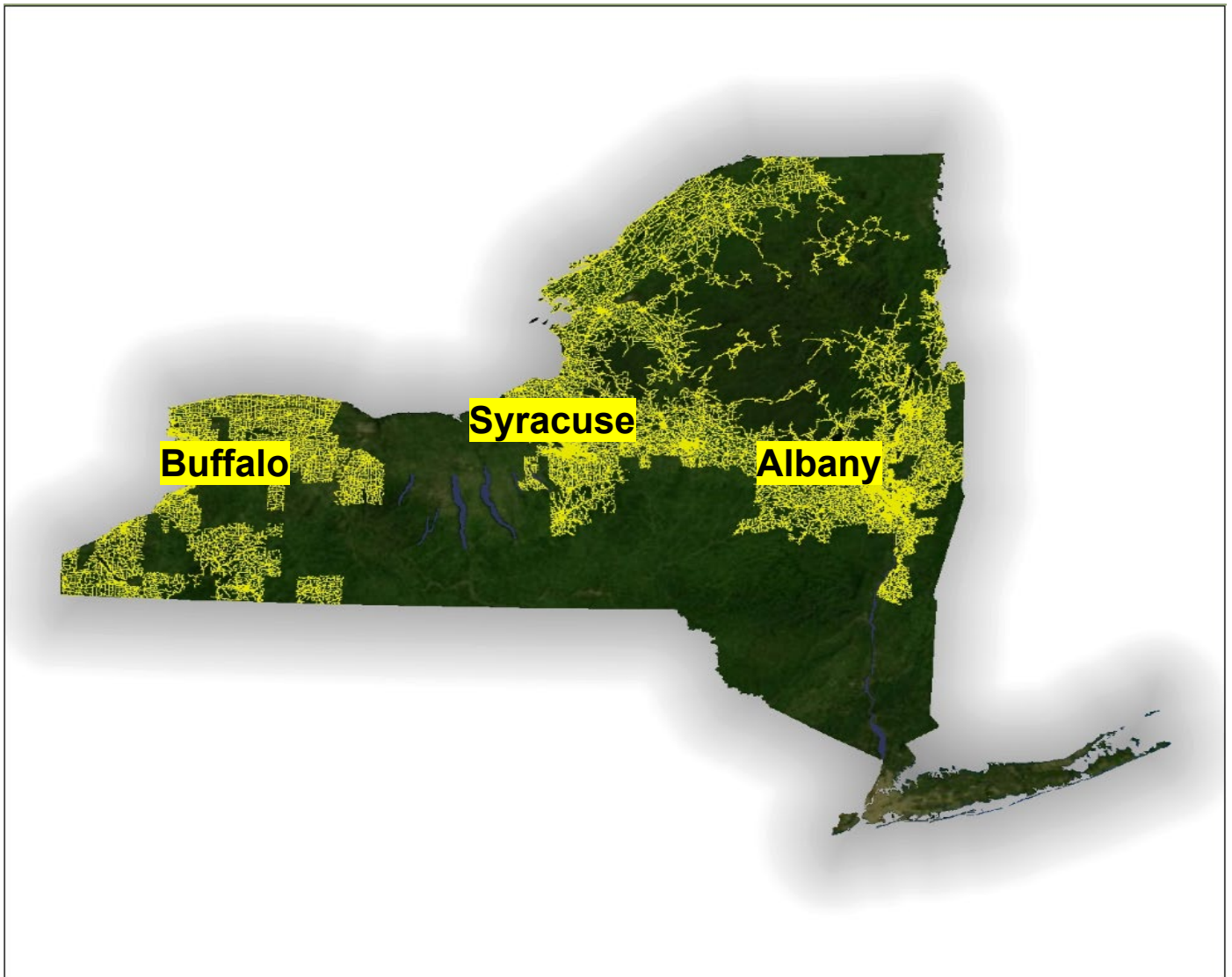


nationalgrid

ANNUAL ELECTRIC RELIABILITY REPORT



ANNUAL ELECTRIC RELIABILITY REPORT FOR 2022
PSC CASE #23-E-0119



ANNUAL ELECTRIC RELIABILITY REPORT for 2022

PSC CASES 02-E-1240 and 23-E-0119

Prepared By:

**Customer Reliability and
Electric Distribution Planning & Engineering
MARCH 2023**

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ANNUAL ELECTRIC RELIABILITY REPORT for 2022

Introduction

Enclosed is the 2022 Annual Electric Reliability Report for Niagara Mohawk Power Corporation d/b/a National Grid (“National Grid” or “Company”). This report has been prepared based on National Grid’s electric service to its customers for the year ended December 31, 2021, in compliance with New York State Public Service Commission (“PSC”) Cases 02-E-1240 and 23-E-0119.

In 2022, National Grid met both reliability targets – System Average Interruption Frequency Index (“SAIFI”) and Customer Average Interruption Duration Index (“CAIDI”) – and as a result, no penalties were incurred.

This report reviews the reliability metrics at both the system-wide and regional levels, with analyses broken down by causes and circuits. The report includes a detailed analysis for any circuit that was among the top 5% worst performing distribution circuits in 2022. For any region where the SAIFI or CAIDI reliability metric did not meet the target, we also include a detailed analysis of the factors that contributed to the below-target performance and a description of our plan to improve performance. Information on the major storms of 2022 is also included in the report.

National Grid continues its efforts to maintain reliability. This report includes a description of the Company’s Reliability, Inspection and Maintenance, and Vegetation Management Programs. We have included a summary of expenditures and information regarding the composition of our work force as requested by Department of Public Service (“DPS”) Staff.

A. SUMMARY OF PERFORMANCE AND COMMENTS

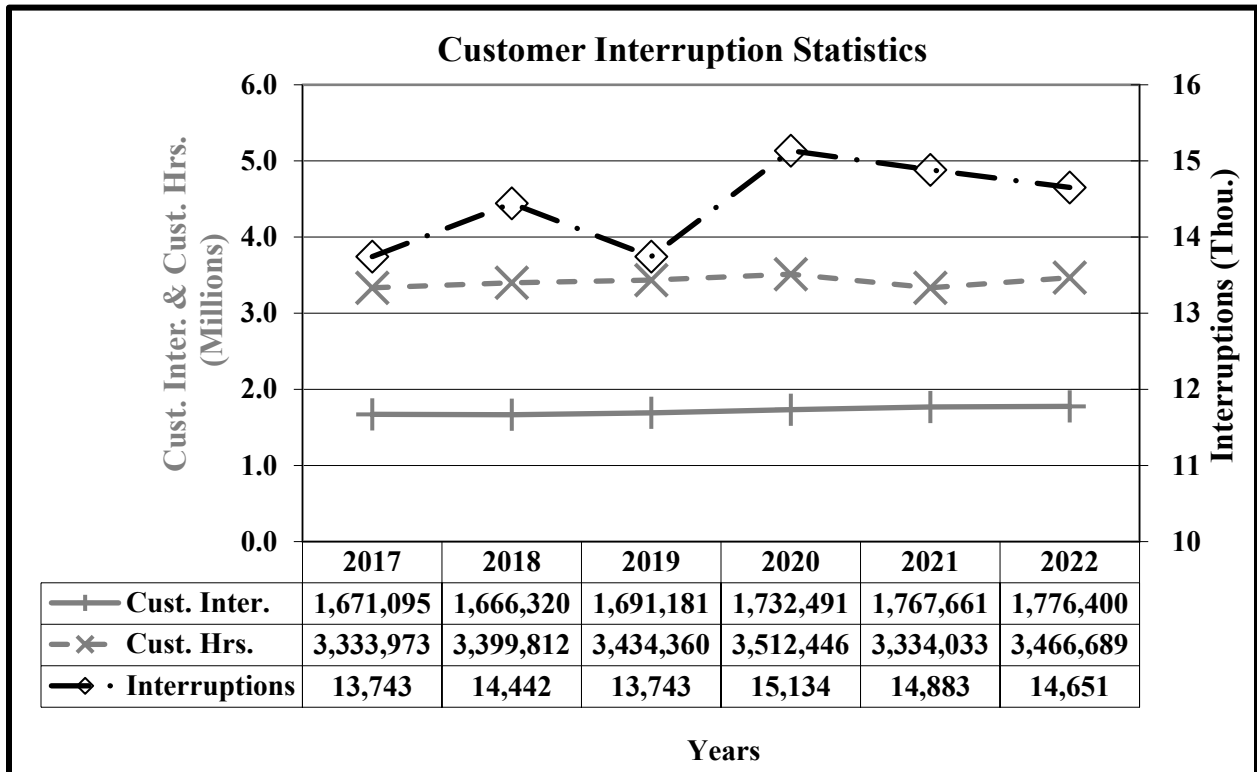
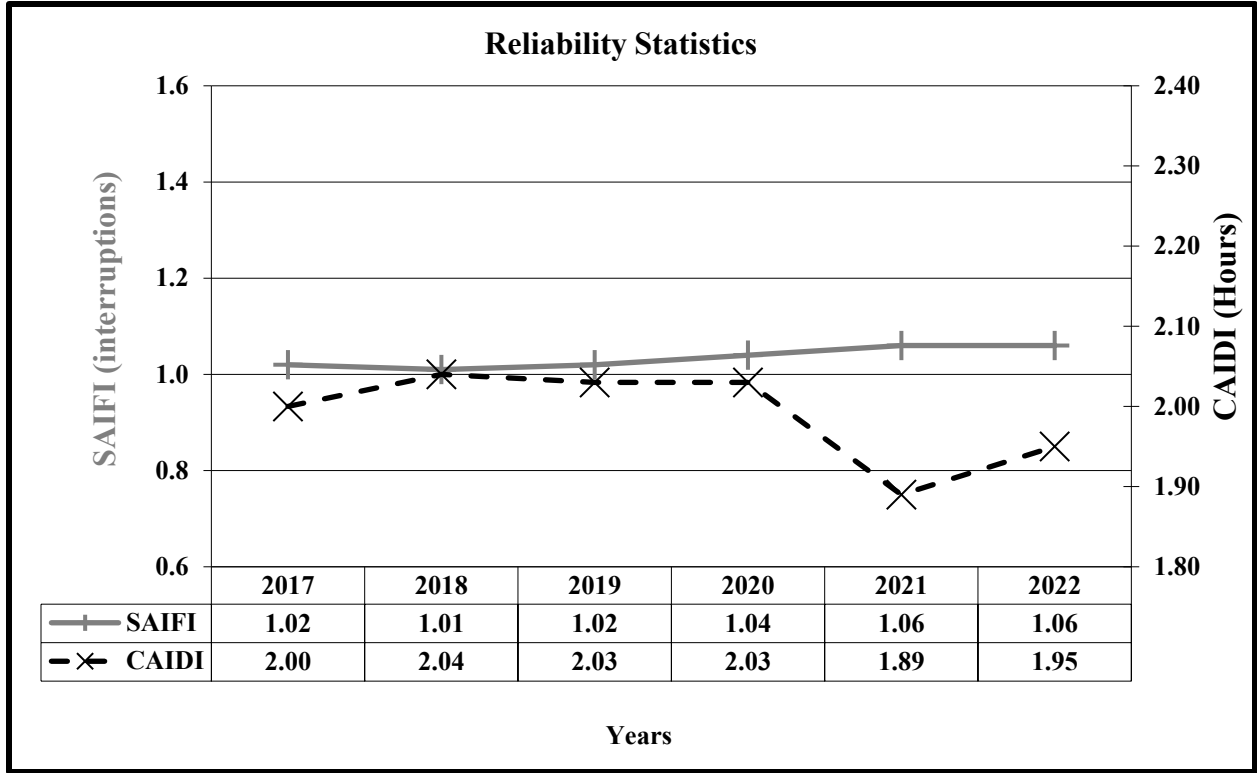
1. CORPORATE SAIFI AND CAIDI

The Company successfully met the Customer Average Interruption Duration Index (CAIDI) metric for 2022, with a value of 1.95 hours. This is 7% below the target of 2.10 hours and is 2% below the 5-year average.

The Company also successfully met the System Average Interruption Frequency Index (SAIFI) target for 2022, with a value of 1.06. This is 2% below the target of 1.08 and 3% above the 5-year average.

The number of interruptions excluding major storms was 2% below the 2021 result and was 2% above the 5-year average. The number of customers interrupted was 1% above the 2021 result and 4% above the 5-year average. The duration of customers interrupted (Customer-Hours Interrupted) was 4% above the 2021 result and was 2% above the 5-year average.

	2022	2021	2020	2019	2018	2017
CAIDI Threshold: 2.10	1.95	1.89	2.03	2.03	2.04	2.00
SAIFI Threshold: 1.08	1.06	1.06	1.04	1.02	1.01	1.02
SAIDI	2.06	1.99	2.11	2.08	2.07	2.04
Interruptions	14,651	14,883	15,134	13,743	14,442	13,743
Customers Interrupted	1,776,400	1,767,661	1,732,491	1,691,181	1,666,320	1,671,095
Customer-Hours Interrupted	3,466,689	3,334,033	3,512,446	3,434,360	3,399,812	3,333,973
Customers Served	1,678,863	1,673,962	,663,214	1,653,868	1,643,812	1,630,719
Customers per Interruption	121.25	118.77	114.48	123.06	115.38	121.60
Availability Index	99.9764	99.9773	99.9760	99.9763	99.9764	99.9767
Interruptions/1000 Customers	8.73	8.89	9.10	8.31	8.79	8.43



2. CAIDI AND SAIFI BY REGION

The tables below illustrate CAIDI and SAIFI performance for each region. Data from 2017 through 2022 is derived from the Interruption and Disturbance System (IDS).

CAIDI performance met PSC goals in 6 of 8 regions. Customers in the Northern region experienced the most improvement with an 18% decrease as compared to 2021. Customers in the Genesee and Southwest regions also showed improvement in CAIDI from 2021.

Customers in the Frontier and Mohawk Valley regions experienced CAIDI performance that did not meet the regional goal.

SAIFI performance met PSC goals in 4 of 8 regions. Customers in the Frontier region experienced the most improvement with a 23% decrease from 2021. Customers in the Central, and Northeast regions also showed improvement in SAIFI from 2021.

Customers in the Capital, Mohawk Valley, Northern and Southwest regions experienced SAIFI performance that did not meet the regional goal.

CAIDI (IDS data)

Region	2022 Threshold	2022 Actual	2021 Actual	2020 Actual	2019 Actual	2018 Actual	2017 Actual
Capital	2.025	2.00	1.86	1.92	2.28*	2.20*	2.09*
Central	1.899	1.84	1.70	1.65	1.65	1.80	1.70
Frontier	1.869	1.97*	1.63	2.58*	1.63	1.61	1.79*
Genesee	2.049	1.53	1.75	1.53	1.75	2.06*	1.76
Mohawk Valley	2.150	2.20*	1.94	2.35*	1.93	2.29*	1.57
Northeast	2.578	2.43	2.40	2.29	2.72*	2.42	2.42
Northern	2.111	1.49	1.81	2.07	2.00	1.84	2.34*
Southwest	1.950	1.72	1.74	1.70	1.68	1.86	2.04*

SAIFI (IDS data)

Region	2022 Threshold	2022 Actual	2021 Actual	2020 Actual	2019 Actual	2018 Actual	2017 Actual
Capital	1.024	1.06*	0.99	1.07*	1.02	0.95	0.92*
Central	1.226	1.15	1.40*	1.04	1.06	1.17	1.16*
Frontier	0.480	0.33	0.43	0.52*	0.46	0.48	0.43
Genesee	1.037	1.00	0.98	1.20*	1.41*	1.23*	0.76
Mohawk Valley	1.483	1.49*	1.34	1.34	1.42	1.29	1.52*
Northeast	1.372	1.31	1.34	1.39*	1.26	1.22	1.36*
Northern	1.412	1.61*	1.29	1.28	1.15	1.34	1.48*
Southwest	1.181	1.32*	1.06	0.99	1.11	1.02	1.13*

Note: The numbers in these tables are based on data that excludes major storm events. An asterisk (*) indicates that the region fell short of the PSC goal for the region.

3. PSC CAUSE CODE ANALYSIS

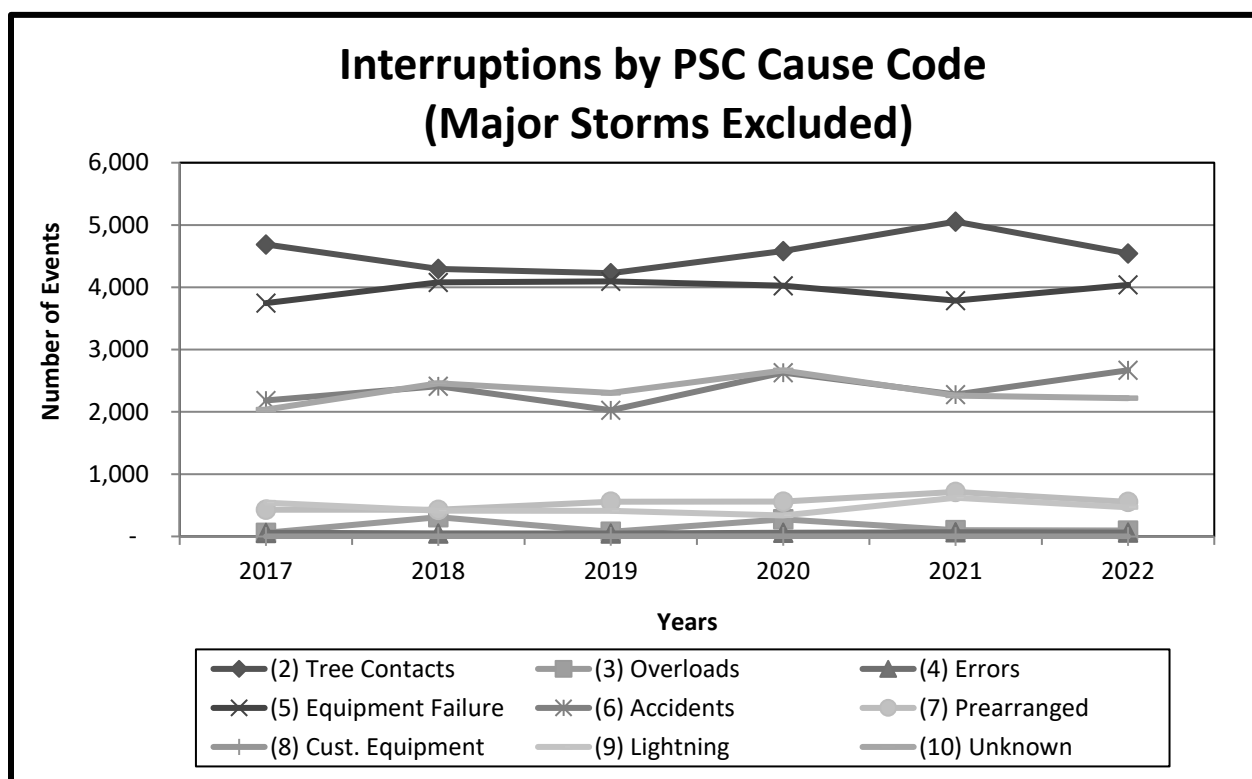
As illustrated in the table below, overall interruptions including major storms increased 12% in 2022 as compared to 2021. There was a decrease in Tree Contacts, Overloads, Operator Errors, Prearranged, and Unknown events. There was an increase in Major Storm, Equipment Failure, and Accidents events.

Excluding Cause Code (1) Major Storms, the number of interruptions decreased 2% from 2021. The top three contributors to the number of interruptions were (2) Tree Contacts at 31%, (5) Equipment Failure at 28%, and (6) Accidents at 18%.

During the past several years, National Grid has worked with DPS Staff to enhance its vegetation management program. In 2022, (2) Tree Contacts decreased by 10% from 2021, the number of customers interrupted (CI) decreased by 14%, and customer-hours decreased by 16%. CAIDI, due to tree contacts, decreased 3% in 2022 as compared to 2021, while SAIFI, due to tree contacts, increased 14%. The results this year can be attributed to an increase in adverse weather which did not result in Major Storm Exclusions.

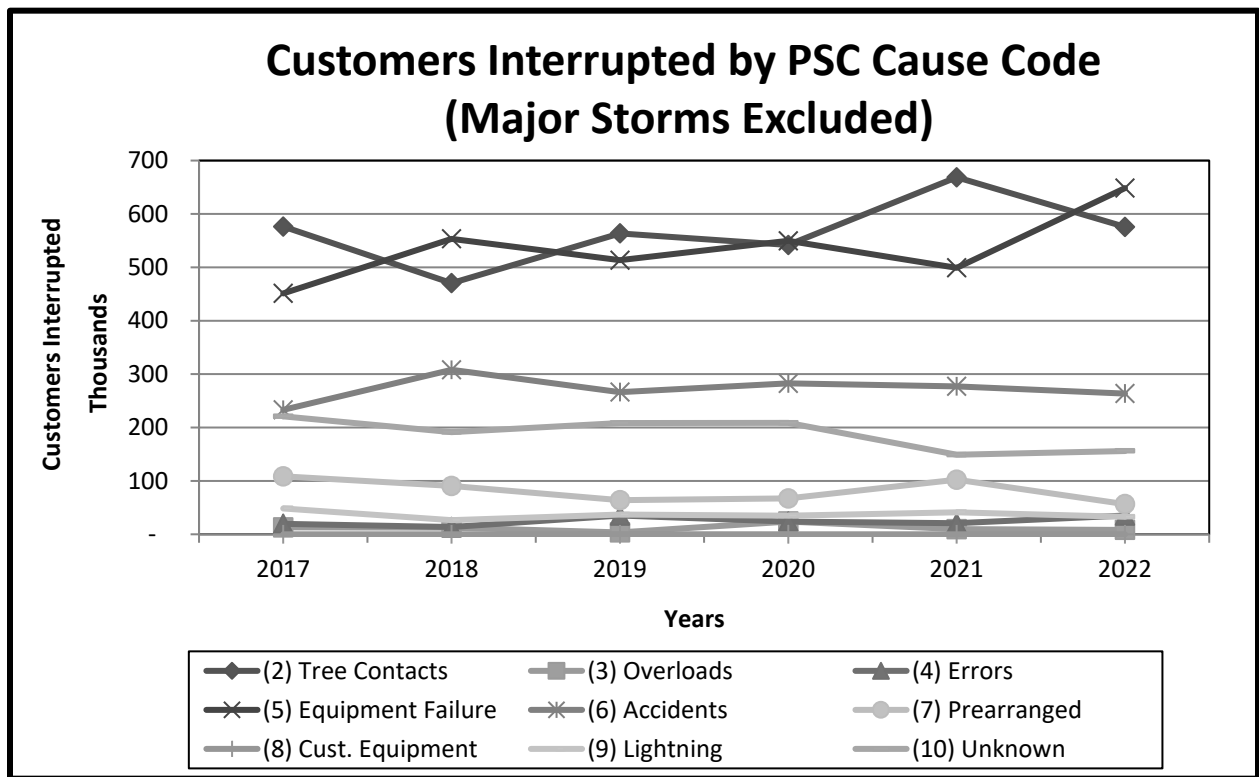
NUMBER OF INTERRUPTIONS BY CAUSE CODE

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	6,193	3,676	5,648	7,429	8,206	5,053
02 Tree Contacts	4,543	5,054	4,582	4,226	4,296	4,687
03 Overloads	95	101	275	75	309	59
04 Errors	63	67	60	47	48	59
05 Equipment Failure	4,039	3,786	4,025	4,095	4,078	3,746
06 Accidents	2,668	2,278	2,630	2,026	2,411	2,183
07 Prearranged	556	715	560	558	429	430
08 Customer Equipment	0	0	1	1	0	0
09 Lightning	468	621	337	411	413	542
10 Unknown	2,219	2,261	2,664	2,304	2,458	2,037
Totals	20,844	18,559	20,782	21,172	22,648	18,796



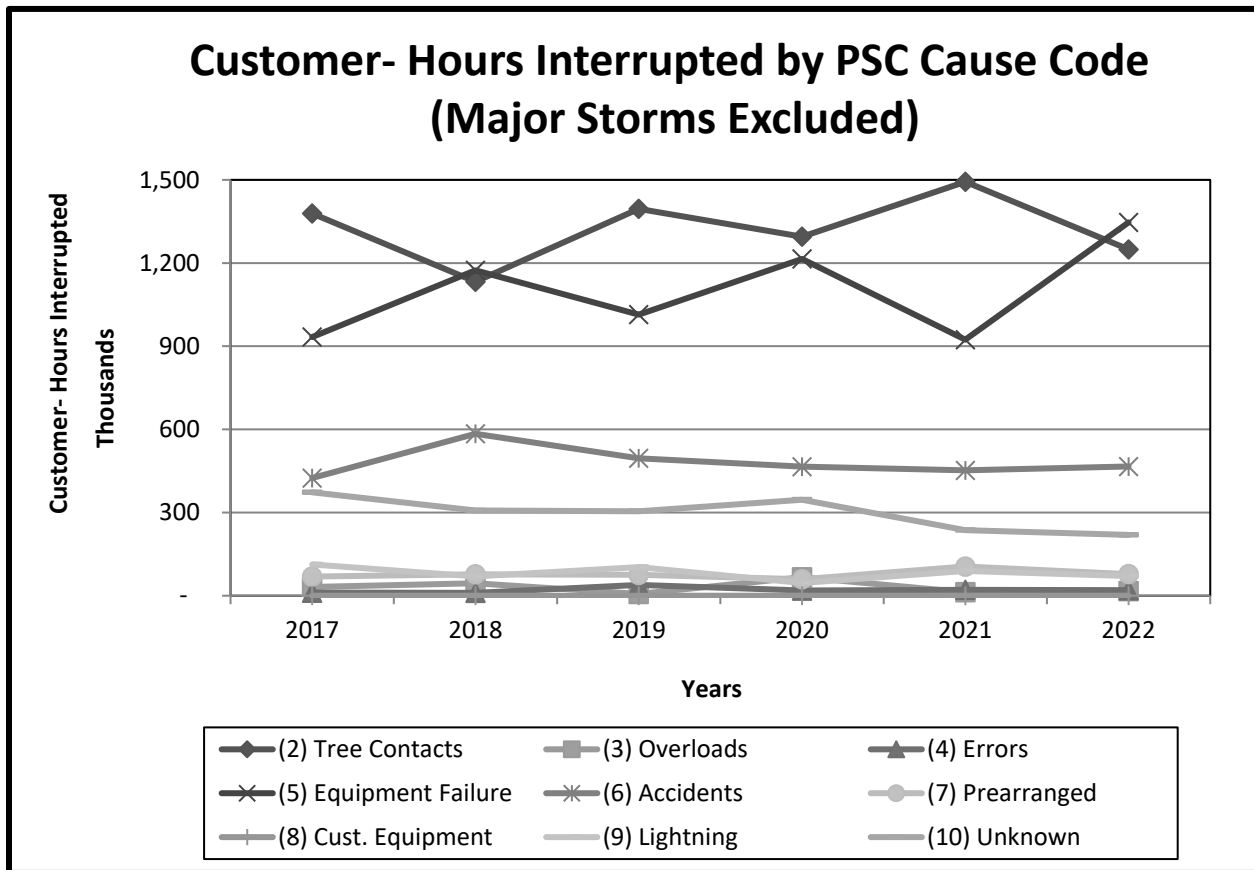
CUSTOMERS INTERRUPTED BY CAUSE CODE

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	711,979	422,542	762,303	766,788	839,762	570,641
02 Tree Contacts	575,679	668,684	541,885	563,621	470,432	576,371
03 Overloads	8,330	9,596	23,844	3,551	12,379	12,998
04 Errors	35,130	20,705	23,868	35,118	13,633	19,595
05 Equipment Failure	648,441	499,126	549,707	513,423	553,325	451,180
06 Accidents	263,655	277,079	282,628	266,276	308,087	233,085
07 Prearranged	56,485	102,170	67,108	63,860	90,590	108,583
08 Customer Equipment	0	0	18	5	0	0
09 Lightning	32,652	41,276	34,892	36,951	26,491	48,381
10 Unknown	156,028	149,025	208,541	208,376	191,383	220,902
Totals	2,488,379	2,190,203	2,494,794	2,457,969	2,506,082	2,241,736



CUSTOMER-HOURS INTERRUPTED BY CAUSE CODE

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	6,443,755	2,843,246	9,117,326	5,525,954	7,433,501	5,037,211
02 Tree Contacts	1,249,374	1,493,056	1,295,150	1,395,571	1,132,720	1,378,786
03 Overloads	16,579	12,619	66,766	6,617	44,767	31,352
04 Errors	19,776	21,224	18,648	38,914	10,263	11,179
05 Equipment Failure	1,346,687	923,628	1,214,969	1,014,061	1,174,011	933,171
06 Accidents	466,120	452,177	465,372	495,830	584,050	424,588
07 Prearranged	77,785	105,417	59,476	75,398	77,269	69,184
08 Cust. Equipment	0	0	26	8	0	0
09 Lightning	71,063	89,328	45,841	103,179	69,490	112,784
10 Unknown	219,303	236,584	346,198	304,782	307,243	372,929
Totals	9,910,443	6,177,279	12,629,772	8,960,314	10,833,312	8,371,184



CUSTOMERS INTERRUPTED AND CUSTOMER-HOURS
INTERRUPTED BY CAUSE CODE INCLUDING MAJOR STORMS

Code	Category	Interruptions		Customers Interrupted		Customer-Hours	
		Number	% Total	Number	% Total	Number	% Total
01	Major Storms	6,193	29.7%	711,979	28.6%	6,443,755	65.0%
02	Tree	4,543	21.8%	575,679	23.1%	1,249,374	12.6%
03	Overload	95	0.5%	8,330	0.3%	16,579	0.2%
04	Errors	63	0.3%	35,130	1.4%	19,776	0.2%
05	Equipment	4,039	19.4%	648,441	26.1%	1,346,687	13.6%
06	Accidents	2,668	12.8%	263,655	10.6%	466,120	4.7%
07	Prearranged	556	2.7%	56,485	2.3%	77,785	0.8%
08	Customers	0	0.0%	0	0.0%	0	0.0%
09	Lightning	468	2.2%	32,652	1.3%	71,063	0.7%
10	Unknown	2,219	10.6%	156,028	6.3%	219,303	2.2%
	Totals	20,844	100.0%	2,488,379	100.0%	9,910,443	100.0%

CUSTOMERS INTERRUPTED AND CUSTOMER-HOURS
INTERRUPTED BY CAUSE CODE EXCLUDING MAJOR STORMS

Code	Category	Interruptions		Customers Interrupted		Customer-Hours	
		Number	% Total	Number	% Total	Number	% Total
02	Tree	4,543	31.0%	575,679	32.4%	1,249,374	36.0%
03	Overload	95	0.6%	8,330	0.5%	16,579	0.5%
04	Errors	63	0.4%	35,130	2.0%	19,776	0.6%
05	Equipment	4,039	27.6%	648,441	36.5%	1,346,687	38.8%
06	Accidents	2,668	18.2%	263,655	14.8%	466,120	13.4%
07	Prearranged	556	3.8%	56,485	3.2%	77,785	2.2%
08	Customers	0	0.0%	0	0.0%	0	0.0%
09	Lightning	468	3.2%	32,652	1.8%	71,063	2.0%
10	Unknown	2,219	15.1%	156,028	8.8%	219,303	6.3%
	Totals	14,651	100.0%	1,776,400	100.0%	3,466,687	100.0%

Cause Code 01 - Major Storms

In 2022, Major Storms accounted for 30% of interruptions, 29% of customers interrupted, and 65% of Customer-Hours Interrupted.

Interruptions due to Major Storm were up 68% from 2021, and up 3% over the 5-year average. Customers interrupted due to Major Storms were up 68% from 2021, and up 6% over the 5-year average. Customer-Hours interrupted were up 127% from 2021 and up 8% over the 5-year average.

The remaining PSC code descriptions do not include Major Storms in the percentages.

Cause Code 02 - Tree Contacts

In 2022, Tree Contacts accounted for 31% of interruptions, 32% of customers interrupted, and 36% of Customer-Hours Interrupted.

Interruptions due to Tree Contacts were down 10% from 2021, and down 1% over the 5-year average. Customers interrupted due to Tree Contacts were down 14% from 2021, and up 2% over the 5-year average. Customer-Hours interrupted were down 16% from 2021 and down 7% over the 5-year average.

Tree Contacts were the largest cause of interruptions in 2022.

Cause Code 03 – Overloads

In 2022, Overloads accounted for 1% of interruptions, 0% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Overloads were down 6% from 2021, and down 42% over the 5-year average. Customers interrupted due to Overloads were down 13% from 2021, and down 33% over the 5-year average. Customer-Hours interrupted were up 31% from 2021 and down 49% over the 5-year average.

Overloads were the 7th largest cause of interruptions in 2022.

Cause Code 04 - Operator Error

In 2022, Operator Error accounted for 0% of interruptions, 2% of customers interrupted, and 1% of Customer-Hours Interrupted.

Interruptions due to Operator Error were down 6% from 2021, and up 13% over the 5-year average. Customers interrupted due to Operator Error were up 70% from 2021, and up 56% over the 5-year average. Customer-Hours interrupted were down 7% from 2021 and down 1% over the 5-year average.

Operator Error was the 8th largest cause of interruptions in 2022.

Cause Code 05 - Equipment Failure

In 2022, Equipment Failures accounted for 28% of interruptions, 37% of customers interrupted, and 39% of Customer-Hours Interrupted.

Interruptions due to Equipment Failure were up 7% from 2021, and up 2% over the 5-year average. Customers interrupted due to Equipment Failure were up 30% from 2021, and up 26% over the 5-year average. Customer-Hours interrupted were up 46% from 2021 and up 28% over the 5-year average.

Equipment Failures were the 2nd largest cause of interruptions in 2022.

Cause Code 06 – Accidents

In 2022, Accidents accounted for 18% of interruptions, 15% of customers interrupted, and 13% of Customer-Hours Interrupted.

Interruptions due to Accidents were up 17% from 2021, and up 16% over the 5-year average. Customers interrupted due to Accidents were down 5% from 2021, and down 4% over the 5-year average. Customer-Hours interrupted were up 3% from 2021 and down 4% over the 5-year average.

Accidents were the 3rd largest cause of interruptions in 2022.

Cause Code 07 – Prearranged

In 2022, Prearranged outages accounted for 4% of interruptions, 3% of customers interrupted, and 2% of Customer-Hours Interrupted.

Interruptions due to Prearranged outages were down 22% from 2021, and up 3% over the 5-year average. Customers interrupted due to Prearranged outages were down 45% from 2021, and down 35% over the 5-year average. Customer-Hours interrupted were down 26% from 2021 and up 1% over the 5-year average.

Prearranged outages were the 5th largest cause of interruptions in 2022.

Cause Code 08 - Customer Equipment

In 2022, Customer Equipment accounted for 0% of interruptions, 0% of customers interrupted, and 0% of Customer-Hours Interrupted.

Customer Equipment was the 9th largest cause of interruptions in 2022.

Cause Code 09 – Lightning

In 2022, Lightning accounted for 3% of interruptions, 2% of customers interrupted, and 2% of Customer-Hours Interrupted.

Interruptions due to Lightning were down 25% from 2021, and up 1% over the 5-year average. Customers interrupted due to Lightning were down 21% from 2021, and down 13% over the 5-year average. Customer-Hours interrupted were down 20% from 2021 and down 16% over the 5-year average.

Lightning was the 6th largest cause of interruptions in 2022.

Cause Code 10 – Unknown

In 2022, Unknown causes accounted for 15% of interruptions, 9% of customers interrupted, and 6% of Customer-Hours Interrupted.

Interruptions due to Unknown causes were down 2% from 2021, and down 5% over the 5-year average. Customers interrupted due to Unknown causes were up 5% from 2021, and down 20% over the 5-year average. Customer-Hours interrupted were down 7% from 2021 and down 30% over the 5-year average.

Unknown causes were the 4th largest cause of interruptions in 2022.

4. MAJOR STORMS

National Grid’s electric system experienced 27 severe weather incidents in 2022 that qualified as major storms; an increase of 3 major storms reported in 2021 (24). Of the 27 events in 2022, 9 impacted the Central Division (Central – 2; Mohawk Valley – 2; Northern – 5), 10 impacted the Eastern Division (Capital – 4; Northeast – 6), and 8 impacted the Western Division (Frontier – 2; Genesee – 3; Southwest – 3). To qualify as a major storm, a storm event period must affect at least ten percent of the customers in an operating region or have at least one customer out of service for 24 hours or more. The Company excludes all interruptions caused by major storms from the CAIDI and SAIFI indices. The storms occurred during 11 distinct time periods, affecting multiple regions and in many cases, lasting more than one day.

Major Interruptions Due to Major Storms

As shown in the table below, the number of major storm interruptions in 2022 was 3% higher than the 5-year average (2017 to 2021). All regions, except Frontier, Northeast and Northern, experienced a lower number of Major Storm interruptions in 2022 relative to the 5-year average. There was a 69% increase in the number of 2022 interruptions as compared to 2021.

Major Storm Interruptions by Region

					(a)	(b)	(c)	(d) = (b-c)/c	(e) =(b-a)/a
Regions	2017	2018	2019	2020	2021	2022	17 - 21 Average	2022 vs. 5-year average	2022 vs. 2021
Capital	1,037	1,433	1,460	2,089	587	557	1,194	-53.34%	-5.11%
Central	419	635	698	143	157	235	381	-38.35%	49.68%
Frontier	263	413	1,352	413	546	1000	665	50.49%	83.15%
Genesee	1,033	503	532	206	520	549	557	-1.47%	5.58%
Mohawk	442	965	529	178	377	418	485	-13.78%	10.88%
Northeast	1,332	2,304	1,749	1,810	515	1,883	1,599	17.77%	265.63%
Northern	180	1,144	945	101	670	1286	721	78.36%	91.94%
Southwest	347	809	264	708	300	264	449	-41.16%	-12.00%
Total	5,053	8,206	7,529	5,648	3,672	6,192	6,022	2.83%	68.63%

Major Storms – 2022

Date	Region	Storm Conditions	CI	CHI	Interruptions	Storm Duration	24 Hour Events	24 Hour Customers Interrupted	Qualification
3/6/2022	Southwest	High Winds	812	2,434	25	1D 3H 49M	1	25	24Hr
3/6/2022	Frontier	High Winds	7,197	15,131	80	1D 12H 56M	2	6	24Hr
3/6/2022	Genesee	High Winds	14,167	80,007	183	2D 1H 21M	17	561	10%/24Hr
3/6/2022	Northeast	High Winds	21,660	72,351	177	2D 2H 26M	1	85	24Hr
3/7/2022	Capital	High Winds	28,978	155,231	144	1D 15H 2M	2	28	24Hr
4/15/2022	Northern	High Winds	9,730	20,506	97	1D 3H 36M	1	1	24Hr
4/18/2022	Northeast	Wind, Thunderstorms, Tornado	110,136	1,518,658	840	3D 6H 59M	235	23,026	10%/24Hr
4/18/2022	Northern	Strong Winds, Heavy Wet Snow	16,171	128,275	204	2D 10H 51M	26	1,404	10%/24Hr
4/18/2022	Mohawk	Strong Winds, Heavy Wet Snow	40,102	638,528	313	3D 4H 27M	91	11,507	10%/24Hr
4/18/2022	Central	Strong Winds, Heavy Wet Snow	10,339	35,164	150	2D 2H 34M	3	22	24Hr
4/18/2022	Capital	Strong Winds, Heavy Wet Snow	46,852	119,565	178	1D 19H 19M	15	188	10%/24Hr
6/16/2022	Genesee	Thunderstorms, High Winds	6,841	24,072	62	1D 3H 1M	1	143	24Hr
6/16/2022	Northern	Thunderstorms, High Winds	18,969	105,524	159	1D 22H 28M	17	689	10%/24Hr
8/4/2022	Capital	Thunderstorms, High Winds	8,970	28,909	97	1D 19H 12M	1	43	24Hr
8/23/2022	Northeast	Thunderstorms, High Winds	33,244	10,036	37	1D 17H 19M	1	15	10%/24Hr
8/29/2022	Southwest	Thunderstorms, High Winds	4,313	15,043	53	1D 1H 59M	2	33	24Hr
8/30/2022	Northeast	Thunderstorms, High Winds	47,688	156,528	192	2D 6H 41M	3	57	10%/24Hr
11/17/2022	Central	High Winds, Heavy Snow	18,903	83,643	85	1D 15H 52M	1	176	24Hr
12/16/2022	Northern	Heavy, Wet Snow	35,737	146,444	486	3D 13H 42M	7	26	10%/24Hr
12/16/2022	Northeast	Heavy, Wet Snow	66,114	668,189	434	2D 18H 43M	36	3,725	10%/24Hr
12/22/2022	Capital	High Winds, Blizzard, Heavy Snow	8,774	40,043	138	2D 5H 10M	1	89	24Hr
12/22/2022	Mohawk	High Winds, Blizzard, Heavy Snow	14,508	59,327	105	1D 19H 48M	17	181	10%/24Hr
12/22/2022	Northern	High Winds, Blizzard, Heavy Snow	22,204	141,434	340	4D 23H 24M	24	550	10%/24Hr
12/23/2022	Northeast	High Winds, Blizzard, Heavy Snow	17,034	37,818	203	1D 21H 55M	2	35	24Hr
12/23/2022	Southwest	High Winds, Blizzard, Heavy Snow	18,935	92,632	186	2D 9H 58M	30	560	10%/24Hr
12/23/2022	Frontier	High Winds, Blizzard, Heavy Snow	59,762	1,716,137	920	5D 11H 9M	500	27,976	10%/24Hr
12/23/2022	Genesee	High Winds, Blizzard, Heavy Snow	24,370	331,983	304	3D 9H 46M	145	6,533	10%/24Hr

5. CIRCUIT RELIABILITY

In order to identify action plans to maintain reliability, the Company ranks each circuit system-wide on the following four reliability metrics and generates an overall ranking by summing the four rankings for each feeder. This method helps to ensure that National Grid focuses on the worst performing feeders from the viewpoint of customers regardless of physical location, voltage, or configuration.

- 1) Number of Interruptions
- 2) Number of Customer-Hours Interrupted (CHI)
- 3) SAIFI (Customers Interrupted/Customers Served)
- 4) SAIDI (Customer Hours/Customers Served)

The Company performs a detailed analysis of the reliability issues for the top 5% of circuits on this list. The location, duration of the interruptions, number of customers affected, cause(s), and physical environmental characteristics of the circuits are all analyzed to develop appropriate action plans that will address the issues.

For this report, the maximum number of feeders analyzed and evaluated in any one operating region is capped at twenty feeders. If any operating region has more than twenty feeders that rank among the top 5% worst performing, the performance for a commensurate number of next highly ranked feeders in other regions are analyzed. The following table shows the number of circuits in each operating region that were among the top 5% of feeders in terms of reliability issues. More detailed information can be found in Section L.1.

Company Operating Region	Total Number of Distribution Circuits	Company Criteria	
		Worst 5% For System	Circuits Analyzed
Capital	329	18	20
Central	299	17	19
Frontier	685	1	1
Genesee	140	5	6
Mohawk	138	20	20
Northeast	206	25	20
Northern	156	14	14
Southwest	152	6	6
Grand Total	2,105	106	106

6. RELIABILITY AND OTHER PROGRAMS

The Company has made significant investments for capital improvements and maintenance activities in recent years to develop and implement programs that will maintain the long-term performance and health of network assets.

The Reliability Program is designed to significantly improve and maintain reliability through four initiatives:

- 1) Engineering Reliability Reviews (“ERRs”)
- 2) Sub-Transmission Automation & Fault Location, Isolation, & Service Restoration (“FLISR”)
- 3) Vegetation Management
- 4) Inspection and Maintenance Program (“I&M”)
- 5) Trip Saver Installation Program

The I&M program has substantially replaced some of the strategy’s program work such as feeder hardening, potted porcelain cutout replacement, recloser installation, targeted pole replacement, manhole, and vaults. Section B of this report describes the Company’s reliability programs in more detail.

New York State continues to experience volatile weather that causes interruptions for our customers. The Company maintains a reliable grid through proactive infrastructure programs and effective storm response plans. Although the Company’s reliability metrics remain relatively stable, these ‘minor storm’ days continue to place upward pressure on them. The Company monitors the impacts of these weather events to better understand risks and develop approaches to mitigate them.

New York’s Broadband Expansion Program represented a significant increase in pole attachment activity since 2018. This unprecedented growth and speed of fiber expansion also, at times, created the need for National Grid to assist in the correction of non-compliant attachments. The total reliability impact of this corrective work has not been quantified within this report, as most corrections were completed without the interruption of power to customers. In a small number of situations, there were unplanned interruptions and/or the need to proactively de-energize sections of lines to facilitate corrections to attachments, resulting in interruption of service to a limited number of customers.

7. TRANSMISSION AND DISTRIBUTION INSPECTION AND MAINTENANCE PROGRAM

The Company takes a proactive approach to asset management. The I&M program is designed to find and fix issues before they become problems. The inspections also provide detailed information about the Company's assets for further analysis of trends. In addition, planning of the transmission and distribution system assesses capacity, reliability, and asset replacement issues in the future. The overarching objective of the initiatives is to get ahead of reliability concerns before they become events. Inspection of the transmission and distribution system is performed on a comprehensive system-wide basis using four basic methods:

- 1) A comprehensive helicopter inspection is performed to determine the condition of select lines (mainly transmission) and to help establish a repair schedule. These inspections are used to gather information to evaluate the need for maintenance or capital improvement on poorly performing circuits. The inspections provide detailed information about conductors, hardware, and structures.
- 2) Infrared testing is performed to sense heat dissipation from sub-transmission and transmission lines. Infrared testing detects faulty splices and loop sleeves so the Company can take short pre-arranged interruptions to repair problems proactively thereby avoiding potentially lengthy uncontrolled emergency interruptions.
- 3) Distribution and transmission lines are manually patrolled.
- 4) Mobile surveys of underground electric distribution systems are performed in select areas (cities with a population of >50,000) to detect elevated voltage.

Pursuant to the Electric Safety Standards, the performance target for inspections for 2022 was 19% (i.e., 95% of the annual 20% target). Defects that required immediate attention were addressed. Other problems were prioritized so they could be addressed in future work plans. National Grid inspected 20.6% of its electric facilities for the period ending December 31, 2022.

The results are summarized in the following tables.

2022 Facility Inspection Program Results

Category	Total System Units	2022 Units Completed	2022 Actual Inspected
Overhead Distribution	1,268,823	263,075	20.7%
Overhead Transmission	105,748	24,115	22.8%
Underground	103,111	20,452	19.8%
Pad-mounted Transformers	73,751	14,672	19.9%
Streetlight	43,380	6,032	13.9%
Totals	1,594,813	328,346	20.6%

Inspection Performance Summary

Overhead Distribution Facilities

Inspection Year	Number of Overhead Distribution Structures Inspected	% of Overall System Inspected
2022	263,075	21%
2021	259,312	21%
2020	257,879	20%
2019	228,478	18%
2018	251,012	20%

Overhead Transmission Facilities

Inspection Year	Number of Overhead Transmission Facilities Inspected	% of Overall System Inspected
2022	24,115	23%
2021	22,292	21%
2020	22,112	21%
2019	17,580	17%
2018	22,310	21%

Underground Facilities

Inspection Year	Number of Underground Facilities Inspected	% of Overall System Inspected
2022	20,452	20%
2021	20,573	20%
2020	18,729	18%
2019	19,015	19%
2018	25,046	25%

Pad-mount Transformers

Inspection Year	Number of Pad-mounted Transformers Inspected	% of Overall System Inspected
2022	14,672	20%
2021	15,502	21%
2020	13,061	18%
2019	13,123	19%
2018	17,161	24%

Streetlights

Inspection Year	Number of Streetlights Inspected	% of Overall System Inspected
2022	6,032	14%
2021	12,992	27%
2020	12,974	23%
2019	15,890	24%
2018	14,532	22%

In accordance with the Safety Standards, set forth in the PSC’s orders in Case 04-M-0159 National Grid uses the following severity levels to establish priority for repairs and scheduling:

Level I – Repair as soon as possible but not longer than one week. A Level I classification represents an actual or imminent safety hazard to the public or a serious and immediate threat to the delivery of power. Critical safety hazards present at the time of the inspection shall be guarded until the hazard is mitigated.

Level II – Repair within one year. A Level II classification represents conditions that are likely to fail prior to the next inspection cycle and represent a threat to safety and/or reliability should a failure occur prior to repair.

Level III – Repair within three years. A Level III classification represents conditions that do not present immediate safety or operational concerns and would likely have a minimal impact on the safe and reliable delivery of power should a failure occur prior to repair.

Level IV – A Level IV classification represents conditions found but repairs are not needed at this time. Level IV is used to track atypical conditions that do not require repair within a five-year timeframe. This level is used for future monitoring purposes and planning proactive maintenance activities.

The following table summarizes the deficiencies identified by the inspection program in 2022 for the transmission and distribution system in each category. The specific issues that were identified for each asset grouping are described in the Company’s 2022 Annual Stray Voltage Testing and Facility Inspection Report in Case 04-M-0159 filed on February 15, 2023. All Level I issues and most Level II issues have already been addressed. The remaining issues will be addressed consistent with the timeframes as discussed above.

Program	Level 1	Level 2	Level 3
Distribution	498	4,227	17,047
Underground	96	934	622
Transmission	23	207	1,568

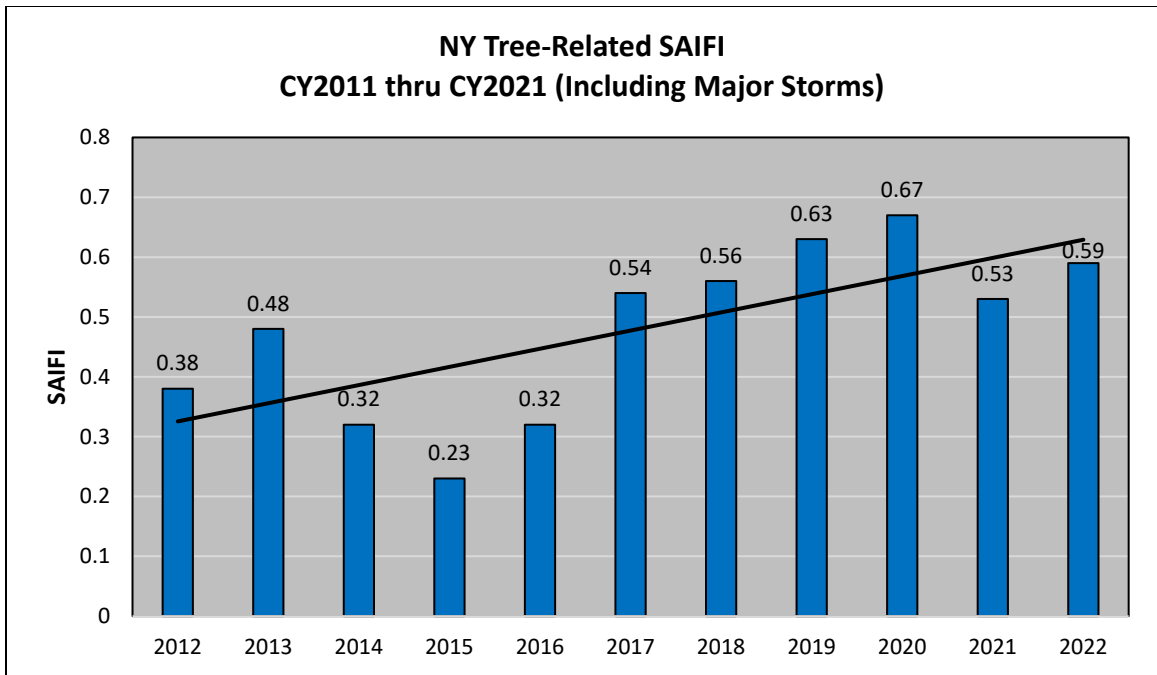
8. VEGETATION MANAGEMENT PROGRAM

The Company's vegetation management program is divided into two sub-programs, one for the distribution system and another for the transmission system. Both programs include a time-based cycle component and a reliability improvement component to minimize tree-related interruptions from trees and limbs failing into the infrastructure as well as providing a measure of public and worker safety. The Company is investigating the development of a tool utilizing AI satellite imagery to model tree growth to assist in predicting the optimum time and location to perform pruning along circuits based on growth data which in time could create a Natural Prune Cycle.

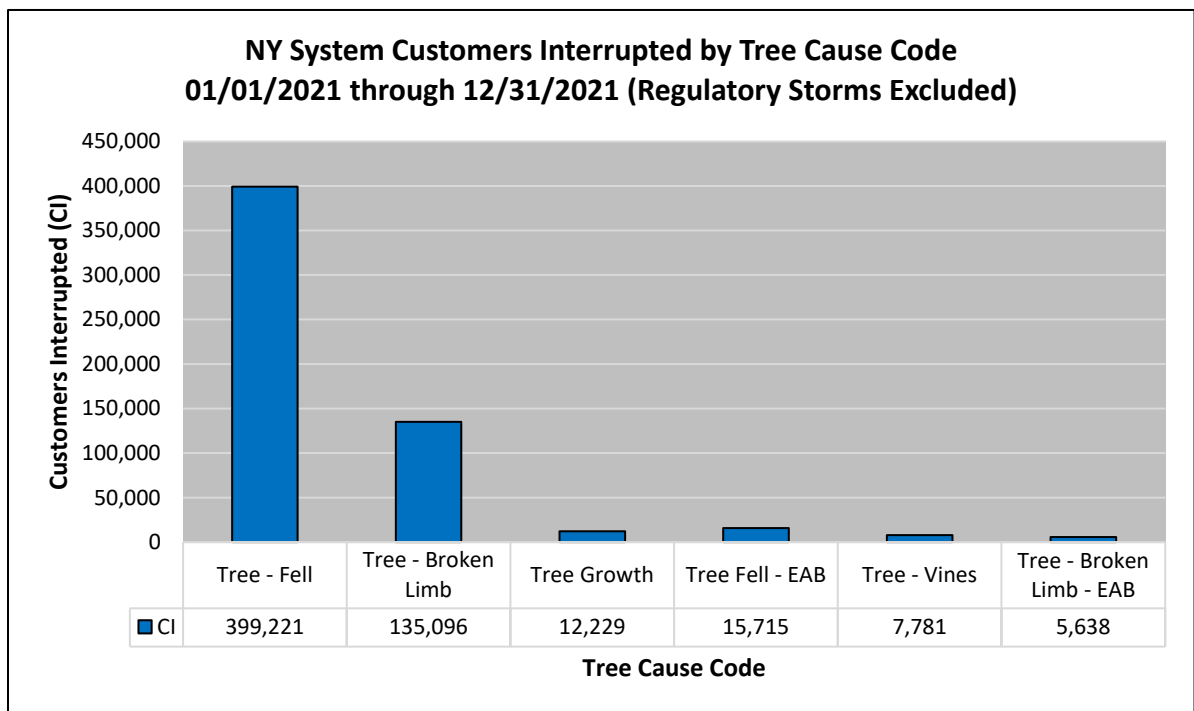
For the transmission system, the cycle-based program is an integrated vegetation management ("IVM") program used to manage vegetation along the floor of the rights-of-way. The ROW edges that contain tall growing species are observed during patrols on a scheduled basis and maintained as needed to minimize risk. The details regarding the transmission program performance are reported annually in a separate report to the PSC.

The Company's distribution component is circuit pruning, presently a time-based methodology, and is a comprehensive program that provides for the pruning of vegetation along all distribution circuit miles on an average five- and one-half year interval. An optimal cycle length is set for each circuit based on growing season, growth characteristics of predominant tree species in that area, and the appropriate clearance that can be created at the time of pruning. The Company has maintained a level of funding necessary to operate the program for many years allowing the completion of multiple full program cycles of pruning. In addition to pruning, hazard tree removals are performed on prioritized distribution feeders. The Company identifies feeders for the inspection and removal of hazard trees based on field inspections, tree exposure, historical interruption data, number of customers served and circuit configuration.

Shown in the chart on the next page is the New York system tree-related SAIFI including major storms for the past ten years. Although tree-related interruptions are strongly correlated with wind and weather patterns; that variability and its effect on tree interruption data is mitigated when viewed over a longer period of years. As shown by the chart, SAIFI has been trending upward over the last ten years.



Demonstrated in the chart below, the distribution of tree interruptions between the six tree cause categories points to the importance of a robust hazard tree program. Tree fell interruptions accounted for 69% of all tree interruptions in CY2022, followed by 24% caused by limb failures, 2% caused by tree growth, and lastly vine growth. The minimal number of tree growth and vine growth interruptions is an indication that the current pruning program and pruning specifications are effective in minimizing interruptions related to vegetation growth. Ash tree failures have been minimized through the EAB mitigation program. Over time we are seeing the failure of White pine, Sugar Maple and other species due to invasive fungi and insects that are compromising tree health and structure. Only a robust hazard tree mitigation process can address these tree failure issue.



The Company implemented a formal Ash tree removal program in 2017 to mitigate the decline of Ash trees due to Emerald Ash Borer (EAB). Based on incremental funding, approximately 30,000 infested trees are targeted for removal in FY23 and FY24. As part of the mitigation plan, an outage follow-up program was implemented to monitor the number of outage events caused by Ash trees. Below is a summary of the outage follow-up. Approximately 9.7% of the forest along the utility lines in New York State are comprised of Ash trees. In CY2022, approximately 10% of all vegetation related outages were caused by Ash trees. Continuing to monitor the program to observe if Ash tree failures remain stable or if they begin to escalate due to EAB infestations helps to distribute resources appropriately.

2022 Ash Tree Interruptions by Division (Excluding major storms)

Division	Total Tree Events	Ash Tree Events	EAB Ash Tree Events	% Ash Tree Failures	%Ash Tree with EAB Failures
East	1,789	37	8	2%	22%
Central	1,606	33	9	2%	27%
West	1,149	201	188	18%	94%
Total	4,544	271	205	10%	76%

In the table below the NY Operating Regions are ranked based on 2022 tree-related SAIFI performance. Regions with the highest tree densities also had the highest distribution line tree exposure, and these regions generally have the highest number of interruptions each year. Vegetation program budget dollars, especially for hazard tree work, are oriented with these same facts in mind.

Tree Interruptions by Region – 2022 (Excluding major storms)

Rank	Region	Number of Interruptions	Customers Interrupted	SAIFI
1	Northeast	960	123,905	0.536
2	Capital	829	117,674	0.348
3	Central	683	113,534	0.390
4	Southwest	554	59,477	0.561
5	Mohawk	491	49,993	0.356
6	Northern	433	50,158	0.361
7	Frontier	323	32,577	0.098
8	Genesee	272	28,848	0.286

9. ELECTRIC SUBSTATION PREVENTIVE MAINTENANCE PROGRAM

The Substation Computerized Maintenance Management System (“CMMS”) covers an array of inspections, diagnostics, and maintenance activities to be completed in accordance with National Grid Substation Maintenance Standards and Procedures. These documents identify intervals and maintenance activities to be performed on different types of substation equipment (transformers, circuit breakers, Load Tap Changers (“LTC”), batteries and chargers, etc.). Protection Systems Engineering Documents provide the substation relay calibration and testing requirements for the bulk power, transmission, distribution, and communication-protection systems.

National Grid Upstate New York Substations and Protection, Telecom and Operations (“PTO”) field personnel performed and documented 15,545 discrete maintenance activities across the system in calendar year 2022. Total expenditure for the Upstate New York Substation Maintenance Program was approximately \$4.410 million. The listing of specific substation maintenance activities are as follows:

<u>Substation Maintenance Programs</u> <u>Apparatus: Activity</u>	<u>Number</u> <u>Performed</u>
Battery: Diagnostic Inspection	575
Circuit Breaker: Diagnostics	534
Circuit Breaker: Mechanism Inspection (GCB2)	1
Circuit Switcher: Diagnostics	6
Disconnect: Motor Operator Operation	56
Load Tap Changer: DGA	1,039
Load Tap Changer: Internal Inspections	3
Substation: Visual & Operations (V&O) Inspections	4,460
Substation: Thermographic Inspections	749
Transformer: DGA	1,777
Transformer: Diagnostics	1
Transformer: Oil Quality (Screen Test)	53
Transformer: Cooler Cleaning	30
Voltage Regulator: DGA	36
Relay Testing: NERC	2,645
Relay Testing: Other	1,111
Battery: KF-1,KF-2 Battery Diagnostic Test (ST1/ST2)	174
Substation: KF-3 Station Service Critical Load Test (ST-3)	0
Standby Generator: KF-5 E Gen Run Test (ST-5)	121
Standby Generator: KF-6 E Gen Transfer Test (ST-6)	13
Battery: NERC PRC-005-6 Battery Bi-Monthly Check	1,016
Circuit Breaker: DC Trip Coil Verification Check - NERC PRC-005-6	1,145
Totals	15,545

The CMMS uses a Maintenance Scheduling Number (“MSN”) that provides detailed information to prioritize and schedule the substation maintenance program work tasks. The CMMS application, Cascade, is used as a data warehouse and scheduling tool to manage workloads and balance risk. It is also used to help justify decisions related to work force and budgeting requirements. Cascade is the database used to assist in the development of maintenance plans and asset replacement programs for the calendar, fiscal, or multi-year maintenance and replacement programs.

As a maintenance example, an MSN number is used to trigger maintenance notification. The MSN number continues to increase creating a prioritized backlog until the maintenance task is completed. The MSN number increases at a predetermined rate depending on the type of maintenance task. This notification allows for the scheduling of the necessary equipment outages for maintenance inspection, diagnostics, or other tests as specified by published standards or procedures. The range between 400 and 500 allows for the scheduling of outages and completion of the maintenance activity. If the equipment MSN number is greater than 500, it is considered overdue. Variance reports are generated monthly to indicate the maintenance activities performed during the reporting period and year-to-date.

The tables below represent a snapshot of the Cascade generated monthly report.

Substation Maintenance Status by Equipment Class – New York

Transmission

	≥ 500 Overdue*	400-499 Due	Total Units	Month TD COMP	FYTD COMP
Animal Fence Maintenance	0	0	9	0	6
Battery & Chg: Std Insp	0	59	348	26	146
CAP PrePeak Insp	0	0	50	0	43
Circuit Breaker Diag	1	2	777	1	30
Circuit Breaker Mech Insp (GCB2)	1	0	5	2	2
CKTSW Diag	0	2	142	0	1
Disconnects: MO Diag Insp	0	2	657	0	5
EGEN Diag	0	0	15	0	0
LTC:DGA	0	55	400	27	414
Substation V&O	0	177	353	195	1614
Thermographic Insp*	0	326	326	0	121
Transf DGA	1	85	542	41	453
Transf Oil Quality	0	9	98	0	22
TRF Cooler Cleaner	0	0	22	0	22

Distribution

	≥ 500 Overdue*	400-499 Due	Total Units	Month TD COMP	FYTD COMP
Animal Fence Maintenance	0	0	71	0	38
Battery & Chg: Std Insp	0	14	216	8	115
CAP PrePeak Insp	0	0	56	0	50
Circuit Breaker Diag	24	147	3865	41	582
CKTSW Diag	0	0	7	0	0
Disconnects: MO Diag Insp	0	0	93	0	0
LTC:DGA	0	40	292	25	292
LTC: Internal Insp	0	0	6	1	3
Substation V&O Insp	0	197	429	257	1973
Thermographic Insp*	0	410	412	1	110
Transf DGA	1	58	591	27	292
Transf Oil Quality	1	5	62	0	11
TRF Cooler Cleaning	1	0	6	0	5
VREG Internal	0	0	9	0	0
VREG: DGA	0	13	70	12	56

* Testing is done by PTO Meter and Test.

* ≥ 500 Overdue column includes overdue, exemptions, and OPEX. Does not include NPCC (refer to page 10).

In addition to its functionality as an asset register, the Cascade system manages other substation maintenance work. The system generates Work Orders when maintenance is required to track follow-up work with Trouble Orders and Follow-up Work Orders. As substation mechanics perform maintenance and inspections from automatically generated Work Orders, if problems are discovered, they will have several options: fix the problem while on site, initiate a Follow-up Work Order, and/or initiate a Trouble Order. Trouble Orders track problems and failures that have occurred during normal operation of the equipment and require immediate repair. Follow-up Work Orders track problems found during Visual & Operational (V&O) Inspections or scheduled equipment inspections.

Protective relays are tested on a calendar year basis. Triggers are based on the last test date and testing interval.

B. RELIABILITY PROGRAMS AND WORK FORCE INFORMATION

1. RELIABILITY PROGRAMS

National Grid has invested in a number of capital and maintenance programs to maintain the reliability of the electric system. Programs that are specifically designed to improve reliability are described below in detail with the exception of the vegetation management program which was described in a previous section of this report.

- **Engineering Reliability Reviews (“ERRs”)**
- **Sub-Transmission Automation and Fault Location, Isolation, & Service Restoration (“FLISR”)**
- **Distribution Fault Location, Isolation, & Service Restoration (“FLISR”)**
- **Vegetation Management** – Enhanced right-of-way clearing and treatment and Enhanced Hazard Tree Maintenance (“EHTM”) removal of danger trees on critical sections of the distribution system.
- **TripSaver Installation Program** – Single-phase cutout mounted recloser installations

In addition to reliability programs, certain aspects of the I&M program contribute to improved reliability and increased likelihood that the Company will satisfy PSC reliability goals. The I&M program is designed to ensure the Company fulfills its obligation to provide safe and adequate service by inspecting its facilities and repairing identified safety and reliability issues in a timely fashion. Replacement of deteriorated overhead and underground assets helps prevent a future failure which has a cumulative effect of improving reliability over time.

ERRs

As discussed in the Company's 2020 Asset Condition Report and Capital Investment Plan filed October 1, 2020 in Case 17-E-0238, the Customer Reliability & Analytics group generates the list of Worst Performing Feeders during the preparation of the Electric Service Reliability Report. The list of feeders includes interruptions associated with supply issues (transmission or substation) and excludes major storms. From the list, a small number of geographically diverse feeders are selected for an ERR. The scope of an ERR typically includes:

- Review of one-year and multi-year historical reliability data for current issues and trends.
- Review of recently completed and/or future planned work that is expected to impact reliability.
- Review the need for the installation of radial and/or loop scheme reclosers.
- Review the need for additional line fuses to improve the sectionalization of the feeder.
- Comprehensive review of the coordination of protective devices to ensure proper operation.
- Review for equipment in poor condition.
- Review of heavily loaded equipment.
- Review for other feeder improvements such as fault indicators, feeder ties, capacitor banks, load balancing, additional switches to improve switching time, and primary reconductoring (overhead and/or underground).

This review has been in place since FY2007 with 323 feeders going through the process. To date, this program is responsible for several of the 952 recloser installations across the Company's service territory.

Sub-Transmission Automation and Fault Location, Isolation, & Service Restoration ("FLISR")

After an initial investigation of automation and communication technologies, National Grid began a targeted Sub-Transmission Automation pilot in 2008 that deployed automation schemes on six circuits. These schemes use distributed intelligence through local controls and switches, with peer-to-peer communication through to a local substation Energy Management System ("EMS") uplink point achieved using spread spectrum 900 MHz radios. By up linking to EMS, Supervisory Control & Data Acquisition ("SCADA") capability of the automation devices is provided to the Company's Control Centers. In addition, all data is brought back to a central database warehouse for future analysis.

Following the success of pilot automation installations in 2008 and 2009, which verified the capability of advanced distribution automation enabled equipment, the Company recognized the additional benefit of identifying projects where the installation of modernized switching schemes would provide increased reliability

to the Sub-Transmission system. There are currently 15 Sub-Transmission peer-to-peer automation schemes deployed on the system.

In 2020, automation on the Sub-Transmission system was transitioned away from the peer-to-peer automation system to a centralized Fault Location, Isolation, and Service Restoration (“FLISR”) system. FLISR schemes utilize sectionalizing devices with localized protection settings and 4G cellular radio communications to a common Remote Terminal Unit (“RTU”) at the Company’s Regional Control Center. The RTU houses engineering developed logic to actively restore unaffected areas of the system during a contingency event, once the faulted section has been isolated locally, by coordinating the devices that are part of the FLISR scheme to make informed restoration actions based on the system’s status. FLISR devices will communicate to the Company’s EMS system and have full SCADA capability to allow for monitoring and control of the assets deployed, similar to the previous automation system utilized at National Grid. There are currently 3 Sub-Transmission FLISR Schemes deployed on the system.

Following successful installations and operation of FLISR using the Company’s RTU based platform, additional lines were selected for FLISR deployment and there are currently 22 Sub-Transmission FLISR schemes in the design or construction phase. Each fiscal year, Sub-Transmission lines are being reviewed by engineering for their eligibility to deploy a FLISR scheme. These circuits are selected based on their reliability performance, customer impact, and other operational considerations such as communications availability. There is a target of about 140 Sub-Transmission circuits to have active FLISR schemes in the future based on the potential impact to reduce the number of outages experienced by customers served via these circuits.

Distribution Fault Location, Isolation, & Service Restoration (“FLISR”)

After the deployment of initial Sub-T FLISR schemes, National Grid investigated the potential customer impacts for deploying automated feeder ties on the 15kV class distribution system and began deploying centralized Fault Location, Isolation, and Service Restoration (“FLISR”) schemes in 2021 using the same platform as the Sub-T FLISR schemes. These FLISR schemes utilize reclosers with localized protection settings and 4G cellular radio communications to a common Remote Terminal Unit (“RTU”) at the Company’s Regional Control Center. The RTU houses engineering developed logic to actively restore unaffected areas of the system during a contingency event. Once the faulted section has been isolated locally, the devices that are part of the FLISR scheme coordinate to make informed restoration actions based on the system’s status. FLISR devices will communicate to the Company’s EMS system and have full SCADA capability to allow for monitoring and control of the assets deployed. The Company will have 10 active Distribution FLISR schemes by mid-2023. The Company also has a target of deploying FLISR such that about 60% of its NY customers would live on circuits with FLISR, potentially reducing the impact of outages to this set of customers.

TripSaver Installation Program

The Company began installing cutout mounted reclosers system-wide in 2019. These reclosers are aimed at reducing the number of sustained interruptions related to temporary faults on fused portions of the distribution system. These devices will limit the exposure to transient faults, such as tree and animal contacts, lightning and unknown causes that have led to customer outages. Locations targeted for TripSaver installations include circuits with high customer counts and historical reliability issues.

2. CAPITAL AND O&M BUDGETS AND ACTUAL EXPENDITURES

The Company develops investment plans to meet its obligation to provide safe and adequate electric delivery service to 1.6 million customers at reasonable cost. Providing this service requires the Company to maintain a vast physical infrastructure located in 450 cities and towns across our 25,000 square mile service area.

The following tables show fiscal year Capital and Operation and Maintenance expenditure over the past five years.

Fiscal Year Capital Actual Expenditures (\$ Millions)						
System	FY 2018	FY 2019	FY 2020	FY2021	FY2022	FY2023*
Distribution	\$290.3	\$306.2	\$341.7	\$389.2	\$416.3	\$464.2
Sub-transmission	\$23.9	\$27.6	\$38.0	\$34.2	\$33.7	\$31.0
Transmission	\$177.1	\$189.0	\$215.1	\$193.4	\$258.5	\$319.5
Totals	\$491.3	\$491.3	\$594.8	\$616.8	\$708.5	\$814.7

* Forecasted spend for FY 2023.

The following tables summarize fiscal year tree trimming operations and maintenance expenditures over the past five years.

Fiscal Year Transmission Tree Trimming Actual and Budgeted Expenditure (\$ Millions)						
Spending	FY 2018	FY 2019	FY 2020	FY 2021	FY2022	FY2023*
Actual	\$14.13	\$15.43	\$16.70	\$17.74	\$19.63	\$19.37
Budgeted	\$13.30	\$15.27	\$16.66	\$17.14	\$15.51	\$16.65

Fiscal Year Distribution Tree Trimming Actual and Budgeted Expenditure (\$ Millions)						
Spending	FY 2018	FY 2019	FY 2020	FY 2021	FY2022*	FY2023*
Actual	\$54.03	\$56.58	\$58.00	\$58.69	\$60.95	\$63.85
Budgeted	\$48.92	\$56.57	\$57.99	\$59.08	\$62.06	\$66.58

* Forecasted spend for FY 2023.

3. WORK FORCE NUMBERS

The following table summarizes the work force numbers for field positions associated with overhead, underground, and substation crews. It should be noted that head counts are not tracked by reliability vs. non-reliability work.

Distribution

Title	2017	2018	2019	2020	2021	2022
Cable Splicer A	14	12	10	11	6	12
Cable Splicer B	13	14	14	12	12	13
Cable Splicer C	23	26	27	25	24	25
Cable Splicer Helper	6	5	5	4	6	3
Chief Cable Splicer A	30	32	33	36	31	28
Chief Electrician A	17	16	15	13	15	15
Chief Electrician B	1	1	1	1	1	1
Chief Equip Operator A	7	7	7	6	5	6
Chief Laborer A	1	1	1	1	1	2
Chief Line Mechanic A						
Chief Line Mechanic A Hot Stick	303	290	305	306	302	288
Chief Line Mechanic B Hot Stick						
Chief Maintenance Mechanic A	34	33	35	35	32	31
Chief Mechanic A	14	16	14	15	16	14
Chief Street Light Service Mechanic A	7	5	7	6	5	5
Distribution Inspector B						
Distribution Inspector C	25	25	19	16	13	8
Electrician A	5	4	3	3	2	1
Electrician B	3	7	8	7	5	8
Electrician C	30	29	30	33	33	30
Electrician Helper					2	3
Equipment Operator A						
Equipment Operator B	1	1	1	1	1	1
Equipment Operator C	6	5	6	7	9	7
Field Helper	3	5	11	9	24	27
Gas Line Inspector B						
Gas Mechanic C						
Laborer						1
Line Mechanic A	37	36	57	40	29	50
Line Mechanic B	41	60	73	101	99	67
Line Mechanic C	84	76	48	60	73	83
Line Mechanic Helper	18	25	26	22	26	30
Line Mechanic-Hot Stick	197	177	183	164	160	151
Maintenance Helper	1	1		3		5

Title	2017	2018	2019	2020	2021	2022
Maintenance Mechanic A	5	8	6	5	8	8
Maintenance Mechanic B	11	9	15	14	7	15
Maintenance Mechanic C	54	50	44	44	47	51
Mechanic A	2	3	7	3	5	1
Mechanic B	3	2	4	4	7	4
Mechanic C	26	22	25	19	18	21
Mechanic Helper	1	4		5		7
One Person Line/Trouble Mechanic	63	62	67	69	68	67
Platform Attendant	5	7	9	1	9	3
Relay Tester A					12	13
Relay Tester B	1	31		33	32	28
Relay Tester C					40	40
Relief Operator K						
Relief Operator M						
Relief Operator P	4	4	3	4	5	6
Safety Advocate	2	1	1	1		
Street Light Service Mechanic Helper						1
Street Light Service Mechanic A	4	1		1	4	3
Street Light Service Mechanic B					1	1
Street Light Service Mechanic C	25	20	23	23	18	16
Technician D						
Tech-Substation Dept.	4	4	5	5	3	4
Tran Line Worker Hot Stick						
Tran Live Line Bare Hand						
Traveling Operator A						
Traveling Operator B	1				2	2
Traveling Operator C	13	13	14	18	12	15
Traveling Operator D	27	26	27	24	22	21
Trouble Mechanic A Hot Stick						
Trouble Mechanic C Hot Stick	5	5	4	5	4	5
Trouble Mechanic D Hot Stick	5	5	5	5	5	5
Distribution Total	1,182	1,186	1,198	1,220	1,261	1,252

Transmission

Title	2017	2018	2019	2020	2021	2022
Chief Electrician B						
Chief Live Line Bare Hand Specialist	6	5	5	5	5	12
Chief Line Mechanic A Hot Stick						
Chief Line Mechanic B Hot Stick						
Electrician A						
Electrician B						
Electrician C						
Equipment Operator C	6					
Equipment Operator D		6	6	6	6	1
Equipment Operator Live Line						11
Line Worker A/3rd Class		5	8	8	8	20
Line Worker B/2nd Class		1	2	2	2	1
Line Worker C/1st Class	2	1				7
Line Worker Hot Stick	12	10	5	5	5	15
Live Line Bare Hand Specialist	22	26	35	35	35	21
Safety Advocate Electric	1	1	1	1	1	1
Transmission Total	49	55	62	62	62	89

Distribution & Transmission Grand Total	1,231	1,241	1,260	1,282	1,323	1,341
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4. CONTRACTOR CREW SERVICES

The following table represents the average monthly contractor head counts utilized by the Company to implement its work plans for distribution and sub-transmission overhead and underground line work during the past six years. It should be noted that contractor head counts are not tracked by reliability vs. non-reliability work.

Distribution & Sub-transmission	2017	2018	2019	2020	2021	2022
Contractor average monthly head count	22	32	60	74	79	88

The following table represents the average monthly contractor head counts utilized by the Company to implement its work plans for transmission. It should be noted that contractor head counts are not tracked by reliability vs. non-reliability work.

Transmission	2017	2018	2019	2020	2021	2022
Contractor average monthly head count	49	47	51	49	86	58

The following table represents the average monthly contractor head counts utilized by the Company to implement its work plans for distribution vegetation management during the past six years. It should be noted that contractor head counts are not tracked by reliability vs. non-reliability work.

Distribution Vegetation Management	2017	2018	2019	2020	2021	2022
Contractor average monthly head count	427	423	534	580	612	610

C. CAPITAL REGION

1. OPERATING REGIONAL PERFORMANCE

a. HISTORIC CAIDI AND SAIFI INDICES

IDS Info:

	2022	2021	2020	2019	2018	2017
CAIDI (Threshold 2.025)	2.00	1.86	1.92	2.28	2.20	2.09
SAIFI (Threshold 1.024)	1.06	0.99	1.07	1.02	0.95	0.92
SAIDI	2.11	1.83	2.05	2.33	2.09	1.91
Interruptions	2,946	3,014	3,347	2,881	3,088	2,547
Customers Interrupted	356,687	331,968	354,996	337,576	311,134	297,590
Customer-Hours Interrupted	712,899	616,176	683,031	769,961	685,218	622,120
Customers Served	337,761	335,992	332,797	331,016	328,413	325,004
Customers Per Interruption	121.08	110.14	106.06	117.17	100.76	116.84
Availability Index	99.9759	99.9791	99.9766	99.9734	99.9762	99.9781
Interruptions/1000 Customers	8.72	8.97	10.06	8.70	9.40	7.84

b. DISCUSSION OF REGIONAL PERFORMANCE

In 2022, the Capital Region met its CAIDI reliability target and did not meet its SAIFI reliability target as set forth by the New York Public Service Commission (PSC). The final System Average Interruption Frequency Index (SAIFI) result was 1.06 interruptions, 4% above the PSC goal of 1.024 interruptions. As shown in the table above, the Customer Average Interruption Duration index (CAIDI) was 2.00 in 2022, 1% below the PSC's regional target of 2.025 hours.

