Duration Per Customer Affected (CAIDI)	2.00	1.93	1.97	1.97	2.02	1.98
Average Duration Per Customers Served	1.96	2.11	2.03	2.30	2.41	2.15
Interruptions Per 1000 Customers Served	11.03	11.68	11.60	12.25	11.85	11.62
Number of Customers Affected Per Customer Served (SAIFI)	0.98	1.10	1.03	1.17	1.19	1.09

NYSEG

Including Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	17,850	11,729	12,332	11,203	13,025	13,228
Number of Customer-Hours	19,975,449	2,830,224	3,391,684	2,381,242	3,977,003	6,511,120
Number of Customers Affected	1,581,500	1,210,993	1,143,341	1,110,385	1,374,336	1,284,111
Number of Customers Served	858,396	855,347	867,392	875,383	879,066	867,117
Average Duration Per Customer Affected (CAIDI)	12.63	2.34	2.97	2.14	2.89	5.07
Average Duration Per Customers Served	23.37	3.30	3.97	2.75	4.54	7.51
Interruptions Per 1000 Customers Served	20.88	13.66	14.42	12.92	14.88	15.25
Number of Customers Affected Per Customer Served (SAIFI)	1.85	1.41	1.34	1.28	1.57	1.48

** Customer Served is the number of customers as of the last day of the current year.
For example, for the calendar year of 2016, customers served is the number of customers as of December 31, 2016. For indices using customers served, the previous year is used.

PSEG-LI

Excluding Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	15,625	17,672	17,721	17,214	20,139	17,674
Number of Customer-Hours	945,305	890,558	1,096,866	1,222,162	1,408,373	1,112,653
Number of Customers Affected	752,311	791,039	805,693	934,097	1,237,719	904,172
Number of Customers Served	1,118,610	1,115,781	1,113,474	1,116,191	1,118,963	1,116,604
Average Duration Per Customer Affected (CAIDI)	1.26	1.13	1.36	1.31	1.14	1.23
Average Duration Per Customers Served	0.85	0.80	0.98	1.10	1.26	1.00
Interruptions Per 1000 Customers Served	14.00	15.80	15.88	15.46	18.04	15.83
Number of Customers Affected Per Customer Served (SAIFI)	0.67	0.71	0.72	0.84	1.11	0.81

PSEG-LI

Including Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	39,026	21,401	18,586	19,061	23,292	24,273
Number of Customer-Hours	46,371,469	1,648,627	1,210,719	2,166,956	2,183,379	10,716,230
Number of Customers Affected	2,056,428	997,229	853,209	1,111,055	1,495,619	1,302,708
Number of Customers Served	1,118,610	1,115,781	1,113,474	1,116,191	1,118,963	1,116,604
Average Duration Per Customer Affected (CAIDI)	22.55	1.65	1.42	1.95	1.46	8.23
Average Duration Per Customers Served	41.56	1.47	1.09	1.95	1.96	9.60
Interruptions Per 1000 Customers Served	34.98	19.13	16.66	17.12	20.87	21.74
Number of Customers Affected Per Customer Served (SAIFI)	1.84	0.89	0.76	1.00	1.34	1.17

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

For example, for the calendar year of 2016, customers served is the number of customers as of December 31, 2016. For indices using customers served, the previous year is used.

O&R

Excluding Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	2,652	2,449	3,226	2,900	3,223	2,890
Number of Customer-Hours	347,689	316,486	387,054	545,813	398,964	399,201
Number of Customers Affected	206,798	195,880	238,230	224,054	234,934	219,979
Number of Customers Served	220,129	220,813	221,579	221,542	223,048	221,422
Average Duration Per Customer Affected (CAIDI)	1.68	1.62	1.62	2.44	1.70	1.81
Average Duration Per Customers Served	1.58	1.44	1.75	2.46	1.80	1.80
Interruptions Per 1000 Customers Served	12.09	11.13	14.61	13.09	14.55	13.05
Number of Customers Affected Per Customer Served (SAIFI)	0.94	0.89	1.08	1.01	1.06	0.99

O&R

Including Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	3,326	2,570	3,398	2,900	3,547	3,148
Number of Customer-Hours	14,130,288	460,209	633,345	545,813	523,975	3,258,726
Number of Customers Affected	407,678	223,754	263,634	224,054	267,191	277,262
Number of Customers Served	220,129	220,813	221,579	221,542	223,048	221,422
Average Duration Per Customer Affected (CAIDI)	34.66	2.06	2.40	2.44	1.96	11.75
Average Duration Per Customers Served	64.41	2.09	2.87	2.46	2.37	14.72
Interruptions Per 1000 Customers Served	15.16	11.67	15.39	13.09	16.01	14.22
Number of Customers Affected Per Customer Served (SAIFI)	1.86	1.02	1.19	1.01	1.21	1.25

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

For example, for the calendar year of 2016, customers served is the number of customers as of December 31, 2016. For indices using customers served, the previous year is used.

