CENTRAL HUDSON
GAS & ELECTRIC CORPORATION

2017

ELECTRIC RELIABILITY REPORT

MARCH 29, 2018

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1. Overall Assessment of Reliability Performance

a) Corporate Overview/Definitions

Improved electric reliability and power quality continue to be important objectives for Central Hudson. The five Operating Divisions have SAIFI and CAIDI goals in accordance with the 2004 Order Adopting Changes to Standards on Reliability of Electric Service to guide their efforts to provide our customers with the best possible electric service reliability. In 2017, Central Hudson met the electric service Reliability Performance Mechanism targets defined in Case 14-E-0318 for both the CAIDI index and the SAIFI index. Central Hudson's 2017 non-storm SAIFI was 1.183, which is below the Reliability Performance Mechanism SAIFI target of 1.3. Central Hudson's 2017 non-storm CAIDI was 2.20, which is below the Reliability Performance Mechanism CAIDI target of 2.5.

The Electric Distribution and Standards Engineering Section has the responsibility in the Engineering Group to closely monitor the Central Hudson electric system and to analyze and develop plans to improve the performance and the reliability of electric service to all Central Hudson customers. In 2017, the Electric Distribution and Standards Engineering Section consisted of four subsections: Electric Operations, Electric Construction Standards, and Electric Distribution Planning (two teams with focus on Interconnections and Distribution Automation). All reported to the Director of Electric Distribution and Standards. The section staffing included:

- 1 Electric Distribution Operations Section Leader
  - 5 Electric Operations Engineers
  - 1 Electric Operations Utility Engineer
  - 1 Stray Voltage and Inspections Contractor
- 1 Electric Distribution Construction Standards Engineer Lead
  - 2 Electric Distribution Standards Engineers
  - 1 Electric Distribution Standards Contractor
- 1 Electric Distribution Planning Engineer Lead
  - 1 Electric Distribution Planning Engineer
  - 2 Electric Distribution Planning Engineering Technicians
  - 2 Electric Distribution Planning Contractors
- 1 Electric Distribution Planning Engineer Lead
  - 3 Electric Distribution Automation Engineers

All of the above employees were located in the Corporate Headquarters in Poughkeepsie, with the exception of the five Electric Operations Engineers. The Electric Operations Engineers were located throughout the service territory. Two were located in the Lower Hudson Division, one in the Mid-Hudson Division, and two in the Upper Hudson Division.

The following report details the 2017 reliability performance of the Central Hudson System and an assessment of the five operating areas' performance. This assessment includes a five-year history of performance, listings of both the SAIFI and CAIDI indices, and a synopsis of our current power quality programs.

****** NOTE ******

For clarification purposes, Central Hudson Substations are named by their geographic location. In addition, the distribution circuits emanating from them are numbered in accordance with their operating voltage. For example, a circuit operating at less than 5 kV is named with a three digit number, a 15 kV circuit consists of a four digit number with the second digit being a "0," and a 34.5 kV circuit consists of a four digit number with the second number being a "3." Also, where possible, sequential numbers are used for the circuits exiting from the same substation.

b) Corporate Performance List

i) 5 Year Detailed Assessment of Performance Indices (SAIFI & CAIDI)

The tables below summarize Central Hudson's performance over a period of five years. The SAIFI indices are calculated by dividing the total number of customers interrupted by the total number of customers served. The CAIDI indices are calculated by dividing the sum of the customer interruption duration by the total number of customers interrupted.

	SAIFI (Without Storms)	CAIDI (Without Storms)	SAIFI (With Storms)	CAIDI (With Storms)
2013	1.03	2.30	1.06	2.36
2014	1.24	2.27	1.61	3.74
2015	1.28	2.07	1.38	2.09
2016	1.33	2.34	1.44	2.51
2017	1.18	2.20	1.55	3.24
5-Year Average	1.21	2.24	1.41	2.79

Table 1a – 5-Year System SAIFI & CAIDI Performance Indices

	CAIDI (Without-Storms)				
	2013	**2014**	**2015**	**2016**	**2017**
Work Hours	1.61	1.63	1.49	1.52	1.90
Non-Work Hours	2.66	2.53	2.37	2.78	2.40

Table 1b – 5-Year System CAIDI Work Hours vs. Non-Work Hours (Without Storms)

Cause Code	Cause Code Description	SAIFI						CAIDI					
		2013	2014	2015	2016	2017	5-Year Average	2013	2014	2015	2016	2017	5-Year Average
2	Tree Contacts	0.456	0.468	0.564	0.563	0.600	0.530	2.65	2.74	2.58	2.84	2.55	2.67
3	Overloads	0.009	0.007	0.004	0.008	0.002	0.006	2.14	3.69	3.31	1.56	1.66	2.47
4	Operating or Working Errors	0.033	0.006	0.064	0.064	0.032	0.040	0.30	1.10	0.30	2.00	1.62	1.06
5	Apparatus or Equipment Failures	0.185	0.294	0.215	0.229	0.146	0.214	2.19	2.33	1.78	1.75	2.06	2.02
6	Accidents or Events Not Under the Utility's Control	0.156	0.276	0.283	0.296	0.265	0.255	2.00	1.57	1.60	1.85	1.63	1.73
7	Prearranged	0.011	0.018	0.005	0.007	0.010	0.010	1.84	3.04	2.68	2.06	2.10	2.34
8	Customer's Equipment or Failures	0.001	0.002	0.001	0.002	0.001	0.001	1.86	4.69	2.28	3.03	3.65	3.10
9	Lightning	0.084	0.030	0.030	0.035	0.021	0.040	2.31	2.25	2.82	3.87	1.90	2.63
10	Unknown or Unclassified	0.092	0.137	0.112	0.123	0.106	0.114	2.06	1.85	2.02	2.06	2.04	2.01

Table 2 – 5-Year System SAIFI & CAIDI Performance Indices by Cause Code

Evaluating Table 2 indicates outages due to "tree contacts" (Cause Code 2) are the number one non-storm SAIFI driver for 2017. Tree contact SAIFI in 2017 was 6% higher compared to 2016, and was 12% higher than the 5-year average. The largest contributor to tree contact SAIFI was limbs and trees from outside the clearance zone (50% of Cause Code 2 SAIFI). The increase in tree SAIFI from previous years can be attributed to danger trees as well as inclement weather throughout the year that was not significant enough to code as a storm. Danger trees are trees that are located outside of the limits of our easements but pose a threat to the reliability of our distribution system.

To begin to mitigate the impacts of danger trees, beginning in 2016, within 10 business days of each tree related outage that causes a breaker lock-out an assessment is performed by the Line Clearance personnel to collect data related to tree failure mode, condition, species and location (inside or outside ROW). Line Clearance personnel will assist the Director of Line Clearance in identifying trends in the data related to failure mode, condition, species, and location, and develop an effective process for identification and removal of danger trees along pre-scheduled distribution circuits. As part of the Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Electric Service in Case 17-E-0459, Central Hudson requested incremental funding to address the recommendations from ECI in order to improve the system reliability. This incremental funding request seeks to address the following distribution vegetation management items: address routine trimming backlog / underfunding, danger tree removals, EAB danger tree removals, off-cycle spot trimming and completion of the original enhanced line clearance areas.

Additionally, Central Hudson engaged Environmental Consultants, Inc. ("ECI") to provide an updated assessment on the line clearance program and the state of tree-related outages. Some of ECI's recommendations were to obtain increased funding to return to a four-year trimming schedule, create a separate schedule for circuits affected by the residency of protected bat species and to obtain funding for a widespread removal of danger trees, the majority of which are Ash trees along three-phase circuitry to combat tree mortality caused by the Emerald Ash Borer and other tree diseases. As a result of the recommendations, on May 5, 2017, Central Hudson petitioned the Public Service Commission ("Commission") for deferral accounting authority incremental funding for additional transmission line clearance and danger tree removal funding. The Commission ruled on this petition in Case 17-E-0250 on September 28, 2017, granting in part, deferral accounting and recovery for this purpose. The Commission approved up to $2 million for the removal of danger trees along 262 miles of three-phase circuitry on the twelve highest priority circuits.

In 2017, 69% of the top 20 drivers for tree SAIFI occurred during rain, wind, and/or lightning storm conditions. Of the total 2,904 tree related interruptions, only 22% occurred during a calm/normal day, and 41% occurred during adverse weather conditions that did not code for storm. More details about non-coding storms can be found in the district assessments in Section 2 of this report. The vegetation management programs are further discussed in Section 3a of this report.

Outages as a result of "accidents or events not under the utility's control" (Cause Code 6) was the second highest non-storm SAIFI driver in 2017. Although vehicle-related outages are still at historically high level, Code 6's decreased by 10% compared to 2016, driven primarily by vehicle-related outages (48% of Cause Code 6 SAIFI). 2017 saw a 14% decrease in vehicle-related SAIFI compared to 2016. The second driver of Cause Code 6 SAIFI was squirrels (35% of Cause Code 6 SAIFI); however, 2017 saw a decrease of 2% in overall squirrel-related SAIFI compared to 2016. This decrease was driven by Central Hudson continuing to use Electronic Reclosers to improve transient protection on the distribution system, as well as continued installation of squirrel guards and covered tap wires. See Section 1d for details on the number of Electronic Reclosers installed in 2017.

Outages as a result of "apparatus or equipment failures" (Cause Code 5) was the third highest non-storm SAIFI driver in 2017. Although Cause Code 5 was the third driver, 2017 saw a decrease in SAIFI of 36% compared to 2016. The top driver for Code 5 SAIFI in 2017 was conductor/cable (22% of Cause Code 5 SAIFI). The second and third drivers in 2017 were connectors and cutouts, together accounting for 25% of Cause Code 5 SAIFI. Although most porcelain cutouts impacting 500 or more customers were already replaced with newer, more resilient polymer cutouts, District

Operating Engineers continue to drive projects to replace porcelain cutouts at lower customer count thresholds, install more electronic reclosers, and create capital budget projects to replace aging infrastructure.

Non-storm CAIDI in 2017 decreased by 6% when compared to 2016 and was 3% lower than the five year average. This improvement can be attributed to the 10.2% reduction in tree-related outage CAIDI. In many cases, the interruption response time has been improved by scheduling additional crews to respond to outages at the end of the day or after hours and weekends based on the weather forecast and repair time has been improved through the identification of additional switching opportunities. Utilizing a Business Intelligence tool, COGNOS, the Electric T&D Department is collecting data that is being used to identify potential opportunities to improve response time and/or repair time. Engineering and Operations continue to work collaboratively to identify additional cost effective opportunities to improve our CAIDI performance. Specific CAIDI drivers are discussed in the Operating Area Performance section of this report (Section 2).

ii) Description of all major storms excluded from the reliability indices

February 2017

- February 13th through February 15th, 2017 – Snow Storm

  The Kingston District experienced a snow storm event that caused 200 interruptions and affected 12,476 customers (approximately 19% of the Kingston operating area's customers). The storm coded based on both duration and customer count. Sixty seven (67) customers experienced an interruption lasting over 24 hours. Priority was given to repairs that would restore the largest number of customers. During this event 26 Central Hudson poles were broken. Due to the confined nature of the storm, the Kingston District was assisted by other districts, thus reducing the overall CAIDI of the restoration effort.

- February 25th through February 27th, 2017 – Wind/Rain Storm

  The Kingston District experienced a wind/rain storm event that caused 138 interruptions and affected 13,166 customers (approximately 20% of the Kingston operating area's customers). The storm coded based on both duration and customer count. Forty-eight (48) customers experienced an interruption lasting over 24 hours. Priority was given to repairs that would restore the largest number of customers.

  The Poughkeepsie District experienced a wind/rain storm event that caused 96 interruptions and affected 7,161 customers (approximately 9.4% of the Poughkeepsie operating area's customers). The storm coded based on outage duration. Seven (7) customers experienced an interruption lasting over 24 hours. Priority was given to repairs that would restore the largest number of customers.

  The Newburgh District experienced a wind/rain storm event that caused 64 interruptions and affected 13,563 customers (approximately 18% of the Newburgh operating area's customers). The storm coded based on both duration and customer count. Seven (7) customers experienced an interruption lasting over 24 hours. Priority was given to repairs that would restore the largest number of customers.

March 2017

- March 2nd through March 3rd, 2017 – Rain/Snow Storm

  The Kingston District experienced a snow storm event that caused 95 interruptions and affected 11,559 customers (approximately 18% of the Kingston operating area's customers). The storm coded based on customer count. Priority was given to repairs that would restore the largest number of customers. During this event 5 Central Hudson poles were broken and the 3021 circuit Electronic Recloser locked out which was abnormally carrying extra 426 customers, on top of its 1,754 customers, from the 341 and 345 circuits. Due to the confined nature of the storm, the Kingston District was assisted by other districts, thus reducing the overall CAIDI of the restoration effort.

- March 14th through March 15th, 2017 – Snow/Ice Storm

  The Kingston District experienced a snow storm event that caused 47 interruptions and affected 9,787 customers (approximately 15% of the Kingston operating area's customers). The storm coded based on both duration and customer count. Due to emergency switching, power was restored to the vast majority of customers quickly and two (2) customers experienced an interruption lasting over 24 hours. Priority was given to repairs that would restore the largest number of customers. Due to the confined nature of the storm, the Kingston District was assisted by other districts, thus reducing the overall CAIDI of the restoration effort.

May 2017

- May 5th through May 7th 2017 – Thunderstorm

  The Poughkeepsie District experienced a thunderstorm event that caused 60 interruptions and affected 2,533 customers (approximately 3.3% of the Poughkeepsie operating area's customers). The storm coded based on outage duration. One (1) customer in the Poughkeepsie operating area experienced an interruption lasting over 24 hours. Priority was given to repairs that would restore the largest number of customers.

- May 18th 2017 – Thunderstorm

  The Catskill District experienced a thunderstorm event that caused 26 interruptions and affected 3,844 customers (approximately 11.2% of the Catskill operating area's customers). The storm coded based on customer count. No customers in the Catskill operating area experienced an interruption lasting over 24 hours. Priority was given to repairs that would restore the largest number of customers.

June 2017

- June 19th through June 20th, 2017 – Thunderstorm

  The Poughkeepsie District experienced a thunderstorm event that caused 74 interruptions and affected 7,716 customers (approximately 10% of the Poughkeepsie operating area's customers). The storm coded based on both outage duration and customer count. One (1) customer in the Poughkeepsie operating area experienced an interruption lasting over 24 hours. Priority was given to repairs that would restore the largest number of customers.

October 2017

- October 29th through October 31th, 2017 – Thunderstorm

  The Kingston District experienced a thunderstorm event that caused 188 interruptions and affected 8,991 customers (approximately 14% of the Kingston operating area's customers). The storm coded based on both duration and customer count. Forty-two (42) customers experienced an interruption lasting over 24 hours. Priority was given to repairs that would restore the largest number of customers. During this event 12 Central Hudson poles were broken, and many others had to be reset or re-anchored.

  The Poughkeepsie District experienced a thunderstorm event that caused 90 interruptions and affected 3,395 customers (approximately 5% of the Poughkeepsie operating area's customers). The storm coded based on outage duration. Five (5) customers in the Poughkeepsie operating area experienced an interruption lasting over 24 hours. Priority was given to repairs that would restore the largest number of customers.

  The Fishkill District experienced a thunderstorm event that caused 38 interruptions and affected 2,876 customers (approximately 6% of the Fishkill operating area's customers). The storm coded based on outage duration. Five (5) customers in the Fishkill operating area experienced an interruption lasting over 24 hours. Priority was given to repairs that would restore the largest number of customers.

iii) Corrective actions to be taken in areas where reliability performance indices were not met

In 2017, Central Hudson met the electric service Reliability Performance Mechanism targets defined in Case 14-E-0318 for both the CAIDI index and the SAIFI index. Central Hudson's 2017 non-storm SAIFI was 1.183, which is below the Reliability Performance Mechanism SAIFI target of 1.3. Central Hudson's 2017 non-storm CAIDI was 2.20, which is below the Reliability Performance Mechanism CAIDI target of 2.5.

iv) Corrective actions to be taken in response to adverse trends or performance in specific areas or categories

With the exception of Cause Code 2 – Tree-Related interruptions and Cause Code 6 – Accidents or Events not under Central Hudson's Control, Table 2 does not indicate an adverse trend in the past 5 years. 2017 non-storm SAIFI was primarily driven by "tree contacts" which has been increasing over the past 5 years. Central Hudson strives to continue the tree trimming program as scheduled within budget constraints and implement spot trimming and danger tree removal as necessary to help reduce the amount of tree related incidents. Central Hudson's response to this negative trend was described in Section 1.b.i..The adverse trend within Cause Code 6 – Accidents or Events not under Central Hudson's Control, can be attributed to an increase in SAIFI from outages due to squirrel contact incidents. To combat this trend, Central Hudson is continuing to use Electronic Reclosers to improve transient protection on the distribution system, as well as the continued installation of squirrel guards and covered tap wires. Additionally, Central Hudson is reviewing design practices and equipment specifications to make the distribution more resistant to squirrel contact outages. In January 2017, Central Hudson launched a distracted driving awareness campaign, *'Thanks for putting down the phone. Stay in the Safety Zone: It's the bright thing to do'*. Safety messages continue to be shared through television, radio, newspapers, highway billboards, and social media, and a Family Safe Driving Agreement is available on our website.

c) Major distribution capital investments made in the year and their impact on reliability

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

d) Details about distribution reliability projects/investments made in the year and their impact on reliability

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
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[redacted]

Remote Communication

Central Hudson continues to utilize Sensus RTM (formerly referred to as Telemetric) communication devices to provide communications to DA devices. Central Hudson will maintain communications to our field devices with Sensus RTM until the Network Strategy program is fully rolled out.

A Network Strategy project is in progress to replace our existing Sensus cellular communications in most locations. The Network Strategy solution will provide enhanced communications to our field devices. Intelligent electronic devices on the distribution system will communicate over the Tier 2 communications platform before transitioning to the Tier 1 platform for backhaul to the Distribution Management System (DMS). The Tier 2 network strategy will provide sufficient bandwidth to allow more frequent data polling from

our field devices along with remote control via the DMS. Installation of the Tier 2 network radios was primarily focused in the Fishkill operating district during 2017.

Distribution Line Infrared Surveys

During the summer of 2017, distribution line infrared surveys were conducted in each of the five operating areas. These surveys help identify equipment that have poor connections that will eventually lead to a thermal failure. By identifying these "hot spots", action can be taken to proactively prevent outages due to equipment failure. Distribution line infrared surveys of the three-phase mainline of all distribution circuits were completed in 2017. There were 66 items found that were deemed "Immediate", "Critical", or "Serious" in 2017. The majority of repairs on items deemed "Immediate" have been completed. Remaining repairs will be completed before the 2018 summer peak. The total cost of the infrared survey in 2017 was $17,500. Repairs made are not considered major capital investment work, and are handled through expense at the operating area level.

e) Details about distribution reliability projects/investments to be taken based on the results from the annual distribution facility inspection reports provided in February of each year

Central Hudson performs physical inspections of the following facilities:

- Distribution Overhead
- URD – Pad-Mounted equipment
- Underground – Manholes / Pull Boxes
- Transmission Overhead

Facility inspections continue to be performed at the same time as contact (stray) voltage testing whenever possible. Inspectors are instructed to be conservative and report anything that looks questionable, which will then be reviewed by a Central Hudson employee prior to repair/replacement. This is a more efficient utilization of available resources to ensure all potential issues are identified. Due to the complexity of the network system and intricacies of working in manholes and pull boxes, Central Hudson personnel are utilized to perform inspections on these facilities.

In 2008, Central Hudson began to utilize third party contractors to replace guy guards that had been broken or were missing from guy wires. These Contractors provide specialized repair teams that are able to store extra guy guards on their vehicles. This program has been a success. In 2013, 2014, 2015, 2016 and 2017; 4,230, 5,697, 2,454, 1,811, and 1,772 locations had missing guy guards replaced, respectively. Currently, there are only 56 known locations in need of replacement guy guards.

Facility inspections provide the benefit of identifying locations in need of trimming. Since 2013, 7,656 trimming conditions were identified and ranked as Level III, 97 trimming conditions were identified and ranked as Level II, and 11 trimming conditions were identified and ranked as Level I. Of the total 7,764 vine conditions identified, 7,763 (99.99%) were closed within the established "Time Frame for Repair", and 1 condition is not due and will be repaired at a later date ("Not Repaired, Not Due").

Facility inspections help identify poles in need of replacement. Careful inspections determine if poles are in need of replacement due to conditions such as broken poles, severe pole lean, pole rot, wash out, evidence of flashover and woodpecker holes. Replacements are included in an annual Distribution Pole Replacement Program. As a direct result of facilities inspections, approximately 1,253 poles were replaced in 2017. Expenditures associated with pole replacements as a result of facility inspections are not tracked separately from other types of pole work; therefore 2017 expenditures are not available. In addition, many poles identified are replaced through larger capital budget projects. $810,000, $810,000, $1,000,000, and $1,800,000 were budgeted for the total Distribution Pole Replacement Program in 2014, 2015, 2016 and 2017 respectively. $2,425,000 has been budgeted for 2018. These budgets do not reflect total expenditures on pole replacements.

Facility inspections help identify manholes and pull boxes, padmount transformers and switches, as well as cable and underground equipment that are in need of repair. Several items were addressed in 2017, including wall reinforcement, broken covers, minor ceiling repair, reinforcement / replacement of rusted I-beams, tripping hazards and clearing of debris.

Facility inspections were utilized to drive reliability and efficiency improvement programs. In previous years Central Hudson had contract technicians perform micro-surveys as a part of regular facility inspections and testing. These included a cutout inventory by composition (porcelain or polymer), pole mounted streetlight inventory (including head type, body type, bulb type (when applicable), bulb wattage (when applicable), width, and decorative arm) and wildlife protector survey to check if all transformers had the approved wildlife protector installed on the primary bushing. The findings from micro-surveys performed from 2010 to 2012 have been reviewed and were used to help plan replacement and maintenance programs in previous years. No micro-surveys are planned going forward due to the decreased scope of stray voltage testing to approximately 20% of Central Hudson assets. This reduction has limited the synergies that were identified in performing a “micro-survey” while performing stray voltage testing. However, inspectors have been requested to look for items such as multiple automatic splices in a span that will assist in the development of future reliability improvement projects.