The 2022 CAIDI result was 8% above the 2021 result of 1.86 hours, and 3% below the previous 5-year average of 2.07 hours. The 2022 SAIFI was 7% above the 2021 result of 0.99 interruptions, and 7% above the previous 5-year average of 0.99 interruptions.

In 2022, excluding major storms, the Capital Region experienced 11 transmission interruptions. These interruptions accounted for 0.4% of the region's total interruptions (11 of 2,946), 8% of the region's total customers interrupted (CI), (30,206 of 356,687), and 6% (44,739 of 712,898) of the region's total customer-hours interrupted (CHI). Overall, transmission interruptions had a CAIDI of 1.48 hours, and a SAIFI of 0.09 interruptions.

The number of transmission-related interruptions increased from 3 in 2021 to 11 in 2022 (an increase of 267%). The number of customers interrupted increased from 6,192 in 2021, to 30,206 in 2022 (an increase of 388%), while the customer-hours interrupted increased from 6,999 in 2021, to 44,739 in 2022 (an increase of 539%).

In 2022, excluding major storms, the Capital Region experienced 9 substation interruptions. These interruptions accounted for 0.3% of the region's total interruptions (9 of 2,946), 12% of the region's total customers interrupted, (42,763 of 356,687), and 16% (114,270 of 712,898) of the region's total customer-hours interrupted. Overall, substation interruptions had a CAIDI of 2.67 hours, and a SAIFI of 0.13 interruptions.

The number of substation-related interruptions increased from 8 to 9 from 2021 to 2022 (an increase of 13%). The number of customers interrupted increased from 20,732 in 2021, to 42,763 in 2022 (an increase of 106%), while the customer-hours interrupted increased from 30,115 in 2021, to 114,270 in 2022 (an increase of 279%).

In 2022, excluding major storms, the Capital Region experienced 2,926 distribution interruptions. These interruptions accounted for 99% of the region's total interruptions (2,926 of 2,946), 80% of the region's total customers interrupted, (283,718 of 356,687), and 78% (553,889 of 712,898) of the region's total customer-hours interrupted. Overall, distribution interruptions had a CAIDI of 1.95 hours, and a SAIFI of 0.84 interruptions.

The number of distribution-related interruptions decreased from 3,003 to 2,926 from 2021 to 2022 (a decrease of 3%). The number of customers interrupted decreased from 305,044 in 2021, to 283,718 in 2022 (a decrease of 7%), while the customer-hours interrupted decreased from 579,061 in 2021, to 553,889 in 2022 (a decrease of 4%).

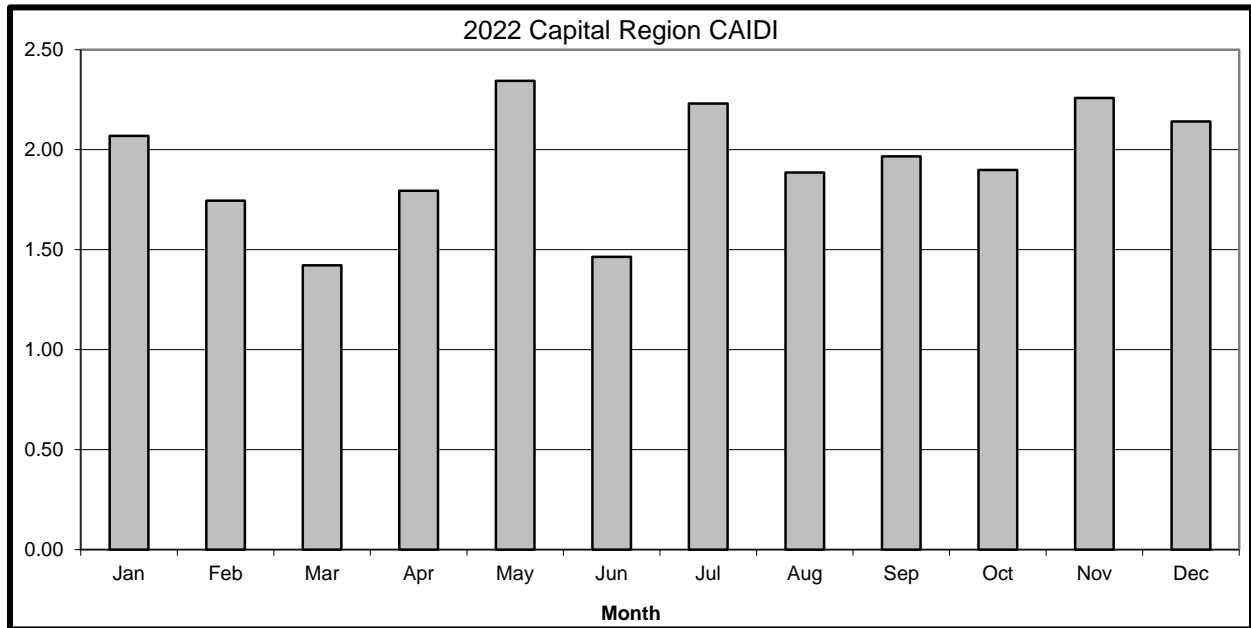
c. MONTHLY CAIDI AND SAIFI GRAPHS

The graphs on the following page show the monthly CAIDI and SAIFI for the Capital Region for 2022 (excluding Major Storms).

The CAIDI graph shows the individual CAIDI, by month, for the Capital Region for 2022. The year-end CAIDI was below the CAIDI threshold of 2.025 hours. The Capital Region ended 2022 with a CAIDI of 2.00, approximately 1% less than the threshold. The three best-performing months were February (1.75), March (1.42), and June (1.46). CAIDI was above the threshold for five months in 2022; January (2.07), May (2.34), July (2.23), November (2.26), and December (2.14).

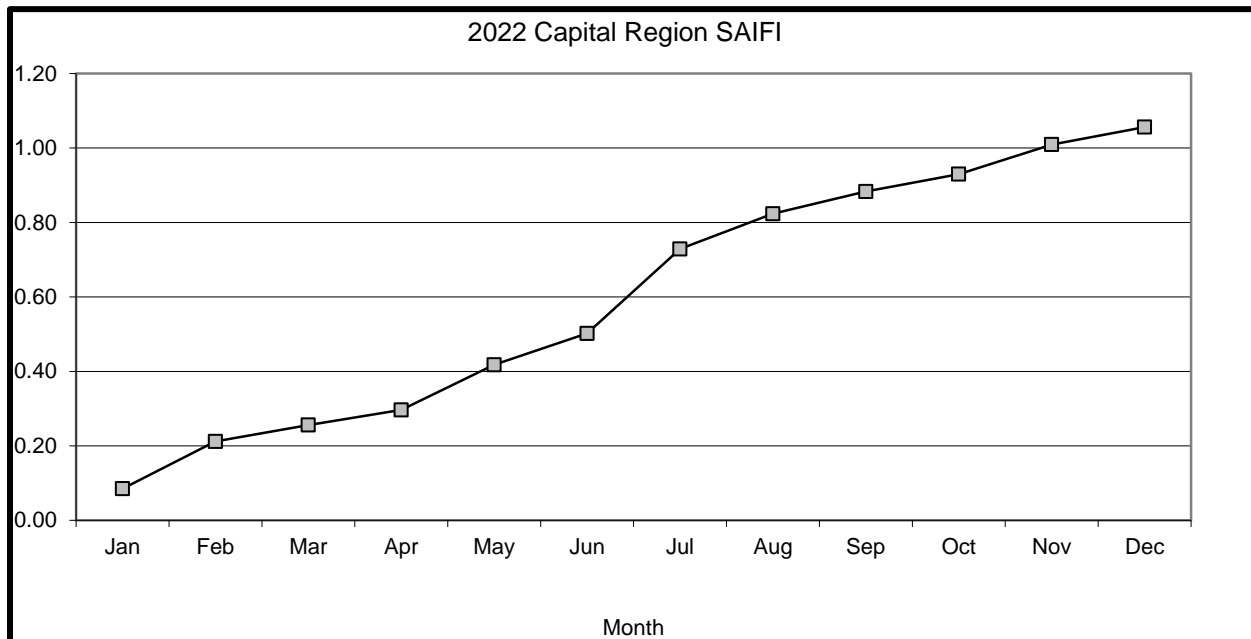
The SAIFI graph shows the cumulative SAIFI, by month, for the Capital Region for 2022. The year-end SAIFI was above the SAIFI threshold of 1.024 for the year. The Capital Region ended 2022 with a SAIFI of 1.06, approximately 1% above the threshold. The greatest increase occurred during the months of February (0.13), May (0.12), and July (0.23). These months accounted for 45% of the total SAIFI accrued. The lowest three months for SAIFI were March (0.05), April (0.04), October (0.05), and December (0.05). These months contributed to only 18% of the total SAIFI.

GRAPH OF MONTHLY CAIDI AND SAIFI FOR THE CAPITAL REGION



PSC CAIDI Goal:	
Threshold	2.025
2022 Actual	2.00

PSC SAIFI Goal:	
Threshold	1.024
2022 Actual	1.06



d. PSC CAUSE CODES

1) Number of Events by Cause – Historical

IDS Info

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	557	587	2,089	1,459	1,433	1,037
02 Tree Contacts	829	914	934	770	791	777
03 Overloads	14	13	33	12	82	3
04 Operator Error	6	8	7	12	9	10
05 Equipment	854	808	886	835	954	781
06 Accidents	502	445	607	487	503	424
07 Prearranged	161	215	131	161	106	115
08 Customer Equip.	-	-	-	-	-	-
09 Lightning	37	66	23	53	65	32
10 Unknown	543	545	726	551	578	405
Total	3,503	3,601	5,436	4,340	4,521	3,584

2) Customers Interrupted by Cause – Historical

IDS Info

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	93,574	97,510	314,863	161,241	130,354	90,215
02 Tree Contacts	117,674	127,913	121,887	119,201	93,234	108,344
03 Overloads	2,287	3,382	3,701	874	4,675	217
04 Operator Error	3,918	1,057	6,433	14,097	775	4,044
05 Equipment	124,395	90,765	117,049	87,827	102,951	97,442
06 Accidents	52,438	50,726	64,581	70,772	68,240	35,246
07 Prearranged	11,016	19,032	9,597	8,814	9,677	9,667
08 Customer Equip.	-	-	-	-	-	-
09 Lightning	10,268	2,133	6,306	17,483	3,437	1,778
10 Unknown	34,691	36,960	25,442	18,508	28,145	40,852
Total	450,261	429,478	669,859	498,817	441,488	387,805

3) Customer-Hours Interrupted by Cause – Historical

IDS Info

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	344,535	327,224	4,969,123	892,262	848,107	555,898
02 Tree Contacts	212,266	260,838	283,408	301,946	238,510	260,581
03 Overloads	1,490	4,120	7,366	736	24,662	402
04 Operator Error	2,864	942	3,718	19,637	396	3,580
05 Equipment	317,987	170,220	231,855	200,229	240,622	198,920
06 Accidents	92,871	86,652	99,616	135,777	108,626	70,835
07 Prearranged	15,067	21,955	6,984	13,040	7,289	9,407
08 Customer Equip.	-	-	-	-	-	-
09 Lightning	13,324	6,748	5,907	57,520	14,599	8,116
10 Unknown	57,030	64,700	44,176	41,074	50,514	70,282
Total	1,057,433	943,399	5,652,152	1,662,220	1,533,325	1,178,019

4) Interruptions, Customers Interrupted, and Customer-Hours Interrupted – 2022

Cause Code	Interruptions		Customers Interrupted		Customer-hours Interrupted	
	Number	% Total	Number	% Total	Number	% Total
01 Major Storms	557	15.9%	93,574	20.8%	344,535	32.6%
02 Tree Contacts	829	23.7%	117,674	26.1%	212,266	20.1%
03 Overloads	14	0.4%	2,287	0.5%	1,490	0.1%
04 Operator Error	6	0.2%	3,918	0.9%	2,864	0.3%
05 Equipment	854	24.4%	124,395	27.6%	317,987	30.1%
06 Accidents	502	14.3%	52,438	11.6%	92,871	8.8%
07 Prearranged	161	4.6%	11,016	2.4%	15,067	1.4%
08 Customer Equip.	0	0.0%	0	0.0%	0	0.0%
09 Lightning	37	1.1%	10,268	2.3%	13,324	1.3%
10 Unknown	543	15.5%	34,691	7.7%	57,030	5.4%
Total	3,503	100.0%	450,261	100.0%	1,057,433	100.0%

e. **INTERRUPTION REVIEW BY PSC CAUSE CODES**

Cause Code 01 - Major Storms

In 2022, Major Storms accounted for 16% of interruptions, 21% of customers interrupted, and 33% of Customer-Hours Interrupted.

Interruptions due to Major Storms were down 5% from 2021, and down 58% over the 5-year average. Customers interrupted due to Major Storms were down 4% from 2021, and down 41% over the 5-year average. Customer-Hours interrupted were up 5% from 2021 and down 77% over the 5-year average.

The remaining PSC code descriptions do not include Major Storms in the percentages.

Cause Code 02 - Tree Contacts

In 2022, Tree Contacts accounted for 28% of interruptions, 33% of customers interrupted, and 30% of Customer-Hours Interrupted.

Interruptions due to Tree Contacts were down 9% from 2021, and down 1% over the 5-year average. Customers interrupted due to Tree Contacts were down 8% from 2021, and up 3% over the 5-year average. Customer-Hours interrupted were down 19% from 2021 and down 21% over the 5-year average.

Tree Contacts were the 2nd largest cause of interruptions in 2022.

Cause Code 03 - Overloads

In 2022, Overloads accounted for 0% of interruptions, 1% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Overloads were up 8% from 2021, and down 52% over the 5-year average. Customers interrupted due to Overloads were down 32% from 2021, and down 11% over the 5-year average. Customer-Hours interrupted were down 64% from 2021 and down 80% over the 5-year average.

Overloads were the 7th largest cause of interruptions in 2022.

Cause Code 04 - Operator Error

In 2022, Operator Error accounted for 0% of interruptions, 1% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Operator Error were down 25% from 2021, and down 33% over the 5-year average. Customers interrupted due to Operator Error were up 271% from 2021, and down 26% over the 5-year average. Customer-Hours interrupted were up 204% from 2021 and down 49% over the 5-year average.

Operator Error was the 8th largest cause of interruptions in 2022.

Cause Code 05 - Equipment Failure

In 2022, Equipment Failures accounted for 29% of interruptions, 35% of customers interrupted, and 45% of Customer-Hours Interrupted.

Interruptions due to Equipment Failure were up 6% from 2021, and up 0% over the 5-year average. Customers interrupted due to Equipment Failure were up 37% from 2021, and up 25% over the 5-year average. Customer-Hours interrupted were up 87% from 2021 and up 53% over the 5-year average.

Equipment Failures were the largest cause of interruptions in 2022.

Cause Code 06 - Accidents

In 2022, Accidents accounted for 17% of interruptions, 15% of customers interrupted, and 13% of Customer-Hours Interrupted.

Interruptions due to Accidents were up 13% from 2021, and up 2% over the 5-year average. Customers interrupted due to Accidents were up 3% from 2021, and down 9% over the 5-year average. Customer-Hours interrupted were up 7% from 2021 and down 7% over the 5-year average.

Accidents were the 4th largest cause of interruptions in 2022.

Cause Code 07 - Prearranged

In 2022, Prearranged accounted for 5% of interruptions, 3% of customers interrupted, and 2% of Customer-Hours Interrupted.

Interruptions due to Prearranged were down 25% from 2021, and up 10% over the 5-year average. Customers interrupted due to Prearranged were down 42% from 2021, and down 3% over the 5-year average. Customer-Hours interrupted were down 31% from 2021 and up 28% over the 5-year average.

Prearranged was the 5th largest cause of interruptions in 2022.

Cause Code 08 - Customer Equipment

There were no Customer Equipment interruptions in 2022.

Cause Code 09 - Lightning

In 2022, Lightning accounted for 1% of interruptions, 3% of customers interrupted, and 2% of Customer-Hours Interrupted.

Interruptions due to Lightning were down 44% from 2021, and down 23% over the 5-year average. Customers interrupted due to Lightning were up 381% from 2021, and up 65% over the 5-year average. Customer-Hours interrupted were up 97% from 2021 and down 28% over the 5-year average.

Lightning was the 6th largest cause of interruptions in 2022.

Cause Code 10 - Unknown

In 2022, Unknown causes accounted for 18% of interruptions, 10% of customers interrupted, and 8% of Customer-Hours Interrupted.

Interruptions due to Unknown causes were down 0% from 2021, and down 3% over the 5-year average. Customers interrupted due to Unknown causes were down 6% from 2021, and up 14% over the 5-year average. Customer-Hours interrupted were down 12% from 2021 and up 4% over the 5-year average.

Unknown causes were the 3rd largest cause of interruptions in 2022.

f. **DISCUSSION OF REGIONAL CAPEX PROJECTS WITH 2021/22 SPENDS:**

The Company continues to work on capital projects in the Capital Region to maintain customer satisfaction and future reliability. Engineering works with Field Operations to address localized concerns raised through PSC complaints and other customer inquiries in the Capital Region. These solutions were varied and included fusing, installing cutout-mounted reclosers, adding tree wire, small rebuilds and conversions, adding animal guards, and tree trimming.

Some specific projects that were either constructed in CY2022 or are scheduled to be designed and/or constructed in CY2023 are listed below.

Bethlehem Area Conversions and Transfers

The southern Bethlehem area has seen a large growth in residential developments that is driving the need for load relief. All load transfers, the split of the 02155 into two separate feeders with all related station work budgeted for 2022 has been completed with additional load transfers and ratio installations budgeted for 2023 and beyond.

A capital improvement project was created to transfer load to the new 02157 distribution feeder from Delmar and Elsmere to pick up these substations load to construct new Elsmere Substation and demo Delmar substation.

A separate capital improvement project was created to transfer load to the Unionville 27652 which will pick up Delmar load in this Bethlehem/Delmar area.

Bethlehem 02155 will pick up Quail Hollow allowing the Quail Hollow substation to be retired under a capital improvement project and conversion of the existing Quail Hollow 4.8 kV which will also create a tie with the Selkirk 14952 that is capable of picking up more of the Selkirk 14952 load in N-1 conditions.

Chrisler Ave Station Project

The Chrisler Avenue Substation Project will serve the Schenectady, NY area by increasing the capacity and improving the reliability of electrical service to our customers within the city of Schenectady and the town of Rotterdam. The primary driver for this project is to resolve the asset condition issues on major station equipment within the Chrisler Avenue and Emmet Street substations. The plan involves rebuilding Chrisler Avenue from 34.5/4.16 kV to 34.5/13.2 kV, with a 12/16/20 MVA power transformer and four distribution feeders through a 5-bay metal-clad switchgear to serve the distribution needs of the surrounding community and allow for the retirement of the Emmet Street substation. This project converts a 4.16 kV island to 13.2 kV creating more operational flexibility during contingency conditions. Construction of the substation is scheduled for completion in April of 2023.

While the construction upgrades of the Chrisler Avenue substation are nearing completion, much work remains before the Chrisler Avenue 25751, 25752,

25753, and 25754 distribution feeders are in their final configuration at 13.2 kV. Ultimately, the Chrisler Avenue 25751 will continue north on Chrisler Avenue to Norwood Avenue where it will absorb load currently served by the Emmet Street 25605 and 25609 feeders, converting a majority of the mainline to 13.2 kV. The Chrisler Avenue 25752 will head west down Catalyn Street to Crane Street where it will pick up all load previously served by the Chrisler Avenue 25737 at 4.16 kV. The Chrisler Avenue 25753 will head east on Altamont Avenue where it will absorb load currently served by the Watt Street 23051 and McClellan 30452 distribution feeders. Finally, the Chrisler Avenue 25754 will head south on Altamont Avenue where it will absorb load from the Curry Road 36557 and 36553 distribution feeders. Construction on the distribution portion of the Chrisler Avenue substation project began in October 2022 and is expected to be completed in June 2024.

Delaware Avenue Getaway and Conversion

The Delaware Avenue getaway work has been completed and the McCarty Avenue conversion work is complete. Delaware Avenue conversion work scheduled for 2022 was completed. The spare 13.2 kV breaker in the Delaware Avenue substation is in service and pushed into the Delaware Avenue 33033 feeder with this feeder converted to 13.2 kV in 2022. Further conversions on the 33052 are scheduled in 2023 and ties between 16456 and 16452 are being created in 2023 that will be used for further transfers to Delaware Station in 2025.

Elnora Future R550 Breaker and Feeder Getaway

The 34.5/4.8 kV, Shore Road distribution substation currently serves portions of the Ballston Spa/Charlton, NY area. The Shore Road substation has been identified as a substation in need of reconstruction or retirement based on its most recent asset condition report and the determination has been made that Shore Road substation shall be retired. As part of this retirement, 2 of the 3 distribution feeders are in the process of being transferred to the recently completed Lasher Road substation via feeders 322152 and 322153. The remaining Shore Road 28186 will be transferred to a new distribution feeder that will be served via the Elnora substation.

As part of this project, a new 13.2 kV feeder breaker and distribution getaway will be constructed out of Elnora Substation. The existing distribution on Ballston Lake Road will be rebuilt for double circuit construction for the 44256 and future 44255 feeder. The future 44255 feeder will continue west along Ballston Lake Road and absorb a portion of the 44256 feeder via Ashdown Road and Waite Road. The existing single-phase 4.8 kV section of the Shore Road 28186 along Ballston Lake Road north to Schaubert Road will be rebuilt and converted to three-phase 13.2 kV. The newly built Elnora 44255 feeder will then absorb the remaining load at Shore Road Substation. Construction for the Elnora 44255 breaker R550, the feeder getaway, and the first phase of the overhead construction is scheduled for 2024, the second phase of the overhead construction of the Elnora 44255 is scheduled for 2025 which will allow for the retirement of the Shore Road substation.

Lasher Road Station Project

The Lasher Road Substation Project will serve the growing Ballston, NY area by increasing the capacity and improving the reliability of electrical service to our customers in the Towns of Ballston and Glenville. The primary driver for this project is to relieve exposure to post-contingency thermal overloading of the Luther Forest-Eastover Road #308, 115 kV line with the planned Global Foundries expansion, however the project includes a 115/13.2 kV, 15/20/25 MVA power transformer with four feeders through a seven-bay metal-clad to serve the distribution needs of surrounding community and help allow for the retirement of the Shore Road substation. Construction of the substation was completed in March of 2020.

Construction of the distribution to be attached to the Lasher Road substation began in 2019 with the distribution work closest to the substation. The first of the new feeders, the Lasher Road 322151, began serving load previously served from the Randall Road 46356 feeder in June of 2020. By September 2020, the Lasher Road 322152 feeder began serving load previously served by the Ballston 01252. In December of 2020, the Lasher 332153 feeder absorbed all the remaining load on the Randall Road substation previously served by the Randall Road 46357 feeder, allowing for the future retirement of the Randall Road substation.

While the construction of the Lasher Road 332151 feeder is complete, much work remains before the Lasher Road 322152 and 322153 feeders are completed. Ultimately, the Lasher Road 322152 will continue south on State Highway 50 from Middle Line Road to Lake Hill Road where it will absorb load currently served by the Shore Road 28185 and 28187 feeders. Meanwhile, the Lasher Road 322153 feeder is being constructed down Hop City and Scotch Bush Roads from Randall Road to Lake Hill Road where it will absorb the rest of the load currently served from the Shore Road 28185 and 28187 feeders. Construction of this work is underway and is expected to be completed in FY2025.

Corliss Park Station Project

The Corliss Park Substation Project will serve the growing Troy, NY area by increasing the capacity and improving the reliability of electrical service in the area. Troy has seen significant load growth in the area over the past few years which has led the Corliss Park and North Troy substation transformers to begin nearing their normal loading limits.

This project will upgrade the Corliss Park substation transformer and reallocate load from the North Troy 12354 feeder to a new Corliss Park feeder. Additionally, all Corliss Park feeders and portions of the North Troy 12354 feeder, presently operating at 4.16 kV, will be converted to 13.2 kV. This will create much needed 13.2 kV ties, allowing for shorter outage durations and increased reliability. This project will also create additional feeder ties with the 5 kV Lansingburgh feeders and resolve repeated low voltage concerns for the entire area of 115th Street and 2nd Avenue.

Liberty Street Station Project

The Liberty Street Substation Project will serve the growing Troy, NY area by increasing the capacity and improving the reliability of electrical service in the area. The Liberty Street TB1 substation transformer currently has oil leaks and is nearing its end of life.

This project will upgrade the Liberty Street TB1 substation transformer and reallocate load from the Tibbits Avenue 28252, Tibbits Avenue 28255, and Reynolds Road 33457 feeders to two new Liberty Street feeders. Additionally, all Liberty Street overhead feeders and Tibbits Avenue feeders, presently operating at 4.16 kV, will be converted to 13.2 kV. This project will also resolve loading issues for the entire area of South Troy that has seen significant load growth in the area. This project will create much needed 13.2 kV ties, allowing for shorter outage durations and increased reliability.

Williams Street Conversion Project – Valkin 42753

The Williams Street Conversion Project will serve the growing area of Hudson, NY by converting over a mile of overhead to 13.2 kV distribution. The Village of Kinderhook was originally an island of 4.8 kV infrastructure. This resulted in limited feeder ties in the area. The Williams Street conversion is the second of three phases to eliminate this 4.8 kV island.

In the second phase to convert the Village of Kinderhook to 13.2 kV distribution Williams Street will be converted in its entirety. A half mile section of Chatham Street and a quarter mile section of Railroad Avenue will also be converted in this project. Once this phase is complete this section of overhead will be fed from the south via Hudson Street. This section being fed from the south is temporary until phase three (Kinderhook Street Conversion) is complete. At this time, it will once again be fed from the north.

Kinderhook Street Conversion Project – Valkin 42753

The Kinderhook Street Conversion Project will serve the growing area of Hudson, NY by converting over a mile of overhead to 13.2 kV distribution. This is the third phase of the plan to eliminate the 4.8 kV island in the Village of Kinderhook. The scope of this project will also include the removal of a 2,500 kVA pad-mounted ratio transformer. This transformer is located off Kinderhook Street. An internal 13.2 kV tie will be created to improve reliability of the feeder.

This project is the third and final stage to make the Village of Kinderhook 13.2 kV. Once this project is complete there will no longer be an island of 4.8 kV. In the second phase (Williams Street Conversion) a switch on Chatham Street was opened. During this phase that switch will be closed and the switch at the intersection of Williams Street and Hudson Street will be opened. This will be the internal 13.2 kV tie. This tie can be utilized to manually isolate and restore power from an alternate direction during sustained outages.

Capital Region Capital Projects in Excess of \$1M Completed in 2022:

Region	Project Name	Project Type	Fin Sys Project No.	Finish	Total Spend
Capital	Menands 10151/ 52 Relocations	D Line	C049998	12/1/2022	\$2,851,474
Capital	EHI Segment A Wolf Road - Menands Line 10 Reconductor	T Line	C084708	2/25/2022	\$4,418,000
Capital	North Troy - Hoosick #5 CCR	T Line	C048678	2/15/2022	\$11,941,000
Capital	EHI Segment B Substations- Hudson Upgrades	T Line	C084710	6/26/2022	\$3,354,000
Capital	EHI Segment A Substations - Reynolds Road Upgrades - BKR R4	T Line	C084709	4/15/2022	\$32,464,000
Capital	EHI Segment B Substations- Valkin Upgrades	D Line	C085574	3/5/2022	\$8,249,000
Capital	EHI Segment B Substations - Buckley Corners	D Line	C085574	5/20/2022	\$8,249,000
Capital	Commerce Ave Sta XFMR D/F - C088755	D Line	C088755	7/29/2022	\$2,198,100
Capital	EHI Segment B Substations- Blue Stores Upgrades	D Line	C085574	12/22/2022	\$8,249,000
Capital	Pawling Ave Conv (29252/37253)	D Line	C050103	1/28/2022	\$1,188,328
Capital	Burdeck 26552 - Burnett St Conversion	D Line	C046632	1/10/2022	\$2,298,000
Capital	Lasher Road - 53 Feeder	D Line	C068348	12/16/2022	\$8,154,000
Capital	Pin#1085.40 Route 146 (Carman Rd) G	D Line	C083010	8/31/2022	\$1,061,955
Capital	Elnora 56 - Kingsbury Rd	D Line	C084209	3/16/2022	\$1,400,664
Capital	Delaware 33035 Conversion	D Line	C081895	3/31/2022	\$2,659,000
Capital	Weatherfield URD Cable Replacement Phase 2	D Line	C084344	12/1/2021	\$1,036,432
Capital	Weatherfield URD Replace Phase 3	D Line	C086828	6/30/2022	\$1,439,511
Capital	Albany Steam - 115kv Asset Replacement	T Line	C079461	12/16/2022	\$4,993,000
Capital	Patroon Station 323 - DSCADA (Replace CPU & Dual Port RTU & Dual Port 2nd RTU)	T Line	C081809	12/01/2022	\$2,190,000
Capital	Rosa Road Station 137 - DSCADA (Replace CPU & Dual Port RTU)	T Line	C081809	12/01/2022	\$2,190,000
Capital	Schodack Station 451 - DSCADA (Full RTU Upgrade) (Eng Fy22, Const Fy23)	D Line	C077972	6/10/2022	\$2,344,000
Capital	New Krumkill Sta 421 DSCADA (Dual Port)	D Line	C077972	12/16/2022	\$2,344,000
Capital	Rotterdam Microwave Tower	T Line	C069570	10/31/2022	\$1,191,000
Capital	Greenbush TB8 DF	T Line	C091139	11/28/2022	\$1,920,000
Capital	Riverside Station Replace TB4 DF	D Line	C091468	12/30/2022	\$2,450,000

g. DISCUSSION OF REGIONAL PERFORMANCE OF LOW VOLTAGE AC (LVAC) NETWORK DISTRIBUTION SYSTEM(S)

Albany Secondary LVAC Network

The Albany secondary network serves the downtown area of Albany, NY and is supplied by 10 – 13.2 kV feeders that originate from the Riverside and Trinity Substations. This system serves approximately 3,055 customer accounts and experienced a peak load of approximately 25.1 MVA in 2022.

The table below lists each distribution circuit serving the Albany secondary Network with the number of events that caused an operation of the Substation Breaker.

Substation	Feeder	# Breaker Operations from Faults / Failures
Riverside	28801	0
Riverside	28802	0
Riverside	28805	1
Trinity	16406	0
Riverside	28807	0
Trinity	16408	0
Trinity	16410	0
Riverside	28811	0
Riverside	28812	1
Riverside	28815	0

As shown above the Albany Secondary Network experienced a total of 2 unplanned distribution circuit outages in 2021.

Major equipment replacements in 2022 consisted of 2 network transformers and 2 network protectors. Annual maintenance consisted of manhole and vault inspections, network protector and transformer inspections, and network protector operation checks.

Troy Secondary LVAC Network

The Troy Secondary Network serves the downtown area bounded by River Street, Congress Street, and Union Street. This network is supplied by 6 – 4.16 kV and 2 – 13.2 kV feeders that originate from the Liberty Street Substation. This system serves approximately 1,480 customer accounts and experienced a peak load of approximately 8.2 MVA in 2022.

The table below lists each distribution circuit serving the Troy Secondary Network with the number of events that caused an operation of the Substation Breaker.

Substation	Feeder	# Breaker Operations from Faults / Failures
Liberty	09425	0
Liberty	09427	0
Liberty	09431	0
Liberty	09432	0
Liberty	09442	0
Liberty	09444	0
Liberty	09451	0
Liberty	09411	0

As shown above, the Troy Secondary Network experienced a total of 0 unplanned distribution circuit outages in 2022.

Major equipment replacements in 2022 consisted of 2 network transformers and 2 network protectors. Annual maintenance consisted of manhole and vault inspections, network protector and transformer inspections, and network protector operation checks.

Schenectady Secondary LVAC Network

The Schenectady Secondary Network serves the downtown area around State Street from Nott Terrace to Washington Avenue, Erie Boulevard from State Street to River Road, and Broadway to Smith Street. This network is supplied by 5 – 13.2 kV feeders that originate from the Front Street Substation. This system serves approximately 1,200 customer accounts and experienced a peak load of approximately 9.9 MVA in 2022.

The table below lists each distribution circuit serving the Schenectady Secondary Network with the number of events that caused an operation of the Substation Breaker.

Substation	Feeder	# Breaker Operations from Faults / Failures
Front	36002	0
Front	36003	0
Front	36006	0
Front	36007	0
Front	36008	0

As shown above the Schenectady Secondary Network experienced no unplanned distribution circuit outages in 2022.

Major equipment replacements in 2022 consisted of 1 network transformer and 1 network protector. Annual maintenance consisted of manhole and vault inspections, network protector and transformer inspections, and network protector operation checks.

2. OPERATING CIRCUIT LISTS

The next three (3) tables will provide the following information for the Capital Region.

- a. Worst Performing Circuit List
- b. Worst Performing Circuits with 3 Year History for CAIDI and SAIFI Indices
- c. Worst Performing Circuits by # of Momentary Interruptions

a. NATIONAL GRID WORST PERFORMING CIRCUIT LIST

CAPITAL REGION

FEEDER #	A CUST. SERVED	B TOTAL INTER.	C # CUST. INTER.	D CUST. HRS. INTER.	C/A SAIFI	D/A SAIDI	D/C CAIDI	NUMBER OF MOMENTARIES
HUDSON 08753	2,106	27	7,677	15,804	3.65	7.50	2.06	1
ALTAMONT 28355	2,182	27	13,846	13,235	6.35	6.07	0.96	1
GREENBUSH 07856	1,628	22	4,420	32,997	2.71	20.27	7.47	6
GREENBUSH 07852	2,333	27	6,180	17,158	2.65	7.35	2.78	0
PINEBUSH 37152	1,402	21	4,973	11,558	3.55	8.24	2.32	2
HOOSICK 31452	1,543	26	3,389	14,688	2.20	9.52	4.33	1
BLUE STORES 30351	2,185	36	5,005	12,301	2.29	5.63	2.46	1
HEMSTREET 32851	1,884	37	4,806	9,125	2.55	4.84	1.90	0
BOYNTONVILLE 33351	2,127	44	5,363	9,858	2.52	4.63	1.84	0
MENANDS 10153	1,673	24	9,305	7,457	5.56	4.46	0.80	0
SCHODACK 45152	1,125	28	3,063	6,442	2.72	5.73	2.10	1
HUDSON 08751	1,747	30	5,106	7,665	2.92	4.39	1.50	0
STUYVESANT 03551	638	16	2,759	5,997	4.32	9.40	2.17	2
HOOSICK 31451	1,752	30	4,579	7,460	2.61	4.26	1.63	0
RENSSELAER 13256	2,504	33	5,062	11,360	2.02	4.54	2.24	2
BURDECK ST 26551	684	14	2,041	7,468	2.98	10.92	3.66	1
ELNORA 44258	1,762	24	3,563	8,205	2.02	4.66	2.30	5
PROSPECT HILL 41351	1,493	13	4,270	9,665	2.86	6.47	2.26	0
GREENBUSH 07854	1,123	13	3,969	6,432	3.53	5.73	1.62	5
BLUE STORES 30353	1,423	34	2,892	5,528	2.03	3.88	1.91	9

Regional Goals:
CAIDI: 2.025
SAIFI: 1.024

b. NATIONAL GRID WORST PERFORMING CIRCUITS WITH 3 YEAR HISTORY FOR CAIDI AND SAIFI INDICES

CAPITAL REGION

FEEDER #	2022 CAIDI	2021 CAIDI	2020 CAIDI	2019 CAIDI	2022 SAIFI	2021 SAIFI	2020 SAIFI	2019 SAIFI
HUDSON 08753	2.06	1.75	1.21	0.76	3.65	2.07	2.06	1.08
ALTAMONT 28355	0.96	1.97	1.35	1.79	6.35	2.12	0.80	2.32
GREENBUSH 07856	7.47	2.17	2.10	3.81	2.71	0.18	0.46	0.08
GREENBUSH 07852	2.78	2.53	2.11	3.35	2.65	0.66	1.69	0.79
PINEBUSH 37152	2.32	2.23	2.95	2.19	3.55	2.50	0.44	0.24
HOOSICK 31452	4.33	1.93	3.29	2.53	2.20	1.27	0.29	0.60
BLUE STORES 30351	2.46	2.91	2.79	3.15	2.29	1.16	2.51	1.94
HEMSTREET 32851	1.90	1.62	2.57	2.44	2.55	2.48	1.58	1.39
BOYNTONVILLE 33351	1.84	2.58	2.17	4.50	2.52	2.42	2.79	1.50
MENANDS 10153	0.80	2.19	1.14	1.53	5.56	0.69	1.03	1.28
SCHODACK 45152	2.10	3.94	4.42	2.29	2.72	0.72	0.98	1.03
HUDSON 08751	1.50	0.81	1.81	1.57	2.92	2.50	1.35	2.59
STUYVESANT 03551	2.17	1.32	0.57	3.79	4.32	3.76	1.14	2.55
HOOSICK 31451	1.63	2.07	4.02	3.88	2.61	0.72	0.51	0.15
RENSSELAER 13256	2.24	1.62	2.01	6.63	2.02	0.35	0.87	0.28
BURDECK ST 26551	3.66	1.05	1.69	1.52	2.98	2.11	0.24	1.51
ELNORA 44258	2.30	1.30	0.98	2.88	2.02	2.30	4.05	1.12
PROSPECT HILL 41351	2.26	1.88	5.88	3.18	2.86	0.67	0.20	0.18
GREENBUSH 07854	1.62	3.55	1.75	4.46	3.53	0.07	1.18	0.68
BLUE STORES 30353	1.91	2.75	3.06	3.42	2.03	2.88	1.48	1.08

Regional Goals:
 CAIDI 2.025
 SAIFI 1.024

c. NATIONAL GRID WORST PERFORMING CIRCUITS BY # OF MOMENTARY INTERRUPTIONS

CAPITAL REGION

Feeders			Customer Momentaries				Ranks		
Volts (kV)	Station Name	Ckt/F No.	Substation	Transmission	Distribution	Total	Within Region	Within System	Reliability Ranking
No circuits experienced 10 or more momentary interruptions in 2022.									

d. WORST PERFORMING CIRCUIT ANALYSIS

This year, the Capital Region's list of Worst Feeders consists of twenty 13.2 kV feeders.

For the Capital Region the CAIDI performance threshold is 2.025 and SAIFI performance threshold is 1.024.

1. HUDSON 08753 – 13.2 kV

Profile: 2,106 Customers, 49.8 Circuit Miles

Indices: CAIDI = 2.06, SAIFI = 3.65

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	11	40.74%	3,392	44.18%	8,343	52.79%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	5	18.52%	4,217	54.93%	7,329	46.37%
6	ACCIDENTS	3	11.11%	13	0.17%	28	0.18%
7	PREARRANGED	1	3.70%	7	0.09%	6	0.04%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	3.70%	3	0.04%	15	0.09%
10	UNKNOWN	6	22.22%	45	0.59%	83	0.53%
Totals		27	100.00%	7,677	100.00%	15,804	100.00%

Problem Analysis:

- There were 27 interruptions on the Hudson 08753 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on January 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 28% of the total customers interrupted (2,113 of 7,677), and 33% of the total customer-hours interrupted (5,198 of 15,804). During this outage work was in progress to implement the 345/115 kV double circuit single tower line between Greenbush and Churchtown. At the time of the outage, the loop from Pleasant Valley was in an abnormal configuration. Additionally, the line 12 relays were being repaired at Hudson as part of the Energy Highway project. As a result, Hudson was radial fed from Pleasant Valley off the 13 line. The outage was caused by a clamp failure on the bottom phase conductor between Tower 177 and Tower 178 at the Hudson tap.
- There were no substation interruptions.
- The remaining 26 events occurred at the distribution level.
- The distribution circuit breaker for the Hudson 08753 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Hudson 08753 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 55% of the total amount of customers interrupted (4,202 out of 7,677) and 51% of the total amount of the customer-hours interrupted (8,119 out of 15,804).
 - This lockout occurred on August 30, 2022, when a tree fell (PSC cause code 02). Switch 16039 at pole 165 was opened. This lockout accounted for 27% of the total

- customers interrupted (2,101 of 7,677) and 38% of the total customer-hours interrupted (5,992 of 15,804).
 - This lockout occurred on October 27, 2022, when a device failed (PSC cause code 05). The B phase on the lightning arrester at pole 9-1 on Dock Street went phase to phase. This lockout accounted for 27% of the total customers interrupted (2,101 of 7,677) and 13% of the total customer-hours interrupted (2,127 of 15,804).
- The Hudson 53 experienced 2 sustained three-phase recloser operations in 2022. These interruptions accounted for 14% of the total amount of customers interrupted (1,093 of 7,677) and 11% of the total amount of the customer-hours interrupted (1,818 of 15,804)
 - The first lockout occurred on July 25, 2022, when a tree (PSC cause code 02) took down primary between pole 179 and pole 180 Mt. Marino. This lockout accounted for 8% of the total customers interrupted (629 of 7,677), and 6% of the total customer-hours interrupted (987 of 15,804).
 - The second lockout occurred on September 26, 2022, when a tree (PSC cause code 02) took down primary at pole 10 County HWY 14. This lockout accounted for 6% of the total customers interrupted (464 of 7,677), and 5% of the total customer-hours interrupted (831 of 15,804).
- The single transmission outage, combined with 2 circuit breaker lockouts, and combined with the 2 three-phase recloser lockouts, accounted for 96% of the total customers interrupted (7,408 of 7,677), and 96% of the total customer-hours interrupted (15,135 of 15,804).
- Trees were the leading cause of interruptions on the Hudson 08753 in 2022, accounting for 41% of total interruptions (11 of 27). Unknown were the 2nd leading cause of interruptions, accounting for 22% of total interruptions (6 of 27). Equipment Failures were the 3rd leading cause of interruptions, accounting for 19% of total interruptions (5 of 27).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Hudson 08753 in 2022, accounting for 55% of total customers interrupted (4,217 of 7,677). Trees were the 2nd leading cause of customers interrupted, accounting for 44% of total customers interrupted (3,392 of 7,677). Unknown were the 3rd leading cause of customers interrupted, accounting for 1% of total customers interrupted (45 of 7,677).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Hudson 08753 in 2022, accounting for 53% of total customer-hours interrupted (8,343 of 15,804). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 46% of total customer-hours interrupted (7,329 of 15,804). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 1% of total customer-hours interrupted (83 of 15,804).
- Of the 27 interruptions on this circuit, 16 affected 10 customers or less, with 6 being single customer outages.

Actions Taken:

- There are 2 three-phase reclosers and 1 single phase reclosers on the Hudson 08753. These reclosers have assisted with minimizing customers interrupted and customer hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Hudson 08753 in 2020.
- Tree trimming and a hazard tree review was completed on the Hudson 08753 in 2023.

Action Plan:

- Complete all identified level 1, 2, and 3 maintenance.
- A capital improvement project is scheduled to improve reliability via a new loadbreak disconnect with a shunt fuse on the Hudson 08753.
- A capital improvement project is scheduled to improve both reliability and protection coordination by installing a three-phase recloser on the Hudson 08753.
- A capital improvement project is scheduled to improve reliability via a new cutout-mounted recloser on the Hudson 08753.
- A capital improvement project is scheduled to improve reliability by converting Michael Court to relieve an overloaded ratio on the Hudson 08753.
- A capital improvement project is scheduled to improve fusing coordination on the Hudson 08753.
- A capital improvement project is scheduled to improve reliability by installing new switches on the Hudson 08753 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.

2. ALTAMONT 28355 – 13.2 kV

Profile: 2,182 Customers, 58.6 Circuit Miles

Indices: CAIDI = 0.96, SAIFI = 6.35

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	Total	Number	% Total	Number	% Total
2	TREE	13	48.15%	12,320	88.98%	11,148	84.23%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	7	25.93%	171	1.24%	694	5.24%
6	ACCIDENTS	2	7.41%	6	0.04%	34	0.26%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	5	18.52%	1,349	9.74%	1,359	10.27%
Totals		27	100.00%	13,846	100.00%	13,235	100.00%

Problem Analysis:

- There were 27 interruptions on the Altamont 28355 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 27 events occurred at the distribution level.
- The distribution circuit breaker for the Altamont 28355 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Altamont 28355 experienced 3 sustained operations (lockouts) in 2022. These interruptions accounted for 63% of the total amount of customers interrupted (8,790 out of 13,846) and 54% of the total amount of the customer-hours interrupted (7,206 out of 13,235).
 - The first lockout occurred on August 24, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 31% of the total customers interrupted (4,348 of 13,846), and 27% of the total customer-hours interrupted (3,593 of 13,235).
 - The second lockout occurred on November 12, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 16% of the total customers interrupted (2,267 of 13,846), and 8% of the total customer-hours interrupted (1,055 of 13,235).
 - The third lockout occurred on August 17, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 16% of the total customers interrupted (2,175 of 13,846), and 19% of the total customer-hours interrupted (2,557 of 13,235).

- Trees were the leading cause of interruptions on the Altamont 28355 in 2022, accounting for 48% of total interruptions (13 of 27). Equipment Failures were the 2nd leading cause of interruptions, accounting for 26% of total interruptions (7 of 27). Unknown were the 3rd leading cause of interruptions, accounting for 19% of total interruptions (5 of 27).
- Trees were the leading cause of customers interrupted (CI) on the Altamont 28355 in 2022, accounting for 89% of total customers interrupted (12,320 of 13,846). Unknown were the 2nd leading cause of customers interrupted, accounting for 10% of total customers interrupted (1,349 of 13,846). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 1% of total customers interrupted (171 of 13,846).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Altamont 28355 in 2022, accounting for 84% of total customer-hours interrupted (11,148 of 13,235). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 10% of total customer-hours interrupted (1,359 of 13,235). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (694 of 13,235).
- Of the 27 interruptions on this circuit, 14 affected 14 customers or less, with 6 being single customer outages.

Actions Taken:

- There are six 3-phase reclosers on the Altamont 28355. These reclosers have proven to be beneficial to the reliability of the feeder since one of the mainline interruptions were isolated by a recloser instead of affecting the entire feeder. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Altamont 28355 in 2018 and all identified level 1, 2 and 3 maintenance have been completed.
- Emerald Ash Bore tree removal and an Enhanced Hazard Tree Mitigation review was completed on the Altamont 28355 in FY21.

Action Plan:

- Engineering completed a Protection review of the Altamont 28355 and one three-phase recloser will be added in 2023. This will reduce customers interrupted and customer-hours interrupted in the future.
- Engineering reviewed if the addition of cutout mounted single-phase reclosers will assist in minimizing customers interrupted and customer-hours interrupted, and two locations were identified for installation in 2023.

3. GREENBUSH 07856 – 13.2 kV

Profile: 1,628 Customers, 15.63 Circuit Miles

Indices: CAIDI = 7.47, SAIFI = 2.71

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	2	9.09%	123	2.78%	868	2.63%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	11	50.00%	2,484	56.20%	29,929	90.70%
6	ACCIDENTS	3	13.64%	131	2.96%	209	0.63%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	6	27.27%	1,682	38.05%	1,990	6.03%
Totals		22	100.00%	4,420	100.00%	32,997	100.00%

Problem Analysis:

- There were 22 interruptions on the Greenbush 07856 in 2022.
- There were no transmission interruptions.
- There were 2 substation interruptions.
 - The first Substation interruption occurred on July 17, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 37% of the total customers interrupted (1,627 of 4,420), and 53% of the total customer-hours interrupted (17,544 of 32,997). This outage was failure of a PT on the 15 line at Greenbush Substation with lockout of the 77G and 99G bus interrupting all 07856 customers.
 - The second Substation interruption occurred on July 19, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 37% of the total customers interrupted (1,627 of 4,420), and 6% of the total customer-hours interrupted (1,871 of 32,997). This failure was when all load was placed on TB8 due to the previous failure on the 17th still having TB7 out of service when TB8 faulted internally. TB8 was not loaded beyond its ratings. TB8 transformer was tested and found to be un-repairable and replaced immediate with a spare.
- The remaining 20 events occurred at the distribution level.
- The distribution circuit breaker for the Greenbush 07856 experienced 6 momentary operations in 2022.
- The distribution circuit breaker for the Greenbush 07856 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 10% of the total amount of customers interrupted (463 out of 4,420) and 30% of the total amount of the customer-hours interrupted (10,002 out of 32,997).

- This lockout occurred on November 28, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 10% of the total customers interrupted (463 of 4,420), and 30% of the total customer-hours interrupted (10,002 of 32,997). This was failure of the original ratio on the 28th and the second failure of the replacement ratio after commissioning occurring on the 29th.
- Equipment Failures were the leading cause of interruptions on the Greenbush 07856 in 2022, accounting for 50% of total interruptions (11 of 22). Unknown were the 2nd leading cause of interruptions, accounting for 27% of total interruptions (6 of 22). Accidents were the 3rd leading cause of interruptions, accounting for 14% of total interruptions (3 of 22).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Greenbush 07856 in 2022, accounting for 56% of total customers interrupted (2,484 of 4,420). Unknown were the 2nd leading cause of customers interrupted, accounting for 38% of total customers interrupted (1,682 of 4,420). Accidents were the 3rd leading cause of customers interrupted, accounting for 3% of total customers interrupted (131 of 4,420).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Greenbush 07856 in 2022, accounting for 91% of total customer-hours interrupted (29,929 of 32,997). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 6% of total customer-hours interrupted (1,990 of 32,997). Trees were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (868 of 32,997).
- Of the 22 interruptions on this circuit, 11 affected 10 customers or less, with 6 being single customer outages.

Actions Taken:

- The failed 115 kV PT was replaced with an available spare.
- The failed TB8 transformer was replaced with an available spare.
- A maintenance foot patrol was completed on the Greenbush 07856 in 2021 and all identified level 1 and 2 maintenance have been completed.
- There is one three-phase recloser on the Greenbush 07856. This recloser has assisted with minimizing customers interrupted and customer-hours interrupted since it was installed.
- Tree trimming and a hazard tree review, was completed on the Greenbush 07856 in FY22.

Action Plan:

- Complete all identified level 3 maintenance.
- A capital improvement project C092251 was budgeted for design and build in CY26 to convert over a mile of existing three-phase 4.8 kV distribution to three-phase 13.2 kV on Phillips Road on the Greenbush 07856 to remove the ratio that failed twice.
- Engineering to review the settings for the three-phase recloser to ensure proper device coordination and update if warranted.
- Engineering to review if the addition of cutout mounted single-phase reclosers will assist in minimizing customers interrupted and customer-hours interrupted and install if warranted.

4. GREENBUSH 07852 – 13.2 kV

Profile: 2,333 Customers, 24.27 Circuit Miles

Indices: CAIDI = 2.78, SAIFI = 2.65

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	3	11.11%	58	0.94%	213	1.24%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	11	40.74%	3,277	53.03%	11,885	69.27%
6	ACCIDENTS	4	14.81%	167	2.70%	404	2.35%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	9	33.33%	2,678	43.33%	4,656	27.14%
Totals		27	100.00%	6,180	100.00%	17,158	100.00%

Problem Analysis:

- There were 27 interruptions on the Greenbush 07852 in 2022.
- There were no transmission interruptions.
- There were 2 substation interruptions.
 - The first Substation interruption occurred on July 17, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 38% of the total customers interrupted (2,329 of 6,180), and 47% of the total customer-hours interrupted (8,003 of 17,158). This outage was failure of a PT on the 15 line at Greenbush Substation with lockout of the 77G and 99G bus interrupting all 07856 customers.
 - The second Substation interruption occurred on July 19, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 38% of the total customers interrupted (2,328 of 6,180), and 20% of the total customer-hours interrupted (3,453 of 17,158). This failure occurred when all load was placed on TB8 due to the previous failure on the 17th still having TB7 out of service when TB8 faulted internally. TB8 was not loaded beyond its ratings. TB8 transformer was tested and found to be un-repairable and replaced immediate with a spare.
- The remaining 25 events occurred at the distribution level.
- The distribution circuit breaker for the Greenbush 07852 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Greenbush 07852 experienced 0 sustained operations (lockouts) in 2022.

- Equipment Failures were the leading cause of interruptions on the Greenbush 07852 in 2022, accounting for 41% of total interruptions (11 of 27). Unknown were the 2nd leading cause of interruptions, accounting for 33% of total interruptions (9 of 27). Accidents were the 3rd leading cause of interruptions, accounting for 15% of total interruptions (4 of 27).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Greenbush 07852 in 2022, accounting for 53% of total customers interrupted (3,277 of 6,180). Unknown were the 2nd leading cause of customers interrupted, accounting for 43% of total customers interrupted (2,678 of 6,180). Accidents were the 3rd leading cause of customers interrupted, accounting for 3% of total customers interrupted (167 of 6,180).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Greenbush 07852 in 2022, accounting for 69% of total customer-hours interrupted (11,885 of 17,158). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 27% of total customer-hours interrupted (4,656 of 17,158). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 2% of total customer-hours interrupted (404 of 17,158).
- Of the 27 interruptions on this circuit, 13 affected 14 customers or less, with 4 being single customer outages.

Actions Taken:

- The failed 115 kV PT was replaced with an available spare.
- The failed TB8 transformer was replaced with an available spare.
- There are three three-phase recloser on the Greenbush 07852. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Greenbush 07852 in 2021 and all identified level 1 and 2 maintenance have been completed.
- Tree trimming and a hazard tree review, was completed on the Greenbush 07852 in FY22.

Action Plan:

- Complete all identified level 3 maintenance.
- Engineering to review the settings for the three-phase reclosers to ensure proper device coordination and update if warranted.
- Engineering to review if the addition of cutout mounted single-phase reclosers will assist in minimizing customers interrupted and customer-hours interrupted and install if warranted.

5. PINEBUSH 37152 – 13.2 kV

*Profile: 1,402 Customers, 12.22 Circuit Miles
Indices: CAIDI = 2.32, SAIFI = 3.55*

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	8	38.10%	2,658	53.45%	5,797	50.16%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	38.10%	2,096	42.15%	5,589	48.35%
6	ACCIDENTS	1	4.76%	13	0.26%	11	0.09%
7	PREARRANGED	3	14.29%	84	1.69%	79	0.69%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	1	4.76%	122	2.45%	82	0.71%
Totals		21	100.00%	4,973	100.00%	11,558	100.00%

Problem Analysis:

- There were 21 interruptions on the Pinebush 37152 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 21 events occurred at the distribution level.
- The distribution circuit breaker for the Pinebush 37152 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Pinebush 37152 experienced 3 sustained operations (lockouts) in 2022. These interruptions accounted for 79% of the total amount of customers interrupted (3,905 out of 4,973) and 61% of the total amount of the customer-hours interrupted (7,022 out of 11,558).
 - The first lockout occurred on January 18, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 28% of the total customers interrupted (1,403 of 4,973), and 29% of the total customer-hours interrupted (3,364 of 11,558).
 - The second lockout occurred on February 18, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 22% of the total customers interrupted (1,100 of 4,973), and 16% of the total customer-hours interrupted (1,818 of 11,558).
 - The third lockout occurred on November 27, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 28% of the total customers interrupted (1,402 of 4,973), and 16% of the total customer-hours interrupted (1,841 of 11,558).

- Trees were the leading cause of interruptions on the Pinebush 37152 in 2022, accounting for 38% of total interruptions (8 of 21). Equipment Failures were the 2nd leading cause of interruptions, accounting for 38% of total interruptions (8 of 21). Prearranged were the 3rd leading cause of interruptions, accounting for 14% of total interruptions (3 of 21).
- Trees were the leading cause of customers interrupted (CI) on the Pinebush 37152 in 2022, accounting for 53% of total customers interrupted (2,658 of 4,973). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 42% of total customers interrupted (2,096 of 4,973). Unknown were the 3rd leading cause of customers interrupted, accounting for 2% of total customers interrupted (122 of 4,973).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Pinebush 37152 in 2022, accounting for 50% of total customer-hours interrupted (5,797 of 11,558). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 48% of total customer-hours interrupted (5,589 of 11,558). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 1% of total customer-hours interrupted (82 of 11,558).
- Of the 21 interruptions on this circuit, 8 affected 14 customers or less, with 1 being single customer outage.

Actions Taken:

- A maintenance foot patrol was completed on the Pinebush 37152 in 2021 and all identified level 1 and 2 maintenance on the Pinebush 37152 has been completed.
- Engineering has reviewed all voltage settings for all Pinebush feeders.

Action Plan:

- Complete all identified Level 3 maintenance on the Pinebush 37152.
- Install a new midline recloser on Western Avenue.
- Engineering to review if the addition of three three-phase reclosers will assist in minimizing customers interrupted and customer-hours interrupted and install if warranted.
- Engineering to review if the addition of cutout mounted single-phase reclosers will assist in minimizing customers interrupted and customer-hours interrupted and install if warranted.
- Tree Trimming and a hazard tree review is scheduled on the Pinebush 37152 is scheduled for FY24.

6. HOOSICK 31452 – 13.2 kV

Profile: 1,543 Customers, 57.5 Circuit Miles

Indices: CAIDI = 4.33, SAIFI = 2.20

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	38.46%	1,719	50.72%	816	5.56%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	30.77%	1,588	46.86%	13,736	93.52%
6	ACCIDENTS	3	11.54%	15	0.44%	15	0.10%
7	PREARRANGED	1	3.85%	7	0.21%	4	0.03%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	4	15.38%	60	1.77%	117	0.80%
Totals		26	100.00%	3,389	100.00%	14,688	100.00%

Problem Analysis:

- There were 26 interruptions on the Hoosick 31452 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on June 17, 2022, when a tree (PSC cause code 02) took down 115 kV primary between pole 202 and pole 203 on the Hoosick - Bennington #6 line. This lockout accounted for 45% of the total customers interrupted (1,541 of 3,389) and 1% of the total customer-hours interrupted (180 of 14,688).
- There were no substation interruptions.
- The remaining 25 events occurred at the distribution level.
- The distribution circuit breaker for the Hoosick 31452 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Hoosick 31452 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 46% of the total amount of customers interrupted (1,545 out of 3,389) and 93% of the total amount of the customer-hours interrupted (13,594 out of 14,688).
 - This lockout occurred on February 18, 2022, when a riser switch failed (PSC cause code 05) on pole 1 on Parsons Avenue. This lockout accounted for 46% of the total customers interrupted (1,545 of 3,389) and 93% of the total customer-hours interrupted (13,594 of 14,688).
- The single circuit breaker lockout, combined with the single transmission interruption, accounted for 91% of the total customers interrupted (3,086 of 3,389) and 94% of the total customer-hours interrupted (13,774 of 14,688).

- Trees were the leading cause of interruptions on the Hoosick 31452 in 2022, accounting for 38% of total interruptions (10 of 26). Equipment Failures were the 2nd leading cause of interruptions, accounting for 31% of total interruptions (8 of 26). Unknown were the 3rd leading cause of interruptions, accounting for 15% of total interruptions (4 of 26).
- Trees were the leading cause of customers interrupted (CI) on the Hoosick 31452 in 2022, accounting for 51% of total customers interrupted (1,719 of 3,389). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 47% of total customers interrupted (1,588 of 3,389). Unknown were the 3rd leading cause of customers interrupted, accounting for 2% of total customers interrupted (60 of 3,389).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Hoosick 31452 in 2022, accounting for 94% of total customer-hours interrupted (13,736 of 14,688). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 6% of total customer-hours interrupted (816 of 14,688). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 1% of total customer-hours interrupted (117 of 14,688).
- Of the 26 interruptions on this circuit, 14 affected 10 customers or less, with 10 being single customer outages.

Actions Taken:

- There are 2 three-phase reclosers on the Hoosick 31452. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Hoosick 31452 in 2018 and all identified level 1, 2, and 3 maintenance has been completed.
- Tree trimming and a hazard tree review was completed on the Hoosick 31452 in 2021.
- A capital improvement project was completed to install a recloser on White Creek Road which will assist in decreasing customer counts in the event of a sustained outage as well as prevent sustained outages that, otherwise, would have been momentary in nature.

Action Plan:

- Tree trimming and a hazard tree review are scheduled to be performed on the Hoosick 31452 in 2027.
- A capital improvement project is scheduled to remove an overloaded, 2,500 kVA, step-down ratio transformer on High Street and convert over 2.5 miles of 5 kV delta to 15 kV. This project will bring a significant portion of the Hoosick 31452 up to current standards as well as create multiple 15 kV feeder ties which will allow a neighboring feeder to energize the Hoosick 31452 in the event of a sustained outage. This project will also mitigate the potential for low voltage concerns, especially during peak loading timeframes.
- A capital improvement project is scheduled to convert approximately 0.50 miles of 5 kV delta to 15 kV on County Highway 68. This project also calls for the installation of a cutout-mounted recloser which will prevent sustained outages that, otherwise, would have been momentary in nature.
- A capital improvement project is scheduled to improve fusing coordination on the Hoosick 31452 which will assist in decreasing customer counts in the event of a sustained outage.
- A capital improvement project is scheduled to install one or more cutout-mounted reclosers on the Hoosick 31452 which will prevent sustained outages that, otherwise, would have been momentary in nature.
- A capital improvement project is scheduled to install one or more switches on the Hoosick 31452 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.

7. BLUE STORES 30351 – 13.2 kV

Profile: 2,185 Customers, 114.3 Circuit Miles

Indices: CAIDI = 2.46, SAIFI = 2.29

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	12	33.33%	3,445	68.83%	9,105	74.02%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	10	27.78%	103	2.06%	590	4.79%
6	ACCIDENTS	2	5.56%	53	1.06%	102	0.83%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	2.78%	2	0.04%	4	0.03%
10	UNKNOWN	11	30.56%	1,402	28.01%	2,500	20.33%
Totals		36	100.00%	5,005	100.00%	12,301	100.00%

Problem Analysis:

- There were 36 interruptions on the Blue Stores 30351 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 36 events occurred at the distribution level.
- The distribution circuit breaker for the Blue Stores 30351 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Blue Stores 30351 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 44% of the total amount of customers interrupted (2,190 out of 5,005) and 47% of the total amount of the customer-hours interrupted (5,751 out of 12,301).
 - This lockout occurred on May 28, 2022, when a tree (PSC cause code 02) was on primary at pole 24 on County Route 8. Switch at pole 7 was opened to isolate and make a partial restoration. This lockout accounted for 44% of the total customers interrupted (2,190 of 5,005) and 47% of the total customer-hours interrupted (5,751 of 12,301).
- The Blue Stores 30351 experienced 3 sustained three-phase recloser operations in 2022. These interruptions accounted for 39% of the total amount of customers interrupted (1,974 of 5,005) and 29% of the total amount of the customer-hours interrupted (3,627 of 12,301).
 - The first lockout occurred on May 16, 2022, when there was a limb (PSC cause code 02) on primary at pole 57 on County HWY 19. This lockout accounted for 17% of the total customers interrupted (834 of 5,005), and 12% of the total customer-hours interrupted (1,428 of 12,301).

- The second lockout occurred on July 12, 2022, due to an unknown cause (PSC cause code 10). Line crews patrolled and no cause was found. This lockout accounted for 11% of the total customers interrupted (569 of 5,005), and 13% of the total customer-hours interrupted (1,566 of 12,301).
- The third lockout occurred on August 26, 2022, due to an unknown cause (PSC cause code 10). A non-reclosed assurance (NRA) was in place at the time of the lockout. This lockout accounted for 11% of the total customers interrupted (571 of 5,005), and 5% of the total customer-hours interrupted (633 of 12,301).
- The single circuit breaker lockout combined with the 3 three-phase recloser lockouts, accounted for 83% of the total customers interrupted (4,164 of 5,005), and 76% of the total customer-hours interrupted (9,378 of 12,301).
- Trees were the leading cause of interruptions on the Blue Stores 30351 in 2022, accounting for 33% of total interruptions (12 of 36). Unknown were the 2nd leading cause of interruptions, accounting for 31% of total interruptions (11 of 36). Equipment Failures were the 3rd leading cause of interruptions, accounting for 28% of total interruptions (10 of 36).
- Trees were the leading cause of customers interrupted (CI) on the Blue Stores 30351 in 2022, accounting for 69% of total customers interrupted (3,445 of 5,005). Unknown were the 2nd leading cause of customers interrupted, accounting for 28% of total customers interrupted (1,402 of 5,005). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 2% of total customers interrupted (103 of 5,005).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Blue Stores 30351 in 2022, accounting for 74% of total customer-hours interrupted (9,105 of 12,301). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 20% of total customer-hours interrupted (2,500 of 12,301). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (590 of 12,301).
- Of the 36 interruptions on this circuit, 16 affected 10 customers or less, with 11 being single customer outages.

Actions Taken:

- There are 3 three-phase reclosers on the Blue Stores 30351. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Blue Stores 30351 in 2022.
- Tree trimming and a hazard tree review was completed on the Blue Stores 30351 in 2022.
- A capital improvement project to install a cutout-mounted recloser on Buckwheat Bridge Road was completed on the Blue Stores 30351.
- A capital improvement project to relocate rear lot overhead line to the road on Sopak Road was completed on the Blue Stores 30351.
- A capital improvement project to transfer part of US HWY 9 from the Blue Stores 30351 to the Blue Stores 30354 was completed.

Action Plan:

- Complete all identified level 1, 2, and 3 maintenance.

- A capital improvement project is scheduled to improve both reliability and protection coordination by installing a three-phase recloser on the Blue Stores 30351.
- A capital improvement project is scheduled to improve fusing coordination on the Blue Stores 30351.
- A capital improvement project is scheduled to improve reliability and protection coordination by installing cutout-mounted reclosers on the Blue Stores 30351.
- A capital improvement project is scheduled to improve reliability by installing new switches on the Blue Stores 30351 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.

8. HEMSTREET 32851 – 13.2 kV

Profile: 1,884 Customers, 123.6 Circuit Miles

Indices: CAIDI = 1.90, SAIFI = 2.55

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	12	32.43%	1,890	39.33%	3,023	33.12%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	9	24.32%	573	11.92%	1,424	15.61%
6	ACCIDENTS	8	21.62%	329	6.85%	669	7.33%
7	PREARRANGED	3	8.11%	6	0.12%	20	0.21%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	2.70%	1,883	39.18%	3,782	41.44%
10	UNKNOWN	4	10.81%	125	2.60%	208	2.28%
Totals		37	100.00%	4,806	100.00%	9,125	100.00%

Problem Analysis:

- There were 37 interruptions on the Hemstreet 32851 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 37 events occurred at the distribution level.
- The distribution circuit breaker for the Hemstreet 32851 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Hemstreet 32851 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 39% of the total amount of customers interrupted (1,883 out of 4,806) and 41% of the total amount of the customer-hours interrupted (3,782 out of 9,125).
 - This lockout occurred on July 25, 2022, when lightning (PSC cause code 09) took down primary near pole 37 on Stillwater Road. This lockout accounted for 39% of the total customers interrupted (1,883 of 4,806) and 41% of the total customer-hours interrupted (3,782 of 9,125).
- The Hemstreet 32851 experienced 4 sustained three-phase recloser operations in 2022. These interruptions accounted for 33% of the total amount of customers interrupted (1,593 of 4,806) and 25% of the total amount of the customer-hours interrupted (2,261 of 9,125).
 - The first lockout occurred on February 14, 2022, when a tree (PSC cause code 02) took down primary near pole 13 on Pleasant Street. This lockout accounted for 5% of the total customers interrupted (244 of 4,806) and 3% of the total customer-hours interrupted (241 of 9,125).

- The second lockout occurred on April 7, 2022, when a tree (PSC cause code 02) broke pole 24 downstream of recloser R20465, subsequently breaking the crossarms on poles 21, 22, and 23. This lockout accounted for 6% of the total customers interrupted (265 of 4,806) and 5% of the total customer-hours interrupted (458 of 9,125).
- The third lockout occurred on July 21, 2022, when a tree (PSC cause code 02) took down primary between pole 109 and pole 110 on State Highway 67. This lockout accounted for 5% of the total customers interrupted (254 of 4,806) and 5% of the total customer-hours interrupted (464 of 9,125).
- The fourth lockout occurred on November 7, 2022, when a tree limb (PSC cause code 02) landed across multiple phases of primary near pole 25 on Master Street. This lockout accounted for 17% of the total customers interrupted (830 of 4,806) and 12% of the total customer-hours interrupted (1,098 of 9,125).
- The single circuit breaker lockout, combined with the 4 three-phase recloser lockouts, accounted for 72% of the total customers interrupted (3,476 of 4,806) and 66% of the total customer-hours interrupted (6,043 of 9,125).
- Trees were the leading cause of interruptions on the Hemstreet 32851 in 2022, accounting for 32% of total interruptions (12 of 37). Equipment Failures were the 2nd leading cause of interruptions, accounting for 24% of total interruptions (9 of 37). Accidents were the 3rd leading cause of interruptions, accounting for 22% of total interruptions (8 of 37).
- Trees were the leading cause of customers interrupted (CI) on the Hemstreet 32851 in 2022, accounting for 39% of total customers interrupted (1,890 of 4,806). Lightning was the 2nd leading cause of customers interrupted, accounting for 39% of total customers interrupted (1,883 of 4,806). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 12% of total customers interrupted (573 of 4,806).
- Lightning was the leading cause of customer-hours interrupted (CHI) on the Hemstreet 32851 in 2022, accounting for 41% of total customer-hours interrupted (3,782 of 9,125). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 33% of total customer-hours interrupted (3,023 of 9,125). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 16% of total customer-hours interrupted (1,424 of 9,125).
- Of the 37 interruptions on this circuit, 19 affected 10 customers or less, with 7 being single customer outages.

Actions Taken:

- There are 7 three-phase reclosers on the Hemstreet 32851. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Hemstreet 32851 in 2020 and all identified level 1 and 2 maintenance has been completed.
- A capital improvement project was completed to install a cutout-mounted recloser on Verbeck Avenue which will prevent sustained outages that, otherwise, would have been momentary in nature.
- A capital improvement project was completed to install a regulator on Beadle Hill Road to mitigate the potential for low voltage during peak loading timeframes.
- A capital improvement project was completed to improve fuse coordination on the entirety of the Hemstreet 32851 which will assist in decreasing customer counts in the event of a sustained outage.

Action Plan:

- Complete all identified level 3 maintenance on the Hemstreet 32851.
- Tree trimming and a hazard tree review are scheduled to be performed on the Hemstreet 32851 in 2023.
- A capital improvement project is scheduled to remove approximately 0.80 miles of 5 kV delta, rear lot distribution, part of which crosses the Hoosic River. New 15 kV distribution will be constructed along the road which will allow easier access by crews, thereby significantly reducing outage times in the event of a sustained outage.
- A capital improvement project is scheduled to install a recloser on Master Street which will assist in decreasing customer counts in the event of a sustained outage as well as prevent sustained outages that, otherwise, would have been momentary in nature.
- A capital improvement project is scheduled to install one or more cutout-mounted reclosers on the Hemstreet 32851 which will prevent sustained outages that, otherwise, would have been momentary in nature.
- A capital improvement project is scheduled to install one or more switches on the Hemstreet 32851 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.

9. BOYNTONVILLE 33351 – 13.2 kV

*Profile: 2,127 Customers, 153.5 Circuit Miles
Indices: CAIDI = 1.84, SAIFI = 2.52*

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	26	59.09%	5,021	93.62%	9,069	91.99%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	7	15.91%	211	3.93%	434	4.40%
6	ACCIDENTS	9	20.45%	126	2.35%	339	3.44%
7	PREARRANGED	1	2.27%	4	0.07%	8	0.08%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	1	2.27%	1	0.02%	8	0.08%
Totals		44	100.00%	5,363	100.00%	9,858	100.00%

Problem Analysis:

- There were 44 interruptions on the Boyntonville 33351 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on June 17, 2022, when a tree (PSC cause code 02) fell between pole 202 and pole 203 on the Hoosick - Bennington #6 line. This lockout accounted for 40% of the total customers interrupted (2,121 of 5,363) and 3% of the total customer-hours interrupted (247 of 9,858).
- There were no substation interruptions.
- The remaining 43 events occurred at the distribution level.
- The distribution circuit breaker for the Boyntonville 33351 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Boyntonville 33351 experienced 0 sustained operations (lockouts) in 2022.
- The Boyntonville 33351 experienced 6 sustained three-phase recloser operations in 2022. These interruptions accounted for 45% of the total amount of customers interrupted (2,426 of 5,363) and 62% of the total amount of the customer-hours interrupted (6,146 of 9,858).
 - The first lockout occurred on January 17, 2022, when a tree (PSC cause code 02) fell on primary near pole 24 downstream of recloser R4446. This lockout accounted for 7% of the total customers interrupted (397 of 5,363) and 18% of the total customer-hours interrupted (1,765 of 9,858).
 - The second lockout occurred on February 3, 2022, when a tree limb (PSC cause code 02) fell on primary near pole 34 downstream of recloser R4446. This lockout

- accounted for 7% of the total customers interrupted (394 of 5,363) and 13% of the total customer-hours interrupted (1,325 of 9,858).
- The third lockout occurred on May 17, 2022, when a tree limb (PSC cause code 02) fell on primary near pole 242 downstream of recloser R20582. This lockout accounted for 8% of the total customers interrupted (440 of 5,363) and 6% of the total customer-hours interrupted (589 of 9,858).
- The fourth lockout occurred on July 28, 2022, when a tree (PSC cause code 02) took down primary near pole 38 downstream of recloser R4446. This lockout accounted for 7% of the total customers interrupted (396 of 5,363) and 17% of the total customer-hours interrupted (1,702 of 9,858).
- The fifth lockout occurred on August 23, 2022, when primary was found off its insulator (PSC cause code 05) near pole 11 downstream of recloser R16007. This lockout accounted for 4% of the total customers interrupted (198 of 5,363) and 4% of the total customer-hours interrupted (369 of 9,858).
- The sixth lockout occurred on October 12, 2022, when a tree (PSC cause code 02) fell on primary downstream of recloser R20572. This lockout accounted for 11% of the total customers interrupted (601 of 5,363), and 4% of the total customer-hours interrupted (397 of 9,858).
- The single transmission interruption, combined with the 6 three-phase recloser lockouts, accounted for 85% of the total customers interrupted (4,547 of 5,363) and 65% of the total customer-hours interrupted (6,394 of 9,858).
- Trees were the leading cause of interruptions on the Boyntonville 33351 in 2022, accounting for 59% of total interruptions (26 of 44). Accidents were the 2nd leading cause of interruptions, accounting for 20% of total interruptions (9 of 44). Equipment Failures were the 3rd leading cause of interruptions, accounting for 16% of total interruptions (7 of 44).
- Trees were the leading cause of customers interrupted (CI) on the Boyntonville 33351 in 2022, accounting for 94% of total customers interrupted (5,021 of 5,363). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 4% of total customers interrupted (211 of 5,363). Accidents were the 3rd leading cause of customers interrupted, accounting for 2% of total customers interrupted (126 of 5,363).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Boyntonville 33351 in 2022, accounting for 92% of total customer-hours interrupted (9,069 of 9,858). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 4% of total customer-hours interrupted (434 of 9,858). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (339 of 9,858).
- Of the 44 interruptions on this circuit, 32 affected 10 customers or less, with 17 being single customer outages.

Actions Taken:

- There are 5 three-phase reclosers on the Boyntonville 33351. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Boyntonville 33351 in 2021 and all identified level 1 and 2 maintenance has been completed.
- Tree trimming and a hazard tree review was completed on the Boyntonville 33351 in 2020.

- A capital improvement project was completed to improve fuse coordination on the entirety of the Boyntonville 33351 which will assist in decreasing customer counts in the event of a sustained outage.
- Strategic switching was performed to decrease customer counts in the event of a sustained recloser operation.

Action Plan:

- Complete all identified level 3 maintenance on the Boyntonville 33351.
- Tree trimming and a hazard tree review are scheduled to be performed on the Boyntonville 33351 in 2026.
- A capital improvement project is scheduled to relocate an existing recloser upstream to decrease the exposure of the circuit breaker, thereby decreasing customer counts in the event of a sustained outage.
- A capital improvement project is scheduled to install a recloser on NY-7 which will assist in decreasing customer counts in the event of a sustained outage as well as prevent sustained outages that, otherwise, would have been momentary in nature.
- A capital improvement project is scheduled to install one or more cutout-mounted reclosers on the Boyntonville 33351 which will prevent sustained outages that, otherwise, would have been momentary in nature.
- A capital improvement project is scheduled to install one or more switches on the Boyntonville 33351 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.
- A capital improvement project is scheduled to install one or more fault indicators on the Boyntonville 33351 which will assist crews in locating the source of a fault in the event of a sustained outage, thereby decreasing outage times.

10. MENANDS 10153 – 13.2 kV

Profile: 1,673 Customers, 15.06 Circuit Miles

Indices: CAIDI = 0.80, SAIFI = 5.56

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	41.67%	765	8.22%	1,171	15.71%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	7	29.17%	8,412	90.40%	5,718	76.67%
6	ACCIDENTS	3	12.50%	20	0.21%	46	0.62%
7	PREARRANGED	1	4.17%	4	0.04%	3	0.05%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	4.17%	47	0.51%	374	5.02%
10	UNKNOWN	2	8.33%	57	0.61%	145	1.94%
Totals		24	100.00%	9,305	100.00%	7,457	100.00%

Problem Analysis:

- There were 24 interruptions on the Menands 10153 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 24 events occurred at the distribution level.
- The distribution circuit breaker for the Menands 10153 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Menands 10153 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 89% of the total amount of customers interrupted (8,306 out of 9,305) and 74% of the total amount of the customer-hours interrupted (5,482 out of 7,457).
 - This lockout occurred on July 30, 2022, coded as a cause of deterioration (PSC cause code 05). This lockout accounted for 89% of the total customers interrupted (8,306 of 9,305), and 74% of the total customer-hours interrupted (5,482 of 7,457). Initial work was a broken insulator on the Menands 10153 being worked on dead with Menands 10153 feeder tied to Maplewood 30751 during the repair. Then the Maplewood 51 breaker operated, this removed all Menands 10153 customers from service. Maplewood and Menands customers were returned to service in controlled steps to avoid overloads.
- Trees were the leading cause of interruptions on the Menands 10153 in 2022, accounting for 42% of total interruptions (10 of 24). Equipment Failures were the 2nd leading cause of interruptions, accounting for 29% of total interruptions (7 of 24). Accidents were the 3rd leading cause of interruptions, accounting for 13% of total interruptions (3 of 24).