RG&E

Excluding Major Storms

	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	3,054	3,063	2,972	3,037	2,838	2,993
Number of Customer-Hours	475,116	489,490	488,496	507,355	383,461	468,784
Number of Customers Affected	265,720	268,921	280,590	278,760	214,019	261,602
Number of Customers Served	366,369	367,534	369,381	371,328	371,866	369,296
Average Duration Per Customer Affected (CAIDI)	1.79	1.82	1.74	1.82	1.79	1.79
Average Duration Per Customers Served	1.32	1.34	1.33	1.37	1.03	1.27
Interruptions Per 1000 Customers Served	8.47	8.36	8.09	8.22	7.64	8.10
Number of Customers Affected Per Customer Served (SAIFI)	0.74	0.73	0.76	0.75	0.58	0.71

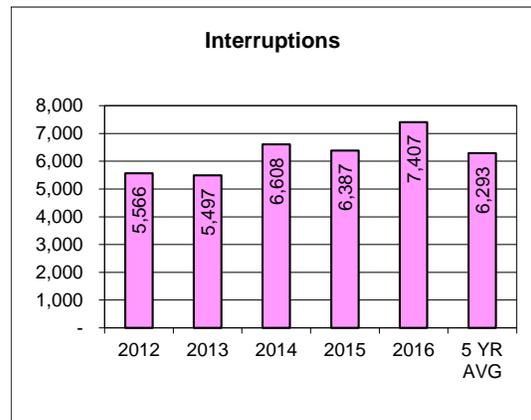
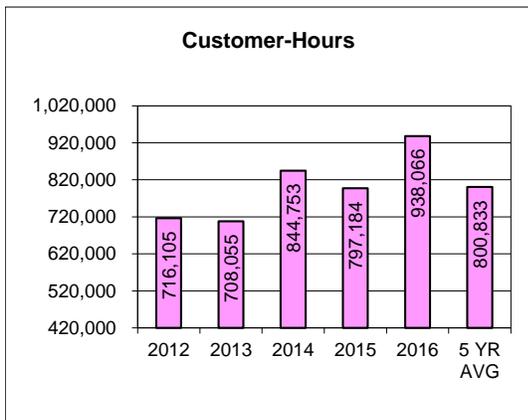
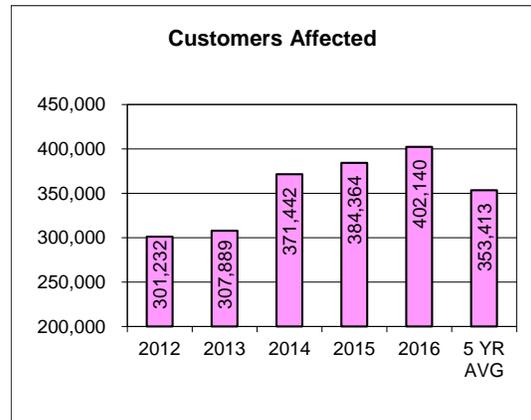
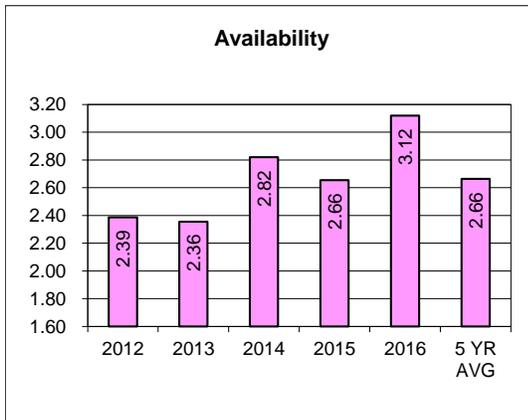
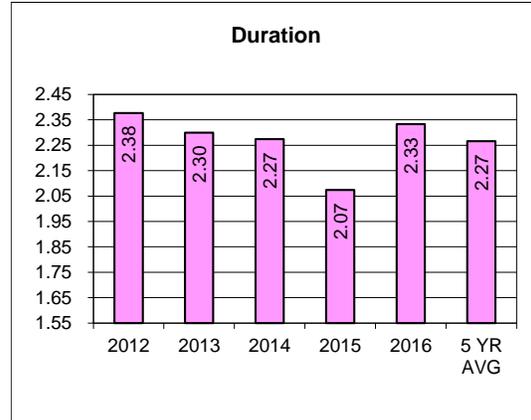
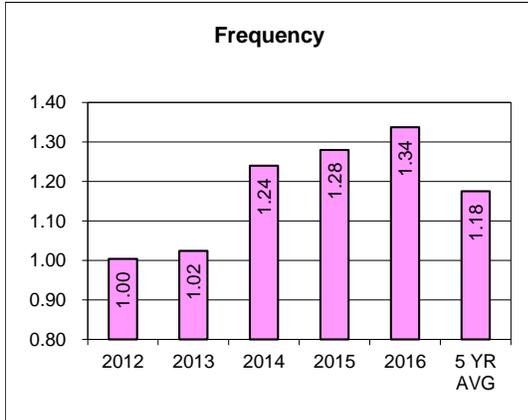
RG&E