2. Division/Operating Area Performance

CATSKILL OPERATING DISTRICT

a) Detailed assessment of the Catskill District reliability performance indices (SAIFI & CAIDI) and all applicable cause codes. Assessment should include annual and five-year performance information for each measure and each cause code.

	PSC SAIFI Objective	SAIFI (Without Storms)	PSC CAIDI Objective	CAIDI (Without Storms)
2013	1.0	1.03	2.00	2.14
2014	1.0	1.61	2.00	2.32
2015	1.0	1.45	2.00	1.60
2016	1.0	1.29	2.00	1.90
2017	1.0	1.24	2.00	2.06
5 Year Average		1.32		2.01

Table 3 – 5-Year Catskill SAIFI & CAIDI Performance Indices

Cause Code	Cause Code Description	SAIFI						CAIDI					
		2013	2014	2015	2016	2017	5-Year Average	2013	2014	2015	2016	2017	5-Year Average
2	Tree Contacts	0.426	0.301	0.595	0.430	0.544	0.459	2.28	2.65	2.04	1.91	2.39	2.22
3	Overloads	0.002	0.000	0.000	0.000	0.000	0.001	2.77	2.86	1.53	1.71	1.88	2.59
4	Operating or Working Errors	0.001	0.000	0.000	0.142	0.004	0.029	1.12	2.07	1.67	2.37	0.59	2.32
5	Apparatus or Equipment Failures	0.148	0.851	0.379	0.207	0.147	0.346	2.07	2.53	0.68	1.97	2.57	2.02
6	Accidents or Events Not Under the Utility's Control	0.202	0.299	0.288	0.288	0.348	0.285	1.60	1.60	1.58	1.67	1.52	1.59
7	Prearranged	0.009	0.008	0.002	0.014	0.015	0.009	1.52	1.92	1.15	1.66	1.77	1.69
8	Customer's Equipment or Failures	0.000	0.000	0.000	0.004	0.000	0.001	4.57	0.00	2.45	0.23	0.00	0.30
9	Lightning	0.132	0.03	0.058	0.010	0.007	0.048	2.47	1.90	2.42	2.65	2.17	2.39
10	Unknown or Unclassified	0.105	0.121	0.128	0.190	0.170	0.143	2.35	1.97	1.97	1.79	1.76	1.93

Table 4 – 5-Year Catskill SAIFI & CAIDI Performance Indices by Area

b) If SAIFI/CAIDI targets were not met, provide the following:

i) <u>Description of problems that resulted in failure to meet the target</u>

During 2017, the Catskill Operating Area had a SAIFI of 1.24 and a CAIDI of 2.06 (excluding "major storm" activity). The 1.24 SAIFI index is higher than the established operating area target of 1.00 by 0.24 and is approximately 6% lower than the 5-year average SAIFI index of 1.32. This was a 4% improvement from the 2016 SAIFI value of 1.29. The 2.06 CAIDI index is higher than the established operating area minimum of 2.00 by 0.06 and is approximately 2.5% higher than the five-year average CAIDI index of 2.01.

The Catskill District non-storm SAIFI objective was exceeded primarily due to "tree contacts" and "accidents or events not under the utility's control".

1) On November 6, a tree from outside of the clearance zone caused the 69 kV "CL" line to lock out at 20:02. The "CL" lockout resulted in the loss of power to the Lawrenceville Substation (circuit 2385). The customers fed by the Freehold and South Cairo Substation were restored in 3 minutes and 13 seconds via supervisory switching. The customers fed by Lawrenceville circuit 2385 were restored after the CL-491 was manually opened to isolate the fault. Once the fault was isolated the "CL" line was back fed to the open CL-491 from the South Cairo Substation to restore Lawrenceville at 20:33. A total of 1,891 customers were affected by this outage for 31 minutes.

2) On May 20, a dump truck hooked the circuit 1072 neutral and broke pole 113376. This pole has both circuit 1076 and 1072 on it just east of the Coxsackie Substation. The broken pole was isolated allowing the circuit 1076 substation breaker to be closed in 1:31. Distribution switching was completed to restore circuit 1072 in 1:42. A total of 1,888 customers were affected by this outage.

3) On September 11, a car hit and broke pole 124236 on Route 405 in Westerlo causing the Westerlo circuit 1091 substation breaker to lock out. The Greenville pad-mounted automatic throw over saved 257 customers from an outage. Crews opened 3-600 amp disconnects on pole 73867 and subsequently back fed through the Greenville pad-mounted automatic throw over to restore power to 1,316 customers in 1:57. Line breaks were installed on pole 124233 to allow the Westerlo circuit 1091 substation breaker to be closed in 3:16 to restore power to 111 customers. Eight customers remained without power until repairs were completed in 7 hours. A total of 1,435 customers were affected by this outage.

The Catskill District non-storm CAIDI objective was exceeded primarily due to "tree contacts" that resulted from minor storm activity. The Catskill District only experienced 2 "code 1" storm events during 2017. During the four major storm events that did not impact the Catskill Operating District, Catskill crews were called upon to assist other districts in the restoration efforts. With fewer crews available due to storm restoration efforts, the minor storm outages in the Catskill District took longer to restore. The average tree outage duration during the time frame when at least one other District had a "code 1" storm event was 3.6 hours.

As shown in the tables in Section 5 of this report, of the 27 circuits in the Catskill Operating Area, 52% of these circuits (14 out of 27) performed at or better than the Electric Service Standard SAIFI level of 1.0. 60% of the Catskill circuits (16 out of 27) performed better than the Electric Service Standard CAIDI level of 2.00 (120 minutes per interruption).

ii) <u>Historical O&M efforts and expenditures within the Catskill area (to the extent possible) for each of the past 5 years</u>

Central Hudson does not identify O&M efforts and expenditures on a District level. This is done on a System level and is addressed in Section 3 of this report.

iii) <u>Corrective actions to be taken with target dates for completion</u>

1) Circuit 1071 and 1083 – Polyphase and reconductor Route 9W 3.0 miles from New Baltimore to the New York State Thruway entrance in Coxsackie. This is an infrastructure/reliability improvement project. Scheduled for completion during the second quarter of 2018.

2) Circuit 1083 – Polyphase and reconductor Route 144 in New Baltimore, 0.5 Miles. This is an infrastructure/operating improvement project. Scheduled for completion during the second quarter of 2018.

3) Circuit 1092 – Rebuild Single Phase along Stone Bridge Road, 0.75 Miles. This is a 10X reliability improvement project. Scheduled for completion during the second quarter of 2018.

4) Circuit 2001 – Rebuild Three Phase along Paul Saxe Road, 1.25 Miles. This is an infrastructure/reliability improvement project. Scheduled for completion during the fourth quarter of 2018.

5) Circuit 2001 / 2042 – Install a VIPER ALT on Route 23A in Palenville. This is a reliability improvement project. Scheduled for completion in the third quarter of 2018.

6) Circuit 2072 – Construct circuit exit from the Freehold Substation, 1.2 Miles. This is a reliability improvement /operating project. Scheduled for completion during the second quarter of 2018.

7) Install three electronic reclosers in 2018. The electronic reclosers will replace existing Type V4L recloser installations. Scheduled for completion during the fourth quarter of 2018.

8) Tree trimming of 8 Catskill District circuits scheduled throughout 2018 will improve the reliability of 11,400 customers as tree-related outages have outage durations that are typically longer than average. – 4th Quarter 2018.

c) Confirm compliance with corrective actions identified in last year's report if Catskill missed the targets in the previous year.

The following 2017 projects were listed in the 2016 annual report as being expected to improve the future reliability in the Catskill Operating Area. More time will be needed to realize the impact on reliability these projects will have.

1) 3X Action Items – The District continues to monitor the 3X report on a monthly basis in order to identify locations in need of animal guards. This is a proactive step in reducing the number of outages caused by squirrels.

2) Circuit 1071 and 1083 – Polyphase and reconductor Route 9W, 3.0 miles from New Baltimore to the New York State Thruway entrance in Coxsackie. This is an infrastructure/reliability improvement project. This project was deferred due to CATV projects and other emerging priorities.

3) Circuit 2001/2042 – Install VIPER ALT on Route 23A in Palenville. This is a reliability improvement project. This project was deferred due to CATV projects and other emerging priorities

4) Circuit 1092 – Rebuild Single Phase along Route 357 and Hale Road, 5.0 Miles. This is a 10X reliability improvement project. Completed in the fourth quarter of 2017.

5) Installed four electronic reclosers to replace existing Type V4L recloser installations as the first fuse point for circuits 2002, 2004 (2) and circuit 2005. Completed during the fourth quarter of 2017.

6) Due to inadequate funding, no circuits were trimmed in the Catskill District during 2017. The eight circuits that were planned for 2017 serve a total of 11,400 customers.

KINGSTON OPERATING DISTRICT

a) Detailed assessment of the Kingston District reliability performance indices (SAIFI & CAIDI) and all applicable cause codes. Assessment should include annual and five-year performance information for each measure and each cause code.

	PSC SAIFI Objective	**SAIFI** (Without Storms)	**PSC** CAIDI Objective	**CAIDI** (Without Storms)
2013	1.00	1.53	2.25	2.48
2014	1.00	1.76	2.25	2.43
2015	1.00	1.58	2.25	2.45
2016	1.00	1.79	2.25	2.53
2017	1.00	1.83	2.25	2.23
5 Year Average		1.70		2.42

Table 5 – 5-Year Kingston SAIFI & CAIDI Performance Indices

Cause Code	**Cause Code Description**	**SAIFI**						**CAIDI**					
		2013	**2014**	**2015**	**2016**	**2017**	**5-Year Average**	**2013**	**2014**	**2015**	**2016**	**2017**	**5-Year Average**
2	Tree Contacts	0.736	0.809	0.899	1.032	1.146	0.924	3.09	2.88	2.80	3.10	2.59	2.86
3	Overloads	0.005	0.001	0.001	0.001	0.001	0.002	4.31	1.65	1.58	3.70	2.16	3.02
4	Operating or Working Errors	0.140	0.002	0.014	0.041	0.003	0.040	3.66	0.87	2.45	0.81	2.98	0.55
5	Apparatus or Equipment Failures	0.304	0.451	0.222	0.179	0.226	0.276	2.49	2.11	2.37	2.06	1.51	2.12
6	Accidents or Events Not Under the Utility's Control	0.201	0.293	0.288	0.345	0.294	0.284	1.35	1.53	1.50	1.39	1.43	1.60
7	Prearranged	0.007	0.013	0.002	0.012	0.016	0.010	1.90	2.31	2.13	1.94	1.84	2.03
8	Customer's Equipment or Failures	0.000	0.001	0.001	0.004	0.003	0.002	7.56	3.10	3.05	4.03	3.40	3.56
9	Lightning	0.036	0.027	0.025	0.022	0.036	0.034	2.96	5.59	3.38	4.44	2.25	3.21
10	Unknown or Unclassified	0.079	0.159	0.129	0.153	0.108	0.125	2.23	2.18	2.15	2.05	2.06	2.10

Table 6 – 5-Year Kingston SAIFI & CAIDI Performance Indices by Area

b) If SAIFI/CAIDI targets were not met, provide the following:

i) <u>Description of problems that resulted in failure to meet the target</u>

During 2017, the Kingston Operating Area had a SAIFI of 1.83 and a CAIDI of 2.23 (excluding 'major storm' activity). The 1.83 SAIFI index is higher than the established operating area target of 1.00 by 0.83 and is approximately 9.6% higher than the previous 4-year average SAIFI index of 1.67. The 2.23 CAIDI index is lower than the established operating area minimum of 2.25 by 0.02 and is approximately 9.7% better than the previous 4-year average CAIDI index of 2.47.

The Kingston District non-storm SAIFI objective was exceeded primarily due to "tree contacts." Tree outage SAIFI was 11% higher in 2017 when compared to 2016 and 32% higher than the previous 4-year average. During 2017, eleven circuits in the Kingston District were trimmed. These circuits serve 15,334 customers comprising 23% of the district's total customer count. During 2018, twenty-five circuits in the Kingston District are scheduled for trimming. These circuits serve 22,612 customers comprising 35% of the district's total customer count. The scheduled trimming is expected to provide some offset to the deterioration in the tree-related SAIFI in the Kingston District.

The Kingston District has been at the epicenter of the outbreak of the Emerald Ash Borer infestation in the Central Hudson territory. The conditions in the district are hospitable to the prevalence of Ash trees and as such the rapid spreading of the pest. In its analysis of our vegetation management practices, ECI examined the health of a sample of the Ash tree population and found that conditions in Kingston to be in the most advanced state of decline as seen in Chart 1. The impact of the infestation is showing up within the reliability data as seen in Chart 2 where it is clear that tree outages are increasing at a faster pace in the Kingston District and trees emanating from outside the clearance zone are contributing to customer interruptions at an increasing rate.

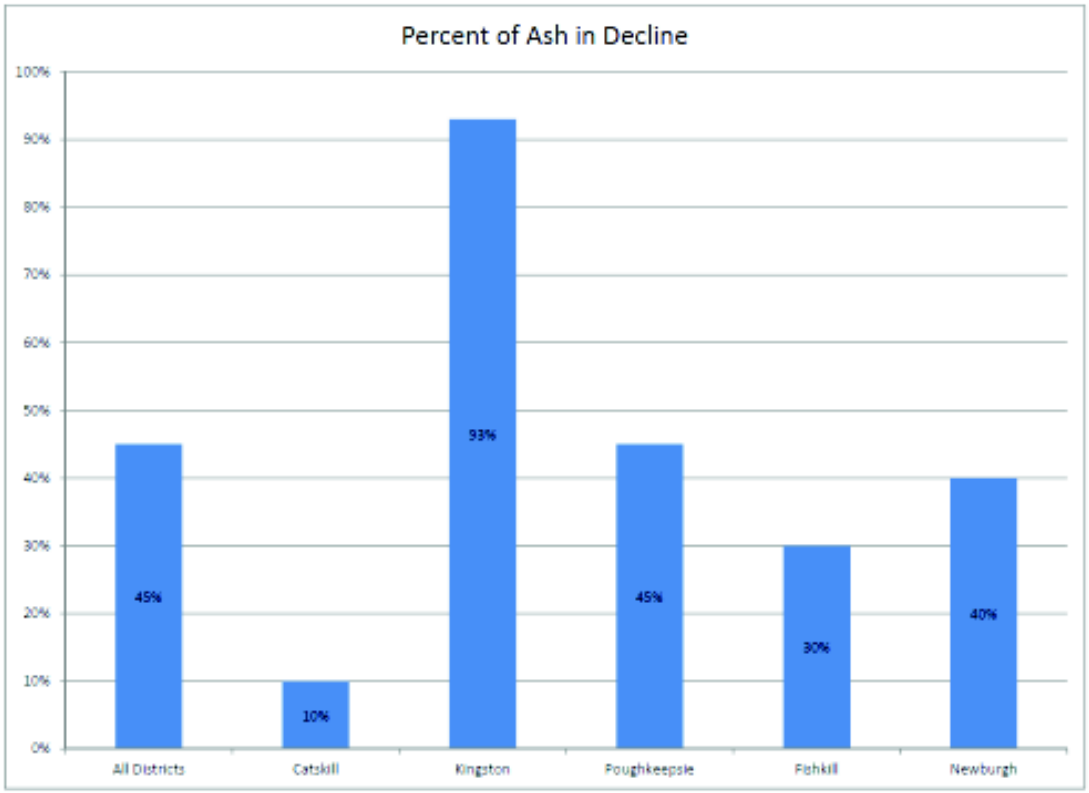

Chart 1 – Estimated Extent of EAB Infestation per ECI Study

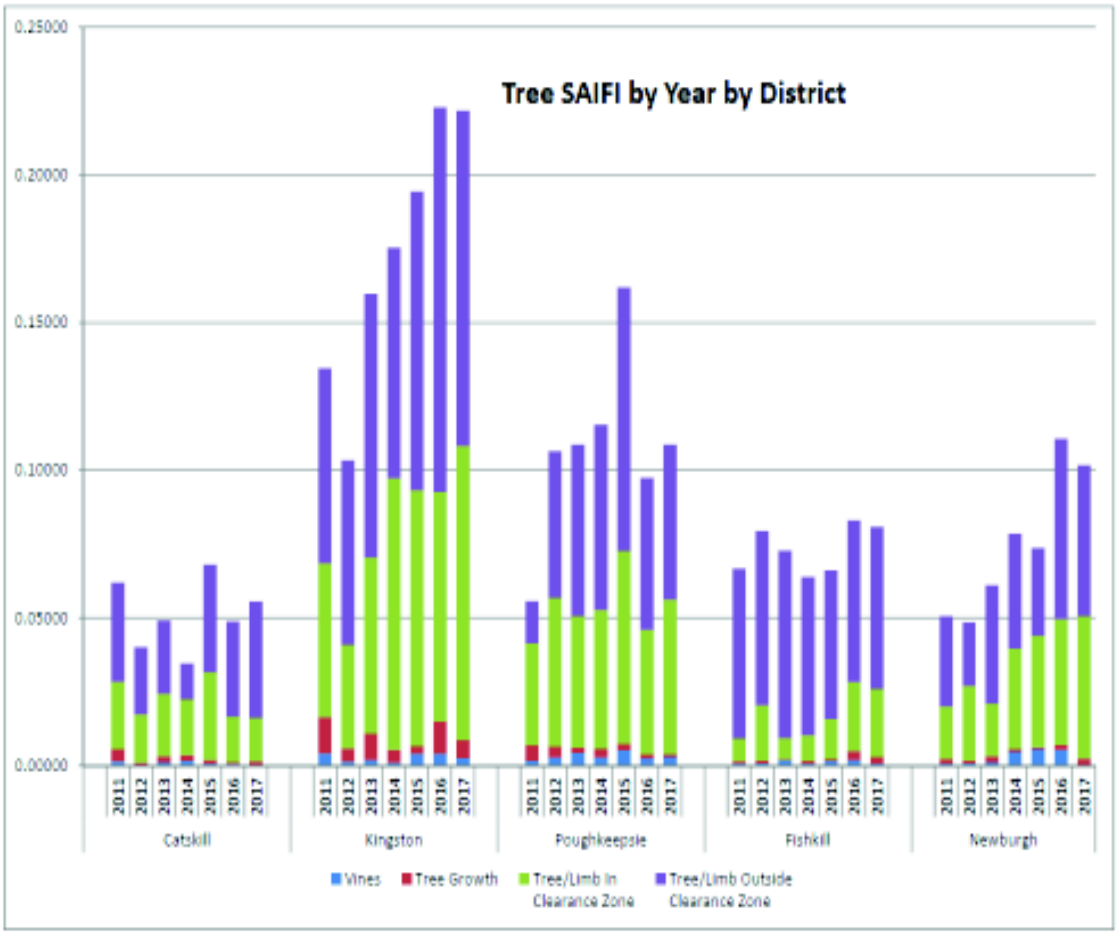

Chart 2 – Historical Tree-Related Outage SAIFI by District and secondary cause code

As shown in the tables in Section 5 of this report, of the 67 circuits in the Kingston Operating Area, 54% of these circuits (36 out of 67) performed at or better than the Electric Service Standard SAIFI level of 1.0. 91% of the Kingston circuits (61 out of 67) performed better than the Electric Service Standard CAIDI level of 2.25 (135 minutes per interruption).

Non-storm CAIDI in 2017 improved by 11% when compared to 2016 and a 6% improvement over the previous four-year average. The number of non-storm interruptions in 2017 decreased by 0.6% when compared to 2016. Tree-related outages increased 11% from 2016. The share of tree-related outages as a percentage of all non-storm outages by means of ECM increased from 61% to 73%. Lastly, the CAIDI for these tree-related outages in 2017 decreased 13% when compared to 2016. This increasing amount of interruptions caused by tree-related issues were the main driver for the SAIFI exceeding the target. Another category, Equipment Failure, saw an improvement of 19% in SAIFI and 34% in CAIDI. Also, the Accidents not under Utility Control category saw an 11% worsening in SAIFI, but an 11% improvement in CAIDI. However, these two categories only combined to account for 18% of the total ECM. That is for all their improvements, their relative weight was insignificant against the tree category at 73%. There were multitudes more cases involving trees (1,030) than Equipment Failure (246) and Accidents not Under Utility Control (359).

ii) <u>Historical O&M efforts and expenditures within the Kingston area (to the extent possible) for each of the past 5 years</u>

Central Hudson does not identify O&M efforts and expenditures on a District level. This is done on a System level and is addressed in Section 3 of this report.

iii) <u>Corrective actions to be taken with target dates for completion</u>

1) Eleven Kingston District circuits are scheduled for tree trimming and vegetation management throughout 2018. The planned trimming is expected to improve each circuit's reliability and in turn the District total. Scheduled completion is 4Q 2018.

2) Central Hudson is looking to enact the recommendations made by Environmental Consultants, Inc. (ECI) to improve Central Hudson's tree-related outage performance. These recommendations included obtaining increased funding to return to a four-year trimming schedule, creating a separate schedule for circuits affected by the residency of protected bat species and obtaining funding for a widespread removal of Ash trees along three-phase circuitry to combat tree mortality caused by the Emerald Ash Borer. Completion of this effort depends on funding levels established in the Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Electric Service, Case 17-E-0459.

3) As described in Section 1.b.i, Central Hudson was allowed deferral accounting for up to $2 million in incremental funding for a targeted distribution emerald ash borer danger tree program. Ensuring that the customers benefit from the greatest return on investment, Central Hudson developed a comprehensive top twelve ranking of its circuits most in need of combating the invasive species affecting the most ratepayers. This priority list incorporated tree and storm-related outages, emerald ash borer known and potential future geographical risk locations, customer circuit density, and circuit mileage in order to generate the maximum customer benefit to hedge against the destructive beetle. Ten of the twelve (83%) circuits identified as in need of special funding to combat reliability issues deriving from trees and the emerald ash borer reside in the Kingston District. Mobilization and execution will be complete by the end of the 2Q 2018.