- Equipment Failures were the leading cause of customers interrupted (CI) on the Menands 10153 in 2022, accounting for 90% of total customers interrupted (8,412 of 9,305). Trees were the 2nd leading cause of customers interrupted, accounting for 8% of total customers interrupted (765 of 9,305). Unknown were the 3rd leading cause of customers interrupted, accounting for 1% of total customers interrupted (57 of 9,305).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Menands 10153 in 2022, accounting for 77% of total customer-hours interrupted (5,718 of 7,457). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 16% of total customer-hours interrupted (1,171 of 7,457). Lightning was the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (374 of 7,457).
- Of the 24 interruptions on this circuit, 16 affected 10 customers or less, with 4 being single customer outages.

Actions Taken:

- There are 2 three-phase reclosers on the Menands 10153. These reclosers have proven to be beneficial to the reliability of the feeder. One of the mainline interruptions were isolated by a recloser instead of affecting the entire feeder. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A small capital improvement project was completed in 2022 for off cycle tree removal and fuse coordination.
- A maintenance foot patrol was completed on the Menands 10153 in 2020 and all identified level 1 and 2 maintenance has been completed.
- Tree trimming and a hazard tree review, was completed on the Menands 10153 in FY22.

Action Plan:

- Complete all identified level 3 maintenance on the Menands 10153.
- Engineering to review if the addition of 3 three-phase reclosers will assist in minimizing customers interrupted and customer-hours interrupted; to install if warranted.
- Engineering to review if the addition of cutout-mounted reclosers will assist in minimizing customers interrupted and customer-hours interrupted; to install if warranted.

11. SCHODACK 45152 – 13.2 kV

Profile: 1,125 Customers, 30.71 Circuit Miles

Indices: CAIDI = 2.10, SAIFI = 2.72

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	7	25.00%	1,332	43.49%	2,718	42.19%
3	OVERLOADS	1	3.57%	1	0.03%	1	0.01%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	3	10.71%	6	0.20%	73	1.13%
6	ACCIDENTS	6	21.43%	92	3.00%	150	2.32%
7	PREARRANGED	1	3.57%	50	1.63%	66	1.02%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	7.14%	93	3.04%	245	3.81%
10	UNKNOWN	8	28.57%	1,489	48.61%	3,189	49.51%
Totals		28	100.00%	3,063	100.00%	6,442	100.00%

Problem Analysis:

- There were 28 interruptions on the Schodack 45152 in 2022.
- There were no transmission interruptions.
- There was 1 substation interruption.
 - This Substation interruption occurred on July 19, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 37% of the total customers interrupted (1,126 of 3,063), and 37% of the total customer-hours interrupted (2,383 of 6,442). This failure was when all load was placed on TB8 due to the previous failure on the 17th still having TB7 out of service when TB8 faulted internally. TB8 was not loaded beyond its ratings. TB8 transformer was tested and found to be un-repairable and replaced immediate with a spare. Schodack feeders could not take all Greenbush loading and were required to be de-energized to avoid thermal overload.
- The remaining 27 events occurred at the distribution level.
- The distribution circuit breaker for the Schodack 45152 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Schodack 45152 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 37% of the total amount of customers interrupted (1,126 out of 3,063) and 28% of the total amount of the customer-hours interrupted (1,812 out of 6,442).
 - This lockout occurred on July 28, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 37% of the total customers interrupted (1,126 of 3,063), and 28% of the total customer-hours interrupted (1,812 of 6,442). Tree outage was isolated with switching bringing back majority of customers.

- Unknown were the leading cause of interruptions on the Schodack 45152 in 2022, accounting for 29% of total interruptions (8 of 28). Trees were the 2nd leading cause of interruptions, accounting for 25% of total interruptions (7 of 28). Accidents were the 3rd leading cause of interruptions, accounting for 21% of total interruptions (6 of 28).
- Unknown were the leading cause of customers interrupted (CI) on the Schodack 45152 in 2022, accounting for 49% of total customers interrupted (1,489 of 3,063). Trees were the 2nd leading cause of customers interrupted, accounting for 43% of total customers interrupted (1,332 of 3,063). Lightning was the 3rd leading cause of customers interrupted, accounting for 3% of total customers interrupted (93 of 3,063).
- Unknown were the leading cause of customer-hours interrupted (CHI) on the Schodack 45152 in 2022, accounting for 50% of total customer-hours interrupted (3,189 of 6,442). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 42% of total customer-hours interrupted (2,718 of 6,442). Lightning was the 3rd leading cause of customer-hours interrupted, accounting for 4% of total customer-hours interrupted (245 of 6,442).
- Of the 28 interruptions on this circuit, 14 affected 13 customers or less, with 4 being single customer outages.

Actions Taken:

- A maintenance foot patrol was completed on the Schodack 45152 in 2022 and all identified level 1 maintenance has been completed.
- Tree trimming and a hazard tree review was completed on the Schodack 45152 in FY21.

Action Plan:

- Complete all identified level 2 maintenance on the Schodack 45152.
- Engineering to review if the addition of 3 three-phase reclosers will assist in minimizing customers interrupted and customer-hours interrupted; to install if warranted.
- Engineering to review if the addition of cutout-mounted reclosers will assist in minimizing customers interrupted and customer-hours interrupted; to install if warranted.

12. HUDSON 08751 – 13.2 kV

Profile: 1,747 Customers, 54.3 Circuit Miles

Indices: CAIDI = 1.50, SAIFI = 2.92

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	13	43.33%	2,002	39.21%	2,843	37.09%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	26.67%	1,978	38.74%	3,715	48.47%
6	ACCIDENTS	2	6.67%	89	1.74%	449	5.86%
7	PREARRANGED	1	3.33%	11	0.22%	14	0.18%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	6	20.00%	1,026	20.09%	644	8.41%
Totals		30	100.00%	5,106	100.00%	7,665	100.00%

Problem Analysis:

- There were 30 interruptions on the Hudson 08751 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on January 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 34% of the total customers interrupted (1,739 of 5,106), and 43% of the total customer-hours interrupted (3,260 of 7,665). This outage was due to work being done to implement the 345/115 kV double circuit single tower line between Greenbush and Churchtown. Also, during this outage the loop from Pleasant Valley was in an abnormal configuration. Additionally, the line 12 relays were being repaired at Hudson as part of the Energy Highway project. As a result, Hudson was radial fed from Pleasant Valley off the 13 line. The outage was caused by a clamp failure on the bottom phase conductor between Tower 177 and Tower 178 at the Hudson tap.
- There were no substation interruptions.
- The remaining 29 events occurred at the distribution level.
- The distribution circuit breaker for the Hudson 08751 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Hudson 08751 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 48% of the total amount of customers interrupted (2,472 out of 5,106) and 34% of the total amount of the customer-hours interrupted (2,589 out of 7,665).
 - This lockout occurred on April 16, 2022, when a tree (PSC cause code 02) took primary down at pole 87 on State HWY 23B. The station breaker was opened to isolate the outage. This lockout accounted for 34% of the total customers

- interrupted (1,740 of 5,106), and 30% of the total customer-hours interrupted (2,286 of 7,665).
- This lockout occurred on May 17, 2022, due to an unknown cause (PSC cause code 10). The non-reclosed assurance (NRA) was on the breaker. The line crews patrolled and did not find any issues. Once the patrol was completed the breaker was closed back in and it held. This lockout accounted for 14% of the total customers interrupted (732 of 5,106), and 4% of the total customer-hours interrupted (303 of 7,665).
 - The Hudson 08751 experienced 2 sustained three-phase recloser operations in 2022. These interruptions accounted for 7% of the total amount of customers interrupted (365 of 5,106) and 4% of the total amount of the customer-hours interrupted (329 of 7,665).
 - The first lockout occurred on March 19, 2022, due to an unknown cause (PSC cause code 10). The line crews patrolled and did not find any issues. The recloser was then closed via EMS. This lockout accounted for 4% of the total customers interrupted (222 of 5,106), and 2% of the total customer-hours interrupted (149 of 7,665).
 - The second lockout occurred on September 22, 2022, due to deterioration (PSC cause code 05) when an insulator broke at pole 282. This lockout accounted for 3% of the total customers interrupted (143 of 5,106), and 2% of the total customer-hours interrupted (180 of 7,665).
 - The single transmission outage, combined with the 2 circuit breaker lockouts, and combined with the 2 three-phase recloser lockouts, accounted for 90% of the total customers interrupted (4,576 of 5,106), and 81% of the total customer-hours interrupted (6,178 of 7,665).
 - Trees were the leading cause of interruptions on the Hudson 08751 in 2022, accounting for 43% of total interruptions (13 of 30). Equipment Failures were the 2nd leading cause of interruptions, accounting for 27% of total interruptions (8 of 30). Unknown were the 3rd leading cause of interruptions, accounting for 20% of total interruptions (6 of 30).
 - Trees were the leading cause of customers interrupted (CI) on the Hudson 08751 in 2022, accounting for 39% of total customers interrupted (2,002 of 5,106). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 39% of total customers interrupted (1,978 of 5,106). Unknown were the 3rd leading cause of customers interrupted, accounting for 20% of total customers interrupted (1,026 of 5,106).
 - Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Hudson 08751 in 2022, accounting for 48% of total customer-hours interrupted (3,715 of 7,665). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 37% of total customer-hours interrupted (2,843 of 7,665). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 8% of total customer-hours interrupted (644 of 7,665).
 - Of the 30 interruptions on this circuit, 17 affected 10 customers or less, with 5 being single customer outages.

Actions Taken:

- There are 4 three-phase reclosers on the Hudson 08751. These reclosers have assisted with minimizing customers interrupted and customer hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Hudson 08751 in 2019.
- Tree trimming and a hazard tree review was completed on the Hudson 08751 in 2023.

Action Plan:

- Complete all identified level 1, 2, and 3 maintenance.
- A capital improvement project is scheduled to improve fusing coordination on the Hudson 08751.
- A capital improvement project is scheduled to improve reliability and protection coordination by installing cutout-mounted reclosers on the Hudson 08751.
- A capital improvement project is scheduled to improve reliability by installing new switches on the Hudson 08751 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.

13. STUYVESANT 03551 – 13.2 kV

Profile: 638 Customers, 20.9 Circuit Miles

Indices: CAIDI = 2.17, SAIFI = 4.32

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	8	50.00%	1,971	71.44%	3,916	65.29%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	3	18.75%	13	0.47%	40	0.67%
6	ACCIDENTS	3	18.75%	768	27.84%	2,030	33.86%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	2	12.50%	7	0.25%	11	0.18%
Totals		16	100.00%	2,759	100.00%	5,997	100.00%

Problem Analysis:

- There were 16 interruptions on the Stuyvesant 03551 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 16 events occurred at the distribution level.
- The distribution circuit breaker for the Stuyvesant 03551 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Stuyvesant 03551 experienced 4 sustained operations (lockouts) in 2022. These interruptions accounted for 92% of the total amount of customers interrupted (2,550 out of 2,759) and 80% of the total amount of the customer-hours interrupted (4,813 out of 5,997).
 - This lockout occurred on July 06, 2022, when a tree (PSC cause code 02) took primary down at pole 826-A on US HWY 9. The outage was isolated by performing switching and then repairs were made. This lockout accounted for 23% of the total customers interrupted (637 of 2,759), and 8% of the total customer-hours interrupted (454 of 5,997).
 - This lockout occurred on May 13, 2022, when a vehicle (PSC cause code 06) broke pole 14 and took down primary at pole 14 on Route 9. This lockout accounted for 23% of the total customers interrupted (641 of 2,759), and 19% of the total customer-hours interrupted (1,130 of 5,997).
 - This lockout occurred on September 22, 2022, when a tree (PSC cause code 02) was across phases at pole 580 on Route 9. Breaker R-510 needed to be closed at the station due to an EMS command failure. This lockout accounted for 23% of the

- total customers interrupted (636 of 2,759), and 21% of the total customer-hours interrupted (1,272 of 5,997
- This lockout occurred on November 21, 2022, when a tree (PSC cause code 02) took primary down at pole 832 ½ on Route 9. This lockout accounted for 23% of the total customers interrupted (636 of 2,759), and 33% of the total customer-hours interrupted (1,957 of 5,997).
 - Trees were the leading cause of interruptions on the Stuyvesant 03551 in 2022, accounting for 50% of total interruptions (8 of 16). Equipment Failures were the 2nd leading cause of interruptions, accounting for 19% of total interruptions (3 of 16). Accidents were the 3rd leading cause of interruptions, accounting for 19% of total interruptions (3 of 16).
 - Trees were the leading cause of customers interrupted (CI) on the Stuyvesant 03551 in 2022, accounting for 71% of total customers interrupted (1,971 of 2,759). Accidents were the 2nd leading cause of customers interrupted, accounting for 28% of total customers interrupted (768 of 2,759). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 0% of total customers interrupted (13 of 2,759).
 - Trees were the leading cause of customer-hours interrupted (CHI) on the Stuyvesant 03551 in 2022, accounting for 65% of total customer-hours interrupted (3,916 of 5,997). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 34% of total customer-hours interrupted (2,030 of 5,997). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 1% of total customer-hours interrupted (40 of 5,997).
 - Of the 16 interruptions on this circuit, 7 affected 10 customers or less, with 1 being single customer outages.

Actions Taken:

- There are 2 three-phase reclosers on the Stuyvesant 03551. These reclosers have assisted with minimizing customers interrupted and customer hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Stuyvesant 03551 in 2020.
- Tree trimming and a hazard tree review was completed on the Stuyvesant 03551 in 2019.
- A capital improvement project to improve fusing coordination on US HWY 9 was completed on the Stuyvesant 03551.

Action Plan:

- Complete all identified level 1, 2, and 3 maintenance.
- A capital improvement project is scheduled to improve fusing coordination on Day Road on the Stuyvesant 03551.
- A capital improvement project is scheduled to improve reliability by relocating rear lot overhead line to the road on Rossman Road on the Stuyvesant 03551.
- A capital improvement project is scheduled to improve both reliability and protection coordination via installing a loop scheme between the Stuyvesant 03551 and the Hudson 08752.
- A capital improvement project is scheduled to improve reliability and protection coordination by installing cutout-mounted reclosers on the Stuyvesant 03551.
- A capital improvement project is scheduled to improve reliability by installing new switches on the Stuyvesant 03551 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.

14. HOOSICK 31451 – 13.2 kV

Profile: 1,752 Customers, 96.9 Circuit Miles

Indices: CAIDI = 1.63, SAIFI = 2.61

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	18	60.00%	4,363	95.28%	6,276	84.13%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	26.67%	161	3.52%	476	6.38%
6	ACCIDENTS	3	10.00%	41	0.90%	683	9.16%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	1	3.33%	14	0.31%	25	0.33%
Totals		30	100.00%	4,579	100.00%	7,460	100.00%

Problem Analysis:

- There were 30 interruptions on the Hoosick 31451 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on June 17, 2022, when a tree (PSC cause code 02) took down 115 kV primary between pole 202 and pole 203 on the Hoosick - Bennington #6 line. This lockout accounted for 40% of the total customers interrupted (1,835 of 4,579) and 3% of the total customer-hours interrupted (214 of 7,460).
- There were no substation interruptions.
- The remaining 29 events occurred at the distribution level.
- The distribution circuit breaker for the Hoosick 31451 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Hoosick 31451 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 38% of the total amount of customers interrupted (1,755 out of 4,579) and 45% of the total amount of the customer-hours interrupted (3,378 out of 7,460).
 - This lockout occurred on September 06, 2022, when a tree (PSC cause code 02) took down primary near pole 15 on River Road. This lockout accounted for 38% of the total customers interrupted (1,755 of 4,579) and 45% of the total customer-hours interrupted (3,378 of 7,460).
- The Hoosick 31451 experienced 1 sustained three-phase recloser operation in 2022. This interruption accounted for 10% of the total amount of customers interrupted (476 of 4,579) and 25% of the total amount of the customer-hours interrupted (1,837 of 7,460).

- This lockout occurred on August 31, 2022, when a tree (PSC cause code 02) fell near pole 19 on County Route 59. This lockout accounted for 10% of the total amount of customers interrupted (476 of 4,579) and 25% of the total amount of the customer-hours interrupted (1,837 of 7,460).
- The single transmission interruption, single circuit breakout lockout, and single three-phase recloser lockout, accounted for 89% of the total customers interrupted (4,066 of 4,579) and 73% of the total customer-hours interrupted (5,429 of 7,460).
- Trees were the leading cause of interruptions on the Hoosick 31451 in 2022, accounting for 60% of total interruptions (18 of 30). Equipment Failures were the 2nd leading cause of interruptions, accounting for 27% of total interruptions (8 of 30). Accidents were the 3rd leading cause of interruptions, accounting for 10% of total interruptions (3 of 30).
- Trees were the leading cause of customers interrupted (CI) on the Hoosick 31451 in 2022, accounting for 95% of total customers interrupted (4,363 of 4,579). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 4% of total customers interrupted (161 of 4,579). Accidents were the 3rd leading cause of customers interrupted, accounting for 1% of total customers interrupted (41 of 4,579).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Hoosick 31451 in 2022, accounting for 84% of total customer-hours interrupted (6,276 of 7,460). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 9% of total customer-hours interrupted (683 of 7,460). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 6% of total customer-hours interrupted (476 of 7,460).
- Of the 30 interruptions on this circuit, 14 affected 10 customers or less, with 5 being single customer outages.

Actions Taken:

- There are 3 three-phase reclosers on the Hoosick 31451. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Hoosick 31451 in 2018 and all identified level 1, 2, and 3 maintenance has been completed.
- Tree trimming and a hazard tree review was completed on the Hoosick 31451 in 2021.

Action Plan:

- A capital improvement project is scheduled to remove an overloaded, 2,500 kVA, step-down ratio transformer by converting over 1 mile of 5 kV delta to 15 kV. This project will bring a significant portion of the Hoosick 31451 up to current standards as well as create a new 15 kV feeder tie which will allow a neighboring feeder to energize the Hoosick 31451 in the event of a sustained outage. This project will also mitigate the potential for low voltage concerns, especially during peak loading timeframes.
- A capital improvement project is scheduled to remove an overloaded step-down ratio on Eddy Road, convert approximately 0.75 miles to 5 kV delta to 15 kV, relocate distribution from the rear lot to the road, and install a cutout-mounted recloser.
- A capital improvement project is scheduled to improve fusing coordination on the Hoosick 31451 which will assist in decreasing customer counts in the event of a sustained outage.
- A capital improvement project is scheduled to install one or more cutout-mounted reclosers on the Hoosick 31451 which will prevent sustained outages that, otherwise, would have been momentary in nature.
- A capital improvement project is scheduled to install one or more switches on the Hoosick 31451 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.
- A capital improvement project is scheduled to install one or more three-phase reclosers on the Hoosick 31451 which will assist in decreasing customer counts in the event of a sustained outage as well as prevent sustained outages that, otherwise, would have been momentary in nature.

15. RENSSELAER 13256 – 13.2 kV

Profile: 2,504 Customers, 18.59 Circuit Miles

Indices: CAIDI = 2.24, SAIFI = 2.02

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	4	12.12%	181	3.58%	726	6.39%
3	OVERLOADS	1	3.03%	1,479	29.22%	253	2.22%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	24.24%	2,873	56.76%	8,360	73.59%
6	ACCIDENTS	9	27.27%	170	3.36%	254	2.24%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	11	33.33%	359	7.09%	1,768	15.56%
Totals		33	100.00%	5,062	100.00%	11,360	100.00%

Problem Analysis:

- There were 33 interruptions on the Rensselaer 13256 in 2022.
- There were no transmission interruptions.
- There was 1 substation interruption.
 - This Substation interruption occurred on July 17, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 49% of the total customers interrupted (2,498 of 5,062), and 43% of the total customer-hours interrupted (4,829 of 11,360). Rensselaer TB1 faulted internally and all load including the 13256 was placed on neighboring feeders. TB1 was inspected internally and place back into service.
- The remaining 32 events occurred at the distribution level.
- The distribution circuit breaker for the Rensselaer 13256 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Rensselaer 13256 experienced 0 sustained operations (lockouts) in 2022.
- Unknown were the leading cause of interruptions on the Rensselaer 13256 in 2022, accounting for 33% of total interruptions (11 of 33). Accidents were the 2nd leading cause of interruptions, accounting for 27% of total interruptions (9 of 33). Equipment Failures were the 3rd leading cause of interruptions, accounting for 24% of total interruptions (8 of 33).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Rensselaer 13256 in 2022, accounting for 57% of total customers interrupted (2,873 of 5,062). Overloads were the 2nd leading cause of customers interrupted, accounting for 29% of total

customers interrupted (1,479 of 5,062). Unknown were the 3rd leading cause of customers interrupted, accounting for 7% of total customers interrupted (359 of 5,062).

- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Rensselaer 13256 in 2022, accounting for 74% of total customer-hours interrupted (8,360 of 11,360). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 16% of total customer-hours interrupted (1,768 of 11,360). Trees were the 3rd leading cause of customer-hours interrupted, accounting for 6% of total customer-hours interrupted (726 of 11,360).

Of the 33 interruptions on this circuit, 11 affected 12 customers or less, with 1 being single customer outage.

Actions Taken:

- There is 1 three-phase recloser on the Rensselaer 13256. This reclosers has assisted with minimizing customers interrupted and customer-hours interrupted since it was installed.
- Three capital projects were entered, budgeted, and scheduled for the planned retirement of Rensselaer TB1 with the 13254 and 13256 to be placed on neighboring feeders.
- A maintenance foot patrol was completed on the Rensselaer 13256 in 2021 and all identified level 1 and 2 maintenance has been completed.

Action Plan:

- Complete all identified level 3 maintenance on the Rensselaer 13256.
- Engineering to review if the addition of 3 three-phase reclosers will assist in minimizing customers interrupted and customer-hours interrupted; to install if warranted.
- Engineering to review if the addition of cutout-mounted reclosers will assist in minimizing customers interrupted and customer-hours interrupted; to install if warranted.
- Tree trimming and a hazard tree review are scheduled to be performed on the Rensselaer 13256 in FY24.
- A capital project is scheduled to transfer load from 13256 to Reynolds Road feeders in FY23.

16. BURDECK STREET 26551 – 13.2 kV

Profile: 684 Customers, 18.2 Circuit Miles

Indices: CAIDI = 3.66, SAIFI = 2.98

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	1	7.14%	1	0.05%	2	0.02%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	7	50.00%	520	25.48%	3,567	47.76%
6	ACCIDENTS	3	21.43%	1,516	74.28%	3,891	52.10%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	3	21.43%	4	0.20%	8	0.11%
Totals		14	100.00%	2,041	100.00%	7,468	100.00%

Problem Analysis:

- There were 14 interruptions on the Burdeck Street 26551 in 2022.
- There were no transmission interruptions.
- There was 1 substation interruption.
 - This Substation interruption occurred on January 1, 2022, coded as a cause of animal (PSC cause code 06). This lockout accounted for 34% of the total customers interrupted (688 of 2,041), and 19% of the total customer-hours interrupted (1,400 of 7,468).
- The remaining 13 events occurred at the distribution level.
- The distribution circuit breaker for the Burdeck Street 26551 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Burdeck Street 26551 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 34% of the total amount of customers interrupted (688 out of 2,041) and 9% of the total amount of the customer-hours interrupted (655 out of 7,468).
 - This lockout occurred on May 17, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 34% of the total customers interrupted (688 of 2,041), and 9% of the total customer-hours interrupted (655 of 7,468). A motor vehicle accident occurred within the Duanesburg Industrial Park, crews opened switches at pole 19 to isolate and restored 681 customers in 53 minutes, and the remaining 7 customers were restored in 6 hours and 8 minutes.
- Equipment Failures were the leading cause of interruptions on the Burdeck Street 26551 in 2022, accounting for 50% of total interruptions (7 of 14). Accidents were the 2nd leading

- cause of interruptions, accounting for 21% of total interruptions (3 of 14). Unknown were the 3rd leading cause of interruptions, accounting for 21% of total interruptions (3 of 14).
- Accidents were the leading cause of customers interrupted (CI) on the Burdeck Street 26551 in 2022, accounting for 74% of total customers interrupted (1,516 of 2,041). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 25% of total customers interrupted (520 of 2,041). Unknown were the 3rd leading cause of customers interrupted, accounting for 0% of total customers interrupted (4 of 2,041).
 - Accidents were the leading cause of customer-hours interrupted (CHI) on the Burdeck St 26551 in 2022, accounting for 52% of total customer-hours interrupted (3,891 of 7,468). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 48% of total customer-hours interrupted (3,567 of 7,468). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 0% of total customer-hours interrupted (8 of 7,468).
 - Of the 14 interruptions on this circuit, 7 affected 10 customers or less, with 4 being single customer outages.

Actions Taken:

- Tree trimming and hazard tree removal was completed on the Burdeck 26551 in 2020.

Action Plan:

- A maintenance foot patrol of the Burdeck 26551 is scheduled for 2023.
- Underground fault indicators are scheduled to be installed within the Sunrise Estates URD on the Burdeck 26551 in 2023 to help underground crews more effectively locate cable failures.
- Two cutout-mounted single phase reclosers are scheduled to be installed on Keller Avenue and Dunnsville Road on the Burdeck 26551 in 2023.
- A small capital project is scheduled for 2023 to improve fuse coordination within the Rotterdam Industrial Park on the Burdeck 26551 in 2023.
- The next tree trimming and hazardous tree removal cycle will be completed on the Burdeck 26551 in 2025.

17. ELNORA 44258 – 13.2 kV

Profile: 1,762 Customers, 39.3 Circuit Miles

Indices: CAIDI = 2.30, SAIFI = 2.02

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	2	8.33%	92	2.58%	92	1.12%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	12	50.00%	1,595	44.77%	6,824	83.18%
6	ACCIDENTS	5	20.83%	1,802	50.58%	1,151	14.03%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	5	20.83%	74	2.08%	137	1.67%
Totals		24	100.00%	3,563	100.00%	8,205	100.00%

Problem Analysis:

- There were 24 interruptions on the Elnora 44258 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 24 events occurred at the distribution level.
- The distribution circuit breaker for the Elnora 44258 experienced 5 momentary operations in 2022.
- The distribution circuit breaker for the Elnora 44258 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 49% of the total amount of customers interrupted (1,760 out of 3,563) and 13% of the total amount of the customer-hours interrupted (1,062 out of 8,205).
 - This lockout occurred on June 10, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 49% of the total customers interrupted (1,760 of 3,563), and 13% of the total customer-hours interrupted (1,062 of 8,205).
- Equipment Failures were the leading cause of interruptions on the Elnora 44258 in 2022, accounting for 50% of total interruptions (12 of 24). Accidents were the 2nd leading cause of interruptions, accounting for 21% of total interruptions (5 of 24). Unknown were the 3rd leading cause of interruptions, accounting for 21% of total interruptions (5 of 24).
- Accidents were the leading cause of customers interrupted (CI) on the Elnora 44258 in 2022, accounting for 51% of total customers interrupted (1,802 of 3,563). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 45% of total customers interrupted (1,595 of 3,563). Trees were the 3rd leading cause of customers interrupted, accounting for 3% of total customers interrupted (92 of 3,563).

- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Elnora 44258 in 2022, accounting for 83% of total customer-hours interrupted (6,824 of 8,205). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 14% of total customer-hours interrupted (1,151 of 8,205). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 2% of total customer-hours interrupted (137 of 8,205).
- Of the 24 interruptions on this circuit, 17 affected 10 customers or less, with 7 being single customer outages.

Actions Taken:

- There are four three-phase reclosers on the Elnora 44258. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A small fusing project to better fuse single phase taps off Plank Road and Bruno Road was completed in 2022.
- Tree trimming and hazardous tree removal was completed on the Elnora 44258 in 2022.

Action Plan:

- Complete all identified level 2 and 3 maintenance on the Elnora 44258.
- A small capital project is scheduled for 2023 to install a cutout-mounted recloser on Kinns Road and improve fuse coordination the Elnora 44258 in 2023.
- Inspect switchgear in the County Knolls South URD and replace as necessary.
- A small capital project is scheduled for 2023 to install sectionalizing switches for operational flexibility.
- Underground fault indicators are scheduled to be installed within the Country Knolls South URD on the Elnora 44258 in 2023 to help underground crews more effectively locate cable failures.
- The next tree trimming and hazardous tree removal cycle will be completed on the Elnora 44258 in 2027.

18. PROSPECT HILL 41351 – 13.2 kV

Profile: 1,493 Customers, 34.4 Circuit Miles

Indices: CAIDI = 2.26, SAIFI = 2.86

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	1	7.69%	1,206	28.24%	2,171	22.47%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	46.15%	3,005	70.37%	7,419	76.76%
6	ACCIDENTS	2	15.38%	33	0.77%	44	0.46%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	4	30.77%	26	0.61%	31	0.32%
Totals		13	100.00%	4,270	100.00%	9,665	100.00%

Problem Analysis:

- There were 13 interruptions on the Prospect Hill 41351 in 2022.
- There were no transmission interruptions.
- There were 2 substation interruptions.
 - The first Substation interruption occurred on May 22, 2022, due to an issue on the 91B bus (PSC cause code 05). This lockout accounted for 35% of the total customers interrupted (1,495 of 4,270) and 58% of the total customer-hours interrupted (5,599 of 9,665).
 - The second Substation interruption occurred on May 27, 2022, when moisture (PSC cause code 05) tripped the mobile substation, Mobile 8E, energizing Prospect Hill substation to repair the aforementioned 91B bus issue. This lockout accounted for 35% of the total customers interrupted (1,495 of 4,270) and 18% of the total customer-hours interrupted (1,739 of 9,665).
- The remaining 11 events occurred at the distribution level.
- The distribution circuit breaker for the Prospect Hill 41351 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Prospect Hill 41351 experienced 0 sustained operations (lockouts) in 2022.
- The Prospect Hill 41351 experienced 1 sustained three-phase recloser operations in 2022. This interruption accounted for 28% of the total amount of customers interrupted (1,206 of 4,270) and 22% of the total amount of the customer-hours interrupted (2,171 of 9,665).

- The 2 circuit breaker lockouts, combined with the single three-phase recloser lockout, accounted for 98% of the total customers interrupted (4,196 of 4,270) and 98% of the total customer-hours interrupted (9,509 of 9,665).
- Equipment Failures were the leading cause of interruptions on the Prospect Hill 41351 in 2022, accounting for 46% of total interruptions (6 of 13). Unknown were the 2nd leading cause of interruptions, accounting for 31% of total interruptions (4 of 13). Accidents were the 3rd leading cause of interruptions, accounting for 15% of total interruptions (2 of 13).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Prospect Hill 41351 in 2022, accounting for 70% of total customers interrupted (3,005 of 4,270). Trees were the 2nd leading cause of customers interrupted, accounting for 28% of total customers interrupted (1,206 of 4,270). Accidents were the 3rd leading cause of customers interrupted, accounting for 1% of total customers interrupted (33 of 4,270).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Prospect Hill 41351 in 2022, accounting for 77% of total customer-hours interrupted (7,419 of 9,665). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 22% of total customer-hours interrupted (2,171 of 9,665). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 0% of total customer-hours interrupted (44 of 9,665).
- Of the 13 interruptions on this circuit, 7 affected 10 customers or less, with 2 being single customer outages.

Actions Taken:

- There are 4 three-phase reclosers on the Prospect Hill 41351. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since their installation.
- A maintenance foot patrol was completed on the Prospect Hill 41351 in 2019 and all identified level 1, 2, and 3 maintenance has been completed.
- Tree trimming and a hazard tree review was completed on the Prospect Hill 41351 in 2019.
- A capital improvement project was completed to install a cutout-mounted recloser on Domenica Drive which will prevent sustained outages that, otherwise, would have been momentary in nature.

Action Plan:

- Tree trimming and a hazard tree review are scheduled to be performed on the Prospect Hill 41351 in 2023.
- A capital improvement project is scheduled to improve fusing coordination on the Prospect Hill 41351 which will assist in decreasing customer counts in the event of a sustained outage.
- A capital improvement project is scheduled to install one or more switches on the Prospect Hill 41351 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.
- A capital improvement project is scheduled to install one or more three-phase reclosers on the Prospect Hill 41351 which will assist in decreasing customer counts in the event of a sustained outage as well as prevent sustained outages that, otherwise, would have been momentary in nature.

19. GREENBUSH 07854 – 13.2 kV

Profile: 1,123 Customers, 19.08 Circuit Miles

Indices: CAIDI = 1.62, SAIFI = 3.53

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	4	30.77%	1,669	42.05%	2,428	37.74%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	1	7.69%	1,129	28.45%	2,653	41.25%
6	ACCIDENTS	3	23.08%	8	0.20%	7	0.11%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	5	38.46%	1,163	29.30%	1,344	20.90%
Totals		13	100.00%	3,969	100.00%	6,432	100.00%

Problem Analysis:

- There were 13 interruptions on the Greenbush 07854 in 2022.
- There were no transmission interruptions.
- There were 2 substation interruptions.
 - The first Substation interruption occurred on July 17, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 28% of the total customers interrupted (1,129 of 3,969), and 41% of the total customer-hours interrupted (2,653 of 6,432). This outage was failure of a PT on the 15 line at Greenbush Substation with lockout of the 77G and 99G bus interrupting all 07856 customers.
 - The second Substation interruption occurred on July 19, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 28% of the total customers interrupted (1,129 of 3,969), and 20% of the total customer-hours interrupted (1,261 of 6,432). This failure occurred when all load was placed on TB8 due to the previous failure on the 17th still having TB7 out of service when TB8 faulted internally. TB8 was not loaded beyond its ratings. TB8 transformer was tested and found to be un-repairable and replaced immediate with a spare.
- The remaining 11 events occurred at the distribution level.
- The distribution circuit breaker for the Greenbush 07854 experienced 5 momentary operations in 2022.
- The distribution circuit breaker for the Greenbush 07854 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 28% of the total amount of customers interrupted (1,128 out of 3,969) and 17% of the total amount of the customer-hours interrupted (1,080 out of 6,432).

- This lockout occurred on August 9, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 28% of the total customers interrupted (1,128 of 3,969), and 17% of the total customer-hours interrupted (1,080 of 6,432).
- Unknown were the leading cause of interruptions on the Greenbush 07854 in 2022, accounting for 38% of total interruptions (5 of 13). Trees were the 2nd leading cause of interruptions, accounting for 31% of total interruptions (4 of 13). Accidents were the 3rd leading cause of interruptions, accounting for 23% of total interruptions (3 of 13).
- Trees were the leading cause of customers interrupted (CI) on the Greenbush 07854 in 2022, accounting for 42% of total customers interrupted (1,669 of 3,969). Unknown were the 2nd leading cause of customers interrupted, accounting for 29% of total customers interrupted (1,163 of 3,969). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 28% of total customers interrupted (1,129 of 3,969).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Greenbush 07854 in 2022, accounting for 41% of total customer-hours interrupted (2,653 of 6,432). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 38% of total customer-hours interrupted (2,428 of 6,432). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 21% of total customer-hours interrupted (1,344 of 6,432).
- Of the 13 interruptions on this circuit, 8 affected 10 customers or less, with 3 being single customer outages.

Actions Taken:

- The failed 115 kV PT was replaced with an available spare.
- The failed TB8 transformer was replaced with an available spare.
- There is one three-phase recloser on the Greenbush 07854. This recloser has assisted with minimizing customers interrupted and customer-hours interrupted since it was installed.
- A maintenance foot patrol was completed on the Greenbush 07854 in 2021 and all identified level 1 and 2 maintenance have been completed.
- Tree trimming and a hazard tree review was completed on the Greenbush 07854 in FY22.

Action Plan:

- Complete all identified level 3 maintenances.
- Engineering to review the settings for the three-phase reclosers to ensure proper device coordination and update if warranted.
- Engineering to review if the addition of cutout mounted single-phase reclosers will assist in minimizing customers interrupted and customer-hours interrupted and install if warranted.

20. BLUE STORES 30353 – 13.2 kV

Profile: 1,423 Customers, 113.5 Circuit Miles

Indices: CAIDI = 1.91, SAIFI = 2.03

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	11	32.35%	432	14.94%	1,913	34.60%
3	OVERLOADS	1	2.94%	590	20.40%	545	9.86%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	9	26.47%	67	2.32%	215	3.89%
6	ACCIDENTS	4	11.76%	1,431	49.48%	490	8.86%
7	PREARRANGED	1	2.94%	2	0.07%	2	0.03%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	8	23.53%	370	12.79%	2,363	42.75%
Totals		34	100.00%	2,892	100.00%	5,528	100.00%

Problem Analysis:

- There were 34 interruptions on the Blue Stores 30353 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 34 events occurred at the distribution level.
- The distribution circuit breaker for the Blue Stores 30353 experienced 9 momentary operations in 2022.
- The distribution circuit breaker for the Blue Stores 30353 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Blue Stores 30353 in 2022, accounting for 32% of total interruptions (11 of 34). Equipment Failures were the 2nd leading cause of interruptions, accounting for 26% of total interruptions (9 of 34). Unknown were the 3rd leading cause of interruptions, accounting for 24% of total interruptions (8 of 34).
- Accidents were the leading cause of customers interrupted (CI) on the Blue Stores 30353 in 2022, accounting for 49% of total customers interrupted (1,431 of 2,892). Overloads were the 2nd leading cause of customers interrupted, accounting for 20% of total customers interrupted (590 of 2,892). Trees were the 3rd leading cause of customers interrupted, accounting for 15% of total customers interrupted (432 of 2,892).
- Unknown were the leading cause of customer-hours interrupted (CHI) on the Blue Stores 30353 in 2022, accounting for 43% of total customer-hours interrupted (2,363 of 5,528). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 35% of total customer-hours interrupted (1,913 of 5,528). Overloads were the 3rd leading cause of customer-hours interrupted, accounting for 10% of total customer-hours interrupted (545 of 5,528).
- Of the 34 interruptions on this circuit, 18 affected 10 customers or less, with 10 being single customer outages.

Actions Taken:

- There are 3 three-phase reclosers on the Blue Stores 30353. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Blue Stores 30353 in 2022.
- Tree trimming and a hazard tree review was completed on the Blue Stores 30353 in 2019.
- A capital improvement project to improve fusing coordination on County HWY 10 was completed on the Blue Stores 30353.

Action Plan:

- Complete all identified level 1, 2, and 3 maintenance.
- A capital improvement project is scheduled to improve fusing coordination on the Blue Stores 30353.
- A capital improvement project is scheduled to improve reliability by relocating rear lot overhead line to the road and converting on Bells Pond Road on the Blue Stores 30353.
- A capital improvement project is scheduled to improve reliability by relocating rear lot overhead line to the road and extending three-phase on County Route 27 on the Blue Stores 30353.
- A capital improvement project is scheduled to improve both reliability and protection coordination by installing a three-phase recloser on the Blue Stores 30353.
- A capital improvement project is scheduled to alleviate loading concerns on the ratio bank on Proper Road on the Blue Stores 30353.
- A capital improvement project is scheduled to improve reliability by relocating rear lot on Albany Post Road to the road on the Blue Stores 30353.
- A capital improvement project is scheduled to improve reliability by installing new switches on the Blue Stores 30353 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.

3. ACTION PLAN SUMMARIES

a. SUMMARY OF ACTION ITEM PLANS FOR 2022 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
Hudson	08753	2023	Complete level 1 maintenance	March-2024	N/A	On schedule.
Hudson	08753	2023	Complete level 2 maintenance	March-2024	N/A	On schedule.
Hudson	08753	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Hudson	08753	2023	Loadbreak disconnect with shunt fuse	March-2024	N/A	On schedule.
Hudson	08753	2023	Mill Street three-phase recloser	March-2024	N/A	On schedule.
Hudson	08753	2023	Howard Avenue cutout-mounted recloser	March-2024	N/A	Installs a cutout-mounted recloser on Howard Avenue.
Hudson	08753	2023	Michael Court conversion	March-2025	N/A	Convert Michael Court to relieve an overloaded ratio.
Hudson	08753	2023	Fusing coordination	March-2024	N/A	On schedule.
Hudson	08753	2023	Switch installation	March-2024	N/A	On schedule.
Altamont	28355	2023	Protection review of the Altamont 28355	March-2024	N/A	On schedule.
Altamont	28355	2023	Recloser installation	March-2024	N/A	On schedule.
Altamont	28355	2023	Cutout-mounted recloser installation	March-2024	N/A	On schedule.
Greenbush	07856	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Greenbush	07856	2023	Philips Road conversion	March-2026	N/A	C092251 is budgeted for design and build in CY26.
Greenbush	07856	2023	Recloser settings review	March-2024	N/A	Engineering to review the settings for the 3-phase reclosers to ensure proper device coordination and update if warranted.
Greenbush	07856	2023	Cutout-mounted recloser review	March-2024	N/A	Engineering to review if the addition of cutout-mounted single-phase reclosers will assist in minimizing customers interrupted install if warranted.
Greenbush	07852	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Greenbush	07852	2023	Recloser settings review	March-2024	N/A	Engineering to review the settings for the 3-phase reclosers to ensure proper device coordination and update if warranted.
Greenbush	07852	2023	Cutout-mounted recloser review	March-2024	N/A	Engineering to review if the addition of cutout-mounted single-phase reclosers will assist in minimizing customers interrupted install if warranted.
Pinebush	37152	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Pinebush	37152	2023	Recloser installation	March-2024	N/A	Install new recloser on Western Avenue.
Pinebush	37152	2023	Recloser installation review	March-2024	N/A	Engineering to review if the addition of three 3-phase reclosers will assist in minimizing customers interrupted and install if warranted.
Pinebush	37152	2023	Cutout-mounted recloser review	March-2024	N/A	Engineering to review if the addition of cutout-mounted single-phase reclosers will assist in minimizing customers interrupted install if warranted.
Pinebush	37152	2023	Tree trimming	March-2024	N/A	Tree Trimming is scheduled on the Pinebush 37152 for FY24.
Hoosick	31452	2023	Tree trimming	March-2028	N/A	Tree Trimming is scheduled on the Hoosick 31452 in 2027.
Hoosick	31452	2023	High Street conversion	March-2024	N/A	Converts 2.5-mile section from 5 kV to 15 kV and creates multiple feeder ties.
Hoosick	31452	2023	County HWY 68 conversion	March-2024	N/A	Converts 0.5-mile section from 5 kV to 15 kV.
Hoosick	31452	2023	Fusing coordination	March-2024	N/A	On schedule.
Hoosick	31452	2023	Cutout-mounted recloser installation	March-2024	N/A	On schedule.
Hoosick	31452	2023	Switch installation	March-2024	N/A	On schedule.
Blue Stores	30351	2023	Complete level 1 maintenance	March-2024	N/A	On schedule.
Blue Stores	30351	2023	Complete level 2 maintenance	March-2024	N/A	On schedule.
Blue Stores	30351	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Blue Stores	30351	2023	Recloser installation	March-2024	N/A	On schedule.
Blue Stores	30351	2023	Fusing coordination	March-2024	N/A	On schedule.
Blue Stores	30351	2023	Cutout-mounted recloser installation	March-2024	N/A	On schedule.
Blue Stores	30351	2023	Switch installation	March-2024	N/A	On schedule.
Hemstreet	32851	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Hemstreet	32851	2023	Tree trimming	March-2024	N/A	Tree Trimming is scheduled on the Hemstreet 32451 in 2023.
Hemstreet	32851	2023	Hoosic River rear lot	March-2025	N/A	Removes approximately 0.80 miles of 5 kV delta, rear lot distribution, part of which crosses the Hoosic River.

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
Hemstreet	32851	2023	Recloser installation	March-2024	N/A	Install a recloser on Master Street.
Hemstreet	32851	2023	Cutout-mounted recloser installation	March-2024	N/A	On schedule.
Hemstreet	32851	2023	Switch installation	March-2024	N/A	On schedule.
Boyntonville	33351	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Boyntonville	33351	2023	Tree trimming	March-2027	N/A	Tree Trimming is scheduled on the Boyntonville 3351 in 2026.
Boyntonville	33351	2023	Recloser relocation	March-2024	N/A	Relocate existing recloser upstream on the Boyntonville 333351.
Boyntonville	33351	2023	Recloser installation	March-2024	N/A	Install a recloser on NY-7.
Boyntonville	33351	2023	Cutout-mounted recloser installation	March-2024	N/A	On schedule.
Boyntonville	33351	2023	Switch installation	March-2024	N/A	On schedule.
Boyntonville	33351	2023	Fault indicators installation	March-2024	N/A	On schedule.
Menands	10153	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Menands	10153	2023	Recloser installation review	March-2024	N/A	Engineering to review if the addition of three 3-phase reclosers will assist in minimizing customers interrupted and install if warranted.
Menands	10153	2023	Cutout-mounted recloser review	March-2024	N/A	Engineering to review if the addition of cutout-mounted single-phase reclosers will assist in minimizing customers interrupted install if warranted.
Schodack	45152	2023	Complete level 2 maintenance	March-2024	N/A	On schedule.
Schodack	45152	2023	Recloser installation review	March-2024	N/A	Engineering to review if the addition of three 3-phase reclosers will assist in minimizing customers interrupted and install if warranted.
Schodack	45152	2023	Cutout-mounted recloser review	March-2024	N/A	Engineering to review if the addition of cutout-mounted single-phase reclosers will assist in minimizing customers interrupted install if warranted.
Hudson	08751	2023	Complete level 1 maintenance	March-2024	N/A	On schedule.
Hudson	08751	2023	Complete level 2 maintenance	March-2024	N/A	On schedule.
Hudson	08751	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Hudson	08751	2023	Fusing coordination	March-2024	N/A	On schedule.
Hudson	08751	2023	Cutout-mounted recloser installation	March-2024	N/A	On schedule.
Hudson	08751	2023	Switch installation	March-2024	N/A	On schedule.
Stuyvesant	03551	2023	Complete level 1 maintenance	March-2024	N/A	On schedule.
Stuyvesant	03551	2023	Complete level 2 maintenance	March-2024	N/A	On schedule.
Stuyvesant	03551	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Stuyvesant	03551	2023	Day Road fusing coordination	March-2024	N/A	Fix fusing on Day Road on the Stuyvesant 03551.
Stuyvesant	03551	2023	Rossman Road rear lot	March-2025	N/A	Remove rear lot on Rossman Road and convert overhead on the road to 3-Ø 13.2 kV.
Stuyvesant	03551	2023	Stuyvesant 51 and Hudson 52 loop scheme	March-2027	N/A	Creates a loop scheme between the Stuyvesant 51 and Hudson 52.
Stuyvesant	03551	2023	Cutout-mounted recloser installation	March-2024	N/A	On schedule.
Stuyvesant	03551	2023	Switch installation	March-2024	N/A	On schedule.
Hoosick	31451	2023	Hoosick 31451 overloaded ratio	March-2028	N/A	Removes overloaded 2,500 kVA ratio by converting over a mile from 5 kV to 15 kV.
Hoosick	31451	2023	Eddy Road overloaded ratio	March-2025	N/A	Converts 0.75 miles from 5 kV delta to 15kV. Relocates rear lot distribution.
Hoosick	31451	2023	Fusing coordination	March-2024	N/A	On schedule.
Hoosick	31451	2023	Cutout-mounted recloser installation	March-2024	N/A	On schedule.
Hoosick	31451	2023	Switch installation	March-2024	N/A	On schedule.
Hoosick	31451	2023	Recloser installation	March-2024	N/A	On schedule.
Rensselaer	13256	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Rensselaer	13256	2023	Recloser installation review	March-2024	N/A	Engineering to review if the addition of three 3-phase reclosers will assist in minimizing customers interrupted and install if warranted.
Rensselaer	13256	2023	Cutout-mounted recloser review	March-2024	N/A	Engineering to review if the addition of cutout-mounted single-phase reclosers will assist in minimizing customers interrupted install if warranted.
Rensselaer	13256	2023	Tree trimming	March-2024	N/A	Tree Trimming is scheduled on the Rensselaer 13256 in FY24

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
Rensselaer	13256	2023	Rensselaer 13256 to Reynolds Road load transfer	March-2024	N/A	On schedule.
Burdeck Street	26551	2023	Maintenance foot patrol	March-2024	N/A	On schedule.
Burdeck Street	26551	2023	Fault indicators installation	March-2024	N/A	Underground fault indicators to be installed at the Sunrise Estates URD.
Burdeck Street	26551	2023	Cutout-mounted recloser installation	March-2024	N/A	Cutout-mounted recloser to be installed on Keller Avenue and Dunnsville Road.
Burdeck Street	26551	2023	Fusing coordination	March-2024	N/A	Improve fuse coordination within the Rotterdam Industrial Park.
Burdeck Street	26551	2023	Tree trimming	March-2026	N/A	On schedule.
Elnora	44258	2023	Complete level 2 maintenance	March-2024	N/A	On schedule.
Elnora	44258	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Elnora	44258	2023	Cutout-mounted recloser installation	March-2024	N/A	Install a cutout-mounted recloser on Kinns Road.
Elnora	44258	2023	Switchgear inspection	March-2024	N/A	Inspect switchgear in the County Knolls South URD and replace if necessary.
Elnora	44258	2023	Switch installation	March-2024	N/A	On schedule.
Elnora	44258	2023	Fault indicators installation	March-2024	N/A	Underground fault indicators to be installed at the County Knolls South URD.
Elnora	44258	2023	Tree trimming	March-2028	N/A	On schedule.
Prospect Hill	41351	2023	Tree trimming	March-2024	N/A	Tree Trimming is scheduled on the Prospect Hill 41351 in 2023.
Prospect Hill	41351	2023	Fusing coordination	March-2024	N/A	On schedule.
Prospect Hill	41351	2023	Switch installation	March-2024	N/A	On schedule.
Prospect Hill	41351	2023	Recloser installation	March-2024	N/A	On schedule.
Greenbush	07854	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Greenbush	07854	2023	Recloser settings review	March-2024	N/A	Engineering to review the settings for the 3-phase reclosers to ensure proper device coordination and update if warranted.
Greenbush	07854	2023	Cutout-mounted recloser review	March-2024	N/A	Engineering to review if the addition of cutout-mounted single-phase reclosers will assist in minimizing customers interrupted install if warranted.
Blue Stores	30353	2023	Complete level 1 maintenance	March-2024	N/A	On schedule.
Blue Stores	30353	2023	Complete level 2 maintenance	March-2024	N/A	On schedule.
Blue Stores	30353	2023	Complete level 3 maintenance	March-2024	N/A	On schedule.
Blue Stores	30353	2023	Fusing coordination	March-2024	N/A	On schedule.
Blue Stores	30353	2023	Bells Pond Road conversion and rear lot relocation	March-2025	N/A	Relocating rear lot section of overhead to the road and extending 13.2 kV.
Blue Stores	30353	2023	County Route 27 three-phase extension and rear-lot relocation	March-2027	N/A	Extends three-phase to the bifurcation point and relocates two sections of primary to the road.
Blue Stores	30353	2023	Recloser installation	March-2024	N/A	Installs a recloser on County HWY 19.
Blue Stores	30353	2023	Proper Road Conversion	March-2024	N/A	Project to alleviate loading concerns on the 250 kVA ratio bank.
Blue Stores	30353	2023	Albany Post Road rear lot relocation	March-2027	N/A	Relocates rear lot section of overhead to the road.
Blue Stores	30353	2023	Switch installation	March-2024	N/A	On schedule.

b. STATUS OF ACTION PLANS FOR 2021 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
Pinebush	37153	2022	Complete level 2 maintenance.	Sep-23	N/A	Complete.
Pinebush	37153	2022	Cutout-mounted recloser location review.	Apr-22	N/A	Complete.
Pinebush	37153	2022	Fuse coordination review.	Mar-23	N/A	Re-evaluating scope as further review needed.
Brunswick	26452	2022	Improve fusing coordination.	Mar-23	N/A	Under Construction.
Brunswick	26452	2022	Install cutout-mounted reclosers.	Mar-23	N/A	In Detailed Design.
Brunswick	26453	2022	Complete level 2 maintenance.	Sep-22	N/A	Complete.
Brunswick	26453	2022	Complete level 3 maintenance	Mar-23	N/A	On Schedule.
Brunswick	26453	2022	Improve fusing coordination.	Mar-23	N/A	In Detailed Design.
Brunswick	26453	2022	Improve reliability on Crandall Road and Taconic Lake Road.	Mar-25	N/A	On Schedule.
Blue Stores	30353	2022	Proper Road transformer removal.	Mar-23	N/A	Under Construction.
Blue Stores	30353	2022	County Highway fusing.	Mar-23	N/A	Design complete. Awaiting construction.
Blue Stores	30353	2022	State Highway 82 fusing.	Mar-23	N/A	In Detailed Design.
Blue Stores	30353	2022	Bells Pond Road Mainline rear lot relocation.	Mar-25	N/A	In Detailed Design.
Blue Stores	30353	2022	County Route 27 three-phase extension and rear lot relocation.	Mar-25	N/A	In Detailed Design.
Blue Stores	30353	2022	Albany Post Road rear lot relocation.	Mar-25	N/A	In Detailed Design.
Boyntonville	33351	2022	Complete level 3 maintenance.	Mar-23	N/A	On Schedule.
Boyntonville	33351	2022	Improve fusing coordination.	Mar-23	N/A	In Detailed Design.
Boyntonville	33351	2022	Recloser installation and relocation.	Mar-23	N/A	Design complete. Awaiting construction.
Grooms Road	34557	2022	Complete level 3 maintenance.	Dec-22	N/A	Complete.
Grooms Road	34557	2022	Install a 40K cutout-mounted recloser on East Street Tap.	Mar-23	N/A	Design complete. Awaiting construction.
Grooms Road	34557	2022	Install three-phase recloser on Saratoga Road.	Mar-23	N/A	Not proceeding project no longer applicable after investigation.
Grooms Road	34557	2022	Install fault indicators on Hetcheltown Road and Alplaus Avenue.	Mar-23	N/A	Design complete. Awaiting construction.
Grooms Road	34557	2022	Transfer a section of three-phase mainline on Aqueduct Road to be served by the R20357 recloser at pole 7-1/2 on Balltown Road.	Mar-23	N/A	In Detailed Design.
Grooms Road	34557	2022	Create a FLISR scheme between Grooms Road 34557 and Front Street 36053.	Mar-23	N/A	Under Construction.
Grooms Road	34557	2022	Tree trimming and a hazard tree review.	Mar-26	N/A	On Schedule.
Grooms Road	34557	2022	Maintenance foot patrol.	Mar-24	N/A	On Schedule.
Voorheesville	17851	2022	Tree trimming and a hazard tree review.	Mar-23	N/A	On Schedule.
Voorheesville	17851	2022	Three-phase recloser installation.	Mar-23	N/A	Complete.
Voorheesville	17851	2022	Cutout-mounted recloser location review.	Mar-23	N/A	Complete.
Voorheesville	17851	2022	Complete level 3 maintenance.	Mar-23	N/A	On Schedule.
Hemstreet	32851	2022	Complete level 3 maintenance.	Mar-23	N/A	On Schedule.
Hemstreet	32851	2022	Tree trimming and hazard tree review.	Dec-22	N/A	Complete.
Hemstreet	32851	2022	Improve fusing coordination.	Mar-23	N/A	In Detailed Design.
Trinity	16454	2022	Three-phase recloser installation.	Jan-23	N/A	Complete.

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
Trinity	16454	2022	Tree trimming and hazard tree review.	Mar-23	N/A	On Schedule.
Trinity	16454	2022	Cutout-mounted recloser location review.	Oct-22	N/A	Complete.
Trinity	16454	2022	Station breaker coordination review.	Oct-22	N/A	Complete.
Altamont	28355	2022	Three-phase recloser location review.	Oct-22	N/A	Complete.
Altamont	28355	2022	Three-phase recloser installation.	Mar-23	N/A	Under Construction.
Altamont	28355	2022	Cutout-mounted recloser location review.	Oct-22	N/A	Complete.
Pinebush	37152	2022	Complete level 2 maintenance.	Sep-22	N/A	Complete.
Pinebush	37152	2022	Three-phase recloser location review.	Oct-22	N/A	Complete.
Pinebush	37152	2022	Cutout-mounted recloser location review	Oct-22	N/A	Complete.
Grooms Road	34553	2022	Update protection settings for the R19546 recloser on Crescent Road.	Mar-23	N/A	Design complete. Stuck in ROW.
Grooms Road	34553	2022	Update protection settings for the R19444 recloser on Merall Drive.	Mar-23	N/A	Design complete. Stuck in ROW.
Grooms Road	34553	2022	Fusing modifications on Crescent Road and Merall Drive for improved reliability and installation of hookstick loadbreak disconnect switch on Merall Drive.	Mar-23	N/A	Design complete. Stuck in ROW.
Grooms Road	34553	2022	Tree trimming and a hazard tree review.	Mar-26	N/A	On Schedule.
Grooms Road	34553	2022	Maintenance foot patrol.	Mar-24	N/A	On Schedule.
Stuyvesant	3551	2022	Day Road fusing.	Mar-23	N/A	Design complete. Stuck in ROW.
Stuyvesant	3551	2022	Rossmann Road rear lot relocation.	Mar-23	N/A	In Detailed Design.
Stuyvesant	3551	2022	New York State Route fusing.	Jun-22	N/A	Complete.
Stuyvesant	3551	2022	Loop Scheme Investigation between Stuyvesant 51 and Hudson 52.	Mar-23	N/A	In Detailed Design.
Hudson	8753	2022	Loadbreak disconnect with shunt fuse.	Mar-23	N/A	Design complete. Stuck in ROW.
Hudson	8753	2022	Mill Street three-phase recloser.	Mar-23	N/A	Design complete. Stuck in ROW.
Hudson	8753	2022	Howard Avenue cutout-mounted recloser and fuse	Mar-23	N/A	Project canceled as duplicate.
Hoags Corners	22151	2022	Complete level 3 maintenance.	Oct-22	N/A	Complete.
Hoags Corners	22151	2022	Tree trimming and a hazard tree review.	Mar-23	N/A	On Schedule.
Hoags Corners	22151	2022	34.5 kV review.	Mar-23	N/A	Design complete. Awaiting construction.
Hoags Corners	22151	2022	Three-phase recloser location review.	Oct-22	N/A	Complete.
Hoags Corners	22151	2022	Cutout-mounted recloser location review.	Mar-23	N/A	Complete.
Hoags Corners	22151	2022	Fuse coordination review.	Oct-22	N/A	Complete.
North Troy	12353	2022	Improve fusing coordination.	Feb-23	N/A	Complete.
Inman Road	37056	2022	Install three-phase recloser on Van Antwerp Road.	Mar-23	N/A	Design Complete. Awaiting settings.
Inman Road	37056	2022	Install three-phase recloser on River Road.	Mar-23	N/A	In Detailed Design.
Inman Road	37056	2022	Transfer load from the Inman 37056 to the Inman 37052 while also installing line sensors to monitor loading on a rear lot mainline section behind Hedgewood Lane.	Jul-22	N/A	Re-evaluating scope as transferring load no longer a valid option.
Inman Road	37056	2022	Maintenance foot patrol.	Dec-22	N/A	Complete.
Inman Road	37056	2022	Tree trimming and a hazard tree review.	Mar-25	N/A	On Schedule.

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
Pinebush	37152	2022	Complete level 3 maintenance.	Oct-22	N/A	Complete.
Pinebush	37152	2022	Three-phase recloser location review.	Oct-22	N/A	Complete.
Pinebush	37152	2022	Cutout-mounted recloser location review.	Oct-22	N/A	Complete.

4. OPERATING REGION PERFORMANCE BELOW MINIMUM

a. MAINTENANCE HISTORY AND ANALYSIS OF FACTORS THAT CAUSED THE BELOW MINIMUM PERFORMANCE.

In 2022 the Capital Region failed to meet the PSC minimum SAIFI requirement of 1.024 after meeting the requirement in 2021. The Capital Region passed in 2021 with an annual SAIFI of 0.99. However, the Capital Region failed to meet the target in 2022 with an annual SAIFI of 1.06, only 3.5% above the threshold. Meanwhile, the Capital Region did meet the annual CAIDI goal of 2.025 in 2022 with a CAIDI of 2.00.

In 2022, the Capital Region experienced 2,946 interruptions. Most of these interruptions (99%) occurred on the distribution system. However, 11 of these interruptions occurred on the transmission or sub-transmission systems in 2022. These interruptions accounted for 0.4% of the region's total interruptions (11 of 2,946), 8% of the total amount of customers interrupted (30,206 of 356,687) and 6% of the total amount of the customer-hours interrupted (44,739 of 712,898). The SAIFI and CAIDI of the transmission and sub-transmission systems in 2022 were 0.09 interruptions and 1.48 hours, respectively. In 2021, there were 3 transmission outages in the Capital Region, and in 2022 there were 11 which is an increase of 267%. This resulted in customers interrupted increasing from 6,192 in 2021 to 30,206 in 2022 which is an increase of 388%. While customer-hours interrupted increased from 6,999 in 2021 to 44,739 in 2022 which is an increase of 539%.

There were also 9 substation-related interruptions in the Capital Region in 2022. These interruptions accounted for 0.3% of the region's total interruptions, (9 of 2,946), 12% of the region's total customers interrupted (42,763 of 356,687) and 16% of the region's total customer-hours interrupted (114,270 of 712,898). The number of substation-related interruptions increased from 8 in 2021 to 9 in 2022.

The distribution system accounted for 99% of the interruptions in the Capital Region in 2022 (2,926 of 2,946). The distribution system accounted for 92% of the of the total amount of customers interrupted (326,481 of 356,687) and 94% of the total amount of the customer-hours interrupted (668,159 of 712,899). The SAIFI of only the distribution system in 2022, after removing all transmission and sub-transmission outages, met the SAIFI goal for the Capital Region, with a distribution SAIFI of 0.97 interruptions per year.

b. **PLANNED PROGRAMS OR PLANNED CORRECTIVE ACTIONS AND PROPOSED IMPROVEMENTS TO THE PERFORMANCE INDICES.**

The contribution of transmission outages is significant to the regional performance indices, as can be seen in the data provided in the previous section. This is because transmission outages often result in very high customers interrupted and customer-hours interrupted.

Tree trimming around the distribution system will remain a priority in 2023 to address what is typically the single largest contributor to customer interruptions within the Capital Region.

Along with all the specific distribution projects outlined in of each Capital Region Worst Performing Feeder's Action Plan section, listed below are additional efforts to improve restoration times:

- The Eastern Division Reliability Team will continue to investigate and analyze outages impacting greater than 2,500 customers or more than 50,000 customer-minutes-interrupted (CMI). This effort will look at the interruptions impacting the greatest number of customers to see what could have been done better to reduce the length of the interruption or to have eliminated it altogether.
- The review of suitable locations for the installation of new cutout-mounted reclosers. This will prevent sustained outages that, otherwise, would have been momentary in nature.
- The review of suitable locations for the installation of new reclosers. These will assist in decreasing customer counts in the event of a sustained outage as well as prevent sustained outages that, otherwise, would have been momentary in nature.
- The review of suitable locations for the installation of switches which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.
- The review of fusing coordination on feeders to assist in decreasing customer counts in the event of a sustained outage.
- Identify switches with porcelain insulators to be replaced with either switches with polymer insulators or hook stick switches.

D. CENTRAL REGION

1. OPERATING REGIONAL PERFORMANCE

a. HISTORIC CAIDI AND SAIFI INDICES

IDS Info:

	2022	2021	2020	2019	2018	2017
CAIDI (Target 1.899)	1.84	1.70	1.65	1.65	1.80	1.70
SAIFI (Target 1.226)	1.15	1.40	1.04	1.06	1.17	1.16
SAIDI	2.11	2.37	1.72	1.75	2.11	1.98
Interruptions	2,414	2,479	2,103	2,003	2,313	2,033
Customers Interrupted	333,799	406,484	301,159	305,267	334,013	328,521
Customer-Hours Interrupted	613,424	690,331	495,444	503,716	601,662	558,888
Customers Served	291,189	290,852	288,777	287,348	285,558	282,491
Customers Per Interruption	138.28	163.97	143.20	152.40	144.41	161.59
Availability Index	99.9760	99.9729	99.9805	99.9800	99.9759	99.9774
Interruptions/1000 customers	8.29	8.52	7.28	6.97	8.10	7.20

b. DISCUSSION OF REGIONAL PERFORMANCE

In 2022, the Central Region met its CAIDI reliability target and met its SAIFI reliability target as set forth by the New York Public Service Commission (PSC). The final System Average Interruption Frequency Index (SAIFI) result was 1.15 interruptions, 6% below the PSC goal of 1.226 interruptions. As shown in the table above, the Customer Average Interruption Duration index (CAIDI) was 1.84 in 2022, 3% below the PSC's regional target of 1.899 hours.

The 2022 CAIDI result was 8% above the 2021 result of 1.7 hours, and 8% above the previous 5-year average of 1.70 hours. The 2022 SAIFI was 18% below the 2021 result of 1.4 interruptions, and 2% below the previous 5-year average of 1.17 interruptions.

In 2022, excluding major storms, the Central Region experienced 20 transmission interruptions. These interruptions accounted for 1% of the region's total interruptions (20 of 2,414), 21% of the region's total customers interrupted (CI), (69,925 of 333,799), and 21% (126,003 of 613,424) of the region's total customer-hours interrupted (CHI). Overall, transmission interruptions had a CAIDI of 1.8 hours, and a SAIFI of 0.24 interruptions.

The number of transmission-related interruptions decreased from 26 in 2021 to 20 in 2022 (a decrease of 23%). The number of customers interrupted decreased from 77,615 in 2021, to 69,925 in 2022 (a decrease of 10%), while the customer-hours interrupted decreased from 132,851 in 2021, to 126,003 in 2022 (a decrease of 5%).

In 2022, excluding major storms, the Central Region experienced 13 substation interruptions. These interruptions accounted for 1% of the region's total interruptions (13 of 2,414), 7% of the region's total customers interrupted, (24,456 of 333,799), and 5% (31,055 of 613,424) of the region's total customer-hours interrupted. Overall, substation interruptions had a CAIDI of 1.27 hours, and a SAIFI of 0.08 interruptions.

The number of substation-related interruptions remained the same from 13 to 13 from 2021 to 2022 (no change). The number of customers interrupted decreased from 24,965 in 2021, to 24,456 in 2022 (a decrease of 2%), while the customer-hours interrupted decreased from 37,843 in 2021, to 31,055 in 2022 (a decrease of 18%).

In 2022, excluding major storms, the Central Region experienced 2,381 distribution interruptions. These interruptions accounted for 99% of the region's total interruptions (2,381 of 2,414), 72% of the region's total customers interrupted, (239,418 of 333,799), and 74% (456,366 of 613,424) of the region's total customer-hours interrupted. Overall, distribution interruptions had a CAIDI of 1.91 hours, and a SAIFI of 0.82 interruptions.

The number of distribution-related interruptions decreased from 2,440 to 2,381 from 2021 to 2022 (a decrease of 2%). The number of customers interrupted decreased from 303,904 in 2021, to 239,418 in 2022 (a decrease of 21%), while the customer-hours interrupted decreased from 519,633 in 2021, to 456,366 in 2022 (a decrease of 12%).

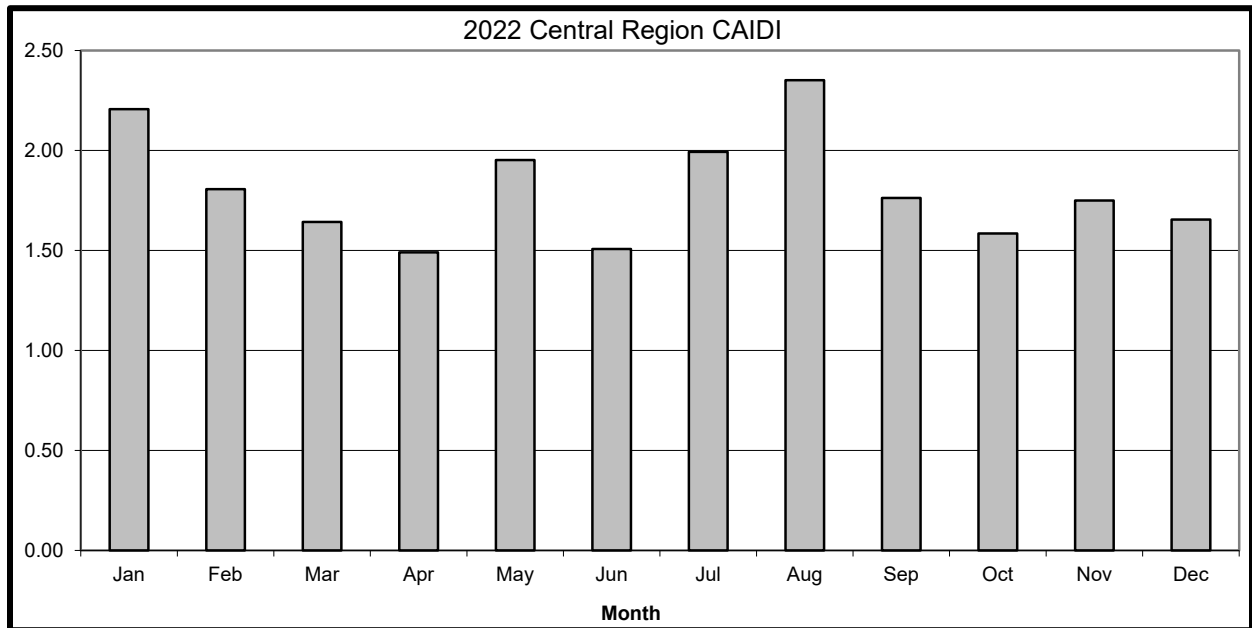
c. MONTHLY CAIDI AND SAIFI GRAPHS

The following graphs show the monthly CAIDI and SAIFI for the Central Region for 2022 (Excluding Major Storms).

Regional CAIDI exceeded the PSC threshold of 1.899 hours in January (2.21), May (1.95), July (1.99) and August (2.35). CAIDI in January was influenced by a double circuit transmission interruption on January 15th. CAIDI in May was influenced by sub-transmission interruptions throughout the month. CAIDI in July was influenced by tree events. CAIDI in August was influenced by a weather event on the 7th and 8th.

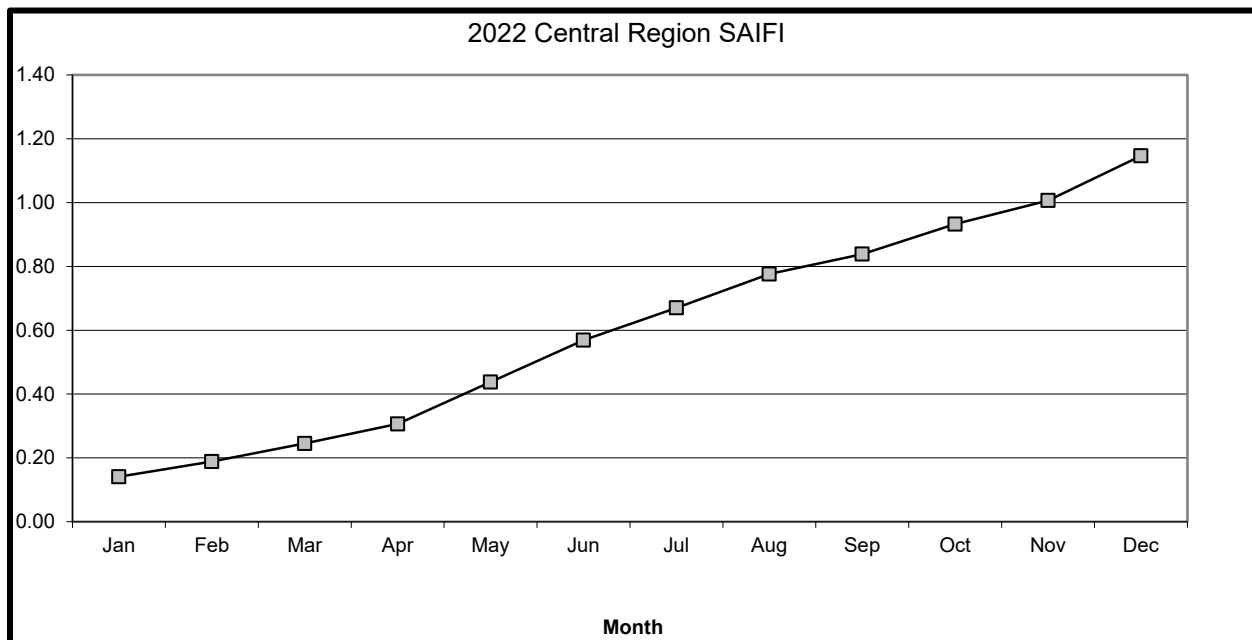
Regional SAIFI was above the monthly thresholds in January (0.14), March (0.14), May (0.13) and December (0.14). January's SAIFI was impacted by a double circuit transmission event on the 15th. The SAIFI was above the threshold in March due to higher-than-normal device failures and accidents. May's SAIFI was impacted by a weather event on the 16th. December's SAIFI was impacted by an interruption to the Lighthouse Hill-Clay #7 Line.

GRAPH OF MONTHLY CAIDI AND SAIFI FOR CENTRAL REGION



PSC CAIDI Goal:	
Threshold	1.899
2022 Actual	1.84

PSC SAIFI Goal:	
Threshold	1.226
2022 Actual	1.15



d. PSC CAUSE CODES

1) Number of Events by Cause – Historical

IDS Info:

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	235	157	143	698	635	419
02 Tree Contacts	682	781	528	500	693	577
03 Overloads	11	10	56	22	69	9
04 Operator Error	17	9	13	5	5	7
05 Equipment	776	774	667	732	688	654
06 Accidents	470	395	455	358	445	397
07 Prearranged	94	125	108	96	81	67
08 Customer Equip.	0	0	1	1	0	0
09 Lightning	97	129	24	36	66	36
10 Unknown	267	256	252	253	266	286
Total	2,649	2,636	2,246	2,246	2,948	2,452

2) Customers Interrupted by Cause – Historical

IDS Info:

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	29,242	21,494	30,121	87,616	96,440	49,394
02 Tree Contacts	113,048	171,635	92,186	78,098	108,612	94,053
03 Overloads	413	144	4,730	243	1,446	1,241
04 Operator Error	4,953	2,231	7,025	110	7,145	1,807
05 Equipment	133,946	110,069	98,212	108,707	104,157	106,175
06 Accidents	51,917	80,899	54,427	46,402	49,516	34,450
07 Prearranged	6,678	20,632	11,617	17,497	32,038	20,802
08 Customer Equip.	0	0	18	5	0	0
09 Lightning	4,841	5,963	2,691	6,171	4,531	5,568
10 Unknown	18,003	14,911	30,298	48,034	26,568	64,425
Total	363,041	427,978	331,280	392,883	430,453	377,915

3) Customer-Hours Interrupted by Cause – Historical

IDS Info:

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	119,036	77,026	92,052	370,365	508,277	246,273
02 Tree Contacts	230,936	325,960	150,754	166,050	225,964	187,343
03 Overloads	996	438	18,050	1,222	3,961	354
04 Operator Error	3,544	3,628	8,345	168	4,382	1,103
05 Equipment	242,778	171,910	186,351	173,269	181,626	206,034
06 Accidents	86,826	126,879	72,988	74,079	89,571	58,404
07 Prearranged	7,653	20,260	11,309	26,962	15,378	10,547
08 Customer Equip.	0	0	26	8	0	0
09 Lightning	10,669	15,302	3,628	15,700	15,939	6,325
10 Unknown	30,022	25,950	44,063	46,258	64,843	88,780
Total	732,460	767,354	587,495	874,081	1,109,938	805,161

4) Interruptions, Customers Interrupted and Customer-Hours Interrupted - 2022

Cause Code	Interruptions		Customers Interrupted		Customer-Hours Interrupted	
	Number	% Total	Number	% Total	Number	% Total
01 Major Storms	235	8.9%	29,242	8.1%	119,036	16.3%
02 Tree Contacts	682	25.7%	113,048	31.1%	230,936	31.5%
03 Overloads	11	0.4%	413	0.1%	996	0.1%
04 Operator Error	17	0.6%	4,953	1.4%	3,544	0.5%
05 Equipment	776	29.3%	133,946	36.9%	242,778	33.1%
06 Accidents	470	17.7%	51,917	14.3%	86,826	11.9%
07 Prearranged	94	3.5%	6,678	1.8%	7,653	1.0%
08 Customer Equip.	0	0.0%	0	0.0%	0	0.0%
09 Lightning	97	3.7%	4,841	1.3%	10,669	1.5%
10 Unknown	267	10.1%	18,003	5.0%	30,022	4.1%
Total	2,649	100.0%	363,041	100.0%	732,460	100.0%

e. **INTERRUPTION REVIEW BY PSC CAUSE CODES**

Cause Code 01 - Major Storms

In 2022, Major Storms accounted for 9% of interruptions, 8% of customers interrupted, and 16% of Customer-Hours Interrupted.

Interruptions due to Major Storm were up 50% from 2021, and down 43% over the 5-year average. Customers interrupted due to Major Storms were up 36% from 2021, and down 49% over the 5-year average. Customer-Hours interrupted were up 55% from 2021 and down 54% over the 5-year average.

The remaining PSC code descriptions do not include Major Storms in the percentages.

Cause Code 02 - Tree Contacts

In 2022, Tree Contacts accounted for 28% of interruptions, 34% of customers interrupted, and 38% of Customer-Hours Interrupted.

Interruptions due to Tree Contacts were down 13% from 2021, and up 11% over the 5-year average. Customers interrupted due to Tree Contacts were down 34% from 2021, and up 4% over the 5-year average. Customer-Hours interrupted were down 29% from 2021 and up 10% over the 5-year average.

Tree Contacts were the 2nd largest cause of interruptions in 2022.

Cause Code 03 - Overloads

In 2022, Overloads accounted for 0% of interruptions, 0% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Overloads were up 10% from 2021, and down 67% over the 5-year average. Customers interrupted due to Overloads were up 187% from 2021, and down 74% over the 5-year average. Customer-Hours interrupted were up 127% from 2021 and down 79% over the 5-year average.

Overloads were the 8th largest cause of interruptions in 2022.

Cause Code 04 - Operator Error

In 2022, Operator Error accounted for 1% of interruptions, 1% of customers interrupted, and 1% of Customer-Hours Interrupted.