Including Major Storms

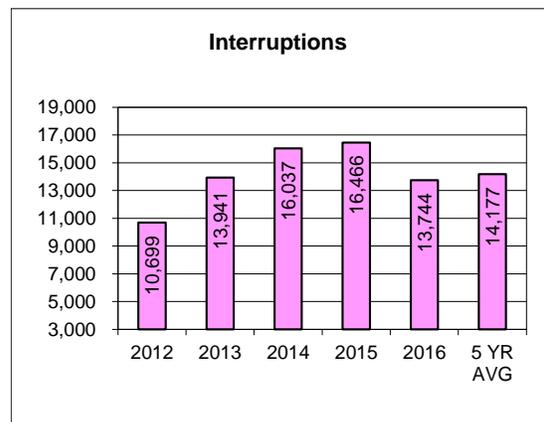
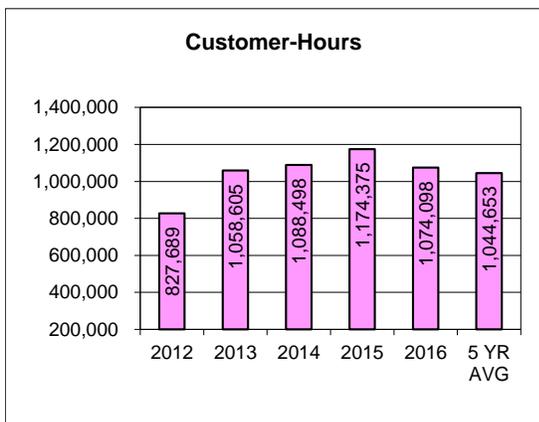
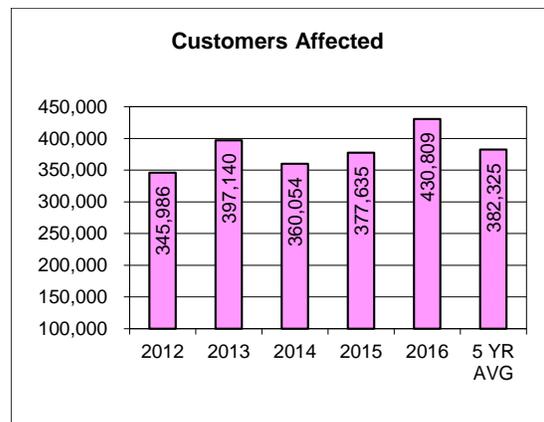
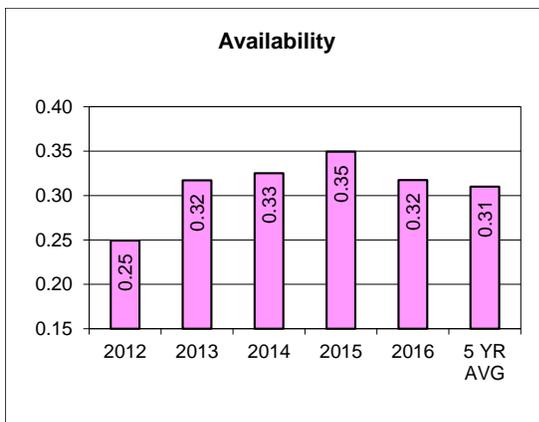
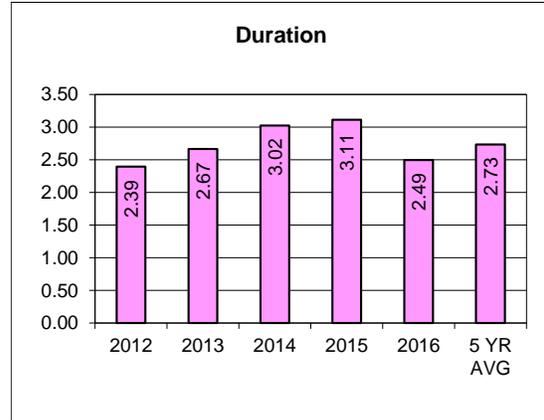
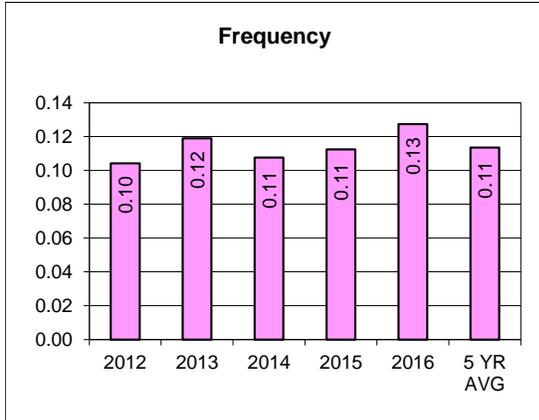
	2012	2013	2014	2015	2016	5 YR AVG
Number of Interruptions	3,555	3,451	3,156	3,183	3,020	3,273
Number of Customer-Hours	997,001	915,700	723,019	685,163	539,505	772,078
Number of Customers Affected	331,398	332,851	312,207	320,206	258,475	311,027
Number of Customers Served	366,369	367,534	369,381	371,328	371,866	369,296
Average Duration Per Customer Affected (CAIDI)	3.01	2.75	2.32	2.14	2.09	2.48
Average Duration Per Customers Served	2.76	2.50	1.97	1.85	1.45	2.09
Interruptions Per 1000 Customers Served	9.86	9.42	8.59	8.62	8.13	8.86
Number of Customers Affected Per Customer Served (SAIFI)	0.92	0.91	0.85	0.87	0.70	0.84