4) Hurley Ave 2094 On-Road – In the first zone of protection, one mile of the Hurley Ave 2094 mainline runs off-road through an inaccessible swampy area, with the antiquated pole plant in poor shape. Building a new mainline with spacer cable along Hurley Ave to supplant this off-road risk is scheduled for 1Q 2018 completion.

c) Confirm compliance with corrective actions identified in last year's report if Kingston missed the targets in the previous year.

The following 2017 projects were listed in the 2016 annual report as being expected to improve the future reliability in the Kingston Operating Area. More time will be needed to realize the impact on reliability these projects will have.

1) As well as twelve unfinished carryover circuits from 2016, twenty-six Kingston circuits were scheduled for trimming in 2017, totaling thirty-eight. The planned trimming is expected to improve each circuit's reliability and in turn the District total reliability. Trimming for eleven of these circuits were completed by the fourth quarter of 2017. Trimming on twenty-seven more circuits are currently in progress with the remaining circuits expected to be finished during 2018.

2) Sturgeon Pool New Substation – In addition to a brand new substation, this multiple year project serves to convert the 341 circuit to high voltage, subsume and convert the Dashville 345 circuit to high voltage, and create strong tie points with nearby circuits. This project was completed in the 3rd Quarter of 2017.

3) Maverick Road 3011/3013 ALT team – This automatic load transfer team will address the outages associated with the 3011 mainline in the first zone of protection that runs through the woods for 1.4 miles. Scheduled completion is Q3 2018. Re-consideration will also be

given to the outstanding Capital Budget project to move the off-road section on-road along Maverick Rd (K-2011-13).

4) Granite Road 3024 Convert & Reconductor – This project aims to eliminate #8 copper primary and relocate an off-road feed with poor reliability. Scheduled completion is tentatively scheduled for Q4 2018.

5) Samsonville 3082 Reconductor – Reconductoring 1.2 miles of thermally stressed #4 copper and increase resiliency. Due to CATV and other emerging projects, the project was deferred until 2018. Scheduled completion is Q2 2018.

5) Install VIPER Automatic Load Transfer Team on Foxhall and Flatbush in Kingston – This will provide immediate restoration for 619 customers (approx. 3.3 MVA) in the event of an upstream loss of voltage. Scheduled for completion in Q2 2018.

6) A project is planned to Polyphase 1.2 miles of the Lincoln Park 2016 circuit along Main Street, Parkside Drive, and Douglas Drive into the hamlet of Ruby to provide an alternate feed into this neighborhood. It is currently fed radially via 60 year-old cable built underneath the Thruway. Work was completed in Q4 2017.

7) A portion of the KO Cable is slated for reconductoring with larger wire to increase the capacity of the circuit to ensure sufficient reserve to the Jansen Ave. Substation. Project design is in progress. Work is scheduled to be completed in Q3 2018.

8) A portion of the mainline for the Honk Falls 3071 circuit is slated to be rerouted around Plank Road which has been the home of several large tree-related outages. The existing mainline will be extended down Route 55 and then new circuitry will be built along Church Street. Additional sectionalizing devices will be installed to relocate the existing 3071/3072 tie point as well as to turn the Plank Road circuitry into a fused spur line. Due to CATV and other emerging projects, the project was deferred until 2018. Work is scheduled to be completed in Q2 2018.

POUGHKEEPSIE OPERATING DISTRICT

a) Detailed assessment of the Poughkeepsie District reliability performance indices (SAIFI & CAIDI) and all applicable cause codes. Assessment should include annual and five-year performance information for each measure and each cause code.

	PSC SAIFI Objective	**SAIFI** (Without Storms)	**PSC** CAIDI Objective	**CAIDI** (Without Storms)
2013	1.20	0.85	2.25	2.38
2014	1.20	1.15	2.25	2.13
2015	1.20	1.23	2.25	2.41
2016	1.20	1.16	2.25	2.73
2017	1.20	1.10	2.25	2.39
5 Year Average		1.10		2.41

Table 7 – 5-Year Poughkeepsie SAIFI & CAIDI Performance Indices

Cause Code	**Cause Code Description**	**SAIFI**						**CAIDI**					
		2013	**2014**	**2015**	**2016**	**2017**	**5-Year Average**	**2013**	**2014**	**2015**	**2016**	**2017**	**5-Year Average**
2	Tree Contacts	0.448	0.457	0.641	0.386	0.431	0.473	2.50	2.39	2.86	3.50	2.86	2.81
3	Overloads	0.007	0.024	0.012	0.021	0.001	0.013	2.38	3.76	3.35	0.86	2.20	2.58
4	Operating or Working Errors	0.005	0.007	0.006	0.080	0.082	0.036	1.07	0.96	1.87	3.37	1.63	2.38
5	Apparatus or Equipment Failures	0.138	0.123	0.231	0.192	0.171	0.171	1.96	2.74	1.75	2.39	2.29	2.18
6	Accidents or Events Not Under the Utility's Control	0.119	0.242	0.202	0.294	0.279	0.227	2.02	1.74	1.69	1.98	2.07	1.91
7	Prearranged	0.014	0.046	0.009	0.008	0.009	0.017	3.30	3.49	3.96	2.51	2.19	3.29
8	Customer's Equipment or Failures	0.003	0.002	0.001	0.001	0.000	0.001	1.24	4.53	1.37	4.37	6.05	2.93
9	Lightning	0.044	0.021	0.024	0.059	0.005	0.031	3.20	0.79	3.02	3.11	3.23	2.80
10	Unknown or Unclassified	0.074	0.223	0.107	0.121	0.118	0.128	2.49	1.34	2.18	2.38	2.07	1.94

Table 8 – 5-Year Poughkeepsie SAIFI & CAIDI Performance Indices by Area

b) If SAIFI/CAIDI targets were not met, provide the following:

i) <u>Description of problems that resulted in failure to meet the target</u>

During 2017, the Poughkeepsie Operating District had a SAIFI of 1.10 (excluding "major storm" activity). The 1.10 SAIFI index is lower than the established operating area target of 1.20 by 0.10 and is consistent with the 5-year average SAIFI index of 1.10. The district had a CAIDI of 2.39 (excluding "major storm" activity). This index is higher than the established operating area target of 2.25 by 0.14 and is approximately 1% higher than the 5-year average CAIDI index of 2.39. Central Hudson met the corporate target SAIFI and CAIDI during 2017. Individual district targets however, are not in line with the corporate objectives.

As shown in the tables in Section 5 of this report, of the 71 circuits in the Poughkeepsie Operating District, 53% of these circuits (38 out of 71) performed at or better than the Electric Service Standard SAIFI level of 1.2. 62% of the Poughkeepsie circuits (44 out of 71) performed better than the Electric Service Standard CAIDI level of 2.25 (120 minutes per interruption).

The Poughkeepsie Operating District non-storm CAIDI objective was exceeded for the following reasons:

1) Tree-related outages were the leading cause of outages and customer interruptions in the district during 2017 and therefore, the overall district reliability is driven by results from this category.

2) During a non-coding storm on February 13th, a tree from outside of the right of way fell onto the Rhinebeck 7051 off-road mainline. This brought down wires and broke the pole. Prior to switching 1,666 customers were initially interrupted and the total duration of the outage was nearly 7 hours. While attempting to facilitate switching, a branch was found on the line near the end of the 7051 mainline. This resulted in an interruption for an additional 1,387 customers on the Milan 7061 circuit for over 3 hours. Without this event, the Poughkeepsie CAIDI would have been 2.20.

3) On January 10th, a secondary network cable flashed over in a manhole that contained both the PU and PK primary cables. The breakers for both cables locked out as a result of the ensuing fire. The PO cable had already been switched out at the time for un-related work. This resulted in the entire network being interrupted, affecting 887 customers for over 7 hours. Without this event, the Poughkeepsie CAIDI would have been 2.31

ii) <u>Historical O&M efforts and expenditures within the Poughkeepsie area (to the extent possible) for each of the past 5 years</u>

Central Hudson does not identify O&M efforts and expenditures on a District level. This is done on a System level and is addressed in Section 3 of this report.

iii) Corrective actions to be taken with target dates for completion

1) 7095 Circuit – Convert 7.7 miles of 4800 to single phase 7620 along McGhee, Rt. 83, Hunns Lake, Pugsley Hill, Shaefer, Carpenter Hill, and Conklin Hill. This would eliminate cascading voltage issues, eliminate 4800 circuitry, and create 5 high voltage ties, increasing the switching capabilities during long-duration outages (Phase I). – 4th Quarter 2018.

2) 6003 Circuit – Extend the 6003 by rebuilding circuitry along College Ave to Worrall Ave. Tap into circuitry along Worrall to MH 90. Replace cable from MH 90 to MH 122. Install 1500 kVA padmount stepdown by Maryland Ave Substation. Retire Maryland Avenue Substation. This will additionally eliminate old paper and lead cable which has longer than average repair times when faults occur. – 3rd Quarter 2018.

3) 7013 Circuit – Repurpose an existing tie breaker to create a new distribution circuit position to provide additional operating flexibility in the area increasing the switching capabilities during long-duration outages – 2nd quarter 2018

4) 7024 Circuit – Reconductor circuitry along Niagara Rd. to provide additional operating flexibility in the area increasing the switching capabilities during long-duration outages – 3rd Quarter 2018

5) 6008 Circuit – Replace 5 kV Self-Supporting Aerial Cable on Taylor Ave & Orchard Pl. which has longer than average repair times when faults occur – 2nd Quarter 2018

6) Poughkeepsie Smart Grid Ph. I – Will commence in 2018 and be completed in 2019.

7) Tree trimming of 9 Poughkeepsie District circuits scheduled throughout 2018 will improve the reliability of 10,994 customers as tree-related outages have outage durations that are typically longer than average. – 4th Quarter 2018

c) Confirm compliance with corrective actions identified in last year's report if Poughkeepsie missed the targets in the previous year.

The following 2017 projects were listed in the 2016 annual report as being expected to improve the future reliability in the Poughkeepsie Operating Area. More time will be needed to realize the impact on reliability these projects will have.

1) 6057 Circuit – Relocate approximately 1.5 miles of circuitry on-road along Camby Rd. – Completed in 2017

2) 7095 Circuit – Convert 7.7 miles of 4800 to single phase 7620 along McGhee, Rt. 83, Hunns Lake, Pugsley Hill, Shaefer, Carpenter Hill, and Conklin Hill. This would eliminate cascading voltage issues, eliminate 4800 circuitry, and create 5 high voltage ties (Phase I). – Deferred to 2018 due to reprioritization with CATV and other emerging projects.

3) 6003 Circuit – Extend the 6003 by rebuilding circuitry along College Ave to Worrall Ave. Tap into circuitry along Worrall to MH 90. Replace cable from MH 90 to MH 122. Install 1500 kVA padmount stepdown by Maryland Ave Substation. Retire Maryland Avenue Substation. – In progress and scheduled for completion in 3rd Quarter 2018.

4) 7023 Circuit – Rebuild the 7023 circuit as an underbuild under the new G Line – In progress and scheduled for completion in 2nd Quarter 2018.

5) 7013 Circuit – Repurpose an existing tie breaker to create a new distribution circuit position to provide additional operating flexibility in the area – In progress and scheduled for completion in 2nd quarter 2018.

6) Install and program 5 VIPERs – Completed in 2017.

7) Due to inadequate funding, tree trimming of only one Poughkeepsie District circuit was completed throughout 2017, increasing the reliability of 283 customers. Nine additional circuits serving 11,000 customers were originally scheduled for trimming in 2017 which would have increased their reliability.

FISHKILL OPERATING DISTRICT

a) Detailed assessment of the Fishkill District reliability performance indices (SAIFI & CAIDI) and all applicable cause codes. Assessment should include annual and five-year performance information for each measure and each cause code.

	PSC SAIFI Objective	SAIFI (Without Storms)	PSC CAIDI Objective	CAIDI (Without Storms)
2013	1.20	1.01	2.00	2.06
2014	1.20	0.96	2.00	2.16
2015	1.20	1.19	2.00	1.68
2016	1.20	1.31	2.00	2.38
2017	1.20	0.880	2.00	2.24
5 Year Average		1.07		2.10

Table 9 – 5-Year Fishkill SAIFI & CAIDI Performance Indices

Cause Code	Cause Code Description	SAIFI						CAIDI					
		2013	2014	2015	2016	2017	5-Year Average	2013	2014	2015	2016	2017	5-Year Average
2	Tree Contacts	0.449	0.394	0.406	0.510	0.496	0.451	2.31	2.71	2.26	2.28	2.36	2.38
3	Overloads	0.030	0.001	0.003	0.008	0.002	0.009	0.97	2.70	3.51	2.25	1.18	1.43
4	Operating or Working Errors	0.004	0.015	0.235	0.045	0.019	0.064	1.14	1.01	0.15	1.05	2.75	0.49
5	Apparatus or Equipment Failures	0.171	0.180	0.207	0.341	0.069	0.194	1.91	2.07	2.27	1.52	3.18	1.97
6	Accidents or Events Not Under the Utility's Control	0.170	0.254	0.235	0.257	0.182	0.219	1.79	1.51	1.45	3.24	1.59	1.96
7	Prearranged	0.005	0.004	0.008	0.001	0.002	0.004	0.85	1.21	1.33	1.98	0.89	1.20
8	Customer's Equipment or Failures	0.000	0.006	0.000	0.000	0.000	0.001	2.45	4.54	0.00	0.00	0.00	4.51
9	Lightning	0.150	0.065	0.006	0.053	0.008	0.056	1.99	1.54	6.68	6.55	1.97	2.85
10	Unknown or Unclassified	0.032	0.039	0.091	0.092	0.103	0.071	2.33	2.51	1.94	1.91	2.09	2.07

Table 10 – 5-Year Fishkill SAIFI & CAIDI Performance Indices by Area

b) If SAIFI/CAIDI targets were not met, provide the following:

i) Description of problems that resulted in failure to meet the target

During 2017, the Fishkill Operating Area had a SAIFI of 0.880 and a CAIDI of 2.24, excluding major storm activity. The 0.880 SAIFI index met the established operating criteria of 1.20 and is 18% lower than the 5-year average SAIFI index of 1.07. The 2.24 CAIDI index is 12% higher than the established operating area minimum of 2.0 and 7% higher than the 5-year average CAIDI. Central Hudson met the corporate targets for both SAIFI and CAIDI. Individual District targets, however, are not in line with the corporate targets.

The Fishkill Operating District non-storm CAIDI objective was exceeded primarily due to outages caused by tree contacts. Many of these occurred during 2017 storm activity that did not meet the criteria for a major storm event, such as the storm events that occurred on March 2 (average outage duration: 4.4 hours), June 30 (average duration: 4.5 hours), July 8 (average outage duration: 4 hours) and October 24 (average outage duration: 3.9 hours).

The single event that contributed most to exceeding the CAIDI target occurred on May 15, when a large tree from outside the clearance zone broke two poles and took down 6 sections of spacer cable at the southern border of the Central Hudson service territory. Switching was able to be performed, but only after taking steps to increase capacity on the alternate feed. This event interrupted 740 customers for 3.65 hours and 15 customers for 12.7 hours. Without this event, Fishkill CAIDI would have been 2.21.

As shown in Section 5 of this report, of the 45 circuits in the Fishkill Operating Area, 84% of these circuits (38 out of 45) performed at or better than the Electric Service Standard SAIFI level of 1.2. 51% of the Fishkill circuits (23 out of 45) performed better than the Electric Service Standard CAIDI level of 2.0 (120 minutes per interruption).

ii) Historical O&M efforts and expenditures within the Fishkill area (to the extent possible) for each of the past 5 years

Central Hudson does not identify O&M efforts and expenditures on a District level. This is done on a System level and is addressed in Section 3 of this report.

iii) Corrective actions to be taken with target dates for completion

1) 8056/8051 – Rebuild/Polyphase 1.6 miles of the 8051 and 8056 circuits to increase operational flexibility and decrease both CAIDI and SAIFI. Scheduled for completion by the fourth quarter of 2018.

2) 881/882/8015L/8085L – Finish conversion of the 881, 882, 8015L and 8085L circuits. This project represents Phase IV in the ultimate plan to retire Beacon and Conway Place Substations. Once completed, strong ties will exist to help decrease outage duration. This project is scheduled for completion by the fourth quarter of 2018.

3) 8086/8066 – Polyphase 0.7 miles and convert/polyphase an additional 1.3 miles of the 8066 circuit on South Mountain Pass Road. This project represents Phase I in the ultimate plan to eliminate a large pocket of 4.8 kV construction and create a strong tie between the 8066 and 8086 circuits at the southern border of Central Hudson service territory. This project is scheduled for completion by the fourth quarter of 2018.

4) 8093 – Reconductor 1.5 miles of 3-phase circuitry on Rt. 82 with 556 Al conductors to strengthen the tie with the 8093 circuit at pole #P65846 and improve CAIDI during peak load periods. This project is scheduled for completion by the fourth quarter of 2018.

5) 8094 – Polyphase 1.76 miles on Lake Walton Road with 336 Al conductors and build a new three-phase tie with the 8096 circuit to improve CAIDI for customers on Lake Walton Road. Scheduled for completion by the fourth quarter of 2018.

6) 8063 – Rebuild a 0.5-mile portion of the first zone main-line on-road to decrease both SAIFI and CAIDI. This project is scheduled for completion by the fourth quarter of 2018.

7) 8072 – Rebuild/polyphase 1.7 miles of circuitry on East Hook Cross Road to allow for a strong loop tie on the 8072 circuit that will improve CAIDI for the majority of customers downstream of the existing automatic load transfer scheme. This project is scheduled for completion by the fourth quarter of 2018.

8) Tree trimming of 12 Fishkill District circuits scheduled throughout 2018 will increase the reliability of 16,979 customers as tree-related outages have durations that are typically longer than average. Scheduled for completion by the fourth quarter of 2018.

c) Confirm compliance with corrective actions identified in last year's report if Fishkill missed the targets in the previous year.

The Fishkill District missed both its SAIFI and CAIDI targets in 2016. The following 2017 projects were listed in the 2016 Annual Report as being expected to improve the future reliability in the Fishkill Operating Area. More time will be needed to realize the impact on reliability these projects will have.

1) BF Cable – Remove the BF Cable and replace it with three miles of 13.2 kV distribution circuitry. This project represents Phase III in the ultimate plan to retire Beacon and Conway Place Substations and create strong ties to decrease outage duration. This project was completed by the third quarter of 2017.

2) 8056/8051 – Rebuild/Polyphase 1.6 miles of the 8051 and 8056 circuits to increase operational flexibility and decrease both CAIDI and SAIFI. This project was originally scheduled for completion in 2017 but has been deferred for completion in the fourth quarter of 2018.

3) Tree trimming was completed on 18 Fishkill District circuits in 2017, increasing the reliability of 25,720 customers.

NEWBURGH OPERATING DISTRICT

a) Detailed assessment of the Newburgh District reliability performance indices (SAIFI & CAIDI) and all applicable cause codes. Assessment should include annual and five-year performance information for each measure and each cause code.

	PSC SAIFI Objective	SAIFI (Without Storms)	PSC CAIDI Objective	CAIDI (Without Storms)
2013	1.20	0.78	2.00	2.20
2014	1.20	0.90	2.00	2.24
2015	1.20	1.04	2.00	1.77
2016	1.20	1.13	2.00	1.86
2017	1.20	0.89	2.00	1.96
5 Year Average		0.95		1.99

Table 11 – 5-Year Newburgh SAIFI & CAIDI Performance Indices

Cause Code	Cause Code Description	SAIFI						CAIDI					
		2013	2014	2015	2016	2017	5-Year Average	2013	2014	2015	2016	2017	5-Year Average
2	Tree Contacts	0.241	0.310	0.290	0.434	0.398	0.335	2.76	3.00	2.21	2.58	2.37	2.57
3	Overloads	0.005	0.001	0.000	0.004	0.006	0.003	4.78	3.77	3.75	3.91	1.63	3.35
4	Operating or Working Errors	0.002	0.007	0.085	0.045	0.027	0.033	1.57	1.42	0.16	0.60	0.97	0.48
5	Apparatus or Equipment Failures	0.154	0.148	0.126	0.248	0.101	0.155	2.20	2.22	1.93	1.19	1.90	1.80
6	Accidents or Events Not Under the Utility's Control	0.126	0.300	0.389	0.286	0.243	0.269	1.80	1.48	1.68	1.48	1.41	1.55
7	Prearranged	0.016	0.008	0.001	0.000	0.010	0.007	0.70	2.54	0.74	0.00	2.73	1.70
8	Customer's Equipment or Failures	0.001	0.002	0.001	0.001	0.000	0.001	3.76	5.81	2.65	3.04	2.24	4.21
9	Lightning	0.081	0.018	0.042	0.021	0.040	0.041	2.18	1.61	2.33	1.41	1.44	1.93
10	Unknown or Unclassified	0.157	0.102	0.110	0.088	0.066	0.105	1.75	2.32	1.78	2.01	2.20	1.97

Table 12 – 5-Year Newburgh SAIFI & CAIDI Performance Indices by Area

b) If SAIFI/CAIDI targets were not met, provide the following:

i) Description of problems that resulted in failure to meet the target

During 2017, the Newburgh District met its SAIFI and CAIDI targets. SAIFI (without storms) was 25.8% below the PSC SAIFI objective and CAIDI (without storms) was 2% below the PSC CAIDI objective.

ii) Historical O&M efforts and expenditures within the Newburgh area (to the extent possible) for each of the past 5 years

Central Hudson does not identify O&M efforts and expenditures on a District level. This is done on a System level and is addressed in Section 3 of this report.

iii) Corrective actions to be taken with target dates for completion

Targets were met.

c) Confirm compliance with corrective actions identified in last year's report if Newburgh missed the targets in the previous year.

Targets were met.

3. Reliability Programs

a) List, describe and provide a detailed assessment of distribution reliability programs and investments. Provide program budgets and actual expenditures for each of the past 5 years.

The expenditures listed for the following reliability programs and investments are installation expenditures.