Interruptions due to Operator Error were up 89% from 2021, and up 113% over the 5-year average. Customers interrupted due to Operator Error were up 122% from 2021, and up 35% over the 5-year average. Customer-Hours interrupted were down 2% from 2021 and up 1% over the 5-year average.

Operator Error was the 7th largest cause of interruptions in 2022.

Cause Code 05 - Equipment Failure

In 2022, Equipment Failures accounted for 32% of interruptions, 40% of customers interrupted, and 40% of Customer-Hours Interrupted.

Interruptions due to Equipment Failure were up 0% from 2021, and up 10% over the 5-year average. Customers interrupted due to Equipment Failure were up 22% from 2021, and up 27% over the 5-year average. Customer-Hours interrupted were up 41% from 2021 and up 32% over the 5-year average.

Equipment Failures were the largest cause of interruptions in 2022.

Cause Code 06 - Accidents

In 2022, Accidents accounted for 19% of interruptions, 16% of customers interrupted, and 14% of Customer-Hours Interrupted.

Interruptions due to Accidents were up 19% from 2021, and up 15% over the 5-year average. Customers interrupted due to Accidents were down 36% from 2021, and down 2% over the 5-year average. Customer-Hours interrupted were down 32% from 2021 and up 3% over the 5-year average.

Accidents were the 3rd largest cause of interruptions in 2022.

Cause Code 07 - Prearranged

In 2022, Prearranged accounted for 4% of interruptions, 2% of customers interrupted, and 1% of Customer-Hours Interrupted.

Interruptions due to Prearranged were down 25% from 2021, and down 1% over the 5-year average. Customers interrupted due to Prearranged were down 68% from 2021, and down 67% over the 5-year average. Customer-Hours interrupted were down 62% from 2021 and down 55% over the 5-year average.

Prearranged was the 6th largest cause of interruptions in 2022.

Cause Code 08 - Customer Equipment

There were no Customer Equipment interruptions in 2022.

Cause Code 09 - Lightning

In 2022, Lightning accounted for 4% of interruptions, 1% of customers interrupted, and 2% of Customer-Hours Interrupted.

Interruptions due to Lightning were down 25% from 2021, and up 67% over the 5-year average. Customers interrupted due to Lightning were down 19% from 2021, and down 3% over the 5-year average. Customer-Hours interrupted were down 30% from 2021 and down 6% over the 5-year average.

Lightning was the 5th largest cause of interruptions in 2022.

Cause Code 10 - Unknown

In 2022, Unknown causes accounted for 11% of interruptions, 5% of customers interrupted, and 5% of Customer-Hours Interrupted.

Interruptions due to Unknown causes were up 4% from 2021, and up 0% over the 5-year average. Customers interrupted due to Unknown causes were up 21% from 2021, and down 52% over the 5-year average. Customer-Hours interrupted were up 16% from 2021 and down 46% over the 5-year average.

Unknown causes were the 4th largest cause of interruptions in 2022.

f. DISCUSSION OF REGIONAL CAPEX PROJECTS WITH 2021/22 SPENDS

The Company continues to work on capital projects in the Central Region in order to maintain customer satisfaction and future reliability. Some specific projects that were constructed in either CY22 or will be constructed in CY23 are listed below. Additional descriptions of other major infrastructure projects will follow.

There are several projects where lines are being rebuilt or reconductored. These projects are either the result of engineering reliability reviews (ERRs) conducted on the Worst Performing Circuits or are the responses to customer inquiries via the Quick Resolution System (QRS). There are several sub-transmission line rebuild projects and a number of distribution line rebuild projects in progress.

There are additional load relief projects scheduled to be completed throughout the region. Most of these load relief projects are ratio transformer replacements or voltage conversions. Line reconductoring is also included in the voltage conversions, where appropriate.

There are also a number of substation projects that were completed, are underway or slated to begin in 2022. All but one of these projects are load relief projects. These projects include constructing new feeders to retire old 5kV substations. These projects include a Harris Road (to retire Glenwood) and Milton Ave (to retire Hinsdale and Camillus).

Major Capital Projects for Central Region:

Region	Project Name	Project Type	Fin Sys Project No.	Finish	Total Spend
Central	WPC Teall-Oneida 5 - WO 30422904 - C084553	Trans Line	C084553	10/20/22	\$6,493,000
Central	WPC FY21 Tilden Cortland #18 - C084553	Trans Line	C084553	3/25/22	\$6,493,000
Central	Harris Road D-Line	Dist Line	C032446	6/16/22	\$10,028,000
Central	CRCC - UPGRADE RTU (PCC 1 & PCC 2) (DxT) - C022151		C022151	2/1/22	\$11,302,367
Central	EXELON FITZPATRICK M9000 RTU - C069437	Trans Sub	C069437	9/14/22	\$1,870,000
Central	HOPKINS ROAD STATION - DSCADA (ADD RTU) - C077972	Dist Sub	C077972	6/10/22	\$2,344,000
Central	DF - MILTON AVE- TR1 FAILURE - C089081	Dist Sub	C089081	4/15/22	\$1,999,900
Central	LHH 44 2012 NYS PSC Action item - CR47	Dist Line	CD00953	8/16/22	\$1,008,211

g. DISCUSSION OF REGIONAL PERFORMANCE OF LVAC (LOW VOLTAGE AC) NETWORK DISTRIBUTION SYSTEM(S)

City of Syracuse - Ash Street LVAC Network

The Ash Street LVAC Network serves the northern downtown area and James Street of the City of Syracuse. This system is supplied by ten 11.5kV feeders that originate from the Ash Street substation. This system serves approximately 2,012 customer accounts and experienced a peak load of approximately 23.175 MVA in 2022.

The table below lists the breaker operations in 2022 that were a result of a fault and/or failure.

Substation	Feeder Number	Breaker Number	Breaker Number	# Breaker Operations from Failures
Ash Street	22340	R400	R4505	0
Ash Street	22341	R410	R4175	0
Ash Street	22342	R420	R4265	0
Ash Street	22343	R430	R4315	0
Ash Street	22344	R440	R4485	0
Ash Street	22345	R450	R4505	1
Ash Street	22346	R460	R4265	1
Ash Street	22347	R470	R4175	1
Ash Street	22348	R480	R4485	0
Ash Street	22349	R490	R4295	0

As shown above, the Ash Street LVAC Network experienced three feeder outages in 2022. All outages involved cable. The cable was repaired and placed back into service. At no time was this network operated beyond its double contingency (N-2) design criteria.

There one major event at the Ash Street station where an animal tripped the 11.5kV bus A as well as Feeder 49. No customers had an interruption during this event.

Annual maintenance consisted of manhole and vault inspections, network protector and transformer inspections and network protector operation checks.

Equipment maintenance consisted of manhole and vault rebuilds, network protector and transformer replacements.

At this time, there are no major projects being designed and/or under construction.

City of Syracuse – Temple Street LVAC Network

The Temple Street LVAC Network serves the southern downtown area of the City of Syracuse with several spot network services in the northern area. This network is supplied by seven 13.2kV feeders that originate from the Temple Street substation. This system serves approximately 510 customer accounts and experienced a peak load of approximately 17.315 MVA in 2022.

The table below lists the breaker operations in 2022 that were a result of a fault and/or failure.

Substation	Feeder	Breaker	Breaker	# Breaker Operations from Failures
Temple Street	24349	R490	R4895	0
Temple Street	24350	R500	R5015	0
Temple Street	24353	R530	R5235	0
Temple Street	24354	R540	R5455	1
Temple Street	24356	R560	R5675	0
Temple Street	24357	R570	R5675	1
Temple Street	24358	R580	R5895	0

As shown above the Temple Street LVAC Network experienced two feeder outages in 2022. At no time was this network operated beyond its double contingency (N-2) design criteria.

There were no major events associated with the network in 2022.

Annual maintenance consisted of manhole and vault inspections, network protector and transformer inspections and network protector operation checks.

Equipment maintenance consisted of manhole and vault rebuilds, network protector and transformer replacements.

There are two major projects being designed and/or under being designed and/or under construction, to replace the two metalclad switchgear where one of the two metalclad switchgear supplies the seven feeders of the LVAC Network system.

City of Cortland LVAC Network

The Cortland LVAC Network serves the downtown area of the City of Cortland along Main Street from Lincoln Avenue to Port Watson Street. This network is supplied by three 4.8kV feeders: two feeders from the Cortland Substation and one feeder from the Miller Street Substation. This system serves approximately 378 customer accounts and experienced a peak load of approximately 1.734 MVA in 2022.

The table below lists the breaker operations in 2022 that were a result of a fault and/or failure.

Substation	Feeder Number	Breaker Number	# Breaker Operations from Failures
Cortland	50201	R010	0
Cortland	50204	R040	0
Miller Street	11705	R050	0

As shown above the Cortland LVAC Network experienced zero feeder outages in 2022. There were no customer interruptions. At no time was this network operated beyond its single contingency (N-1) design criteria.

There was one event in 2022 where we lost the 34.5kV source at the Miller Street station. No customers had an interruption during this event.

Annual maintenance consisted of manhole and vault inspections, network protector and transformer inspections and network protector operation checks.

Equipment maintenance consisted of manhole and vault rebuilds, network protector and transformer replacements.

At this time, there are no major projects being designed and/or under construction.

The Company has decided to transform this LVAC Network system into a LVAC Radial system. The project to disassemble the network is scheduled to begin in 2025.

2. OPERATING CIRCUIT LISTS

The next three (3) tables will provide the following information for the Central Region.

- a. Worst Performing Circuit List
- b. Worst Performing Circuits with 3 Year History for CAIDI and SAIFI Indices
- c. Worst Performing Circuits by # of Momentary Interruptions

a. NATIONAL GRID WORST PERFORMING CIRCUIT LIST

CENTRAL REGION

FEEDER #	A CUST. SERVED	B TOTAL INTER.	C # CUST. INTER.	D CUST. HRS. INTER.	C/A SAIFI	D/A SAIDI	D/C CAIDI	NUMBER OF MOMENTARIES
WEST MONROE 27451	2,045	44	14,057	13,646	6.87	6.67	0.97	11
COLOSSE 32151	2,632	54	12,532	16,958	4.76	6.44	1.35	9
WEST CLEVELAND 32651	822	33	5,620	9,614	6.84	11.70	1.71	9
THIRD ST 21672	945	20	4,434	9,930	4.69	10.51	2.24	0
E PULASKI 32451	2,039	36	4,355	17,416	2.14	8.54	4.00	2
SOUTHWOOD 24452	2,004	22	7,214	14,052	3.60	7.01	1.95	4
CLEVELAND 1166	1,158	17	4,845	13,584	4.18	11.73	2.80	8
LIGHTHOUSE HILL 6144	2,329	55	4,185	18,313	1.80	7.86	4.38	0
LORDS HILL 15067	794	23	3,073	5,854	3.87	7.37	1.90	2
SANDY CREEK 6652	1,700	36	3,609	10,504	2.12	6.18	2.91	3
TRUXTON 7473	548	35	1,483	4,683	2.71	8.55	3.16	3
NEW HAVEN 25652	1,425	24	3,570	8,130	2.51	5.70	2.28	0
NILES 29451	1,322	29	2,756	7,041	2.08	5.33	2.55	2
BELMONT 26054	1,641	16	4,501	9,848	2.74	6.00	2.19	0
MILTON AVE 26656	1,531	23	2,204	12,934	1.44	8.45	5.87	4
SORRELL HILL 26954	3,264	20	8,984	10,616	2.75	3.25	1.18	6
GILBERT MILLS 24751	2,187	29	3,719	9,895	1.70	4.52	2.66	4
CONSTANTIA 1923	683	11	4,678	5,793	6.85	8.48	1.24	9
CENTRAL SQUARE 1562	605	13	2,781	4,315	4.60	7.13	1.55	9

Regional Goals:
CAIDI 1.899
SAIFI 1.226

b. NATIONAL GRID WORST PERFORMING CIRCUITS WITH 3 YEAR HISTORY FOR CAIDI AND SAIFI INDICES

CENTRAL REGION

FEEDER #	2022 CAIDI	2021 CAIDI	2020 CAIDI	2019 CAIDI	2022 SAIFI	2021 SAIFI	2020 SAIFI	2019 SAIFI
WEST MONROE 27451	0.97	1.97	0.81	0.48	6.87	8.74	2.43	3.55
COLOSSE 32151	1.35	1.12	0.63	1.41	4.76	5.60	1.44	1.41
WEST CLEVELAND 32651	1.71	2.70	1.36	2.43	6.84	11.52	3.89	2.12
THIRD ST 21672	2.24	2.44	2.11	2.20	4.69	2.93	0.97	1.55
E PULASKI 32451	4.00	1.34	1.36	0.96	2.14	1.29	0.41	2.64
SOUTHWOOD 24452	1.95	1.43	3.01	2.89	3.60	1.13	1.54	3.01
CLEVELAND 1166	2.80	3.07	0.79	3.24	4.18	5.37	1.65	0.17
LIGHTHOUSE HILL 6144	4.38	1.33	1.41	2.76	1.80	3.77	4.46	1.25
LORDS HILL 15067	1.90	2.88	4.00	2.74	3.87	0.72	0.36	2.67
SANDY CREEK 6652	2.91	2.19	1.49	1.33	2.12	5.56	1.41	1.38
TRUXTON 7473	3.16	2.11	1.74	5.19	2.71	0.88	5.29	3.48
NEW HAVEN 25652	2.28	2.06	1.34	2.25	2.51	1.71	2.47	3.66
NILES 29451	2.55	3.92	4.03	4.00	2.08	2.23	2.10	0.69
BELMONT 26054	2.19	0.83	1.34	0.53	2.74	1.07	0.08	3.01
MILTON AVE 26656	5.87	0.98	0.96	3.39	1.44	2.23	4.62	0.03
SORRELL HILL 26954	1.18	1.50	1.65	2.01	2.75	1.26	1.06	0.12
GILBERT MILLS 24751	2.66	1.47	1.79	3.76	1.70	4.72	1.84	0.62
CONSTANTIA 1923	1.24	3.18	1.66	1.67	6.85	7.31	2.02	1.15
CENTRAL SQUARE 1562	1.55	3.13	2.14	1.53	4.60	4.49	1.88	4.09

Regional Goals:
 CAIDI 1.899
 SAIFI 1.226

c. NATIONAL GRID WORST PERFORMING CIRCUITS BY # OF MOMENTARY INTERRUPTIONS

CENTRAL REGION

Feeders			Customer Momentaries				Ranks		
Volts (kV)	Station Name	Ckt/F No.	Substation	Transmission	Distribution	Total	Within Region	Within System	Reliability Ranking
13.2	West Monroe	11-27451	0	9	2	11	1	4	10

d. WORST PERFORMING CIRCUIT ANALYSIS

In 2021, the Central Region is required to analyze and report on nineteen of the worst performing circuits. The list consists of Twelve 13.2kV circuits, one 12kV, five 4.8kV circuits and one 4.16kV circuit.

The reliability performance thresholds for the Central Region are 1.899 hours for CAIDI and 1.226 interruptions for SAIFI.

1. WEST MONROE 27451 - 13.2kV

Profile: 2,045 Customers, 88.23 Circuit Miles
Indices: CAIDI = 0.97, SAIFI = 6.87

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	22	50.00%	5,199	36.99%	5,753	42.15%
3	OVERLOADS	1	2.27%	3	0.02%	8	0.06%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	10	22.73%	8,338	59.32%	7,153	52.41%
6	ACCIDENTS	4	9.09%	347	2.47%	369	2.71%
7	PREARRANGED	1	2.27%	5	0.04%	8	0.06%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	2.27%	1	0.01%	4	0.03%
10	UNKNOWN	5	11.36%	164	1.17%	353	2.59%
Totals		44	100.00%	14,057	100.00%	13,646	100.00%

Problem Analysis:

- There were 44 interruptions on the West Monroe 27451 in 2022.
- There were 3 transmission interruptions.
 - The first Transmission interruption occurred on January 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 15% of the total customers interrupted (2,042 of 14,057), and 20% of the total customer-hours interrupted (2,712 of 13,646). This was due to a down conductor on the Lighthouse Hill-Clay #7 Line.
 - The second Transmission interruption occurred on December 13, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 14% of the total customers interrupted (2,036 of 14,057), and 1% of the total customer-hours interrupted (196 of 13,646). This was due to multiple sections of shield wire that had come down on the Lighthouse Hill-Clay #7 Line.
 - The third Transmission interruption occurred on May 27, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 15% of the total customers interrupted (2,048 of 14,057), and 18% of the total customer-hours interrupted (2,428 of 13,646). This event was due to a broken guy wire on the Mallory-Cleveland 31 Line.
- There was 1 substation interruption.
 - This Substation interruption occurred on January 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 15% of the total customers interrupted (2,041 of 14,057), and 8% of the total customer-hours interrupted (1,123 of 13,646). This interruption was due to problems in closing the Mallory-Cleveland 31 breaker at Mallory after the Lighthouse Hill-Clay 7 lockout.
- The remaining 40 events occurred at the distribution level.

- The distribution circuit breaker for the West Monroe 27451 experienced 11 momentary operations in 2022.
- The distribution circuit breaker for the West Monroe 27451 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 29% of the total amount of customers interrupted (4,081 out of 14,057) and 26% of the total amount of the customer-hours interrupted (3,553 out of 13,646).
 - The first lockout occurred on May 16, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 15% of the total customers interrupted (2,045 of 14,057), and 17% of the total customer-hours interrupted (2,252 of 13,646).
 - The second lockout occurred on December 06, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 14% of the total customers interrupted (2,036 of 14,057), and 10% of the total customer-hours interrupted (1,300 of 13,646).
- Trees were the leading cause of interruptions on the West Monroe 27451 in 2022, accounting for 50% of total interruptions (22 of 44). Equipment Failures were the 2nd leading cause of interruptions, accounting for 23% of total interruptions (10 of 44). Unknown were the 3rd leading cause of interruptions, accounting for 11% of total interruptions (5 of 44).
- Equipment Failures were the leading cause of customers interrupted (CI) on the West Monroe 27451 in 2022, accounting for 59% of total customers interrupted (8,338 of 14,057). Trees were the 2nd leading cause of customers interrupted, accounting for 37% of total customers interrupted (5,199 of 14,057). Accidents were the 3rd leading cause of customers interrupted, accounting for 2% of total customers interrupted (347 of 14,057).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the West Monroe 27451 in 2022, accounting for 52% of total customer-hours interrupted (7,153 of 13,646). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 42% of total customer-hours interrupted (5,753 of 13,646). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (369 of 13,646).
- Of the 44 interruptions on this circuit, 14 affected 10 customers or less, with 5 being single customer outages.

Action Taken:

- Completed all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder in May 2021.
- Distribution Forestry cycle pruned the feeder in FY2021.
- Distribution Forestry completed Ash tree removals on the feeder in FY2021.
- 313 Hazard trees have been removed since 2019
- Replaced 6 rotted/woodpecker damaged poles in the Mallory-Cleveland 31 Line (34.5kV)

Action Plan:

- Install sectionalizing breakers on the transmission line side of Mallory Substation FY26
- The I&M inspection (foot patrol) of the feeder will be conducted 2023.
- Hazard tree removal to be completed in 2023.
- Replace additional poles on Mallory-Cleveland 31 Line (34.5kV)

2. COLOSSE 32151 - 13.2kV

Profile: 2,632 Customers, 139.6 Circuit Miles
 Indices: CAIDI = 1.35, SAIFI = 4.76

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	28	51.85%	2,413	19.25%	10,497	61.90%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	14	25.93%	9,213	73.52%	4,729	27.89%
6	ACCIDENTS	7	12.96%	876	6.99%	1,646	9.71%
7	PREARRANGED	1	1.85%	2	0.02%	3	0.02%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	3	5.56%	19	0.15%	62	0.36%
10	UNKNOWN	1	1.85%	9	0.07%	22	0.13%
Totals		54	100.00%	12,532	100.00%	16,958	100.00%

Problem Analysis:

- There were 54 interruptions on the Colosse 32151 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on December 13, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 21% of the total customers interrupted (2,629 of 12,532), and 1% of the total customer-hours interrupted (253 of 16,958). This was due to multiple section of static wire down on the Lighthouse Hill-Clay #7 115kV line.
- There were no substation interruptions.
- The remaining 53 events occurred at the distribution level.
- The distribution circuit breaker for the Colosse 32151 experienced 9 momentary operations in 2022.
- The distribution circuit breaker for the Colosse 32151 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 21% of the total amount of customers interrupted (2,633 out of 12,532) and 2% of the total amount of the customer-hours interrupted (380 out of 16,958).
 - This lockout occurred on July 18, 2022, coded as a cause of fire on company equipment (PSC cause code 05). This lockout accounted for 21% of the total customers interrupted (2,633 of 12,532), and 2% of the total customer-hours interrupted (380 of 16,958). This was due to a pole fire.
- Trees were the leading cause of interruptions on the Colosse 32151 in 2022, accounting for 52% of total interruptions (28 of 54). Equipment Failures were the 2nd leading cause of interruptions, accounting for 26% of total interruptions (14 of 54). Accidents were the 3rd leading cause of interruptions, accounting for 13% of total interruptions (7 of 54).

- Equipment Failures were the leading cause of customers interrupted (CI) on the Colosse 32151 in 2022, accounting for 74% of total customers interrupted (9,213 of 12,532). Trees were the 2nd leading cause of customers interrupted, accounting for 19% of total customers interrupted (2,413 of 12,532). Accidents were the 3rd leading cause of customers interrupted, accounting for 7% of total customers interrupted (876 of 12,532).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Colosse 32151 in 2022, accounting for 62% of total customer-hours interrupted (10,497 of 16,958). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 28% of total customer-hours interrupted (4,729 of 16,958). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 10% of total customer-hours interrupted (1,646 of 16,958).
- Reclosers on this circuit experienced 5 interruptions in 2022. These interruptions accounted for 40% of the total customers interrupted (5,016 of 12,532) and 56% of the total customer-hours interrupted (9,454 of 16,958).
 - The first interruption occurred on March 24, 2022, coded as device failed (PSC cause code 05). This lockout (R40411) accounted for 10% of the total customers interrupted (1,302 of 12,532), and 2% of the total customer-hours interrupted (391 of 16,958). This was due to a broken pole.
 - The second interruption occurred on May 17, 2022, coded as deterioration (PSC cause code 05). This lockout (R40677) accounted for 10% of the total customers interrupted (1,292 of 12,532), and 2% of the total customer-hours interrupted (391 of 16,958). This was to take slack out.
 - The third interruption occurred on June 17, 2022, coded as device failed (PSC cause code 05). This lockout (R40411) accounted for 10% of the total customers interrupted (1,310 of 12,532), and 19% of the total customer-hours interrupted (3,221 of 16,958). This was due to a burnt tap.
 - The fourth interruption occurred on December 22, 2022, coded as Tree fell (PSC cause code 02). This lockout (R6120) accounted for 4% of the total customers interrupted (556 of 12,532), and 4% of the total customer-hours interrupted (695 of 16,958).
 - The fifth interruption occurred on December 23, 2022, coded as tree fell (PSC cause code 02). This lockout (R40411) accounted for 4% of the total customers interrupted (556 of 12,532), and 29% of the total customer-hours interrupted (4,867 of 16,958). This was due to a broken pole.
- Of the 54 interruptions on this circuit, 30 affected 10 customers or less, with 14 being single customer outages.

Action Taken:

- The I&M inspection (foot patrol) of the feeder was completed in August 2021.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder in August 2022.
- 301 Hazard trees have been removed since 2019

Action Plan:

- Install sectionalizing breakers on the transmission line side of Mallory Substation FY26
- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder in August 2024.
- Routine tree trimming/pruning to be completed in FY2023.

3. WEST CLEVELAND 32651 - 13.2kV

Profile: 822 Customers, 47.2 Circuit Miles
 Indices: CAIDI = 1.71, SAIFI = 6.84

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	13	39.39%	781	13.90%	2,671	27.79%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	24.24%	3,307	58.84%	4,841	50.35%
6	ACCIDENTS	5	15.15%	957	17.03%	611	6.35%
7	PREARRANGED	1	3.03%	1	0.02%	1	0.01%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	3.03%	1	0.02%	4	0.04%
10	UNKNOWN	5	15.15%	573	10.20%	1,486	15.46%
Totals		33	100.00%	5,620	100.00%	9,614	100.00%

Problem Analysis:

- There were 33 interruptions on the West Cleveland 32651 in 2022.
- There were 3 transmission interruptions.
 - The first Transmission interruption occurred on January 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 13% of the total customers interrupted (749 of 5,620), and 10% of the total customer-hours interrupted (995 of 9,614). This was due to a down conductor on the Lighthouse Hill-Clay #7 Line.
 - The second Transmission interruption occurred on December 13, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 16% of the total customers interrupted (918 of 5,620), and 1% of the total customer-hours interrupted (88 of 9,614). This was due to multiple sections of shield wire that had come down on the Lighthouse Hill-Clay #7 Line.
 - The third Transmission interruption occurred on May 27, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 13% of the total customers interrupted (754 of 5,620), and 31% of the total customer-hours interrupted (3,028 of 9,614). This event was due to a broken guy wire on the Mallory-Cleveland 31 Line.
- There were 2 substation interruption.
 - The first Substation interruption occurred on January 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 13% of the total customers interrupted (749 of 5,620), and 4% of the total customer-hours interrupted (406 of 9,614). This interruption was due to problems in closing the Mallory-Cleveland 31 breaker at Mallory after the Lighthouse Hill-Clay 7 lockout.

- The second Substation interruption occurred on September 6, 2022, coded as a cause of Animal (PSC cause code 06). This lockout accounted for 16% of the total customers interrupted (921 of 5,620), and 6% of the total customer-hours interrupted (542 of 9,614). This interruption was due to due animal contact on one of the station voltage regulators.
- The remaining 28 events occurred at the distribution level.
- The distribution circuit breaker for the West Cleveland 27451 experienced 9 momentary operations in 2022.
- Trees were the leading cause of interruptions on the West Cleveland 32651 in 2022, accounting for 39% of total interruptions (13 of 33). Equipment Failures were the 2nd leading cause of interruptions, accounting for 24% of total interruptions (8 of 33). Unknown and Accidents were the 3rd leading cause of interruptions, accounting for 15% of total interruptions (5 of 33 each).
- Equipment Failures were the leading cause of customers interrupted (CI) on the West Cleveland 32651 in 2022, accounting for 59% of total customers interrupted (3,307 of 5,620). Accidents were the 2nd leading cause of customers interrupted, accounting for 17% of total customers interrupted 957 of 5,620). Trees were the 3rd leading cause of customers interrupted, accounting for 14% of total customers interrupted (781 of 5,620).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the West Cleveland 32651 in 2022, accounting for 50% of total customer-hours interrupted (4,841 of 9,614). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 28% of total customer-hours interrupted (2,671 of 9,614). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 15% of total customer-hours interrupted (1,486 of 9,614).
- Of the 44 interruptions affecting this circuit, 10 affected 10 customers or less, with 5 being single customer outages.

Action Taken:

- The I&M inspection (foot patrol) of the feeder was completed in June 2020.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by June 2021.
- Distribution Forestry cycle pruned the feeder in FY2022.
- 288 Hazard trees have been removed since 2019
- Replaced 6 rotted/woodpecker damaged poles in the Mallory-Cleveland 31 Line (34.5kV)

Action Plan:

- Install sectionalizing breakers on the transmission line side of Mallory Substation FY26
- Distribution Forestry to monitor the feeder for hazard trees
- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by June 2023.
- Replace additional poles on Mallory-Cleveland 31 Line (34.5kV)

4. THIRD ST 21672 – 4.8kV

Profile: 945 Customers, 27.6 Circuit Miles
 Indices: CAIDI = 2.24, SAIFI = 4.69

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	50.00%	2,347	52.93%	6,470	65.16%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	4	20.00%	103	2.32%	305	3.07%
6	ACCIDENTS	4	20.00%	1,034	23.32%	2,005	20.19%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	2	10.00%	950	21.43%	1,150	11.58%
Totals		20	100.00%	4,434	100.00%	9,930	100.00%

Problem Analysis:

- There were 20 interruptions on the Third St 21672 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on May 26, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 21% of the total customers interrupted (947 of 4,434), and 11% of the total customer-hours interrupted (1,139 of 9,930).
 - The second Transmission interruption occurred on January 08, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 30% of the total customers interrupted (1,332 of 4,434), and 44% of the total customer-hours interrupted (4,344 of 9,930). The tree was on the tap to Third Street substation.
- There were no substation interruptions.
- The remaining 18 events occurred at the distribution level.
- The distribution circuit breaker for the Third St 21672 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Third St 21672 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Third St 21672 in 2022, accounting for 50% of total interruptions (10 of 20). Equipment Failures were the 2nd leading cause of interruptions, accounting for 20% of total interruptions (4 of 20). Accidents were the 3rd leading cause of interruptions, accounting for 20% of total interruptions (4 of 20).

- Trees were the leading cause of customers interrupted (CI) on the Third St 21672 in 2022, accounting for 53% of total customers interrupted (2,347 of 4,434). Accidents were the 2nd leading cause of customers interrupted, accounting for 23% of total customers interrupted (1,034 of 4,434). Unknown were the 3rd leading cause of customers interrupted, accounting for 21% of total customers interrupted (950 of 4,434).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Third St 21672 in 2022, accounting for 65% of total customer-hours interrupted (6,470 of 9,930). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 20% of total customer-hours interrupted (2,005 of 9,930). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 12% of total customer-hours interrupted (1,150 of 9,930).
- Of the 20 interruptions on this circuit, 8 affected 10 customers or less, with 2 being single customer outages.

Action Taken:

- Distribution Forestry cycle pruned the feeder in FY2019.
- The I&M inspection (foot patrol) of the feeder was in March 2020.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by March 2021.

Action Plan:

- Routine tree trimming/pruning to be completed in FY2025.
- Hazard tree removal to be completed in 2023.
- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by March 2023.

5. E PULASKI 32451 - 13.2kV

Profile: 2,039 Customers, 105.4 Circuit Miles
Indices: CAIDI = 4.00, SAIFI = 2.14

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	27.78%	1,196	27.46%	5,046	28.97%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	22.22%	3,034	69.67%	11,752	67.47%
6	ACCIDENTS	4	11.11%	13	0.30%	23	0.13%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	5	13.89%	7	0.16%	35	0.20%
10	UNKNOWN	9	25.00%	105	2.41%	561	3.22%
Totals		36	100.00%	4,355	100.00%	17,416	100.00%

Problem Analysis:

- There were 36 interruptions on the E Pulaski 32451 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 36 events occurred at the distribution level.
- The distribution circuit breaker for the E Pulaski 32451 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the E Pulaski 32451 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 67% of the total amount of customers interrupted (2,938 out of 4,355) and 65% of the total amount of the customer-hours interrupted (11,407 out of 17,416).
 - This lockout occurred on August 07, 2022, coded as a cause of insulation failure - cable (PSC cause code 05). This lockout accounted for 67% of the total customers interrupted (2,938 of 4,355), and 65% of the total customer-hours interrupted (11,407 of 17,416). This was due to a main line cable fault.
- Trees were the leading cause of interruptions on the E Pulaski 32451 in 2022, accounting for 28% of total interruptions (10 of 36). Unknown were the 2nd leading cause of interruptions, accounting for 25% of total interruptions (9 of 36). Equipment Failures were the 3rd leading cause of interruptions, accounting for 22% of total interruptions (8 of 36).
- Equipment Failures were the leading cause of customers interrupted (CI) on the E Pulaski 32451 in 2022, accounting for 70% of total customers interrupted (3,034 of 4,355). Trees were the 2nd leading cause of customers interrupted, accounting for 27% of total customers interrupted (1,196 of 4,355). Unknown were the 3rd leading cause of customers interrupted, accounting for 2% of total customers interrupted (105 of 4,355).

- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the E Pulaski 32451 in 2022, accounting for 67% of total customer-hours interrupted (11,752 of 17,416). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 29% of total customer-hours interrupted (5,046 of 17,416). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (561 of 17,416).
- Of the 36 interruptions on this circuit, 22 affected 10 customers or less, with 11 being single customer outages.

Action Taken:

- The I&M inspection (foot patrol) of the feeder was completed in October 2019.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by October 2020.
- Completed all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by October 2022.

Action Plan:

- Hazard tree removal to be completed in 2023.
- Routine tree trimming/pruning is planned to be completed in FY2023.

6. SOUTHWOOD 24452 - 13.2kV

Profile: 2,004 Customers, 76.4 Circuit Miles
 Indices: CAIDI = 1.95, SAIFI = 3.60

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	6	27.27%	3,896	54.01%	7,574	53.90%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	11	50.00%	3,152	43.69%	5,609	39.91%
6	ACCIDENTS	2	9.09%	135	1.87%	697	4.96%
7	PREARRANGED	1	4.55%	11	0.15%	34	0.24%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	2	9.09%	20	0.28%	139	0.99%
Totals		22	100.00%	7,214	100.00%	14,052	100.00%

Problem Analysis:

- There were 22 interruptions on the Southwood 24452 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 22 events occurred at the distribution level.
- The distribution circuit breaker for the Southwood 24452 experienced 4 momentary operations in 2022.
- The distribution circuit breaker for the Southwood 24452 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 51% of the total amount of customers interrupted (3,712 out of 7,214) and 47% of the total amount of the customer-hours interrupted (6,657 out of 14,052).
 - The first lockout occurred on July 25, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 24% of the total customers interrupted (1,725 of 7,214), and 34% of the total customer-hours interrupted (4,733 of 14,052).
 - The second lockout occurred on June 04, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 28% of the total customers interrupted (1,987 of 7,214), and 14% of the total customer-hours interrupted (1,924 of 14,052).
- Equipment Failures were the leading cause of interruptions on the Southwood 24452 in 2022, accounting for 50% of total interruptions (11 of 22). Trees were the 2nd leading cause of interruptions, accounting for 27% of total interruptions (6 of 22). Accidents were the 3rd leading cause of interruptions, accounting for 9% of total interruptions (2 of 22).

- Trees were the leading cause of customers interrupted (CI) on the Southwood 24452 in 2022, accounting for 54% of total customers interrupted (3,896 of 7,214). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 44% of total customers interrupted (3,152 of 7,214). Accidents were the 3rd leading cause of customers interrupted, accounting for 2% of total customers interrupted (135 of 7,214).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Southwood 24452 in 2022, accounting for 54% of total customer-hours interrupted (7,574 of 14,052). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 40% of total customer-hours interrupted (5,609 of 14,052). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (697 of 14,052).
- Of the 22 interruptions on this circuit, 7 affected 10 customers or less, with 4 being single customer outages.

Action Taken:

- The I&M inspection (foot patrol) of the feeder was completed in May 2021.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder in May 2022

Action Plan:

- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder in May 2024
- Routine tree trimming/pruning is planned to be completed in FY2023.

7. CLEVELAND 1166 – 4.8kV

Profile: 1,158 Customers, 42.4 Circuit Miles
 Indices: CAIDI = 2.80, SAIFI = 4.18

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	58.82%	195	4.02%	1,081	7.96%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	7	41.18%	4,650	95.98%	12,503	92.04%
6	ACCIDENTS	0	0.00%	0	0.00%	0	0.00%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	0	0.00%	0	0.00%	0	0.00%
Totals		17	100.00%	4,845	100.00%	13,584	100.00%

Problem Analysis:

- There were 17 interruptions on the Cleveland 1166 in 2022.
- There were 3 transmission interruptions.
 - The first Transmission interruption occurred on January 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 24% of the total customers interrupted (1,162 of 4,845), and 411% of the total customer-hours interrupted (1,543 of 13,584). This was due to a down conductor on the Lighthouse Hill-Clay #7 Line.
 - The second Transmission interruption occurred on December 13, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 24% of the total customers interrupted (1,155 of 4,845), and 0.8% of the total customer-hours interrupted (111 of 13,584). This was due to multiple sections of shield wire that had come down on the Lighthouse Hill-Clay #7 Line.
 - The third Transmission interruption occurred on May 27, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 24% of the total customers interrupted (1,155 of 4,845), and 75% of the total customer-hours interrupted (10,188 of 13,584). This event was due to a broken guy wire on the Mallory-Cleveland 31 Line.
- There was 1 substation interruption.
 - This Substation interruption occurred on January 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 24% of the total customers interrupted (1,162 of 4,845), and 4.7% of the total customer-hours interrupted (639 of 13,584). This interruption was due to problems in closing the Mallory-Cleveland 31 breaker at Mallory after the Lighthouse Hill-Clay 7 lockout.
- The remaining 13 events occurred at the distribution level.

- The distribution circuit breaker for the West Cleveland 27451 experienced 9 momentary operations in 2022.
- Trees were the leading cause of interruptions on the Cleveland 1166 in 2022, accounting for 59% of total interruptions (10 of 17). Equipment Failures were the 2nd leading cause of interruptions, accounting for 41% of total interruptions (7 of 17).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Cleveland 1166 in 2022, accounting for 96% of total customers interrupted (4,650 of 4,845). Trees were the 2nd leading cause of customers interrupted, accounting for 4% of total customers interrupted (195 of 4,845).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Cleveland 1166 in 2022, accounting for 92% of total customer-hours interrupted (12,503 of 13,584). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 8% of total customer-hours interrupted (1,081 of 13,845).
- Of the 17 interruptions affecting this circuit, 6 affected 10 customers or less, with 2 being single customer outages.

Action Taken:

- Distribution Forestry cycle pruned the feeder in FY2022.
- The I&M inspection (foot patrol) of the feeder was completed in 2021.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder in 2022.
- Distribution Forestry completed Ash tree removals on the feeder in FY2021.
- 595 Hazard trees have been removed since 2019
- Replaced 6 rotted/woodpecker damaged poles in the Mallory-Cleveland 31 Line (34.5kV)

Action Plan:

- Install sectionalizing breakers on the transmission line side of Mallory Substation FY26
- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by 2024.
- Replace additional poles on Mallory-Cleveland 31 Line (34.5kV)

8. LIGHTHOUSE HILL 6144 – 12.0kV

Profile: 2,329 Customers, 158.8 Circuit Miles
 Indices: CAIDI = 4.38, SAIFI = 1.80

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	33	60.00%	3,471	82.94%	16,646	90.89%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	13	23.64%	96	2.29%	435	2.37%
6	ACCIDENTS	3	5.45%	495	11.83%	735	4.01%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	1.82%	2	0.05%	21	0.11%
10	UNKNOWN	5	9.09%	121	2.89%	478	2.61%
Totals		55	100.00%	4,185	100.00%	18,313	100.00%

Problem Analysis:

- There were 55 interruptions on the Lighthouse Hill 6144 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 55 events occurred at the distribution level.
- The distribution circuit breaker for the Lighthouse Hill 6144 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Lighthouse Hill 6144 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Lighthouse Hill 6144 in 2022, accounting for 60% of total interruptions (33 of 55). Equipment Failures were the 2nd leading cause of interruptions, accounting for 24% of total interruptions (13 of 55). Unknown were the 3rd leading cause of interruptions, accounting for 9% of total interruptions (5 of 55).
- Trees were the leading cause of customers interrupted (CI) on the Lighthouse Hill 6144 in 2022, accounting for 83% of total customers interrupted (3,471 of 4,185). Accidents were the 2nd leading cause of customers interrupted, accounting for 12% of total customers interrupted (495 of 4,185). Unknown were the 3rd leading cause of customers interrupted, accounting for 3% of total customers interrupted (121 of 4,185).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Lighthouse Hill 6144 in 2022, accounting for 91% of total customer-hours interrupted (16,646 of 18,313). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 4% of total customer-hours interrupted (735 of 18,313). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (478 of 18,313).

- Of the 55 interruptions on this circuit, 24 affected 10 customers or less, with 10 being single customer outages.

Action Taken:

- Distribution Forestry cycle pruned the feeder in FY2019.
- The I&M inspection (foot patrol) of the feeder was completed in November 2020.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by November 2021.

Action Plan:

- Routine tree trimming/pruning to be completed in FY2025.
- Forestry to review for hazard tree removals
- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by November 2023.

9. LORDS HILL 15067 – 4.8kV

Profile: 794 Customers, 24.8 Circuit Miles
 Indices: CAIDI = 1.90, SAIFI = 3.87

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	43.48%	1,871	60.89%	3,450	58.94%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	5	21.74%	944	30.72%	2,040	34.84%
6	ACCIDENTS	4	17.39%	47	1.53%	131	2.23%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	4	17.39%	211	6.87%	234	3.99%
Totals		23	100.00%	3,073	100.00%	5,854	100.00%

Problem Analysis:

- There were 23 interruptions on the Lords Hill 15067 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on October 17, 2022, coded as a cause of tree - vines (PSC cause code 02). This lockout accounted for 29% of the total customers interrupted (881 of 3,073), and 25% of the total customer-hours interrupted (1,468 of 5,854). The tree vines were located on P250 between Fabius and Pompey
 - The second Transmission interruption occurred on December 01, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 26% of the total customers interrupted (797 of 3,073), and 27% of the total customer-hours interrupted (1,608 of 5,854). Tree fell broke P32 Cherry Valley and took down Sub-t line
- There were no substation interruptions.
- The remaining 21 events occurred at the distribution level.
- The distribution circuit breaker for the Lords Hill 15067 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Lords Hill 15067 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Lords Hill 15067 in 2022, accounting for 43% of total interruptions (10 of 23). Equipment Failures were the 2nd leading cause of interruptions, accounting for 22% of total interruptions (5 of 23). Accidents were the 3rd leading cause of interruptions, accounting for 17% of total interruptions (4 of 23).

- Trees were the leading cause of customers interrupted (CI) on the Lords Hill 15067 in 2022, accounting for 61% of total customers interrupted (1,871 of 3,073). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 31% of total customers interrupted (944 of 3,073). Unknown were the 3rd leading cause of customers interrupted, accounting for 7% of total customers interrupted (211 of 3,073).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Lords Hill 15067 in 2022, accounting for 59% of total customer-hours interrupted (3,450 of 5,854). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 35% of total customer-hours interrupted (2,040 of 5,854). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 4% of total customer-hours interrupted (234 of 5,854).
- Of the 23 interruptions on this circuit, 14 affected 10 customers or less, with 5 being single customer outages.

Action Taken:

- Distribution Forestry cycle pruned the feeder in FY2021.
- The I&M inspection (foot patrol) of the feeder was completed in July 2021.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by April 2022.

Action Plan:

- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by April 2024.
- Routine tree trimming/pruning to be completed in FY2027.
- Forestry to review for hazard tree removals, out to the first protective device

10. SANDY CREEK 6652 - 13.2kV

Profile: 1,700 Customers, 57.0 Circuit Miles
Indices: CAIDI = 2.91, SAIFI = 2.12

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	19	52.78%	2,547	70.57%	9,160	87.21%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	9	25.00%	1,027	28.46%	1,233	11.74%
6	ACCIDENTS	3	8.33%	9	0.25%	21	0.20%
7	PREARRANGED	1	2.78%	1	0.03%	1	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	4	11.11%	25	0.69%	89	0.85%
Totals		36	100.00%	3,609	100.00%	10,504	100.00%

Problem Analysis:

- There were 36 interruptions on the Sandy Creek 6652 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 36 events occurred at the distribution level.
- The distribution circuit breaker for the Sandy Creek 6652 experienced 3 momentary operations in 2022.
- The distribution circuit breaker for the Sandy Creek 6652 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Sandy Creek 6652 in 2022, accounting for 53% of total interruptions (19 of 36). Equipment Failures were the 2nd leading cause of interruptions, accounting for 25% of total interruptions (9 of 36). Unknown were the 3rd leading cause of interruptions, accounting for 11% of total interruptions (4 of 36).
- Trees were the leading cause of customers interrupted (CI) on the Sandy Creek 6652 in 2022, accounting for 71% of total customers interrupted (2,547 of 3,609). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 28% of total customers interrupted (1,027 of 3,609). Unknown were the 3rd leading cause of customers interrupted, accounting for 1% of total customers interrupted (25 of 3,609).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Sandy Creek 6652 in 2022, accounting for 87% of total customer-hours interrupted (9,160 of 10,504). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 12% of total customer-hours interrupted (1,233 of 10,504). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 1% of total customer-hours interrupted (89 of 10,504).

- Reclosers on this circuit experienced 3 interruptions in 2022. These interruptions accounted for 43% of the total customers interrupted (1,538 of 3,609) and 40% of the total customer-hours interrupted (4,187 of 10,504).
 - The first interruption occurred on February 20, 2022, coded as tree fell (PSC cause code 02). This lockout (R41474) accounted for 5% of the total customers interrupted (188 of 3,609), and 4% of the total customer-hours interrupted (382 of 10,504).
 - The second interruption occurred on August 21, 2022, coded as tree fell (PSC cause code 02). This lockout (R42651) accounted for 19% of the total customers interrupted (676 of 3,609), and 31% of the total customer-hours interrupted (3,272 of 10,504).
 - The third interruption occurred on June 17, 2022, coded as tree-broken limb (PSC cause code 02). This lockout (R2651) accounted for 19% of the total customers interrupted (676 of 3,609), and 5% of the total customer-hours interrupted (533 of 10,504).
- Of the 36 interruptions on this circuit, 17 affected 10 customers or less, with 7 being single customer outages.

Action Taken:

- The I&M inspection (foot patrol) of the feeder was completed in October 2019.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by October 2020.
- Completed all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by October 2022.

Action Plan:

- Routine tree trimming/pruning to be completed in FY2023.
- Hazard tree removal to be completed in 2023.

11. TRUXTON 7473 - 4.8kV

Profile: 548 Customers, 57.1 Circuit Miles
Indices: CAIDI = 3.16, SAIFI = 2.71

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	21	60.00%	627	42.28%	3,813	81.43%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	9	25.71%	715	48.21%	595	12.71%
6	ACCIDENTS	1	2.86%	116	7.82%	174	3.72%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	2.86%	2	0.13%	8	0.17%
10	UNKNOWN	3	8.57%	23	1.55%	92	1.97%
Totals		35	100.00%	1,483	100.00%	4,683	100.00%

Problem Analysis:

- There were 35 interruptions on the Truxton 7473 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on January 17, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 37% of the total customers interrupted (550 of 1,483), and 6% of the total customer-hours interrupted (303 of 4,683). Sub-t pole caught fire between Cuyler and Ballina
- There were no substation interruptions.
- The remaining 34 events occurred at the distribution level.
- The distribution circuit breaker for the Truxton 7473 experienced 3 momentary operations in 2022.
- The distribution circuit breaker for the Truxton 7473 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Truxton 7473 in 2022, accounting for 60% of total interruptions (21 of 35). Equipment Failures were the 2nd leading cause of interruptions, accounting for 26% of total interruptions (9 of 35). Unknown were the 3rd leading cause of interruptions, accounting for 9% of total interruptions (3 of 35).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Truxton 7473 in 2022, accounting for 48% of total customers interrupted (715 of 1,483). Trees were the 2nd leading cause of customers interrupted, accounting for 42% of total customers interrupted (627 of 1,483). Accidents were the 3rd leading cause of customers interrupted, accounting for 8% of total customers interrupted (116 of 1,483).

- Trees were the leading cause of customer-hours interrupted (CHI) on the Truxton 7473 in 2022, accounting for 81% of total customer-hours interrupted (3,813 of 4,683). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 13% of total customer-hours interrupted (595 of 4,683). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 4% of total customer-hours interrupted (174 of 4,683).
- Of the 35 interruptions on this circuit, 26 affected 10 customers or less, with 13 being single customer outages.

Action Taken:

- Distribution Forestry cycle pruned the feeder in FY2020.
- The I&M inspection (foot patrol) of the feeder was completed in June 2020.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by June 2021.

Action Plan:

- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by June 2023.
- Routine tree trimming/pruning to be completed in FY2026.
- Schedule and perform mid cycle hazard tree review
- Creating a feeder tie between Loring's, to be completed in FY2027

12. NEW HAVEN 25652 - 13.2kV

Profile: 1,425 Customers, 71.7 Circuit Miles
 Indices: CAIDI = 2.28, SAIFI = 2.51

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	41.67%	2,727	76.39%	7,085	87.16%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	33.33%	561	15.71%	799	9.82%
6	ACCIDENTS	3	12.50%	266	7.45%	211	2.60%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	4.17%	2	0.06%	8	0.10%
10	UNKNOWN	2	8.33%	14	0.39%	26	0.32%
Totals		24	100.00%	3,570	100.00%	8,130	100.00%

Problem Analysis:

- There were 24 interruptions on the New Haven 25652 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 24 events occurred at the distribution level.
- The distribution circuit breaker for the New Haven 25652 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the New Haven 25652 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 40% of the total amount of customers interrupted (1,442 out of 3,570) and 24% of the total amount of the customer-hours interrupted (1,947 out of 8,130).
 - This lockout occurred on May 21, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 40% of the total customers interrupted (1,442 of 3,570), and 24% of the total customer-hours interrupted (1,947 of 8,130).
- Trees were the leading cause of interruptions on the New Haven 25652 in 2022, accounting for 42% of total interruptions (10 of 24). Equipment Failures were the 2nd leading cause of interruptions, accounting for 33% of total interruptions (8 of 24). Accidents were the 3rd leading cause of interruptions, accounting for 13% of total interruptions (3 of 24).
- Trees were the leading cause of customers interrupted (CI) on the New Haven 25652 in 2022, accounting for 76% of total customers interrupted (2,727 of 3,570). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 16% of total customers interrupted (561 of 3,570). Accidents were the 3rd leading cause of customers interrupted, accounting for 7% of total customers interrupted (266 of 3,570).

- Trees were the leading cause of customer-hours interrupted (CHI) on the New Haven 25652 in 2022, accounting for 87% of total customer-hours interrupted (7,085 of 8,130). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 10% of total customer-hours interrupted (799 of 8,130). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (211 of 8,130).
- Reclosers on this circuit experienced 3 interruptions in 2022. These interruptions accounted for 41% of the total customers interrupted (1,446 of 3,570) and 19% of the total customer-hours interrupted (1,533 of 8,130).
 - The first interruption occurred on February 17, 2022, coded as device failed (PSC cause code 02). This lockout (R1195) accounted for 7% of the total customers interrupted (263 of 3,570), and 3% of the total customer-hours interrupted (237 of 8,130). This was due to a broken insulator.
 - The second interruption occurred on February 24, 2022, coded as tree fell (PSC cause code 02). This lockout (R41195) accounted for 7% of the total customers interrupted (263 of 3,570), and 3% of the total customer-hours interrupted (204 of 8,130). This was due to a motor vehicle accident on CR-4.
 - The third interruption occurred on April 15, 2022, coded as tree fell (PSC cause code 02). This lockout (R2651) accounted for 26% of the total customers interrupted (920 of 3,570), and 13% of the total customer-hours interrupted (1,092 of 8,130).
- Of the 24 interruptions on this circuit, 10 affected 10 customers or less, with 7 being single customer outages.

Action Taken:

- Distribution Forestry cycle pruned the feeder in FY2021.
- The I&M inspection (foot patrol) of the feeder was completed in June 2018.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by June 2019.
- Completed all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by June 2021.

Action Plan:

- Hazard tree removal to be completed in 2023.

13. NILES 29451 - 13.2kV

Profile: 1,322 Customers, 105.7 Circuit Miles
 Indices: CAIDI = 2.55, SAIFI = 2.08

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	13	44.83%	414	15.02%	2,819	40.03%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	20.69%	384	13.93%	1,006	14.28%
6	ACCIDENTS	2	6.90%	334	12.12%	127	1.80%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	6.90%	1,346	48.84%	2,237	31.77%
10	UNKNOWN	6	20.69%	278	10.09%	853	12.11%
Totals		29	100.00%	2,756	100.00%	7,041	100.00%

Problem Analysis:

- There were 29 interruptions on the Niles 29451 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 29 events occurred at the distribution level.
- The distribution circuit breaker for the Niles 29451 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Niles 29451 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 48% of the total amount of customers interrupted (1,324 out of 2,756) and 30% of the total amount of the customer-hours interrupted (2,098 out of 7,041).
 - This lockout occurred on June 26, 2022, coded as a cause of lightning (PSC cause code 09). This lockout accounted for 48% of the total customers interrupted (1,324 of 2,756), and 30% of the total customer-hours interrupted (2,098 of 7,041).
- Trees were the leading cause of interruptions on the Niles 29451 in 2022, accounting for 45% of total interruptions (13 of 29). Equipment Failures were the 2nd leading cause of interruptions, accounting for 21% of total interruptions (6 of 29). Unknown were the 3rd leading cause of interruptions, accounting for 21% of total interruptions (6 of 29).
- Lightning were the leading cause of customers interrupted (CI) on the Niles 29451 in 2022, accounting for 49% of total customers interrupted (1,346 of 2,756). Trees were the 2nd leading cause of customers interrupted, accounting for 15% of total customers interrupted (414 of 2,756). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 14% of total customers interrupted (384 of 2,756).

- Trees were the leading cause of customer-hours interrupted (CHI) on the Niles 29451 in 2022, accounting for 40% of total customer-hours interrupted (2,819 of 7,041). Lightning were the 2nd leading cause of customer-hours interrupted, accounting for 32% of total customer-hours interrupted (2,237 of 7,041). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 14% of total customer-hours interrupted (1,006 of 7,041).
- Of the 29 interruptions on this circuit, 11 affected 10 customers or less, with 3 being single customer outages.

Action Taken:

- Distribution Forestry cycle pruned the feeder in FY2022.
- The I&M inspection (foot patrol) of the feeder was completed in May 2019.
- Complete all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by May 2020.
- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by May 2022.

Action Plan:

- Hazard tree removal to be completed in 2023.

14. BELMONT 26054 - 13.2kV

Profile: 1,641 Customers, 9.3 Circuit Miles
Indices: CAIDI = 2.19, SAIFI = 2.74

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	1	6.25%	1	0.02%	4	0.05%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	9	56.25%	2,533	56.28%	5,976	60.69%
6	ACCIDENTS	3	18.75%	1,789	39.75%	3,786	38.44%
7	PREARRANGED	2	12.50%	162	3.60%	48	0.49%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	1	6.25%	16	0.36%	33	0.33%
Totals		16	100.00%	4,501	100.00%	9,848	100.00%

Problem Analysis:

- There were 16 interruptions on the Belmont 26054 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on January 15, 2022, coded as a cause of deterioration (PSC cause code 05). This lockout accounted for 35% of the total customers interrupted (1,573 of 4,501), and 28% of the total customer-hours interrupted (2,727 of 9,848). This was due to a static wire that came down on a double circuit 115kV line.
- There were no substation interruptions.
- The remaining 15 events occurred at the distribution level.
- The distribution circuit breaker for the Belmont 26054 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Belmont 26054 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 37% of the total amount of customers interrupted (1,669 out of 4,501) and 37% of the total amount of the customer-hours interrupted (3,599 out of 9,848).
 - This lockout occurred on October 28, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 37% of the total customers interrupted (1,669 of 4,501), and 37% of the total customer-hours interrupted (3,599 of 9,848). This MVA resulted in a broken pole.
- Equipment Failures were the leading cause of interruptions on the Belmont 26054 in 2022, accounting for 56% of total interruptions (9 of 16). Accidents were the 2nd leading cause of interruptions, accounting for 19% of total interruptions (3 of 16). Prearranged were the 3rd leading cause of interruptions, accounting for 13% of total interruptions (2 of 16).

- Equipment Failures were the leading cause of customers interrupted (CI) on the Belmont 26054 in 2022, accounting for 56% of total customers interrupted (2,533 of 4,501). Accidents were the 2nd leading cause of customers interrupted, accounting for 40% of total customers interrupted (1,789 of 4,501). Prearranged were the 3rd leading cause of customers interrupted, accounting for 4% of total customers interrupted (162 of 4,501).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Belmont 26054 in 2022, accounting for 61% of total customer-hours interrupted (5,976 of 9,848). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 38% of total customer-hours interrupted (3,786 of 9,848). Prearranged were the 3rd leading cause of customer-hours interrupted, accounting for 0% of total customer-hours interrupted (48 of 9,848).
- Of the 16 interruptions on this circuit, 2 affected 10 customers or less, with 2 being single customer outages.

Action Taken:

- The I&M inspection (foot patrol) of the feeder was completed in May 2021.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by May 2022.
- Distribution Forestry cycle pruned the feeder in FY2018.

Action Plan:

- Completed all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by May 2024.
- Routine tree trimming/pruning to be completed in FY2024.

15. MILTON AVE 26656 - 13.2kV

Profile: 1,531 Customers, 59.6 Circuit Miles
Indices: CAIDI = 5.87, SAIFI = 1.44

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	6	26.09%	1,705	77.36%	12,311	95.18%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	3	13.04%	77	3.49%	45	0.35%
6	ACCIDENTS	5	21.74%	46	2.09%	60	0.47%
7	PREARRANGED	2	8.70%	72	3.27%	50	0.38%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	7	30.43%	304	13.79%	468	3.62%
Totals		23	100.00%	2,204	100.00%	12,934	100.00%

Problem Analysis:

- There were 23 interruptions on the Milton Ave 26656 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 23 events occurred at the distribution level.
- The distribution circuit breaker for the Milton Ave 26656 experienced 4 momentary operations in 2022.
- The distribution circuit breaker for the Milton Ave 26656 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 70% of the total amount of customers interrupted (1,534 out of 2,204) and 92% of the total amount of the customer-hours interrupted (11,898 out of 12,934).
 - This lockout occurred on October 13, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 70% of the total customers interrupted (1,534 of 2,204), and 92% of the total customer-hours interrupted (11,898 of 12,934). This tree fell in an off-road ROW which required specialized equipment to get to the broken poles.
- Unknown were the leading cause of interruptions on the Milton Ave 26656 in 2022, accounting for 30% of total interruptions (7 of 23). Trees were the 2nd leading cause of interruptions, accounting for 26% of total interruptions (6 of 23). Accidents were the 3rd leading cause of interruptions, accounting for 22% of total interruptions (5 of 23).
- Trees were the leading cause of customers interrupted (CI) on the Milton Ave 26656 in 2022, accounting for 77% of total customers interrupted (1,705 of 2,204). Unknown were the 2nd leading cause of customers interrupted, accounting for 14% of total customers interrupted (304 of 2,204). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 3% of total customers interrupted (77 of 2,204).

- Trees were the leading cause of customer-hours interrupted (CHI) on the Milton Ave 26656 in 2022, accounting for 95% of total customer-hours interrupted (12,311 of 12,934). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 4% of total customer-hours interrupted (468 of 12,934). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 0% of total customer-hours interrupted (60 of 12,934).
- Of the 23 interruptions on this circuit, 11 affected 10 customers or less, with 4 being single customer outages.

Action Taken:

- The I&M inspection (foot patrol) of the feeder was completed in December 2020.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by December 2021.
- Distribution Forestry cycle pruned the feeder in FY2018.

Action Plan:

- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by December 2023.
- Routine tree trimming/pruning to be completed in FY2024.
- Hazard tree removal to be completed in FY2023.

16. SORRELL HILL 26954 - 13.2kV

Profile: 3,264 Customers, 35.5 Circuit Miles
Indices: CAIDI = 1.18, SAIFI = 2.75

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	8	40.00%	6,696	74.53%	5,011	47.20%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	30.00%	2,114	23.53%	5,061	47.67%
6	ACCIDENTS	3	15.00%	116	1.29%	314	2.96%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	10.00%	49	0.55%	187	1.76%
10	UNKNOWN	1	5.00%	9	0.10%	43	0.41%
Totals		20	100.00%	8,984	100.00%	10,616	100.00%

Problem Analysis:

- There were 20 interruptions on the Sorrell Hill 26954 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 20 events occurred at the distribution level.
- The distribution circuit breaker for the Sorrell Hill 26954 experienced 6 momentary operations in 2022.
- The distribution circuit breaker for the Sorrell Hill 26954 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 73% of the total amount of customers interrupted (6,521 out of 8,984) and 42% of the total amount of the customer-hours interrupted (4,506 out of 10,616).
- The first lockout occurred on October 14, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 36% of the total customers interrupted (3,260 of 8,984), and 16% of the total customer-hours interrupted (1,668 of 10,616).
- The second lockout occurred on June 14, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 36% of the total customers interrupted (3,261 of 8,984), and 27% of the total customer-hours interrupted (2,838 of 10,616).
- Trees were the leading cause of interruptions on the Sorrell Hill 26954 in 2022, accounting for 40% of total interruptions (8 of 20). Equipment Failures were the 2nd leading cause of interruptions, accounting for 30% of total interruptions (6 of 20). Accidents were the 3rd leading cause of interruptions, accounting for 15% of total interruptions (3 of 20).

- Trees were the leading cause of customers interrupted (CI) on the Sorrell Hill 26954 in 2022, accounting for 75% of total customers interrupted (6,696 of 8,984). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 24% of total customers interrupted (2,114 of 8,984). Accidents were the 3rd leading cause of customers interrupted, accounting for 1% of total customers interrupted (116 of 8,984).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Sorrell Hill 26954 in 2022, accounting for 48% of total customer-hours interrupted (5,061 of 10,616). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 47% of total customer-hours interrupted (5,011 of 10,616). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (314 of 10,616).
- The recloser (R2961) on the Sorrell Hill 26954 experienced 1 sustained interruption (lockouts) in 2022. This interruption accounted for 22% of the total amount of customers interrupted (2,003 out of 8,984) and 45% of the total amount of the customer-hours interrupted (4,816 out of 10,616). The lockout occurred on February 13, 2022, coded as a cause of insulation failure (PSC cause code 02). This interruption was due to a cable fault.
- Of the 20 interruptions on this circuit, 5 affected 10 customers or less, with 4 being single customer outages.

Action Taken:

- The I&M inspection (foot patrol) of the feeder was completed in September 2021.
- Completed all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by September 2022.
- 1,502 Ash trees have been removed since 2019.

Action Plan:

- Routine tree trimming/pruning to be completed in FY2024.
- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by September 2024.

17. GILBERT MILLS 24751 - 13.2kV

Profile: 2,187 Customers, 78.1 Circuit Miles
Indices: CAIDI = 2.66, SAIFI = 1.70

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	34.48%	761	20.46%	1,498	15.14%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	3.45%	285	7.66%	85	0.86%
5	EQUIPMENT	7	24.14%	2,434	65.45%	7,354	74.32%
6	ACCIDENTS	8	27.59%	111	2.98%	711	7.18%
7	PREARRANGED	1	3.45%	92	2.47%	140	1.41%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	2	6.90%	36	0.97%	107	1.08%
Totals		29	100.00%	3,719	100.00%	9,895	100.00%

Problem Analysis:

- There were 29 interruptions on the Gilbert Mills 24751 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 29 events occurred at the distribution level.
- The distribution circuit breaker for the Gilbert Mills 24751 experienced 4 momentary operations in 2022.
- The distribution circuit breaker for the Gilbert Mills 24751 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 59% of the total amount of customers interrupted (2,186 out of 3,719) and 73% of the total amount of the customer-hours interrupted (7,214 out of 9,895).
 - This lockout occurred on November 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 59% of the total customers interrupted (2,186 of 3,719), and 73% of the total customer-hours interrupted (7,214 of 9,895). This event was due to a failed ratio that was not fused.
- Trees were the leading cause of interruptions on the Gilbert Mills 24751 in 2022, accounting for 34% of total interruptions (10 of 29). Accidents were the 2nd leading cause of interruptions, accounting for 28% of total interruptions (8 of 29). Equipment Failures were the 3rd leading cause of interruptions, accounting for 24% of total interruptions (7 of 29).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Gilbert Mills 24751 in 2022, accounting for 65% of total customers interrupted (2,434 of 3,719). Trees were the 2nd leading cause of customers interrupted, accounting for 20% of total customers interrupted (761 of 3,719). Operators Errors were the 3rd leading cause of customers interrupted, accounting for 8% of total customers interrupted (285 of 3,719).

- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Gilbert Mills 24751 in 2022, accounting for 74% of total customer-hours interrupted (7,354 of 9,895). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 15% of total customer-hours interrupted (1,498 of 9,895). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 7% of total customer-hours interrupted (711 of 9,895).
- Of the 29 interruptions on this circuit, 15 affected 10 customers or less, with 8 being single customer outages.

Action Taken:

- The I&M inspection (foot patrol) of the feeder was completed in May 2022.
- Routine tree trimming/pruning was completed in FY2022.
- Distribution Forestry completed Ash tree removals on the feeder in FY2021.
- 768 Hazard trees have been removed since 2019.
- Fuse installed at un-fused ratio.

Action Plan:

- Complete all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by May 2023.
- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by May 2025.
- Forestry to review for hazard tree removals.

18. CONSTANTIA 1923 – 4.16kV

Profile: 683 Customers, 15.0 Circuit Miles
Indices: CAIDI = 1.24, SAIFI = 6.85

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	1	9.09%	8	0.17%	30	0.52%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	9.09%	123	2.63%	14	0.24%
5	EQUIPMENT	4	36.36%	2,816	60.20%	2,360	40.74%
6	ACCIDENTS	1	9.09%	434	9.28%	1,255	21.66%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	4	36.36%	1,297	27.73%	2,134	36.84%
Totals		11	100.00%	4,678	100.00%	5,793	100.00%

Problem Analysis:

- There were 11 interruptions on the Constantia 1923 in 2022.
- There were 3 transmission interruptions.
 - The first Transmission interruption occurred on January 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 16% of the total customers interrupted (756 of 4,678), and 17% of the total customer-hours interrupted (1,004 of 5,793). This was due to a down conductor on the Lighthouse Hill-Clay #7 Line.
 - The second Transmission interruption occurred on December 13, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 13% of the total customers interrupted (585 of 4,678), and 1% of the total customer-hours interrupted (56 of 5,793). This was due to multiple sections of shield wire that had come down on the Lighthouse Hill-Clay #7 Line.
 - The third Transmission interruption occurred on May 27, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 16% of the total customers interrupted (750 of 4,678), and 16% of the total customer-hours interrupted (901 of 5,793). This event was due to a broken guy wire on the Mallory-Cleveland 31 Line.
- There were 2 substation interruptions.
 - The first Substation interruption occurred on January 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 15% of the total customers interrupted (725 of 4,678), and 7% of the total customer-hours interrupted (399 of 5,793). This interruption was due to problems in closing the Mallory-Cleveland 31 breaker at Mallory after the Lighthouse Hill-Clay 7 lockout.

- The second Substation interruption occurred on January 24, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 16% of the total customers interrupted (756 of 4,678), and 22% of the total customer-hours interrupted (1,285 of 5,793).
- The remaining 6 events occurred at the distribution level.
- The distribution circuit breaker for the Constantia 1923 experienced 9 momentary operations in 2022.
- The distribution circuit breaker for the Constantia 1923 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 9% of the total amount of customers interrupted (434 out of 4,678) and 22% of the total amount of the customer-hours interrupted (1,255 out of 5,793).
 - This lockout occurred on September 25, 2022, coded as a cause of animal (PSC cause code 06). This lockout accounted for 9% of the total customers interrupted (434 of 4,678), and 22% of the total customer-hours interrupted (1,255 of 5,793). Cause was a squirrel.
- Equipment Failures were the leading cause of interruptions on the Constantia 1923 in 2022, accounting for 36% of total interruptions (4 of 11). Unknown were the 2nd leading cause of interruptions, accounting for 36% of total interruptions (4 of 11). Trees were the 3rd leading cause of interruptions, accounting for 9% of total interruptions (1 of 11).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Constantia 1923 in 2022, accounting for 60% of total customers interrupted (2,816 of 4,678). Unknown were the 2nd leading cause of customers interrupted, accounting for 28% of total customers interrupted (1,297 of 4,678). Accidents were the 3rd leading cause of customers interrupted, 9% of total customers interrupted (434 of 4,678).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Constantia 1923 in 2022, accounting for 41% of total customer-hours interrupted (2,360 of 5,793). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 37% of total customer-hours interrupted (2,134 of 5,793). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 22% of total customer-hours interrupted (1,255 of 5,793).
- Of the 11 interruptions on this circuit, 1 affected 10 customers or less, with 0 being single customer outages.

Action Taken:

- The I&M inspection (foot patrol) of the feeder was completed in May 2022.
- Distribution Forestry cycle pruned the feeder in FY2018.
- 434 Ash trees have been removed since 2019.
- Replaced 6 rotted/woodpecker damaged poles in the Mallory-Cleveland 31 Line (34.5kV)

Action Plan:

- Install sectionalizing breakers on the transmission line side of Mallory Substation FY26
- Distribution Forestry cycle pruned the feeder in FY2024.
- Complete all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by May 2023.
- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by May 2025.
- Replace additional poles on Mallory-Cleveland 31 Line (34.5kV).

19. CENTRAL SQUARE 1562 – 4.8kV

Profile: 605 Customers, 22.8 Circuit Miles
 Indices: CAIDI = 1.55, SAIFI = 4.60

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	4	30.77%	320	11.51%	2,294	53.16%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	46.15%	2,456	88.31%	2,005	46.46%
6	ACCIDENTS	1	7.69%	2	0.07%	3	0.07%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	7.69%	2	0.07%	10	0.24%
10	UNKNOWN	1	7.69%	1	0.04%	3	0.06%
Totals		13	100.00%	2,781	100.00%	4,315	100.00%

Problem Analysis:

- There were 13 interruptions on the Central Square 1562 in 2022.
- There were 3 transmission interruptions.
 - The first Transmission interruption occurred on January 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 22% of the total customers interrupted (609 of 2,781), and 19% of the total customer-hours interrupted (811 of 4,315). This was due to a down conductor on the Lighthouse Hill-Clay #7 Line.
 - The second Transmission interruption occurred on December 13, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 22% of the total customers interrupted (604 of 2,781), and 1% of the total customer-hours interrupted (58 of 4,315). This was due to multiple sections of shield wire that had come down on the Lighthouse Hill-Clay #7 Line.
 - The third Transmission interruption occurred on May 27, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 22% of the total customers interrupted (604 of 2,781), and 17% of the total customer-hours interrupted (725 of 4,315). This event was due to a broken guy wire on the Mallory-Cleveland 31 Line.
- There was 1 substation interruption.
 - This Substation interruption occurred on January 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 22% of the total customers interrupted (608 of 2,781), and 8% of the total customer-hours interrupted (334 of 4,315). This interruption was due to problems in closing the Mallory-Cleveland 31 breaker at Mallory after the Lighthouse Hill-Clay 7 lockout.
- The remaining 9 events occurred at the distribution level.

- The distribution circuit breaker for the Central Square 1562 experienced 9 momentary operations in 2022.
- The distribution circuit breaker for the Central Square 1562 experienced 0 sustained operations (lockouts) in 2022.
- Equipment Failures were the leading cause of interruptions on the Central Square 1562 in 2022, accounting for 46% of total interruptions (6 of 13). Trees were the 2nd leading cause of interruptions, accounting for 31% of total interruptions (4 of 13). Accidents were the 3rd leading cause of interruptions, accounting for 8% of total interruptions (1 of 13).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Central Square 1562 in 2022, accounting for 88% of total customers interrupted (2,456 of 2,781). Trees were the 2nd leading cause of customers interrupted, accounting for 12% of total customers interrupted (320 of 2,781). Accidents were the 3rd leading cause of customers interrupted, accounting for 0% of total customers interrupted (2 of 2,781).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Central Square 1562 in 2022, accounting for 53% of total customer-hours interrupted (2,294 of 4,315). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 46% of total customer-hours interrupted (2,005 of 4,315). Lightning were the 3rd leading cause of customer-hours interrupted, accounting for 0% of total customer-hours interrupted (10 of 4,315).
- Of the 13 interruptions on this circuit, 4 affected 10 customers or less, with 1 being single customer outages.

Action Taken:

- The I&M inspection (foot patrol) of the feeder was completed in March 2022.
- 284 Ash trees have been removed since 2019
- Replaced 6 rotted/woodpecker damaged poles in the Mallory-Cleveland 31 Line (34.5kV).

Action Plan:

- Install sectionalizing breakers on the transmission line side of Mallory Substation FY26.
- Distribution Forestry cycle pruned the feeder in FY2024.
- Complete all level 2 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by March 2023.
- Complete all level 3 maintenance work that was identified by the I&M inspection (foot patrol) on the feeder by March 2025.
- Replace additional poles on Mallory-Cleveland 31 Line (34.5kV)

3. ACTION PLAN SUMMARIES

a. SUMMARY OF ACTION PLANS FOR 2022 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
West Monroe	27451	2022	Install sectionalizing breakers on the transmission line side of Mallory Substation	03/2026		
West Monroe	27451	2022	The I&M inspection (foot patrol)	12/2023		Cost dependent on results of I&M patrol
West Monroe	27451	2022	Hazard tree removal	12/2023		
West Monroe	27451	2022	Replace SubT poles	12/2023		
Colosse	32151	2022	Install sectionalizing breakers on the transmission line side of Mallory Substation	03/2026		
Colosse	32151	2022	Level 3 maintenance	08/2024		
Colosse	32151	2022	Routine tree trimming/pruning to be completed in FY2023.	03/2023		
West Cleveland	32651	2022	Install sectionalizing breakers on the transmission line side of Mallory Substation	03/2026		
West Cleveland	32651	2022	Distribution Forestry to review the circuit for hazard trees.	12/2023		
West Cleveland	32651	2022	Level 3 maintenance	06/2023		
West Cleveland	32651	2022	Replace SubT poles	12/2023		
Third Street	21672	2022	Routine trimming	03/2025		
Third Street	21672	2022	Hazard tree removal	12/2023		
Third Street	21672	2022	Level 3 maintenance	03/2023		
East Pulaski	32451	2022	Routine trimming	03/2023		
East Pulaski	32451	2022	Hazard tree removal	12/2023		
Southwood	24452	2022	Level 3 maintenance	05/2024		
Southwood	24452	2022	Routine trimming	03/2023		
Cleveland	1166	2022	Level 3 maintenance	12/2024		
Cleveland	1166	2022	Install sectionalizing breakers on the transmission line side of Mallory Substation	03/2026		
Cleveland	1166	2022	Replace SubT poles	12/2023		
Lighthouse Hill	6144	2022	Routine trimming	33/2025		
Lighthouse Hill	6144	2022	Forestry to review for hazard tree removals	12/2022		
Lighthouse Hill	6144	2022	Level 3 maintenance	11/2023		
Lords Hill	15067	2022	Level 3 maintenance	4/2024		Cost dependent on results of I&M patrol
Lords Hill	15067	2022	Routine trimming	12/2026		
Lords Hill	15067	2022	Hazard tree removal	09/2023		Schedule and perform hazard tree review out to first protective devise
Sandy Creek	6652	2022	Routine trimming	03/2023		
Sandy Creek	6652	2022	Hazard tree removal	12/2023		
Truxton	7473	2022	Level 3 maintenance	06/2023		Cost dependent on results of I&M patrol
Truxton	7473	2022	Routine trimming	06/2025		
Truxton	7473	2022	hazard tree review	09/2023		Schedule and perform mid cycle hazard tree review
Truxton	7473	2022	Feeder Tie	04/2026		Work created to give Cortland OH hours and improve reliability, broken out into 3 years
New Haven	25652	2022	Hazard tree removal	12/2023		
Niles	29451	2022	Hazard tree removal	12/2023		
Belmont	26054	2022	Level 3 maintenance	05/2024		
Belmont	26054	2022	Routine trimming	03/2024		
Milton	26656	2022	Hazard tree removal	12/2023		
Milton	26656	2022	Level 3 maintenance	12/2023		
Milton	26656	2022	Routine trimming	03/2024		
Sorrell Hill	26954	2022	Level 3 maintenance	09/2024		

b. STATUS OF ACTION PLANS FOR 2021 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Actual Completion Date	Actual Cost	Comments
West Monroe	27451	2021	Install sectionalizing breakers on the transmission line side of Mallory Substation	03/2026		
West Monroe	27451	2021	The I&M inspection (foot patrol)	12/2023		Cost dependent on results of I&M patrol
West Monroe	27451	2021	Level 3 maintenance	03/2022	\$69,700	
Cleveland	1166	2021	Install sectionalizing breakers on the transmission line side of Mallory Substation	03/2026		
Cleveland	1166	2021	Level 2 maintenance	12/2022		Cost dependent on results of I&M patrol
Constantia	1923	2021	Install trip saver on P1 Johnson Road	07/2022	\$2,500	
Constantia	1923	2021	Install sectionalizing breakers on the transmission line side of Mallory Substation	03/2026		
Constantia	1923	2021	Routine tree trimming/pruning to be completed in FY2024.	03/2024		
Constantia	1923	2021	Distribution Forestry to monitor the feeder for hazard trees	12/2022		
Constantia	1923	2021	The I&M inspection (foot patrol)	12/2022		Cost dependent on results of I&M patrol
West Cleveland	32651	2021	Install sectionalizing breakers on the transmission line side of Mallory Substation	03/2026		
West Cleveland	32651	2021	Routine trimming	03/2022		
West Cleveland	32651	2021	Distribution Forestry to review the circuit for hazard trees.	12/2022		
West Cleveland	32651	2021	Level 3 maintenance	06/2023		Cost dependent on results of I&M patrol
Colosse	32151	2021	Level 2 maintenance	08/2022		Cost dependent on results of I&M patrol
Colosse	32151	2021	Level 3 maintenance	08/2024		Cost dependent on results of I&M patrol
Gilbert Mills	24751	2021	The I&M inspection (foot patrol)	07/2022		Cost dependent on results of I&M patrol
Sandy Creek	6652	2021	Level 3 maintenance	10/2022		
Sandy Creek	6652	2021	Routine trimming	03/2023		
Tully Center	27853	2021	Distribution Forestry to review the circuit for hazard trees.	12/2022		
Tully Center	27853	2021	Routine trimming	03/2026		
Lighthouse Hill	6144	2021	Routine trimming	33/2025		
Lighthouse Hill	6144	2021	Forestry to review for hazard tree removals	12/2022		
Lighthouse Hill	6144	2021	Level 3 maintenance	11/2022		
New Haven	25653	2021	Routine trimming	03/2023		
New Haven	25653	2021	The I&M inspection (foot patrol).	12/2023		Cost dependent on results of I&M patrol
Tully Center	27851	2021	Hazard tree removal	12/2022		
Niles	29451	2021	Level 3 maintenance	05/2022	\$186,500	
Whitaker	29652	2021	Routine trimming	03/2025		
Whitaker	29652	2021	Forestry to review for hazard tree removals	12/2022		
Whitaker	29652	2021	Level 3 maintenance	08/2022		
Gilbert Mills	24753	2021	Level 3 maintenance	12/2023		
Paloma	25456	2021	Level 3 maintenance	11/2023		
Sandy Creek	6651	2021	Routine trimming	03/2023		
Sandy Creek	6651	2021	Level 2 maintenance	09/2022		
Sandy Creek	6651	2021	Level 3 maintenance	09/2024		
Jewett Road	29154	2021	Level 3 maintenance	07/2022	\$40,600	
Duguid	26552	2021	Hazard tree removal	03/2022		
Duguid	26552	2021	The I&M inspection (foot patrol)	03/2022		Cost dependent on results of I&M patrol

Station	Feeder	Report Year	Action Plan	Actual Completion Date	Actual Cost	Comments
Duguid	26552	2021	Distribution Forestry cycle pruned the feeder in FY2026.	03/2026		
Duguid	26552	2021	Install new mini pad substations to relieve load in 2022.	03/2023		
Ridge Road	21994	2021	Forestry to review for hazard tree removals	12/2022		
Teall Ave	7254	2021	Maintenance Patrol	12/2022		Cost dependent on results of I&M patrol
Teall Ave	7254	2021	Install 115kV MOD	04/2022		

E. FRONTIER REGION

1. OPERATING REGIONAL PERFORMANCE

a. HISTORIC CAIDI AND SAIFI INDICES

IDS Info:

	2022	2021	2020	2019	2018	2017
CAIDI (Threshold 1.869)	1.97	1.63	2.58	1.63	1.61	1.79
SAIFI (Threshold 0.480)	0.33	0.43	0.52	0.46	0.48	0.43
SAIDI	0.66	0.70	1.34	0.76	0.77	0.77
Interruptions	1,355	1,325	1,650	1,468	1,480	1,541
Customers Interrupted	111,047	144,137	171,231	151,806	156,487	138,537
Customer-Hours Interrupted	218,658	234,433	441,958	248,160	252,020	248,544
Customers Served	332,562	332,602	330,590	328,331	326,422	324,315
Customers Per Interruption	81.95	108.78	103.78	103.41	105.73	89.90
Availability Index	99.9925	99.9920	99.9848	99.9914	99.9912	99.9913
Interruptions/1000 customers	4.07	3.98	4.99	4.47	4.53	4.75

b. DISCUSSION OF REGIONAL PERFORMANCE

In 2022, the Frontier Region did not meet its CAIDI reliability target and met its SAIFI reliability target as set forth by the New York Public Service Commission (PSC). The final System Average Interruption Frequency Index (SAIFI) result was 0.33 interruptions, 31% below the PSC goal of 0.480 interruptions. As shown in the table above, the Customer Average Interruption Duration index (CAIDI) was 1.97 in 2022, 5% above the PSC's regional target of 1.869 hours.