** Customer Served is the number of customers as of the last day of the current year.
For example, for the calendar year of 2016, customers served is the number of customers as of December 31, 2016. For indices using customers served, the previous year is used.

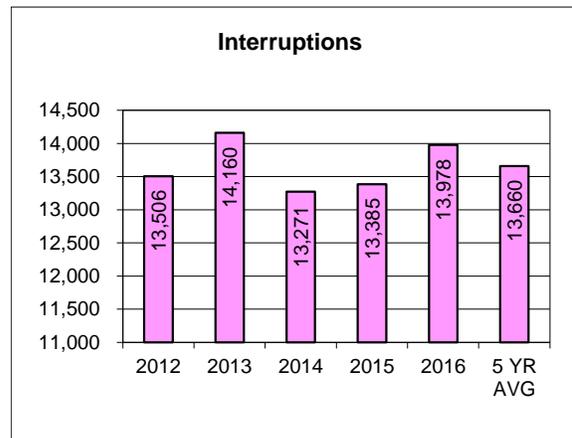
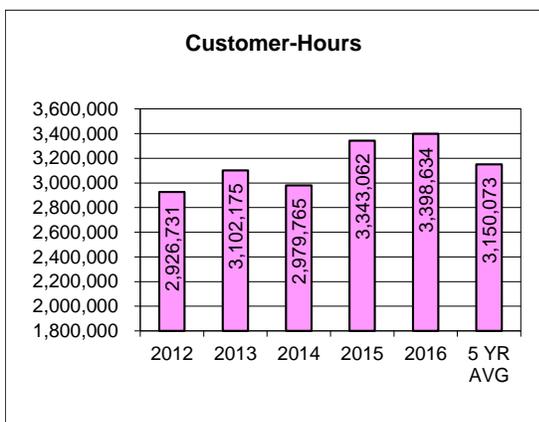
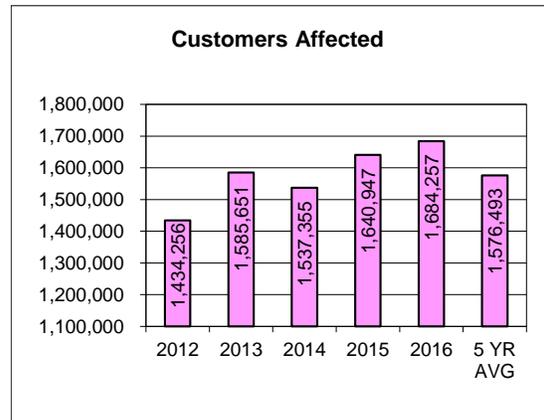
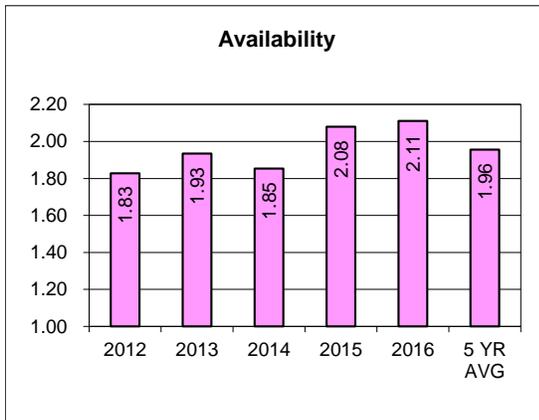
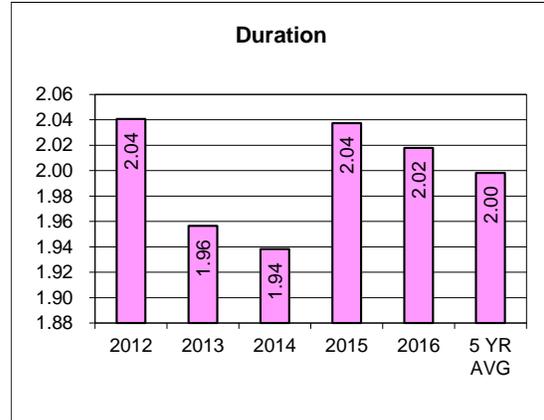
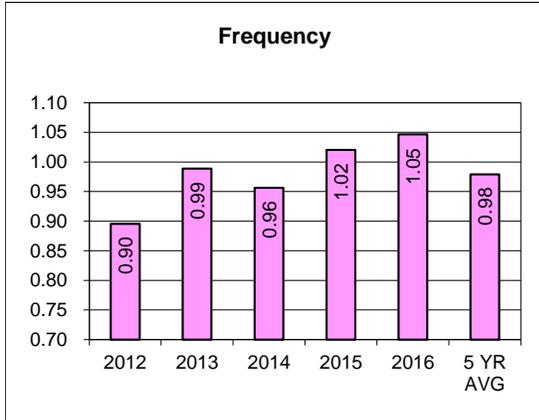
Central Hudson Gas and Electric (Excluding Major Storms)