Distribution Line Infrared Surveys

As of 2010, the distribution line infrared surveys of the three-phase mainline of all distribution circuits are being conducted annually. Infrared surveys help identify equipment that have poor connections that will eventually lead to a thermal failure. By identifying these “hot spots”, action can be taken to proactively prevent outages due to equipment failure. In 2011, a 3-year contract was awarded to a Contractor who was able to conduct this survey for roughly one third of the cost compared to previous years, without a sacrifice to quality or quantity. The distribution line infrared surveys were completed at a cost of $16,250 in 2013. In 2014, a new 3-year contract was awarded. The distribution line infrared surveys were completed at a cost of $16,250 in 2014, $16,250 in 2015 and $16,875 in 2016. The number of items found that were deemed “Immediate”, “Serious”, or “Critical” were 199 in 2015, 50 in 2016 and 66 in 2017. The majority of repairs have been completed on items deemed “Immediate” and the remaining repairs will be completed before the 2018 summer peak. Repairs made are not considered major capital investment work, and are handled through expense on a District level. This past year a new 3-year contract was awarded to complete the surveys at the cost of $17,500 for 2017, $18,125 for 2018, and $18,750 for 2019.

3X Report

The 3X report, which is completed on a monthly basis, is designed to acknowledge those protective devices that have operated at least 3 times in a 12-month period for the same or unknown causes. Each month, the Electric Operating Engineers review the 3X report for their District and determine if a plan of action is needed to address repeat outages at specific locations. The overall goal of this report is to improve reliability by decreasing SAIFI. Corrective action is carried out throughout the year, and typically involves installing animal guards or lightning arrestors, or performing spot trimming. This work is not considered major capital investment work, and is managed through expense on a District level.

10X Report/Customers Experiencing Multiple Interruptions

In 2008, a program was developed to determine areas with significantly below average reliability (pockets of customers who may be experiencing poor reliability) on the Central Hudson system. This program allows us to determine the number of customers that experience a given number of outages in a calendar year. The 10X report was created as a way to determine how many customers on our system experience 10 or more outages in a 12-month period. This report shows the areas with significantly below average reliability by plotting them on a map for each given District. It should be noted that the 10X report targets areas with significantly below average reliability in *specific locations* on a circuit. Upgrades or programs only address these specific locations, not the entire circuit. At times it may be found that different areas with significantly below average reliability may develop over a number of years on the same circuit, and that the same solution can be successfully employed to different areas of the circuit. Table 13 below is a summary of trimming completed on 10X circuits that had experienced numerous tree outages during the past 5 years. Expenditures associated with trimming are discussed later in this section of the report.

District	Circuit	Year(s) Identified in 10X Report	Routine Trimmed	Spot Trimming
Catskill	1092	2012	2013	
Catskill	1083	2015	2016	
Catskill	2005	2012	2011, 2013	
Catskill	2061	2011	2012	
Catskill	2385	2014	2015	
Kingston	2094	2011, 2012, 2013, 2016	2013, 2017	
Kingston	3012	2012, 2013	2014	
Kingston	3022	2012	2013	
Kingston	3023	2016	2017	
Kingston	3024	2012, 2016	2013, 2017	
Kingston	3078	2012	2012	
Kingston	3081	2013	2014	
Kingston	3091	2012	2013	
Poughkeepsie	6057	2012	2013	
Poughkeepsie	7025	2015		2016
Poughkeepsie	7071	2014	2011-2012, 2015	
Poughkeepsie	7072	2014	2015	
Poughkeepsie	7091	2014	2012, 2015	
Fishkill	8022	2012	2013	
Fishkill	8063	2016	2017	
Fishkill	8066	2011, 2012, 2016	2013, 2017	
Fishkill	8072	2012	2012	
Fishkill	8086	2011	2012	
Fishkill	8093	2012, 2016	2012, 2017	
Newburgh	4043	2012	2012	
Newburgh	4097	2012	2011, 2013	
Newburgh	5004	2015	2016	2016
Newburgh	5013	2011	2012	
Newburgh	5021	2012	2014	

Table 13 – Trimming in response to 10X

In response to the 2012 10X report (performed in 2013) squirrel guards were installed on the Catskill 1071 and Newburgh 5051 circuits. A fuse was also added to an off-road spur on the Newburgh 5051 circuit in order to improve reliability for the upstream customers. In response to the 2013 10X report (carried out in 2014), a load pocket on the Newburgh 4002 circuit was transferred to a more reliable feeder in order to lessen the outage frequency for these customers. In response to the 2014 10X report (carried out in 2015), to improve reliability for the Kingston 2094 and Newburgh 5021 circuits, transformers and insulators were changed out on the 2094 circuit due to affected customers fed from pole number K11851 on Ashokan Rd. and arrestors, cutouts, and taps were all changed out along the 5021 line which feeds Sparking Ridge Rd. In response to the 2015 10X report (carried out in 2016), to improve reliability for the Kingston 1014 and 3023 circuits, squirrel guards were installed on all transformers on the affected circuitry. To improve reliability for the Poughkeepsie 7025 and Newburgh 5004, squirrel guards and covered taps were installed on the transformers on the affected circuitry. To improve reliability for the Poughkeepsie 7071 circuit, squirrel guards were installed on the problem transformers along with replaced flash-damaged lightning arrestors and transformers. In response to the 2016 10X report (carried out in 2017), to improve reliability for the Catskill 1092, an additional fuse location was added to reduce the area of exposure for outages on Stone Bridge Road. To improve reliability for the Poughkeepsie 6057 circuit, a detailed engineering inspection was completed and any suspect hardware was replaced. Additionally, fuse sizes were verified and a location with mis-coordination was found and corrected. Actual expenditures associated with fusing upgrades (unless part of a specific program) are not tracked and therefore cannot be included. This work is not considered major capital investment work, and is handled through expense on a District level. The Cutout Replacement Program is discussed later in this section, and expenditures related to the entire program can be found in Section 3b.

For areas that involved infrastructure improvements, a number of projects were completed in response to the 2012, 2013, 2014, 2015 and 2016 10X reports. These projects have not only helped reduce the number of outages for 10X customers, but have also positively impacted non-10X customers residing on the same circuit. The following are the Capital Budget projects that were completed.

Catskill

1071 Circuit – The 1071 circuit appeared on the 2012 10X report. In order to improve reliability for the affected areas, a project proposal was submitted in 2014 to rebuild 4.25 miles of single phase circuitry on-road along Route 51, Sodom Road, and Shady Lane. The estimated cost of this project is $640,000 and is scheduled for 2018. Once completed, reliability should significantly improve.

1091 Circuit – The 1091 circuit appeared on the 2014 10X report. This involved customers affected along Route 408 and Kropp Road. In order to resolve the reliability problems in the area, a capital budget project was submitted in 2015 to rebuild 3.5 miles of single phase circuitry. This project is currently scheduled for 2021 at an estimated cost of $650,000.

1092 Circuit – A reconductor job for the 1092 circuit along County Route 351 in Rensselaerville was completed in 2012. The total cost was $402,000. The 2012 non-storm circuit SAIFI for the 1092 circuit showed a 29% improvement compared to the average of the previous 4 years. The 1092 circuit did not appear on the 2011 10X report. Although the 1092 circuit did appear on the 2012 10X report, the project mentioned above was not finished until the end of 2012. The completion of this project as well as tree trimming performed in 2013 has helped improve the 2013 non-storm circuit SAIFI by 37% compared to the average of the previous 4 years. The 1092 circuit did not appear on the 2013 10X report. The 1092 circuit did appear on the 2014 10X report; however, the area affected was along Route 357 and Hale Road. In 2015, a budget project was submitted to rebuild 5.0 miles of single phase circuitry along these roads in order to resolve the reliability problems in the area. This project was completed in 2017 at a cost of $524 thousand. The 1092 circuit did appear on the 2015 and 2016 10X report; however, the area affected was along Stonebridge Road. In 2016, a budget project was submitted to rebuild 0.75 miles of single phase circuitry along this road in order to resolve the reliability problems in the area. This project is tentatively scheduled to be completed in 2018 at an estimated cost of $150,000.

2005 Circuit – The 2005 circuit appeared on the 2012 10X report. In order to improve reliability for the areas affected, two projects were submitted in 2014. The first project was completed in 2014 and involved rebuilding 1.25 miles of 3 phase circuitry along Ross Ruland Rd. The total cost for this project was $316,455.

The second project involves rebuilding 2.5 miles of single phase circuitry along Warren Stein Road and Country Route 67. This project was completed in 2016 and was budgeted for $375,000. The 2005 circuit did not appear on the 2014 or 2016 10X report, however it did appear on the 2015 10X report.

Kingston

2094 Circuit – In 2014 and 2015, the 2094 circuit appeared on the 10X report for the Olivebridge area. In order to improve reliability for this area, a capital budget project was submitted in 2015 to create a 1MVA single phase standby microgrid generator along Ashokan Road near Spillway Road to pick up 123 customers. Following further analysis, this project was abandoned in favor of a rebuild of the infrastructure in the problem area, much of which will require replacement regardless of the microgrid installation. The project was submitted for inclusion in the 2018-2022 5 Year Capital Budget. Phase 1 consists of rebuilding 1.5 miles of circuitry along Fording Place Road at an estimated cost of $436 thousand. This project is tentatively scheduled to be completed in 2018. Phase 2 consists of rebuilding 3 miles of circuitry along Ashokan Road at an estimated cost of $675 thousand. This project is tentatively scheduled to be completed in 2018. Phase 3 consists of rebuilding 2.6 miles of circuitry along Lapla Road at an estimated cost of $522 thousand. This project is tentatively scheduled to be completed in 2019.

3011 Circuit – The 3011 circuit appeared on the 2011 and 2016 10X Report. Although this appearance was partly due to the weakened trees that continued to fall after Irene, two projects are planned for the West Shokan area. These projects are tentatively scheduled for completion in 2020 and were submitted to eliminate the off-road circuitry gaps along High Point Mountain Road and McMillian Road. After these projects are completed, they will greatly help reduce the amount of outages in the area. In 2017, an Electronic Recloser installation is also slated for the 3011 circuit as part of the Distribution Automation Program (discussed later in this section). This installation will allow the 2094 circuit to pick up the 3011 in the event of an SR line trip out. This project is expected to help improve reliability. The 3011 circuit did not appear on the 2012, 2013, 2014 or 2015 10X reports.

3012 Circuit – The 3012 circuit appeared on the 2011, 2012, 2013, 2015 and 2016 10X Reports. Grogkill and Romano Road are located in a valley at the end of the 3012 circuit. In 2012, a project was submitted to help reliability for the area. The estimated cost of this project is $100,000 and after its completion in 2019, the feeds to Grogkill and Mount Tobias Road will be relocated on-road along Rt. 212 in Willow. Electronic reclosers were also installed in 2013 and 2014 on the 3012 circuit as part of the Distribution Automation Program. The 3012 circuit did not appear on the 2014 10X report.

3091 Circuit – The 3091 circuit appeared on the 2012 and 2016 10X report. In 2012 a project was scheduled for completion in order to rebuild 1.5 miles on-road along Rt. 55A. Because a DEP permit is required to move the circuitry on road, this project is currently on hold awaiting the permit. Once completed, reliability should improve for the affected areas. The cost of this project is estimated to be $450,000. The 3091 circuit did not appear on the 2013, 2014 or 2015 10X reports.

3024 Circuit – The 3024 circuit appeared on the 2012 and 2016 10X report. This circuit was part of Smart Grid Pilot involving the installation of an electronic recloser which was completed in 2014 at a cost of $45,921. The installation of the new electronic recloser will create a more robust feeder as it becomes less susceptible to transient outages. More time will be needed to fully realize this projects impact on reliability. In 2018, a VIPER ALT team will become operational which will allow 10X customers on the 3024 circuit to be transferred to the 3023 in the event of a source side outage. The 3024 circuit did not appear on the 2013, 2014 or 2015 10X reports.

Poughkeepsie

6057 Circuit – The 6057 circuit appeared on the 2012 and 2016 10X report. The areas affected were located in a pocket near the end of the feeder. In order to improve reliability, in 2012, electronic reclosers were installed at a cost of $44,000. The cause of the 2016 inclusion is believed to have been located and fixed as noted in the section above describing minor upgrades. The 6057 circuit did not appear on the 2013, 2014 or 2015 10X reports.

7052 Circuit – The 7052 circuit appeared on the 2012 10X report. The ALT that serves the affected areas was out of service for some time, but eventually repaired in 2012. Electronic reclosers located in the first zone of protection replaced type D's in 2012 as well, at a cost of $53,000. The 7052 also did not appear on the 2013, 2014, 2015 or 2016 10X reports.

Fishkill

8066 Circuit – The reliability of 690 customers had been historically impacted by a 0.4 mile off-road portion of spacer cable. In order to improve reliability to these customers, this portion of circuitry was moved on-road. The total 2012 capital investment was $198,000. While the 8066 circuit did show up on the 2012 10X report, these outages were tree related. Trimming was completed in 2013. The 8066 circuit did not appear on the 2013 10X report and the 2014 non-storm circuit SAIFI showed an improvement of 41% compared to the average of the previous 4 years. The 8066 circuit did not appear on the 2014 or 2015 10X reports. A small portion of the 8066 circuit appeared on the 2016 10X report but that area has since been trimmed in 2017.

8072 Circuit – The 8072 circuit appeared on the 2012 10X report. Towards the end of 2012, a project was completed to convert Long Hill and Hortontown Road to 13.2kV. During the conversion, old infrastructure was replaced and moved on road. The total cost for this project was $147,441. Since this project has been completed, the number of customers interrupted in 2013 has decreased by 14% compared to the previous 4 years. The 8072 circuit did not appear on the 2013 10X report. The 2014 non-storm circuit SAIFI continued to show an improvement of 21% compared to the average of the previous 4 years. The 8072 circuit did not appear on the 2014, 2015 or 2016 10X reports.

Newburgh

5013 Circuit – The 5013 circuit appeared on the 2010 and 2011 10X report. A project was created to extend the 5013 circuit to Huckleberry Turnpike in Plattekill and move the 5013 circuit from off-road to on road in Freetown Highway area. This project started in 2010 and circuitry for the 5013 circuit was moved on road in May 2011. The total cost was $245,115. As of March 2012, these customers are now also protected by an ALT. Compared to the average of the previous 4 years; the 2012 non-storm circuit SAIFI for the 5013 circuit saw a 75% improvement. The 5013 circuit did not appear on the 2012 10X report. In 2013, the circuit saw a 66% improvement in circuit SAIFI compared to the average of the previous 4 years. The 5013 circuit did not appear on the 2013 10X report. In 2014, the 5013 saw an improvement of 20% in non-storm circuit SAIFI compared to the average of the previous 4 years. The 5013 circuit did not appear on the 2014, 2015 or 2016 10X reports.

5021 Circuit – The 5021 circuit appeared on the 2012 10X report. To address this project, in 2013, a project was submitted to relocate the existing old infrastructure on-road along Route 299. This project was completed in the second quarter of 2015 at a total capital cost of $59,370. More time will be needed to fully realize this projects impact on reliability. The 5021 circuit did not appear on the 2015 or 2016 10X report.

Circuits over 6 MVA and 1.5 MVA

As mentioned in Section 1d of this report, the "Circuits over 6 MVA or 1.5 MVA" report (Circuits Over 6) provides a means of monitoring and balancing load growth on a local level, and is a proactive program that addresses reliability by allowing for operational flexibility for emergency switching and maintenance.

To address specific operational flexibility concerns related to the Circuits Over 6 Reports of the past 5 years, a number of new distribution circuits were installed, infrastructure and equipment upgrades were completed, and circuits were offloaded through shifting tie points with adjacent circuits. Actual expenditures associated with most local load transfers are not tracked, and therefore cannot be included. This work is not considered major capital investment work, and is handled through expense on a District level. Details on the 2017 load transfers driven by the 2016 Circuits Over 6 Report can be found in Section 1d of this report. The following is a summary of substation and distribution infrastructure improvement projects, including new distribution circuits.

1. In the 2007, 2008, 2009, 2012, and 2013 Circuits Over 6 Report, the Newburgh 5021 circuit was identified as operating above its normal design rating. Local load transfers were carried out until the new Galeville Substation could be completed. A Capital Budget project was developed for 2010 that would utilize new Galeville circuitry to offload the 5021 circuit as well as provide load relief to the New Paltz and Highland areas. 2.8 miles of circuitry was polyphased on Libertyville Road in order to provide load relief to this area. The associated capital cost through 2010 was $527,000 and an additional $234,000 was spent in 2011 to complete the project. After determining 2.5 miles of conductor along Rt. 299 was only #4 and #2 Al, in order to push the 5031 circuit into the Village of New Paltz, the 2.5 miles required reconductoring. This project was completed in 2014 at a total capital cost of $336,068 and allowed for the 5021 to be successfully offloaded.

2. In the summer of 2010, the Saugerties 302 circuit was estimated to have at a minimum a peak load that was 1.55 MVA, which is slightly above its design rating. Due to voltage issues observed, Phase 1 of a 2 phase project to convert the 302 circuit was initiated in 2013. The total capital cost for distribution line work in 2013 was $305,782. In 2014, phase 2 of this project was finalized at a total capital cost of $79,523. The completion of this project will allow for some circuit reconfigurations in order to provide some load relief for the 3002 circuit. In 2006, it was also determined that a new substation would be required to replace the existing Saugerties Substation. The in-service date of the new substation was June of 2013. The new substation increased load serving capability in the area, as well as improved operational flexibility for emergency switching and maintenance. The total 2013 capital investment for the substation and distribution line work was $1.629 million and $934 thousand, respectively.

3. In 2011 and 2012, the 4043 circuit in Newburgh appeared on the Circuits over 6 MVA or 1.5 MVA as operating above its normal design rating. In 2013, this circuit was upgraded to high capacity. As a result, this circuit is now operating within its rating. The project was started and completed in 2013. The total 2013 capital investment was $249,000 for distribution line work and $106,000 for substation work. The total capital investment for final substation work in 2014 was $1,661.

4. In the 2012 and 2013 Circuits over 6 MVA or 1.5 MVA, the Newburgh 406, 4041, 4044, 4053 circuits appeared as operating above their normal design criteria. In 2013, a new high capacity circuit was installed out of Union Avenue Substation in Newburgh. As a result, the 406 was relieved and portions of the 4041, 4044, and 4053 circuits were transferred to the new circuit. This project was started and completed in 2013. The total 2013 capital investment for the substation and distribution line work was $35 thousand and $1.346 million, respectively.

5. Since 2011, the Kingston 1012 circuit has appeared on the Circuits over 6 MVA or 1.5 MVA for operating above its normal design rating. In 2013, the 1023 circuit was extended to allow for it to offload a portion of the 1012 circuit. In 2012, Phase I was completed and Phase II was completed for 2013. The total 2012 capital investment for Phase I was $206,000 and Phase II was $535,000.

6. Since 2010, the Poughkeepsie 7051 circuit has been identified as operating above its normal design rating. In 2013, construction of a new Milan 7062 circuit was proposed. Phase 1 and 2 of this project were completed in 2013 and 2014. The total capital investment spent in 2013 was $372,000 and $738,000 for 2014. Phase 3 of this project was finalized in 2015 allowing for the northeast portion of the 7051 circuit to be offloaded. The total capital investment in 2015 was $620,000.

7. To offload the 6061 and 7024 Poughkeepsie circuits operating above their design rating since 2011, a project was initiated in 2014 to rebuild 1.3 miles along Pendell Rd., Creek Rd., and Smith St. as a 13.2kV 6061/6065 double circuit using 336 bare AA phase conductors. This project was started and completed in 2014 at a total capital investment of $646,715.

8. To address limited switching capabilities which caused the 4026, 5052, and 5053 circuits to appear at least once on the Circuits over 6MVA report since 2011, in 2014, a brand new circuit was installed out of Maybrook Substation in the Newburgh District. This project was started and completed in 2014 and has allowed for load relief on each of the three circuits. The total capital investment for substation work was $103,915. The total capital costs for distribution line work was $479,108.

9. Due to lack of operational flexibility and thermal concerns in the Northeast Dutchess area, in 2012 it was recommended that a new 7013 circuit fed from the Hibernia Substation be constructed. This project also sought to address the loading concerns for the 7011 circuit which appeared on the Circuits over 6 MVA or 1.5 MVA since 2011. This project was started in 2016 and will be finished in 2018.

10. In the 2012, 2013, 2015 and 2016 Circuits Over 6 Report, the Manchester 6092 circuit was identified as operating above its normal design rating. A Capital Budget project was completed in 2016 to build 0.7 miles of double circuit, three-phase 13.2kV circuitry along Rt. 44 from the old Delaval Plant to James St. using 336 bare AA phase conductors. This project would allow the Manchester 6097 circuit to offload approximately 1 MVA from the 6092 circuit. More details on this project, including the 2016 capital costs, can be found in Section 1d.

11. In the 2016 and 2017 Circuits over 6 MVA or 1.5 MVA, the Coldenham 4027 circuit was identified as operating above its normal design rating. Load shifting capabilities are limited in this area due to the current circuit loading. Due to the load growth in the area of Rt. 17K and Rt. 300, additional load support is needed. The new Union Avenue 4055 circuit was constructed to alleviate these loading concerns. The total 2017 capital investments were $1.842 million. The circuit was placed in service in Q1 2018. But even with the new circuit, there are load constraints, requiring new mainline circuitry to be built underground near Stewart Airport. This project meets the Non-Wires Alternative Suitability Criteria. As a result, Central Hudson has solicited NWA proposals to address the needs for this area. Proposals are currently in the process of being reviewed.

12. In the 2015 and 2016 Circuits over 6 MVA or 1.5 MVA, the Montgomery Street 406 circuit was identified as operating above its normal design rating. 0.85 miles of the 406 circuit was converted and transferred to the Union Avenue 4054 in order to mitigate some of the area's concerns. The total 2016 capital investment was $64 thousand, the total 2017 capital investment was $253 thousand, and the project was completed in Q3 2017.

13. In the 2016 Circuits Over 6 Report, the 8015 circuit was identified as operating above its normal design rating. A new circuit 8017 was built in 2017 to offload a portion of the 8015 circuit.

ALT Switch Installations

Automatic Load Transfer (ALT) switch teams transfer pockets of load to alternate feeds for loss of primary feed. Central Hudson has 66 of these teams installed system wide. Over the past 5 years, ALT switch operations have accounted for an average of 4.95% savings in total system SAIFI and 5.14% savings in non-storm system SAIFI. Table 14 below shows the benefits this form of automation has had in regards to non-storm SAIFI saved for specific cause codes that have historically had the largest impact on reliability.