The 2022 CAIDI result was 21% above the 2021 result of 1.63 hours, and 5% above the previous 5-year average of 1.87 hours. The 2022 SAIFI was 23% below the 2021 result of 0.43 interruptions, and 28% below the previous 5-year average of 0.46 interruptions.

In 2022, excluding major storms, the Frontier Region experienced 6 transmission interruptions. These interruptions accounted for 0.4% of the region's total interruptions (6 of 1,355), 10% of the region's total customers interrupted (CI), (11,631 of 111,047), and 13% (27,965 of 218,658) of the region's total customer-hours interrupted (CHI). Overall, transmission interruptions had a CAIDI of 2.4 hours, and a SAIFI of 0.03 interruptions.

The number of transmission-related interruptions increased from 3 in 2021 to 6 in 2022 (an increase of 100%). The number of customers interrupted increased from 11,183 in 2021, to 11,631 in 2022 (an increase of 4%), while the customer-hours interrupted increased from 6,013 in 2021, to 27,965 in 2022 (an increase of 365%).

In 2022, excluding major storms, the Frontier Region experienced 8 substation interruptions. These interruptions accounted for 1% of the region's total interruptions (8 of 1,355), 7% of the region's total customers interrupted, (8,159 of 111,047), and 7% (14,449 of 218,658) of the region's total customer-hours interrupted. Overall, substation interruptions had a CAIDI of 1.77 hours, and a SAIFI of 0.02 interruptions.

The number of substation-related interruptions decreased from 14 to 8 from 2021 to 2022 (a decrease of 43%). The number of customers interrupted decreased from 27,221 in 2021, to 8,159 in 2022 (a decrease of 70%), while the customer-hours interrupted decreased from 39,766 in 2021, to 14,449 in 2022 (a decrease of 64%).

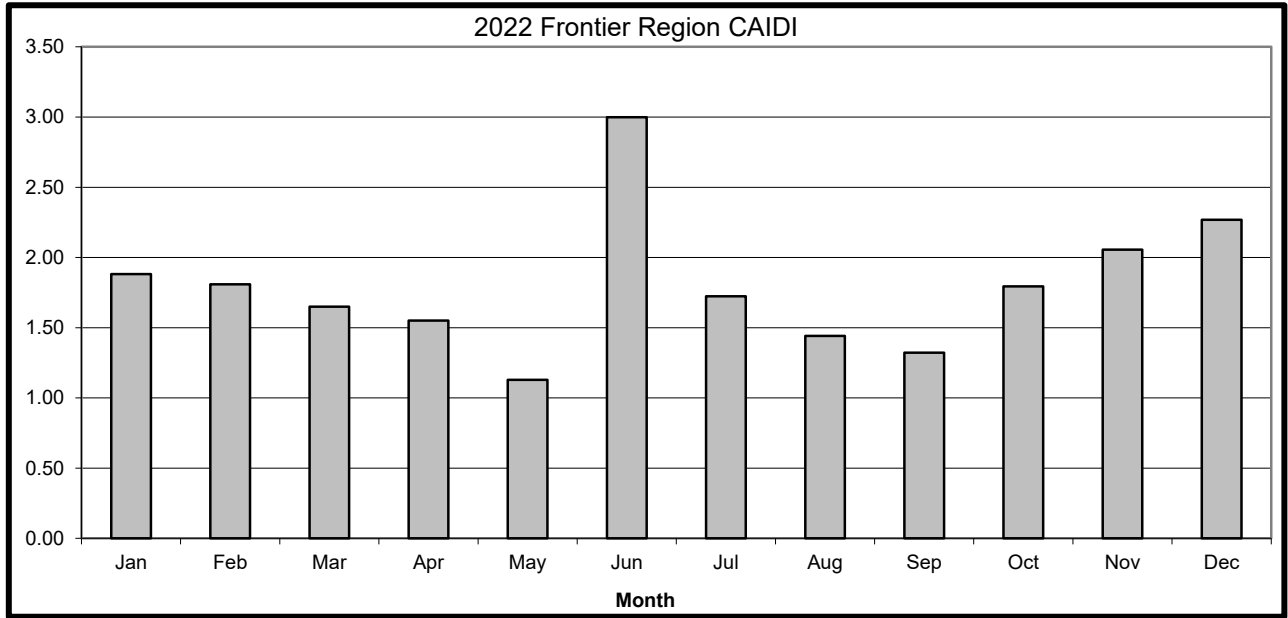
In 2022, excluding major storms, the Frontier Region experienced 1,341 distribution interruptions. These interruptions accounted for 99% of the region's total interruptions (1,341 of 1,355), 82% of the region's total customers interrupted, (91,257 of 111,047), and 81% (176,244 of 218,658) of the region's total customer-hours interrupted. Overall, distribution interruptions had a CAIDI of 1.93 hours, and a SAIFI of 0.27 interruptions.

c. MONTHLY CAIDI AND SAIFI GRAPHS

The graphs on the following page show the monthly CAIDI and SAIFI for the Frontier Region for 2022. The months of June (0.07), September (0.04) and November (0.04) were the highest contributors to SAIFI for 2022, with 45% of the Frontier Region's SAIFI occurring during these three months. The best six months for SAIFI were January (0.02), March (0.01), April (0.02), May (0.02), August (0.02) and October (0.02). The interruptions that occurred during these six months contributed 33% of the Frontier Region's SAIFI.

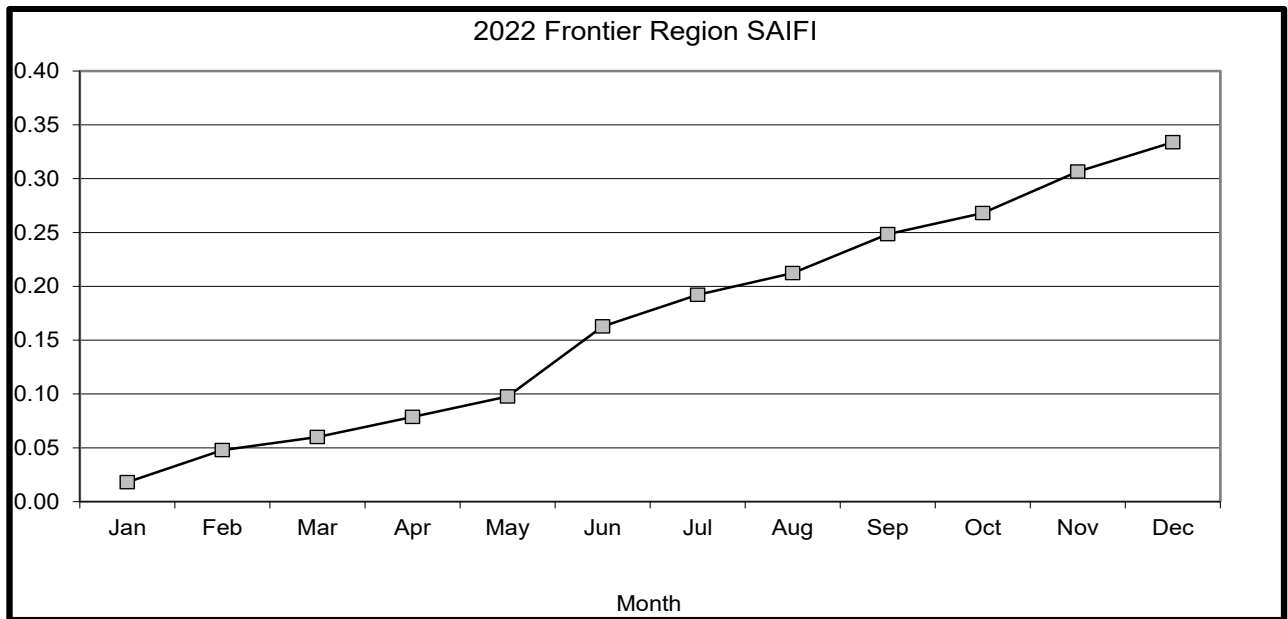
Monthly CAIDI was at or below the 2022 PSC threshold of 1.869, a total of eight months, with the best four months being April (1.55), May (1.13), August (1.44) and September (1.32). The four months that exceeded the threshold were January (1.88), June (3.00), November (2.06) and December (2.27).

GRAPH OF MONTHLY CAIDI AND SAIFI FOR FRONTIER REGION



PSC CAIDI Goal:	
Threshold	1.869
2022 Actual	1.97

PSC SAIFI Goal:	
Threshold	0.480
2022 Actual	0.33



d. PSC CAUSE CODES

1) Number of Events by Cause – Historical

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	1,004	546	413	1,352	413	263
02 Tree Contacts	323	321	369	392	366	444
03 Overloads	23	33	117	10	65	17
04 Operator Error	8	19	9	8	10	17
05 Equipment	558	502	650	647	628	591
06 Accidents	239	208	222	182	206	191
07 Prearranged	80	123	88	83	67	94
08 Customer Equip.	0	0	0	0	0	0
09 Lightning	33	29	35	21	20	55
10 Unknown	91	90	160	125	118	132
Total	2,359	1,871	2,063	2,820	1,893	1,804

2) Customers Interrupted by Cause – Historical

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	66,967	52,775	25,654	92,360	60,452	35,972
02 Tree Contacts	32,577	37,791	32,063	37,954	32,818	32,670
03 Overloads	857	1,824	3,934	1,757	1,848	889
04 Operator Error	1,292	3,231	3,033	8,464	3,485	2,135
05 Equipment	47,510	60,217	58,370	53,766	75,854	47,618
06 Accidents	16,599	19,799	18,857	22,445	16,446	18,326
07 Prearranged	5,865	8,850	6,181	3,489	8,870	12,591
08 Customer Equip.	0	0	0	0	0	0
09 Lightning	1,456	5,602	7,685	1,448	2,416	10,314
10 Unknown	4,891	6,823	41,108	22,483	14,750	13,994
Total	178,014	196,912	196,885	244,166	216,939	174,509

3) Customer-Hours Interrupted by Cause – Historical

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	1,731,846	426,393	146,111	941,315	305,750	405,150
02 Tree Contacts	51,618	62,174	90,952	70,766	64,681	77,062
03 Overloads	1,260	3,235	27,504	2,703	3,978	1,454
04 Operator Error	366	3,424	941	9,300	2,075	1,968
05 Equipment	116,205	104,948	197,045	85,445	127,747	85,377
06 Accidents	32,090	30,826	27,380	40,505	25,821	35,892
07 Prearranged	9,484	13,614	9,613	4,418	4,602	9,552
08 Customer Equip.	0	0	0	0	0	0
09 Lightning	2,118	8,201	10,414	3,850	6,384	11,715
10 Unknown	5,517	8,010	78,110	31,173	16,730	25,524
Total	1,950,504	660,825	588,069	1,189,476	557,769	653,694

4) Interruptions, Customers Interrupted, and Customer-Hours Interrupted – 2022

Cause Code	Interruptions		Customers Interrupted		Customer-Hours Interrupted	
	Number	% Total	Number	% Total	Number	% Total
01 Major Storms	1,004	42.6%	66,967	37.6%	1,731,846	88.8%
02 Tree Contacts	323	13.7%	32,577	18.3%	51,618	2.6%
03 Overloads	23	1.0%	857	0.5%	1,260	0.1%
04 Operator Error	8	0.3%	1,292	0.7%	366	0.0%
05 Equipment	558	23.7%	47,510	26.7%	116,205	6.0%
06 Accidents	239	10.1%	16,599	9.3%	32,090	1.6%
07 Prearranged	80	3.4%	5,865	3.3%	9,484	0.5%
08 Customer Equip.	0	0.0%	0	0.0%	0	0.0%
09 Lightning	33	1.4%	1,456	0.8%	2,118	0.1%
10 Unknown	91	3.9%	4,891	2.7%	5,517	0.3%
Total	2,359	100.0%	178,014	100.0%	1,950,504	100.0%

e. INTERRUPTION REVIEW BY PSC CAUSE CODES

Cause Code 01 - Major Storms

In 2022, Major Storms accounted for 43% of interruptions, 38% of customers interrupted, and 89% of Customer-Hours Interrupted.

Interruptions due to Major Storm were up 84% from 2021, and up 68% over the 5-year average. Customers interrupted due to Major Storms were up 27% from 2021, and up 25% over the 5-year average. Customer-Hours interrupted were up 306% from 2021 and up 289% over the 5-year average.

The remaining PSC code descriptions do not include Major Storms in the percentages.

Cause Code 02 - Tree Contacts

In 2022, Tree Contacts accounted for 24% of interruptions, 29% of customers interrupted, and 24% of Customer-Hours Interrupted.

Interruptions due to Tree Contacts were up 1% from 2021, and down 13% over the 5-year average. Customers interrupted due to Tree Contacts were down 14% from 2021, and down 3% over the 5-year average. Customer-Hours interrupted were down 17% from 2021 and down 27% over the 5-year average.

Tree Contacts were the 2nd largest cause of interruptions in 2022.

Cause Code 03 - Overloads

In 2022, Overloads accounted for 2% of interruptions, 1% of customers interrupted, and 1% of Customer-Hours Interrupted.

Interruptions due to Overloads were down 30% from 2021, and down 52% over the 5-year average. Customers interrupted due to Overloads were down 53% from 2021, and down 58% over the 5-year average. Customer-Hours interrupted were down 61% from 2021 and down 84% over the 5-year average.

Overloads were the 7th largest cause of interruptions in 2022.

Cause Code 04 - Operator Error

In 2022, Operator Error accounted for 1% of interruptions, 1% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Operator Error were down 58% from 2021, and down 38% over the 5-year average. Customers interrupted due to Operator Error were down 60% from 2021, and down 68% over the 5-year average. Customer-Hours interrupted were down 89% from 2021 and down 90% over the 5-year average.

Operator Error was the 8th largest cause of interruptions in 2022.

Cause Code 05 - Equipment Failure

In 2022, Equipment Failures accounted for 41% of interruptions, 43% of customers interrupted, and 53% of Customer-Hours Interrupted.

Interruptions due to Equipment Failure were up 11% from 2021, and down 8% over the 5-year average. Customers interrupted due to Equipment Failure were down 21% from 2021, and down 20% over the 5-year average. Customer-Hours interrupted were up 11% from 2021 and down 3% over the 5-year average.

Equipment Failures were the largest cause of interruptions in 2022.

Cause Code 06 - Accidents

In 2022, Accidents accounted for 18% of interruptions, 15% of customers interrupted, and 15% of Customer-Hours Interrupted.

Interruptions due to Accidents were up 15% from 2021, and up 18% over the 5-year average. Customers interrupted due to Accidents were down 16% from 2021, and down 14% over the 5-year average. Customer-Hours interrupted were up 4% from 2021 and down 0% over the 5-year average.

Accidents were the 3rd largest cause of interruptions in 2022.

Cause Code 07 - Prearranged

In 2022, Prearranged accounted for 6% of interruptions, 5% of customers interrupted, and 4% of Customer-Hours Interrupted.

Interruptions due to Prearranged were down 35% from 2021, and down 12% over the 5-year average. Customers interrupted due to Prearranged were down 34% from 2021, and down 27% over the 5-year average. Customer-Hours interrupted were down 30% from 2021 and up 13% over the 5-year average.

Prearranged was the 5th largest cause of interruptions in 2022.

Cause Code 08 - Customer Equipment

There were no Customer Equipment interruptions in 2022.

Cause Code 09 - Lightning

In 2022, Lightning accounted for 2% of interruptions, 1% of customers interrupted, and 1% of Customer-Hours Interrupted.

Interruptions due to Lightning were up 14% from 2021, and up 3% over the 5-year average. Customers interrupted due to Lightning were down 74% from 2021, and down 73% over the 5-year average. Customer-Hours interrupted were down 74% from 2021 and down 74% over the 5-year average.

Lightning was the 6th largest cause of interruptions in 2022.

Cause Code 10 - Unknown

In 2022, Unknown causes accounted for 7% of interruptions, 4% of customers interrupted, and 3% of Customer-Hours Interrupted.

Interruptions due to Unknown causes were up 1% from 2021, and down 30% over the 5-year average. Customers interrupted due to Unknown causes were down 28% from 2021, and down 76% over the 5-year average. Customer-Hours interrupted were down 31% from 2021 and down 84% over the 5-year average.

Unknown causes were the 4th largest cause of interruptions in 2022.

f. DISCUSSION OF REGIONAL CAPEX PROJECTS WITH 2022/23 SPENDS :

The Company continues to work on capital-related projects in the Frontier Region to maintain customer satisfaction and future reliability. Some specific projects that were constructed in 2022 or will be constructed in 2023 are discussed below. An additional table of major infrastructure projects completed in 2022 follows. This includes distribution, sub-transmission, and transmission-related projects.

A number of ongoing projects are related to the program for reconstructing indoor Buffalo substations. This work is being done to upgrade the aging infrastructure within the Buffalo system, much of which is made up of 1920-30's vintage equipment that is at or beyond the end of its expected lifecycle. This effort is in place to maintain reliability and maintain the ability to serve our customers in the City of Buffalo. Reconstruction of Substation 53 is in progress, while design efforts continue for rebuild of substations 32 and 38. These efforts represent projects completed in recent years, those now in progress, and those planned to start in the upcoming year or are in design phase.

There are also numerous distribution projects to rebuild or reconductor lines. These projects are the result of reliability reviews, responses to QRS inquiries, the result of implementing an asset strategy, or load-related issues.

Some specific reliability-related projects in the Frontier Region follow below:

Royal Substation

The installation of a new 115kV/13.2kV substation with 8 feeders located in Niagara Falls, New York is currently in progress. This substation will provide supply cables to feed three existing 5kV Substations #80, #83 & #85 in Niagara Falls. Ultimately once these 3 stations are rebuilt to operate at 13.2kV-5kV their load will be transferred the new Royal Station and the 115-12kV Harper Station can be retired. The Royal Ave Station Project was completed in 2022, with other stations to be done in subsequent years.

Stephenson Substation

The installation of a new 13.2kV/4.8kV substation with 8 feeders located in Niagara Falls, New York is currently in progress. This substation will replace the current 5kV station 85. The Stephenson Ave Station Project is expected to be completed in the 1st quarter of FY24.

Welch Substation

The installation of a new 13.2kV/4.16kV substation with 8 feeders located in Niagara Falls, New York is currently in progress. This substation will replace the current 5kV station 83. The Welch Ave. Station Project is expected to be completed in the 4th quarter of FY25.

Station 122 Substation

The installation of a new 23kV/4.16kV substation with 8 feeders located in North Tonawanda, New York is currently in progress. This substation will replace the current 5kV station 122. This Station Project is expected to be completed in the 4th quarter of FY24.

Major Capital Projects for Frontier Region:

Region	Project Name	Project Type	Fin Sys Proj. No.	Finish	Total Spend
Frontier	GARDENVILLE-DUNKIRK 73&74 BONDING & GROUNDING-W027141687	Trans	C080523	2/11/22	\$2,851,000
Frontier	NIAGARA-PACKARD 193/194 RECONDUCTOR	Trans	C079236	6/29/22	\$15,276,000
Frontier	HUNTLEY-LOCKPORT 36/37 REINSULATE	Trans	C088980	4/6/22	\$4,500,000
Frontier	NIAGARA-PACKARD 191 RECONDUCTOR	Trans	C079489	3/24/22	\$12,906,000
Frontier	STATION 124 ALMEDA AVE TB1, TB2, TB3 & TB4 REPLACEMENT	Dist Sub	C046670	1/13/22	\$6,569,000
Frontier	STATION 215 - BUFFALO AVE – SCADA (FULL RTU UPGRADE)	Dist Sub	C077972	1/13/22	\$2,344,000
Frontier	YOUNGMAN TERMINAL STATION DSCADA (FULL UPGRADE)	Tran Sub	C081809	6/10/22	\$2,190,000
Frontier	BUFFALO STATION 129 – F12974 RECONDUCTORING (OH)	Dist	C046558	5/6/22	\$1,014,000

g. DISCUSSION OF REGIONAL PERFORMANCE OF LVAC NETWORK DISTRIBUTION SYSTEM(S)

Buffalo LVAC Network

Background

The Elm Street 230/23 kV Station that serves Buffalo’s network area has twenty 23kV cables, which supply 146 general network vaults, 141 spot network vaults, nine primary commercial customers, three National Grid distribution stations and can serve five additional distribution stations via normally open tie switches. General network vaults supply the low voltage network which serves approximately 1,170 National Grid customers. Spot network vaults serve 375 commercial customers. Elm Street station peaked at 104 MVA during Summer 2022.

Performance

The table below lists the breaker operations at Elm Street in 2022 that were a result of a fault or a failure on either the primary cable or a piece of network equipment (reactor, transformer, high voltage switch or protector):

2022 ELM ST 23KVNETWORK PERFORMANCE					
STATION	CABLE	BKR	BKR	# OF OPERATIONS DUE TO FAILURES	CUSTOMERS AFFECTED
ELM	1E	R122	R125	1	0
ELM	2E	R222	R225	1	0
ELM	3E	R335	R338	1	0
ELM	4E	R435	R438	0	0
ELM	5E	R145	R148	1	0
ELM	6E	R332	R335	1	0
ELM	7E	R125	R128	1	0
ELM	8E	R225	R228	1	0
ELM	9E	R325	R238	1	0
ELM	10E	R432	R435	1	0
ELM	11E	R322	R325	0	0
ELM	12E	R325	R328	0	0
ELM	14E	R422	R425	0	0
ELM	15E	R425	R428	1	0
ELM	16E	R142	R145	1	0
ELM	17E	R242	R245	0	0
ELM	18E	R232	R235	0	0
ELM	23E	R248	R245	1	0
ELM	27E	R132	R135	2	0
ELM	35E	R138	R135	2	0

Improvements

In 2022 New York West replaced the high voltage switches, network transformers and network protectors in the following vaults; 27-174,7-178, 9-178, 10-101, 23-119, 6-167. Protector were replaced in vault 3-132, 27-69, 8-126. This equipment was identified as in need of replacement via the I&M process, or it failed in service. At this time the I&M process has identified 11 additional vaults requiring equipment change-outs that are planned for future years. Approximately 5,000 feet of LVAC cable was replaced in 2022. A project to replace approximately 10,000 feet of LVAC secondary cable per year is expected to be continued in 2023.

One new spot network vault was completed at 74 Franklin St, consisting of two (2) 1000kVA transformers with protectors, primary switches, and link boxes to serve the Police Headquarters in downtown Buffalo.

2. OPERATING CIRCUIT LISTS

The next three tables will provide the following information for the Frontier Region.

- a. Worst Performing Circuit List
- b. Worst Performing Circuits with 3 Year History for CAIDI and SAIFI Indices
- c. Worst Performing Circuits by # of Momentary Interruptions

b. NATIONAL GRID WORST PERFORMING CIRCUIT LIST

FRONTIER REGION

	A	B	C	D				
FEEDER #	CUST. SERVED	TOTAL INTER.	# CUST. INTER.	CUST. HRS. INTER.	C/A SAIFI	D/A SAIDI	D/C CAIDI	NUMBER OF MOMENTARIES
WILSON STA 93 9363	717	14	2,819	5,084	3.93	7.09	1.80	4

Regional Goals:
 CAIDI 1.869
 SAIFI 0.48

c. NATIONAL GRID WORST PERFORMING CIRCUITS WITH 3 YEAR HISTORY FOR CAIDI AND SAIFI INDICES

FRONTIER REGION

FEEDER #	2022 CAIDI	2021 CAIDI	2020 CAIDI	2019 CAIDI	2022 SAIFI	2021 SAIFI	2020 SAIFI	2019 SAIFI
WILSON STA 93 9363	1.80	0.67	0.63	1.32	3.93	2.39	1.60	3.56

Regional Goals:
 CAIDI 1.869
 SAIFI 0.48

d. NATIONAL GRID WORST PERFORMING CIRCUITS BY # OF MOMENTARY INTERRUPTIONS

FRONTIER REGION

Feeders			Customer Momentaries				Ranks		
Volts (kV)	Station Name	Ckt/F No.	Substation	Transmission	Distribution	Total	Within Region	Within System	Reliability Ranking
No circuits experienced 10 or more momentary interruptions in 2022.									

e. WORST PERFORMING CIRCUIT ANALYSIS

This year, the Frontier Region's list of Worst Feeders consists of one 4.8kV feeder.

For the Frontier Region, the CAIDI performance threshold is 1.869 and SAIFI performance threshold is 0.48.

1. WILSON STA 93 9363 – 4.8kV

Profile: 717 Customers, 40.9 Circuit Miles
 Indices: CAIDI = 1.80, SAIFI = 3.93

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	8	57.14%	1,518	53.85%	2,264	44.53%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	2	14.29%	59	2.09%	8	0.16%
6	ACCIDENTS	3	21.43%	1,141	40.48%	2,525	49.65%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	1	7.14%	101	3.58%	287	5.65%
Totals		14	100.00%	2,819	100.00%	5,084	100.00%

Problem Analysis:

- There were 14 interruptions on the Wilson Sta 93 9363 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on June 07, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 25% of the total customers interrupted (717 of 2,819), and 3% of the total customer-hours interrupted (148 of 5,084). The tree issue caused outage of approximately 13 minutes on SubT Line 402 causing outage on all feeders at Station 93.
- There were no substation interruptions.
- The remaining 13 events occurred at the distribution level.
- The distribution circuit breaker for the Wilson Sta 93 9363 experienced 4 momentary operations in 2022.
- The distribution circuit breaker for the Wilson Sta 93 9363 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 51% of the total amount of customers interrupted (1,433 out of 2,819) and 58% of the total amount of the customer-hours interrupted (2,961 out of 5,084).
 - The first lockout occurred on June 22, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 25% of the total customers interrupted (716 of 2,819), and 23% of the total customer-hours interrupted (1,154 of 5,084). Truck hit pole causing downed conductors on Cambria Wilson Rd which resulted in outage of approximately 2 hours to make repairs.
 - The second lockout occurred on December 03, 2022, coded as a cause of tree - broken limb - emerald ash borer (PSC cause code 02). This lockout accounted for 25% of the total customers interrupted (717 of 2,819), and 36% of the total

customer-hours interrupted (1,807 of 5,084). Tree caused downed conductors on Cambria Wilson Rd which resulted in outage times ranging from 2 to 5.5 hours as repairs were made.

- Trees were the leading cause of interruptions on the Wilson Sta 93 9363 in 2022, accounting for 57% of total interruptions (8 of 14). Accidents were the 2nd leading cause of interruptions, accounting for 21% of total interruptions (3 of 14). Equipment Failures were the 3rd leading cause of interruptions, accounting for 14% of total interruptions (2 of 14).
- Trees were the leading cause of customers interrupted (CI) on the Wilson Sta 93 9363 in 2022, accounting for 54% of total customers interrupted (1,518 of 2,819). Accidents were the 2nd leading cause of customers interrupted, accounting for 40% of total customers interrupted (1,141 of 2,819). Unknown were the 3rd leading cause of customers interrupted, accounting for 4% of total customers interrupted (101 of 2,819).
- Accidents were the leading cause of customer-hours interrupted (CHI) on the Wilson Sta 93 9363 in 2022, accounting for 50% of total customer-hours interrupted (2,525 of 5,084). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 45% of total customer-hours interrupted (2,264 of 5,084). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 6% of total customer-hours interrupted (287 of 5,084).
- Of the 14 interruptions on this circuit, 6 affected 10 customers or less, with 4 being single customer outages.

Actions Taken:

- Cycle Tree trimming and an Enhanced Hazard Tree Mitigation review were last completed on Wilson 9363 in 2019.
- Distribution line inspection was last completed in June 2022. All Level 1 work has been completed.
- SubT line inspection on Line 402 was last completed in January 2021. All Level 1 and Level 2 work has been completed.

Action Plan:

- Distribution line inspection was last completed in June 2022; Level 2 work scheduled for completion by June 2024 and Level 3 work scheduled for completion by June 2025.
- SubT line inspection was last completed in January 2021; Level 3 work scheduled for completion by June 2024.
- Engineering to review the fusing to determine if there is proper device coordination and fusing of side-taps and update and/or install if warranted.
- Next Cycle Tree trimming scheduled for 2024.
- Hazard Tree Mitigation review to be done in 2023.

3. ACTION PLAN SUMMARIES

a. SUMMARY OF ACTION ITEM PLANS FOR 2022 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
Wilson	9363	2022	Complete level 2 maintenance	06/2024	TBD	
Wilson	9363	2022	Complete level 3 maintenance	06/2025	TBD	
Wilson	9363	2022	Complete level 3 SubT maintenance	1/2024	TBD	
Wilson	9363	2022	Cycle Tree Trimming	12/2024	TBD	
Wilson	9363	2022	Hazard Tree Review	12/2023	TBD	
Wilson	9363	2022	Engineering Review of Fusing Coordination	12/2023	TBD	

b. STATUS OF ACTION PLANS FOR 2021 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
Buffalo Ave	21555	2021	Complete level 2 maintenance	09/2022	TBD	Complete
Buffalo Ave	21555	2021	Complete level 3 maintenance	09/2023	TBD	
Buffalo Ave	21555	2021	Fusing coordination and side-tap review	12/2023	TBD	WR#30743242
Buffalo Ave	21555	2021	Cutout mounted recloser opportunity review	12/2021	TBD	Complete

4. OPERATING REGION PERFORMANCE BELOW MINIMUM

a. MAINTENANCE HISTORY AND ANALYSIS OF FACTORS THAT CAUSED THE BELOW MINIMUM PERFORMANCE.

In 2022 the Frontier Region failed to meet the PSC minimum CAIDI requirement after meeting the requirement in 2021. The Frontier Region has been below the target of 1.869 four of the previous five years. However, the Frontier Region failed to meet the target in 2022 with an annual CAIDI of 1.97. Meanwhile, the Frontier Region met the annual SAIFI goal of 0.48 in 2022 with a SAIFI of 0.33.

In 2022, the Frontier Region experienced 1,355 interruptions. Most of these interruptions (99%) occurred on the distribution system. However, 6 of these interruptions (0.4%) occurred on the transmission or sub-transmission systems, interrupting 11,631 customers (10%) and accounting for 27,965 customer-hours interrupted (13%). The SAIFI and CAIDI of the transmission and sub-transmission systems in 2022 were 0.03 interruptions and 2.40 hours respectively. The impact of these 6 interruptions was significant on CAIDI being that they were almost 32 minutes over target involving 10% of total customers making the annual CAIDI in the Frontier worse. Transmission CAIDI was 440% greater in 2022 as compared to 2021 when it was 0.54 hours vs. 2.4 hours. This was the major factor in the Frontier Region not meeting its target this year.

There were also 8 substation-related interruptions in the Frontier Region in 2022, interrupting 8,159 customers (7%) and accounting for 14,449 customer-hours interrupted (7%). The SAIFI and CAIDI of substation-related interruptions in 2022 was 0.02 interruptions per year and 1.77 hours.

The distribution system accounted for 99% of the interruptions in the Frontier Region in 2022, interrupting 91,257 customers (82%) and accounting for 176,244 customer-hours interrupted (81%). The SAIFI of the distribution system in 2022 met the SAIFI goal for the Frontier Region, with a distribution SAIFI of 0.27 interruptions per year. The CAIDI of the distribution system in 2022 was 1.93 hours slightly over target and 0.15 greater than 2021.

b. **PLANNED PROGRAMS OR PLANNED CORRECTIVE ACTIONS AND PROPOSED IMPROVEMENTS TO THE PERFORMANCE INDICES.**

The Company is continuing its efforts in the Frontier Region to maintain reliability. These efforts include distribution patrols, maintenance programs, single phase and three phase line recloser installations, protection coordination studies, lightning protection installations, and tree trimming programs. All these programs and corrective actions not only will reduce the number of interruptions and/or customers interrupted but also the restoration times. The Company will continue to stay on schedule for tree trimming and believes that this maintained schedule for tree trimming and miles trimmed will reduce both the incidence and duration of tree-related interruptions.

The contribution of transmission outages is significant to the regional performance indices, as can be seen in the data provided in the previous section. It is very difficult to predict transmission equipment failures in advance, and in a continued attempt to minimize these interruptions, Transmission Planning and Asset Management (TPAM) has several projects in the works to improve the performance of some of the worst performing transmission lines.

Tree trimming around the distribution system will remain a priority in 2022, to address what is typically the single largest contributor to customer interruptions within the Frontier Region. In addition, there is a list of distribution improvement capital projects to be designed and/or constructed in FY2024, which can be viewed in the 1.f section of this report.

Substation Improvements

- 1) When substation equipment is being installed or repaired, animal guards are being installed.
- 2) When opportunities arise, feeder-ties will be constructed to temporarily transfer load onto adjacent substations. This will improve reliability for the affected station.
- 3) The Company's ongoing maintenance program for substations should help reduce the potential for substation problems in 2020. This program includes:
 - Circuit breaker diagnostic tests
 - Circuit breaker mechanism checks
 - Load tap changer internal inspections
 - Dissolved gas analysis on load tap changers and transformers.
 - Calibration/inspections on relay positions and communication packages
 - Functional testing of relays
 - Battery maintenance

- 4) Network – The annual practice for Buffalo area networks is to review and change out transformers and protectors due to deterioration as needed. The Buffalo area has approximately 285 vaults containing network transformers and protectors. The goal of this effort is to replace the equipment before failure occurs.

Additional efforts to improve restoration times are listed below:

- The Divisional Reliability Team will continue to investigate and analyze outages impacting greater than 2,500 customers or more than 50,000 customer-minutes-interrupted (CMI). This effort will look at the interruptions impacting the greatest number of customers to see what could have been done better to reduce the length of the interruption or to have eliminated it altogether.
- The review of suitable locations for the installation of new cutout mounted reclosers (CMRs) will continue to reduce the number of temporary faults that result in permanent outages on smaller side taps.

F. GENESEE REGION

1. OPERATING REGIONAL PERFORMANCE

a. HISTORIC CAIDI AND SAIFI INDICES

IDS Info:

	2022	2021	2020	2019	2018	2017
CAIDI (Threshold 2.049)	1.53	1.75	1.53	1.75	2.06	1.76
SAIFI (Threshold 1.037)	1.00	0.98	1.20	1.41	1.23	0.76
SAIDI	1.52	1.72	1.84	2.45	2.53	1.34
Interruptions	1,019	933	928	980	886	980
Customers Interrupted	100,413	98,675	120,597	140,279	122,045	75,171
Customer-Hours Interrupted	153,606	172,991	184,711	244,951	251,608	131,985
Customers Served	100,877	100,536	100,210	99,786	99,272	98,834
Customers Per Interruption	98.54	105.76	129.95	143.14	137.75	76.71
Availability Index	99.9826	99.9804	99.9790	99.9720	99.9711	99.9848
Interruptions/1000Customers	10.10	9.28	9.26	9.82	8.93	9.92

b. DISCUSSION OF REGIONAL PERFORMANCE

In 2022, the Genesee Region met its CAIDI reliability target and met its SAIFI reliability target as set forth by the New York Public Service Commission (PSC). The final System Average Interruption Frequency Index (SAIFI) result was 1.00 interruptions, 4% below the PSC goal of 1.037 interruptions. As shown in the table above, the Customer Average Interruption Duration index (CAIDI) was 1.53 in 2022, 25% below the PSC's regional target of 2.049 hours.

The 2022 CAIDI result was 13% below the 2021 result of 1.75 hours, and 14% below the previous 5-year average of 1.77 hours. The 2022 SAIFI was 2% above the 2021 result of 0.98 interruptions, and 11% below the previous 5-year average of 1.12 interruptions.

In 2022, excluding major storms, the Genesee Region experienced 13 transmission interruptions. These interruptions accounted for 1% of the region's total interruptions (13 of 1,019), 27% of the region's total customers interrupted (CI), (26,745 of 100,413), and 30% (45,932 of 153,607) of the region's total customer-hours interrupted (CHI). Overall, transmission interruptions had a CAIDI of 1.72 hours, and a SAIFI of 0.27 interruptions.

The number of transmission-related interruptions increased from 12 in 2021 to 13 in 2022 (an increase of 8%). The number of customers interrupted increased from 18,075 in 2021, to 26,745 in 2022 (an increase of 48%), while the customer-hours interrupted increased from 43,703 in 2021, to 45,932 in 2022 (an increase of 5%).

In 2022, excluding major storms, the Genesee Region experienced 3 substation interruptions. These interruptions accounted for 0.3% of the region's total interruptions (3 of 1,019), 6% of the region's total customers interrupted, (6,231 of 100,413), and 2% (2,614 of 153,607) of the region's total customer-hours interrupted. Overall, substation interruptions had a CAIDI of .42 hours, and a SAIFI of 0.06 interruptions.

The number of substation-related interruptions decreased from 8 to 3 from 2021 to 2022 (a decrease of 63%). The number of customers interrupted decreased from 14,348 in 2021, to 6,231 in 2022 (a decrease of 57%), while the customer-hours interrupted decreased from 17,306 in 2021, to 2,614 in 2022 (a decrease of 85%).

In 2022, excluding major storms, the Genesee Region experienced 1,003 distribution interruptions. These interruptions accounted for 98% of the region's total interruptions (1,003 of 1,019), 67% of the region's total customers interrupted, (67,437 of 100,413), and 68% (105,061 of 153,607) of the region's total customer-hours interrupted. Overall, distribution interruptions had a CAIDI of 1.56 hours, and a SAIFI of 0.67 interruptions.

The number of distribution-related interruptions increased from 913 to 1,003 from 2021 to 2022 (an increase of 10%). The number of customers interrupted increased from 66,252 in 2021, to 67,437 in 2022 (an increase of 2%), while the customer-hours interrupted decreased from 111,982 in 2021, to 105,061 in 2022 (a decrease of 6%).

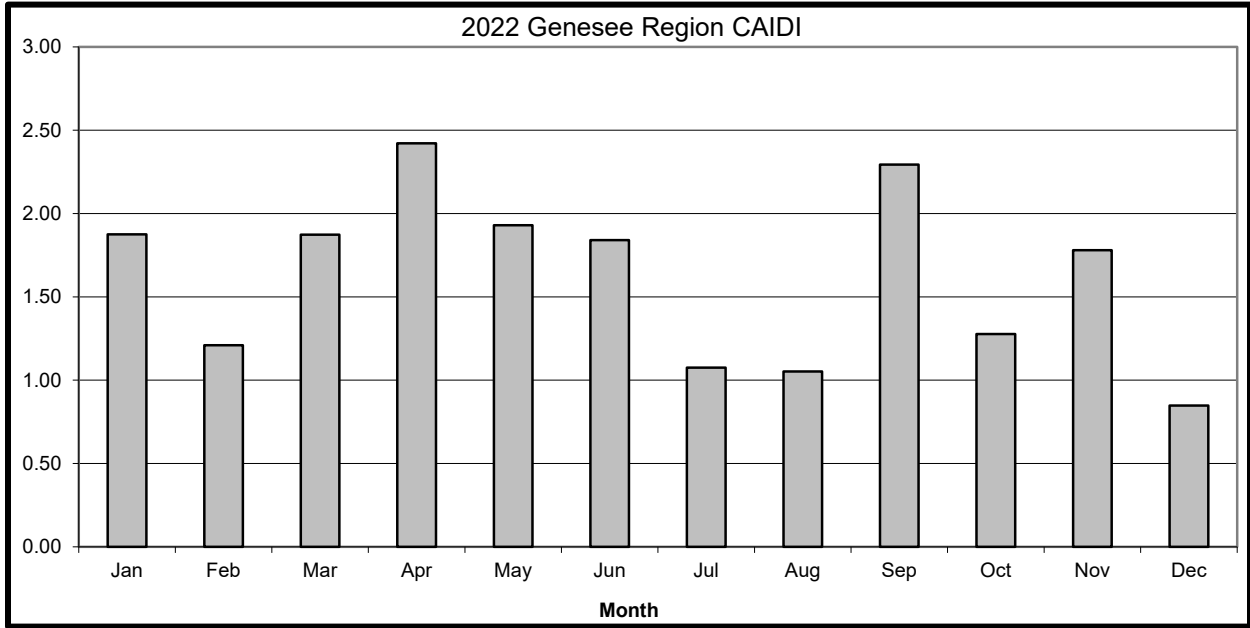
c. MONTHLY CAIDI AND SAIFI GRAPHS

The graphs on the following page show the monthly CAIDI and SAIFI for the Genesee Region for 2022.

CAIDI was below the PSC threshold of 2.049, a total of ten months in 2022, with best three months being July (1.08), August (1.05) and December (0.85). The two months that exceeded the threshold were in April (2.42) and September (2.29).

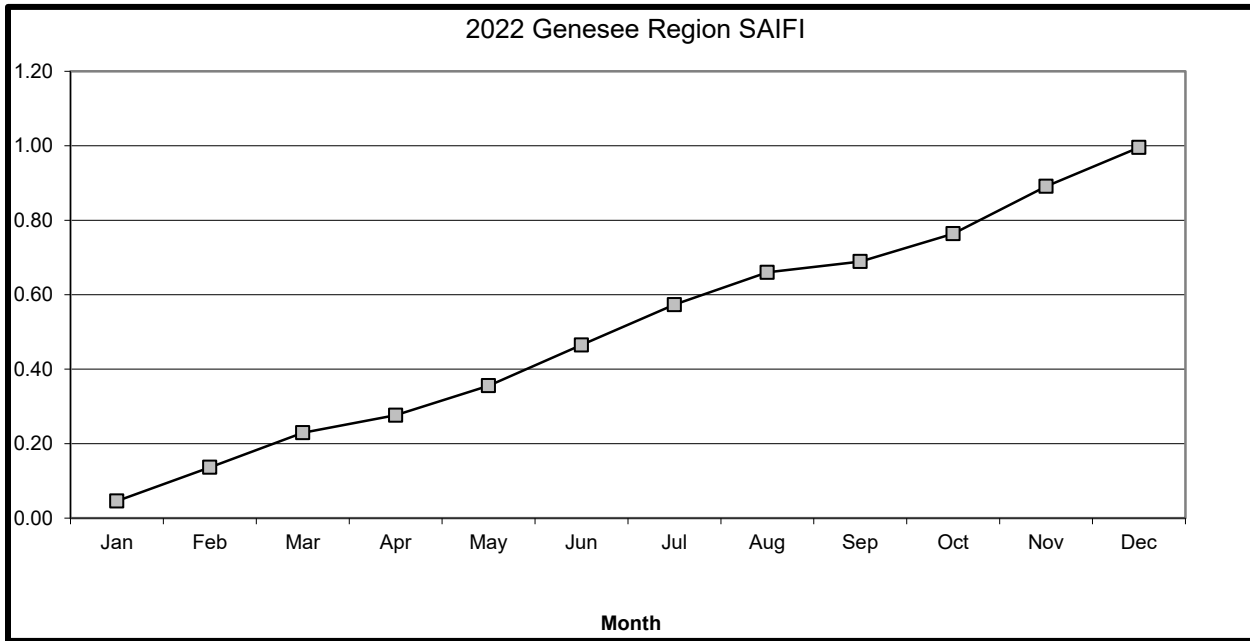
SAIFI was below the PSC threshold of 1.037 in 2022 and showed the greatest increase during the months of June (0.11), July (0.11), November (0.13) and December (0.10). These four months accounted for 45% of Genesee Region's annual SAIFI metric. In contrast, the months of January (0.05), April (0.05) and September (0.03) were the best three months and contributed only 13% to the Region's SAIFI.

GRAPH OF MONTHLY CAIDI AND SAIFI FOR THE GENESSEE REGION



PSC CAIDI Goal:	
Threshold	2.049
2022 Actual	1.53

PSC SAIFI Goal:	
Threshold	1.037
2022 Actual	1.00



d. PSC CAUSE CODES

1) Number of Events by Cause – Historical

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	550	523	206	532	503	1,033
02 Tree Contacts	272	242	220	258	184	235
03 Overloads	7	7	12	3	9	3
04 Operator Error	3	5	4	4	6	9
05 Equipment	262	258	288	326	275	275
06 Accidents	275	216	212	178	226	198
07 Prearranged	15	33	30	21	28	41
08 Customer Equip.	0	0	0	0	0	0
09 Lightning	40	35	30	30	29	91
10 Unknown	145	137	132	160	129	128
Total	1,569	1,456	1,134	1,512	1,389	2,013

2) Customers Interrupted by Cause – Historical

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	45,384	43,905	18,068	38,360	47,213	97,630
02 Tree Contacts	28,848	18,768	26,188	34,115	20,717	23,637
03 Overloads	62	1,794	7,751	68	164	16
04 Operator Error	3,195	95	184	6,092	1,826	1,183
05 Equipment	29,675	33,304	48,964	54,305	40,661	21,379
06 Accidents	20,400	20,143	14,946	26,593	34,508	14,130
07 Prearranged	2,211	6,378	7,373	2,973	4,058	4,976
08 Customer Equip.	0	0	0	0	0	0
09 Lightning	5,740	5,931	2,085	1,385	4,333	4,187
10 Unknown	10,282	12,262	13,106	14,748	15,778	5,663
Total	145,797	142,580	138,665	178,639	169,258	172,801

3) Customer-Hours Interrupted by Cause – Historical

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	436,544	727,571	76,176	247,052	363,920	1,904,793
02 Tree Contacts	43,395	42,526	40,476	74,452	32,897	44,076
03 Overloads	109	1,821	2,790	74	567	125
04 Operator Error	435	127	77	1,443	1,630	825
05 Equipment	47,442	46,209	85,436	84,094	141,295	31,952
06 Accidents	31,586	38,028	28,769	46,360	39,642	25,598
07 Prearranged	1,878	11,271	4,654	1,961	5,580	4,688
08 Customer Equip.	0	0	0	0	0	0
09 Lightning	15,120	15,004	2,394	3,174	9,473	10,678
10 Unknown	13,643	18,004	20,115	33,392	20,525	14,043
Total	590,151	900,562	260,886	492,002	615,528	2,036,778

4) Interruptions, Customers Interrupted and Customer-Hours Interrupted – 2022

Cause Code	Interruptions		Customers Interrupted		Customer Hours Interrupted	
	Number	% Total	Number	% Total	Number	% Total
01 Major Storms	550	35.1%	45,384	31.1%	436,544	74.0%
02 Tree Contacts	272	17.3%	28,848	19.8%	43,395	7.4%
03 Overloads	7	0.4%	62	0.0%	109	0.0%
04 Operator Error	3	0.2%	3,195	2.2%	435	0.1%
05 Equipment	262	16.7%	29,675	20.4%	47,442	8.0%
06 Accidents	275	17.5%	20,400	14.0%	31,586	5.4%
07 Prearranged	15	1.0%	2,211	1.5%	1,878	0.3%
08 Customer Equip.	0	0.0%	0	0.0%	0	0.0%
09 Lightning	40	2.5%	5,740	3.9%	15,120	2.6%
10 Unknown	145	9.2%	10,282	7.1%	13,643	2.3%
Total	1,569	100.0%	145,797	100.0%	590,151	100.0%

e. **INTERRUPTION REVIEW BY PSC CAUSE CODES**

Cause Code 01 - Major Storms

In 2022, Major Storms accounted for 35% of interruptions, 31% of customers interrupted, and 74% of Customer-Hours Interrupted.

Interruptions due to Major Storm were up 5% from 2021, and down 2% over the 5-year average. Customers interrupted due to Major Storms were up 3% from 2021, and down 7% over the 5-year average. Customer-Hours interrupted were down 40% from 2021 and down 34% over the 5-year average.

The remaining PSC code descriptions do not include Major Storms in the percentages.

Cause Code 02 - Tree Contacts

In 2022, Tree Contacts accounted for 27% of interruptions, 29% of customers interrupted, and 28% of Customer-Hours Interrupted.

Interruptions due to Tree Contacts were up 12% from 2021, and up 21% over the 5-year average. Customers interrupted due to Tree Contacts were up 54% from 2021, and up 17% over the 5-year average. Customer-Hours interrupted were up 2% from 2021 and down 7% over the 5-year average.

Tree Contacts were the 2nd largest cause of interruptions in 2022.

Cause Code 03 - Overloads

In 2022, Overloads accounted for 1% of interruptions, 0% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Overloads were flat at 0% from 2021, and flat at 0% over the 5-year average. Customers interrupted due to Overloads were down 97% from 2021, and down 97% over the 5-year average. Customer-Hours interrupted were down 94% from 2021 and down 90% over the 5-year average.

Overloads were the 7th largest cause of interruptions in 2022.

Cause Code 04 - Operator Error

In 2022, Operator Error accounted for 0% of interruptions, 3% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Operator Error were down 40% from 2021, and down 50% over the 5-year average. Customers interrupted due to Operator Error were up 3263% from 2021, and up 70% over the 5-year average. Customer-Hours interrupted were up 241% from 2021 and down 47% over the 5-year average.

Operator Error was the 8th largest cause of interruptions in 2022.

Cause Code 05 - Equipment Failure

In 2022, Equipment Failures accounted for 26% of interruptions, 30% of customers interrupted, and 31% of Customer-Hours Interrupted.

Interruptions due to Equipment Failure were up 2% from 2021, and down 8% over the 5-year average. Customers interrupted due to Equipment Failure were down 11% from 2021, and down 25% over the 5-year average. Customer-Hours interrupted were up 3% from 2021 and down 39% over the 5-year average.

Equipment Failures were the 3rd largest cause of interruptions in 2022.

Cause Code 06 - Accidents

In 2022, Accidents accounted for 27% of interruptions, 20% of customers interrupted, and 21% of Customer-Hours Interrupted.

Interruptions due to Accidents were up 27% from 2021, and up 33% over the 5-year average. Customers interrupted due to Accidents were up 1% from 2021, and down 8% over the 5-year average. Customer-Hours interrupted were down 17% from 2021 and down 11% over the 5-year average.

Accidents were the largest cause of interruptions in 2022.

Cause Code 07 - Prearranged

In 2022, Prearranged accounted for 1% of interruptions, 2% of customers interrupted, and 1% of Customer-Hours Interrupted.

Interruptions due to Prearranged were down 55% from 2021, and down 52% over the 5-year average. Customers interrupted due to Prearranged were down 65% from 2021, and down 57% over the 5-year average. Customer-Hours interrupted were down 83% from 2021 and down 67% over the 5-year average.

Prearranged was the 6th largest cause of interruptions in 2022.

Cause Code 08 - Customer Equipment

There were no Customer Equipment interruptions in 2022.

Cause Code 09 - Lightning

In 2022, Lightning accounted for 4% of interruptions, 6% of customers interrupted, and 10% of Customer-Hours Interrupted.

Interruptions due to Lightning were up 14% from 2021, and down 7% over the 5-year average. Customers interrupted due to Lightning were down 3% from 2021, and up 60% over the 5-year average. Customer-Hours interrupted were up 1% from 2021 and up 86% over the 5-year average.

Lightning was the 5th largest cause of interruptions in 2022.

Cause Code 10 - Unknown

In 2022, Unknown causes accounted for 14% of interruptions, 10% of customers interrupted, and 9% of Customer-Hours Interrupted.

Interruptions due to Unknown causes were up 6% from 2021, and up 4% over the 5-year average. Customers interrupted due to Unknown causes were down 16% from 2021, and down 17% over the 5-year average. Customer-Hours interrupted were down 24% from 2021 and down 37% over the 5-year average.

Unknown causes were the 4th largest cause of interruptions in 2022.

f. DISCUSSION OF REGIONAL CAPEX PROJECTS WITH 2022/23 SPENDS :

The Company continues to work on capital projects in the Genesee Region to maintain customer satisfaction and maintain future reliability. Some specific projects that were either constructed in 2022 or planned for construction in 2023 are discussed below. An additional table of major infrastructure projects completed in 2022 follows. This includes distribution, transmission, and substation-related projects.

Some projects on the list or discussed below are substation-related projects located throughout the Region to address loading concerns or equipment condition issues, including Sonora Way 4381.

There are numerous distribution projects to rebuild or re-conductor lines. These projects are the result of reliability reviews, response to a QRS inquiry, the result of implementing an asset strategy, or load-related issues.

Some specific reliability-related projects in the Genesee Region follow below:

Sonora Way Substation 4381

Sonora Way Substation is a 115kV/13.2kV substation installed in 2015 with two new feeders to allow for the removal of Mobile 7W and to provide load relief for Lakeville Substation 40 and Geneseo Substation 55. Overall, the plan is to install new switchgear and three new feeders from Sonora Way substation to retire Lakeville Substation 40 and provide relief for Livonia Substation 37. The new feeders will also improve reliability and service by providing load relief, future feeder ties, operational flexibility and allow for additional hosting capacity. The three new feeders are expected to be completed by May 2025.

Orangeville 1961 – Reconductor Project

This project involves reconductoring distribution mainline on Orangeville F1961 along Orangeville Center Road to strengthen the existing tie with Wethersfield F2361. This will improve the resiliency, reliability and provide the ability for load transfers and operational flexibility. The project is expected to be completed by 4th quarter of FY22.

Sub-Transmission Infrastructure Projects

The 34.5kV system in the Genesee Region consists of several very long loops which traverse rural territory in the Western Division. There were several projects completed in 2022 or are planned for 2023/2024, that will maintain and upgrade the system, including projects to install Reclosers on sub-transmission lines 226, 301, 304, 308 and 312 in the Genesee Region in FY2023/2024. The Reclosers will improve reliability by sectionalizing portions of the lines during interruptions.

Major Capital Projects for Genesee Region:

Region	Project Name	Project Type	Fin Sys Proj No.	Finish	Total Spend
Genesee	SE BATAVIA-GOLAH #119 Level 1 – WO 29680744	Trans	C083143	2/25/22	\$4,910,000
Genesee	MORTIMER-GOLAH 110 STRUCTURE #6 REPLACEMENT	Trans	C085649	3/6/22	\$1,100,000
Genesee	KNAPP RD 22651 FEEDER TIE	Dist	C028716	3/22/22	\$2,328,187

2. OPERATING CIRCUIT LISTS

The next three tables will provide the following information for the Genesee Region.

- a. Worst Performing Circuit List
- b. Worst Performing Circuits with 3 Year History for CAIDI and SAIFI Indices
- c. Worst Performing Circuits by # of Momentary Interruptions

a. NATIONAL GRID WORST PERFORMING CIRCUIT LIST

GENESEE REGION

FEEDER #	A CUST. SERVED	B TOTAL INTER.	C # CUST. INTER.	D CUST. HRS. INTER.	C/A SAIFI	D/A SAIDI	D/C CAIDI	NUMBER OF MOMENTARIES
ORANGEVILLE STA 19 1961	649	21	2,211	6,291	3.41	9.69	2.85	1
WETHERSFIELD STA 23 2361	426	21	1,570	4,910	3.69	11.53	3.13	1
RICHMOND STA 32 3253	1,521	15	5,617	6,922	3.69	4.55	1.23	1
BROCKPORT STA 74 7457	1,394	16	3,916	6,733	2.81	4.83	1.72	1
LYNDONVILLE STA 95 9561	834	16	2,018	5,828	2.42	6.99	2.89	9
RICHMOND STA 32 3251	859	22	2,948	3,624	3.43	4.22	1.23	1

Regional Goals:
CAIDI 2.049
SAIFI 1.037

b. NATIONAL GRID WORST PERFORMING CIRCUITS WITH A 3 YEAR HISTORY FOR CAIDI AND SAIFI INDICES

GENESEE REGION

FEEDER #	2022 CAIDI	2021 CAIDI	2020 CAIDI	2019 CAIDI	2022 SAIFI	2021 SAIFI	2020 SAIFI	2019 SAIFI
ORANGEVILLE STA 19 1961	2.85	2.54	1.41	2.28	3.41	3.44	1.35	0.57
WETHERSFIELD STA 23 2361	3.13	3.79	2.24	1.97	3.69	7.71	0.68	0.58
RICHMOND STA 32 3253	1.23	2.09	2.23	1.37	3.69	0.06	0.90	3.40
BROCKPORT STA 74 7457	1.72	1.89	3.04	1.03	2.81	0.14	0.10	1.29
LYNDONVILLE STA 95 9561	2.89	2.03	1.70	1.06	2.42	1.96	3.39	3.04
RICHMOND STA 32 3251	1.23	1.40	1.68	2.11	3.43	0.58	0.93	1.45

Regional Goals:
 CAIDI 2.049
 SAIFI 1.037

c. NATIONAL GRID WORST PERFORMING CIRCUITS BY # OF MOMENTARY INTERRUPTIONS

GENESEE REGION

Feeders			Customer Momentaries				Ranks		
Volts (kV)	Station Name	Ckt/F No.	Substation	Transmission	Distribution	Total	Within Region	Within System	Reliability Ranking
No circuits experienced 10 or more momentary interruptions in 2022.									

d. WORST PERFORMING CIRCUIT ANALYSIS

For 2022, the Company is reporting on the six worst performing feeders in the Genesee Region. The list consists of three 13.2kV feeders and three 4.8kV feeders.

For the Genesee Region, the CAIDI threshold is 2.049 and the SAIFI threshold is 1.037.

1. ORANGEVILLE STA 19 1961 – 4.8kV

Profile: 649 Customers, 63.6 Circuit Miles
Indices: CAIDI = 2.85, SAIFI = 3.41

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	7	33.33%	140	6.33%	789	12.55%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	28.57%	2,007	90.77%	5,352	85.07%
6	ACCIDENTS	0	0.00%	0	0.00%	0	0.00%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	4.76%	23	1.04%	56	0.89%
10	UNKNOWN	7	33.33%	41	1.85%	94	1.49%
Totals		21	100.00%	2,211	100.00%	6,291	100.00%

Problem Analysis:

- There were 21 interruptions on the Orangeville Sta 19 1961 in 2022.
- There were 3 transmission interruptions.
 - The first Transmission interruption occurred on February 02, 2022, coded as a cause of deterioration (PSC cause code 05). This lockout accounted for 29% of the total customers interrupted (649 of 2,211), and 14% of the total customer-hours interrupted (876 of 6,291). This event resulted from a broken insulator which caused the Attica-Wethersfield Line 209 to lock out resulting in an outage of 1.4 hours.
 - The second Transmission interruption occurred on March 16, 2022, coded as a cause of deterioration (PSC cause code 05). This lockout accounted for 29% of the total customers interrupted (649 of 2,211), and 30% of the total customer-hours interrupted (1,893 of 6,291). This event resulted from a loose conductor which caused the Attica-Wethersfield Line 209 to lock out resulting in an outage of 2.9 hours.
 - The third Transmission interruption occurred on April 25, 2022, coded as a cause of insulation failure - other (PSC cause code 05). This lockout accounted for 27% of the total customers interrupted (591 of 2,211), and 35% of the total customer-hours interrupted (2,177 of 6,291). This event resulted from a loose conductor which caused the Attica-Wethersfield Line 209 to lock out resulting in an outage of 3.7 hours.
- There were no substation interruptions.

- The remaining 18 events occurred at the distribution level.
- The distribution circuit breaker for the Orangeville Sta 19 1961 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Orangeville Sta 19 1961 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Orangeville Sta 19 1961 in 2022, accounting for 33% of total interruptions (7 of 21). Unknown were the 2nd leading cause of interruptions, accounting for 33% of total interruptions (7 of 21). Equipment Failures were the 3rd leading cause of interruptions, accounting for 29% of total interruptions (6 of 21).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Orangeville Sta 19 1961 in 2022, accounting for 91% of total customers interrupted (2,007 of 2,211). Trees were the 2nd leading cause of customers interrupted, accounting for 6% of total customers interrupted (140 of 2,211). Unknown were the 3rd leading cause of customers interrupted, accounting for 2% of total customers interrupted (41 of 2,211).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Orangeville Sta 19 1961 in 2022, accounting for 85% of total customer-hours interrupted (5,352 of 6,291). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 13% of total customer-hours interrupted (789 of 6,291). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 1% of total customer-hours interrupted (94 of 6,291).
- Of the 21 interruptions on this circuit, 11 affected 10 customers or less, with 8 being single customer outages.

Action Taken:

- Distribution line inspection was completed in August 2021. All Level 1 maintenance has been completed.
- Distribution cycle tree trimming completed in FY2019.
- Sub-T cycle tree trimming on Line 209 completed in FY2018.
- Sub-T hazard tree work done on Line 209 in FY2022.
- Sub-T line inspection was completed in July 2019. All Level 1, Level 2 & Level 3 maintenance has been completed.

Action Plan:

- Complete Level 2 Distribution Line Inspection work due in 2023.
- Complete Level 3 Distribution Line Inspection work due in 2024.
- Next Sub-T Line Inspection work on 209 Line due in 2024.
- Distribution cycle tree trimming is scheduled for FY2025.
- Distribution Hazzard Tree work is scheduled for FY2024.
- Sub-T cycle tree trimming on Line 209 is scheduled for FY24.

2. WETHERSFIELD STA 23 2361 – 4.8kV

Profile: 426 Customers, 48.7 Circuit Miles
Indices: CAIDI = 3.13, SAIFI = 3.69

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	8	38.10%	90	5.73%	381	7.76%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	28.57%	1,284	81.78%	3,710	75.57%
6	ACCIDENTS	3	14.29%	140	8.92%	704	14.35%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	4	19.05%	56	3.57%	114	2.32%
Totals		21	100.00%	1,570	100.00%	4,910	100.00%

Problem Analysis:

- There were 21 interruptions on the Wethersfield Sta 23 2361 in 2022.
- There were 3 transmission interruptions.
 - The first Transmission interruption occurred on February 02, 2022, coded as a cause of deterioration (PSC cause code 05). This lockout accounted for 27% of the total customers interrupted (425 of 1,570), and 12% of the total customer-hours interrupted (574 of 4,910). This event resulted from a broken insulator which caused the Attica-Wethersfield Line 209 to lock out resulting in an outage of 1.4 hours.
 - The second Transmission interruption occurred on March 16, 2022, coded as a cause of deterioration (PSC cause code 05). This lockout accounted for 27% of the total customers interrupted (425 of 1,570), and 33% of the total customer-hours interrupted (1,608 of 4,910). This event resulted from a loose conductor which caused the Attica-Wethersfield Line 209 to lock out resulting in an outage of 2.9 hours.
 - The third Transmission interruption occurred on April 25, 2022, coded as a cause of insulation failure - other (PSC cause code 05). This lockout accounted for 27% of the total customers interrupted (425 of 1,570), and 31% of the total customer-hours interrupted (1,502 of 4,910). This event resulted from a loose conductor which caused the Attica-Wethersfield Line 209 to lock out resulting in an outage of 3.7 hours.
- There were no substation interruptions.

- The remaining 18 events occurred at the distribution level.
- The distribution circuit breaker for the Wethersfield Sta 23 2361 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Wethersfield Sta 23 2361 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Wethersfield Sta 23 2361 in 2022, accounting for 38% of total interruptions (8 of 21). Equipment Failures were the 2nd leading cause of interruptions, accounting for 29% of total interruptions (6 of 21). Unknown were the 3rd leading cause of interruptions, accounting for 19% of total interruptions (4 of 21).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Wethersfield Sta 23 2361 in 2022, accounting for 82% of total customers interrupted (1,284 of 1,570). Accidents were the 2nd leading cause of customers interrupted, accounting for 9% of total customers interrupted (140 of 1,570). Trees were the 3rd leading cause of customers interrupted, accounting for 6% of total customers interrupted (90 of 1,570).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Wethersfield Sta 23 2361 in 2022, accounting for 76% of total customer-hours interrupted (3,710 of 4,910). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 14% of total customer-hours interrupted (704 of 4,910). Trees were the 3rd leading cause of customer-hours interrupted, accounting for 8% of total customer-hours interrupted (381 of 4,910).
- Of the 21 interruptions on this circuit, 14 affected 10 customers or less, with 6 being single customer outages.

Action Taken:

- Distribution line inspection was completed in August 2021. All Level 1 maintenance has been completed.
- Distribution cycle tree trimming was completed in FY2019.
- Emerald Ash Bore removal completed in FY2019.
- Sub-T line inspection was completed in July 2019. All Level 1, Level 2 & Level 3 maintenance has been completed.
-

Action Plan:

- Complete Level 2 Distribution Line Inspection work due in 2023.
- Complete Level 3 Distribution Line Inspection work due in 2024.
- Distribution cycle tree trimming is scheduled for FY2024.
- Next Sub-T Line Inspection work on 209 Line due in 2024.

3. RICHMOND STA 32 3253 – 13.2kV

Profile: 1,521 Customers, 66.8 Circuit Miles
Indices: CAIDI = 1.23, SAIFI = 3.69

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	7	46.67%	793	14.12%	1,198	17.30%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	6.67%	1,514	26.95%	202	2.92%
5	EQUIPMENT	2	13.33%	1,521	27.08%	2,098	30.31%
6	ACCIDENTS	2	13.33%	143	2.55%	202	2.91%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	13.33%	1,564	27.84%	2,987	43.15%
10	UNKNOWN	1	6.67%	82	1.46%	236	3.41%
Totals		15	100.00%	5,617	100.00%	6,922	100.00%

Problem Analysis:

- There were 15 interruptions on the Richmond Sta 32 3253 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on February 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 27% of the total customers interrupted (1,519 of 5,617), and 30% of the total customer-hours interrupted (2,087 of 6,922). This event resulted from a pole fire due to a failed insulator which caused the North Lakeville-Richmond Line 226 to lock out resulting in an outage of 1.4 hours.
 - The second Transmission interruption occurred on June 16, 2022, coded as a cause of lightning (PSC cause code 09). This lockout accounted for 27% of the total customers interrupted (1,518 of 5,617), and 42% of the total customer-hours interrupted (2,910 of 6,922). This event resulted from a broken pole due lightning which caused the North Lakeville-Richmond Line 226 to lock out resulting in an outage of 8.8 hours.
- There was 1 substation interruption.
 - This Substation interruption occurred on July 20, 2022, coded as a cause of operating / testing error (PSC cause code 04). This lockout accounted for 27% of the total customers interrupted (1,514 of 5,617), and 3% of the total customer-hours interrupted (202 of 6,922). This event resulted from a switching error that inadvertently de-energized the mobile that was supplying the Richmond Station at the time resulting in an outage of approximately 8 minutes.

- The remaining 12 events occurred at the distribution level.
- The distribution circuit breaker for the Richmond Sta 32 3253 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Richmond Sta 32 3253 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Richmond Sta 32 3253 in 2022, accounting for 47% of total interruptions (7 of 15). Equipment Failures were the 2nd leading cause of interruptions, accounting for 13% of total interruptions (2 of 15). Accidents were the 3rd leading cause of interruptions, accounting for 13% of total interruptions (2 of 15).
- Lightning were the leading cause of customers interrupted (CI) on the Richmond Sta 32 3253 in 2022, accounting for 28% of total customers interrupted (1,564 of 5,617). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 27% of total customers interrupted (1,521 of 5,617). Operators Errors were the 3rd leading cause of customers interrupted, accounting for 27% of total customers interrupted (1,514 of 5,617).
- Lightning were the leading cause of customer-hours interrupted (CHI) on the Richmond Sta 32 3253 in 2022, accounting for 43% of total customer-hours interrupted (2,987 of 6,922). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 30% of total customer-hours interrupted (2,098 of 6,922). Trees were the 3rd leading cause of customer-hours interrupted, accounting for 17% of total customer-hours interrupted (1,198 of 6,922).
- Of the 15 interruptions on this circuit, 11 affected 10 customers or less, with 7 being single customer outages.

Action Taken:

- Distribution line inspection was completed in July 2020. All Level 1 & Level 2 maintenance has been completed.
- Distribution cycle tree trimming completed in FY2021.
- Sub-T cycle tree trimming on Line 209 completed in FY2023.
- Sub-T line inspection was completed in September 2022. All Level 1 maintenance has been completed.

Action Plan:

- Distribution cycle tree trimming is scheduled for FY2026.
- Complete Level 3 Distribution Line Inspection work due in 2023.
- Complete Level 2 Sub-T Line Inspection work on Line 226 due in 2024.
- Complete Level 3 Sub-T Line Inspection work on Line 226 due in 2025.
- Sub-T cycle tree trimming on Line 209 is scheduled for FY29.

4. BROCKPORT STA 74 7457 – 13.2kV

Profile: 1,394 Customers, 34.6 Circuit Miles
 Indices: CAIDI = 1.72, SAIFI = 2.81

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	5	31.25%	1,920	49.03%	983	14.61%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	3	18.75%	1,798	45.91%	5,357	79.57%
6	ACCIDENTS	5	31.25%	45	1.15%	59	0.88%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	3	18.75%	153	3.91%	333	4.94%
Totals		16	100.00%	3,916	100.00%	6,733	100.00%

Problem Analysis:

- There were 16 interruptions on the Brockport Sta 74 7457 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on December 03, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 36% of the total customers interrupted (1,404 of 3,916), and 3% of the total customer-hours interrupted (234 of 6,733). This event resulted from a tree contact that caused the North Lockport-Mortimer Line 113 to lock out resulting in an outage of 10 minutes to restore with bus transfer.
- There were no substation interruptions.
- The remaining 15 events occurred at the distribution level.
- The distribution circuit breaker for the Brockport Sta 74 7457 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Brockport Sta 74 7457 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Brockport Sta 74 7457 in 2022, accounting for 31% of total interruptions (5 of 16). Accidents were the 2nd leading cause of interruptions, accounting for 31% of total interruptions (5 of 16). Equipment Failures were the 3rd leading cause of interruptions, accounting for 19% of total interruptions (3 of 16).

- Trees were the leading cause of customers interrupted (CI) on the Brockport Sta 74 7457 in 2022, accounting for 49% of total customers interrupted (1,920 of 3,916). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 46% of total customers interrupted (1,798 of 3,916). Unknown were the 3rd leading cause of customers interrupted, accounting for 4% of total customers interrupted (153 of 3,916).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Brockport Sta 74 7457 in 2022, accounting for 80% of total customer-hours interrupted (5,357 of 6,733). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 15% of total customer-hours interrupted (983 of 6,733). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (333 of 6,733).
- Of the 16 interruptions on this circuit, 5 affected 10 customers or less, with 2 being single customer outages.

Action Taken:

- Distribution cycle tree trimming was completed in FY2020.
- Distribution line inspection was completed in August 2021. All Level 1 maintenance has been completed.
- Emerald Ash Bore removal completed in FY2023.

Action Plan:

- Complete Level 2 Distribution Line Inspection work due in 2023.
- Complete Level 3 Distribution Line Inspection work due in 2024.
- Distribution cycle tree trimming is scheduled for FY2025.

5. LYNDONVILLE STA 95 9561 – 4.8kV

Profile: 834 Customers, 47.0 Circuit Miles
Indices: CAIDI = 2.89, SAIFI = 2.42

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	12	75.00%	1,531	75.87%	4,416	75.76%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	2	12.50%	70	3.47%	194	3.33%
6	ACCIDENTS	2	12.50%	417	20.66%	1,219	20.91%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	0	0.00%	0	0.00%	0	0.00%
Totals		16	100.00%	2,018	100.00%	5,828	100.00%

Problem Analysis:

- There were 16 interruptions on the Lyndonville Sta 95 9561 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on November 12, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 41% of the total customers interrupted (831 of 2,018), and 38% of the total customer-hours interrupted (2,202 of 5,828). This event resulted from a tree on the line which caused the Phillips-Medina Line 301 to lock out resulting in an outage of 2.7 hours.
- There were no substation interruptions.
- The remaining 15 events occurred at the distribution level.
- The distribution circuit breaker for the Lyndonville Sta 95 9561 experienced 9 momentary operations in 2022.
- The distribution circuit breaker for the Lyndonville Sta 95 9561 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Lyndonville Sta 95 9561 in 2022, accounting for 75% of total interruptions (12 of 16). Equipment Failures were the 2nd leading cause of interruptions, accounting for 13% of total interruptions (2 of 16). Accidents were the 3rd leading cause of interruptions, accounting for 13% of total interruptions (2 of 16).

- Trees were the leading cause of customers interrupted (CI) on the Lyndonville Sta 95 9561 in 2022, accounting for 76% of total customers interrupted (1,531 of 2,018). Accidents were the 2nd leading cause of customers interrupted, accounting for 21% of total customers interrupted (417 of 2,018). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 3% of total customers interrupted (70 of 2,018).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Lyndonville Sta 95 9561 in 2022, accounting for 76% of total customer-hours interrupted (4,416 of 5,828). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 21% of total customer-hours interrupted (1,219 of 5,828). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (194 of 5,828).
- Of the 16 interruptions on this circuit, 9 affected 10 customers or less, with 7 being single customer outages.

Action Taken:

- Distribution line inspection was completed in August 2022. All Level 1 maintenance has been completed.
- Distribution cycle tree trimming was completed in FY2022.
- Sub-T line inspection on Line 301 was last completed in January 2021. All Level 1 and Level 2 work has been completed.

Action Plan:

- Complete Level 2 Distribution Line Inspection work due in 2024.
- Complete Level 3 Distribution Line Inspection work due in 2025.
- Distribution cycle tree trimming is scheduled for FY2027.
- Sub-T line inspection was last completed in January 2021; Level 3 work scheduled for completion by January 2024.

6. RICHMOND STA 32 3251 - 13.2kV

Profile: 859 Customers, 70.7 Circuit Miles
Indices: CAIDI = 1.23, SAIFI = 3.43

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	45.45%	115	3.90%	216	5.95%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	4.55%	859	29.14%	115	3.16%
5	EQUIPMENT	5	22.73%	875	29.68%	786	21.68%
6	ACCIDENTS	2	9.09%	238	8.07%	320	8.83%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	3	13.64%	860	29.17%	2,187	60.34%
10	UNKNOWN	1	4.55%	1	0.03%	1	0.04%
Totals		22	100.00%	2,948	100.00%	3,624	100.00%

Problem Analysis:

- There were 22 interruptions on the Richmond Sta 32 3251 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on February 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 29% of the total customers interrupted (859 of 2,948), and 20% of the total customer-hours interrupted (731 of 3,624). This event resulted from a pole fire due to a failed insulator which caused the North Lakeville-Richmond Line 226 to lock out resulting in an outage of 0.85 hours.
 - The second Transmission interruption occurred on June 16, 2022, coded as a cause of lightning (PSC cause code 09). This lockout accounted for 29% of the total customers interrupted (858 of 2,948), and 60% of the total customer-hours interrupted (2,182 of 3,624). This event resulted from a broken pole due lightning which caused the North Lakeville-Richmond Line 226 to lock out resulting in an outage of 2.5 hours.
- There was 1 substation interruption.
 - This Substation interruption occurred on July 20, 2022, coded as a cause of operating / testing error (PSC cause code 04). This lockout accounted for 29% of the total customers interrupted (859 of 2,948), and 3% of the total customer-hours interrupted (115 of 3,624). This event resulted from a switching error that inadvertently de-energized the mobile that was supplying the Richmond Station at the time resulting in an outage of approximately 8 minutes.

- The remaining 19 events occurred at the distribution level.
- The distribution circuit breaker for the Richmond Sta 32 3251 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Richmond Sta 32 3251 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Richmond Sta 32 3251 in 2022, accounting for 45% of total interruptions (10 of 22). Equipment Failures were the 2nd leading cause of interruptions, accounting for 23% of total interruptions (5 of 22). Lightning were the 3rd leading cause of interruptions, accounting for 14% of total interruptions (3 of 22).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Richmond Sta 32 3251 in 2022, accounting for 30% of total customers interrupted (875 of 2,948). Lightning were the 2nd leading cause of customers interrupted, accounting for 29% of total customers interrupted (860 of 2,948). Operators Errors were the 3rd leading cause of customers interrupted, accounting for 29% of total customers interrupted (859 of 2,948).
- Lightning were the leading cause of customer-hours interrupted (CHI) on the Richmond Sta 32 3251 in 2022, accounting for 60% of total customer-hours interrupted (2,187 of 3,624). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 22% of total customer-hours interrupted (786 of 3,624). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 9% of total customer-hours interrupted (320 of 3,624).
- Of the 22 interruptions on this circuit, 16 affected 10 customers or less, with 11 being single customer outages.

Action Taken:

- Distribution line inspection was completed in June 2020. All Level 1, & Level 2 maintenance has been completed.
- Distribution cycle tree trimming was completed in FY2021.
- Sub-T line inspection was completed in September 2022. All Level 1 maintenance has been completed.