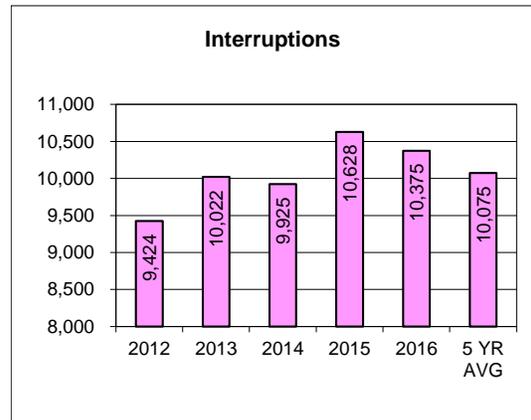
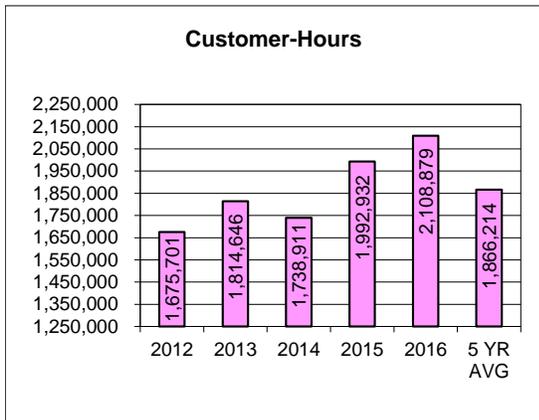
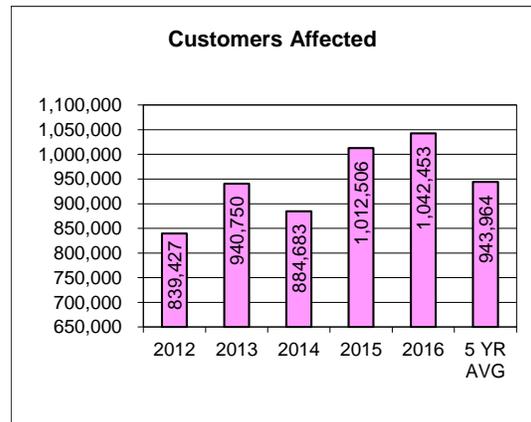
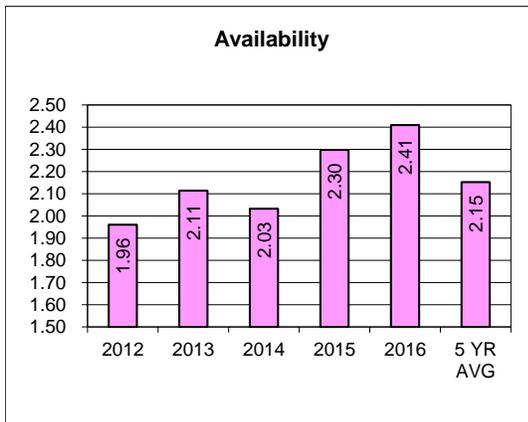
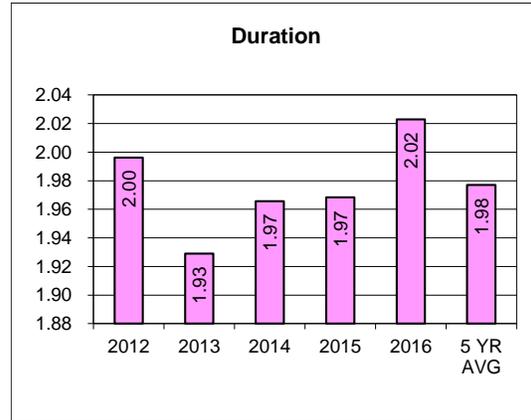
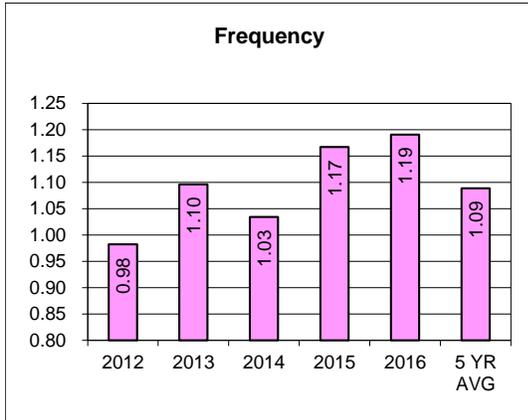
Con Edison – System (Excluding Major Storms)