Cause Code	Cause Code Description	5-Year Average SAIFI Savings
2	Tree Contacts	6.97%
5	Apparatus or Equipment Failures	5.45%
6	Accidents or Events Not Under the Utility's Control	2.51%
9	Lightning	7.10%
10	Unknown or Unclassified	2.62%

Table 14 – ALT Switch Program - % SAIFI Saved

The approximate installation cost is $115,000 per team. Locations are identified each year to be a part of the program. In 2017 a Scadamate team was used to upgrade a Cooper S control ALT team. There were no new ALT teams were installed. Three additional teams will be installed in 2018.

14.4kV Cable Replacement

Central Hudson has approximately 55 miles of 14.4 kV paper and lead cable used in the sub-transmission system. Several cables are over 60 years old and failures of these cables are typically associated with cracks in the lead shield. A 5-phase cable replacement program was created in 2008 to address the 14.4 kV feeds into the Poughkeepsie Secondary Network. Each phase consists of two parts. The first part of each phase involves underground conduit and manhole upgrades, and the second part involves the cable replacement utilizing the new infrastructure.

Phases 1 through 3 of both the infrastructure and cable replacements (approximately 0.7 miles) were completed prior to 2013.

Phase 4 infrastructure was completed in 2012. Cable work commenced in 2012 and was completed in 2013. The remaining Phase 4 cable termination work was completed in 2013 at a cost of $109,000.

Phase 5 involved installing a new duct bank and manhole system on Main Street, between Liberty Street and South Hamilton Street (approximately 0.25 miles) and installing new underground cable for the PO, PU and PK network feeds. The infrastructure portion of this final phase was completed in 2013 at a cost of $422,000. The final cable replacement phase of this program was completed in 2014 at a cost of $532,000. The total cost for all 5 phases of the infrastructure replacement was approximately $2.375 million. The total cost for all 5 phases of the underground cable replacement was approximately $2.177 million.

Overhead cable replacement projects associated with the 14.4kV Cable Replacement Program between 2010 and 2013 involved the Poughkeepsie PH cable, and the Newburgh WN and UW cables. The overhead portion of the PH cable was replaced in 2011. The majority of the overhead portion of the WN cable (approximately 3.0 miles) was replaced in 2010. The remaining WN cable replacement was completed in 2011. A study of the area fed by the New Windsor Substation was completed in 2011. It was determined that the UW cable would no longer be needed. It was eliminated in 2013 and the substation was retired in 2014. Capital investment for the projects above, are not listed as they occurred prior to the 5-year window that this report addresses.

Newburgh Secondary Network

A multi-phase capital budget program to address cables and infrastructure in the Newburgh secondary network was initiated in 2014. In 2014, approximately 0.22 miles of nearly 90 year old tile duct east of Johnston Street (south side of Broadway) was replaced, and 5 pull boxes had roof and wall repairs performed. The total 2014 capital investment was approximately $532,000.

New cables were installed in the new conduit system in 2015. The total 2015 capital investment was approximately $242,000.

Approximately 0.32 miles of secondary network cables were replaced west of Johnston Street (south side of Broadway) in 2016. The total 2016 capital investment was approximately $463,000.

A new roof was installed for a manhole on Broadway in 2017. In addition to the new roof, a new 3-way vacuum switch installed in the same manhole, and 800 feet of secondary network cable and primary 15kV cable for the 404 circuit on the north side of Broadway between Chambers Street and Lander Street was replaced. The total 2017 capital investment was approximately $198,000.

Distribution Automation

Central Hudson currently utilizes Electrical Distribution Design's (EDD) model-based Distributed Engineering Workstation (DEW) software. With this advanced modeling software Central Hudson is able to realize continuous improvement in distribution system reliability, efficiency, capacity and security as smart grid is implemented over time as a strategic part of capital investment. This software allows for an open architecture that can adapt as technology advances and priorities change. DEW is capable of performing integrated system analyses for planning, design and operations management.

In 2015, the Distribution Automation program began a transition from pilot to full scale rollout. In addition to electronic device installation and circuit reconductoring, the project includes deployment of a network communication system of radios with a fiber/microwave backbone, as well as a Distribution Management System. These components form the backbone of the Fault Locating, Isolation, and Service Restoration (FLISR) scheme as well as the VVO/CVR scheme (Volt-VAR Optimization and Conservation Voltage Reduction). In order to track the progress of all three projects, milestones were developed and completed every six months.

During 2017, the Distribution Automation project installed 19 switched capacitors, 24 voltage regulator sets and controllers, and 40 electronic reclosers. The installation of these devices follows the recommendations established through the detailed plans completed in accordance to the milestones. The milestones for Distribution Automation also establish time frames for the number FLISR ready devices and VVO devices. In 2017, the integration of the Distribution Management System (DMS) completed many significant milestones. During 2017 the DMS project was able to successfully complete site acceptance testing. By the end of 2017, the DMS was able to issue commands to Distribution Automation devices. Network Strategy continues to build communications between field devices over both tier 2 and tier 1 to Central Hudson headquarters. Central Hudson has successfully met each milestone and has shown significant progress in each of the three projects. The total capital expenditures for 2017 were approximately $4.5 million for Distribution Automation, $1.3 million for DMS and $5.4 million for Network Strategy. For additional information, please reference Central Hudson's Project Milestones & Testing Report on Distribution Automation, Distribution Management System, and Network Strategy filed September 21, 2015 as part of Case 14-E-0318 and 14-G-0319.

Cutout Replacement

In 2002, Central Hudson developed a cutout replacement program. The program was divided into 3 phases. Phase 1 was replacement of all 1st zone porcelain cutouts with polymer cutouts. Approximately 5,000 cutouts were replaced through 2006. Phase 2 was replacement of all porcelain cutouts in the 2nd zone with over 1,500 customers. Approximately 1,107 cutouts were replaced as part of the 2007 program. Phase 3 was divided into parts 'a' and 'b'. Phase 3a involved replacement of all porcelain cutouts that resulted in exposure to between 1,000 and 1,500 customers. Approximately 2,976 cutouts were replaced as part of the 2008 program. Phase 3b is replacement of all porcelain cutouts that have between 500 and 1,000 customers. This phase started in 2009 and was completed in early 2010. Approximately 8,036 cutouts were replaced.

Following the completion of the cutout replacement program, micro-surveys were performed to identify cutouts that may have been missed. Approximately $214,000 was spent between 2012 and 2013, addressing these locations. Between 2014 and 2017, Central Hudson continued to proactively monitor and address cutout replacements as necessary at the district level at locations that did not meet the threshold for replacement under the initial program. The Company is currently evaluating the potential for additional replacement programs to further replace porcelain cutouts. However, customers affected by cutout failure have been steadily declining over recent years. During, the previous five years, cutout failures have been between the second and fourth leading cause of equipment failure. In 2017, this sub cause code was the third leading cause of equipment failure related customer interruptions.

Breaker Replacement

Breaker failures are not a common occurrence, but they have the potential to impact a significant number of customers. In 2008, the Breaker Replacement plan was developed as a means to improve the Central Hudson infrastructure and maintain system reliability. Breaker replacements were prioritized based on duty rating, condition assessment and obsolescence. 35 substation breakers were replaced in the first year of the program. The expenditures for the Breaker Replacement program are shown in Table 16 below.

	2013	2014	2015	2016	2017
Breaker Replacement Program Expenditures ($000)	$2,221	$3,808	$2,400	$1,600	$1,700

Table 16 – Breaker Replacement Program

$4.3 million has been budgeted for 2018 to replace an additional 37 breakers, some of which have already been purchased and designed. A total of 78 breakers were identified and replaced between 2013 and 2017. The need to replace additional breakers is an on-going process and will continue based on real time field evaluation and condition assessments.

Overcurrent Protection and Reliability Practices – Quanta Technology Distribution Audit

In 2007, Quanta Technology was contracted to conduct a distribution system audit. The audit focused on overcurrent protection and reliability practices. To perform this audit, Quanta Technology reviewed several internal documents to determine Central Hudson's current practices. The recommendations in the report were based on a comparison of Central Hudson's current practices to current industry practice. The current industry practices that were recommended to improve reliability were completed in 2008. Projects still being implemented during the past 5 years are included in this section.

Early in 2012, the pilot program was concluded and considered a success. In 2013, Distribution Engineering issued criteria for applying instantaneous reclosing and lateral fuse saving throughout the service territory. Distribution Engineering has been working with the Electric System Protection group to review the application of instantaneous auto-reclose to substation distribution circuit breakers on a case-by-case basis. All current electronic recloser installations have been configured for instantaneous auto-reclose to provide fault protection along the distribution circuit, thereby minimizing customer impact for transient faults. All future electronic recloser installations will be completed with instantaneous auto-reclose enabled.

Recommended practices based upon the Quanta Technology Study and implementation are detailed below:

1. Electronic Reclosers – The audit identified the benefits associated with the use of electronic reclosers as the first protective device. These devices can provide a wide variety of additional relaying features that can improve system reliability and reduce maintenance costs. Per the Quanta recommendation, a new section in the Distribution Engineering Guides was created in 2008 to address application guidelines of electronic reclosers, as well as a methodology for providing remote communication.

   Central Hudson's practice prior to 2009 was to use hydraulic reclosers. Installation of electronic reclosers is expected to result in improved reliability. They provide an improvement of outage prioritization, instant notification of momentary interruptions via Sensus units, additional fuse saving, available fault data to allow for troubleshooting of outages and result in more flexible protection of the system. Based on data sampled from the Kingston District from 2009 through 2012, each unit saves approximately 5 outages on average per year.

   In 2010 and forward, approximately 13 units per year are being replaced, prioritized based on customer count and coordinated with the current recloser maintenance cycle as well as other planned capital projects. These 13 new units per year are in addition to the electronic reclosers that will be installed on each new distribution circuit. In 2010, 17 new electronic reclosers were installed at a cost of $601,000. In 2011, only nine of the 13 planned new electronic reclosers were installed due to the unusually large impact of the 2011 storms. The total 2011 cost of the new electronic reclosers was approximately $434,520. In 2012, $588,691 was spent to install 14 new electronic reclosers. In 2013, 14 new electronic reclosers were installed at a cost of $537,447. In 2014, 16 new electronic reclosers were installed at a cost of $714,938. In 2015, 10 new electronic reclosers were installed at a cost of $486,515. In 2016, no new electronic reclosers were installed for Poughkeepsie, Kingston or Catskill. A number of recloser installations were completed as part of Distribution Automation programs for Fishkill and Newburgh and are outlined in the Distribution Automation section. In 2017, $454,242 was spent to install 9 new electronic reclosers. Additional recloser installations were completed as part of Distribution Automation program for Fishkill and Newburgh and are outlined in the Distribution Automation section. The cost of the program is expected to be $350,000 for 2018.

2. Instantaneous Reclose for Substation Breakers and Electronic Reclosers - Instantaneous reclose is the theory of re-energizing an electrical system within 12-30 cycles following a transient fault to restore the integrity of the system. 12-30 cycles equates to approximately 0.2–0.5 seconds, which should be ample time for transient faults to clear and small enough time to go unnoticed by rotating machines and electric drives. Therefore, the ultimate goal of instantaneous reclose is to allow for transient faults to clear while providing uninterrupted power to the end users.

   The Newburgh Union Avenue Substation circuits were chosen for a pilot program to implement instantaneous reclose. 2009 was the first year of this program. For each breaker operation resulting from a fault in the 1st zone of protection, customer calls were tracked. It was anticipated that with the new instantaneous reclose relay settings, there would be little to no impact to customers. This study concluded in March of 2012. Table 17 below shows the results from 2009 through 2012.

Year	Number of Breaker Operations	Number of Breaker Operations Resulting in Customer calls
2009	7	1
2010	8	0
2011	2	0
2012	6	0

Table 17 – Number of Breaker Operations and Resulting Customer Calls due to 1st Zone Faults

   Due to the success of the study, Central Hudson continues to program distribution circuit breaker relays and electronic reclosers with instantaneous autoreclosing whenever feasible. Central Hudson plans to implement autoreclosing system wide as changes are made in a substation. The current process involves Electric System Protection notifying the District Electric Operations Engineer when an opportunity for application arises, such as the installation of new relays or if relays require setting changes for other purposes. Instantaneous autoreclose is not applied to circuits where sectionalizers are implemented downstream or on feeders where non-inverter based generation is present.

   Because solar PV inverters take up to 2 seconds to detect an island and open, with the higher penetration of these resources the Company will have to significantly reduce implementation of this scheme over the next several years. This is particularly true on feeders where reclose blocking is applied in lieu of Direct Transfer Trip (DTT) for anti-islanding protection. With the reduction in instantaneous reclose usage, not only will the opening of the recloser be more visible to the customer, but it will result in the need to reduce the reach of these reclosers, negatively impacting SAIFI.

5-Year Capital Budgets and Expenditures

Table 18 below is a summary of 5-year distribution capital budgets and expenditures. The "Total Improvement Blankets" include minor overhead line improvement, infrastructure damage repairs, and underground line improvement. "Total Limited Term" includes overhead service replacements as well as other overhead minor equipment repairs/replacements. The "Total Relocation Blanket" includes expenditures involved with highway rebuilds. "Total Specifics" are major capital improvement projects.

	2013		2014		2015		2016		2017	
	Budgeted	**Expended**	**Budgeted**	**Expended**	**Budgeted**	**Expended**	**Budgeted**	**Expended**	**Budgeted**	**Expended**
Total Improvement Blankets	$4,969	$6,222	$4,942	$3,981	$8,087	$7,110	$9,634	$9,732	$12,216	$10,105
Total Limited Term	$1,500	$1,252	$1,350	$995	$0	$1,135	$0	$3,333	$0	$2,474
Total Relocation Blanket	$162	$126	$170	$50	$0	-$10	$75	$74	$49	$50
Total Specifics	$14,787	$12,278	$18,942	$15,511	$21,285	$20,503	$22,081	$18,501	$20,872	$16,905
TOTAL BUDGET GROUP 15	**$21,418**	**$19,878**	**$25,403[2]**	**$20,537[1]**	**$29,372**	**$28,738**	**$31,790**	**$31,585**	**$29,656**	**$29,588**

Table 18 – Distribution 5-Year Budgets and Expenditures ($000)

[1]*Restoration efforts as a result of the November 2014 Thanksgiving snow storm resulted in decreased capital budget spending due to the lengthy restoration process after these events, loss of contract and company personnel to mutual aid, and mitigation of temporary repairs resulting from the restoration process.*
[2]*In 2014, the initial budget was lower ($22.154 million) and dollars were moved to enable authorization of work orders.*

Tables 19a and 19b summarize the total Transmission and Substation 5-year budgets and expenditures. These areas are indirectly related to Distribution in that they have an impact on reliability.

	Budgeted	Expended
2013 Total Budget	$12,094	$11,512
2014 Total Budget	$13,123	$13,344
2015 Total Budget	$19,498	$19,284
2016 Total Budget	$20,846	$21,368
2017 Total Budget	$21,420	$21,472

Table 19a – Transmission 5-Year Budgets and Expenditures ($000)

	Budgeted	Expended
2013 Total Budget	$13,746	$13,022
2014 Total Budget	$14,722	$15,335
2015 Total Budget	$16,670	$17,199
2016 Total Budget	$19,309	$19,369
2017 Total Budget	$21,589	$20,637

Table 19b – Substation 5-Year Budgets and Expenditures ($000)

Vegetation Management

As part of our initial self-assessment and review of the Modified Enhanced Tree Trimming Program introduced in 2008, a field audit was conducted. These audits were completed in October and November of 2008. These circuits were field reviewed in their entirety as part of our initial test program for the field audits. Any follow-up items that were recommended from the field audits were identified and forwarded to the Director of Line Clearance for a corrective action plan and schedule for completion on all the findings.

In 2011, the Modified Enhanced Trimming Program (now the Routine Trimming Program) sustained a total improvement of 30.47% for tree related outages and 24.34% for the combination of tree and storm related outages. This same level of reliability improvement was maintained in 2012. In 2013, the total improvement for tree related outages was 27%. In 2014, the total improvement seen for tree and storm related outages, combined, were 33%. The aggregate total reliability improvement of tree and storm related outages would have been even better had it not been for the 5 most severe storms in Central Hudson's history (Twin Peaks in 2010, Tropical Storm Irene and "SnowFall" in 2011, Tropical Storm Sandy in 2012 and "SnowBird" in 2014). Expenditures related to the Tree Trimming program are listed in section 3e of this report.

Unfortunately, after experiencing significant improvement in tree related SAIFI through 2011, despite improvement in other areas of reliability, Central Hudson began to see the trend reverse and eventually have a significant impact on Central Hudson's overall SAIFI metric. By 2017, the contribution of non-storm tree related SAIFI compared to the overall system SAIFI was 50.7%. The increase in tree related SAIFI compared to the average of the previous 4 years was 17.1%. 2017 tree related storm SAIFI also saw an increase of 235.4% compared to the previous year. Non-storm tree related SAIFI as well as tree related SAIFI including storms are metrics that will continue to be measured for 2018. The five-year business plan incorporates improved performance related to SAIFI. To meet these targets, in 2016, Central Hudson identified and initiated implementation plans to improve performance. This included collecting and reviewing tree related data after breaker lockouts, further reviewing trends related to trees species (particularly ash trees), as well as establishing an effective process for identifying and removing danger trees.

In 2016, Central Hudson also engaged a consultant, Environmental Consultants, Inc. (ECI), to assess Central Hudson's line clearance program. Some of ECI's recommendations included: obtaining increased funding to return to a four-year trimming schedule, creating a separate schedule for circuits affected by the residency of protected bat species, and obtaining funding for a widespread removal of danger trees, the majority of which are Ash trees along three-phase circuitry to combat tree mortality caused by the Emerald Ash Borer and other tree diseases. As a result of the recommendations, on May 5, 2017, Central Hudson petitioned the Public Service Commission ("Commission") for deferral accounting authority incremental funding for additional transmission line clearance and danger tree removal funding. The Commission ruled on this petition in Case 17-E-0250 on September 28, 2017, granting in part, deferral accounting and recovery for this purpose. The Commission approved up to $2 million for the removal of danger trees along 262 miles of three-phase circuitry on the twelve highest priority circuits.

As part of the Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Electric Service in Case 17-E-0459, Central Hudson requested incremental funding to address the recommendations from ECI in order to improve the system reliability. This incremental funding request seeks to address the following distribution vegetation management items: address routine trimming backlog / underfunding, danger tree removals, EAB danger tree removals, off-cycle spot trimming and completion of the original enhanced line clearance areas.

Facility Inspection

Central Hudson's facility inspection program has been in place for many years. All of Central Hudson's facility inspection activities comply with the minimum requirements set forth in the standards. The purpose of the inspections is to visually evaluate the equipment associated with overhead distribution and transmission facilities, and underground distribution facilities. Prior to the Order, Central Hudson had in place a comprehensive inspection program that in many cases exceeded the minimum requirements set forth in the standards. Inspection frequency for distribution and transmission structures is based on a five-year cycle.

The following is a summary of the facility inspection program as reviewed in Central Hudson Gas & Electric's Electric System Planning Guides dated October 2013.

Structure Categories

Central Hudson Gas and Electric has approximately 234,008 individual facilities that require testing for the presence of stray voltage and in some cases facility inspection. These facilities are broken down into five main categories including:

- Distribution Overhead – wooden poles, guy wires, metallic risers and all attached devices that are accessible from the ground
- Underground Facilities – manholes, pull boxes, URD pad-mounted equipment and all devices associated with underground facilities
- Transmission Structures – all structures, guys, and down leads attached to the structures. Transmission structures support circuit voltages of 69 kilovolts and greater. Facilities that house circuits of lower voltage in addition to the transmission voltage levels are included in this category.

Distribution Overhead

There are approximately 208,781 distribution pole structures in Central Hudson's territory. These consist of primarily wooden poles. The poles support electric power distribution lines and equipment as well as telephone, cable, and other miscellaneous attachments. Those distribution structures that have ground wires, metallic risers, guy wires, or metal control boxes are required to be tested for stray voltage as part of the program. Distribution overhead facilities are included in both the stray voltage and inspection programs.

Underground Facilities

There are 1,289 system manholes and pull boxes as well as 16,408 URD pad-mounted devices on Central Hudson's system. The manholes and pull boxes are primarily located in Central Hudson's network areas. Pull boxes are typically provided with a concrete cover in a cast iron frame. Manholes are covered with a cast iron cover, steel grating, or reinforced concrete cover. The pad-mounted devices are associated with our URD (Underground Residential Distribution) system. The pad-mounted devices are installed on concrete or fiberglass bases and are themselves enclosed in metallic or fiberglass cabinets. These locations are included in both the stray voltage and facility inspection programs.

Transmission

Transmission facilities consist of all overhead transmission towers and pole structures with operating voltages of 69 kV or higher. There are a total of 8,819 individual transmission poles/towers in Central Hudson's system. Transmission structures that are either metallic or wood and have down grounds, guys or riser pipes were tested for stray voltage as part of this program. All transmission structures are field inspected as part of Central Hudson's facility inspection program.

Expenditures related to the Facility Inspection Program are listed in Table 20 below.

	2013	2014	2015	2016	2017
Total Budgeted	$578,907	$627,166	$1,043,264	$917,973	$952,902
Total Expenditures	$753,505	$785,321	$1,010,464	$887,913	$821,914

Table 20 – 5-Year Facility Inspection Program Expenditures

b) Operations and Maintenance (O&M) budgets and actual expenditures associated with reliability programs for each of the past 5 years

Table 21 below summarizes the total O&M 5-year budgets and expenditures.