Action Plan:

- Distribution cycle tree trimming is scheduled for FY2026.
- Complete Level 3 Distribution Line Inspection work due in 2023.
- Complete Level 2 Sub-T Line Inspection work on Line 226 due in 2024.
- Complete Level 3 Sub-T Line Inspection work on Line 226 due in 2025.

3. ACTION PLAN SUMMARIES

a. SUMMARY OF ACTION PLANS FOR 2022 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
Orangeville	1961	2022	Complete Level 2 maintenance work	2023	TBD	
Orangeville	1961	2022	Complete Level 3 maintenance work	2024	TBD	
Orangeville	1961	2022	Distribution Cycle Tree Trimming	2024	TBD	
Orangeville	1961	2022	Sub-T Cycle Tree Trimming	FY2024	TBD	
Orangeville	1961	2022	Distribution Hazard Tree Removal	FY2024	TBD	
Orangeville	1961	2022	Sub-T I&M Inspection	FY2024	TBD	
Wethersfield	2361	2022	Complete Level 2 maintenance work	2023	TBD	
Wethersfield	2361	2022	Complete Level 3 maintenance work	2024	TBD	
Wethersfield	2361	2022	Distribution Cycle Tree Trimming	FY2024	TBD	
Wethersfield	2361	2022	Sub-T I&M Inspection	2024	TBD	
Richmond	3253	2022	Complete Level 3 maintenance work	2023	TBD	
Richmond	3253	2022	Distribution Cycle Tree Trimming	FY2026	TBD	
Richmond	3253	2022	Complete Level 2 Sub-T maint work	2024	TBD	
Richmond	3253	2022	Complete Level 3 Sub-T maint work	2025	TBD	
Brockport	7457	2022	Complete Level 2 maintenance work	2023	TBD	
Brockport	7457	2022	Complete Level 3 maintenance work	2024	TBD	
Brockport	7457	2022	Distribution Cycle Tree Trimming	FY2025	TBD	
Lyndonville	9561	2022	Complete Level 2 maintenance work	2024	TBD	
Lyndonville	9561	2022	Complete Level 3 maintenance work	2025	TBD	
Lyndonville	9561	2022	Complete Level 3 Sub-T maint work	2024	TBD	
Richmond	3251	2022	Distribution Cycle Tree Trimming	FY2026	TBD	
Richmond	3251	2022	Complete Level 3 maintenance work	2023	TBD	
Richmond	3251	2022	Complete Level 2 Sub-T maint work	2024	TBD	
Richmond	3251	2022	Complete Level 3 Sub-T maint work	2025	TBD	

b. STATUS OF ACTION PLANS FOR 2021 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
Wethersfield	2361	2021	Complete Level 2 maintenance work	2023	TBD	
Wethersfield	2361	2021	Complete Level 3 maintenance work	2024	TBD	
Wethersfield	2361	2021	Distribution Cycle Tree Trimming	FY2025	TBD	
Wethersfield	2361	2021	Complete Level 3 Sub-T Maintenance-Line 209	2022	TBD	Complete
E. Golah	5155	2021	Complete Level 2 maintenance work	2023	TBD	
E. Golah	5155	2021	Distribution Cycle Tree Trimming	FY2024	TBD	
Orangeville	1961	2021	Complete Level 2 maintenance work	2023	TBD	
Orangeville	1961	2021	Complete Level 3 maintenance work	2024	TBD	
Orangeville	1961	2021	Distribution Cycle Tree Trimming	FY2024	TBD	
Orangeville	1961	2021	Complete Level 3 Sub-T Maintenance-Line 209	2022	TBD	Complete
Brockport	7459	2021	Complete Level 2 maintenance work	2023	TBD	
Brockport	7459	2021	Complete Level 3 maintenance work	2024	TBD	
Brockport	7459	2021	Distribution Cycle Tree Trimming	FY2025	TBD	
E. Golah	5156	2021	Complete Level 2 maintenance work	2022	TBD	Complete
E. Golah	5156	2021	Complete Level 3 maintenance work	2023	TBD	
E. Golah	5156	2021	Distribution Cycle Tree Trimming	FY2024	TBD	
W. Hamlin	8254	2021	Distribution Cycle Tree Trimming	FY2026	TBD	
Southland Lyndonville	8462 9561	2020	Sub-T Line 301 Distribution Cycle Tree Trimming	FY2022	TBD	Complete
Leroy	0457	2020	Distribution Line Inspection	2021	TBD	Completed March 2021
Leroy	0456	2020	Complete Level 3 maintenance work	2022	TBD	Complete
Lyndonville	9561	2020	Distribution Line Inspection	2022	TBD	Complete
Lyndonville	9561	2019	Distribution Cycle Tree Trimming	FY2022	TBD	Complete

G. MOHAWK VALLEY REGION

1. OPERATING REGIONAL PERFORMANCE

a. HISTORIC CAIDI AND SAIFI INDICES

IDS info:

	2022	2021	2020	2019	2018	2017
CAIDI (Threshold 2.150)	2.20	1.94	2.35	1.93	2.29	1.57
SAIFI (Threshold 1.483)	1.49	1.34	1.34	1.42	1.29	1.52
SAIDI	3.27	2.60	3.15	2.75	2.94	2.40
Interruptions	1,459	1,381	1,349	1,283	1,331	1,209
Customers Interrupted	209,062	187,636	186,722	197,595	177,829	209,763
Customer-Hours Interrupted	459,360	363,296	438,515	381,537	406,526	329,832
Customers Served	140,458	139,837	139,367	138,719	138,080	137,634
Customers Per Interruption	143.29	135.87	138.42	154.01	133.61	173.50
Availability Index	99.9627	99.9703	99.9642	99.9686	99.9664	99.9726
Interruptions/1000 Customers	10.39	9.88	9.68	9.25	9.64	8.78

b. DISCUSSION OF REGIONAL PERFORMANCE

In 2022, the Mohawk Valley Region did not meet its CAIDI reliability target and did not meet its SAIFI reliability target as set forth by the New York Public Service Commission (PSC). The final System Average Interruption Frequency Index (SAIFI) result was 1.49 interruptions, 0.5% above the PSC goal of 1.483 interruptions. As shown in the table above, the Customer Average Interruption Duration index (CAIDI) was 2.20 in 2022, 2% above the PSC's regional target of 2.150 hours.

The 2022 CAIDI result was 13% above the 2021 result of 1.94 hours, and 10% above the previous 5-year average of 2.00 hours. The 2022 SAIFI was 11% above the 2021 result of 1.34 interruptions, and 8% above the previous 5-year average of 1.38 interruptions.

In 2022, excluding major storms, the Mohawk Valley Region experienced 15 transmission interruptions. These interruptions accounted for 1% of the region's total interruptions (15 of 1,459), 34% of the region's total customers interrupted (CI), (71,194 of 209,062), and 46% (211,485 of 459,359) of the region's total customer-hours interrupted (CHI). Overall, transmission interruptions had a CAIDI of 2.97 hours, and a SAIFI of 0.51 interruptions.

The number of transmission-related interruptions increased from 13 in 2021 to 15 in 2022 (an increase of 15%). The number of customers interrupted increased from 40,492 in 2021, to 71,194 in 2022 (an increase of 76%), while the customer-hours interrupted increased from 82,372 in 2021, to 211,485 in 2022 (an increase of 157%).

In 2022, excluding major storms, the Mohawk Valley Region experienced 7 substation interruptions. These interruptions accounted for 0.5% of the region's total interruptions (7 of 1,459), 8% of the region's total customers interrupted, (16,976 of 209,062), and 1% (6,419 of 459,359) of the region's total customer-hours interrupted. Overall, substation interruptions had a CAIDI of .38 hours, and a SAIFI of 0.12 interruptions.

The number of substation-related interruptions decreased from 10 to 7 from 2021 to 2022 (a decrease of 30%). The number of customers interrupted decreased from 19,160 in 2021, to 16,976 in 2022 (a decrease of 11%), while the customer-hours interrupted decreased from 17,495 in 2021, to 6,419 in 2022 (a decrease of 63%).

In 2022, excluding major storms, the Mohawk Valley Region experienced 1,437 distribution interruptions. These interruptions accounted for 98% of the region's total interruptions (1,437 of 1,459), 58% of the region's total customers interrupted, (120,892 of 209,062), and 53% (241,455 of 459,359) of the region's total customer-hours interrupted. Overall, distribution interruptions had a CAIDI of 2. hours, and a SAIFI of 0.86 interruptions.

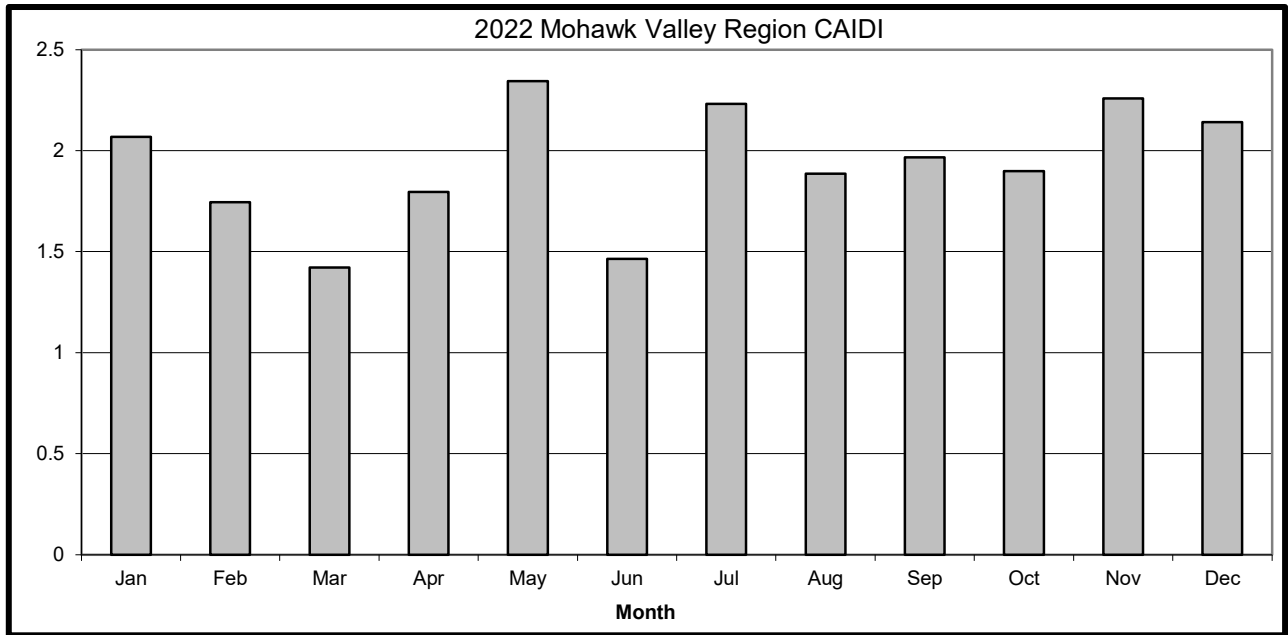
The number of distribution-related interruptions increased from 1,358 to 1,437 from 2021 to 2022 (an increase of 6%). The number of customers interrupted decreased from 127,984 in 2021, to 120,892 in 2022 (a decrease of 6%), while the customer-hours interrupted decreased from 263,429 in 2021, to 241,455 in 2022 (a decrease of 8%).

c. MONTHLY CAIDI AND SAIFI GRAPHS

The graphs on the following page show the monthly CAIDI and SAIFI for the Mohawk Valley Region for 2022 (Excluding Major Storms).

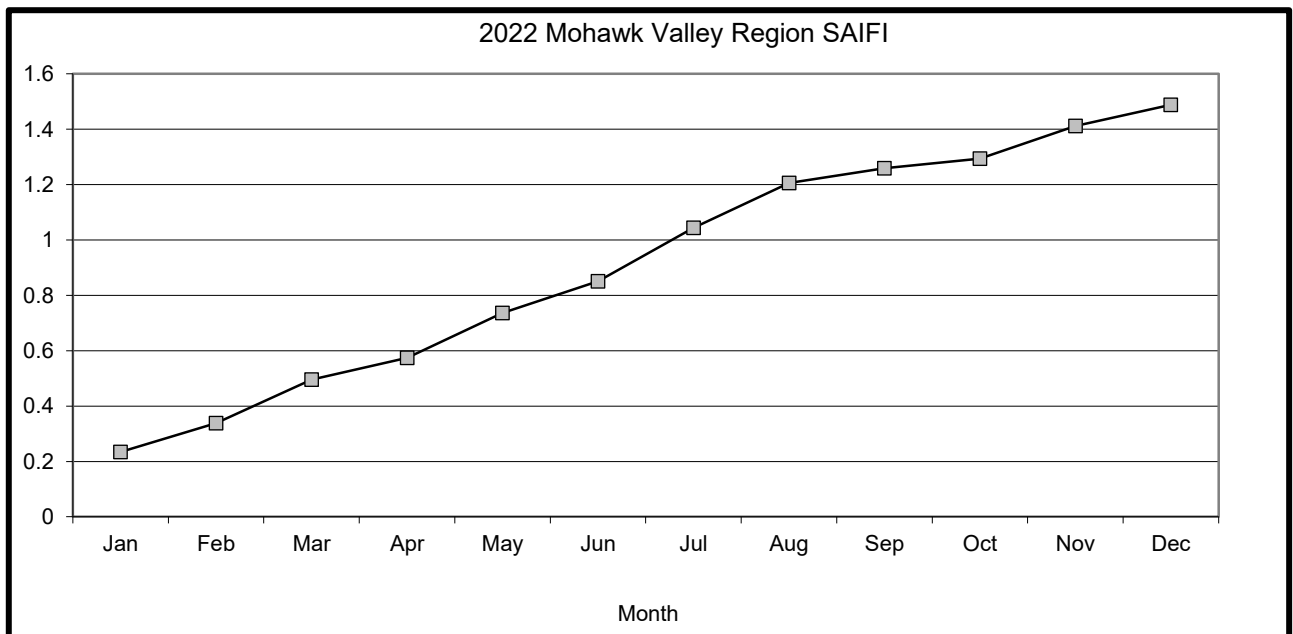
- The CAIDI graph shows the individual CAIDI by month for 2022. The Mohawk Valley Region was below the CAIDI threshold of 2.150 hours for nine months of the year, with May being the highest month with a CAIDI of 2.34 hours, accounting for 7.2% of the number of interruptions (105 of 1,459), 10.9% of the total number of customers interrupted (22,761 of 208,872) and 11.1% of the total customer-hours interrupted (50,727 of 458,860). The Mohawk Valley Region ended the year with an overall CAIDI of 2.197.
- The SAIFI graph shows the cumulative SAIFI by month for 2022. The Mohawk Valley Region was above the SAIFI threshold of 1.483. January was the worst performing month in terms of customers interrupted with a SAIFI of 0.235, accounting for 3.7% of the number of interruptions (54 of 1,459), 15.8% of the total number of customers interrupted (32,920 of 208,872) and 7.4% of the total customer-hours interrupted (33,965 of 458,860). The Mohawk Valley Region ended the year with a SAIFI of 1.488.

GRAPH OF MONTHLY CAIDI AND SAIFI INDICES FOR THE MOHAWK VALLEY



PSC CAIDI Goal:	
Threshold	2.150
2022 Actual	2.197

PSC SAIFI Goal:	
Threshold	1.483
2022 Actual	1.488



d. PSC CAUSE CODES

1) Number of Events by Cause – Historical

IDS info:

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	418	378	529	965	442	360
02 Tree Contacts	490	507	430	458	467	490
03 Overloads	16	16	6	26	5	14
04 Operator Error	8	9	5	4	0	3
05 Equipment	443	370	405	365	318	375
06 Accidents	247	202	158	201	196	199
07 Prearranged	53	48	62	37	20	40
08 Customer Equip.	0	0	0	0	0	0
09 Lightning	36	42	31	51	36	45
10 Unknown	166	187	186	189	167	180
Total	1,877	1,759	1,527	1,812	2,296	1,651

2) Customers Interrupted by Cause – Historical

IDS info:

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	54,610	54,789	52,904	136,049	69,505	40,140
02 Tree Contacts	49,992	61,727	79,647	45,181	68,831	70,991
03 Overloads	939	403	144	895	5,156	181
04 Operator Error	7,557	3,157	526	46	0	1,036
05 Equipment	104,771	58,880	62,802	77,836	43,625	120,816
06 Accidents	28,327	22,044	22,121	36,339	39,054	28,403
07 Prearranged	3,770	21,845	14,220	5,393	27,491	32,315
08 Customer Equip.	0	0	0	0	0	0
09 Lightning	2,719	5,269	1,691	3,573	8,813	5,578
10 Unknown	10,987	14,311	16,444	8,566	16,793	18,447
Total	263,672	242,425	212,827	250,499	313,878	279,268

3) Customer-Hours Interrupted by Cause – Historical

IDS info:

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	698,288	229,494	337,565	838,451	320,893	254,438
02 Tree Contacts	140,280	163,328	177,014	117,146	144,131	177,297
03 Overloads	1,600	1,534	471	2,021	2,550	485
04 Operator Error	968	3,820	702	31	0	211
05 Equipment	219,448	115,089	111,307	183,190	85,689	239,291
06 Accidents	51,266	33,260	48,395	73,199	49,038	66,573
07 Prearranged	7,449	13,783	11,821	4,133	7,050	22,706
08 Customer Equip.	0	0	0	0	0	0
09 Lightning	14,405	10,706	5,112	8,550	17,255	10,686
10 Unknown	23,943	21,775	26,717	18,255	24,120	21,497
Total	1,157,647	592,790	648,907	719,103	1,244,977	650,726

4) Interruptions, Customers Interrupted, and Customer-Hours Interrupted – 2022

Cause Code	Interruptions		Customers Interrupted		Customer-Hours Interrupted	
	Number	% Total	Number	% Total	Number	% Total
01 Major Storms	418	22.3%	54,610	20.7%	698,288	60.3%
02 Tree Contacts	490	26.1%	49,992	19.0%	140,280	12.1%
03 Overloads	16	0.9%	939	0.4%	1,600	0.1%
04 Operator Error	8	0.4%	7,557	2.9%	968	0.1%
05 Equipment	443	23.6%	104,771	39.7%	219,448	19.0%
06 Accidents	247	13.2%	28,327	10.7%	51,266	4.4%
07 Prearranged	53	2.8%	3,770	1.4%	7,449	0.6%
08 Customer Equip.	0	0.0%	0	0.0%	0	0.0%
09 Lightning	36	1.9%	2,719	1.0%	14,405	1.2%
10 Unknown	166	8.8%	10,987	4.2%	23,943	2.1%
Total	1,877	100.0%	263,672	100.0%	1,157,647	100.0%

e. **INTERRUPTION REVIEW BY PSC CAUSE CODES**

Cause Code 01 - Major Storms

In 2022, Major Storms accounted for 22% of interruptions, 21% of customers interrupted, and 60% of Customer-Hours Interrupted.

Interruptions due to Major Storm were up 11% from 2021, and down 16% over the 5-year average. Customers interrupted due to Major Storms were down 0% from 2021, and down 20% over the 5-year average. Customer-Hours interrupted were up 204% from 2021 and up 80% over the 5-year average.

The remaining PSC code descriptions do not include Major Storms in the percentages.

Cause Code 02 - Tree Contacts

In 2022, Tree Contacts accounted for 34% of interruptions, 24% of customers interrupted, and 31% of Customer-Hours Interrupted.

Interruptions due to Tree Contacts were down 3% from 2021, and up 7% over the 5-year average. Customers interrupted due to Tree Contacts were down 19% from 2021, and down 22% over the 5-year average. Customer-Hours interrupted were down 14% from 2021 and down 12% over the 5-year average.

Tree Contacts were the largest cause of interruptions in 2022.

Cause Code 03 - Overloads

In 2022, Overloads accounted for 1% of interruptions, 0% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Overloads were flat at 0% from 2021, and up 14% over the 5-year average. Customers interrupted due to Overloads were up 133% from 2021, and down 31% over the 5-year average. Customer-Hours interrupted were up 4% from 2021 and up 14% over the 5-year average.

Overloads were the 7th largest cause of interruptions in 2022.

Cause Code 04 - Operator Error

In 2022, Operator Error accounted for 1% of interruptions, 4% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Operator Error were down 11% from 2021, and up 60% over the 5-year average. Customers interrupted due to Operator Error were up 139% from 2021, and up 586% over the 5-year average. Customer-Hours interrupted were down 75% from 2021 and down 16% over the 5-year average.

Operator Error was the 8th largest cause of interruptions in 2022.

Cause Code 05 - Equipment Failure

In 2022, Equipment Failures accounted for 30% of interruptions, 50% of customers interrupted, and 48% of Customer-Hours Interrupted.

Interruptions due to Equipment Failure were up 20% from 2021, and up 20% over the 5-year average. Customers interrupted due to Equipment Failure were up 78% from 2021, and up 70% over the 5-year average. Customer-Hours interrupted were up 91% from 2021 and up 65% over the 5-year average.

Equipment Failures were the 2nd largest cause of interruptions in 2022.

Cause Code 06 - Accidents

In 2022, Accidents accounted for 17% of interruptions, 14% of customers interrupted, and 11% of Customer-Hours Interrupted.

Interruptions due to Accidents were up 22% from 2021, and up 24% over the 5-year average. Customers interrupted due to Accidents were up 29% from 2021, and down 5% over the 5-year average. Customer-Hours interrupted were up 54% from 2021 and up 5% over the 5-year average.

Accidents were the 3rd largest cause of interruptions in 2022.

Cause Code 07 - Prearranged

In 2022, Prearranged accounted for 4% of interruptions, 2% of customers interrupted, and 2% of Customer-Hours Interrupted.

Interruptions due to Prearranged were up 10% from 2021, and up 18% over the 5-year average. Customers interrupted due to Prearranged were down 83% from 2021, and down 74% over the 5-year average. Customer-Hours interrupted were down 46% from 2021 and down 9% over the 5-year average.

Prearranged was the 5th largest cause of interruptions in 2022.

Cause Code 08 - Customer Equipment

There were no Customer Equipment interruptions in 2022.

Cause Code 09 - Lightning

In 2022, Lightning accounted for 2% of interruptions, 1% of customers interrupted, and 3% of Customer-Hours Interrupted.

Interruptions due to Lightning were down 14% from 2021, and up 3% over the 5-year average. Customers interrupted due to Lightning were down 48% from 2021, and down 35% over the 5-year average. Customer-Hours interrupted were up 35% from 2021 and up 67% over the 5-year average.

Lightning was the 6th largest cause of interruptions in 2022.

Cause Code 10 - Unknown

In 2022, Unknown causes accounted for 11% of interruptions, 5% of customers interrupted, and 5% of Customer-Hours Interrupted.

Interruptions due to Unknown causes were down 11% from 2021, and down 10% over the 5-year average. Customers interrupted due to Unknown causes were down 23% from 2021, and down 25% over the 5-year average. Customer-Hours interrupted were up 10% from 2021 and up 5% over the 5-year average.

Unknown causes were the 4th largest cause of interruptions in 2022.

f. DISCUSSION OF REGIONAL CAPEX PROJECTS WITH 2022/23 SPENDS:

The Mohawk Valley Region continues to work on capital projects in order to maintain customer satisfaction and future reliability. Some specific projects that were constructed in either CY22 or will be constructed in CY23 are listed below, in addition to a description of a major infrastructure project.

There are load relief projects scheduled to be completed throughout the Mohawk Valley Region. Most of these load relief projects are ratio transformer replacements or voltage conversions. Line reconductoring is also included in the voltage conversions where appropriate.

There are projects where lines are being rebuilt or reconductored. These projects are either the result of the company's Storm Hardening program, engineering reliability reviews (ERRs) conducted on the Worst Performing Circuits, or are the responses to customer inquiries via the Quick Resolution System (QRS).

Major Capital Projects for Mohawk Valley Region:

Region	Project Name	Project Type	Fin Sys Proj No.	Finish	Total Spend
Mohawk Valley	WPC Teall-Oneida 5	Transmission	C084553	FY23	\$6,493,000
Mohawk Valley	Deerfield-Schuyler 22-46kV	Sub-Transmission	C050288	FY23	\$4,450,000
Mohawk Valley	Old Forge-Raquette Lake 22 46kV	Sub-Transmission	C074003	FY23	\$2,802,000
Mohawk Valley	SCHUYLER STATION 663 - DSCADA (FULL RTU UPGRADE)	Substation	C081809	FY23	\$2,190,000
Mohawk Valley	PLEASANT STATION M9000 RTU	Substation	C069687	FY23	\$1,251,000
Mohawk Valley	Deerfield-Schuyler 22-46kV	Sub-Transmission	C077028	FY23	\$3,570,000

g. DISCUSSION OF REGIONAL PERFORMANCE OF LVAC (LOW VOLTAGE AC) NETWORK DISTRIBUTION SYSTEM(S):

City Of Utica – Terminal Street LVAC Network

The Utica LVAC Network serves the downtown area, mainly Genesee Street and Lafayette Street. This network is supplied by four 13.2kV feeders that originate from the Terminal Substation. This system serves approximately 662 customer accounts and experienced a peak load of approximately 6.732 MVA in 2022.

The table below lists the breaker operations in 2022 that were a result of a fault and/or failure.

Substation	Feeder Number	Breaker Number	Breaker Number	# Breaker Operations from Failures
Terminal	65144	R440	R815	0
Terminal	65145	R450	R825	0
Terminal	65146	R460	R825	0
Terminal	65147	R470	R845	0

As shown above the Utica LVAC Network experienced no feeder outages in 2022. There were no customer interruptions. At no time was this network operated beyond its single contingency (N-1) design criteria.

There were no major events associated with the network in 2022.

Annual maintenance consisted of manhole and vault inspections, network protector and transformer inspections and network protector operation checks.

Equipment maintenance consisted of manhole and vault rebuilds, network protector and transformer replacements.

At this time, there is one major project being designed and/or under construction. The major project is the relocation of the Terminal station which four of the ten feeders supply to LVAC network.

2. OPERATING CIRCUIT LIST

The next three tables will provide the following information for the Mohawk Valley Region.

- a. Worst Performing Circuit List
- b. Worst Performing Circuits with 3 Year History for CAIDI and SAIFI Indices
- c. Worst Performing Circuits by number of Momentary Interruptions

a. NATIONAL GRID WORST PERFORMING CIRCUIT LIST

MOHAWK VALLEY REGION

FEEDER #	A CUST. SERVED	B TOTAL INTER.	C # CUST. INTER.	D CUST. HRS. INTER.	C/A SAIFI	D/A SAIDI	D/C CAIDI	NUMBER OF MOMENTARIES
RAQUETTE LAKE 39861	503	40	5,336	31,269	10.61	62.16	5.86	8
EAGLE BAY 38272	1,070	27	7,150	32,222	6.68	30.11	4.51	8
POLAND - UTICA 62258	1,615	37	5,737	25,038	3.55	15.50	4.36	2
POLAND - UTICA 62257	1,632	34	8,797	14,757	5.39	9.04	1.68	1
LEHIGH 66952	2,010	27	9,694	24,446	4.82	12.16	2.52	3
ALDER CREEK 70152	1,092	47	3,802	12,294	3.48	11.26	3.23	9
EAGLE BAY 38271	949	22	5,898	28,486	6.21	30.02	4.83	8
ALDER CREEK 70161	1,001	32	3,376	12,081	3.37	12.07	3.58	6
LEHIGH 66953	2,191	63	10,538	11,291	4.81	5.15	1.07	0
LEHIGH 66954	774	23	2,784	9,899	3.60	12.79	3.56	0
LEHIGH 66951	1,163	27	6,187	7,735	5.32	6.65	1.25	0
OLD FORGE 38362	744	16	3,867	14,737	5.20	19.81	3.81	8
ONEIDA 50151	1,872	24	4,494	13,316	2.40	7.11	2.96	1
PETERBORO 51452	1,528	18	8,320	9,084	5.45	5.94	1.09	2
OLD FORGE 38361	616	15	2,642	8,460	4.29	13.73	3.20	8
WHITE LAKE 39963	989	17	3,293	8,530	3.33	8.62	2.59	6
CHADWICKS 66851	1,881	45	4,174	8,805	2.22	4.68	2.11	0
OLD FORGE 38364	882	12	4,602	14,034	5.22	15.91	3.05	8
TURIN RD 65356	1,316	29	3,155	5,651	2.40	4.29	1.79	1
DEERFIELD 60656	806	20	2,992	4,201	3.71	5.21	1.40	2

Regional Goals:
CAIDI 2.15
SAIFI 1.483

b. NATIONAL GRID WORST PERFORMING CIRCUITS WITH 3 YEAR HISTORY FOR CAIDI & SAIFI INDICES

MOHAWK VALLEY REGION

FEEDER #	2022 CAIDI	2021 CAIDI	2020 CAIDI	2019 CAIDI	2022 SAIFI	2021 SAIFI	2020 SAIFI	2019 SAIFI
RAQUETTE LAKE 39861	5.86	3.73	5.46	4.66	10.61	6.05	9.73	5.76
EAGLE BAY 38272	4.51	4.24	4.11	4.01	6.68	3.43	7.98	6.81
POLAND - UTICA 62258	4.36	1.48	2.60	2.00	3.55	7.23	7.13	5.11
POLAND - UTICA 62257	1.68	0.78	1.19	1.37	5.39	4.22	4.53	4.43
LEHIGH 66952	2.52	1.12	1.34	2.05	4.82	1.65	0.54	3.25
ALDER CREEK 70152	3.23	2.06	1.36	2.29	3.48	2.38	5.49	2.70
EAGLE BAY 38271	4.83	3.93	4.80	3.43	6.21	4.14	8.60	5.72
ALDER CREEK 70161	3.58	3.51	2.75	2.48	3.37	0.95	3.17	5.04
LEHIGH 66953	1.07	2.22	2.13	1.86	4.81	2.61	2.07	5.09
LEHIGH 66954	3.56	2.01	1.56	1.63	3.60	2.32	1.31	6.26
LEHIGH 66951	1.25	0.76	2.41	1.31	5.32	1.42	0.16	2.31
OLD FORGE 38362	3.81	1.83	4.51	3.15	5.20	3.95	7.94	3.87
ONEIDA 50151	2.96	2.38	1.19	1.72	2.40	3.68	1.76	1.16
PETERBORO 51452	1.09	1.41	1.57	1.71	5.45	1.19	1.72	0.08
OLD FORGE 38361	3.20	3.30	4.15	4.09	4.29	2.74	9.28	6.24
WHITE LAKE 39963	2.59	4.82	4.15	2.53	3.33	0.77	4.68	3.60
CHADWICKS 66851	2.11	2.66	2.44	1.68	2.22	1.06	0.63	1.98
OLD FORGE 38364	3.05	2.55	4.71	2.71	5.22	2.24	7.09	4.21
TURIN RD 65356	1.79	3.29	3.94	3.23	2.40	0.73	0.65	0.62
DEERFIELD 60656	1.40	4.02	1.55	2.75	3.71	0.64	0.42	0.86

Regional Goals:
 CAIDI 2.15
 SAIFI 1.483

c. NATIONAL GRID WORST PERFORMING CIRCUITS BY # OF MOMENTARY INTERRUPTIONS

MOHAWK VALLEY REGION

Feeders			Customer Momentaries				Ranks		
Volts (kV)	Station Name	Ckt/F No.	Substation	Transmission	Distribution	Total	Within Region	Within System	Reliability Ranking
No circuits experienced 10 or more momentary interruptions in 2022.									

d. WORST PERFORMING CIRCUIT ANALYSIS

For 2022, the Mohawk Valley Region is required to analyze and report on 20 of the worst performing circuits. The list consists of twelve 13.2kV and eight 4.8kV circuits.

The reliability performance thresholds for the Mohawk Valley Region are 2.15 for CAIDI and 1.483 for SAIFI.

1. RAQUETTE LAKE 39861 – 4.8kV

Profile: 503 Customers, 37.3 Circuit Miles

Indices: CAIDI = 5.86, SAIFI = 10.61

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	8	20.00%	557	10.44%	3,366	10.77%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	2.50%	503	9.43%	103	0.33%
5	EQUIPMENT	23	57.50%	3,114	58.36%	18,352	58.69%
6	ACCIDENTS	2	5.00%	643	12.05%	5,055	16.17%
7	PREARRANGED	5	12.50%	514	9.63%	4,306	13.77%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	1	2.50%	5	0.09%	87	0.28%
Totals		40	100.00%	5,336	100.00%	31,269	100.00%

Problem Analysis:

- There were 40 interruptions on the Raquette Lake 39861 in 2022.
- There were 9 transmission interruptions.
 - The first Transmission interruption occurred on January 16, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 9% of the total customers interrupted (499 of 5,336), and 15% of the total customer-hours interrupted (4,592 of 31,269). Motor vehicle accident, wires down TP422 NY-28.
 - The second Transmission interruption occurred on February 27, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 9% of the total customers interrupted (500 of 5,336), and 10% of the total customer-hours interrupted (3,016 of 31,269). Insulator failure, wires down TP148 NY-28.
 - The third Transmission interruption occurred on March 12, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 9% of the total customers interrupted (500 of 5,336), and 13% of the total customer-hours interrupted (4,150 of 31,269). Insulator failure, wires down TP2h NY-28.
 - The fourth Transmission interruption occurred on May 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 9% of the total customers interrupted (500 of 5,336), and 8% of the total customer-hours interrupted (2,486 of 31,269). Insulator failure, pole fire TP989 NY-28.
 - The fifth Transmission interruption occurred on May 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 9% of the total customers interrupted (500 of 5,336), and 1% of the total customer-hours interrupted (286 of 31,269). Insulator failure, TP154 NY-12.

- The sixth Transmission interruption occurred on August 08, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 10% of the total customers interrupted (507 of 5,336), and 10% of the total customer-hours interrupted (2,991 of 31,269). Tree limb on primary, backlot TP32 NY-12.
- The seventh Transmission interruption occurred on December 16, 2022, coded as a cause of deterioration (PSC cause code 05). This lockout accounted for 9% of the total customers interrupted (503 of 5,336), and 13% of the total customer-hours interrupted (3,987 of 31,269). Failed connector on primary, TP476 NY-28.
- The eighth Transmission interruption occurred on December 17, 2022, coded as a cause of construction by company (PSC cause code 04). This lockout accounted for 9% of the total customers interrupted (503 of 5,336), and 0% of the total customer-hours interrupted (103 of 31,269). Primary down, TP517 NY-28
- The ninth Transmission interruption occurred on December 17, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 9% of the total customers interrupted (503 of 5,336), and 10% of the total customer-hours interrupted (2,978 of 31,269). Emergency repairs to SWx22-2, NY-28
- There were no substation interruptions.
- The remaining 31 events occurred at the distribution level.
- The distribution circuit breaker for the Raquette Lake 39861 experienced 8 momentary operations in 2022.
- The distribution circuit breaker for the Raquette Lake 39861 experienced 0 sustained operations (lockouts) in 2022.
- Equipment Failures were the leading cause of interruptions on the Raquette Lake 39861 in 2022, accounting for 58% of total interruptions (23 of 40). Trees were the 2nd leading cause of interruptions, accounting for 20% of total interruptions (8 of 40). Prearranged were the 3rd leading cause of interruptions, accounting for 13% of total interruptions (5 of 40).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Raquette Lake 39861 in 2022, accounting for 58% of total customers interrupted (3,114 of 5,336). Accidents were the 2nd leading cause of customers interrupted, accounting for 12% of total customers interrupted (643 of 5,336). Trees were the 3rd leading cause of customers interrupted, accounting for 10% of total customers interrupted (557 of 5,336).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Raquette Lake 39861 in 2022, accounting for 59% of total customer-hours interrupted (18,352 of 31,269). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 16% of total customer-hours interrupted (5,055 of 31,269). Prearranged were the 3rd leading cause of customer-hours interrupted, accounting for 14% of total customer-hours interrupted (4,306 of 31,269).
- Of the 40 interruptions on this circuit, 22 affected 10 customers or less, with 6 being single customer outages.

Action Taken:

- Completed I&M foot patrol in December 2020.
- Completed Level 2 I&M in 2021.

Action Plan:

- Complete Level 3 I&M in 2023.
- Complete cycle tree pruning in FY25.

2. EAGLE BAY 38272 – 4.8kV

Profile: 1,070 Customers, 48.1 Circuit Miles

Indices: CAIDI = 4.51, SAIFI = 6.68

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	15	55.56%	1,740	24.34%	8,336	25.87%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	3.70%	2	0.03%	2	0.01%
5	EQUIPMENT	5	18.52%	4,252	59.47%	20,482	63.57%
6	ACCIDENTS	2	7.41%	1,065	14.90%	3,072	9.53%
7	PREARRANGED	1	3.70%	18	0.25%	13	0.04%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	3	11.11%	73	1.02%	317	0.98%
Totals		27	100.00%	7,150	100.00%	32,222	100.00%

Problem Analysis:

- There were 27 interruptions on the Eagle Bay 38272 in 2022.
- There were 6 transmission interruptions.
 - The first Transmission interruption occurred on January 16, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 15% of the total customers interrupted (1,060 of 7,150), and 9% of the total customer-hours interrupted (3,045 of 32,222). Motor vehicle accident, wires down TP422 NY-28.
 - The second Transmission interruption occurred on February 27, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 15% of the total customers interrupted (1,059 of 7,150), and 19% of the total customer-hours interrupted (6,165 of 32,222). Insulator failure, wires down TP148 NY-28.
 - The third Transmission interruption occurred on March 12, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 15% of the total customers interrupted (1,060 of 7,150), and 26% of the total customer-hours interrupted (8,409 of 32,222). Insulator failure, wires down TP2h NY-28.
 - The fourth Transmission interruption occurred on May 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 15% of the total customers interrupted (1,065 of 7,150), and 16% of the total customer-hours interrupted (5,294 of 32,222). Insulator failure, pole fire TP989 NY-28.
 - The fifth Transmission interruption occurred on May 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 15% of the total customers interrupted (1,067 of 7,150), and 2% of the total customer-hours interrupted (610 of 32,222). Insulator failure, TP154 NY-12.

- The sixth Transmission interruption occurred on August 08, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 15% of the total customers interrupted (1,080 of 7,150), and 20% of the total customer-hours interrupted (6,372 of 32,222). Tree limb on primary, backlot TP32 NY-12.
- There were no substation interruptions.
- The remaining 21 events occurred at the distribution level.
- The distribution circuit breaker for the Eagle Bay 38272 experienced 8 momentary operations in 2022.
- The distribution circuit breaker for the Eagle Bay 38272 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Eagle Bay 38272 in 2022, accounting for 56% of total interruptions (15 of 27). Equipment Failures were the 2nd leading cause of interruptions, accounting for 19% of total interruptions (5 of 27). Unknown were the 3rd leading cause of interruptions, accounting for 11% of total interruptions (3 of 27).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Eagle Bay 38272 in 2022, accounting for 59% of total customers interrupted (4,252 of 7,150). Trees were the 2nd leading cause of customers interrupted, accounting for 24% of total customers interrupted (1,740 of 7,150). Accidents were the 3rd leading cause of customers interrupted, accounting for 15% of total customers interrupted (1,065 of 7,150).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Eagle Bay 38272 in 2022, accounting for 64% of total customer-hours interrupted (20,482 of 32,222). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 26% of total customer-hours interrupted (8,336 of 32,222). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 10% of total customer-hours interrupted (3,072 of 32,222).
- Of the 27 interruptions on this circuit, 14 affected 10 customers or less, with 6 being single customer outages.

Action Taken:

- Completed I&M foot patrol in May 2022.

Action Plan:

- Complete Level 2 I&M in 2023.
- Complete Level 3 I&M in 2025.
- Complete cycle tree pruning in FY25.

3. POLAND - UTICA 62258 – 13.2kV

Profile: 1,615 Customers, 135.4 Circuit Miles
 Indices: CAIDI = 4.36, SAIFI = 3.55

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	17	45.95%	588	10.25%	2,623	10.48%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	10	27.03%	990	17.26%	4,547	18.16%
6	ACCIDENTS	3	8.11%	97	1.69%	202	0.81%
7	PREARRANGED	1	2.70%	2	0.03%	34	0.14%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	5.41%	2,303	40.14%	13,434	53.65%
10	UNKNOWN	4	10.81%	1,757	30.63%	4,198	16.77%
Totals		37	100.00%	5,737	100.00%	25,038	100.00%

Problem Analysis:

- There were 37 interruptions on the Poland - Utica 62258 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on November 30, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 28% of the total customers interrupted (1,607 of 5,737), and 16% of the total customer-hours interrupted (3,884 of 25,038).
- There were no substation interruptions.
- The remaining 36 events occurred at the distribution level.
- The distribution circuit breaker for the Poland - Utica 62258 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Poland - Utica 62258 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 40% of the total amount of customers interrupted (2,303 out of 5,737) and 54% of the total amount of the customer-hours interrupted (13,434 out of 25,038).
 - The first lockout occurred on June 08, 2022, coded as a cause of lightning (PSC cause code 09). This lockout accounted for 20% of the total customers interrupted (1,152 of 5,737), and 17% of the total customer-hours interrupted (4,246 of 25,038). Broken pole - lightning, P5 Coldbrook Rd.
 - The second lockout occurred on August 06, 2022, coded as a cause of lightning (PSC cause code 09). This lockout accounted for 20% of the total customers interrupted (1,151 of 5,737), and 37% of the total customer-hours interrupted (9,188 of 25,038). Conductor down – lightning, P41 NY-8.

- Trees were the leading cause of interruptions on the Poland - Utica 62258 in 2022, accounting for 46% of total interruptions (17 of 37). Equipment Failures were the 2nd leading cause of interruptions, accounting for 27% of total interruptions (10 of 37). Unknown were the 3rd leading cause of interruptions, accounting for 11% of total interruptions (4 of 37).
- Lightning were the leading cause of customers interrupted (CI) on the Poland - Utica 62258 in 2022, accounting for 40% of total customers interrupted (2,303 of 5,737). Unknown were the 2nd leading cause of customers interrupted, accounting for 31% of total customers interrupted (1,757 of 5,737). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 17% of total customers interrupted (990 of 5,737).
- Lightning were the leading cause of customer-hours interrupted (CHI) on the Poland - Utica 62258 in 2022, accounting for 54% of total customer-hours interrupted (13,434 of 25,038). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 18% of total customer-hours interrupted (4,547 of 25,038). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 17% of total customer-hours interrupted (4,198 of 25,038).
- Of the 37 interruptions on this circuit, 22 affected 10 customers or less, with 11 being single customer outages.

Action Taken:

- Completed cycle tree pruning in FY23.
- Completed Level 2 I&M in 2021.

Action Plan:

- Complete Level 3 I&M in 2023.
- Complete I&M foot patrol in 2025.
- Hazard Tree work in progress

4. POLAND - UTICA 62257 – 13.2kV

Profile: 1,632 Customers, 108.4 Circuit Miles
Indices: CAIDI = 1.68, SAIFI = 5.39

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	29.41%	3,620	41.15%	4,317	29.25%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	15	44.12%	2,322	26.40%	4,171	28.26%
6	ACCIDENTS	2	5.88%	40	0.45%	83	0.56%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	2.94%	2	0.02%	6	0.04%
10	UNKNOWN	6	17.65%	2,813	31.98%	6,181	41.88%
Totals		34	100.00%	8,797	100.00%	14,757	100.00%

Problem Analysis:

- There were 34 interruptions on the Poland - Utica 62257 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on November 30, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 13% of the total customers interrupted (1,161 of 8,797), and 19% of the total customer-hours interrupted (2,806 of 14,757).
- There were no substation interruptions.
- The remaining 33 events occurred at the distribution level.
- The distribution circuit breaker for the Poland - Utica 62257 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Poland - Utica 62257 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 37% of the total amount of customers interrupted (3,247 out of 8,797) and 41% of the total amount of the customer-hours interrupted (6,012 out of 14,757).
 - The first lockout occurred on March 07, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 18% of the total customers interrupted (1,626 of 8,797), and 18% of the total customer-hours interrupted (2,727 of 14,757). Broken pole, P4 Schrider Rd.
 - The second lockout occurred on June 26, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 18% of the total customers interrupted (1,621 of 8,797), and 22% of the total customer-hours interrupted (3,284 of 14,757).

- Equipment Failures were the leading cause of interruptions on the Poland - Utica 62257 in 2022, accounting for 44% of total interruptions (15 of 34). Trees were the 2nd leading cause of interruptions, accounting for 29% of total interruptions (10 of 34). Unknown were the 3rd leading cause of interruptions, accounting for 18% of total interruptions (6 of 34).
- Trees were the leading cause of customers interrupted (CI) on the Poland - Utica 62257 in 2022, accounting for 41% of total customers interrupted (3,620 of 8,797). Unknown were the 2nd leading cause of customers interrupted, accounting for 32% of total customers interrupted (2,813 of 8,797). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 26% of total customers interrupted (2,322 of 8,797).
- Unknown were the leading cause of customer-hours interrupted (CHI) on the Poland - Utica 62257 in 2022, accounting for 42% of total customer-hours interrupted (6,181 of 14,757). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 29% of total customer-hours interrupted (4,317 of 14,757). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 28% of total customer-hours interrupted (4,171 of 14,757).
- Of the 34 interruptions on this circuit, 17 affected 10 customers or less, with 11 being single customer outages.

Action Taken:

- Completed I&M foot patrol in 2021.
- Completed cycle tree pruning in FY23.
- Completed Level 2 I&M in 2022.

Action Plan:

- Complete Level 3 I&M in 2024.
- Hazard Tree work in progress

5. LEHIGH 66952 – 13.2kV

Profile: 2,010 Customers, 87.6 Circuit Miles
 Indices: CAIDI = 2.52, SAIFI = 4.82

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	13	48.15%	815	8.41%	2,799	11.45%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	3.70%	2,008	20.71%	234	0.96%
5	EQUIPMENT	8	29.63%	6,819	70.34%	21,305	87.15%
6	ACCIDENTS	4	14.81%	51	0.53%	97	0.40%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	1	3.70%	1	0.01%	11	0.04%
Totals		27	100.00%	9,694	100.00%	24,446	100.00%

Problem Analysis:

- There were 27 interruptions on the Lehigh 66952 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on March 20, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 21% of the total customers interrupted (2,010 of 9,694), and 41% of the total customer-hours interrupted (10,005 of 24,446). Insulator Failure Rome-Levitt Line #8
 - The second Transmission interruption occurred on July 07, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 21% of the total customers interrupted (2,011 of 9,694), and 32% of the total customer-hours interrupted (7,732 of 24,446). Broken crossarm TP68 Rome Levitt Line #8
- There was 1 substation interruption.
 - This Substation interruption occurred on January 12, 2022, coded as a cause of other company activities (PSC cause code 04). This lockout accounted for 21% of the total customers interrupted (2,008 of 9,694), and 1% of the total customer-hours interrupted (234 of 24,446).
- The remaining 24 events occurred at the distribution level.
- The distribution circuit breaker for the Lehigh 66952 experienced 3 momentary operations in 2022.
- The distribution circuit breaker for the Lehigh 66952 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 21% of the total amount of customers interrupted (2,013 out of 9,694) and 10% of the total amount of the customer-hours interrupted (2,359 out of 24,446).

- This lockout occurred on April 03, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 21% of the total customers interrupted (2,013 of 9,694), and 10% of the total customer-hours interrupted (2,359 of 24,446). Switch insulator failure, P5 Liberty St.
- Trees were the leading cause of interruptions on the Lehigh 66952 in 2022, accounting for 48% of total interruptions (13 of 27). Equipment Failures were the 2nd leading cause of interruptions, accounting for 30% of total interruptions (8 of 27). Accidents were the 3rd leading cause of interruptions, accounting for 15% of total interruptions (4 of 27).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Lehigh 66952 in 2022, accounting for 70% of total customers interrupted (6,819 of 9,694). Operators Errors were the 2nd leading cause of customers interrupted, accounting for 21% of total customers interrupted (2,008 of 9,694). Trees were the 3rd leading cause of customers interrupted, accounting for 8% of total customers interrupted (815 of 9,694).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Lehigh 66952 in 2022, accounting for 87% of total customer-hours interrupted (21,305 of 24,446). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 11% of total customer-hours interrupted (2,799 of 24,446). Operators Errors were the 3rd leading cause of customer-hours interrupted, accounting for 1% of total customer-hours interrupted (234 of 24,446).
- Of the 27 interruptions on this circuit, 8 affected 10 customers or less, with 6 being single customer outages.

Action Taken:

- Completed cycle tree pruning in FY20.

Action Plan:

- Hazard Tree review to be scheduled.
- Complete I&M foot patrol in 2023.
- Complete Level 2 I&M in 2024.
- Complete Level 3 I&M in 2026.

6. ALDER CREEK 70152 – 13.2kV

Profile: 1,092 Customers, 85.2 Circuit Miles
 Indices: CAIDI = 3.23, SAIFI = 3.48

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	25	53.19%	2,125	55.89%	9,579	77.92%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	11	23.40%	1,244	32.72%	1,282	10.43%
6	ACCIDENTS	1	2.13%	153	4.02%	785	6.39%
7	PREARRANGED	2	4.26%	123	3.24%	147	1.20%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	2.13%	2	0.05%	8	0.06%
10	UNKNOWN	7	14.89%	155	4.08%	493	4.01%
Totals		47	100.00%	3,802	100.00%	12,294	100.00%

Problem Analysis:

- There were 47 interruptions on the Alder Creek 70152 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on May 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 29% of the total customers interrupted (1,092 of 3,802), and 5% of the total customer-hours interrupted (624 of 12,294). Insulator failure, TP154 NY-12.
 - The second Transmission interruption occurred on August 08, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 29% of the total customers interrupted (1,097 of 3,802), and 53% of the total customer-hours interrupted (6,472 of 12,294). Tree limb on primary, backlot TP32 NY-12.
- There were no substation interruptions.
- The remaining 45 events occurred at the distribution level.
- The distribution circuit breaker for the Alder Creek 70152 experienced 9 momentary operations in 2022.
- The distribution circuit breaker for the Alder Creek 70152 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Alder Creek 70152 in 2022, accounting for 53% of total interruptions (25 of 47). Equipment Failures were the 2nd leading cause of interruptions, accounting for 23% of total interruptions (11 of 47). Unknown were the 3rd leading cause of interruptions, accounting for 15% of total interruptions (7 of 47).

- Trees were the leading cause of customers interrupted (CI) on the Alder Creek 70152 in 2022, accounting for 56% of total customers interrupted (2,125 of 3,802). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 33% of total customers interrupted (1,244 of 3,802). Unknown were the 3rd leading cause of customers interrupted, accounting for 4% of total customers interrupted (155 of 3,802).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Alder Creek 70152 in 2022, accounting for 78% of total customer-hours interrupted (9,579 of 12,294). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 10% of total customer-hours interrupted (1,282 of 12,294). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 6% of total customer-hours interrupted (785 of 12,294).
- Of the 47 interruptions on this circuit, 28 affected 10 customers or less, with 15 being single customer outages.

Action Taken:

- Completed Level 3 I&M in 2022

Action Plan:

- Complete cycle tree pruning in FY24.
- Complete I&M foot patrol in 2024.
- Complete Level 2 I&M in 2025.
- Hazard Tree work in progress

7. EAGLE BAY 38271 – 4.8kV

Profile: 949 Customers, 29.1 Circuit Miles

Indices: CAIDI = 4.83, SAIFI = 6.21

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	5	22.73%	1,031	17.48%	6,123	21.50%
3	OVERLOADS	1	4.55%	13	0.22%	18	0.06%
4	OPER. ERROR	1	4.55%	2	0.03%	1	0.00%
5	EQUIPMENT	10	45.45%	3,896	66.06%	19,593	68.78%
6	ACCIDENTS	2	9.09%	946	16.04%	2,728	9.58%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	4.55%	1	0.02%	5	0.02%
10	UNKNOWN	2	9.09%	9	0.15%	18	0.06%
Totals		22	100.00%	5,898	100.00%	28,486	100.00%

Problem Analysis:

- There were 22 interruptions on the Eagle Bay 38271 in 2022.
- There were 6 transmission interruptions.
 - The first Transmission interruption occurred on January 16, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 16% of the total customers interrupted (943 of 5,898), and 9% of the total customer-hours interrupted (2,701 of 28,486). Motor vehicle accident, wires down TP422 NY-28.
 - The second Transmission interruption occurred on February 27, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 16% of the total customers interrupted (944 of 5,898), and 19% of the total customer-hours interrupted (5,499 of 28,486). Insulator failure, wires down TP148 NY-28.
 - The third Transmission interruption occurred on March 12, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 16% of the total customers interrupted (944 of 5,898), and 26% of the total customer-hours interrupted (7,521 of 28,486). Insulator failure, wires down TP2h NY-28.
 - The fourth Transmission interruption occurred on May 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 16% of the total customers interrupted (950 of 5,898), and 17% of the total customer-hours interrupted (4,723 of 28,486). Insulator failure, pole fire TP989 NY-28.
 - The fifth Transmission interruption occurred on May 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 16% of the total customers interrupted (951 of 5,898), and 2% of the total customer-hours interrupted (543 of 28,486). Insulator failure, TP154 NY-12.

- The sixth Transmission interruption occurred on August 08, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 16% of the total customers interrupted (959 of 5,898), and 20% of the total customer-hours interrupted (5,658 of 28,486). Tree limb on primary, backlot TP32 NY-12.
- There were no substation interruptions.
- The remaining 16 events occurred at the distribution level.
- The distribution circuit breaker for the Eagle Bay 38271 experienced 8 momentary operations in 2022.
- The distribution circuit breaker for the Eagle Bay 38271 experienced 0 sustained operations (lockouts) in 2022.
- Equipment Failures were the leading cause of interruptions on the Eagle Bay 38271 in 2022, accounting for 45% of total interruptions (10 of 22). Trees were the 2nd leading cause of interruptions, accounting for 23% of total interruptions (5 of 22). Accidents were the 3rd leading cause of interruptions, accounting for 9% of total interruptions (2 of 22).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Eagle Bay 38271 in 2022, accounting for 66% of total customers interrupted (3,896 of 5,898). Trees were the 2nd leading cause of customers interrupted, accounting for 17% of total customers interrupted (1,031 of 5,898). Accidents were the 3rd leading cause of customers interrupted, accounting for 16% of total customers interrupted (946 of 5,898).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Eagle Bay 38271 in 2022, accounting for 69% of total customer-hours interrupted (19,593 of 28,486). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 21% of total customer-hours interrupted (6,123 of 28,486). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 10% of total customer-hours interrupted (2,728 of 28,486).
- Of the 22 interruptions on this circuit, 9 affected 10 customers or less, with 5 being single customer outages.

Action Taken:

- Completed I&M foot patrol in 2022.

Action Plan:

- Complete Level 2 I&M in 2023.
- Complete cycle tree pruning in FY25.
- Complete Level 3 I&M in 2025.

8. ALDER CREEK 70161 - 4.8kV

Profile: 1,001 Customers, 60.3 Circuit Miles
 Indices: CAIDI = 3.58, SAIFI = 3.37

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	15	46.88%	1,368	40.52%	7,806	64.61%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	11	34.38%	1,277	37.83%	1,795	14.86%
6	ACCIDENTS	0	0.00%	0	0.00%	0	0.00%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	6.25%	12	0.36%	103	0.85%
10	UNKNOWN	4	12.50%	719	21.30%	2,377	19.68%
Totals		32	100.00%	3,376	100.00%	12,081	100.00%

Problem Analysis:

- There were 32 interruptions on the Alder Creek 70161 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on May 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 30% of the total customers interrupted (1,004 of 3,376), and 5% of the total customer-hours interrupted (574 of 12,081). Insulator failure, TP154 NY-12.
 - The second Transmission interruption occurred on August 08, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 30% of the total customers interrupted (1,007 of 3,376), and 49% of the total customer-hours interrupted (5,941 of 12,081). Tree limb on primary, backlot TP32 NY-12.
- There were no substation interruptions.
- The remaining 30 events occurred at the distribution level.
- The distribution circuit breaker for the Alder Creek 70161 experienced 6 momentary operations in 2022.
- The distribution circuit breaker for the Alder Creek 70161 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Alder Creek 70161 in 2022, accounting for 47% of total interruptions (15 of 32). Equipment Failures were the 2nd leading cause of interruptions, accounting for 34% of total interruptions (11 of 32). Unknown were the 3rd leading cause of interruptions, accounting for 13% of total interruptions (4 of 32).

- Trees were the leading cause of customers interrupted (CI) on the Alder Creek 70161 in 2022, accounting for 41% of total customers interrupted (1,368 of 3,376). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 38% of total customers interrupted (1,277 of 3,376). Unknown were the 3rd leading cause of customers interrupted, accounting for 21% of total customers interrupted (719 of 3,376).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Alder Creek 70161 in 2022, accounting for 65% of total customer-hours interrupted (7,806 of 12,081). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 20% of total customer-hours interrupted (2,377 of 12,081). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 15% of total customer-hours interrupted (1,795 of 12,081).
- Of the 32 interruptions on this circuit, 15 affected 10 customers or less, with 7 being single customer outages.

Action Taken:

- Completed Level 3 I&M in 2022.

Action Plan:

- Complete I&M foot patrol in 2024.
- Complete cycle tree pruning in FY25.
- Complete Level 2 I&M in 2025.
- Hazard Tree work in progress

9. LEHIGH 66953 – 13.2kV

Profile: 2,191 Customers, 117.9 Circuit Miles
 Indices: CAIDI = 1.07, SAIFI = 4.81

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	29	46.03%	1,694	16.08%	3,865	34.23%
3	OVERLOADS	2	3.17%	393	3.73%	268	2.38%
4	OPER. ERROR	1	1.59%	2,172	20.61%	253	2.24%
5	EQUIPMENT	14	22.22%	5,328	50.56%	5,324	47.16%
6	ACCIDENTS	4	6.35%	210	1.99%	443	3.92%
7	PREARRANGED	3	4.76%	477	4.53%	609	5.40%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	4	6.35%	50	0.47%	114	1.01%
10	UNKNOWN	6	9.52%	214	2.03%	414	3.67%
Totals		63	100.00%	10,538	100.00%	11,291	100.00%

Problem Analysis:

- There were 63 interruptions on the Lehigh 66953 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on March 20, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 21% of the total customers interrupted (2,175 of 10,538), and 13% of the total customer-hours interrupted (1,452 of 11,291). Insulator Failure Rome-Levitt Line #8
 - The second Transmission interruption occurred on July 07, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 21% of the total customers interrupted (2,204 of 10,538), and 26% of the total customer-hours interrupted (2,939 of 11,291). Broken crossarm TP68 Rome Levitt Line #8
- There was 1 substation interruption.
 - This Substation interruption occurred on January 12, 2022, coded as a cause of other company activities (PSC cause code 04). This lockout accounted for 21% of the total customers interrupted (2,172 of 10,538), and 2% of the total customer-hours interrupted (253 of 11,291).
- The remaining 60 events occurred at the distribution level.
- The distribution circuit breaker for the Lehigh 66953 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Lehigh 66953 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 8% of the total amount of customers interrupted (864 out of 10,538) and 4% of the total amount of the customer-hours interrupted (498 out of 11,291).

- This lockout occurred on April 03, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 8% of the total customers interrupted (864 of 10,538), and 4% of the total customer-hours interrupted (498 of 11,291). Switch insulator failure, P5 Liberty St.
- Trees were the leading cause of interruptions on the Lehigh 66953 in 2022, accounting for 46% of total interruptions (29 of 63). Equipment Failures were the 2nd leading cause of interruptions, accounting for 22% of total interruptions (14 of 63). Unknown were the 3rd leading cause of interruptions, accounting for 10% of total interruptions (6 of 63).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Lehigh 66953 in 2022, accounting for 51% of total customers interrupted (5,328 of 10,538). Operators Errors were the 2nd leading cause of customers interrupted, accounting for 21% of total customers interrupted (2,172 of 10,538). Trees were the 3rd leading cause of customers interrupted, accounting for 16% of total customers interrupted (1,694 of 10,538).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Lehigh 66953 in 2022, accounting for 47% of total customer-hours interrupted (5,324 of 11,291). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 34% of total customer-hours interrupted (3,865 of 11,291). Prearranged were the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (609 of 11,291).
- Of the 63 interruptions on this circuit, 27 affected 10 customers or less, with 11 being single customer outages.

Action Taken:

- Completed Level 3 I&M in 2022.

Action Plan:

- Complete I&M foot patrol in 2024.
- Complete cycle tree pruning in FY26.
- Complete Level 2 I&M in 2025.
- Hazard Tree review scheduled.

10. LEHIGH 66954 – 13.2kV

Profile: 774 Customers, 67.0 Circuit Miles

Indices: CAIDI = 3.56, SAIFI = 3.60

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	11	47.83%	731	26.26%	2,560	25.86%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	5	21.74%	1,880	67.53%	6,999	70.71%
6	ACCIDENTS	2	8.70%	66	2.37%	127	1.28%
7	PREARRANGED	1	4.35%	15	0.54%	28	0.28%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	8.70%	3	0.11%	5	0.05%
10	UNKNOWN	2	8.70%	89	3.20%	181	1.82%
Totals		23	100.00%	2,784	100.00%	9,899	100.00%

Problem Analysis:

- There were 23 interruptions on the Lehigh 66954 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on March 20, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 28% of the total customers interrupted (773 of 2,784), and 38% of the total customer-hours interrupted (3,761 of 9,899). Insulator Failure Rome-Levitt Line #8
 - The second Transmission interruption occurred on July 07, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 28% of the total customers interrupted (773 of 2,784), and 20% of the total customer-hours interrupted (2,019 of 9,899). Broken crossarm TP68 Rome Levitt Line #8
- There were no substation interruptions.
- The remaining 21 events occurred at the distribution level.
- The distribution circuit breaker for the Lehigh 66954 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Lehigh 66954 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Lehigh 66954 in 2022, accounting for 48% of total interruptions (11 of 23). Equipment Failures were the 2nd leading cause of interruptions, accounting for 22% of total interruptions (5 of 23). Accidents were the 3rd leading cause of interruptions, accounting for 9% of total interruptions (2 of 23).

- Equipment Failures were the leading cause of customers interrupted (CI) on the Lehigh 66954 in 2022, accounting for 68% of total customers interrupted (1,880 of 2,784). Trees were the 2nd leading cause of customers interrupted, accounting for 26% of total customers interrupted (731 of 2,784). Unknown were the 3rd leading cause of customers interrupted, accounting for 3% of total customers interrupted (89 of 2,784).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Lehigh 66954 in 2022, accounting for 71% of total customer-hours interrupted (6,999 of 9,899). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 26% of total customer-hours interrupted (2,560 of 9,899). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 2% of total customer-hours interrupted (181 of 9,899).
- Of the 23 interruptions on this circuit, 7 affected 10 customers or less, with 3 being single customer outages.

Action Taken:

- Completed Level 3 I&M in 2022.

Action Plan:

- Complete I&M foot patrol in 2024.
- Complete cycle tree pruning in FY26.
- Complete Level 2 I&M in 2025.
- Hazard Tree Review to be scheduled.

11. LEHIGH 66951 – 13.2kV

Profile: 1,163 Customers, 70.7 Circuit Miles
 Indices: CAIDI = 1.25, SAIFI = 5.32

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	14	51.85%	503	8.13%	1,673	21.63%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	3.70%	1,171	18.93%	137	1.77%
5	EQUIPMENT	8	29.63%	4,423	71.49%	5,815	75.18%
6	ACCIDENTS	1	3.70%	4	0.06%	20	0.25%
7	PREARRANGED	1	3.70%	75	1.21%	70	0.91%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	3.70%	10	0.16%	18	0.23%
10	UNKNOWN	1	3.70%	1	0.02%	2	0.03%
Totals		27	100.00%	6,187	100.00%	7,735	100.00%

Problem Analysis:

- There were 27 interruptions on the Lehigh 66951 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on March 20, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 19% of the total customers interrupted (1,168 of 6,187), and 30% of the total customer-hours interrupted (2,282 of 7,735). Insulator Failure Rome-Levitt Line #8
 - The second Transmission interruption occurred on July 07, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 19% of the total customers interrupted (1,162 of 6,187), and 21% of the total customer-hours interrupted (1,627 of 7,735). Broken crossarm TP68 Rome Levitt Line #8
- There was 1 substation interruption.
 - This Substation interruption occurred on January 12, 2022, coded as a cause of other company activities (PSC cause code 04). This lockout accounted for 19% of the total customers interrupted (1,171 of 6,187), and 2% of the total customer-hours interrupted (137 of 7,735).
- The remaining 24 events occurred at the distribution level.
- The distribution circuit breaker for the Lehigh 66951 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Lehigh 66951 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 19% of the total amount of customers interrupted (1,167 out of 6,187) and 18% of the total amount of the customer-hours interrupted (1,395 out of 7,735).

- This lockout occurred on April 03, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 19% of the total customers interrupted (1,167 of 6,187), and 18% of the total customer-hours interrupted (1,395 of 7,735). Switch insulator failure, P5 Liberty St.
- Trees were the leading cause of interruptions on the Lehigh 66951 in 2022, accounting for 52% of total interruptions (14 of 27). Equipment Failures were the 2nd leading cause of interruptions, accounting for 30% of total interruptions (8 of 27). Operators Errors were the 3rd leading cause of interruptions, accounting for 4% of total interruptions (1 of 27).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Lehigh 66951 in 2022, accounting for 71% of total customers interrupted (4,423 of 6,187). Operators Errors were the 2nd leading cause of customers interrupted, accounting for 19% of total customers interrupted (1,171 of 6,187). Trees were the 3rd leading cause of customers interrupted, accounting for 8% of total customers interrupted (503 of 6,187).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Lehigh 66951 in 2022, accounting for 75% of total customer-hours interrupted (5,815 of 7,735). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 22% of total customer-hours interrupted (1,673 of 7,735). Operators Errors were the 3rd leading cause of customer-hours interrupted, accounting for 2% of total customer-hours interrupted (137 of 7,735).
- Of the 27 interruptions on this circuit, 16 affected 10 customers or less, with 9 being single customer outages.

Action Taken:

- Completed I&M foot patrol in 2022.

Action Plan:

- Complete Level 2 I&M in 2023.
- Complete Level 3 I&M in 2025.
- Complete cycle tree pruning in FY26.
- Hazard Tree Review to be scheduled.

12. OLD FORGE 38362 – 4.8kV

Profile: 744 Customers, 37.9 Circuit Miles

Indices: CAIDI = 3.81, SAIFI = 5.20

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	6	37.50%	790	20.43%	4,743	32.18%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	7	43.75%	2,257	58.37%	9,172	62.24%
6	ACCIDENTS	2	12.50%	815	21.08%	784	5.32%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	1	6.25%	5	0.13%	38	0.26%
Totals		16	100.00%	3,867	100.00%	14,737	100.00%

Problem Analysis:

- There were 16 interruptions on the Old Forge 38362 in 2022.
- There were 5 transmission interruptions.
 - The first Transmission interruption occurred on January 16, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 19% of the total customers interrupted (743 of 3,867), and 4% of the total customer-hours interrupted (613 of 14,737). Motor vehicle accident, wires down TP422 NY-28.
 - The second Transmission interruption occurred on March 12, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 19% of the total customers interrupted (742 of 3,867), and 28% of the total customer-hours interrupted (4,106 of 14,737). Insulator failure, wires down TP2h NY-28.
 - The third Transmission interruption occurred on May 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 19% of the total customers interrupted (743 of 3,867), and 31% of the total customer-hours interrupted (4,565 of 14,737). Insulator failure, pole fire TP989 NY-28.
 - The fourth Transmission interruption occurred on May 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 19% of the total customers interrupted (743 of 3,867), and 3% of the total customer-hours interrupted (425 of 14,737). Insulator failure, TP154 NY-12.
 - The fifth Transmission interruption occurred on August 08, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 19% of the total customers interrupted (746 of 3,867), and 30% of the total customer-hours interrupted (4,401 of 14,737). Tree limb on primary, backlot TP32 NY-12.
- There were no substation interruptions.

- The remaining 11 events occurred at the distribution level.
- The distribution circuit breaker for the Old Forge 38362 experienced 8 momentary operations in 2022.
- The distribution circuit breaker for the Old Forge 38362 experienced 0 sustained operations (lockouts) in 2022.
- Equipment Failures were the leading cause of interruptions on the Old Forge 38362 in 2022, accounting for 44% of total interruptions (7 of 16). Trees were the 2nd leading cause of interruptions, accounting for 38% of total interruptions (6 of 16). Accidents were the 3rd leading cause of interruptions, accounting for 13% of total interruptions (2 of 16).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Old Forge 38362 in 2022, accounting for 58% of total customers interrupted (2,257 of 3,867). Accidents were the 2nd leading cause of customers interrupted, accounting for 21% of total customers interrupted (815 of 3,867). Trees were the 3rd leading cause of customers interrupted, accounting for 20% of total customers interrupted (790 of 3,867).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Old Forge 38362 in 2022, accounting for 62% of total customer-hours interrupted (9,172 of 14,737). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 32% of total customer-hours interrupted (4,743 of 14,737). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (784 of 14,737).
- Of the 16 interruptions on this circuit, 11 affected 10 customers or less, with 6 being single customer outages.

Action Taken:

- Completed I&M foot patrol in 2021.
- Completed Level 2 I&M in 2022.

Action Plan:

- Complete Level 3 I&M in 2024.
- Complete cycle tree pruning in FY25.

13. ONEIDA 50151 - 13.2kV

Profile: 1,872 Customers, 95.9 Circuit Miles
 Indices: CAIDI = 2.96, SAIFI = 2.40

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	4	16.67%	876	19.49%	4,808	36.10%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	33.33%	2,856	63.55%	7,067	53.07%
6	ACCIDENTS	7	29.17%	670	14.91%	1,195	8.97%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	8.33%	52	1.16%	115	0.86%
10	UNKNOWN	3	12.50%	40	0.89%	132	0.99%
Totals		24	100.00%	4,494	100.00%	13,316	100.00%

Problem Analysis:

- There were 24 interruptions on the Oneida 50151 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on January 29, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 42% of the total customers interrupted (1,875 of 4,494), and 17% of the total customer-hours interrupted (2,281 of 13,316). Insulator Failure 115kV Disconnect Bus
- There were no substation interruptions.
- The remaining 23 events occurred at the distribution level.
- The distribution circuit breaker for the Oneida 50151 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Oneida 50151 experienced 0 sustained operations (lockouts) in 2022.
- Equipment Failures were the leading cause of interruptions on the Oneida 50151 in 2022, accounting for 33% of total interruptions (8 of 24). Accidents were the 2nd leading cause of interruptions, accounting for 29% of total interruptions (7 of 24). Trees were the 3rd leading cause of interruptions, accounting for 17% of total interruptions (4 of 24).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Oneida 50151 in 2022, accounting for 64% of total customers interrupted (2,856 of 4,494). Trees were the 2nd leading cause of customers interrupted, accounting for 19% of total customers interrupted (876 of 4,494). Accidents were the 3rd leading cause of customers interrupted, accounting for 15% of total customers interrupted (670 of 4,494).

- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Oneida 50151 in 2022, accounting for 53% of total customer-hours interrupted (7,067 of 13,316). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 36% of total customer-hours interrupted (4,808 of 13,316). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 9% of total customer-hours interrupted (1,195 of 13,316).
- Of the 24 interruptions on this circuit, 14 affected 10 customers or less, with 6 being single customer outages.

Action Taken:

- Complete Level 3 I&M in 2021.
- Completed cycle tree pruning in FY22.

Action Plan:

- Complete I&M foot patrol in 2023.
- Complete Level 2 I&M in 2024.
- Hazard Tree work in progress.

14. PETERBORO 51452 – 13.2kV

Profile: 1,528 Customers, 26.8 Circuit Miles
 Indices: CAIDI = 1.09, SAIFI = 5.45

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	4	22.22%	1,553	18.67%	1,887	20.78%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	5.56%	1,527	18.35%	178	1.96%
5	EQUIPMENT	6	33.33%	5,007	60.18%	6,614	72.81%
6	ACCIDENTS	3	16.67%	90	1.08%	107	1.18%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	5.56%	39	0.47%	113	1.24%
10	UNKNOWN	3	16.67%	104	1.25%	185	2.04%
Totals		18	100.00%	8,320	100.00%	9,084	100.00%

Problem Analysis:

- There were 18 interruptions on the Peterboro 51452 in 2022.
- There were no transmission interruptions.
- There was 1 substation interruption.
 - This Substation interruption occurred on June 28, 2022, coded as a cause of operating / testing error (PSC cause code 04). This lockout accounted for 18% of the total customers interrupted (1,527 of 8,320), and 2% of the total customer-hours interrupted (178 of 9,084). Opened breaker for planned outage, tie switch not closed prior.
- The remaining 17 events occurred at the distribution level.
- The distribution circuit breaker for the Peterboro 51452 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Peterboro 51452 experienced 3 sustained operations (lockouts) in 2022. These interruptions accounted for 60% of the total amount of customers interrupted (4,982 out of 8,320) and 68% of the total amount of the customer-hours interrupted (6,222 out of 9,084).
 - The first lockout occurred on February 03, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 18% of the total customers interrupted (1,531 of 8,320), and 20% of the total customer-hours interrupted (1,847 of 9,084). Tree branch on primary, P9 Clark St.
 - The second lockout occurred on June 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 18% of the total customers interrupted (1,526 of 8,320), and 34% of the total customer-hours interrupted (3,063 of 9,084). Broken P2h N. Peterboro St.

- The third lockout occurred on July 12, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 23% of the total customers interrupted (1,925 of 8,320), and 14% of the total customer-hours interrupted (1,312 of 9,084). Failed tap, P3 Clark St.
- Equipment Failures were the leading cause of interruptions on the Peterboro 51452 in 2022, accounting for 33% of total interruptions (6 of 18). Trees were the 2nd leading cause of interruptions, accounting for 22% of total interruptions (4 of 18). Accidents were the 3rd leading cause of interruptions, accounting for 17% of total interruptions (3 of 18).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Peterboro 51452 in 2022, accounting for 60% of total customers interrupted (5,007 of 8,320). Trees were the 2nd leading cause of customers interrupted, accounting for 19% of total customers interrupted (1,553 of 8,320). Operators Errors were the 3rd leading cause of customers interrupted, accounting for 18% of total customers interrupted (1,527 of 8,320).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Peterboro 51452 in 2022, accounting for 73% of total customer-hours interrupted (6,614 of 9,084). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 21% of total customer-hours interrupted (1,887 of 9,084). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 2% of total customer-hours interrupted (185 of 9,084).
- Of the 18 interruptions on this circuit, 5 affected 10 customers or less, with 2 being single customer outages.

Action Taken:

- Complete Level 3 I&M in 2021.
- Completed cycle tree pruning in FY21.

Action Plan:

- Complete I&M foot patrol in 2023.
- Complete Level 2 I&M in 2024.
- Hazard Tree work in progress.

15. OLD FORGE 38361 – 4.8kV

Profile: 616 Customers, 33.4 Circuit Miles

Indices: CAIDI = 3.20, SAIFI = 4.29

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	8	53.33%	718	27.18%	4,006	47.35%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	3	20.00%	1,233	46.67%	3,422	40.45%
6	ACCIDENTS	2	13.33%	654	24.75%	861	10.17%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	2	13.33%	37	1.40%	172	2.04%
Totals		15	100.00%	2,642	100.00%	8,460	100.00%

Problem Analysis:

- There were 15 interruptions on the Old Forge 38361 in 2022.
- There were 4 transmission interruptions.
 - The first Transmission interruption occurred on January 16, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 23% of the total customers interrupted (618 of 2,642), and 6% of the total customer-hours interrupted (510 of 8,460). Motor vehicle accident, wires down TP422 NY-28.
 - The second Transmission interruption occurred on May 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 23% of the total customers interrupted (616 of 2,642), and 36% of the total customer-hours interrupted (3,062 of 8,460). Insulator failure, pole fire TP989 NY-28.
 - The third Transmission interruption occurred on May 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 23% of the total customers interrupted (616 of 2,642), and 4% of the total customer-hours interrupted (352 of 8,460). Insulator failure, TP154 NY-12.
 - The fourth Transmission interruption occurred on August 08, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 23% of the total customers interrupted (617 of 2,642), and 43% of the total customer-hours interrupted (3,640 of 8,460). Tree limb on primary, backlot TP32 NY-12.
- There were no substation interruptions.
- The remaining 11 events occurred at the distribution level.
- The distribution circuit breaker for the Old Forge 38361 experienced 8 momentary operations in 2022.

- The distribution circuit breaker for the Old Forge 38361 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Old Forge 38361 in 2022, accounting for 53% of total interruptions (8 of 15). Equipment Failures were the 2nd leading cause of interruptions, accounting for 20% of total interruptions (3 of 15). Accidents were the 3rd leading cause of interruptions, accounting for 13% of total interruptions (2 of 15).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Old Forge 38361 in 2022, accounting for 47% of total customers interrupted (1,233 of 2,642). Trees were the 2nd leading cause of customers interrupted, accounting for 27% of total customers interrupted (718 of 2,642). Accidents were the 3rd leading cause of customers interrupted, accounting for 25% of total customers interrupted (654 of 2,642).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Old Forge 38361 in 2022, accounting for 47% of total customer-hours interrupted (4,006 of 8,460). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 40% of total customer-hours interrupted (3,422 of 8,460). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 10% of total customer-hours interrupted (861 of 8,460).
- Of the 15 interruptions on this circuit, 10 affected 10 customers or less, with 7 being single customer outages.

Action Taken:

- Completed I&M foot patrol in 2021.
- Completed Level 2 I&M in 2022.

Action Plan:

- Complete Level 3 I&M in 2024.
- Complete cycle tree pruning in FY25.

16. WHITE LAKE 39963 – 4.8kV

Profile: 989 Customers, 37.6 Circuit Miles

Indices: CAIDI = 2.59, SAIFI = 3.33

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	7	41.18%	1,121	34.04%	6,426	75.34%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	4	23.53%	1,059	32.16%	1,031	12.09%
6	ACCIDENTS	2	11.76%	984	29.88%	817	9.58%
7	PREARRANGED	1	5.88%	1	0.03%	3	0.03%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	3	17.65%	128	3.89%	253	2.96%
Totals		17	100.00%	3,293	100.00%	8,530	100.00%

Problem Analysis:

- There were 17 interruptions on the White Lake 39963 in 2022.
- There were 3 transmission interruptions.
 - The first Transmission interruption occurred on January 16, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 30% of the total customers interrupted (983 of 3,293), and 10% of the total customer-hours interrupted (811 of 8,530). Motor vehicle accident, wires down TP422 NY-28.
 - The second Transmission interruption occurred on May 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 30% of the total customers interrupted (988 of 3,293), and 7% of the total customer-hours interrupted (565 of 8,530). Insulator failure, TP154 NY-12.
 - The third Transmission interruption occurred on August 08, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 30% of the total customers interrupted (996 of 3,293), and 69% of the total customer-hours interrupted (5,876 of 8,530). Tree limb on primary, backlot TP32 NY-12.
- There were no substation interruptions.
- The remaining 14 events occurred at the distribution level.
- The distribution circuit breaker for the White Lake 39963 experienced 6 momentary operations in 2022.
- The distribution circuit breaker for the White Lake 39963 experienced 0 sustained operations (lockouts) in 2022.