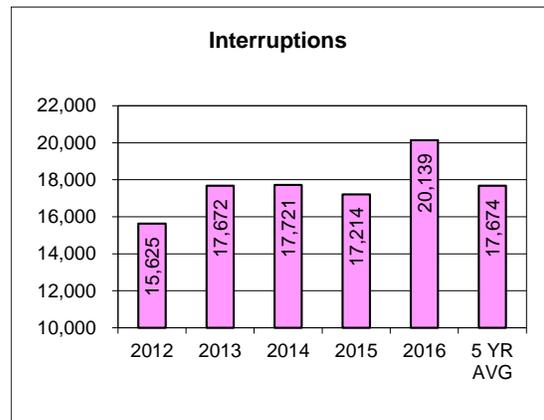
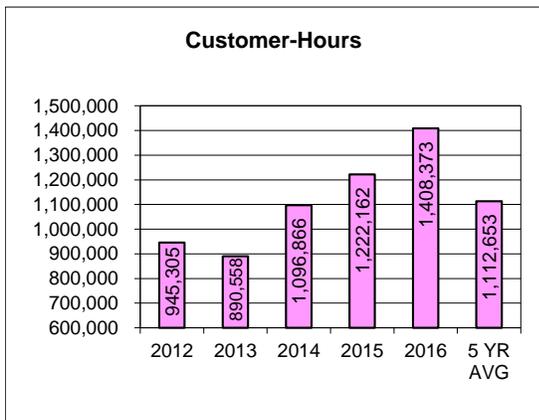
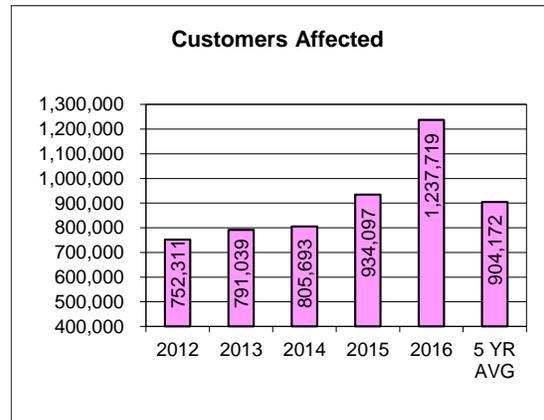
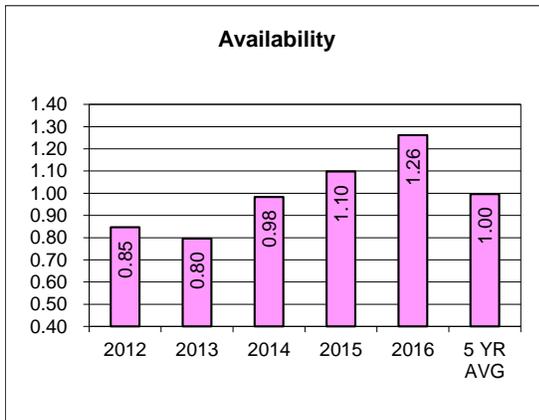
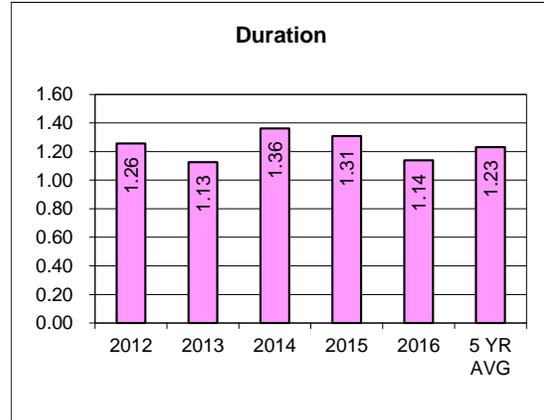
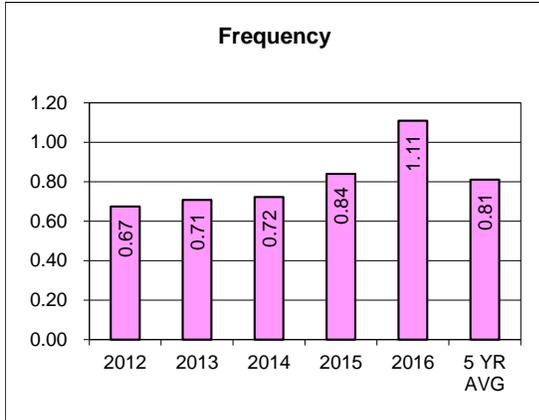
National Grid (Excluding Major Storms)