		2013	2014	2015	2016	2017
Catskill	Budgeted	$2,826,688	$1,291,112	$1,310,380	$1,107,594	$1,194,842
	Actuals	$1,443,175	$1,054,428	$1,107,802	$1,247,168	$1,393,323
Construction	Budgeted	$2,559,234	$3,404,897	$5,492,651	$3,626,364	$5,220,385
	Actuals	$3,197,770	$4,090,687	$5,112,891	$4,815,980	$3,927,458
Fishkill	Budgeted	$1,884,755	$1,520,979	$1,513,020	$1,001,822	$1,532,925
	Actuals	$1,795,347	$1,198,754	$1,758,820	$1,328,865	$1,395,284
Kingston	Budgeted	$3,450,350	$2,168,703	$ 2,251,692	$ 2,056,438	$2,150,658
	Actuals	$3,039,507	$2,058,170	$ 2,564,279	$ 2,434,120	$2,457,048
Newburgh	Budgeted	$2,772,009	$2,143,792	$2,177,578	$2,018,768	$2,147,594
	Actuals	$2,438,877	$2,009,243	$2,369,689	$2,204,731	$2,315,928
Poughkeepsie	Budgeted	$2,439,098	$1,925,843	$2,259,054	$2,575,166	$2,284,529
	Actuals	$2,576,318	$2,147,951	$ 2,545,377	$ 2,134,722	$2,284,257
Service Workers	Budgeted	$490,040	$609,605	$747,774	$857,857	$943,835
	Actuals	$813,099	$719,700	$973,550	$689,381	$723,014
Total Budgets		$16,422,174	$13,064,931	$15,752,149	$13,426,008	$15,474,768
Total Actuals		$15,304,093	$13,278,933	$16,432,408	$14,854,968	$14,496,312

Table 21 – 5-Year O&M Budgets and Expenditures

c) The yearly average and peak field/construction work force numbers by job title for each of the past 5 years

The following is a listing of field/construction job titles:

Director/Superintendent/Operating Supervisor
Line Foreman
Associate Line Foreman
Utility Forester **(new title in 2012)**
Assistant Utility Forester **(new title in 2014)**
Associate Utility Forester **(new title in 2015)**
T & D Maintenance Planner
Working Foreman/Woman 2/C LES&T (Line)
Lineman/Linewoman 1C, 2/C and 3/C
Service Worker A & B
Chief Line Clearance Man/Woman
Working Foreman/Woman 2/C LES&T (Splicer)
Working Foreman/Woman 1/C – PC
Splicer 1/C, 2/C & 3/C
Field Clerk/Storekeeper
Senior Leader Electric T & D Safety & Compliance **(new title in 2017)**

Peak and average work force numbers by specific job title are not available. Table 22 below summarizes the total field/construction work force numbers over the past 5 years.

	2013		2014		2015		2016		2017	
Title	**Peak**	**Avg.**	**Peak**	**Avg.**	**Peak**	**Avg.**	**Peak**	**Avg.**	**Peak**	**Avg.**
Work Foreman/Woman 2/C LES&T	35	31	32	31	32	29.9	31.4	33	36	31.6
Work Foreman/Woman 2/C LES&T – Splicer	0	0	1	1	3	1.4	3	3	3	3
Working Foreman/Woman 1C - PC	17	13	17	16	15	14.3	12.3	14	11	9.3
Lineman/Linewoman 1/C	37	33	33	31	32	28.9	24.6	32	33	29.1
Service Worker A	32	31	30	29	31	30.2	28.6	31	30	29.9
Service Worker B	0	0	5	1	2	0.2	2.3	8	3	0.6
Lineman/Linewoman 3/C	18	14	18	13	22	17.9	17.3	24	17	13.1
Splicer 1/C	6	5	5	5	6	5.3	5.3	6	7	6.6
Splicer 2/C	4	3	6	4	5	3.3	1.7	3	1	0.4
Splicer 3/C	2	2	2	2	2	0.2	0	0	0	0
Chief Line Clearance Man/Woman	2	2	2	2	2	2	2	2	2	2
Utility Workers	2	2	5	2	6	3.3	3.1	5	7	3
Line Foreman	18	17	18	17	18	17.5	20.7	22	22	21.3
Associate Line Foreman			2	1	2	1.9	2	2	2	1.7
Line Clearance Foreman	1	1	1	1	1	0.8	0	0	0	0
Utility Forester	3	3	1	1	2	1.3	2	2	2	2
Associate Utility Forester					1	0.5	1	1	2	1.8
Assistant Utility Forester			2	2	2	1.5	1	1	1	0.2
Director / Regional Director / Senior Director	3	3	5	4	5	5	5	5	6	5.5
Director / Superintendent / Operating Supervisor	7	7	6	5	5	5	5	5	5	4.6
Senior Leader Electric T & D Safety & Compliance *									1	0.6
Engineer	1	1	1	1	1	1	1	1	1	1
T & D Planner	3	2	5	4	4	3.9	3.9	4	5	3.8
Lineman/Linewoman 2/C	7	7	19	12	17	15.2	22.3	30	30	23.4
Field Clerk/Storekeeper	12	12	13	12	13	12	4.8	12	0	0
Total	210	189	229	197	229	202.5	200.3	246	227	194.5

Table 22 – 5-Year Field/Construction Work Force Numbers

**** In 2017, Senior Leader Electric T & D Safety & Compliance title was created***

d) The yearly average and peak contractor crew numbers used by title/classification for each of the past 5 years

The following is a listing of title/classification of the contractor Line Clearance crews and Line Crews:

Line Clearance Personnel:	Line Crew Personnel
AF - (working) Foreman	Superintendent
JT - Journeyman Trimmer	General Foreman
T3 - Trimmer Class 3	Foreman
T2 - Trimmer Class 2	Working Foreman
T1 - Trimmer Class 1	Journeyman Lineman
	Apprentice 1st through 7th

Table's 23a and 23b summarize the average and peak Line Clearance and Line contractor FTE's over the past 5 years.

	2013	2014	2015	2016	2017
Average Contractor FTE	102.5	112	106	114.55	119.68
Peak Contractor FTE	123.6	138	131.9	158.65	225.15

Table 23a – 5-Year Average and Peak Contractor Line Clearance FTE's

	2013	2014	2015	2016	2017
Average Contractor FTE	17.4	29.7	52.55	53.86	58.36
Peak Contractor FTE	34.2	428	89.04	71.09	152.00

Table 23b – 5-Year Average and Peak Contractor Line FTE's

e) Distribution tree trimming budgets and actual expenditures for each of the past 5 years

Table 24 below is a summary of all Distribution Line clearance expenditures for each year over the past 5 years.

	2013	2014	2015	2016	2017
Total Budgeted (Distribution)	$12,205,622	$11,258,596	$11,848,998	$13,318,253	$13,946,918
Total Expenditures (Distribution)	$12,717,942	$11,991,679	$11,450,271	$12,938,783	$14,366,496
Total Budgeted (Transmission)	$1,402,861	$1,708,745	$1,908,766	$1,741,062	$1,707,304
Total Expenditures (Transmission)	$1,367,029	$1,960,584	$1,973,514	$2,436,732	$1,553,128

Table 24 – 5-Year Distribution Line Clearance Expenditures

4. Power Quality (PQ)

a) Provide PQ information as outlined in Section 4(d) of the service standards

A. 2017 Goals/Objectives/Targets for Power Quality:

The Company will continue its 2017 objective to improve power quality at the customer level. Central Hudson views power quality improvement as an opportunity to offer our customers expertise in the form of advisory services, systems, and equipment, which all add value to their electric service.

Responsibility for this objective includes members of the Customer Services Group and the Electric Engineering Services Group. These groups continue the function of working with industrial, commercial and

residential customers to define their power quality needs and to develop practical, cost-effective solutions to respond to these needs.

The work scope is as follows:

1) The Customer Services and the Electric Engineering Services Groups will continue to meet with commercial, industrial, and residential customers to define their power quality needs and to develop practical, cost-effective solutions to their power quality concerns. These meetings will be arranged through the 4 District Directors.

2) Detailed reports will be individually prepared for each customer, summarizing the findings of the power quality assessment and recommending an action plan to improve the customer's power quality.

Central Hudson will continue to monitor momentary interruptions through its SCADA system, where available, in accordance with the 2004 Order Adopting Changes to Standards on Reliability of Electric Service. The Distribution Engineering Section will continue to review in detail the circumstances surrounding all distribution substation breaker operations in order to improve power quality. A proactive step taken in 2009 to improve power quality was to implement instantaneous reclose on the Union Avenue Substation distribution breakers as part of a pilot program. As expected, this pilot program reduced significantly the impact that transient faults had on the customers fed from this substation. Distribution Engineering will work with the Electric System Protection group to review applying instantaneous auto-reclose to substation distribution circuit breakers and instantaneous reclose settings will be implemented in all future electronic recloser installations wherever feasible. But unfortunately, the high penetration of solar PV will cause Central Hudson to reduce the application of this program for our customers, details of this program and results to date, as well as the need to reduce implementation, are discussed in section 3a of this report.

B. Power Quality Program – 2017 Activities:

During 2017, the Customer Services and Electric Engineering Services Groups continued to meet with residential, commercial and industrial customers to assess their power quality needs. The team worked with several of these customers to identify and resolve power quality problems, regardless of whether the root cause was the customer's or Central Hudson's equipment. As part of this program, Central Hudson continued to distribute the brochure entitled "Understanding & Avoiding Commercial Power Disturbances."

Central Hudson has continued to provide training to personnel involved with power quality. Central Hudson has also remained actively involved in industry initiatives such as EPRI's Power Quality Business Unit Council and Power Quality Interest Group. The activities will ensure that Central Hudson personnel remain in touch with the latest developments in power quality and can network with other industry experts concerning power quality equipment or case studies.

Central Hudson continues to participate with the Commission's initiative to review and address power quality issues with the large industrial customers. Historically, Central Hudson has worked with Global Foundries on an ongoing basis to address power quality issues, to communicate and coordinate scheduled maintenance activities, and to work together during switching procedures to minimize customer impact. The Power Quality work has enhanced this relationship by adding additional structure to event reporting and communication.

The parties have maintained an open line of communication during the year to review and discuss disturbances which originated within Central Hudson's service territory and disturbances which were caused by events outside of the Central Hudson's service territory. These reviews served to identify trends, track follow-up activity, and investigate areas for improvement. Central Hudson utilizes event data from both local transmission disturbance monitoring and the power quality monitoring installed in 2016 to correlate the impact (percent sag, event duration) of system disturbances with local Global Foundries monitoring.

Central Hudson has worked over the past few years with IBM/Global Foundries and EPRI on a specific project to address power quality issues. The project included two scopes, the first phase is to perform a power quality investigation of IBM/Global Foundries to determine the susceptibility of current tool sets and

identify cost effective design and mitigation strategies, and the second phase is to use this information and information from other investigations to propose modifications to the existing SEMI F47 criteria that will close gaps in the current criteria and develop recommendations for new testing standards.

In August 2015, the power quality investigation phase was completed and a number of devices and controls were found to be operating well below the SEMI F47 power quality standard. There were a number of recommendations developed for improvements within the manufacturing facility which would improve the facility's ability to ride through power disturbances both within and outside of the facility. The costs for these improvements were nominal when compared to the impact of these power disturbances or the cost of a feeder or utility level solution. Based on the success of the initial power quality study, additional power quality studies have been discussed for manufacturing areas that were not tested.

During 2017, Central Hudson and Global Foundries continued to work together to track system incidents that had an impact on Global Foundries. In addition, Central Hudson installed power quality monitoring at the feeder level during the second quarter of 2016, to improve its ability to track and monitor power quality events at the facility.

C. Power Quality Complaints – Data Collection Methodology, Reporting, Requirements and Results:

Background

As stated in Section 3, Service Reliability Objectives, of PSC Cases 02-E-1240 and 02-E-0701, the New York State Public Service Commission requires all large electric utilities to record the number of power quality complaints received, the number of investigations conducted during the year and the results of the investigations. The results of the investigations must indicate if the origin of the disturbance was the responsibility of the utility or customer and be categorized as follows: momentary interruptions, over voltage condition, under voltage condition, voltage sags and swells, transients, harmonics and noise or unknown.

As stated in Section 5 of the Cases mentioned above, these results must be included in an annual report to the PSC by March 31 of every year along with other specified information regarding electric service standards.

Data Collection Methodology

Power quality complaints are investigated by our field forces. Depending on the nature of the investigation, a dispatch order or trouble order is created to track the investigation from the time the complaint is received to the time the investigation is completed. The employee conducting the investigation will note on the order the nature of the disturbance and results of the investigation. All information regarding the order is recorded electronically through our Customer Information System (CIS).

Data Reporting

An internal program was created to query data from our CIS regarding power quality complaint investigations. The program "pulls" relevant data from all dispatch and trouble orders that have been created to track the investigations. Program output is then imported in Excel format. Once summarized in spreadsheet format, the records are scrutinized, sorted, categorized and tallied, by administrative staff, based on reporting requirements mentioned above. Table's 25a, 25b and 25c provide details of the Power Quality Program for 2017:

District	PQ Complaints Received	Investigations Conducted
Catskill	26	26
Kingston	35	35
Poughkeepsie	57	57
Fishkill	30	30
Newburgh	46	46
Total:	194	194

Table 25a – Number of PQ Complaints Received and Investigations Conducted by Operating District

District	Central Hudson	Customer	Unknown	Total
Catskill	7	8	11	26
Kingston	12	13	10	35
Poughkeepsie	16	23	18	57
Fishkill	5	15	10	30
Newburgh	14	25	7	46
Total:	54	84	56	194

Table 25b – Origin of Disturbance by Operating District

	Catskill	Kingston	Poughkeepsie	Fishkill	Newburgh	Total
Momentary Interruptions	4	1	3	0	1	9
Over Voltage	3	8	4	6	9	30
Under Voltage	1	6	2	4	9	22
Voltage Sag/Swell	5	6	19	5	15	50
Transients	1	0	1	0	0	2
Harmonics & Noise	1	0	1	0	0	2
Unknown	4	7	14	9	3	37
No Problem	7	7	13	6	9	42
Totals	26	35	57	30	46	194

Table 25c – Disturbance Category by Operating District

b) Provide the number of momentary interruptions recorded and the MAIFIe calculation on a company-wide basis along with by operating division for each of the past 5 years

Central Hudson separates all momentary interruptions by voltage class. Voltage class is defined as the voltage at the substation at which the operation occurred to cause a momentary interruption to customers. Momentary interruptions have been recorded for all circuits with full and limited monitoring systems. An exemption was granted in January, 2006 for all circuits that do not have Supervisory Control and Data Acquisition (SCADA) systems. In summary, 94% of Central Hudson's feeders affecting 95% of Central Hudson's customers have a form of SCADA equipment (limited or non-limited) that capture operations, including momentary operations.

MAIFIe uses a total district customer count in its calculations. Events related to faults initiated at the transmission and sub transmission voltage level include customer counts for distribution circuits for which monitoring is not available. Table 26a is a summary of all recorded momentary interruptions for each

Operating District, as well as the System total from 2013 through 2017. Table 26b is the calculated MAIFIe for each Operating District, as well as the System total from 2013 through 2017.

It should be noted that in some cases, it is desirable to sustain a momentary interruption to avoid a permanent interruption for transient faults, which the electric industry typically states accounts for 80-85% of faults.

Operating District	Year				
	2013	2014	2015	2016	2017
Catskill	23	20	16	15	22
Kingston	50	55	45	53	41
Poughkeepsie	37	47	41	50	40
Fishkill	24	27	25	17	23
Newburgh	30	38	43	57	48
System Total	164	187	170	192	174

Table 26a – 5-Year District and System Number of Momentary Interruptions

Operating District	Year				
	2013	2014	2015	2016	2017
Catskill	2.353	1.155	0.676	0.749	0.963
Kingston	1.700	1.266	1.153	1.307	1.791
Poughkeepsie	0.767	0.998	0.718	0.734	0.623
Fishkill	0.476	0.605	0.529	0.427	0.591
Newburgh	0.490	0.723	0.839	0.826	0.900
System Total	1.038	0.941	0.807	0.833	0.980

Table 26b – 5-Year District and System MAIFIe

5. Circuit Performance

a) Provide a listing of circuits, by operating area, based on SAIFI and CAIDI performance for the calendar year

CATSKILL OPERATING DISTRICT

Circuits Sorted By Individual Circuit SAIFI
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
1071	Catskill	1,443	4,786	10,562.37	439.18	3.317	132.42
1091	Catskill	1,692	4,236	7,461.23	264.58	2.504	105.68
2385	Catskill	1,891	4,446	6,723.70	213.34	2.351	90.74
1074	Catskill	896	1,767	3,138.38	210.16	1.972	106.57
2389	Catskill	1,668	3,214	11,378.35	409.29	1.927	212.41
2071	Catskill	1,238	2,137	2,780.33	134.75	1.726	78.06
2006	Catskill	818	1,386	3,850.63	282.44	1.694	166.69
2387	Catskill	330	467	1,286.28	233.87	1.415	165.26
2001	Catskill	1,941	2,624	5,051.18	156.14	1.352	115.50
2061	Catskill	2,104	2,814	4,699.23	134.01	1.337	100.20
1076	Catskill	1,192	1,455	2,316.40	116.60	1.221	95.52
1072	Catskill	696	800	1,331.10	114.75	1.149	99.83
2042	Catskill	1,575	1,697	5,018.98	191.20	1.077	177.45
2005	Catskill	1,962	1,802	2,525.77	77.24	0.918	84.10
2043	Catskill	1,279	1,161	2,758.47	129.40	0.908	142.56
1092	Catskill	2,240	1,911	4,538.73	121.57	0.853	142.50
1083	Catskill	1,504	1,246	3,023.95	120.64	0.828	145.62
1081	Catskill	998	811	1,356.17	81.53	0.813	100.33
2003	Catskill	1,819	1,097	1,347.38	44.44	0.603	73.69
2081	Catskill	1,135	671	2,056.40	108.71	0.591	183.88
2041	Catskill	1,571	736	2,195.98	83.87	0.468	179.02
2002	Catskill	1,535	618	1,098.30	42.93	0.403	106.63
3002L	Catskill	119	29	90.97	45.87	0.244	188.21
2004	Catskill	1,160	279	522.67	27.03	0.241	112.40
1082	Catskill	1,496	193	349.62	14.02	0.129	108.69
2082	Catskill	1	0	0	0	0	0
1000H	Catskill	2	0	0	0	0	0

Circuits Sorted By Individual Circuit CAIDI
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
2389	Catskill	1,668	3,214	11,378.35	409.29	1.927	212.41
3002L	Catskill	119	29	90.97	45.87	0.244	188.21
2081	Catskill	1,135	671	2,056.40	108.71	0.591	183.88
2041	Catskill	1,571	736	2,195.98	83.87	0.468	179.02
2042	Catskill	1,575	1,697	5,018.98	191.20	1.077	177.45
2006	Catskill	818	1,386	3,850.63	282.44	1.694	166.69
2387	Catskill	330	467	1,286.28	233.87	1.415	165.26
1083	Catskill	1,504	1,246	3,023.95	120.64	0.828	145.62
2043	Catskill	1,279	1,161	2,758.47	129.40	0.908	142.56
1092	Catskill	2,240	1,911	4,538.73	121.57	0.853	142.50
1071	Catskill	1,443	4,786	10,562.37	439.18	3.317	132.42
2001	Catskill	1,941	2,624	5,051.18	156.14	1.352	115.50
2004	Catskill	1,160	279	522.67	27.03	0.241	112.40
1082	Catskill	1,496	193	349.62	14.02	0.129	108.69
2002	Catskill	1,535	618	1,098.30	42.93	0.403	106.63
1074	Catskill	896	1,767	3,138.38	210.16	1.972	106.57
1091	Catskill	1,692	4,236	7,461.23	264.58	2.504	105.68
1081	Catskill	998	811	1,356.17	81.53	0.813	100.33
2061	Catskill	2,104	2,814	4,699.23	134.01	1.337	100.20
1072	Catskill	696	800	1,331.10	114.75	1.149	99.83
1076	Catskill	1,192	1,455	2,316.40	116.60	1.221	95.52
2385	Catskill	1,891	4,446	6,723.70	213.34	2.351	90.74
2005	Catskill	1,962	1,802	2,525.77	77.24	0.918	84.10
2071	Catskill	1,238	2,137	2,780.33	134.75	1.726	78.06
2003	Catskill	1,819	1,097	1,347.38	44.44	0.603	73.69
2082	Catskill	1	0	0	0	0	0
1000H	Catskill	2	0	0	0	0	0

KINGSTON OPERATING DISTRICT

Circuits Sorted By Individual Circuit SAIFI
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
1023	Kingston	18	109	215.10	717.00	6.056	118.40
3091	Kingston	1760	8635	26,423.48	900.80	4.906	183.60
1011	Kingston	1575	7518	13,769.80	524.56	4.773	109.90
3013	Kingston	1822	6532	11,655.43	383.82	3.585	107.06
3003	Kingston	2265	7944	15,630.47	414.05	3.507	118.06
2094	Kingston	2498	8623	24,285.93	583.33	3.452	168.99
3012	Kingston	3045	10129	23,348.90	460.08	3.326	138.31
2016	Kingston	2164	6483	13,723.42	380.50	2.996	127.01
3011	Kingston	1800	5353	11,296.80	376.56	2.974	126.62
3022	Kingston	1585	4351	9,407.55	356.12	2.745	129.73
1002	Kingston	3	8	24.35	487.00	2.667	182.63
377	Kingston	72	190	496.85	414.04	2.639	156.90
3095	Kingston	413	1053	3,273.95	475.63	2.550	186.55
5022K	Kingston	32	79	314.07	588.88	2.469	238.53
3014	Kingston	1619	3838	6,815.73	252.59	2.371	106.55
3024	Kingston	2370	5568	14,944.57	378.34	2.349	161.04
1021	Kingston	931	2043	1,667.78	107.48	2.194	48.98
2013	Kingston	987	2085	1,416.73	86.12	2.112	40.77
5084K	Kingston	641	1341	2,426.78	227.16	2.092	108.58
1013	Kingston	880	1831	2,854.52	194.63	2.081	93.54
3096	Kingston	333	663	1,769.58	318.84	1.991	160.14
3001	Kingston	2473	4869	4,308.25	104.53	1.969	53.09
3002	Kingston	1958	2890	11,648.22	356.94	1.476	241.83
1022	Kingston	2405	3324	2,590.67	64.63	1.382	46.76
3082	Kingston	2142	2913	12,951.25	362.78	1.360	266.76
341	Kingston	829	1086	1,213.08	87.80	1.310	67.02
3078	Kingston	1721	2186	7,200.45	251.03	1.270	197.63
1024	Kingston	1953	2180	3,255.77	100.02	1.116	89.61
3072	Kingston	771	782	3,156.17	245.62	1.014	242.16
3004	Kingston	1135	1149	1,728.67	91.38	1.012	90.27
3071	Kingston	689	659	1,949.75	169.79	0.956	177.52
3021	Kingston	1659	1547	1,662.38	60.12	0.932	64.48
2011	Kingston	926	761	2,410.25	156.17	0.822	190.03
3023	Kingston	1892	1521	3,984.33	126.35	0.804	157.17
1014	Kingston	1739	1398	2,690.08	92.82	0.804	115.45
2014	Kingston	159	119	106.18	40.07	0.748	53.54
2093	Kingston	2141	1468	3,420.22	95.85	0.686	139.79
391	Kingston	274	183	724.82	158.72	0.668	237.65
3081	Kingston	1251	806	1,748.65	83.87	0.644	130.17
2015	Kingston	1860	1153	3,227.92	104.13	0.620	167.98

Circuits Sorted By Individual Circuit SAIFI (cont.)
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served[1]	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
2017	Kingston	1035	620	508.08	29.454	0.599	49.17
3083	Kingston	523	296	829.07	95.113	0.566	168.05
3076	Kingston	1084	573	3,232.83	178.939	0.529	338.52
2001K	Kingston	125	46	74.87	35.936	0.368	97.65
1012	Kingston	1692	552	1,135.63	40.271	0.326	123.44
2091	Kingston	600	180	258.48	25.848	0.300	86.16
1003	Kingston	1093	303	367.03	20.148	0.277	72.68
121	Kingston	153	33	122.10	47.882	0.216	222.00
396	Kingston	512	109	200.50	23.496	0.213	110.37
3006	Kingston	69	10	23.67	20.580	0.145	142.00
111	Kingston	593	45	208.72	21.118	0.076	278.29
123	Kingston	34	2	3.33	5.882	0.059	100.00
112	Kingston	644	36	119.40	11.124	0.056	199.00
3005	Kingston	28	1	2.65	5.679	0.036	159.00
2012	Kingston	357	11	21.08	3.543	0.031	115.00
2092	Kingston	1019	12	22.87	1.346	0.012	114.33
375	Kingston	164	1	0.95	0.348	0.006	57.00
300GM	Kingston	1	0	0	0	0	0
1001	Kingston	1	0	0	0	0	0
2018	Kingston	29	0	0	0	0	0
395	Kingston	20	0	0	0	0	0
3NTWK	Kingston	373	0	0	0	0	0
397	Kingston	12	0	0	0	0	0
122	Kingston	248	0	0	0	0	0
300KO	Kingston	1	0	0	0	0	0
376	Kingston	0	0	0	0	0	0
1004	Kingston	0	0	0	0	0	0
3041	Kingston	0	1225	3,522.12	0	0	172.51
345	Kingston	0	93	32.18	0	0	20.76
378	Kingston	0	0	0	0	0	0
300KK	Kingston	0	0	0	0	0	0
3042	Kingston	0	48	52.85	0	0	66.06

[1] Customers served as of 12/31/16. Circuits retired prior to 12/31/17, under construction or available for reserve capacity only or during 2017 will indicate a customer count of 0.