- Trees were the leading cause of interruptions on the White Lake 39963 in 2022, accounting for 41% of total interruptions (7 of 17). Equipment Failures were the 2nd leading cause of interruptions, accounting for 24% of total interruptions (4 of 17). Unknown were the 3rd leading cause of interruptions, accounting for 18% of total interruptions (3 of 17).
- Trees were the leading cause of customers interrupted (CI) on the White Lake 39963 in 2022, accounting for 34% of total customers interrupted (1,121 of 3,293). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 32% of total customers interrupted (1,059 of 3,293). Accidents were the 3rd leading cause of customers interrupted, accounting for 30% of total customers interrupted (984 of 3,293).
- Trees were the leading cause of customer-hours interrupted (CHI) on the White Lake 39963 in 2022, accounting for 75% of total customer-hours interrupted (6,426 of 8,530). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 12% of total customer-hours interrupted (1,031 of 8,530). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 10% of total customer-hours interrupted (817 of 8,530).
- Of the 17 interruptions on this circuit, 11 affected 10 customers or less, with 7 being single customer outages.

Action Taken:

- Completed I&M foot patrol in 2022.

Action Plan:

- Complete Level 2 I&M in 2023.
- Complete Level 3 I&M in 2025.
- Complete cycle tree pruning in FY25.

17. CHADWICKS 66851- 13.2kV

Profile: 1,881 Customers, 90.6 Circuit Miles
 Indices: CAIDI = 2.11, SAIFI = 2.22

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	13	28.89%	2,300	55.10%	4,617	52.44%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	12	26.67%	940	22.52%	1,883	21.39%
6	ACCIDENTS	14	31.11%	721	17.27%	1,875	21.30%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	2.22%	5	0.12%	11	0.13%
10	UNKNOWN	5	11.11%	208	4.98%	418	4.74%
Totals		45	100.00%	4,174	100.00%	8,805	100.00%

Problem Analysis:

- There were 45 interruptions on the Chadwicks 66851 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 45 events occurred at the distribution level.
- The distribution circuit breaker for the Chadwicks 66851 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Chadwicks 66851 experienced 0 sustained operations (lockouts) in 2022.
- Accidents were the leading cause of interruptions on the Chadwicks 66851 in 2022, accounting for 31% of total interruptions (14 of 45). Trees were the 2nd leading cause of interruptions, accounting for 29% of total interruptions (13 of 45). Equipment Failures were the 3rd leading cause of interruptions, accounting for 27% of total interruptions (12 of 45).
- Trees were the leading cause of customers interrupted (CI) on the Chadwicks 66851 in 2022, accounting for 55% of total customers interrupted (2,300 of 4,174). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 23% of total customers interrupted (940 of 4,174). Accidents were the 3rd leading cause of customers interrupted, accounting for 17% of total customers interrupted (721 of 4,174).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Chadwicks 66851 in 2022, accounting for 52% of total customer-hours interrupted (4,617 of 8,805). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 21% of total customer-hours interrupted (1,883 of 8,805). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 21% of total customer-hours interrupted (1,875 of 8,805).

- Of the 45 interruptions on this circuit, 14 affected 10 customers or less, with 4 being single customer outages.

Action Taken:

- Completed I&M foot patrol in 2020.
- Completed Level 2 I&M in 2021.

Action Plan:

- Complete Level 3 I&M in 2023.
- Complete cycle tree pruning in FY25.
- Hazard Tree work in progress.

18. OLD FORGE 38364 – 4.8kV

Profile: 882 Customers, 25.8 Circuit Miles

Indices: CAIDI = 3.05, SAIFI = 5.22

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	6	50.00%	1,066	23.16%	5,891	41.98%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	5	41.67%	2,659	57.78%	7,419	52.86%
6	ACCIDENTS	1	8.33%	877	19.06%	724	5.16%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	0	0.00%	0	0.00%	0	0.00%
Totals		12	100.00%	4,602	100.00%	14,034	100.00%

Problem Analysis:

- There were 12 interruptions on the Old Forge 38364 in 2022.
- There were 5 transmission interruptions.
 - The first Transmission interruption occurred on January 16, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 19% of the total customers interrupted (877 of 4,602), and 5% of the total customer-hours interrupted (724 of 14,034). Motor vehicle accident, wires down TP422 NY-28.
 - The second Transmission interruption occurred on February 27, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 19% of the total customers interrupted (875 of 4,602), and 17% of the total customer-hours interrupted (2,442 of 14,034). Insulator failure, wires down TP148 NY-28.
 - The third Transmission interruption occurred on May 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 19% of the total customers interrupted (880 of 4,602), and 31% of the total customer-hours interrupted (4,375 of 14,034). Insulator failure, pole fire TP989 NY-28.
 - The fourth Transmission interruption occurred on May 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 19% of the total customers interrupted (881 of 4,602), and 4% of the total customer-hours interrupted (503 of 14,034). Insulator failure, TP154 NY-12.
 - The fifth Transmission interruption occurred on August 08, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 19% of the total customers interrupted (888 of 4,602), and 37% of the total customer-hours interrupted (5,239 of 14,034). Tree limb on primary, backlot TP32 NY-12.
- There were no substation interruptions.

- The remaining 7 events occurred at the distribution level.
- The distribution circuit breaker for the Old Forge 38364 experienced 8 momentary operations in 2022.
- The distribution circuit breaker for the Old Forge 38364 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Old Forge 38364 in 2022, accounting for 50% of total interruptions (6 of 12). Equipment Failures were the 2nd leading cause of interruptions, accounting for 42% of total interruptions (5 of 12). Accidents were the 3rd leading cause of interruptions, accounting for 8% of total interruptions (1 of 12).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Old Forge 38364 in 2022, accounting for 58% of total customers interrupted (2,659 of 4,602). Trees were the 2nd leading cause of customers interrupted, accounting for 23% of total customers interrupted (1,066 of 4,602). Accidents were the 3rd leading cause of customers interrupted, accounting for 19% of total customers interrupted (877 of 4,602).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Old Forge 38364 in 2022, accounting for 53% of total customer-hours interrupted (7,419 of 14,034). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 42% of total customer-hours interrupted (5,891 of 14,034). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (724 of 14,034).
- Of the 12 interruptions on this circuit, 8 affected 10 customers or less, with 6 being single customer outages.

Action Taken:

- Completed Level 2 I&M in 2021.

Action Plan:

- Complete Level 3 I&M in 2023.
- Complete cycle tree pruning in FY25.
- Complete I&M foot patrol in 2025.

19. TURIN RD 65356 - 13.2kV

Profile: 1,316 Customers, 97.2 Circuit Miles
 Indices: CAIDI = 1.79, SAIFI = 2.40

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	19	65.52%	3,016	95.59%	5,277	93.37%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	20.69%	66	2.09%	248	4.39%
6	ACCIDENTS	3	10.34%	72	2.28%	122	2.16%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	1	3.45%	1	0.03%	4	0.08%
Totals		29	100.00%	3,155	100.00%	5,651	100.00%

Problem Analysis:

- There were 29 interruptions on the Turin Rd 65356 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 29 events occurred at the distribution level.
- The distribution circuit breaker for the Turin Rd 65356 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Turin Rd 65356 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 81% of the total amount of customers interrupted (2,557 out of 3,155) and 67% of the total amount of the customer-hours interrupted (3,787 out of 5,651).
 - The first lockout occurred on November 30, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 41% of the total customers interrupted (1,279 of 3,155), and 45% of the total customer-hours interrupted (2,515 of 5,651). Tree knocked down primary, P200-4 Stokes Rd.
 - The second lockout occurred on December 06, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 41% of the total customers interrupted (1,278 of 3,155), and 22% of the total customer-hours interrupted (1,271 of 5,651). Tree limb knocked down primary, P36 Cemetery Rd.
- Trees were the leading cause of interruptions on the Turin Rd 65356 in 2022, accounting for 66% of total interruptions (19 of 29). Equipment Failures were the 2nd leading cause of interruptions, accounting for 21% of total interruptions (6 of 29). Accidents were the 3rd leading cause of interruptions, accounting for 10% of total interruptions (3 of 29).

- Trees were the leading cause of customers interrupted (CI) on the Turin Rd 65356 in 2022, accounting for 96% of total customers interrupted (3,016 of 3,155). Accidents were the 2nd leading cause of customers interrupted, accounting for 2% of total customers interrupted (72 of 3,155). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 2% of total customers interrupted (66 of 3,155).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Turin Rd 65356 in 2022, accounting for 93% of total customer-hours interrupted (5,277 of 5,651). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 4% of total customer-hours interrupted (248 of 5,651). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 2% of total customer-hours interrupted (122 of 5,651).
- Of the 29 interruptions on this circuit, 19 affected 10 customers or less, with 13 being single customer outages.

Action Taken:

- Completed Level 2 I&M in 2020.
- Completed Level 3 I&M in 2022.

Action Plan:

- Complete cycle tree pruning in FY24.
- Complete I&M foot patrol in 2024.
- Hazard Tree work in progress.

20. DEERFIELD 60656 - 13.2kV

Profile: 806 Customers, 35.7 Circuit Miles
 Indices: CAIDI = 1.40, SAIFI = 3.71

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	2	10.00%	6	0.20%	34	0.81%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	40.00%	2,631	87.93%	3,428	81.61%
6	ACCIDENTS	5	25.00%	145	4.85%	241	5.73%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	5	25.00%	210	7.02%	498	11.85%
Totals		20	100.00%	2,992	100.00%	4,201	100.00%

Problem Analysis:

- There were 20 interruptions on the Deerfield 60656 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 20 events occurred at the distribution level.
- The distribution circuit breaker for the Deerfield 60656 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Deerfield 60656 experienced 3 sustained operations (lockouts) in 2022. These interruptions accounted for 81% of the total amount of customers interrupted (2,420 out of 2,992) and 60% of the total amount of the customer-hours interrupted (2,513 out of 4,201).
 - The first lockout occurred on February 17, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 27% of the total customers interrupted (802 of 2,992), and 28% of the total customer-hours interrupted (1,170 of 4,201). Failed equipment, P7 Horatio St.
 - The second lockout occurred on March 07, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 27% of the total customers interrupted (809 of 2,992), and 4% of the total customer-hours interrupted (187 of 4,201).
 - The third lockout occurred on March 07, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 27% of the total customers interrupted (809 of 2,992), and 28% of the total customer-hours interrupted (1,155 of 4,201). Broken insulator, P13 Glass Factory Rd.

- Equipment Failures were the leading cause of interruptions on the Deerfield 60656 in 2022, accounting for 40% of total interruptions (8 of 20). Accidents were the 2nd leading cause of interruptions, accounting for 25% of total interruptions (5 of 20). Unknown were the 3rd leading cause of interruptions, accounting for 25% of total interruptions (5 of 20).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Deerfield 60656 in 2022, accounting for 88% of total customers interrupted (2,631 of 2,992). Unknown were the 2nd leading cause of customers interrupted, accounting for 7% of total customers interrupted (210 of 2,992). Accidents were the 3rd leading cause of customers interrupted, accounting for 5% of total customers interrupted (145 of 2,992).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Deerfield 60656 in 2022, accounting for 82% of total customer-hours interrupted (3,428 of 4,201). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 12% of total customer-hours interrupted (498 of 4,201). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 6% of total customer-hours interrupted (241 of 4,201).
- Of the 20 interruptions on this circuit, 7 affected 10 customers or less, with 2 being single customer outages.

Action Taken:

- Completed cycle tree pruning in FY22
- Completed Level 3 I&M in 2021.

Action Plan:

- Complete I&M foot patrol in 2023.
- Complete Level 2 I&M in 2024.
- Hazard Tree work in progress.

3. ACTION PLAN SUMMARIES

a. SUMMARY OF ACTION PLANS FOR 2022 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
Raquette Lake	39861	2022	Complete Level 3 I&M in 2023.	2023		
			Complete cycle tree pruning in FY25.	FY25		
Eagle Bay	38272	2022	Complete Level 2 I&M in 2023.	2023		
			Complete Level 3 I&M in 2025.	2025		
			Complete cycle tree pruning in FY25.	FY25		
Poland - Utica	62258	2022	Complete Level 3 I&M in 2023.	2023		
			Complete I&M foot patrol in 2025.	2025		
			Hazard Tree work in progress	FY24		
Poland - Utica	62257	2022	Complete Level 3 I&M in 2024.	2024		
			Hazard Tree work in progress	FY24		
Lehigh	66952	2022	Hazard Tree review to be scheduled.	FY25		
			Complete I&M foot patrol in 2023.	2023		
			Complete Level 2 I&M in 2024.	2024		
			Complete Level 3 I&M in 2026.	2026		
Alder Creek	70152	2022	Complete cycle tree pruning in FY24.	FY24		
			Complete I&M foot patrol in 2024.	2024		
			Complete Level 2 I&M in 2025.	2025		
			Hazard Tree work in progress	FY24		
Eagle Bay	38271	2022	Complete Level 2 I&M in 2023.	2023		
			Complete cycle tree pruning in FY25.	FY25		
			Complete Level 3 I&M in 2025.	2025		
Alder Creek	70161	2022	Complete I&M foot patrol in 2024.	2024		
			Complete cycle tree pruning in FY25.	FY25		
			Complete Level 2 I&M in 2025.	2025		
			Hazard Tree work in progress	FY24		
Lehigh	66953	2022	Complete I&M foot patrol in 2024.	2024		
			Complete cycle tree pruning in FY26.	FY26		
			Complete Level 2 I&M in 2025.	2025		
			Hazard Tree review scheduled.	FY25		
Lehigh	66954	2022	Complete I&M foot patrol in 2024.	2024		
			Complete cycle tree pruning in FY26.	FY26		
			Complete Level 2 I&M in 2025.	2025		
			Hazard Tree Review to be scheduled.	FY25		
Lehigh	66951	2022	Complete Level 2 I&M in 2023.	2023		
			Complete Level 3 I&M in 2025.	2025		
			Complete cycle tree pruning in FY26.	FY26		
			Hazard Tree Review to be scheduled.	FY25		
Old Forge	38362	2022	Complete Level 3 I&M in 2024.	2024		
			Complete cycle tree pruning in FY25.	FY25		
Oneida	50151	2022	Complete I&M foot patrol in 2023.	2023		
			Complete Level 2 I&M in 2024.	2024		
			Hazard Tree work in progress.	FY24		
Peterboro	51452	2022	Complete I&M foot patrol in 2023.	2023		
			Complete Level 2 I&M in 2024.	2024		

Station	Feeder	Report Year	Action Plan	Estimated Completion Date	Estimated Cost	Comments
			Hazard Tree work in progress.	FY24		
Old Forge	38361	2022	Complete Level 3 I&M in 2024.	2024		
			Complete cycle tree pruning in FY25.	FY25		
White Lake	39963	2022	Complete Level 2 I&M in 2023.	2023		
			Complete Level 3 I&M in 2025.	2025		
			Complete cycle tree pruning in FY25.	FY25		
Chadwicks	66851	2022	Complete Level 3 I&M in 2023.	2023		
			Complete cycle tree pruning in FY25.	FY25		
			Hazard Tree work in progress.	FY24		
Old Forge	38364	2022	Complete Level 3 I&M in 2023.	2023		
			Complete cycle tree pruning in FY25.	FY25		
			Complete I&M foot patrol in 2025.	2025		
Turin Road	65356	2022	Complete cycle tree pruning in FY24.	FY24		
			Complete I&M foot patrol in 2024.	2024		
			Hazard Tree work in progress.	FY24		
Deerfield	60656	2022	Complete I&M foot patrol in 2023.	2023		
			Complete Level 2 I&M in 2024.	2024		
			Hazard Tree work in progress.	FY24		

b. STATUS OF ACTION PLANS FOR 2021 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Actual Compl. Date	Actual Cost	Comments
Poland - Utica	62258	2021	Level 3 I&M	2023		
			Cycle Tree Pruning	FY23		
			Route 8 Phase 3	FY23		
			Route 8 Phase 4	FY24		
Salisbury	67857	2021	Level 3 I&M	2023		
			Cycle Tree Pruning	FY23		
Turin Rd	65357	2021	I&M Foot Patrol	2022		
			Cycle Tree Pruning	FY25		
			Monitor Hazard Trees and Mitigate	FY23		
Oneida	50151	2021	Cycle Tree Pruning	FY28		
			Review Hazard Trees	FY23		
			I&M Foot Patrol	2023		
Eagle Bay	38272	2021	I&M Foot Patrol	2022		
			Level 2 I&M	2023		
			Level 3 I&M	2025		
			Cycle Tree Pruning	FY24		
Lehigh	66953	2021	Level 3 I&M	2022		
			Cycle Tree Pruning	FY24		
			Monitor Hazard Trees and Mitigate	FY23		
Raquette Lake	39861	2021	Level 3 I&M	2023		
			Cycle Tree Pruning	FY24		
			Monitor Hazard Trees and Mitigate	FY23		
Eagle Bay	38271	2021	I&M Foot Patrol	2022		
			Level 2 I&M	2023		
			Level 3 I&M	2025		
			Cycle Tree Pruning	FY24		
Peterboro	51453	2021	I&M Foot Patrol	2023		
Sherman	33351	2021	Cycle Tree Pruning	FY27		
			I&M Foot Patrol	2023		
			Cycle Tree Pruning	FY26		
Old Forge	38362	2021	Review for Hazard Tree Removal	FY23		
			Level 2 I&M	2022		
			Level 3 I&M	2024		
			Cycle Tree Pruning	FY24		
Poland - Utica	62257	2021	Monitor Hazard Trees and Mitigate	FY23		
			Cycle Tree Pruning	FY23		
			Review for Hazard Tree Removal	FY23		
Alder Creek	70152	2021	Level 3 I&M	2022		
			Cycle Tree Pruning	FY25		
			Review for Hazard Tree Removal	FY23		
Old Forge	38361	2021	Level 2 I&M	2022		
			Level 3 I&M	2024		
			Cycle Tree Pruning	FY24		
			Monitor Hazard Trees and Mitigate	FY23		
Sherman	33352	2021	Level 3 I&M	2023		

Station	Feeder	Report Year	Action Plan	Actual Compl. Date	Actual Cost	Comments
			Cycle Tree Pruning	FY26		
			Review for Hazard Tree Removal	FY23		
Peterboro	51451	2021	Level 3 I&M	2022		
			I&M Foot Patrol	2024		
			Cycle Tree Pruning	FY27		
Chadwicks	66853	2021	Level 3 I&M	2022		
			I&M Foot Patrol	2024		
			Cycle Tree Pruning	FY25		
			Monitor Hazard Trees and Mitigate	FY23		

4. OPERATING REGION PERFORMANCE BELOW MINIMUM

a. MAINTENANCE HISTORY AND ANALYSIS OF FACTORS THAT CAUSED THE BELOW MINIMUM PERFORMANCE.

In 2022, the Mohawk Valley Region failed to meet the PSC minimum SAIFI requirement after meeting the requirement in 2021. The region has been below the target of 1.483 since 2017 and passed in 2021 with an annual SAIFI of 1.34. However, the region failed to meet the target in 2022 with an annual SAIFI of 1.488. The Mohawk Valley Region failed to meet the PSC minimum CAIDI requirement after meeting the requirement in 2021. The region has been below the target of 2.150 since 2020 and passed in 2021 with an annual CAIDI of 1.94. However, the region failed to meet the target in 2022 with an annual CAIDI of 2.197.

In 2022, the Mohawk Valley Region experienced 1,459 interruptions. Most of these interruptions (98%) occurred on the distribution system. However, 15 of these interruptions (1%) occurred on the transmission or sub-transmission systems, interrupting 71,194 customers (34.1%) and accounting for 211,485 customer-hours interrupted (46.1%). The SAIFI and CAIDI of the transmission and sub-transmission systems in 2021 were 0.51 interruptions and 2.97 hours respectively. The impact of these 15 interruptions on SAIFI, (0.51 interruptions per year for just 15 interruptions, or a SAIFI of 0.034 per interruption), versus a distribution SAIFI of 0.86 interruptions per year or 0.0006 per interruption, made the overall annual SAIFI in the Mohawk Valley Region worse, ultimately causing it to fail the SAIFI target. Transmission SAIFI was 176% greater in 2022 as compared to 2021.

There were also 7 substation-related interruptions in the Mohawk Valley Region in 2022, interrupting 16,976 customers (8%) and accounting for 6,419 customer-hours interrupted (1%). The SAIFI and CAIDI of substation-related interruptions in 2022 was 0.12 interruptions per year and 0.38 hours.

The distribution system accounted for 98% of the interruptions in the Mohawk Valley Region in 2022, interrupting 120,892 customers (58%) and accounting for 241,455 customer-hours interrupted (53%). The SAIFI of the distribution system in 2022 met the SAIFI goal for the region, with a distribution SAIFI of 0.86 interruptions per year. This represents a decrease in distribution SAIFI from 2021, when it was 0.92 interruptions per year.

b. PLANNED PROGRAMS OR PLANNED CORRECTIVE ACTIONS AND PROPOSED IMPROVEMENTS TO THE PERFORMANCE INDICES.

Interruptions on the transmission and sub-transmission systems have a very significant impact on reliability in the Mohawk Valley Region. This is because many of these lines are radial through heavily forested, environmentally sensitive, inaccessible areas. Many projects have been completed and more are planned to improve the performance of the transmission system. The Inspection & Maintenance program itself is also continually improving the sub-transmission and transmission systems by identifying equipment in need of replacement before it fails. In addition, the Forestry Department is widening the rights-of-way of many of the transmission and sub-transmission lines, as far as easement areas and adjacent property owners will allow, in an attempt to reduce the impact of trees in what is a very heavily forested area. It is expected that the combination of these efforts will improve the performance of the transmission and sub-transmission systems; however, no manner of improvement will eliminate all interruptions.

The contribution of transmission outages is significant to the regional performance indices, as can be seen in the data provided in the previous section. It is very difficult to predict transmission equipment failures in advance, and in a continued attempt to minimize these interruptions, Transmission Planning and Asset Management (TPAM) has several projects in the works to improve the performance of some of the worst performing transmission lines.

Tree trimming around the distribution system will remain a priority in 2023, in order to address what is typically the single largest contributor to customer interruptions within the Mohawk Valley Region. In addition, there is a list of distribution improvement capital projects to be designed and/or constructed in FY2024, which can be viewed in section 1.f of this report.

Additional efforts to improve restoration times are listed below:

- The Divisional Reliability Team will continue to investigate and analyze outages impacting greater than 2,500 customers or more than 50,000 customer-minutes-interrupted (CMI). This effort will look at the interruptions impacting the greatest number of customers to see what could have been done better to reduce the length of the interruption or to have eliminated it altogether.
- The review of suitable locations for the installation of new cutout mounted reclosers (CMRs) will continue to reduce the number of temporary faults that result in permanent outages on smaller side taps.
- The review of new fault location isolation and service restoration (FLISR) schemes are being reviewed and installed to improve outage restoration times.

H. NORTHEAST REGION

1. OPERATING REGIONAL PERFORMANCE

a. HISTORIC CAIDI AND SAIFI INDICES

IDS info:

	2022	2021	2020	2019	2018	2017
CAIDI (Threshold 2.578)	2.43	2.40	2.29	2.72	2.42	2.42
SAIFI (Threshold 1.372)	1.31	1.34	1.39	1.26	1.22	1.36
SAIDI	3.17	3.21	3.19	3.43	2.97	3.30
Interruptions	2,607	2,842	2,872	2,329	2,611	2,284
Customers Interrupted	301,690	307,303	317,036	284,974	275,133	302,792
Customer-Hours Interrupted	733,541	737,313	727,392	776,275	667,045	733,340
Customers Served	231,070	229,747	228,239	226,518	224,817	222,272
Customers Per Interruption	115.72	108.13	110.39	122.36	105.37	132.57
Availability Index	99.9638	99.9634	99.9637	99.9609	99.9661	99.9623
Interruptions/1000 Customers	11.28	12.37	12.58	10.28	11.61	10.28

b. DISCUSSION OF REGIONAL PERFORMANCE

In 2022, the Northeast Region met its CAIDI reliability target and met its SAIFI reliability target as set forth by the New York Public Service Commission (PSC). The final System Average Interruption Frequency Index (SAIFI) result was 1.31 interruptions, 5% below the PSC goal of 1.372 interruptions. As shown in the table above, the Customer Average Interruption Duration index (CAIDI) was 2.43 in 2022, 6% below the PSC's regional target of 2.578 hours.

The 2022 CAIDI result was 1% above the 2021 result of 2.4 hours, and 1% below the previous 5-year average of 2.45 hours. The 2022 SAIFI was 2% below the 2021 result of 1.34 interruptions, and equal to the previous 5-year average of 1.31 interruptions.

In 2022, excluding major storms, the Northeast Region experienced 18 transmission interruptions. These interruptions accounted for 1% of the region's total interruptions (18 of 2,607), 24% of the region's total customers interrupted (CI), (72,779 of 301,690), and 20% (144,629 of 733,541) of the region's total customer-hours interrupted (CHI). Overall, transmission interruptions had a CAIDI of 1.99 hours, and a SAIFI of 0.31 interruptions.

The number of transmission-related interruptions remained the same from 18 in 2021 to 18 in 2022 (no change). The number of customers interrupted increased from 43,037 in 2021, to 72,779 in 2022 (an increase of 69%), while the customer-hours interrupted increased from 133,434 in 2021, to 144,629 in 2022 (an increase of 8%).

In 2022, excluding major storms, the Northeast Region experienced 7 substation interruptions. These interruptions accounted for 0.3% of the region's total interruptions (7 of 2,607), 6% of the region's total customers interrupted, (18,514 of 301,690), and 9% (65,367 of 733,541) of the region's total customer-hours interrupted. Overall, substation interruptions had a CAIDI of 3.53 hours, and a SAIFI of 0.08 interruptions.

The number of substation-related interruptions remained the same from 7 to 7 from 2021 to 2022 (no change). The number of customers interrupted increased from 13,906 in 2021, to 18,514 in 2022 (an increase of 33%), while the customer-hours interrupted increased from 42,398 in 2021, to 65,367 in 2022 (an increase of 54%).

In 2022, excluding major storms, the Northeast Region experienced 2,582 distribution interruptions. These interruptions accounted for 99% of the region's total interruptions (2,582 of 2,607), 70% of the region's total customers interrupted, (210,397 of 301,690), and 71% (523,545 of 733,541) of the region's total customer-hours interrupted. Overall, distribution interruptions had a CAIDI of 2.49 hours, and a SAIFI of 0.91 interruptions.

The number of distribution-related interruptions decreased from 2,817 to 2,582 from 2021 to 2022 (a decrease of 8%). The number of customers interrupted decreased from 250,360 in 2021, to 210,397 in 2022 (a decrease of 16%), while the customer-hours interrupted decreased from 561,481 in 2021, to 523,545 in 2022 (a decrease of 7%).

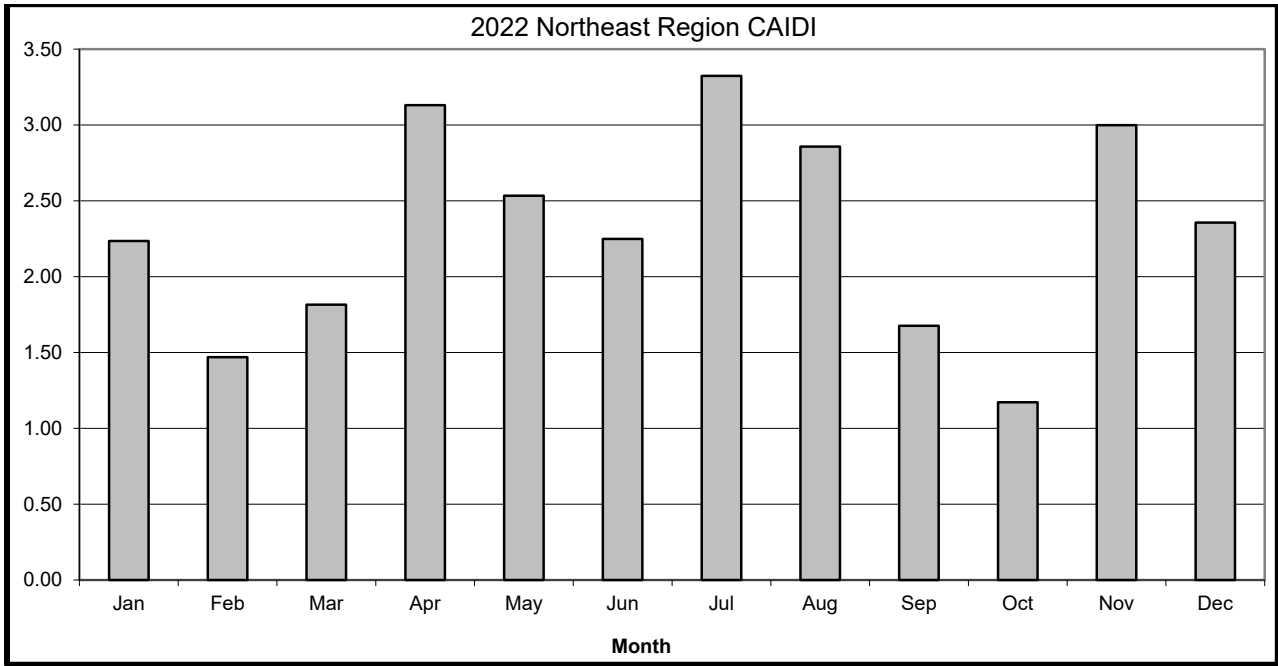
c. MONTHLY CAIDI AND SAIFI GRAPHS

The graphs on the following page show the monthly CAIDI and SAIFI for the Northeast Region for 2022.

The Northeast Region had four months which exceeded the threshold of 2.578 hours for CAIDI; April, July, August, and November. The first three months of 2022 CAIDI were excellent, with only one month exceeding 2.00, January. CAIDI did spike above the threshold in April, at 3.13, but had a sharp decline over the following two months, though never dropping below 2.00. CAIDI then spiked at its highest in July, however, similar to the spike in April, the subsequent months dropped significantly, dropping to the lowest CAIDI of the year in October at only 1.17. November reached a CAIDI of 3.00, before finishing the year off with a CAIDI of 2.36 in December. Even though there were four months that exceeded the CAIDI threshold of 2.578, the four months with a CAIDI well below 2.00 balanced it out, pushing the final metric to 2.43 hours, or 94.3% of the threshold.

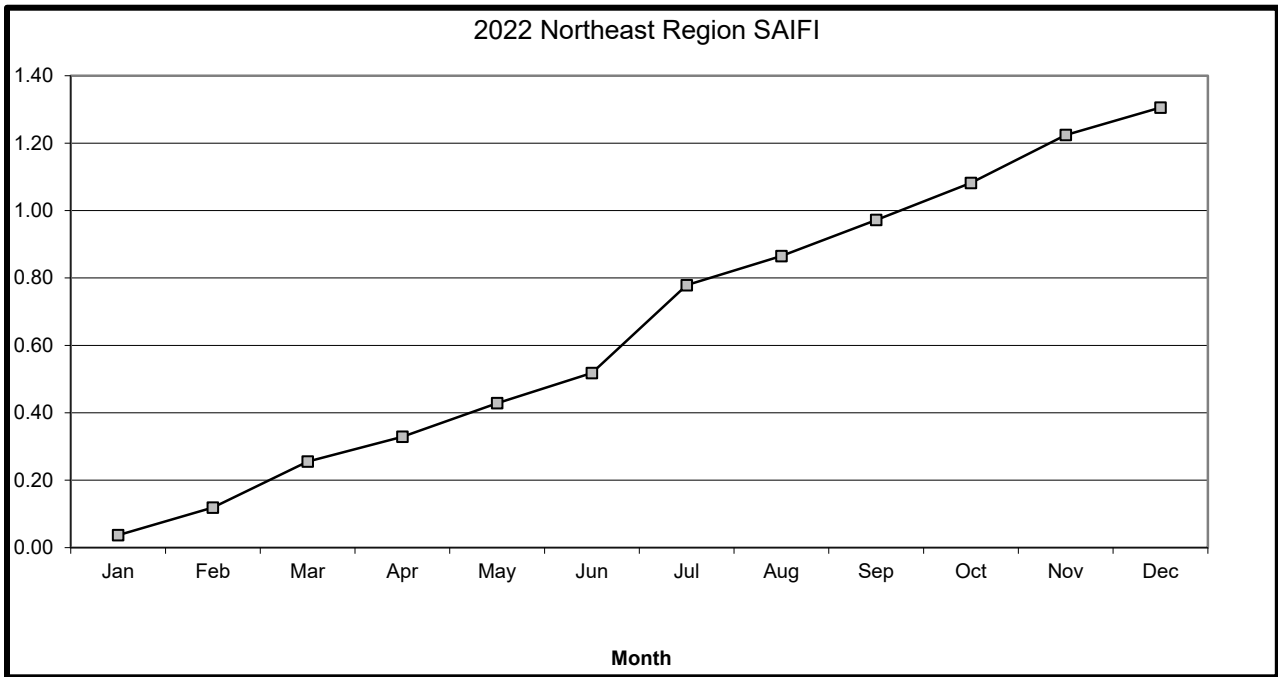
SAIFI in the Northeast Region in 2022 did not fluctuate greatly, varying primarily from a monthly low of 0.07 to a high of 0.14, with the one outlier of 0.26. There were eight months with a SAIFI of 0.10 or lower; January, February, April, May, June, August, September, and December. The remaining four months of 2022 had a monthly SAIFI between 0.11 and 0.26 with three of those four months being between 0.11 and 0.14. Cumulative SAIFI spiked significantly in July, bringing the cumulative value from 0.52 to 0.78. Following July, however, strong performance helped maintain SAIFI values at 0.14 or lower, helping to keep the Northeast Region below the 1.372 threshold, pushing the final metric to 1.31, or 95.5% of the threshold.

GRAPH OF MONTHLY CAIDI AND SAIFI FOR THE NORTHEAST REGION



PSC CAIDI Goal:	
Threshold	2.578
2022 Actual	2.43

PSC SAIFI Goal:	
Threshold	1.372
2022 Actual	1.31



d. PSC CAUSE CODES

1) Number of Events by Cause – Historical

IDS info:

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	1,879	515	1,810	1,650	2,304	1,332
02 Tree Contacts	960	1,246	1,028	927	909	940
03 Overloads	13	7	22	14	42	12
04 Oper. Error	10	5	6	7	2	10
05 Equipment	531	501	547	477	525	407
06 Accidents	428	372	437	303	448	362
07 Prearranged	81	76	60	68	53	53
08 Cust. Equip.	0	0	0	0	0	0
09 Lightning	42	73	44	55	37	66
10 Unknown	542	562	728	478	595	434
Total	4,486	3,357	4,682	3,979	4,915	3,616

2) Customers Interrupted by Cause – Historical

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	295,331	64,474	267,534	216,504	225,645	165,837
02 Tree Contacts	123,905	154,159	111,947	126,288	100,589	145,733
03 Overloads	3,327	1,363	3,463	413	2,494	872
04 Oper. Error	7,131	1,305	259	4,608	73	8,343
05 Equipment	79,771	68,122	98,147	69,852	57,743	48,083
06 Accidents	36,065	42,557	46,889	37,753	70,225	57,531
07 Prearranged	8,143	9,870	13,683	10,799	16,957	7,860
08 Cust. Equip.	0	0	0	0	0	0
09 Lightning	928	1,651	3,752	3,723	877	4,330
10 Unknown	42,420	28,276	38,886	31,538	26,175	30,040
Total	597,021	371,777	584,570	501,478	500,778	468,629

3) Customer-Hours Interrupted by Cause – Historical

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	2,460,171	328,427	3,238,855	2,002,382	2,984,805	1,117,998
02 Tree Contacts	346,208	434,652	334,255	405,495	297,256	390,342
03 Overloads	10,252	668	10,271	1,302	8,426	1,811
04 Oper. Error	10,110	2,150	210	7,357	1,382	1,956
05 Equipment	229,374	160,875	198,551	213,150	97,352	104,885
06 Accidents	79,527	77,779	94,607	72,733	189,072	133,930
07 Prearranged	9,371	9,748	11,108	11,589	17,969	9,664
08 Cust. Equip.	0	0	0	0	0	0
09 Lightning	2,922	3,873	8,901	6,563	2,877	31,207
10 Unknown	45,779	47,568	69,487	58,088	52,713	59,545
Total	3,193,713	1,065,740	3,966,246	2,778,657	3,651,851	1,851,338

4) Interruptions, Customers Interrupted and Customer-Hours Interrupted – 2022

Cause Code	Interruptions		Customers Interrupted		Customer Hours Interrupted	
	Number	% Total	Number	% Total	Number	% Total
01 Major Storms	1,879	41.9%	295,331	49.5%	2,460,171	77.0%
02 Tree Contacts	960	21.4%	123,905	20.8%	346,208	10.8%
03 Overloads	13	0.3%	3,327	0.6%	10,252	0.3%
04 Oper. Error	10	0.2%	7,131	1.2%	10,110	0.3%
05 Equipment	531	11.8%	79,771	13.4%	229,374	7.2%
06 Accidents	428	9.5%	36,065	6.0%	79,527	2.5%
07 Prearranged	81	1.8%	8,143	1.4%	9,371	0.3%
08 Cust. Equip.	0	0.0%	0	0.0%	0	0.0%
09 Lightning	42	0.9%	928	0.2%	2,922	0.1%
10 Unknown	542	12.1%	42,420	7.1%	45,779	1.4%
Total	4,486	100.0%	597,021	100.0%	3,193,713	100.0%

e. **INTERRUPTION REVIEW BY PSC CAUSE CODES**

Cause Code 01 - Major Storms

In 2022, Major Storms accounted for 42% of interruptions, 49% of customers interrupted, and 77% of Customer-Hours Interrupted.

Interruptions due to Major Storm were up 265% from 2021, and up 23% over the 5-year average. Customers interrupted due to Major Storms were up 358% from 2021, and up 57% over the 5-year average. Customer-Hours interrupted were up 649% from 2021 and up 27% over the 5-year average.

The remaining PSC code descriptions do not include Major Storms in the percentages.

Cause Code 02 - Tree Contacts

In 2022, Tree Contacts accounted for 37% of interruptions, 41% of customers interrupted, and 47% of Customer-Hours Interrupted.

Interruptions due to Tree Contacts were down 23% from 2021, and down 5% over the 5-year average. Customers interrupted due to Tree Contacts were down 20% from 2021, and down 3% over the 5-year average. Customer-Hours interrupted were down 20% from 2021 and down 7% over the 5-year average.

Tree Contacts were the largest cause of interruptions in 2022.

Cause Code 03 - Overloads

In 2022, Overloads accounted for 0% of interruptions, 1% of customers interrupted, and 1% of Customer-Hours Interrupted.

Interruptions due to Overloads were up 86% from 2021, and down 32% over the 5-year average. Customers interrupted due to Overloads were up 144% from 2021, and up 93% over the 5-year average. Customer-Hours interrupted were up 1434% from 2021 and up 128% over the 5-year average.

Overloads were the 7th largest cause of interruptions in 2022.

Cause Code 04 - Operator Error

In 2022, Operator Error accounted for 0% of interruptions, 2% of customers interrupted, and 1% of Customer-Hours Interrupted.

Interruptions due to Operator Error were up 100% from 2021, and up 67% over the 5-year average. Customers interrupted due to Operator Error were up 446% from 2021, and up 144% over the 5-year average. Customer-Hours interrupted were up 370% from 2021 and up 287% over the 5-year average.

Operator Error was the 8th largest cause of interruptions in 2022.

Cause Code 05 - Equipment Failure

In 2022, Equipment Failures accounted for 20% of interruptions, 26% of customers interrupted, and 31% of Customer-Hours Interrupted.

Interruptions due to Equipment Failure were up 6% from 2021, and up 8% over the 5-year average. Customers interrupted due to Equipment Failure were up 17% from 2021, and up 17% over the 5-year average. Customer-Hours interrupted were up 43% from 2021 and up 48% over the 5-year average.

Equipment Failures were the 3rd largest cause of interruptions in 2022.

Cause Code 06 - Accidents

In 2022, Accidents accounted for 16% of interruptions, 12% of customers interrupted, and 11% of Customer-Hours Interrupted.

Interruptions due to Accidents were up 15% from 2021, and up 11% over the 5-year average. Customers interrupted due to Accidents were down 15% from 2021, and down 29% over the 5-year average. Customer-Hours interrupted were up 2% from 2021 and down 30% over the 5-year average.

Accidents were the 4th largest cause of interruptions in 2022.

Cause Code 07 - Prearranged

In 2022, Prearranged accounted for 3% of interruptions, 3% of customers interrupted, and 1% of Customer-Hours Interrupted.

Interruptions due to Prearranged were up 7% from 2021, and up 31% over the 5-year average. Customers interrupted due to Prearranged were down 17% from 2021, and down 31% over the 5-year average. Customer-Hours interrupted were down 4% from 2021 and down 22% over the 5-year average.

Prearranged was the 5th largest cause of interruptions in 2022.

Cause Code 08 - Customer Equipment

There were no Customer Equipment interruptions in 2022.

Cause Code 09 - Lightning

In 2022, Lightning accounted for 2% of interruptions, 0% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Lightning were down 42% from 2021, and down 24% over the 5-year average. Customers interrupted due to Lightning were down 44% from 2021, and down 68% over the 5-year average. Customer-Hours interrupted were down 25% from 2021 and down 73% over the 5-year average.

Lightning was the 6th largest cause of interruptions in 2022.

Cause Code 10 - Unknown

In 2022, Unknown causes accounted for 21% of interruptions, 14% of customers interrupted, and 6% of Customer-Hours Interrupted.

Interruptions due to Unknown causes were down 4% from 2021, and down 3% over the 5-year average. Customers interrupted due to Unknown causes were up 50% from 2021, and up 37% over the 5-year average. Customer-Hours interrupted were down 4% from 2021 and down 20% over the 5-year average.

Unknown causes were the 2nd largest cause of interruptions in 2022.

f. DISCUSSION OF REGIONAL CAPEX PROJECTS WITH 2022/23 SPENDS

The Company continues to work on capital projects in the Northeast Region to maintain customer satisfaction and future reliability. Engineering works with Operations to address localized concerns raised through PSC complaints and other customer inquiries in the Northeast Region. These solutions were varied and included fusing, adding tree wire, small rebuilds, adding animal guards and tree trimming.

Some of the specific projects that were either constructed in CY2022 or are scheduled to be designed and/or constructed in CY2023 are listed below.

Construct New Mohican Distribution Substation

A multi-year project to rebuild the existing Mohican substation, which is currently a transmission only substation in the Town of Moreau in the northeast corner of Saratoga County began in 2021, and the substation once completed in 2026 will also serve distribution load. The Mohican substation will have a 40 MVA, 115/13.2 kV transformer with four new distribution feeders. The new distribution work associated with the Mohican substation, which includes adding a new distribution feeder in the Ogden Brook substation, will allow for the retirement of the Farnan Road, Henry Street, Hudson Falls and McCrea Street substations.

The addition of a new feeder in the Ogden Brook substation was completed in 2022, after which work began on the rebuild and conversion of the 4.16 kV Henry Street feeders and their transfer to Ogden Brook. Three of the six Henry Street feeder will be retired and transferred to Ogden Brook prior to the completion of the Mohican substation. In addition, work has already begun on the construction of the new Mohican distribution feeders in an attempt to have the majority of the distribution construction completed prior to the energization of the substation so that the substations being retired can be retired soon after the Mohican substation is complete.

St. Johnsville Feeder Tie Construction

The St. Johnsville substation has two 13.2 kV distribution feeders and currently has only one very limited feeder tie to the nearby Clinton substation which does not allow for the transfer of much load between the two substations. Design work began in 2022 to construct new feeder ties for each of the two St. Johnsville distribution feeders which will allow the feeders to be backed-up in their entirety from the adjacent Inghams and Salisbury substations. Each of these new feeder ties will be at least 5 miles in length and will be in service by the end of 2025.

Construct New Maple Avenue Distribution Substation

A multi-year project to construct a new substation in the Town of Perth in Fulton County, north of the City of Amsterdam, began in early 2019. This substation has a 25 MVA, 115/13.2 kV transformer with four new distribution feeders. Construction of the substation was completed by the end of 2019 and load began

being placed on this substation in the spring of 2020. The main driver for this new substation was asset condition issues at the Market Hill 69/4.16 kV substation.

Construction of the distribution to be attached to the Maple Avenue substation began in 2019 with construction of the distribution duct bank from the substation to the intersection of State Highway 30 and Maple Avenue about ½ mile south of the substation. The overhead distribution construction began in 2020 by extending two overhead distribution feeders (the Maple Avenue 50251 and 50252) south along State Highway 30 from Maple Avenue to Golf Course Road. The construction of the Maple Avenue 50253 and 50254 feeders which were double circuited on Maple Avenue from State Highway 30 to Midline Road was completed in 2022 which allowed for the completion of the rebuild and conversion of the four Market Hill 4.16 kV distribution feeders. The Market Hill feeder conversions were completed in early 2023 distributing the customers previously served out of Market Hill to 13.2 kV Maple Avenue and Church Street feeders. The Market Hill substation has since been de-energized and the 69 kV transmission tap into Market Hill and the Market Hill substation itself will be retired in FY2024.

Convert Cobleskill Distribution from 4.8 kV to 13.2 kV

A multi-year project to convert the distribution in Cobleskill from 4.8 kV to 13.2 kV was begun in 2019 when one of the two 4.8 kV distribution transformers in the Cobleskill substation failed. There was one 4.8 kV distribution feeder on the station transformer that failed which is now being served from the remaining 3 distribution feeders from the second distribution transformer in the Cobleskill substation. A new 13.2 kV distribution transformer was installed to replace the failed 4.8 kV bank after which time the distribution in Cobleskill will be slowly and systematically converted to 13.2 kV to allow for the retirement of the last remaining 4.8 kV transformer and to provide feeder ties with the nearby Grand Street 13.2 kV distribution feeder. The earliest the conversion of the distribution in and around Cobleskill to 13.2 kV could be completed is FY2025.

Battenkill 34258 - Washington Street Conversion

A capital improvement project was created to convert approximately 2.7 miles of the Battenkill 34258 feeder from 4.8 kV to 13.2 kV due to a step-down ratio transformer exceeding its loading capacity. Several protection coordination changes will be implemented, including the installation of 2 cutout-mounted reclosers and the relocation of a three-phase recloser, thus increasing reliability and decreasing the number of sustained outages. Switches will also be added to allow for further opportunities to isolate faults and restore customers sooner. By doing this conversion, National Grid will also be able to interconnect over 1 MW of hydroelectric generation at 13.2 kV, which will assist in shaving feeder peak loading.

Union Street 37652 - County Road 59 Conversion

A capital improvement project was created to convert approximately 2.1 miles of the Union Street 37652 from 4.8 kV to 13.2 kV due to a step-down ratio transformer

exceeding its loading capacity. In doing so, National Grid will be able to provide more reliable voltage and mitigate low voltage concerns. Additionally, several protection coordination changes will be implemented, including the installation of a three-phase recloser and 2 cutout-mounted reclosers, thus increasing reliability and decreasing the number of sustained outages. Switches will also be added to allow for further opportunities to isolate faults and restore customers sooner. This conversion will also relocate approximately 0.9 miles of heavily-treed rear lot distribution to the road.

Northeast Region Capital Projects in Excess of \$1M Completed in 2022:

Region	Project Name	Project Type	Fin Sys Proj No.	Finish Date	Total Spend
Northeast	Warrensburg N.Creek 5 – WPC	T Line	C084553	12/21/2022	\$6,493,000
Northeast	Henry St 36 - River Crossing	D Line	C029432	5/13/2022	\$3,138,000
Northeast	Pin#2134.56 City of Amsterdam NYSDO	D Line	C087161	6/15/2022	\$1,118,196
Northeast	QUEENSBURY STATION 295 - DSCADA (REPLACE CPU & DUAL PORT RTU & DUAL PORT 2ND RTU)	T Line	C081809	12/7/2022	\$2,190,000
Northeast	ASHLEY STATION 331 (PORT PDS 7 EAST) M9000	D Line	C069687	7/8/2022	\$2,600,000

g. DISCUSSION OF REGIONAL PERFORMANCE OF LVAC NETWORK DISTRIBUTION SYSTEM(S)

Glens Falls LVAC Network

The Glens Falls Secondary Network serves the area of Glen Street between Mohican and Glen Streets. This network is supplied by 4 – 4.16 kV feeders from the Glens Falls and Henry Street Substations. This system serves approximately 290 customer accounts and experienced an estimated / simulated peak load of approximately 2.1 MVA in 2022.

The table below lists each distribution circuit serving the Glens Falls Secondary Network with the number of events that caused an operation of the Substation Breaker.

Substation	Feeder	# Breaker Operations from Faults / Failures
Glens Falls	07505	1
Glens Falls	07507	0
Henry Street	31638	0
Henry Street	31639	0

As shown above the Glens Falls Secondary Network experienced a total of 1 unplanned distribution circuit outages in 2022.

Annual maintenance consisted of manhole and vault inspections, network protector and transformer inspections, and network protector operation checks.

2. OPERATING CIRCUIT LISTS

This section includes the following three tables and worst performing feeder analysis for the Northeast Region.

- a. Worst Performing Circuit List
- b. Worst Performing Circuits with 3 Year History for CAIDI & SAIFI Indices
- c. Worst Performing Circuits by # of Momentary Interruptions

a. NATIONAL GRID WORST PERFORMING CIRCUIT LIST

NORTHEAST REGION

FEEDER #	A CUST. SERVED	B TOTAL INTER.	C # CUST. INTER.	D CUST. HRS. INTER.	C/A SAIFI	D/A SAIDI	D/C CAIDI	NUMBER OF MOMENTARIES
PORT HENRY 38551	1,802	36	9,387	23,959	5.21	13.30	2.55	0
SCHROON LAKE 42951	2,393	42	9,230	25,219	3.86	10.54	2.73	3
GLOVERSVILLE 07253	1,511	34	5,104	27,804	3.38	18.40	5.45	2
BATTENKILL 34257	1,635	52	5,539	14,105	3.39	8.63	2.55	0
PORT HENRY 38552	1,631	23	8,805	21,858	5.40	13.40	2.48	0
SCOFIELD 45053	1,463	37	3,439	12,935	2.35	8.84	3.76	1
POTTERSVILLE 42451	1,148	23	4,564	10,028	3.98	8.74	2.20	3
HAGUE ROAD 41853	2,222	19	10,940	18,955	4.92	8.53	1.73	1
EAST SPRINGFIELD 47751	1,023	20	2,902	19,396	2.84	18.96	6.68	1
WILTON 32951	1,537	27	6,371	9,214	4.15	5.99	1.45	3
ASHLEY 33151	1,202	43	2,873	9,343	2.39	7.77	3.25	1
BURGOYNE 33751	1,835	57	5,163	9,369	2.81	5.11	1.81	1
BROOK ROAD 36952	1,824	16	8,555	14,346	4.69	7.87	1.68	3
UNION STREET 37653	1,446	21	4,051	9,054	2.80	6.26	2.23	1
GILMANTOWN 15451	2,066	19	4,520	18,158	2.19	8.79	4.02	1
INDIAN LAKE 31076	766	14	2,021	12,884	2.64	16.82	6.37	1
CHESTERTOWN 04251	1,433	39	3,655	6,153	2.55	4.29	1.68	1
SHARON 36351	714	12	2,125	13,741	2.98	19.24	6.47	1
HUDSON FALLS 08851	1,601	17	4,017	9,628	2.51	6.01	2.40	1
WEIBEL AVENUE 41551	1,263	22	1,923	14,537	1.52	11.51	7.56	2

Regional Goals:
CAIDI 2.578
SAIFI 1.372

b. NATIONAL GRID WORST PERFORMING CIRCUITS WITH 3 YEAR HISTORY FOR CAIDI AND SAIFI INDICES

NORTHEAST REGION

FEEDER #	2022 CAIDI	2021 CAIDI	2020 CAIDI	2019 CAIDI	2022 SAIFI	2021 SAIFI	2020 SAIFI	2019 SAIFI
PORT HENRY 38551	2.55	5.03	2.77	2.11	5.21	2.52	0.71	1.16
SCHROON LAKE 42951	2.73	1.82	1.59	0.92	3.86	2.21	3.16	4.04
GLOVERSVILLE 07253	5.45	1.07	0.75	0.64	3.38	2.78	2.77	1.06
BATTENKILL 34257	2.55	2.79	4.09	2.47	3.39	2.53	1.00	1.48
PORT HENRY 38552	2.48	4.93	1.65	5.99	5.40	2.90	0.86	0.11
SCOFIELD 45053	3.76	6.67	2.52	3.23	2.35	0.27	1.46	0.91
POTTERSVILLE 42451	2.20	1.94	1.92	2.85	3.98	5.18	3.83	1.94
HAGUE ROAD 41853	1.73	3.72	2.48	2.96	4.92	4.91	3.62	2.79
EAST SPRINGFIELD 47751	6.68	1.62	2.28	3.74	2.84	3.17	2.62	0.29
WILTON 32951	1.45	1.08	2.23	1.59	4.15	6.48	2.09	2.85
ASHLEY 33151	3.25	3.93	2.10	4.91	2.39	1.84	3.21	1.77
BURGOYNE 33751	1.81	2.73	2.82	5.41	2.81	0.62	1.03	0.57
BROOK ROAD 36952	1.68	1.28	1.96	1.10	4.69	3.44	0.14	1.52
UNION STREET 37653	2.23	3.70	1.75	4.20	2.80	0.47	3.54	0.47
GILMANTOWN 15451	4.02	3.23	3.39	7.13	2.19	0.94	3.00	3.64
INDIAN LAKE 31076	6.37	3.59	2.22	2.30	2.64	3.87	5.28	1.77
CHESTERTOWN 04251	1.68	3.61	3.47	4.40	2.55	0.63	2.13	0.58
SHARON 36351	6.47	5.23	6.16	0.68	2.98	4.11	0.71	1.95
HUDSON FALLS 08851	2.40	2.08	1.45	1.27	2.51	0.06	2.66	0.30
WEIBEL AVENUE 41551	7.56	1.66	1.43	1.06	1.52	0.54	1.18	1.32

Regional Goals:
CAIDI 2.578
SAIFI 1.372

c. NATIONAL GRID WORST PERFORMING CIRCUITS BY # OF MOMENTARY INTERRUPTIONS

NORTHEAST REGION

Feeders			Customer Momentaries				Ranks		
Volts (kV)	Station Name	Ckt/F No.	Substation	Transmission	Distribution	Total	Within Region	Within System	Reliability Ranking
No circuits experienced 10 or more momentary interruptions in 2022.									

a. WORST PERFORMING CIRCUIT ANALYSIS

For 2022, the Company is reporting on the 20 Worst Performing Feeders in the Northeast Region. This year, the Northeast Region's list of Worst Performing Feeders consists of nineteen 13.2 kV feeders and one 4.8 kV feeder.

For the Northeast Region, the CAIDI threshold is 2.578 hours and the SAIFI threshold is 1.372 interruptions.

1. PORT HENRY 38551 – 13.2 kV

Profile: 1,802 Customers, 99.5 Circuit Miles

Indices: CAIDI = 2.55, SAIFI = 5.21

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	13	36.11%	307	3.27%	1,170	4.88%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	2	5.56%	1,812	19.30%	3,789	15.82%
5	EQUIPMENT	8	22.22%	3,617	38.53%	18,161	75.80%
6	ACCIDENTS	5	13.89%	28	0.30%	140	0.59%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	2.78%	5	0.05%	6	0.02%
10	UNKNOWN	7	19.44%	3,618	38.54%	693	2.89%
Totals		36	100.00%	9,387	100.00%	23,959	100.00%

Problem Analysis:

- There were 36 interruptions on the Port Henry 38551 in 2022.
- There were 4 transmission interruptions.
 - The first Transmission interruption occurred on March 29, 2022 when a contractor working on the Ticonderoga-Republic #2, 115 kV transmission line accidentally made contact with the line while the line was under non-reclose assurance (NRA) (PSC cause code 04). The transmission line was not able to be restored via EMS requiring a manual restoration which resulted in an interruption to the entire feeder for 2.1 hours. This lockout accounted for 19% of the total customers interrupted (1,799 of 9,387), and 16% of the total customer-hours interrupted (3,758 of 23,959).
 - The second Transmission interruption occurred on April 07, 2022 due to a broken insulator (PSC cause code 05) which took over seven hours to locate and replace accounting for 19% of the total customers interrupted (1,799 of 9,387), and 54% of the total customer-hours interrupted (12,902 of 23,959).
 - The third Transmission interruption occurred on July 26, 2022 from an unknown cause (PSC cause code 10). This lockout accounted for 19% of the total customers interrupted (1,805 of 9,387), and 1% of the total customer-hours interrupted (341 of 23,959).
 - The fourth Transmission interruption occurred on October 18, 2022 also from an unknown cause (PSC cause code 10). This lockout accounted for 19% of the total customers interrupted (1,799 of 9,387), and 1% of the total customer-hours interrupted (302 of 23,959).
- There was 1 substation interruption which occurred on January 01, 2022 due to a relay failure within the substation (PSC cause code 05). This lockout accounted for 19% of the total customers interrupted (1,793 of 9,387), and 21% of the total customer-hours interrupted (5,086 of 23,959).

- The 4 transmission events when combined with the substation related interruption affected 8,995 customers (96%) and accounted for 22,390 customer-hours of interruption (93%).
- The remaining 31 events occurred at the distribution level, the largest of which only impacted 74 customers (less than 1%) and accounted for 505 customer-hours of interruption (2%).
- When considering distribution interruptions only, the Port Henry 38551 had a SAIFI of 0.22 and a CAIDI of 4.00.
- The distribution circuit breaker for the Port Henry 38551 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Port Henry 38551 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Port Henry 38551 in 2022, accounting for 36% of total interruptions (13 of 36). Equipment Failures were the 2nd leading cause of interruptions, accounting for 22% of total interruptions (8 of 36). Unknown were the 3rd leading cause of interruptions, accounting for 19% of total interruptions (7 of 36).
- Unknown were the leading cause of customers interrupted (CI) on the Port Henry 38551 in 2022, accounting for 39% of total customers interrupted (3,618 of 9,387). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 39% of total customers interrupted (3,617 of 9,387). Operators Errors were the 3rd leading cause of customers interrupted, accounting for 19% of total customers interrupted (1,812 of 9,387).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Port Henry 38551 in 2022, accounting for 76% of total customer-hours interrupted (18,161 of 23,959). Operators Errors were the 2nd leading cause of customer-hours interrupted, accounting for 16% of total customer-hours interrupted (3,789 of 23,959). Trees were the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (1,170 of 23,959).
- Of the 36 interruptions on this circuit, 27 affected 10 customers or less, with 10 being single customer outages.

Actions Taken:

- There are four three-phase reclosers on the Port Henry 38551. Two of the three-phase reclosers were originally installed in 2006, the third three-phase recloser was installed in 2012 as part of the Westport conversion project. The fourth three-phase recloser was installed in 2018 due to a recloser failure and as part of the Wadham's Hydro recloser upgrade project. Two of the three three-phase line reclosers between the Port Henry substation and the Wadham's Hydroelectric plant in Wadhams were replaced in 2021 to better protect the distribution system from faults at the hydroelectric facility and protect against islanding. A new PCC recloser was also be installed at the Wadham's Hydroelectric facility at that time.
- Three TripSaver, cut-out mounted, single-phase reclosers were installed on the Port Henry 38551 in early 2019 and one additional TripSaver was installed in 2022.
- A major project was completed on the Port Henry 38551 in 2012 to rebuild the three-phase backbone within the Town of Westport, to allow the conversion from 4.8 kV to 13.2 kV, and to provide better voltage performance and fuse coordination throughout the feeder, at a total cost in excess of \$1,600,000.
- A capital improvement project was completed in 2014, at a cost of approximately \$239,000, to construct new three-phase distribution along State Highway 9N between poles 148 and 158, to allow the retirement of approximately 2,000 feet of rear lot distribution.
- A capital improvement project was completed in 2017, at a cost of about \$356,250, to

construct new three-phase distribution along State Highway 9N between poles 195 and 205 and single-phase along Napper Road, to allow the retirement of approximately 1,956 feet of three-phase rear lot distribution and another 1,473 feet of rear lot single-phase distribution.

- A capital improvement project was completed in 2021 at a cost of about \$309,000 to construct approximately 2,500 feet of new single-phase 4.8 kV distribution along State Highway 9N, near the intersection of Sam Spear Road, to allow the retirement of a similar amount of rear lot distribution.
- A small capital project was completed in 2022 to construct about 250 feet of new 7.62 kV, single-phase distribution on Whitney Street to transfer 15 customers from the Port Henry 38552 to the Port Henry 38551 allowing the removal of 1,700 feet of heavily wooded rear-lot distribution.
- Tree trimming and a hazard tree review, which removed 732 hazard trees and another 191 Ash trees infested with the Emerald Ash Borer, was completed on the Port Henry 38551 in FY2019.
- A maintenance foot patrol was performed on the Port Henry 38551 in 2022 and all identified level 1 and 2 maintenance has been completed.
- Generators were installed to serve the customers on the Port Henry 38551 in the spring of 2019 to allow for critical repairs to be made to the Ticonderoga-Republic #2 and Ticonderoga-Whitehall #3, 115 kV transmission lines as well as the relocation of multiple Osprey nests.
- A maintenance foot patrol of the Ticonderoga-Whitehall #3, 115 kV transmission line was completed in 2020 and all identified maintenance is scheduled to be completed during an upcoming line rebuild project identified in the Action Plan below.
- A maintenance foot patrol of the Ticonderoga-Republic #2, 115 kV transmission line was completed in 2018 and all identified maintenance has been completed.
- Integrated Vegetation Management was completed on the Ticonderoga-Whitehall #3, 115 kV transmission line in FY2018.
- Integrated Vegetation Management was completed on the Ticonderoga-Republic #2, 115 kV transmission line in FY2020.

Action Plan:

- Complete all identified level 3 maintenance on the Port Henry 38551.
- A hazard tree review is scheduled to be performed on the Port Henry 38551 in FY2024.
- A capital improvement project to rebuild and convert the Hamlet of Port Henry from 4.8 kV to 13.2 kV to relieve the overloaded step-down ratio transformer serving this area is budgeted for FY2025.
- A capital improvement project to rebuild and convert Broad Street in Port Henry from 4.8 kV to 13.2 kV to create a 13.2 kV feeder tie with the Port Henry 38552 feeder is budgeted for FY2026.
- A multi-year capital project is under construction to replace about 200 115 kV transmission structures on the Ticonderoga-Whitehall #3 and Ticonderoga-Republic #2, 115 kV transmission lines as well as reconductor sections of each line to replace conductors which are in poor condition or which have multiple splices due to past conductor failures. The construction should be completed by the end of FY2024.

2. SCHROON LAKE 42951 – 13.2 kV

Profile: 2,393 Customers, 127.0 Circuit Miles

Indices: CAIDI = 2.73, SAIFI = 3.86

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	19	45.24%	3,428	37.14%	20,181	80.02%
3	OVERLOADS	1	2.38%	6	0.07%	37	0.15%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	19.05%	2,768	29.99%	2,990	11.86%
6	ACCIDENTS	4	9.52%	22	0.24%	48	0.19%
7	PREARRANGED	1	2.38%	183	1.98%	68	0.27%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	9	21.43%	2,823	30.59%	1,895	7.51%
Totals		42	100.00%	9,230	100.00%	25,219	100.00%

Problem Analysis:

- There were 42 interruptions on the Schroon Lake 42951 in 2022.
- There were 3 transmission interruptions which combined affected 7,285 customers (79%) and accounted for 20,550 customer-hours of interruption (81%).
 - The first Transmission interruption occurred on May 04, 2022 when an insulator failed on pole 176 of the Chestertown – Schroon #3, 34.5 kV line (PSC cause code 05) causing an interruption for just over one hour until the load could be transferred to the Pottersville 42451 distribution feeder. This lockout accounted for 26% of the total customers interrupted (2,415 of 9,230), and 7% of the total customer-hours interrupted (1,722 of 25,219).
 - The second Transmission interruption occurred on July 21, 2022 when a tree fell during a thunderstorm taking down 6 sections of the Chestertown – Schroon #3, 34.5 kV line (PSC cause code 02) which knocked out both the Schroon Lake 42951 and the Pottersville 42451 feeders requiring 7.27 hours to repair. This lockout accounted for 26% of the total customers interrupted (2,434 of 9,230), and 70% of the total customer-hours interrupted (17,680 of 25,219).
 - The third Transmission interruption occurred on September 18, 2022 from an unknown cause (PSC cause code 10). Due to available sub-transmission and distribution switching, 1,491 of the 2,436 customers served from the Schroon Lake 42951 at the time of the interruption were restored in 15 minutes while the remaining 945 customers were restored in 50 minutes. This lockout accounted for 26% of the total customers interrupted (2,436 of 9,230), but only 5% of the total customer-hours interrupted (1,149 of 25,219).
- There were no substation interruptions.
- The remaining 39 events occurred at the distribution level, but no distribution related interruption affected more than 311 customers (3%) or accounted for more than 1,006

customer-hours of interruption (4%).

- When considering distribution interruptions only, the Schroon Lake 42951 had a SAIFI of 0.81 and a CAIDI of 2.40.
- The distribution circuit breaker for the Schroon Lake 42951 experienced 3 momentary operations in 2022.
- The distribution circuit breaker for the Schroon Lake 42951 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Schroon Lake 42951 in 2022, accounting for 45% of total interruptions (19 of 42). Unknown were the 2nd leading cause of interruptions, accounting for 21% of total interruptions (9 of 42). Equipment Failures were the 3rd leading cause of interruptions, accounting for 19% of total interruptions (8 of 42).
- Trees were the leading cause of customers interrupted (CI) on the Schroon Lake 42951 in 2022, accounting for 37% of total customers interrupted (3,428 of 9,230). Unknown were the 2nd leading cause of customers interrupted, accounting for 31% of total customers interrupted (2,823 of 9,230). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 30% of total customers interrupted (2,768 of 9,230) here
- Trees were the leading cause of customer-hours interrupted (CHI) on the Schroon Lake 42951 in 2022, accounting for 80% of total customer-hours interrupted (20,181 of 25,219). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 12% of total customer-hours interrupted (2,990 of 25,219). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 8% of total customer-hours interrupted (1,895 of 25,219).
- Of the 42 interruptions on this circuit, 21 affected 10 customers or less, with 2 being single customer outages.

Actions Taken:

- There are four three-phase distribution reclosers, three single-phase reclosers, and nine single-phase TripSaver reclosers on the Schroon Lake 42951. Two of the three-phase reclosers are part of the Pottersville 51/Schroon Lake 51 loop scheme that was installed in 2010 which automatically restores service to 1,017 of the 2,393 customers on the Schroon Lake 42951 (42%) in the event of a transmission or substation outage. In addition, the loop scheme reclosers allow the remote transfer of additional load during an interruption depending upon the loading of the Pottersville and Schroon Lake feeders at the time of the interruption. These reclosers have proven to be beneficial to the reliability of the feeder since during two of the transmission interruptions which occurred in 2022 customers were able to be restored much more quickly than they would have without the loop scheme.
- A capital project was completed in 2014 at a cost in excess of \$423,000 to rebuild approximately one mile of Blue Ridge Road along the road, allowing the retirement of approximately one mile of heavily wooded rear lot distribution.
- A capital project was completed in 2018 to replace the submarine cable serving Clark's Island and the 17 additional customers on the east shore of Schroon Lake only accessible by water at a cost of \$305,193.
- A Minor Storm Hardening project was completed on the Schroon Lake 42951 in 2019 rebuilding approximately 2 miles of rear lot 4.8 kV single-phase distribution near Hoffman Road with new 7.62 kV single-phase distribution along the road at a cost of \$523,458.
- A Minor Storm Hardening project was completed on the Schroon Lake 42951 in early 2021, rebuilding approximately 1/2 mile of rear lot 4.8 kV, three-phase distribution adjacent to Blue Ridge Road with new 13.2 kV, three-phase distribution directly adjacent

to the road.

- The distribution across Interstate 87 between Woodbury Road and Miller Road was replaced in 2021 at a cost of just over \$80,000.
- The bi-directional voltage regulator on pole 206 on U.S. Highway 9 which is an integral part of the Potterville 51/Schroon Lake 51 loop scheme was replaced in 2021.
- A maintenance foot patrol was performed on the Schroon Lake 42951 in 2019 and all maintenance has been completed.
- Tree trimming and a hazard tree review was completed on the Schroon Lake 42951 in FY2022.

Action Plan:

- Complete all identified level 3 maintenance on the Schroon Lake 42951
- A hazard tree review out to the first protective device is scheduled to be performed on the Schroon Lake 42951 in FY2024.
- A project to add external, expulsion fuses to 93 completely self-protected (CSP) transformers on the three-phase mainline will be built in 2023.
- A voltage improvement project will be constructed in 2023 on the Schroon Lake 42951 to add capacitors in various locations throughout the feeder and better balance the load on the feeder to provide more consistent voltage across the feeder.
- A project will be constructed in 2023 to increase the size of existing voltage regulators and add additional voltage regulators on U.S. Highway 9 to increase the capacity of the feeder in North Hudson.
- Install fault indicators at each road crossing of the Chestertown-Schroon #3, 34.5 kV sub-transmission line to allow for the faster location of faults on this line.

3. GLOVERSVILLE 07253 – 13.2 kV

Profile: 1,511 Customers, 78.9 Circuit Miles

Indices: CAIDI = 5.45, SAIFI = 3.38

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	9	26.47%	298	5.84%	1,194	4.29%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	10	29.41%	4,318	84.60%	26,104	93.89%
6	ACCIDENTS	5	14.71%	287	5.62%	178	0.64%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	2.94%	2	0.04%	6	0.02%
10	UNKNOWN	9	26.47%	199	3.90%	321	1.16%
Totals		34	100.00%	5,104	100.00%	27,804	100.00%

Problem Analysis:

- There were 34 interruptions on the Gloversville 07253 in 2022.
- There was 1 transmission interruption which occurred on August 01, 2022 when the mobile substation which was installed in the Gloversville substation due to an equipment failure within the substation four days prior time tripped off-line (PSC cause code 05). This lockout accounted for 23% of the total customers interrupted (1,156 of 5,104), and 17% of the total customer-hours interrupted (4,820 of 27,804).
- There was 1 substation interruption which occurred on July 27, 2022 when an insulator broke on switch #8911 (PSC cause code 05) requiring the installation of a mobile substation causing an interruption in excess of 13 hours which accounted for 30% of the total customers interrupted (1,513 of 5,104), and 71% of the total customer-hours interrupted (19,871 of 27,804).
- The remaining 32 events occurred at the distribution level.
- When considering distribution interruptions only, the Gloversville 07253 had a SAIFI of 1.61 and a CAIDI of 1.28.
- The distribution circuit breaker for the Gloversville 07253 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Gloversville 07253 experienced 1 sustained operation (lockout) in 2022 when on February 3rd, 2022 the station breaker was opened to repair a broken insulator on pole 58 State Highway 309 (PSC cause code 05). This interruption accounted for 30% of the total amount of customers interrupted (1,511 out of 5,104) and 3% of the total amount of the customer-hours interrupted (947 out of 27,804).
- The transmission event when combined with the substation related interruption and the single distribution feeder lockout accounted for only three of the interruptions on the Gloversville 07253 in 2022 (9%) but affected 4,535 customers (89%) and accounted for

25,638 customer-hours of interruption (92%).

- Equipment Failures were the leading cause of interruptions on the Gloversville 07253 in 2022, accounting for 29% of total interruptions (10 of 34). Trees were the 2nd leading cause of interruptions, accounting for 26% of total interruptions (9 of 34). Unknown were the 3rd leading cause of interruptions, accounting for 26% of total interruptions (9 of 34).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Gloversville 07253 in 2022, accounting for 85% of total customers interrupted (4,318 of 5,104). Trees were the 2nd leading cause of customers interrupted, accounting for 6% of total customers interrupted (298 of 5,104). Accidents were the 3rd leading cause of customers interrupted, accounting for 6% of total customers interrupted (287 of 5,104).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Gloversville 07253 in 2022, accounting for 94% of total customer-hours interrupted (26,104 of 27,804). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 4% of total customer-hours interrupted (1,194 of 27,804). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 1% of total customer-hours interrupted (321 of 27,804).
- Of the 34 interruptions on this circuit, 17 affected 10 customers or less, with 6 being single customer outages.

Action Taken:

- There are four three-phase reclosers and three single-phase, cutout mounted, TripSaver reclosers on the Gloversville 07253. One of the three-phase reclosers was originally installed in 1998 and replaced in 2015, while two other three-phase reclosers were installed in 2009. One of the reclosers installed in 2009 was replaced in 2020 when the fourth recloser was installed as part of a project to connect a large DG project on the feeder.
- A project was completed in 2022 to install animal fencing within the Gloversville substation.
- A maintenance foot patrol was performed on the Gloversville 07253 in 2020 and all maintenance has been completed.
- The Gloversville 07253 was tree trimmed in its entirety in 2022.

Action Plan:

- A capital improvement project is budgeted for FY2025 to construct a feeder tie between the Stoner 35851 and the Gloversville 07253 by rebuilding about one mile of distribution on Maple and North Perry Streets as appropriate to convert to 13.2 kV operation.

4. BATTENKILL 34257 – 13.2 kV

Profile: 1,635 Customers, 109.0 Circuit Miles

Indices: CAIDI = 2.55, SAIFI = 3.39.

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	23	44.23%	3,257	58.80%	11,465	81.29%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	15.38%	17	0.31%	75	0.53%
6	ACCIDENTS	9	17.31%	2,125	38.36%	2,249	15.94%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	12	23.08%	140	2.53%	316	2.24%
Totals		52	100.00%	5,539	100.00%	14,105	100.00%

Problem Analysis:

- There were 52 interruptions on the Battenkill 34257 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 52 events occurred at the distribution level.
- The distribution circuit breaker for the Battenkill 34257 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Battenkill 34257 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 29% of the total amount of customers interrupted (1,623 out of 5,539) and 11% of the total amount of the customer-hours interrupted (1,555 out of 14,105).
 - This lockout occurred on January 10, 2022, when a vehicle (PSC cause code 06) broke pole 6 on State Highway 29. This lockout accounted for 29% of the total customers interrupted (1,623 of 5,539) and 11% of the total customer-hours interrupted (1,555 of 14,105).
- The Battenkill 34257 experienced 2 sustained three-phase recloser operations in 2022. These interruptions accounted for 24% of the total amount of customers interrupted (1,324 of 5,539) and 39% of the total amount of the customer-hours interrupted (5,496 of 14,105).
 - The first lockout occurred on July 12, 2022, when a tree (PSC cause code 02) took down primary near pole 187 on Edie Road. This lockout accounted for 20% of the total customers interrupted (1,094 of 5,539) and 37% of the total customer-hours interrupted (5,274 of 14,105).
 - The second lockout occurred on December 21, 2022, when a vehicle (PSC cause code 06) broke pole 22 on Fiddlers Elbow Road. This lockout accounted for 4% of the total customers interrupted (230 of 5,539) and 2% of the total customer-hours interrupted (223 of 14,105).

- The single circuit breaker lockout, combined with the 2 three-phase recloser lockouts, accounted for 53% of the total customers interrupted (2,947 of 5,539) and 50% of the total customer-hours interrupted (7,051 of 14,105).
- Trees were the leading cause of interruptions on the Battenkill 34257 in 2022, accounting for 44% of total interruptions (23 of 52). Unknown were the 2nd leading cause of interruptions, accounting for 23% of total interruptions (12 of 52). Accidents were the 3rd leading cause of interruptions, accounting for 17% of total interruptions (9 of 52).
- Trees were the leading cause of customers interrupted (CI) on the Battenkill 34257 in 2022, accounting for 59% of total customers interrupted (3,257 of 5,539). Accidents were the 2nd leading cause of customers interrupted, accounting for 38% of total customers interrupted (2,125 of 5,539). Unknown were the 3rd leading cause of customers interrupted, accounting for 3% of total customers interrupted (140 of 5,539).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Battenkill 34257 in 2022, accounting for 81% of total customer-hours interrupted (11,465 of 14,105). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 16% of total customer-hours interrupted (2,249 of 14,105). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 2% of total customer-hours interrupted (316 of 14,105).
- Of the 52 interruptions on this circuit, 31 affected 10 customers or less, with 11 being single customer outages.

Actions Taken:

- There are 4 three-phase reclosers on the Battenkill 34257. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Battenkill 34257 in 2018 and all identified level 1, 2, and 3 maintenances have been completed.
- Tree trimming and a hazard tree review was completed on the Battenkill 34257 in 2020.
- A capital improvement project was completed to improve fuse coordination on the entirety of the Battenkill 34257 which will assist in decreasing customer counts in the event of a sustained outage.
- A capital improvement project was completed to relieve a step-down ratio transformer on County Route 49 that was at risk of failing due to overload.
- A capital improvement project was completed to relocate over 0.25 miles of rear lot distribution to the road on County Highway 52, thereby decreasing the potential for tree-related, sustained outages as well as significantly decreasing outage times due to easier access by crews.
- A capital improvement project was completed in 2019 to construct 1,300 feet of new single-phase 7.62 kV distribution on North Road and Prospect Street and install a new step-down ratio transformer on North Road to allow the former Richards Road tap to be split in two, thereby reducing the load on the overloaded Richards Road step-down ratio transformer.
- A capital improvement project was completed in 2021 to rebuild and convert approximately 1.7 miles of distribution on North Road from three-phase, 4.8 kV to three-phase, 13.2 kV to address the overloaded North Road step-down ratio transformer.
- A capital improvement project was completed in 2021 to remove approximately 0.75 miles of heavily-treed, rear lot distribution between Coon Road and Sullivan Road.
- A capital improvement project was completed in 2019 to install a cutout-mounted recloser on Derby Road which will prevent sustained outages that, otherwise, would have been

momentary in nature.