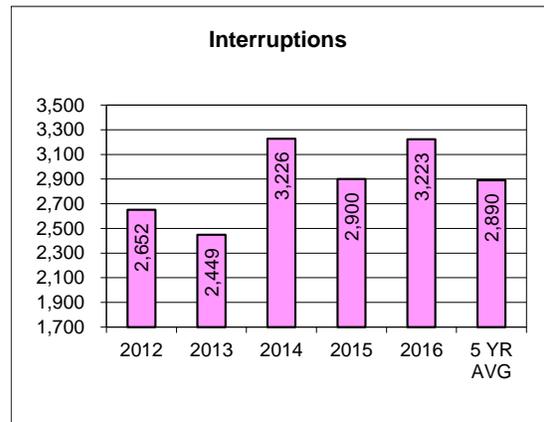
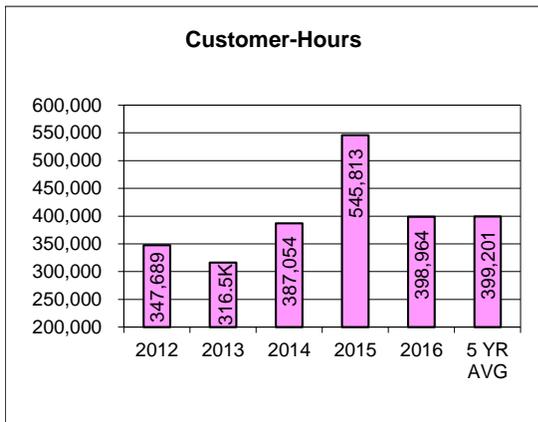
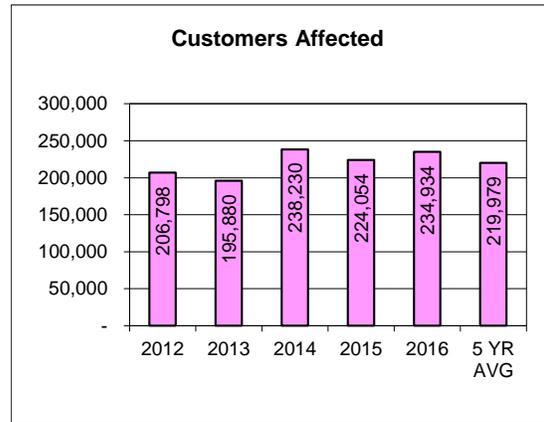
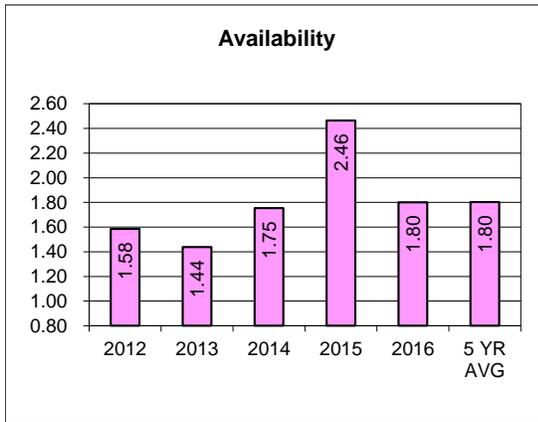
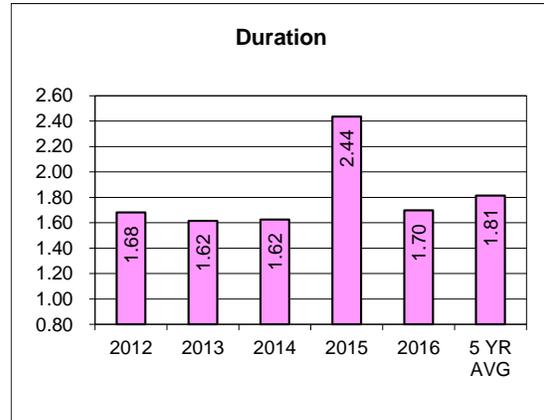
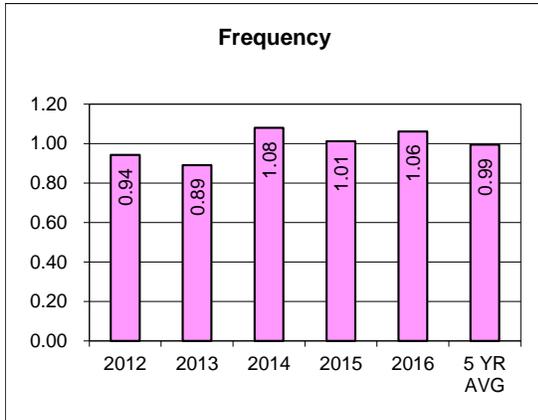
New York State Electric and Gas (Excluding Major Storms)



**PSEG-LI
(Excluding Major Storms)**



Orange & Rockland Utilities (Excluding Major Storms)



Rochester Gas and Electric (Excluding Major Storms)