Circuits Sorted By Individual Circuit CAIDI
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
3076	Kingston	1084	573	3,232.83	178.94	0.529	338.52
111	Kingston	593	45	208.72	21.12	0.076	278.29
3082	Kingston	2142	2913	12,951.25	362.78	1.360	266.76
3072	Kingston	771	782	3,156.17	245.62	1.014	242.16
3002	Kingston	1958	2890	11,648.22	356.94	1.476	241.83
5022K	Kingston	32	79	314.07	588.88	2.469	238.53
391	Kingston	274	183	724.82	158.72	0.668	237.65
121	Kingston	153	33	122.10	47.88	0.216	222.00
112	Kingston	644	36	119.40	11.12	0.056	199.00
3078	Kingston	1721	2186	7,200.45	251.03	1.270	197.63
2011	Kingston	926	761	2,410.25	156.17	0.822	190.03
3095	Kingston	413	1053	3,273.95	475.63	2.550	186.55
3091	Kingston	1760	8635	26,423.48	900.80	4.906	183.60
1002	Kingston	3	8	24.35	487.00	2.667	182.63
3071	Kingston	689	659	1,949.75	169.79	0.956	177.52
3041	Kingston		1225	3,522.12	0.00	0.000	172.51
2094	Kingston	2498	8623	24,285.93	583.33	3.452	168.99
3083	Kingston	523	296	829.07	95.11	0.566	168.05
2015	Kingston	1860	1153	3,227.92	104.13	0.620	167.98
3024	Kingston	2370	5568	14,944.57	378.34	2.349	161.04
3096	Kingston	333	663	1,769.58	318.84	1.991	160.14
3005	Kingston	28	1	2.65	5.68	0.036	159.00
3023	Kingston	1892	1521	3,984.33	126.35	0.804	157.17
377	Kingston	72	190	496.85	414.04	2.639	156.90
3006	Kingston	69	10	23.67	20.58	0.145	142.00
2093	Kingston	2141	1468	3,420.22	95.85	0.686	139.79
3012	Kingston	3045	10129	23,348.90	460.08	3.326	138.31
3081	Kingston	1251	806	1,748.65	83.87	0.644	130.17
3022	Kingston	1585	4351	9,407.55	356.12	2.745	129.73
2016	Kingston	2164	6483	13,723.42	380.50	2.996	127.01
3011	Kingston	1800	5353	11,296.80	376.56	2.974	126.62
1012	Kingston	1692	552	1,135.63	40.27	0.326	123.44
1023	Kingston	18	109	215.10	717.00	6.056	118.40
3003	Kingston	2265	7944	15,630.47	414.05	3.507	118.06
1014	Kingston	1739	1398	2,690.08	92.82	0.804	115.45
2012	Kingston	357	11	21.08	3.54	0.031	115.00
2092	Kingston	1019	12	22.87	1.35	0.012	114.33
396	Kingston	512	109	200.50	23.50	0.213	110.37
1011	Kingston	1575	7518	13,769.80	524.56	4.773	109.90
5084K	Kingston	641	1341	2,426.78	227.16	2.092	108.58
3013	Kingston	1822	6532	11,655.43	383.82	3.585	107.06
3014	Kingston	1619	3838	6,815.73	252.59	2.371	106.55

Circuits Sorted By Individual Circuit CAIDI (cont.)
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served[2]	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
123	Kingston	34	2	3.33	5.88	0.059	100.00
2001K	Kingston	125	46	74.87	35.94	0.368	97.65
1013	Kingston	880	1831	2,854.52	194.63	2.081	93.54
3004	Kingston	1135	1149	1,728.67	91.38	1.012	90.27
1024	Kingston	1953	2180	3,255.77	100.02	1.116	89.61
2091	Kingston	600	180	258.48	25.85	0.300	86.16
1003	Kingston	1093	303	367.03	20.15	0.277	72.68
341	Kingston	829	1086	1,213.08	87.80	1.310	67.02
3042	Kingston	0	48	52.85	0	0	66.06
3021	Kingston	1659	1547	1,662.38	60.12	0.932	64.48
375	Kingston	164	1	0.95	0.35	0.006	57.00
2014	Kingston	159	119	106.18	40.07	0.748	53.54
3001	Kingston	2473	4869	4,308.25	104.53	1.969	53.09
2017	Kingston	1035	620	508.08	29.45	0.599	49.17
1021	Kingston	931	2043	1,667.78	107.48	2.194	48.98
1022	Kingston	2405	3324	2,590.67	64.63	1.382	46.76
2013	Kingston	987	2085	1,416.73	86.12	2.112	40.77
345	Kingston	0	93	32.18	0	0	20.76
300GM	Kingston	1	0	0	0	0	0
397	Kingston	12	0	0	0	0	0
2018	Kingston	29	0	0	0	0	0
122	Kingston	248	0	0	0	0	0
3NTWK	Kingston	373	0	0	0	0	0
1001	Kingston	1	0	0	0	0	0
395	Kingston	20	0	0	0	0	0
378	Kingston	0	0	0	0	0	0
1004	Kingston	0	0	0	0	0	0
376	Kingston	0	0	0	0	0	0
300KO	Kingston	1	0	0	0	0	0
300KK	Kingston	0	0	0	0	0	0

[2] Customers served as of 12/31/16. Circuits retired prior to 12/31/17, under construction or available for reserve capacity only or during 2017 will indicate a customer count of 0.

POUGHKEEPSIE OPERATING DISTRICT

Circuits Sorted By Individual Circuit SAIFI
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served[3]	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
6053	Poughkeepsie	691	1965	2,582.63	224.25	2.844	78.86
7055	Poughkeepsie	1664	4569	9,886.73	356.49	2.746	129.83
500PO	Poughkeepsie	2	5	22.02	660.50	2.500	264.20
6055	Poughkeepsie	1393	3295	3,864.43	166.45	2.365	70.37
7012	Poughkeepsie	1731	4067	8,979.63	311.25	2.350	132.48
7051	Poughkeepsie	1717	3727	14,303.62	499.84	2.171	230.27
6001	Poughkeepsie	1350	2889	5,043.50	224.16	2.140	104.75
7085	Poughkeepsie	641	1364	2,867.23	268.38	2.128	126.13
6003	Poughkeepsie	2447	5172	5,248.95	128.70	2.114	60.89
6094	Poughkeepsie	862	1744	2,031.63	141.41	2.023	69.90
7062	Poughkeepsie	744	1497	2,974.92	239.91	2.012	119.24
7395	Poughkeepsie	1	2	16.48	989.00	2.000	494.50
6057	Poughkeepsie	1882	3331	5,688.25	181.35	1.770	102.46
621	Poughkeepsie	91	148	722.07	476.09	1.626	292.73
6073	Poughkeepsie	1521	2466	7,777.22	306.79	1.621	189.23
6002	Poughkeepsie	2477	3761	5,371.77	130.12	1.518	85.70
6091	Poughkeepsie	639	955	3,002.05	281.88	1.495	188.61
6011	Poughkeepsie	1130	1595	1,139.93	60.53	1.412	42.88
6068	Poughkeepsie	1131	1586	3,303.92	175.27	1.402	124.99
7091	Poughkeepsie	1663	2108	8,329.40	300.52	1.268	237.08
6052	Poughkeepsie	887	1120	4,731.25	320.04	1.263	253.46
6045	Poughkeepsie	645	809	1,466.32	136.40	1.254	108.75
6005	Poughkeepsie	86	105	103.38	72.13	1.221	59.08
7025	Poughkeepsie	2251	2675	9,514.72	253.61	1.188	213.41
622	Poughkeepsie	235	275	1,256.42	320.79	1.170	274.13
NYSEG	Poughkeepsie	12	14	60.67	303.33	1.167	260.00
6075	Poughkeepsie	1506	1706	3,409.00	135.82	1.133	119.90
7061	Poughkeepsie	1940	2165	8,689.83	268.76	1.116	240.83
6066	Poughkeepsie	1179	1297	870.52	44.30	1.100	40.27
6051	Poughkeepsie	919	1003	3,137.23	204.83	1.091	187.67
5NTWK	Poughkeepsie	830	885	2,582.63	224.25	2.844	78.86
7092	Poughkeepsie	421	444	9,886.73	356.49	2.746	129.83
7095	Poughkeepsie	283	296	22.02	660.50	2.500	264.20
6097	Poughkeepsie	1411	1449	3,864.43	166.45	2.365	70.37
6041	Poughkeepsie	1044	1069	8,979.63	311.25	2.350	132.48

[3] Customers served as of 12/31/16. Circuits retired prior to 12/31/17, under construction or available for reserve capacity only or during 2017 will indicate a customer count of 0.

7024	Poughkeepsie	2236	2262	14,303.62	499.84	2.171	230.27
7071	Poughkeepsie	1084	1035	5,043.50	224.16	2.140	104.75
6074	Poughkeepsie	1600	1500	2,867.23	268.38	2.128	126.13
7072	Poughkeepsie	1286	1191	5,248.95	128.70	2.114	60.89
7053	Poughkeepsie	1241	1145	2,031.63	141.41	2.023	69.90

Circuits Sorted By Individual Circuit SAIFI (cont.)
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
7041	Poughkeepsie	1967	1714	7,032.17	214.50	0.871	246.17
7081	Poughkeepsie	1799	1465	4,647.53	155.00	0.814	190.34
6062	Poughkeepsie	854	689	2,311.05	162.37	0.807	201.25
7011	Poughkeepsie	1960	1561	4,523.17	138.46	0.796	173.86
6046	Poughkeepsie	2946	2270	4,259.30	86.75	0.771	112.58
7023	Poughkeepsie	305	193	594.27	116.91	0.633	184.75
623	Poughkeepsie	302	183	591.98	117.61	0.606	194.10
7056	Poughkeepsie	681	409	1,525.32	134.39	0.601	223.76
6065	Poughkeepsie	1831	1099	2,813.62	92.20	0.600	153.61
6042	Poughkeepsie	1634	923	2,992.17	109.87	0.565	194.51
6092	Poughkeepsie	1939	958	2,235.62	69.18	0.494	140.02
6063	Poughkeepsie	545	268	521.93	57.46	0.492	116.85
6093	Poughkeepsie	1458	626	1,146.30	47.17	0.429	109.87
7052	Poughkeepsie	1056	440	1,327.72	75.44	0.417	181.05
7054	Poughkeepsie	1543	512	1,025.22	39.87	0.332	120.14
6008	Poughkeepsie	2002	430	1,315.80	39.44	0.215	183.60
6096	Poughkeepsie	1543	277	363.83	14.15	0.180	78.81
7042	Poughkeepsie	1316	186	685.68	31.26	0.141	221.19
6044	Poughkeepsie	952	127	280.62	17.69	0.133	132.58
6043	Poughkeepsie	1053	125	472.38	26.92	0.119	226.74
6056	Poughkeepsie	597	68	193.50	19.45	0.114	170.74
6061	Poughkeepsie	1061	107	219.45	12.41	0.101	123.06
7058	Poughkeepsie	163	15	114.78	42.25	0.092	459.13
6004	Poughkeepsie	243	14	1.87	0.46	0.058	8.00
624	Poughkeepsie	297	16	28.90	5.84	0.054	108.38
6064	Poughkeepsie	135	4	7.83	3.48	0.030	117.50
6095	Poughkeepsie	1070	23	32.73	1.84	0.021	85.39
500PU	Poughkeepsie	1	0	0	0	0	0
500MS	Poughkeepsie	2	0	0	0	0	0
5000W	Poughkeepsie	1	0	0	0	0	0
500PD	Poughkeepsie	3	0	0	0	0	0
500PK	Poughkeepsie	0	0	0	0	0	0
7022	Poughkeepsie	0	0	0	0	0	0
7057	Poughkeepsie	0	0	0	0	0	0
6067	Poughkeepsie	0	0	0	0	0	0
6047	Poughkeepsie	0	0	0	0	0	0
6048	Poughkeepsie	0	0	0	0	0	0
7013	Poughkeepsie	0	15	22.17	0	0	88.67

Circuits Sorted By Individual Circuit CAIDI
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served[4]	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
7395	Poughkeepsie	1	2	16.48	989.00	2.000	494.50
5NTWK	Poughkeepsie	830	885	6,935.38	501.35	1.066	470.20
7058	Poughkeepsie	163	15	114.78	42.25	0.092	459.13
621	Poughkeepsie	91	148	722.07	476.09	1.626	292.73
622	Poughkeepsie	235	275	1,256.42	320.79	1.170	274.13
500PO	Poughkeepsie	2	5	22.02	660.50	2.500	264.20
NYSEG	Poughkeepsie	12	14	60.67	303.33	1.167	260.00
6041	Poughkeepsie	1044	1069	4,589.35	263.76	1.024	257.59
6052	Poughkeepsie	887	1120	4,731.25	320.04	1.263	253.46
7041	Poughkeepsie	1967	1714	7,032.17	214.50	0.871	246.17
7061	Poughkeepsie	1940	2165	8,689.83	268.76	1.116	240.83
7091	Poughkeepsie	1663	2108	8,329.40	300.52	1.268	237.08
7051	Poughkeepsie	1717	3727	14,303.62	499.84	2.171	230.27
6043	Poughkeepsie	1053	125	472.38	26.92	0.119	226.74
7056	Poughkeepsie	681	409	1,525.32	134.39	0.601	223.76
7042	Poughkeepsie	1316	186	685.68	31.26	0.141	221.19
7025	Poughkeepsie	2251	2675	9,514.72	253.61	1.188	213.41
6062	Poughkeepsie	854	689	2,311.05	162.37	0.807	201.25
6042	Poughkeepsie	1634	923	2,992.17	109.87	0.565	194.51
623	Poughkeepsie	302	183	591.98	117.61	0.606	194.09
7095	Poughkeepsie	283	296	945.70	200.50	1.046	191.70
7081	Poughkeepsie	1799	1465	4,647.53	155.00	0.814	190.34
6073	Poughkeepsie	1521	2466	7,777.22	306.79	1.621	189.23
6091	Poughkeepsie	639	955	3,002.05	281.88	1.495	188.61
6051	Poughkeepsie	919	1003	3,137.23	204.83	1.091	187.67
7023	Poughkeepsie	305	193	594.27	116.91	0.633	184.75
6008	Poughkeepsie	2002	430	1,315.80	39.44	0.215	183.60
7052	Poughkeepsie	1056	440	1,327.72	75.44	0.417	181.05
7053	Poughkeepsie	1241	1145	3,440.69	166.35	0.923	180.30
7011	Poughkeepsie	1960	1561	4,523.17	138.46	0.796	173.86
7092	Poughkeepsie	421	444	1,272.93	181.42	1.055	172.02
6056	Poughkeepsie	597	68	193.50	19.45	0.114	170.74
6074	Poughkeepsie	1600	1500	3,939.63	147.74	0.938	157.59
7072	Poughkeepsie	1286	1191	3,084.10	143.89	0.926	155.37
6065	Poughkeepsie	1831	1099	2,813.62	92.20	0.600	153.61
6092	Poughkeepsie	1939	958	2,235.62	69.18	0.494	140.02
7024	Poughkeepsie	2236	2262	5,082.55	136.38	1.012	134.82

[4] Customers served as of 12/31/16. Circuits retired prior to 12/31/17, under construction or available for reserve capacity only or during 2017 will indicate a customer count of 0.

6044	Poughkeepsie	952	127	280.62	17.686	0.133	132.575
7012	Poughkeepsie	1731	4067	8,979.63	311.253	2.350	132.476
7055	Poughkeepsie	1664	4569	9,886.73	356.493	2.746	129.832
7085	Poughkeepsie	641	1364	2,867.23	268.384	2.128	126.125

Circuits Sorted By Individual Circuit CAIDI (cont.)
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
6068	Poughkeepsie	1131	1586	3,303.92	175.27	1.402	124.99
6061	Poughkeepsie	1061	107	219.45	12.41	0.101	123.06
7054	Poughkeepsie	1543	512	1,025.22	39.87	0.332	120.14
6075	Poughkeepsie	1506	1706	3,409.00	135.82	1.133	119.90
7071	Poughkeepsie	1084	1035	2,057.53	113.89	0.955	119.28
7062	Poughkeepsie	744	1497	2,974.92	239.91	2.012	119.24
6064	Poughkeepsie	135	4	7.83	3.48	0.030	117.50
6063	Poughkeepsie	545	268	521.93	57.46	0.492	116.85
6046	Poughkeepsie	2946	2270	4,259.30	86.75	0.771	112.58
6093	Poughkeepsie	1458	626	1,146.30	47.17	0.429	109.87
6045	Poughkeepsie	645	809	1,466.32	136.40	1.254	108.75
624	Poughkeepsie	297	16	28.90	5.84	0.054	108.38
6001	Poughkeepsie	1350	2889	5,043.50	224.16	2.140	104.75
6057	Poughkeepsie	1882	3331	5,688.25	181.35	1.770	102.46
7013	Poughkeepsie	0	15	22.17	0.00	0.000	88.67
6002	Poughkeepsie	2477	3761	5,371.77	130.12	1.518	85.70
6095	Poughkeepsie	1070	23	32.73	1.84	0.021	85.39
6053	Poughkeepsie	691	1965	2,582.63	224.25	2.844	78.86
6096	Poughkeepsie	1543	277	363.83	14.15	0.180	78.81
6055	Poughkeepsie	1393	3295	3,864.43	166.45	2.365	70.37
6094	Poughkeepsie	862	1744	2,031.63	141.41	2.023	69.90
6003	Poughkeepsie	2447	5172	5,248.95	128.70	2.114	60.89
6005	Poughkeepsie	86	105	103.38	72.13	1.221	59.08
6011	Poughkeepsie	1130	1595	1,139.93	60.53	1.412	42.88
6066	Poughkeepsie	1179	1297	870.52	44.30	1.100	40.27
6097	Poughkeepsie	1411	1449	395.37	16.81	1.027	16.37
6004	Poughkeepsie	243	14	1.87	0.46	0.058	8.00
6047	Poughkeepsie	0	0	0	0	0	0
7022	Poughkeepsie	0	0	0	0	0	0
5000W	Poughkeepsie	1	0	0	0	0	0
6067	Poughkeepsie	0	0	0	0	0	0
500PK	Poughkeepsie	0	0	0	0	0	0
500PD	Poughkeepsie	3	0	0	0	0	0
500PU	Poughkeepsie	1	0	0	0	0	0
500MS	Poughkeepsie	2	0	0	0	0	0
7057	Poughkeepsie	0	0	0	0	0	0
6048	Poughkeepsie	0	0	0	0	0	0

FISHKILL OPERATING DISTRICT

Circuits Sorted By Individual Circuit SAIFI
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
8066	Fishkill	1522	3700	10,822.63	426.65	2.431	175.50
8086	Fishkill	1026	1832	4,122.00	241.05	1.786	135.00
8072	Fishkill	1509	2536	5,978.17	237.70	1.681	141.44
8051	Fishkill	1818	2727	6,815.43	224.93	1.500	149.96
8044	Fishkill	1310	1938	3,320.97	152.11	1.479	102.82
8071	Fishkill	2042	2900	8,727.80	256.45	1.420	180.58
8043	Fishkill	1505	2019	4,314.92	172.02	1.342	128.23
8014	Fishkill	1953	2309	6,544.40	201.06	1.182	170.06
8063	Fishkill	1481	1739	5,599.93	226.87	1.174	193.21
8092	Fishkill	1892	2114	4,747.17	150.54	1.117	134.74
8015	Fishkill	2097	2342	2,841.48	81.30	1.117	72.80
8085	Fishkill	1177	1108	2,193.30	111.81	0.941	118.77
8087	Fishkill	2888	2690	4,951.20	102.86	0.931	110.44
8023	Fishkill	1145	1048	2,725.75	142.83	0.915	156.05
8046	Fishkill	1453	1264	2,922.42	120.68	0.870	138.72
8095	Fishkill	1876	1565	2,360.30	75.49	0.834	90.49
8093	Fishkill	1711	1214	2,019.85	70.83	0.710	99.83
882	Fishkill	790	516	1,484.92	112.78	0.653	172.67
8021	Fishkill	426	277	974.80	137.30	0.650	211.15
8091	Fishkill	2006	1290	1,520.72	45.49	0.643	70.73
8094	Fishkill	2429	1538	2,985.07	73.74	0.633	116.45
8062	Fishkill	1345	693	1,206.55	53.82	0.515	104.46
8016	Fishkill	910	430	690.00	45.50	0.473	96.28
8065	Fishkill	1423	633	519.03	21.89	0.445	49.20
8055	Fishkill	1145	456	1,018.97	53.40	0.398	134.08
8011	Fishkill	799	317	700.70	52.62	0.397	132.63
8013	Fishkill	1051	385	610.60	34.86	0.366	95.16
8012	Fishkill	316	90	248.88	47.26	0.285	165.92
8052	Fishkill	1981	512	1,060.08	32.11	0.258	124.23
8022	Fishkill	635	160	524.72	49.58	0.252	196.77
8045	Fishkill	1379	346	637.50	27.74	0.251	110.55
8056	Fishkill	1695	336	922.43	32.65	0.198	164.72
8024	Fishkill	1130	203	548.93	29.15	0.180	162.25
8096	Fishkill	1008	152	305.75	18.20	0.151	120.69
8061	Fishkill	99	3	7.58	4.60	0.030	151.67
700TR	Fishkill	1	0	0	0	0	0
881	Fishkill	280	0	0	0	0	0
8064	Fishkill	1	0	0	0	0	0
700CM	Fishkill	2	0	0	0	0	0
8025	Fishkill	30	0	0	0	0	0

Circuits Sorted By Individual Circuit SAIFI (cont.)
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
700DC	Fishkill	1	0	0	0	0	0
8041	Fishkill	1	0	0	0	0	0
8017	Fishkill	0	0	0	0	0	0
700BF	Fishkill	0	0	0	0	0	0
8018	Fishkill	0	0	0	0	0	0

Circuits Sorted By Individual Circuit CAIDI
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
8021	Fishkill	426	277	974.80	137.30	0.650	211.15
8022	Fishkill	635	160	524.72	49.58	0.252	196.77
8063	Fishkill	1481	1739	5,599.93	226.87	1.174	193.21
8071	Fishkill	2042	2900	8,727.80	256.45	1.420	180.58
8066	Fishkill	1522	3700	10,822.63	426.65	2.431	175.50
882	Fishkill	790	516	1,484.92	112.75	0.653	172.67
8014	Fishkill	1953	2309	6,544.40	201.06	1.182	170.06
8012	Fishkill	316	90	248.88	47.26	0.285	165.92
8056	Fishkill	1695	336	922.43	32.65	0.198	164.72
8024	Fishkill	1130	203	548.93	29.15	0.180	162.25
8023	Fishkill	1145	1048	2,725.75	142.83	0.915	156.05
8061	Fishkill	99	3	7.58	4.60	0.030	151.67
8051	Fishkill	1818	2727	6,815.43	224.93	1.500	149.96
8072	Fishkill	1509	2536	5,978.17	237.70	1.681	141.44
8046	Fishkill	1453	1264	2,922.42	120.68	0.870	138.72
8086	Fishkill	1026	1832	4,122.00	241.05	1.786	135.00
8092	Fishkill	1892	2114	4,747.17	150.54	1.117	134.74
8055	Fishkill	1145	456	1,018.97	53.40	0.398	134.08
8011	Fishkill	799	317	700.70	52.62	0.397	132.63
8043	Fishkill	1505	2019	4,314.92	172.02	1.342	128.23
8052	Fishkill	1981	512	1,060.08	32.11	0.258	124.23
8096	Fishkill	1008	152	305.75	18.20	0.151	120.69
8085	Fishkill	1177	1108	2,193.30	111.81	0.941	118.77
8094	Fishkill	2429	1538	2,985.07	73.74	0.633	116.45
8045	Fishkill	1379	346	637.50	27.74	0.251	110.55
8087	Fishkill	2888	2690	4,951.20	102.86	0.931	110.44
8062	Fishkill	1345	693	1,206.55	53.82	0.515	104.46
8044	Fishkill	1310	1938	3,320.97	152.11	1.479	102.82
8093	Fishkill	1711	1214	2,019.85	70.83	0.710	99.83
8016	Fishkill	910	430	690.00	45.50	0.473	96.28
8013	Fishkill	1051	385	610.60	34.86	0.366	95.16
8095	Fishkill	1876	1565	2,360.30	75.49	0.834	90.49
8015	Fishkill	2097	2342	2,841.48	81.30	1.117	72.80
8091	Fishkill	2006	1290	1,520.72	45.49	0.643	70.73
8065	Fishkill	1423	633	519.03	21.89	0.445	49.20
700TR	Fishkill	1	0	0	0	0	0
881	Fishkill	280	0	0	0	0	0
8017	Fishkill	0	0	0	0	0	0
8064	Fishkill	1	0	0	0	0	0
8018	Fishkill	0	0	0	0	0	0
700CM	Fishkill	2	0	0	0	0	0
8025	Fishkill	30	0	0	0	0	0

Circuits Sorted By Individual Circuit CAIDI
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
700BF	Fishkill	0	0	0	0	0	0
8041	Fishkill	1	0	0	0	0	0
700DC	Fishkill	1	0	0	0	0	0

NEWBURGH OPERATING DISTRICT

Circuits Sorted By Individual Circuit SAIFI
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
4013	Newburgh	2096	5857	9,809.53	280.81	2.794	100.49
4047	Newburgh	1129	3127	9,375.02	498.23	2.770	179.89
5021	Newburgh	1757	4464	5,145.23	175.71	2.541	69.16
5022	Newburgh	864	1974	6,024.93	418.40	2.285	183.13
4093	Newburgh	1086	2393	3,529.25	194.99	2.203	88.49
5011	Newburgh	1337	2732	3,047.53	136.76	2.043	66.93
4011	Newburgh	1691	3405	6,112.48	216.88	2.014	107.71
4027	Newburgh	888	1236	2,641.30	178.47	1.392	128.22
4015	Newburgh	1168	1598	1,746.48	89.72	1.368	65.58
4053	Newburgh	1617	2118	1,082.02	40.15	1.310	30.65
4042	Newburgh	1771	2239	4,614.82	156.35	1.264	123.67
5033	Newburgh	681	826	4,078.03	359.30	1.213	296.23
5081	Newburgh	1935	2300	2,018.87	62.60	1.189	52.67
5051	Newburgh	1167	1287	1,824.03	93.78	1.103	85.04
4024	Newburgh	1091	1146	1,772.93	97.50	1.050	92.82
4092	Newburgh	242	254	709.05	175.80	1.050	167.49
4095	Newburgh	1388	1428	3,864.82	167.07	1.029	162.39
4003	Newburgh	1	1	5.70	342.00	1.000	342.00
4025	Newburgh	56	56	27.07	29.00	1.000	29.00
800WN	Newburgh	3	3	2.60	52.00	1.000	52.00
5043	Newburgh	2093	2018	4,949.95	141.90	0.964	147.17
5041	Newburgh	2034	1961	3,234.12	95.40	0.964	98.95
4026	Newburgh	481	457	1,830.43	228.33	0.950	240.32
5042	Newburgh	582	552	1,051.77	108.43	0.948	114.32
4091	Newburgh	565	520	774.63	82.26	0.920	89.38
5084	Newburgh	1395	1260	2,678.52	115.21	0.903	127.55
5052	Newburgh	2233	1947	4,532.98	121.80	0.872	139.69
4023	Newburgh	1964	1685	3,800.58	116.11	0.858	135.33
4002	Newburgh	287	241	723.15	151.18	0.840	180.04
4043	Newburgh	2600	2123	3,662.22	84.51	0.817	103.50
4097	Newburgh	1614	1280	3,274.12	121.71	0.793	153.47
5004	Newburgh	1557	1124	2,602.87	100.30	0.722	138.94
5013	Newburgh	1653	1188	2,236.68	81.19	0.719	112.96
4052	Newburgh	2233	1586	2,466.07	66.26	0.710	93.29
4094	Newburgh	956	650	3,058.05	191.93	0.680	282.28
5012	Newburgh	1852	1134	1,784.98	57.83	0.612	94.44
5054	Newburgh	324	197	506.85	93.86	0.608	154.37
5034	Newburgh	202	114	261.87	77.78	0.564	137.83
5024	Newburgh	1298	714	1,055.50	48.79	0.550	88.70
5083	Newburgh	1583	864	1,050.10	39.80	0.546	72.92
5003	Newburgh	1507	752	1,464.37	58.30	0.499	116.84
5031	Newburgh	2069	1029	2,471.93	71.69	0.497	144.14

Circuits Sorted By Individual Circuit SAIFI (cont.)
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
5082	Newburgh	1671	804	2,427.38	87.16	0.481	181.15
4046	Newburgh	512	242	505.08	59.19	0.473	125.23
4022	Newburgh	517	236	605.33	70.25	0.456	153.90
5023	Newburgh	2070	938	1,860.68	53.93	0.453	119.02
5001	Newburgh	1851	807	2,824.35	91.55	0.436	209.99
4051	Newburgh	1751	758	2,660.87	91.18	0.433	210.62
4045	Newburgh	709	302	1,388.83	117.53	0.426	275.93
4041	Newburgh	2078	845	1,335.98	38.58	0.407	94.86
406	Newburgh	899	344	376.50	25.13	0.383	65.67
5002	Newburgh	755	283	615.42	48.91	0.375	130.48
4014	Newburgh	710	219	334.30	28.25	0.308	91.59
5030	Newburgh	38	11	52.83	83.42	0.289	288.18
4021	Newburgh	1644	458	1,225.05	44.71	0.279	160.49
4054	Newburgh	2473	350	618.00	14.99	0.142	105.94
4044	Newburgh	1559	207	477.22	18.37	0.133	138.32
5025	Newburgh	157	20	36.15	13.82	0.127	108.45
4012	Newburgh	1306	113	359.28	16.51	0.087	190.77
410	Newburgh	822	54	152.75	11.15	0.066	169.72
572	Newburgh	517	1	4.62	0.54	0.002	277.00
4096	Newburgh	239	0	0	0	0	0
407	Newburgh	182	0	0	0	0	0
4001	Newburgh	1	0	0	0	0	0
403	Newburgh	759	0	0	0	0	0
4098	Newburgh	1	0	0	0	0	0
8NTWK	Newburgh	328	0	0	0	0	0
5053	Newburgh	76	0	0	0	0	0
5005	Newburgh	1	0	0	0	0	0
571	Newburgh	458	0	0	0	0	0
402	Newburgh	127	0	0	0	0	0
800NB	Newburgh	1	0	0	0	0	0
5006	Newburgh	0	0	0	0	0	0
5032	Newburgh	0	0	0	0	0	0
404	Newburgh	0	0	0	0	0	0
800UN	Newburgh	0	0	0	0	0	0
800B	Newburgh	0	0	0	0	0	0
5085	Newburgh	0	0	0	0	0	0

Circuits Sorted By Individual Circuit CAIDI
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
4003	Newburgh	1	1	5.70	342.00	1.000	342.00
5033	Newburgh	681	826	4,078.03	359.30	1.213	296.23
5030	Newburgh	38	11	52.83	83.42	0.289	288.18
4094	Newburgh	956	650	3,058.05	191.93	0.680	282.28
572	Newburgh	517	1	4.62	0.54	0.002	277.00
4045	Newburgh	709	302	1,388.83	117.53	0.426	275.93
4026	Newburgh	481	457	1,830.43	228.33	0.950	240.32
4051	Newburgh	1751	758	2,660.87	91.18	0.433	210.62
5001	Newburgh	1851	807	2,824.35	91.55	0.436	209.99
4012	Newburgh	1306	113	359.28	16.51	0.087	190.77
5022	Newburgh	864	1974	6,024.93	418.40	2.285	183.13
5082	Newburgh	1671	804	2,427.38	87.16	0.481	181.15
4002	Newburgh	287	241	723.15	151.18	0.840	180.04
4047	Newburgh	1129	3127	9,375.02	498.23	2.770	179.89
410	Newburgh	822	54	152.75	11.15	0.066	169.72
4092	Newburgh	242	254	709.05	175.80	1.050	167.49
4095	Newburgh	1388	1428	3,864.82	167.07	1.029	162.39
4021	Newburgh	1644	458	1,225.05	44.71	0.279	160.49
5054	Newburgh	324	197	506.85	93.86	0.608	154.37
4022	Newburgh	517	236	605.33	70.25	0.456	153.90
4097	Newburgh	1614	1280	3,274.12	121.71	0.793	153.47
5043	Newburgh	2093	2018	4,949.95	141.90	0.964	147.17
5031	Newburgh	2069	1029	2,471.93	71.69	0.497	144.14
5052	Newburgh	2233	1947	4,532.98	121.80	0.872	139.69
5004	Newburgh	1557	1124	2,602.87	100.30	0.722	138.94
4044	Newburgh	1559	207	477.22	18.37	0.133	138.32
5034	Newburgh	202	114	261.87	77.78	0.564	137.83
4023	Newburgh	1964	1685	3,800.58	116.11	0.858	135.33
5002	Newburgh	755	283	615.42	48.91	0.375	130.48
4027	Newburgh	888	1236	2,641.30	178.47	1.392	128.22
5084	Newburgh	1395	1260	2,678.52	115.21	0.903	127.55
4046	Newburgh	512	242	505.08	59.19	0.473	125.23
4042	Newburgh	1771	2239	4,614.82	156.35	1.264	123.67
5023	Newburgh	2070	938	1,860.68	53.93	0.453	119.02
5003	Newburgh	1507	752	1,464.37	58.30	0.499	116.84
5042	Newburgh	582	552	1,051.77	108.43	0.948	114.32
5013	Newburgh	1653	1188	2,236.68	81.19	0.719	112.96
5025	Newburgh	157	20	36.15	13.82	0.127	108.45
4011	Newburgh	1691	3405	6,112.48	216.88	2.014	107.71
4054	Newburgh	2473	350	618.00	14.99	0.142	105.94
4043	Newburgh	2600	2123	3,662.22	84.51	0.817	103.50
4013	Newburgh	2096	5857	9,809.53	280.81	2.794	100.49
5041	Newburgh	2034	1961	3234.12	95.40	0.964	98.95
4041	Newburgh	2078	845	1335.98	38.58	0.407	94.86
5012	Newburgh	1852	1134	1784.98	57.83	0.612	94.44

Circuits Sorted By Individual Circuit CAIDI (cont.)
(Data excludes Major Storms)

Circuit #	Operating Area	Customers Served	Customers Interrupted	Interrupted Customer Hours	SAIDI (Minutes per Customer)	SAIFI (Interruptions per Customer)	CAIDI (Minutes per Interruption)
4052	Newburgh	2233	1586	2,466.07	66.26	0.710	93.29
4024	Newburgh	1091	1146	1,772.93	97.50	1.050	92.82
4014	Newburgh	710	219	334.30	28.25	0.308	91.59
4091	Newburgh	565	520	774.63	82.26	0.920	89.38
5024	Newburgh	1298	714	1,055.50	48.79	0.550	88.70
4093	Newburgh	1086	2393	3,529.25	194.99	2.203	88.49
5051	Newburgh	1167	1287	1,824.03	93.78	1.103	85.04
5083	Newburgh	1583	864	1,050.10	39.80	0.546	72.92
5021	Newburgh	1757	4464	5,145.23	175.71	2.541	69.16
5011	Newburgh	1337	2732	3,047.53	136.76	2.043	66.93
406	Newburgh	899	344	376.50	25.13	0.383	65.670
4015	Newburgh	1168	1598	1,746.48	89.72	1.368	65.58
5081	Newburgh	1935	2300	2,018.87	62.60	1.189	52.67
800WN	Newburgh	3	3	2.60	52.00	1.000	52.00
4053	Newburgh	1617	2118	1,082.02	40.15	1.310	30.65
4025	Newburgh	56	56	27.07	29.00	1.000	29.00
5005	Newburgh	1	0	0	0	0	0
571	Newburgh	458	0	0	0	0	0
5006	Newburgh	0	0	0	0	0	0
4096	Newburgh	239	0	0	0	0	0
8NTWK	Newburgh	328	0	0	0	0	0
402	Newburgh	127	0	0	0	0	0
407	Newburgh	182	0	0	0	0	0
5032	Newburgh	0	0	0	0	0	0
403	Newburgh	759	0	0	0	0	0
4001	Newburgh	1	0	0	0	0	0
404	Newburgh	0	0	0	0	0	0
5085	Newburgh	0	0	0	0	0	0
800B	Newburgh	0	0	0	0	0	0
5053	Newburgh	76	0	0	0	0	0
4098	Newburgh	1	0	0	0	0	0
800NB	Newburgh	1	0	0	0	0	0
800UN	Newburgh	0	0	0	0	0	0

b) Provide an analysis of the worst performing circuits. The analysis must cover a minimum of 5% of the circuits and include a description of the methodology used to identify the worst performing circuits

Through a State-wide Order for Standards on Reliability of Electric Service, the Public Service Commission requires that "each company shall develop and maintain a program for analyzing its worst-performing circuits during the course of each year…the companies shall analyze a minimum of five percent of its circuits as part of its circuit review program each year." The 22 circuits listed below represent approximately 7% of Central Hudson's electric distribution circuits.

The 2017 list included the worst 5% of circuits based on non-storm system SAIFI, and the worst 5% of circuits based on non-storm system ECM. In order to maintain a balance between addressing reoccurring problems (using 5 year averages) and new problems (looking at current year values), the following weighting is used to calculate the worst circuits: previous year, 50% weight; previous year – 2, 25% weight; previous year – 3, 15% weight; previous year – 4, 5% weight; previous year – 5, 5% weight. Table 27a is a list of the worst 5% of circuits based on System SAIFI. Table 27b is a list of the worst 5% of circuits based on System ECM. Table 27c is the combined worst 5% of circuits based on both System SAIFI and System ECM. Attachment #1 of this report is an analysis of each circuit listed in Table 27c.

District	Circuit #	Weighted System SAIFI
Kingston	2094	0.014
Kingston	3003	0.013
Kingston	1011	0.012
Kingston	3013	0.011
Kingston	2016	0.011
Newburgh	4013	0.010
Kingston	3024	0.009
Kingston	3011	0.009
Poughkeepsie	6003	0.009
Kingston	3091	0.008
Kingston	3001	0.008
Kingston	3012	0.008
Catskill	1071	0.008
Poughkeepsie	7055	0.008
Newburgh	5021	0.007
Catskill	2385	0.007
Kingston	3022	0.007

Table 27a –Worst 5% based on System SAIFI

District	Circuit #	Weighted System ECM
Kingston	3003	1.55
Kingston	3024	1.48
Poughkeepsie	7051	1.42
Kingston	3091	1.40
Kingston	1011	1.37
Kingston	2016	1.36
Kingston	3082	1.29
Kingston	3012	1.26
Kingston	3013	1.16
Kingston	3002	1.16
Catskill	2389	1.13
Fishkill	8066	1.07
Kingston	2094	1.07
Catskill	1071	1.05
Kingston	3011	1.01

Table 27b – Worst 5% based on System ECM

Catskill	Kingston	Poughkeepsie	Fishkill	Newburgh
1071	1011	6003	8066	4013
2385	2016	7051		5021
2389	2094	7055		
	3001			
	3002			
	3003			
	3011			
	3012			
	3013			
	3022			
	3024			
	3082			
	3091			

Table 27c – 2017 Worst Circuit List

6. Circuit Performance (Network)

a) Listing of network feeders (primary voltage) by operating area based upon the number of open automatics for the calendar year

Central Hudson has a total of nine (9) network feeders that serve less than 1% of its customers.

The Poughkeepsie network experienced an outage in 2017. As a result of repairs being made on the PO Cable, the circuit was de-energized and the Poughkeepsie Network was being fed by the PU and PK Cables. On 1/10/17, a secondary failure occurred between a manhole and pull box on Catharine Street. The secondary cable was above 2 primary feeders. The explosion from the secondary fault directly impacted the remaining primary feeders. The resulting fire from the explosion caused damage to the closest network transformer. Both remaining network feeders locked out at 9:52 AM and resulted in an interruption to 885 customers. Work was done to put the PO Cable back into service to restore the network, since it was not impacted by the fault. While working to sectionalize the fault and beginning to re-energize the network, smoke was discovered coming from MH-147 (Next to the Verizon Building) and as a result, the PO-1330 was opened, de-energizing any parts of the network that had been re-energized. Upon investigation, it was discovered that a 1/0 copper jumper (which was being utilized for phasing purposes) was inadvertently left on the conductor and began to melt. This was removed and the PO cable breaker was closed back in. All but 2 customers on Catharine Street were restored at 6:15 PM, for a total outage duration of 7 hours, 49 minutes. The remaining 2 customers on Catherine Street were restored 8 hours, 15 minutes later at 2:30 AM.

b) Analysis of the worst performing feeders. The analysis must cover a minimum of 5% of the feeders and include a description of the methodology used to identify the worst performing feeders

Central Hudson does not perform a “worst feeder analysis” on its Network Feeders due to the relatively small size of the network and very small percentage of customers fed from each network.

- END -