- A capital improvement project was completed in 2020 to install a cutout-mounted recloser on State Highway 40 which will prevent sustained outages that, otherwise, would have been momentary in nature

Action Plan:

- Tree trimming and a hazard tree review are scheduled to be performed on the Battenkill 34257 in 2026.
- A capital improvement project is scheduled to relocate a portion of heavily-treed, rear lot distribution to the road on Irwin Road.
- A storm-hardening, capital improvement project is scheduled to build about 4,200 feet of new single-phase distribution on County Highway 52, McClay Road, and Hathorn Road to allow the removal of numerous sections of cross lot distribution while converting the area from 5 kV delta to 15 kV.
- A capital improvement project is scheduled to install one or more cutout-mounted reclosers on the Battenkill 34257 which will prevent sustained outages that, otherwise, would have been momentary in nature
- A capital improvement project is scheduled to install one or more switches on the Battenkill 34257 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.

5. PORT HENRY 38552 – 13.2 kV

Profile: 1,631 Customers, 70.6 Circuit Miles

Indices: CAIDI = 2.48, SAIFI = 5.40

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	5	21.74%	275	3.12%	557	2.55%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	4.35%	1,637	18.59%	3,474	15.89%
5	EQUIPMENT	4	17.39%	3,330	37.82%	16,629	76.08%
6	ACCIDENTS	4	17.39%	56	0.64%	112	0.51%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	9	39.13%	3,507	39.83%	1,087	4.97%
Totals		23	100.00%	8,805	100.00%	21,858	100.00%

Problem Analysis:

- There were 23 interruptions on the Port Henry 38552 in 2022.
- There were 4 transmission interruptions.
 - The first Transmission interruption occurred on March 29, 2022 when a contractor working on the Ticonderoga-Republic #2, 115 kV transmission line accidentally made contact with the line while the line was under non-reclose assurance (NRA) (PSC cause code 04). The transmission line was not able to be restored via EMS requiring a manual restoration which resulted in an interruption to the entire feeder for 2.1 hours. This lockout accounted for 19% of the total customers interrupted (1,637 of 8,805), and 16% of the total customer-hours interrupted (3,474 of 21,858).
 - The second Transmission interruption occurred on April 07, 2022 due to a broken insulator (PSC cause code 05) which took over seven hours to locate and replace accounting for 19% of the total customers interrupted (1,639 of 8,805), and 54% of the total customer-hours interrupted (11,754 of 21,858).
 - The third Transmission interruption occurred on July 26, 2022 from an unknown cause (PSC cause code 10). This lockout accounted for 19% of the total customers interrupted (1,634 of 8,805), and 1% of the total customer-hours interrupted (309 of 21,858).
 - The fourth Transmission interruption occurred on October 18, 2022 also from an unknown cause (PSC cause code 10). This lockout accounted for 19% of the total customers interrupted (1,630 of 8,805), and 1% of the total customer-hours interrupted (274 of 21,858).
- There was 1 substation interruption which occurred on January 1, 2022 due to a relay failure within the substation (PSC cause code 05). This lockout accounted for 19% of the total customers interrupted (1,635 of 8,805), and 21% of the total customer-hours interrupted (4,638 of 21,858).

- The 4 transmission events when combined with the substation related interruption affected 8,175 customers (93%) and accounted for 20,449 customer-hours of interruption (94%).
- The remaining 18 events occurred at the distribution level, the largest of which only impacted 138 customers (2%) and accounted for 344 customer-hours of interruption (2%).
- When considering distribution interruptions only, the Port Henry 38552 had a SAIFI of 0.39 and a CAIDI of 2.24.
- The distribution circuit breaker for the Port Henry 38552 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Port Henry 38552 experienced 0 sustained operations (lockouts) in 2022.
- Unknown were the leading cause of interruptions on the Port Henry 38552 in 2022, accounting for 39% of total interruptions (9 of 23). Trees were the 2nd leading cause of interruptions, accounting for 22% of total interruptions (5 of 23). Equipment Failures were the 3rd leading cause of interruptions, accounting for 17% of total interruptions (4 of 23).
- Unknown were the leading cause of customers interrupted (CI) on the Port Henry 38552 in 2022, accounting for 40% of total customers interrupted (3,507 of 8,805). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 38% of total customers interrupted (3,330 of 8,805). Operators Errors were the 3rd leading cause of customers interrupted, accounting for 19% of total customers interrupted (1,637 of 8,805).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Port Henry 38552 in 2022, accounting for 76% of total customer-hours interrupted (16,629 of 21,858). Operators Errors were the 2nd leading cause of customer-hours interrupted, accounting for 16% of total customer-hours interrupted (3,474 of 21,858). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (1,087 of 21,858).
- Of the 23 interruptions on this circuit, 7 affected 10 customers or less, with one being single customer outages.

Actions Taken:

- There are four three-phase reclosers and one single-phase recloser on the Port Henry 38552. All four three-phase reclosers were installed in 2007 while the single-phase recloser was installed in 2006.
- Three TripSaver, cut-out mounted, single-phase reclosers were installed on the Port Henry 38552 in 2019 and 2020 and another two TripSavers were installed on Witherbee Road in 2022.
- A capital improvement project was completed in 2018 at a cost of \$621,556 to rebuild and convert Moriah and Edgemont Roads from 4.8 kV to 7.62 kV.
- A three-phase tap into a former stone quarry off Switchback Road was removed in 2018 at a cost of \$12,554.
- A capital improvement project was completed in 2021 to rebuild and convert Dalton Hill Road from 4.8 kV to 7.62 kV to allow better coordination between protective devices.
- A maintenance foot patrol was performed on the Port Henry 38552 in 2021 and all identified level 1 and 2 maintenance has been completed.
- Tree trimming and a hazard tree review was completed on the Port Henry 38552 in 2022.
- Generators were installed to serve the customers on the Port Henry 38552 in the spring of 2019 to allow for critical repairs to be made to the Ticonderoga-Republic #2 and Ticonderoga-Whitehall #3, 115 kV transmission lines as well as the relocation of multiple Osprey nests.
- A maintenance foot patrol of the Ticonderoga-Whitehall #3, 115 kV transmission line was

completed in 2020 and all identified maintenance is scheduled to be completed during an upcoming line rebuild project identified in the Action Plan below.

- A maintenance foot patrol of the Ticonderoga-Republic #2, 115 kV transmission line was completed in 2018 and all identified maintenance has been completed.
- Integrated Vegetation Management was completed on the Ticonderoga-Whitehall #3, 115 kV transmission line in FY2018.
- Integrated Vegetation Management was completed on the Ticonderoga-Republic #2, 115 kV transmission line in FY2020.

Action Plan:

- Complete all identified level 3 maintenance on the Port Henry 38552.
- A small capital improvement project is under construction to rebuild and convert a section of the Federal Street tap to 7.62 kV to reduce the load on the Federal Street step-down ratio transformer which is loaded to an estimated 116% of nameplate.
- A capital improvement project is budgeted for FY2024 to rebuild and convert Moriah, Harry Allen, and Breed Hill Roads from 4.8 kV to 7.62 kV to reduce the load on the Moriah Road step-down ratio transformer which is loaded to an estimated 151% of nameplate.
- A multi-year capital project is under construction to replace about 200 115 kV transmission structures on the Ticonderoga-Whitehall #3 and Ticonderoga-Republic #2, 115 kV transmission lines as well as reconductor sections of each line to replace conductors which are in poor condition or which have multiple splices due to past conductor failures. The construction should be completed by the end of FY2024.

6. SCOFIELD 45053 – 13.2 kV

Profile: 1,463 Customers, 89.1 Circuit Miles

Indices: CAIDI = 3.76, SAIFI = 2.35

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	29	78.38%	2,772	80.60%	12,177	94.14%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	3	8.11%	40	1.16%	78	0.61%
6	ACCIDENTS	3	8.11%	613	17.82%	617	4.77%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	2	5.41%	14	0.41%	63	0.48%
Totals		37	100.00%	3,439	100.00%	12,935	100.00%

Problem Analysis:

- There were 37 interruptions on the Scofield 45053 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 37 events occurred at the distribution level.
- The distribution circuit breaker for the Scofield 45053 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Scofield 45053 experienced 0 sustained operations (lockouts) in 2022.
- There were three three-phase distribution recloser lockouts on the Scofield 45053 in 2022 all three of which were caused by trees and locked out recloser R88932 on pole 31 Stony Creek Road. These interruptions accounted for 2,160 customers interrupted (63%) and 10,687 customer-hours of interruption (83%).
 - The first three-phase distribution recloser lockout occurred on June 18, 2022 when recloser R88932 on pole 31 Stony Creek Road locked out due to a tree limb in an undisclosed location. This event accounted for 21% of the total customers interrupted (715 of 3,439), and 5% of the total customer-hours interrupted (657 of 12,935).
 - The second three-phase distribution recloser lockout occurred on June 23, 2022 when recloser R88932 on pole 31 Stony Creek Road locked out due to a tree on the primary at pole 125 Stony Creek Road. This event accounted for 21% of the total customers interrupted (715 of 3,439), and 8% of the total customer-hours interrupted (983 of 12,935).
 - The third three-phase distribution recloser lockout occurred on December 1, 2022 when recloser R88932 on pole 31 Stony Creek Road locked out due to heavy snow bringing down a tree which broke pole 107 on Stony Creek Road. The broken pole required over 14 hours to replace, however, 105 of the 720 customers impacted by

this event were restored in about 3 hours as a result of switching. In total, this event accounted for 21% of the total customers interrupted (720 of 3,439), and 70% of the total customer-hours interrupted (9,047 of 12,935).

- Trees were the leading cause of interruptions on the Scofield 45053 in 2022, accounting for 78% of total interruptions (29 of 37). Equipment Failures were the 2nd leading cause of interruptions, accounting for 8% of total interruptions (3 of 37). Accidents were the 3rd leading cause of interruptions, accounting for 8% of total interruptions (3 of 37).
- Trees were the leading cause of customers interrupted (CI) on the Scofield 45053 in 2022, accounting for 81% of total customers interrupted (2,772 of 3,439). Accidents were the 2nd leading cause of customers interrupted, accounting for 18% of total customers interrupted (613 of 3,439). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 1% of total customers interrupted (40 of 3,439).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Scofield 45053 in 2022, accounting for 94% of total customer-hours interrupted (12,177 of 12,935). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (617 of 12,935). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 1% of total customer-hours interrupted (78 of 12,935).
- Of the 37 interruptions on this circuit, 21 affected 10 customers or less, with 7 being single customer outages.

Actions Taken:

- There are three three-phase reclosers on the Scofield 45053. Two of the 3 phase reclosers were originally installed in 1997. The third 3 phase recloser is an open tie recloser which is part of the Corinth 51/Scofield 53 loop scheme that was installed in 2011.
- Ten TripSaver, cut-out mounted, single-phase reclosers were installed on the Scofield 45053 in 2020 and 2021.
- Tree trimming and a hazard tree review were completed on the Scofield 45053 in FY2019.
- A maintenance foot patrol was performed on the Scofield 45053 in 2019 and all identified maintenance has been completed.
- A capital improvement project to rebuild and convert Hadley and Harrisburg Lake Roads to 7.62/13.2 kV was completed in 2010 at a total cost of over \$1,400,000.
- A capital improvement project to construct a three-phase feeder tie between the Scofield 45053 and the Corinth 28551 was completed in early 2011 at a cost in excess of \$1,100,000. This project included the upgrade of one of the existing reclosers on the Scofield Road 45053 and the installation of an open tie recloser to allow this feeder tie to be automated.
- A project to better balance the loads on the Stony Creek and Hadley Road section of the Scofield 53 and to address elevated voltage and interference on the telephone system was completed in 2019 at a cost of \$160,282.

Action Plan:

- A hazard tree review is scheduled to be performed on the Scofield 53 in FY2024.
- Rebuild Harrisburg Road at Glass Creek Road to remove rear lot distribution through wetlands.
- A Minor Storm Hardening project which will rebuild approximately 5,500 feet of rear lot 4.8 kV single-phase distribution near Harrisburg Road with new 7.62 kV single-phase distribution along the road has been designed and will be constructed as soon as all necessary easements can be obtained.

7. POTTERSVILLE 42451 – 13.2 kV

Profile: 1,148 Customers, 44.5 Circuit Miles
 Indices: CAIDI = 2.20, SAIFI = 3.98

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	12	52.17%	2,188	47.94%	7,283	72.63%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	34.78%	65	1.42%	549	5.47%
6	ACCIDENTS	1	4.35%	1,151	25.22%	1,905	19.00%
7	PREARRANGED	1	4.35%	8	0.18%	4	0.04%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	1	4.35%	1,152	25.24%	288	2.87%
Totals		23	100.00%	4,564	100.00%	10,028	100.00%

Problem Analysis:

- There were 23 interruptions on the Pottersville 42451 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on July 21, 2022 when a tree fell during a thunderstorm taking down 6 sections of the Chestertown – Schroon #3, 34.5 kV line (PSC cause code 02) requiring 7.27 hours to repair. This lockout accounted for 26% of the total customers interrupted (1,154 of 4,564), and 42% of the total customer-hours interrupted (4,220 of 10,028).
 - The second Transmission interruption occurred on September 18, 2022 from an unknown cause (PSC cause code 10). This lockout accounted for 26% of the total customers interrupted (1,152 of 4,564), however, service was restored via switching in 15 minutes, therefore, accounting for only 3% of the total customer-hours interrupted (288 of 4,564).
- There was one substation interruption which occurred on June 17, 2022 when a squirrel got on the 13.2 kV bus in the substation blowing the high side transformer fuse (PSC cause code 06). This lockout accounted for 22% of the total customers interrupted (1,002 of 4,564), and 19% of the total customer-hours interrupted (1,905 of 10,028).
- The 2 transmission events when combined with the substation related interruption affected 3,308 customers (72%) and accounted for 6,413 customer-hours of interruption (64%).
- The remaining 20 events occurred at the distribution level with the largest distribution interruption affecting 194 customers (4%) and accounting for 1,239 customer-hours of interruption (27%).
- When considering distribution interruptions only, the Pottersville 42451 had a SAIFI of 0.96 and a CAIDI of 3.27.
- The distribution circuit breaker for the Pottersville 42451 experienced 3 momentary operations in 2022.

- The distribution circuit breaker for the Pottersville 42451 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Pottersville 42451 in 2022, accounting for 52% of total interruptions (12 of 23). Equipment Failures were the 2nd leading cause of interruptions, accounting for 35% of total interruptions (8 of 23). Accidents were the 3rd leading cause of interruptions, accounting for 4% of total interruptions (1 of 23).
- Trees were the leading cause of customers interrupted (CI) on the Pottersville 42451 in 2022, accounting for 48% of total customers interrupted (2,188 of 4,564). Unknown were the 2nd leading cause of customers interrupted, accounting for 25% of total customers interrupted (1,152 of 4,564). Accidents were the 3rd leading cause of customers interrupted, accounting for 25% of total customers interrupted (1,151 of 4,564).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Pottersville 42451 in 2022, accounting for 73% of total customer-hours interrupted (7,283 of 10,028). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 19% of total customer-hours interrupted (1,905 of 10,028). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (549 of 10,028).
- Of the 23 interruptions on this circuit, 8 affected 10 customers or less, with 3 being single customer outages.

Actions Taken:

- There are five three-phase reclosers on the Pottersville 42451. Two were originally installed in the mid-1990's and upgraded to loop scheme reclosers in 2010. One of the reclosers was installed in early 2011. The fourth and fifth three-phase reclosers are both open tie reclosers discussed below.
- The Pottersville 42451 has a three-phase feeder tie with the Schroon Lake 42951 which has been automated with loop scheme reclosers to automatically restore service to approximately 162 of the 1,148 customers (14%) in the event of a future interruption at or near the substation.
- The Pottersville 42451 also has three-phase feeder tie with the Chestertown 04252 which has been automated with loop scheme reclosers to automatically restore service to approximately 791 of the 1,148 customers (69%) in the event of a future interruption at or near the substation.
- A maintenance foot patrol was performed on the Pottersville 42451 in 2021 and all identified level 1 and 2 maintenance has been completed.
- Tree trimming and a hazard tree review, which removed 504 hazard trees and another 85 Ash trees infested with the Emerald Ash Borer, was completed on the Pottersville 42451 in FY2020.

Action Plan:

- Complete all identified level 3 maintenance on the Pottersville 42451.
- A hazard tree review is scheduled to be performed on the Pottersville 42451 in FY2025.
- A small capital improvement project has been designed to create a single-phase feeder tie between the Pottersville 42451 and the Riparius 29395, along U.S. Highway 9. Construction will begin after all necessary easements have been obtained.
- A project to replace a section of underground cable on Old Mill Lane which has experienced multiple failures will be completed in the spring of 2023.

8. HAGUE ROAD 41853 – 13.2 kV

Profile: 2,222 Customers, 71.8 Circuit Miles
 Indices: CAIDI = 1.73, SAIFI = 4.92

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	12	63.16%	6,110	55.85%	10,904	57.53%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	3	15.79%	2,562	23.42%	7,576	39.97%
6	ACCIDENTS	1	5.26%	1	0.01%	3	0.02%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	5.26%	9	0.08%	49	0.26%
10	UNKNOWN	2	10.53%	2,258	20.64%	422	2.23%
Totals		19	100.00%	10,940	100.00%	18,955	100.00%

Problem Analysis:

- There were 19 interruptions on the Hague Road 41853 in 2022.
- There was 1 transmission interruption which occurred on October 18, 2022 from an unknown cause (PSC cause code 10). This lockout accounted for 20% of the total customers interrupted (2,239 of 10,940), and 2% of the total customer-hours interrupted (376 of 18,955).
- There were no substation interruptions.
- The remaining 18 events occurred at the distribution level.
- The distribution circuit breaker for the Hague Road 41853 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Hague Road 41853 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 40% of the total amount of customers interrupted (4,420 out of 10,940) and 72% of the total amount of the customer-hours interrupted (13,657 out of 18,955).
 - The first lockout occurred on March 23, 2022 when a tree fell breaking three poles near pole 228 on State Highway 9N (PSC cause code 02). This lockout accounted for 20% of the total customers interrupted (2,208 of 10,940), and 36% of the total customer-hours interrupted (6,871 of 18,955).
 - The second lockout occurred on April 14, 2022 when pole 193 on State Highway 9N broke (PSC cause code 05) accounting for 20% of the total customers interrupted (2,212 of 10,940), and 36% of the total customer-hours interrupted (6,786 of 18,955).
- There were three three-phase distribution recloser lockouts on the Hague Road 41853 in 2022 all three of which were caused by trees. These interruptions accounted for 2,607 customers interrupted (24%) and 3,178 customer-hours of interruption (17%).
 - The first three-phase distribution recloser lockout occurred on March 21, 2022 when recloser R7534 on pole 170 State Highway 9N locked out due to a tree limb between

- poles 140 and 141 on State Highway 9N. This event accounted for 11% of the total customers interrupted (1,233 of 10,940), and 8% of the total customer-hours interrupted (1,478 of 18,955).
 - The second three-phase distribution recloser lockout occurred on July 19, 2022 when recloser R8670 on pole 33 State Highway 9N locked out due to a tree limb on the primary at pole 531 State Highway 9N. This event accounted for 9% of the total customers interrupted (1,024 of 10,940), and 5% of the total customer-hours interrupted (986 of 18,955).
 - The third three-phase distribution recloser lockout occurred on October 2, 2022 when recloser R7542 on pole 519 State Highway 9N locked out due to a tree limb on the primary at pole 414 State Highway 9N. This event accounted for 3% of the total customers interrupted (350 of 10,940), and 4% of the total customer-hours interrupted (715 of 18,955).
- The transmission event when combined with the single distribution feeder lockout and the three three-phase line recloser lockouts accounted for only five of the interruptions on the Hague Road 41853 in 2022 (26%) but affected 9,266 customers (85%) and accounted for 17,211 customer-hours of interruption (91%).
- Trees were the leading cause of interruptions on the Hague Road 41853 in 2022, accounting for 63% of total interruptions (12 of 19). Equipment Failures were the 2nd leading cause of interruptions, accounting for 16% of total interruptions (3 of 19). Unknown were the 3rd leading cause of interruptions, accounting for 11% of total interruptions (2 of 19).
- Trees were the leading cause of customers interrupted (CI) on the Hague Road 41853 in 2022, accounting for 56% of total customers interrupted (6,110 of 10,940). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 23% of total customers interrupted (2,562 of 10,940). Unknown were the 3rd leading cause of customers interrupted, accounting for 21% of total customers interrupted (2,258 of 10,940).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Hague Road 41853 in 2022, accounting for 58% of total customer-hours interrupted (10,904 of 18,955). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 40% of total customer-hours interrupted (7,576 of 18,955). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 2% of total customer-hours interrupted (422 of 18,955).
- Of the 19 interruptions on this circuit, 8 affected 10 customers or less, with 4 being single customer outages.

Actions Taken:

- There are five three-phase distribution reclosers and one single-phase recloser on the Hague Road 41853. These reclosers have proven to be beneficial to the reliability of the feeder since three of the mainline interruptions in 2022 were isolated by a three-phase recloser instead of affecting the entire feeder.
- Reclosers R7534 on pole 170 State Highway 9N and R8670 on pole 33 State Highway 9N which were originally install in the late 1990's were replaced in 2021 with new state of the art three-phase line reclosers with communications and remote operating capabilities.
- A Minor Storm Hardening project was completed in 2014, at a cost of \$959,928, to rebuild and convert about 7,000 feet of Baldwin Road to 13.2 kV and install a new three-phase recloser to protect the tap.
- A small capital improvement project to convert Lord Howe Street to 7.62 kV was completed in 2018 at a cost of \$48,087.
- A small fusing project to better fuse the Black Point Road tap was completed in 2018 at a

cost of \$29,318.

- A small capital improvement project was completed in 2019 to reconfigure the tap on Silver Bay Road to reduce exposure for customers in Silver Bay to tree related interruptions.
- A maintenance foot patrol of the Hague Road 41853 was completed in 2018 and all maintenance has been completed.
- Tree trimming and a hazard tree review, which removed 564 hazard trees and another 395 Ash trees infested with the Emerald Ash Borer, was completed on the Hague Road 41853 in FY2019. A further hazard tree review of State Highway 9N was performed in 2021.
- Generators were installed to serve the customers on the Hague Road 41853 in the spring of 2019 to allow for critical repairs to be made to the Ticonderoga-Republic #2 and Ticonderoga-Whitehall #3, 115 kV transmission lines as well as the relocation of multiple Osprey nests.
- A maintenance foot patrol of the Ticonderoga-Whitehall #3, 115 kV transmission line was completed in 2020 and all identified maintenance is scheduled to be completed during an upcoming line rebuild project identified in the Action Plan below.
- A maintenance foot patrol of the Ticonderoga-Republic #2, 115 kV transmission line was completed in 2018 and all identified maintenance has been completed.
- Integrated Vegetation Management was completed on the Ticonderoga-Whitehall #3, 115 kV transmission line in FY2018.
- Integrated Vegetation Management was completed on the Ticonderoga-Republic #2, 115 kV transmission line in FY2020.

Action Plan:

- Complete all identified level 3 maintenance on the Hague Road 41853.
- A maintenance foot patrol of the Hague Road 41853 is scheduled for 2023.
- A hazard tree review is scheduled to be performed on the Hague Road 53 in 2023.
- A capital improvement project to rebuild and convert Alexandria Avenue and a portion of the former Village of Ticonderoga from 4.8 kV to 13.2 kV is budgeted for FY2026.
- A multi-year capital project is under construction to replace about 200 115 kV transmission structures on the Ticonderoga-Whitehall #3 and Ticonderoga-Republic #2, 115 kV transmission lines as well as reconductor sections of each line to replace conductors which are in poor condition or which have multiple splices due to past conductor failures. The construction should be completed by the end of FY2024.

9. EAST SPRINGFIELD 47751 – 13.2 kV

Profile: 1,023 Customers, 93.5 Circuit Miles
 Indices: CAIDI = 6.68, SAIFI = 2.84

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	6	30.00%	1,266	43.63%	16,330	84.19%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	5.00%	97	3.34%	29	0.15%
5	EQUIPMENT	1	5.00%	14	0.48%	86	0.44%
6	ACCIDENTS	1	5.00%	40	1.38%	64	0.33%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	10.00%	2	0.07%	5	0.03%
10	UNKNOWN	9	45.00%	1,483	51.10%	2,882	14.86%
Totals		20	100.00%	2,902	100.00%	19,396	100.00%

Problem Analysis:

- There were 32 interruptions on the East Springfield 47751 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on April 09, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 31.37% of the total customers interrupted (1,020 of 3,251), and 1.55% of the total customer-hours interrupted (337 of 21,793).
- There were no substation interruptions.
- The remaining 31 events occurred at the distribution level.
- The distribution circuit breaker for the East Springfield 47751 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the East Springfield 47751 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 31.6% of the total amount of customers interrupted (1,028 out of 3,251) and 71.96% of the total amount of the customer-hours interrupted (15,683 out of 21,793).
 - This lockout occurred on July 01, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 31.6% of the total customers interrupted (1,028 of 3,251), and 71.96% of the total customer-hours interrupted (15,683 of 21,793).
- Trees were the leading cause of interruptions on the East Springfield 47751 in 2022, accounting for 46.88% of total interruptions (15 of 32). Unknown was the 2nd leading cause of interruptions, accounting for 34.38% of total interruptions (11 of 32). Lightning was the 3rd leading cause of interruptions, accounting for 9.38% of total interruptions (3 of 32).
- Trees were the leading cause of customers interrupted (CI) on the East Springfield 47751 in 2022, accounting for 49.18% of total customers interrupted (1,599 of 3,251). Unknown

was the 2nd leading cause of customers interrupted, accounting for 46.08% of total customers interrupted (1,498 of 3,251). Prearranged outages were the 3rd leading cause of customers interrupted, accounting for 2.98% of total customers interrupted (97 of 3,251).

- Trees were the leading cause of customer-hours interrupted (CHI) on the East Springfield 47751 in 2022, accounting for 85.12% of total customer-hours interrupted (18,551 of 21,793). Unknown was the 2nd leading cause of customer-hours interrupted, accounting for 14.01% of total customer-hours interrupted (3,054 of 21,793). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 0.04% of total customer-hours interrupted (86 of 21,793).
- Of the 32 interruptions on this circuit, 20 affected 10 customers or less, with 16 being single customer outages.

Actions Taken:

- There are three three-phase line reclosers on the East Springfield 47751. Two installed in 2005 and the third upgraded in 2013.
- Tree trimming and a hazard tree review was completed on the East Springfield 47751 in FY2022.
- A maintenance foot patrol was performed on the East Springfield 47751 in 2020 and all identified level 1 and level 2 maintenance has been completed.

Action Plan:

- Complete all identified level 3 maintenance on the East Springfield 47751.
- A project was created to remove rear lot on the East Springfield 47751 near Whiteman Rd to be completed in 2023.
- Engineering fusing coordination review on East Springfield 47751.
- Monitor results of vegetation work from FY2022 on the East Springfield 47751 for 2023.

10. WILTON 32951 – 13.2 kV

Profile: 1,537 Customers, 66.8 Circuit Miles
 Indices: CAIDI = 1.45, SAIFI = 4.15

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	7	25.93%	2,830	44.42%	4,866	52.81%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	5	18.52%	1,087	17.06%	1,415	15.35%
6	ACCIDENTS	8	29.63%	1,594	25.02%	1,371	14.88%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	7	25.93%	860	13.50%	1,562	16.95%
Totals		27	100.00%	6,371	100.00%	9,214	100.00%

Problem Analysis:

- There were 27 interruptions on the Wilton 32951 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on October 6, 2022, when a third-party excavator (PSC cause code 06) took out a pole on the Spier - Brook Road #3 line. This lockout accounted for 23% of the total customers interrupted (1,491 of 6,371) and 13% of the total customer-hours interrupted (1,168 of 9,214).
- There were no substation interruptions.
- The remaining 26 events occurred at the distribution level.
- The distribution circuit breaker for the Wilton 32951 experienced 3 momentary operations in 2022.
- The distribution circuit breaker for the Wilton 32951 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 25% of the total amount of customers interrupted (1,568 out of 6,371) and 13% of the total amount of the customer-hours interrupted (1,229 out of 9,214).
 - This lockout occurred on March 10, 2022, when a tree (PSC cause code 02) fell on primary near pole 28 on Ballard Road. This lockout accounted for 25% of the total customers interrupted (1,568 of 6,371) and 13% of the total customer-hours interrupted (1,229 of 9,214).
- The Wilton 32951 experienced 2 sustained three-phase recloser operations in 2022. These interruptions accounted for 13% of the total amount of customers interrupted (860 of 6,371) and 16% of the total amount of the customer-hours interrupted (1,443 of 9,214).
 - The first lockout occurred on July 12, 2022, when a tree (PSC cause code 02) took down primary between pole 11 and pole 10-½ downstream of recloser R89231. This lockout accounted for 25% of the total customers interrupted (1,568 of 6,371) and 13% of the total customer-hours interrupted (1,229 of 9,214).

- The second lockout occurred on October 22, 2022, for unknown reasons (PSC cause code 10). This lockout accounted for 25% of the total customers interrupted (1,568 of 6,371) and 13% of the total customer-hours interrupted (1,229 of 9,214)
- The single transmission interruption, single circuit breaker lockout, and 2 three-phase recloser lockouts, accounted for 62% of the total customers interrupted (3,919 of 6,371) and 42% of the total customer-hours interrupted (3,840 of 9,214).
- Accidents were the leading cause of interruptions on the Wilton 32951 in 2022, accounting for 30% of total interruptions (8 of 27). Trees were the 2nd leading cause of interruptions, accounting for 26% of total interruptions (7 of 27). Unknown were the 3rd leading cause of interruptions, accounting for 26% of total interruptions (7 of 27).
- Trees were the leading cause of customers interrupted (CI) on the Wilton 32951 in 2022, accounting for 44% of total customers interrupted (2,830 of 6,371). Accidents were the 2nd leading cause of customers interrupted, accounting for 25% of total customers interrupted (1,594 of 6,371). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 17% of total customers interrupted (1,087 of 6,371).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Wilton 32951 in 2022, accounting for 53% of total customer-hours interrupted (4,866 of 9,214). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 17% of total customer-hours interrupted (1,562 of 9,214). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 15% of total customer-hours interrupted (1,415 of 9,214).
- Of the 27 interruptions on this circuit, 19 affected 10 customers or less, with 3 being single customer outages.

Actions Taken:

- There are 3 three-phase reclosers on the Wilton 32951. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Wilton 32951 in 2020 and all identified level 1 and 2 maintenances have been completed.
- Tree trimming and a hazard tree review was completed on the Wilton 32951 in 2022.
- The 10/12.5 MVA, 34.5/13.2 kV substation transformer in the Wilton substation failed in early 2015 and was replaced with a new 12/16/20 MVA, 34.5/13.2 kV substation transformer. Additionally, a 34.5 kV line recloser was installed on the source side of the new station transformer to replace the fuses used to protect the old transformer. The new substation transformer and recloser were placed in service in December of 2015.
- EMS was installed in the Wilton substation in 2019.
- A capital improvement project was completed in 2020 to construct over 1.4 miles of three-phase, 13.2 kV on Stonebridge Road, Peck Lane, and W River Road.
- A capital improvement project was completed in 2021 to install an automation scheme on the sub-transmission lines that serve Wilton. This scheme will enable automatic fault detection, sectionalizing, and restoration of the Wilton substation following interruptions on the sub-transmission lines.
- A capital improvement was completed in 2022 to replace vintage vertical post insulators on one of the 34.5 kV sub-transmission circuits feeding the Wilton substation, the Spier - Brook Road #3 line.

Action Plan:

- Complete all identified level 3 maintenance on the Wilton 32951.

- Tree trimming and a hazard tree review are scheduled to be performed on the Wilton 32951 in 2027.
- A capital improvement project is scheduled to rebuild approximately 0.3 miles of three-phase mainline located rear lot adjacent to along the edge of Ballard Road to accommodate easier access and improve reliability.
- A capital improvement project is scheduled to rebuild approximately 1.7 miles of the Wilton 32952 on State Highway 32 from single-phase, 4.8 kV to three-phase, 13.2 kV to relieve an overloaded step-down ratio transformer and create a feeder tie to the Wilton 32951.
- A capital improvement project is scheduled to rebuild approximately 1.1 miles of the Wilton 32951 on State Highway 50 to three-phase, 13.2 kV to create a feeder tie with the Wilton 32952.
- A capital improvement project is scheduled to improve fusing coordination on the Wilton 32951 which will assist in decreasing customer counts in the event of a sustained outage.
- A capital improvement project is scheduled to install one or more cutout-mounted reclosers on the Wilton 32951 which will prevent sustained outages that, otherwise, would have been momentary in nature.
- A capital improvement project is scheduled to install one or more switches on the Wilton 32951 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage.

11. ASHLEY 33151 – 13.2 kV

Profile: 1,202 Customers, 86.5 Circuit Miles
 Indices: CAIDI = 3.25, SAIFI = 2.39

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	25	58.14%	1,270	44.20%	4,285	45.86%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	13.95%	94	3.27%	257	2.75%
6	ACCIDENTS	3	6.98%	1,313	45.70%	4,563	48.84%
7	PREARRANGED	2	4.65%	145	5.05%	139	1.48%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	7	16.28%	51	1.78%	99	1.06%
Totals		43	100.00%	2,873	100.00%	9,343	100.00%

Problem Analysis:

- There were 43 interruptions on the Ashley 33151 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 43 events occurred at the distribution level.
- The distribution circuit breaker for the Ashley 33151 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Ashley 33151 experienced 1 sustained operation (lockout) in 2022. This interruption was caused by a motor vehicle accident on U.S. Highway 4 (PSC cause code 06) accounting for 42% of the total amount of customers interrupted (1,204 out of 2,873) and 46% of the total amount of the customer-hours interrupted (4,327 out of 9,343).
- There was one three-phase distribution recloser lockout on the Ashley 33151 in 2022 which occurred when a motor vehicle accident broke pole 305 on State Highway 149 accounting for 107 customers interrupted (4%) and 230 customer-hours of interruption (3%).
- Trees were the leading cause of interruptions on the Ashley 33151 in 2022, accounting for 58% of total interruptions (25 of 43). Unknown were the 2nd leading cause of interruptions, accounting for 16% of total interruptions (7 of 43). Equipment Failures were the 3rd leading cause of interruptions, accounting for 14% of total interruptions (6 of 43).
- Accidents were the leading cause of customers interrupted (CI) on the Ashley 33151 in 2022, accounting for 46% of total customers interrupted (1,313 of 2,873). Trees were the 2nd leading cause of customers interrupted, accounting for 44% of total customers interrupted (1,270 of 2,873). Prearranged were the 3rd leading cause of customers

interrupted, accounting for 5% of total customers interrupted (145 of 2,873).

- Accidents were the leading cause of customer-hours interrupted (CHI) on the Ashley 33151 in 2022, accounting for 49% of total customer-hours interrupted (4,563 of 9,343). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 46% of total customer-hours interrupted (4,285 of 9,343). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (257 of 9,343).
- Of the 43 interruptions on this circuit, 18 affected 10 customers or less, with 11 being single customer outages.

Actions Taken:

- There are four three-phase reclosers and two single-phase reclosers on the Ashley 33151. Two of the three-phase reclosers are part of a loop scheme between the Ashley 33151 and the Burgoyne 33753 to automatically transfer 788 customers from the Ashley 33151 to the Burgoyne 33753 should the station breaker lock-out or the 34.5 kV transmission system experience an interruption.
- TripSaver, cut-out mounted single-phase reclosers were installed on two different distribution taps on the Ashley 33151, one each in 2020 and 2021.
- Two sections of Baldwin Corners Road were rebuilt in 2012 to relocate rear lot single-phase distribution onto existing telephone set poles on the road at a cost of \$134,600 and a third section of Baldwin Corners Road was rebuilt in 2019 which installed another 1,946 feet of new conductor on telephone set poles along the road allowing the retirement of 2,509 feet of old rear lot distribution at a cost of \$147,521. The fourth and final section of the Baldwin Corners Road rebuild was completed in January 2023 which constructed about 2,781 feet of new three-phase distribution along Baldwin Corners Road and removed about 2,924 feet of rear lot distribution. Finally, this project converted the first 2.8 miles of Baldwin Corners Road to 13.2 kV and installed a three-phase recloser at the beginning of the tap.
- A capital project was constructed in 2020 to construct about 2,425 feet of new 4.8 kV single-phase distribution along State Highway 149 at Cartier Road to allow for the removal of about 1,631 feet of cross lot distribution from Goodman Road and to reduce the load on the overloaded ratio transformer on Goodman Road at a cost of \$92,130.
- A small capital project was completed in early 2022 to construct about 600 feet of new 4.8 kV single-phase distribution along State Highway 149 near Strainer Lane to allow for the removal of an equal amount of cross lot distribution.
- A project to rebuild about 2 miles of Goodman Road to three-phase, 13.2 kV from the single-phase ratio transformer at pole 26 on Goodman Road to State Highway 149 was completed in 2022.
- A small capital project was completed in 2022 to construct about 2,000 feet of new distribution along Hall Road and State Highway 149 to allow for the removal of about 1,200 feet of cross lot distribution which went diagonally across from Hall Road to State Highway 149.

- A small capital improvement project was completed in early 2023 to construct about 220 feet of single-phase, 7.62 kV distribution on Nicholson Road and install a new step-down ratio transformer to reduce the load on the State Highway 149 step-down ratio transformer which was loaded to an estimated 142% of nameplate.
- A small capital improvement project was completed in early 2023 to rebuild and convert to 7.62 kV about 1,100 feet of single-phase distribution on Hog Town Road to allow the installation of a larger step-up ratio transformer to reduce the load on existing Hog Town Road ratio transformer which was loaded to an estimated 146% of nameplate.
- A capital project was completed in 2022 to construct about 2,450 feet of new 4.8 kV single-phase distribution along State Highway 149 between Strainer Lane and Hall Road to allow for the removal of about 2,100 feet of cross lot distribution.
- A maintenance foot patrol of the Ashley 33151 was completed in 2022 and all level 1 maintenance has been completed.
- Tree trimming and a hazard tree review, which removed 80 hazard trees and another 50 Ash trees infested with the Emerald Ash Borer, was completed on the Ashley 33151 in FY2018.

Action Plan:

- Complete all identified level 2 and 3 maintenance on the Ashley 33151.
- Tree trimming and a hazard tree review on the Ashley 33151 is scheduled for FY2024.
- A small project is budgeted for FY2024 to construct 1,700 feet of new single-phase distribution on State Highway 149 to allow the removal of 2,400 feet of old, rear lot distribution.
- A capital project is budgeted for FY2025 to construct 0.8 miles of new single-phase distribution on Eldridge Road to allow the removal of a 0.8 mile long cross lot tap built in the 1940's which has multiple failing poles and is located in wetlands.
- A capital project is budgeted for FY2025 to construct a three-phase feeder tie between the Cedar 45351 and the Ashley 43151 on State Highway 149 between Hadlock Pond Road and Goodman Road.

12. BURGOYNE 33751 – 13.2 kV

Profile: 1,835 Customers, 136.0 Circuit Miles
 Indices: CAIDI = 1.81, SAIFI = 2.81

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	23	40.35%	3,031	58.71%	4,699	50.16%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	10.53%	652	12.63%	1,138	12.15%
6	ACCIDENTS	9	15.79%	70	1.36%	124	1.33%
7	PREARRANGED	2	3.51%	1,071	20.74%	2,582	27.56%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	1.75%	1	0.02%	4	0.04%
10	UNKNOWN	16	28.07%	338	6.55%	821	8.76%
Totals		57	100.00%	5,163	100.00%	9,369	100.00%

Problem Analysis:

- There were 57 interruptions on the Burgoyne 33751 in 2022.
- There was 1 transmission interruption which occurred on November 20, 2022 when a tree fell and broke multiple transmission poles right outside the Burgoyne substation (PSC cause code 02). This lockout accounted for 36% of the total customers interrupted (1,834 of 5,163), and 18% of the total customer-hours interrupted (1,699 of 9,369).
- There were no substation interruptions.
- The remaining 56 events occurred at the distribution level.
- When considering distribution interruptions only, the Burgoyne 33751 had a SAIFI of 1.81 and a CAIDI of 2.30.
- The distribution circuit breaker for the Burgoyne 33751 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Burgoyne 33751 experienced 0 sustained operations (lockouts) in 2022.
- There were three three-phase distribution recloser lockouts on the Burgoyne 33751 in 2022 all three of which were caused by trees. These interruptions accounted for 829 customers interrupted (16%) and 1,108 customer-hours of interruption (12%).
 - The first three-phase distribution recloser lockout occurred on April 1, 2022 when recloser R7003 on pole 51 State Highway 197 locked out due to the failure of a voltage regulator on pole 7 County Highway 44 which interrupted 5% of the customers (276 of 5,163) accounting for 7% of the total customer-hours interrupted (658 of 9,369).
 - The second three-phase distribution recloser lockout occurred on June 7, 2022 when

recloser R7003 on pole 51 State Highway 197 locked out due to a tree limb on the primary at pole 3 County Highway 45. This event accounted for 5% of the total customers interrupted (276 of 5,163), and 5% of the total customer-hours interrupted (423 of 9,369).

- The third three-phase distribution recloser lockout occurred on July 11, 2022 when recloser R7003 on pole 51 State Highway 197 was opened to disconnect a failing voltage regulator on pole 6 County Highway 44. This event accounted for 5% of the total customers interrupted (277 of 5,163), and less than 1% of the total customer-hours interrupted (27 of 9,369) as the voltage regulator was cut free and the recloser quickly reclosed to restore service.
- Trees were the leading cause of interruptions on the Burgoyne 33751 in 2022, accounting for 40% of total interruptions (23 of 57). Unknown were the 2nd leading cause of interruptions, accounting for 28% of total interruptions (16 of 57). Accidents were the 3rd leading cause of interruptions, accounting for 16% of total interruptions (9 of 57).
- Trees were the leading cause of customers interrupted (CI) on the Burgoyne 33751 in 2022, accounting for 59% of total customers interrupted (3,031 of 5,163). Prearranged were the 2nd leading cause of customers interrupted, accounting for 21% of total customers interrupted (1,071 of 5,163). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 13% of total customers interrupted (652 of 5,163).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Burgoyne 33751 in 2022, accounting for 50% of total customer-hours interrupted (4,699 of 9,369). Prearranged were the 2nd leading cause of customer-hours interrupted, accounting for 28% of total customer-hours interrupted (2,582 of 9,369). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 12% of total customer-hours interrupted (1,138 of 9,369).
- Of the 57 interruptions on this circuit, 25 affected 10 customers or less, with 17 being single customer outages.

Actions Taken:

- There are four three-phase reclosers on the Burgoyne 33751, two of which were originally installed in 1997, one of which was replaced in 2018. A third recloser was installed in 2020 on Brennan Road and the fourth recloser was installed in 2021 on Durkeetown Road as part of the Durkeetown Road rebuild project.
- There are four TripSaver, cut-out mounted single-phase reclosers installed on the Burgoyne 33751, three of which were installed in 2019 with the fourth being installed in 2021
- The 115/13.2 kV Burgoyne substation transformer which was beginning to accumulate damaging gases was replaced in 2017 at a cost in excess of \$1.7M and an animal fence was installed around the substation equipment in 2019.
- A project was completed in 2018 at a cost of \$163,954 to construct 4.8 kV distribution on County Highway 46 and North Ridge Road near West Road to allow removal of heavily treed, inaccessible, rear lot 4.8 kV distribution.
- A project was completed in 2018 at a cost of \$70,216 to construct about 2,600 feet of new 7.62 kV distribution on County Highway 41 east of Hartman Road to allow removal of about 4,910 feet of heavily treed, inaccessible, rear lot 7.62 kV distribution.
- A project was completed in 2018 at a cost of \$45,923 to close a 625 foot single-phase distribution gap on West Valley Road to allow the 9 mile long West Road single-phase tap

to be split into 2 smaller single-phase taps and to reduce the load on the overloaded 7.62/4.8 kV ratio transformer serving the West Road tap.

- A project was completed in 2019 at a cost of \$202,068 to rebuild 7,400 feet of State Highway 197 between poles 100 and 137 as necessary to convert to 13.2 kV and create a three-phase feeder tie with the Butler 36253.
- A project was completed in 2020 at a cost of \$102,462 to construct 1,400 feet of single-phase distribution on Safford Road to allow the transfer of 1.7 miles of single-phase distribution with 64 customers from the Burgoyne 33751 to the Burgoyne 33752 feeder, to address the overloaded Coach Road ratio transformer.
- A small capital improvement project was completed in 2020 at a cost of \$121,615 to extend three-phase on State Highway 40 approximately three sections beyond McEachron Hill Road to allow the balance of State Highway 40 and McEachron Hill Road to be served from separate 7.62/4.8 kV ratio transformers.
- A capital improvement project was completed in 2021 at a cost of \$361,398 to rebuild approximately 1 mile of Durkeetown Road between State Highway 197 and County Highway 46 to three-phase, 13.2 kV in order to provide better load balance on the entire feeder and better voltage downstream of Durkeetown Road.
- A capital improvement project was completed in 2022 at a cost of \$247,171 to construct 1,500 feet of new 7.62 kV distribution on Summit Lake Road to allow the removal of 3,000 feet of cross lot distribution from Dutchtown Road while also reducing the load on the overloaded Dutchtown Road ratio transformer.
- A maintenance foot patrol was completed on the Burgoyne 33751 in 2021 and all level 1 maintenance has been completed.
- Tree trimming and a hazard tree review, which removed 187 hazard trees and another 64 Ash trees infested with the Emerald Ash Borer, was completed on the Burgoyne 33751 in FY2019.

Action Plan:

- Complete all identified level 2 and 3 maintenance on the Burgoyne 33751.
- A hazard tree review is scheduled to be performed on the Burgoyne 33751 in 2023.
- A project is currently under construction to install a new three-phase line recloser on County Highway 42 to split in half the zone of protection currently covered by the station breaker.
- A project is currently under construction to rebuild 1.4 miles of 4.8 kV three-phase on State Highway 40 south of Brennan Road as necessary to convert to 13.2 kV and will replace the existing ratio transformer with a three-phase line recloser.
- The three-phase regulator bank on County Highway 42 will be replaced in 2023.
- A project will be designed and built in FY2024 to convert Bean Hill Road and install two new ratio transformers to split the large West Road tap into smaller pieces to improve reliability while also reducing the load on the overloaded West Road ratio transformer.
- A project is currently in Design for FY2025 construction to construct about 1,400 feet of new single-phase, 7.62 kV distribution on Lick Springs Road near State Highway 40 to allow the removal of a similar amount of rear lot distribution.

13. BROOK ROAD 36952 – 13.2 kV

Profile: 1,824 Customers, 34.3 Circuit Miles
 Indices: CAIDI = 1.68, SAIFI = 4.69

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	4	25.00%	5,886	68.80%	8,039	56.03%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	5	31.25%	1,422	16.62%	3,319	23.14%
6	ACCIDENTS	4	25.00%	1,195	13.97%	2,894	20.17%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	3	18.75%	52	0.61%	94	0.66%
Totals		16	100.00%	8,555	100.00%	14,346	100.00%

Problem Analysis:

- There were 16 interruptions on the Brook Road 36952 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 16 events occurred at the distribution level.
- The distribution circuit breaker for the Brook Road 36952 experienced 3 momentary operations in 2022.
- The distribution circuit breaker for the Brook Road 36952 experienced 0 sustained operations (lockouts) in 2022.
- Equipment Failures were the leading cause of interruptions on the Brook Road 36952 in 2022, accounting for 31% of total interruptions (5 of 16). Trees were the 2nd leading cause of interruptions, accounting for 25% of total interruptions (4 of 16). Accidents were the 3rd leading cause of interruptions, accounting for 25% of total interruptions (4 of 16).
- Trees were the leading cause of customers interrupted (CI) on the Brook Road 36952 in 2022, accounting for 69% of total customers interrupted (5,886 of 8,555). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 17% of total customers interrupted (1,422 of 8,555). Accidents were the 3rd leading cause of customers interrupted, accounting for 14% of total customers interrupted (1,195 of 8,555).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Brook Road 36952 in 2022, accounting for 56% of total customer-hours interrupted (8,039 of 14,346). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 23% of total customer-hours interrupted (3,319 of 14,346). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 20% of total customer-hours

interrupted (2,894 of 14,346).

- Of the 16 interruptions on this circuit, 6 affected 10 customers or less, with 0 being single customer outages.

Actions Taken:

- A maintenance foot patrol was completed on the Brook Road 36952 in 2022 and all identified level 1 maintenance has been completed.
- A capital improvement project was completed to install a voltage regulator and to balance load across all 3 phases which will mitigate the potential for low voltage during peak loading timeframes.
- A capital improvement project was completed in early 2021 to convert Lewis Road, West Milton Road, and Paisley Road from 4.16 kV to 13.2 kV.
- Switching was completed in 2022 to transfer over 7 miles of the Brook Road 36952 to the new Sodeman Road substation.

Action Plan:

- Complete all identified level 2 and 3 maintenance on the Brook Road 36952.
- Tree trimming and a hazard tree review are scheduled to be performed on the Brook Road 36952 in 2023.
- A capital improvement project is scheduled to improve fusing coordination on the Brook Road 36952 which will assist in decreasing customer counts in the event of a sustained outage.
- A capital improvement project is scheduled to install one or more three-phase reclosers on the Brook Road 36952 which will assist in decreasing customer counts in the event of a sustained outage as well as prevent sustained outages that, otherwise, would have been momentary in nature.
- A capital improvement project is scheduled to construct over 1,500 feet of three-phase, 13.2 kV on Greenfield Avenue to create a feeder tie with the Ballston 53. A normally open three-phase recloser will be installed at the tie point which will allow for future automation of this feeder tie, thereby significantly decreasing customer outages in the event of a sustained outage.

14. UNION STREET 37653 – 13.2 kV

Profile: 1,446 Customers, 67.7 Circuit Miles
 Indices: CAIDI = 2.23, SAIFI = 2.80

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	47.62%	3,518	86.84%	7,640	84.38%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	5	23.81%	291	7.18%	513	5.67%
6	ACCIDENTS	4	19.05%	240	5.92%	891	9.84%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	2	9.52%	2	0.05%	10	0.11%
Totals		21	100.00%	4,051	100.00%	9,054	100.00%

Problem Analysis:

- There were 21 interruptions on the Union Street 37653 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 21 events occurred at the distribution level.
- The distribution circuit breaker for the Union Street 37653 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Union Street 37653 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 71% of the total amount of customers interrupted (2,888 out of 4,051) and 77% of the total amount of the customer-hours interrupted (7,011 out of 9,054).
 - The first lockout occurred on March 21, 2022, when a tree (PSC cause code 02) broke pole 20 on Legrys Road. This lockout accounted for 36% of the total customers interrupted (1,440 of 4,051) and 34% of the total customer-hours interrupted (3,092 of 9,054).
 - The second lockout occurred on July 21, 2022, when a tree (PSC cause code 02) took down primary near pole 13 at South Park Street. This lockout accounted for 36% of the total customers interrupted (1,448 of 4,051) and 43% of the total customer-hours interrupted (3,919 of 9,054).
- Trees were the leading cause of interruptions on the Union Street 37653 in 2022, accounting for 48% of total interruptions (10 of 21). Equipment Failures were the 2nd leading cause of interruptions, accounting for 24% of total interruptions (5 of 21). Accidents were the 3rd leading cause of interruptions, accounting for 19% of total

interruptions (4 of 21).

- Trees were the leading cause of customers interrupted (CI) on the Union Street 37653 in 2022, accounting for 87% of total customers interrupted (3,518 of 4,051). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 7% of total customers interrupted (291 of 4,051). Accidents were the 3rd leading cause of customers interrupted, accounting for 6% of total customers interrupted (240 of 4,051).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Union Street 37653 in 2022, accounting for 84% of total customer-hours interrupted (7,640 of 9,054). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 10% of total customer-hours interrupted (891 of 9,054). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 6% of total customer-hours interrupted (513 of 9,054).
- Of the 21 interruptions on this circuit, 17 affected 10 customers or less, with 12 being single customer outages.

Actions Taken:

- There are 2 three-phase reclosers on the Union Street 37653. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Union Street 37653 in 2020 and all identified level 1 and 2 maintenance has been completed.
- Tree trimming and a hazard tree review was completed on the Union Street 37653 in 2018.
- A capital improvement project was completed in 2022 to rebuild over 0.25 miles of Kenyon Hill Road, west of State Highway 22, to allow for the removal of the existing rear lot distribution.
- A capital improvement project was completed in 2020 to rebuild approximately 3,000 feet of County Highway 67 from Main Street and convert Main Street and County Highway 67 to 13.2 kV.
- A capital improvement project as completed in 2021 to create a three-phase, 13.2 kV feeder tie with the Union Street 54 on State Highway 32.

Action Plan:

- Complete all identified level 3 maintenance on the Union Street 37653.
- Tree trimming and a hazard tree review are scheduled to be performed on the Union Street 37653 in 2023.
- A capital improvement project is scheduled to remove over 2,000 feet of rear lot distribution and construct approximately 3,000 feet of new single-phase, 7.62 kV distribution along Mc Millan Road.
- A capital improvement project is scheduled to improve fusing coordination on the Union Street 37653 which will assist in decreasing customer counts in the event of a sustained outage.
- A capital improvement project is scheduled to install one or more three-phase reclosers on the Union Street 37653 which will assist in decreasing customer counts in the event of a sustained outage as well as prevent sustained outages that, otherwise, would have been momentary in nature.

15. GILMANTOWN 15451 – 13.2 kV

Profile: 2,066 Customers, 79.4 Circuit Miles
Indices: CAIDI = 4.02, SAIFI = 2.19

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	12	63.16%	376	8.32%	1,325	7.30%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	4	21.05%	4,124	91.24%	16,783	92.43%
6	ACCIDENTS	2	10.53%	18	0.40%	41	0.22%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	1	5.26%	2	0.04%	9	0.05%
Totals		19	100.00%	4,520	100.00%	18,158	100.00%

Problem Analysis:

- There were 19 interruptions on the Gilmantown 15451 in 2022.
- There was 1 transmission interruption which occurred on May 5, 2022 when during scheduled maintenance at the Northville substation, the 23 kV switches on the 23 kV bus in Northville broke de-energizing all substations downstream including Gilmantown (PSC cause code 05) accounting for 46% of the total customers interrupted (2,061 of 4,520), and 42% of the total customer-hours interrupted (7,672 of 18,158).
- There was 1 substation interruption which occurred on December 12, 2022 when an insulator in the Northville substation failed, locking out 23 kV breaker R1 and de-energizing all substations downstream including Gilmantown (PSC cause code 05). This lockout accounted for 46% of the total customers interrupted (2,061 of 4,520), and 50% of the total customer-hours interrupted (9,098 of 18,158).
- The transmission event when combined with the substation related interruption affected 4,122 customers (91%) and accounted for 16,770 customer-hours of interruption (92%).
- The remaining 17 events occurred at the distribution level, the largest of which only impacted 119 customers (3%) and accounted for 863 customer-hours of interruption (5%).
- When considering distribution interruptions only, the Gilmantown 15451 had a SAIFI of 0.19 and a CAIDI of 3.49.
- The distribution circuit breaker for the Gilmantown 15451 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Gilmantown 15451 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Gilmantown 15451 in 2022,

accounting for 63% of total interruptions (12 of 19). Equipment Failures were the 2nd leading cause of interruptions, accounting for 21% of total interruptions (4 of 19). Accidents were the 3rd leading cause of interruptions, accounting for 11% of total interruptions (2 of 19).

- Equipment Failures were the leading cause of customers interrupted (CI) on the Gilmantown 15451 in 2022, accounting for 91% of total customers interrupted (4,124 of 4,520). Trees were the 2nd leading cause of customers interrupted, accounting for 8% of total customers interrupted (376 of 4,520). Accidents were the 3rd leading cause of customers interrupted, accounting for 0% of total customers interrupted (18 of 4,520).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Gilmantown 15451 in 2022, accounting for 92% of total customer-hours interrupted (16,783 of 18,158). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 7% of total customer-hours interrupted (1,325 of 18,158). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 0% of total customer-hours interrupted (41 of 18,158).
- Of the 19 interruptions on this circuit, 10 affected 10 customers or less, with 2 being single customer outages.

Actions Taken:

- Following a detailed investigation into the cause of the multiple outages on the 23 kV sub-transmission lines that feed the Gilmantown, Wells, and Charley Lake substations, a large capital improvement project was completed in October 2015 to replace 198 of the horizontal post insulators on 66 light angle structures on the Northville-Wells #1 and the Wells-Gilmantown #2, 23 kV sub-transmission lines. A second project to replace all of the remaining 1995 era Lapp insulators on the Northville-Wells #1 and the Wells-Gilmantown #2, 23kV transmission lines was completed in February 2020.
- There are seven three-phase reclosers on the Gilmantown 15451. The three-phase reclosers on pole 147 County Highway 11 and pole 204 State Highway 8 were replaced in 2017 with radial G&W reclosers with integrated potential transformers and Schweitzer controls to provide for remote control of the reclosers and remote access to recloser data.
- A 23 kV sectionalizer was placed in service on the Wells-Gilmantown #2, 23kV sub-transmission line just outside of the Wells Substation.
- A project has been completed in 2019 to install TripSavers in six locations across the Gilmantown 15451 where the ability to reclose due to temporary faults has been found necessary, but the need for a recloser is not warranted.
- A maintenance foot patrol was performed on the Gilmantown 15451 in 2018 and all maintenance has been completed.
- Tree trimming and a hazard tree review, which removed 2,050 hazard trees and another 170 Ash trees infested with the Emerald Ash Borer, was completed on the Gilmantown 15451 in FY2021.

Action Plan:

- Complete all identified level 3 maintenance on the Gilmantown 15451
- A hazard tree review out to the first protective device is scheduled to be performed on the Gilmantown 15451 in FY2024.
- A project is currently under construction to replace the overloaded ratio transformer on pole 253½ State Highway 8 with a larger ratio transformer on pole 257.
- The existing recloser on pole 256 State Highway 8 originally installed in 1995 will be replaced with a new three-phase line recloser with integrated voltage sensing and an SEL controller in 2023.
- A project to replace the overloaded 500 kVA ratio transformer on County Highway 24 and its associated 1995 vintage three-phase line recloser with integrated voltage sensing and an SEL controller will be completed in FY2024.
- A project to rebuild/convert the northern side of Lake Pleasant from 4.8 kV to 13.2 kV is budgeted for FY2026. This will allow for switching between the north and south side of the lake under contingency.
- A project to install battery storage to serve the Gilmantown 15451 feeder when the radial 23 kV sub-Transmission lines which supply Gilmantown are unavailable is in the development stages with a projected in-service date in FY2029.

16. INDIAN LAKE 31076 – 4.8 kV

Profile: 766 Customers, 37.3 Circuit Miles

Indices: CAIDI = 6.37, SAIFI = 2.64

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	9	64.29%	1,904	94.21%	12,498	97.00%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	2	14.29%	3	0.15%	11	0.09%
6	ACCIDENTS	0	0.00%	0	0.00%	0	0.00%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	7.14%	1	0.05%	3	0.03%
10	UNKNOWN	2	14.29%	113	5.59%	371	2.88%
Totals		14	100.00%	2,021	100.00%	12,884	100.00%

Problem Analysis:

- There were 14 interruptions on the Indian Lake 31076 in 2022.
- There was 1 transmission interruption which occurred on November 30, 2022 when a tree fell outside the Indian Lake substation taking down 4 section of the Indian Lake – North Creek #1, 23 kV line (PSC cause code 02). This lockout accounted for 38% of the total customers interrupted (769 of 2,021), and 84% of the total customer-hours interrupted (10,848 of 12,884).
- There were no substation interruptions.
- The remaining 13 events occurred at the distribution level.
- When considering distribution interruptions only, the Indian Lake 31076 had a SAIFI of 1.63 and a CAIDI of 1.63.
- The distribution circuit breaker for the Indian Lake 31076 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Indian Lake 31076 experienced 1 sustained operation (lockout) in 2022. This interruption occurred on June 04, 2022 when a tree fell on the primary at pole 17 State Highway 28 (PSC cause code 02). This lockout accounted for 38% of the total customers interrupted (760 of 2,021), and 7% of the total customer-hours interrupted (912 of 12,884).
- The transmission event when combined with the distribution circuit breaker lockout affected 1,529 customers (76%) and accounted for 11,760 customer-hours of interruption (91%).
- Trees were the leading cause of interruptions on the Indian Lake 31076 in 2022, accounting for 64% of total interruptions (9 of 14). Equipment Failures were the 2nd leading cause of

interruptions, accounting for 14% of total interruptions (2 of 14). Unknown were the 3rd leading cause of interruptions, accounting for 14% of total interruptions (2 of 14).

- Trees were the leading cause of customers interrupted (CI) on the Indian Lake 31076 in 2022, accounting for 94% of total customers interrupted (1,904 of 2,021). Unknown were the 2nd leading cause of customers interrupted, accounting for 6% of total customers interrupted (113 of 2,021). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 0% of total customers interrupted (3 of 2,021).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Indian Lake 31076 in 2022, accounting for 97% of total customer-hours interrupted (12,498 of 12,884). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (371 of 12,884). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 0% of total customer-hours interrupted (11 of 12,884).
- Of the 14 interruptions on this circuit, 4 affected 10 customers or less, with 3 being single customer outages.

Actions Taken:

- There is one three-phase distribution recloser and two single-phase TripSaver reclosers on the Indian Lake 31076 all of which were installed in 2019. These reclosers have proven to be beneficial to the reliability of the feeder in the past though none of these devices locked out in 2021.
- A maintenance foot patrol of the Indian Lake 31076 was completed in 2020 and all level 1 and 2 maintenance has been completed.
- A project was completed in 2015 to replace the Indian Lake substation transformer.
- A project was completed in 2019 to install a three-phase line recloser, 2 single-phase TripSaver reclosers and add and/or change the fuses at seven locations along Blue Mountain Lake Road.
- Tree trimming and a hazard tree review, which removed 503 hazard trees and another 76 Ash trees infested with the Emerald Ash Borer, was completed on the Indian Lake 31076 in FY2020.
- Three 34.5 kV line reclosers and 10 sets of fault indicators were installed on the Indian Lake-North Creek #1, 34.5 kV sub-transmission line in 2012.
- A maintenance foot patrol was performed on the Indian Lake-North Creek #1, 34 kV sub-transmission line in 2018 and all identified maintenance has been completed.

Action Plan:

- Complete all identified level 3 maintenance on the Indian Lake 31076.
- A hazard tree review is scheduled to be performed on the Indian Lake 31076 in FY2025.
- Fuse all CSP transformers and unfused side taps on the three-phase mainline on State Highway 28 east of the intersection of State Highway 30.

17. CHESTERTOWN 04251 – 13.2 kV

Profile: 1,433 Customers, 60.3 Circuit Miles
Indices: CAIDI = 1.68, SAIFI = 2.55

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	20	51.28%	1,597	43.69%	2,616	42.52%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	15.38%	68	1.86%	244	3.96%
6	ACCIDENTS	3	7.69%	362	9.90%	2,565	41.69%
7	PREARRANGED	1	2.56%	66	1.81%	110	1.80%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	9	23.08%	1,562	42.74%	617	10.03%
Totals		39	100.00%	3,655	100.00%	6,153	100.00%

Problem Analysis:

- There were 39 interruptions on the Chestertown 04251 in 2022.
- There was 1 transmission interruption which occurred on September 18, 2022 when the Warrensburg – Chestertown #6, 34.5 kV sub-transmission line locked out for an unknown reason (PSC cause code 10). The Chestertown substation was re-energized via the Chestertown – North Creek #2, 34.5 kV line within 15 minutes, therefore, while this lockout accounted for 39% of the total customers interrupted (1,443 of 3,655), it only accounted for 6% of the total customer-hours interrupted (361 of 6,153).
- There were no substation interruptions.
- The remaining 38 events occurred at the distribution level.
- When considering distribution interruptions only, the Chestertown 04251 had a SAIFI of 1.54 and a CAIDI of 2.62.
- The distribution circuit breaker for the Chestertown 04251 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Chestertown 04251 experienced 0 sustained operations (lockouts) in 2022.
- There were two large distribution interruptions on the Chestertown 04251 in 2022 impacting 356 customer or more. These interruptions accounted for 853 customers interrupted (23%) and 2,991 customer-hours of interruption (49%).
 - The first event occurred on March 17, 2022 when three-phase distribution recloser R88818 on pole 252 U.S. Highway 9 locked out due to a tree limb on the primary at pole 222 U.S. Highway 9 which interrupted 14% of the customers (497 of 3,655) accounting for 7% of the total customer-hours interrupted (442 of

- 6,153).
- The second large distribution event occurred on September 7, 2022 when a tractor trailer truck broke pole 193 on U.S. Highway 9. A switch on pole 194 U.S. Highway 9 was opened to isolate the fault, however, repairs could not be made until the tractor trailer truck was extricated resulting in an interruption of 7.15 hours. As a result, this event interrupted only 10% of the total customers interrupted (356 of 3,655), but accounted for 41% of the total customer-hours interrupted (2,549 of 6,153).
 - The two large distribution interruptions when combined with the transmission interruption accounted for only 3 of the 39 interruptions on the Chestertown 04251 in 2022, however, they interrupted 63% of the customers (2,296 of 3,655) and accounted for 54% of the total customer-hours interrupted (3,352 of 6,153).
 - Trees were the leading cause of interruptions on the Chestertown 04251 in 2022, accounting for 51% of total interruptions (20 of 39). Unknown were the 2nd leading cause of interruptions, accounting for 23% of total interruptions (9 of 39). Equipment Failures were the 3rd leading cause of interruptions, accounting for 15% of total interruptions (6 of 39).
 - Trees were the leading cause of customers interrupted (CI) on the Chestertown 04251 in 2022, accounting for 44% of total customers interrupted (1,597 of 3,655). Unknown were the 2nd leading cause of customers interrupted, accounting for 43% of total customers interrupted (1,562 of 3,655). Accidents were the 3rd leading cause of customers interrupted, accounting for 10% of total customers interrupted (362 of 3,655).
 - Trees were the leading cause of customer-hours interrupted (CHI) on the Chestertown 04251 in 2022, accounting for 43% of total customer-hours interrupted (2,616 of 6,153). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 42% of total customer-hours interrupted (2,565 of 6,153). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 10% of total customer-hours interrupted (617 of 6,153).
 - Of the 39 interruptions on this circuit, 17 affected 10 customers or less, with 6 being single customer outages.

Actions Taken:

- Complete all identified level 3 maintenance on the Chestertown 04251.
- There are two three-phase reclosers on the Chestertown 04251. These reclosers have helped to significantly reduce the customer interruptions and customer-hours interrupted over the past year on the Chestertown 04251.
- Two single-phase TripSaver reclosers were installed on the Chestertown 04251 in 2020.
- A three-phase bank of voltage regulators was installed in 2015 on pole 150 ½ U.S Highway 9 to provide better voltage performance on the south half of the feeder.
- A maintenance foot patrol was completed on the Chestertown 04251 in 2021 and all level 1 and 2 maintenance has been completed.
- Tree trimming and a hazard tree review was completed in 2021 on the Chestertown 04251 including the removal of 272 hazard trees.

Action Plan:

- Complete all identified level 3 maintenance on the Chestertown 04251.
- A hazard tree review out to the first protective device is scheduled to be performed on the Chestertown 04251 in FY2024.
- Investigate the practicality of constructing a three-phase, 13.2 kV feeder tie between the Chestertown 04251 and the Warrensburg 32152 which could be automated with loop scheme reclosers.
- A capital project to rebuild County Highway 8 to three-phase, 13.2 kV for about 3,600 feet from County Highway 65 to State Highway 8 is budgeted for FY2024.
- A capital project to rebuild U.S. Highway 9 to three-phase, 13.2 kV for about 1.1 miles from County Highway 8 to Pinenotch Road is budgeted for FY2025.

18. SHARON 36351 – 13.2 kV

Profile: 714 Customers, 50.9 Circuit Miles
Indices: CAIDI = 6.47, SAIFI = 2.98

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	4	33.33%	364	17.13%	1,386	10.09%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	3	25.00%	1,542	72.56%	11,779	85.72%
6	ACCIDENTS	0	0.00%	0	0.00%	0	0.00%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	8.33%	1	0.05%	4	0.03%
10	UNKNOWN	4	33.33%	218	10.26%	571	4.16%
Totals		12	100.00%	2,125	100.00%	13,741	100.00%

Problem Analysis:

- There were 16 interruptions on the Sharon 36351 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 16 events occurred at the distribution level.
- The distribution circuit breaker for the Sharon 36351 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Sharon 36351 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 50.0% of the total amount of customers interrupted (1,429 out of 2,861) and 72.49% of the total amount of the customer-hours interrupted (11,396 out of 15,720).
 - The first lockout occurred on July 01, 2022, coded as a cause of deterioration (PSC cause code 05). This lockout accounted for 25.0% of the total customers interrupted (713 of 2,861), and 66.55% of the total customer-hours interrupted (10,461 of 15,720).
 - The second lockout occurred on November 30, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 25.0% of the total customers interrupted (716 of 2,861), and 5.95% of the total customer-hours interrupted (935 of 15,720).
- Trees were the leading cause of interruptions on the Sharon 36351 in 2022, accounting for 37.5% of total interruptions (6 of 16). Unknown was the 2nd leading cause of interruptions, accounting for 37.5% of total interruptions (6 of 16). Equipment Failures were the 3rd leading cause of interruptions, accounting for 18.75% of total interruptions (3 of 16).

- Equipment Failures were the leading cause of customers interrupted (CI) on the Sharon 36351 in 2022, accounting for 53.9% of total customers interrupted (1,542 of 2,861). Trees were the 2nd leading cause of customers interrupted, accounting for 37.96% of total customers interrupted (1,086 of 2,861). Unknown was the 3rd leading cause of customers interrupted, accounting for 8.11% of total customers interrupted (232 of 2,861).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Sharon 36351 in 2022, accounting for 74.93% of total customer-hours interrupted (11,779 of 15,720). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 21.14% of total customer-hours interrupted (3,323 of 15,720). Unknown was the 3rd leading cause of customer-hours interrupted, accounting for 3.91% of total customer-hours interrupted (614 of 15,720).
- Of the 16 interruptions on this circuit, 3 affected 10 customers or less, with 3 being single customer outages.

Action Taken:

- There is one three-phase recloser on the Sharon 36351. This recloser can isolate all faults on the three-phase 500 kVA ratio that is on the mainline outside the substation
- A maintenance foot patrol of the Sharon 36351 was performed for 2022 and all identified level 1 and level 2 maintenance has been completed
- A fusing coordination update was completed on the Sharon 36351 near Chestnut St to improve reliability
- Tree trimming and a hazard tree review was completed on the Sharon 36351 in FY2022.

Action Plan:

- Complete all identified level 3 maintenance on the Sharon 36351.
- A capital project is scheduled for FY2025 to rebuild about 2.8 miles of three-phase 4.8 kV distribution on the Sharon 36351 along State Highway 10 and U.S. Highway 20 to 13.2 kV and install a new three-phase step-down ratio transformer on Chestnut Street.
- A rear lot removal & distribution extension project on the Sharon 36351 will improve reliability scheduled for FY2025.

19. HUDSON FALLS 08851 – 13.2 kV

Profile: 1,601 Customers, 10.9 Circuit Miles
Indices: CAIDI = 2.40, SAIFI = 2.51

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	2	11.76%	1,610	40.08%	5,174	53.73%
3	OVERLOADS	2	11.76%	611	15.21%	1,290	13.40%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	3	17.65%	1,641	40.85%	2,963	30.77%
6	ACCIDENTS	3	17.65%	68	1.69%	98	1.02%
7	PREARRANGED	2	11.76%	45	1.12%	37	0.39%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	5	29.41%	42	1.05%	67	0.69%
Totals		17	100.00%	4,017	100.00%	9,628	100.00%

Problem Analysis:

- There were 17 interruptions on the Hudson Falls 08851 in 2022.
- There were 2 transmission interruptions which combined interrupted 3,203 customers (80%) and accounted for 8,009 customer-hours of interruption (83%).
 - The first Transmission interruption occurred on April 1, 2022 when the 6188 switches at the Farnan Road substation failed locking out the Mohican – Hudson Falls #1, 34.5 kV sub-transmission line (PSC cause code 05). This lockout accounted for 40% of the total customers interrupted (1,601 of 4,017), and 30% of the total customer-hours interrupted (2,840 of 9,628).
 - The second Transmission interruption occurred on November 20, 2022 when a tree fell and broke multiple transmission poles right outside the Burgoyne substation de-energizing the 115 kV bus in the Mohican substation which is the source for the Mohican – Hudson Falls #1, 34.5 kV sub-transmission line which serves Hudson Falls (PSC cause code 02). This event accounted for 40% of the total customers interrupted (1,602 of 4,017), and 54% of the total customer-hours interrupted (5,169 of 9,628).
- There were no substation interruptions.
- The remaining 15 events occurred at the distribution level but only one distribution related interruption affected more than 46 customers and that event occurred on July 20, 2022 when the C phase station transformer fuse blew interrupting 600 customers (15%) and accounting for 1,261 customer-hours of interruption (13%).
- When considering distribution interruptions only, the Schroon Lake 42951 had a SAIFI of 0.51 and a CAIDI of 1.99.
- The distribution circuit breaker for the Hudson Falls 08851 experienced 1 momentary

operation in 2022.

- The distribution circuit breaker for the Hudson Falls 08851 experienced 0 sustained operations (lockouts) in 2022.
- Unknown were the leading cause of interruptions on the Hudson Falls 08851 in 2022, accounting for 29% of total interruptions (5 of 17). Equipment Failures were the 2nd leading cause of interruptions, accounting for 18% of total interruptions (3 of 17). Accidents were the 3rd leading cause of interruptions, accounting for 18% of total interruptions (3 of 17).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Hudson Falls 08851 in 2022, accounting for 41% of total customers interrupted (1,641 of 4,017). Trees were the 2nd leading cause of customers interrupted, accounting for 40% of total customers interrupted (1,610 of 4,017). Overloads were the 3rd leading cause of customers interrupted, accounting for 15% of total customers interrupted (611 of 4,017).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Hudson Falls 08851 in 2022, accounting for 54% of total customer-hours interrupted (5,174 of 9,628). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 31% of total customer-hours interrupted (2,963 of 9,628). Overloads were the 3rd leading cause of customer-hours interrupted, accounting for 13% of total customer-hours interrupted (1,290 of 9,628).
- Of the 17 interruptions on this circuit, 6 affected 10 customers or less, with 3 being single customer outages.

Actions Taken:

- A maintenance foot patrol of the Hudson Falls 08851 was completed in 2022 and all level 1 and 2 maintenance has been completed.
- Tree trimming and a hazard tree review was completed on the Hudson Falls 08851 in FY2022.
- A small project to build about 150 feet of distribution on John Street at the intersection of State Highway 4 and convert about 1,700 feet of 4.8 kV single-phase distribution to 7.62 kV was completed in 2022. This project transfers 105 customers from a large, 4.8 kV, three-phase distribution tap through an overloaded ratio transformer directly to the 13.2 kV, three-phase mainline.

Action Plan:

- Complete all identified level 3 maintenance on the Hudson Falls 08851.
- Install a three-phase line recloser on Gibson Street as the source side protection on a 1,500 kVA, 13.2/4.8 kV ratio transformer.
- A small project to build 650 feet of new 7.62 kV single-phase distribution on Williams Street to Burgoyne Avenue is planned for FY2024 to transfer the Williams Street tap and the 101 customers it serves from the Hudson Fall 08851 to the Burgoyne 33754.
- A small project to build 500 feet of new 7.62 kV single-phase distribution on Denis Street to Burgoyne Avenue is planned for FY2024 to transfer the Lower Oak Street tap and the 120 customers it serves from the Hudson Fall 08851 to the Burgoyne 33754.

20. WEIBEL AVENUE 41551 – 13.2 kV

Profile: 1,263 Customers, 64.7 Circuit Miles
Indices: CAIDI = 7.56, SAIFI = 1.52

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	15	68.18%	1,740	90.48%	13,550	93.21%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	2	9.09%	89	4.63%	731	5.03%
6	ACCIDENTS	3	13.64%	82	4.26%	235	1.61%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	2	9.09%	12	0.62%	21	0.14%
Totals		22	100.00%	1,923	100.00%	14,537	100.00%

Problem Analysis:

- There were 22 interruptions on the Weibel Avenue 41551 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 22 events occurred at the distribution level.
- The distribution circuit breaker for the Weibel Avenue 41551 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Weibel Avenue 41551 experienced 0 sustained operations (lockouts) in 2022.
- The Weibel Avenue 41551 experienced 1 sustained three-phase recloser operation in 2022. This interruption accounted for 53% of the total amount of customers interrupted (1,021 of 1,923) and 84% of the total amount of the customer-hours interrupted (12,171 of 14,537).
 - This lockout occurred on August 4, 2022, when trees (PSC cause code 02) took down multiple spans of primary; near pole 26 on Stafford Bridge Road, between pole 28 and pole 30 on State Highway 29, and near pole 122 on Old Schuyler Road. This lockout accounted for 36% of the total customers interrupted (1,440 of 4,051) and 34% of the total customer-hours interrupted (3,092 of 9,054).
- Trees were the leading cause of interruptions on the Weibel Avenue 41551 in 2022, accounting for 68% of total interruptions (15 of 22). Accidents were the 2nd leading cause of interruptions, accounting for 14% of total interruptions (3 of 22). Equipment Failures were the 3rd leading cause of interruptions, accounting for 9% of total interruptions (2 of 22).
- Trees were the leading cause of customers interrupted (CI) on the Weibel Avenue 41551

in 2022, accounting for 90% of total customers interrupted (1,740 of 1,923). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 5% of total customers interrupted (89 of 1,923). Accidents were the 3rd leading cause of customers interrupted, accounting for 4% of total customers interrupted (82 of 1,923).

- Trees were the leading cause of customer-hours interrupted (CHI) on the Weibel Avenue 41551 in 2022, accounting for 93% of total customer-hours interrupted (13,550 of 14,537). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (731 of 14,537). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 2% of total customer-hours interrupted (235 of 14,537).
- Of the 22 interruptions on this circuit, 14 affected 10 customers or less, with 7 being single customer outages.

Actions Taken:

- There are 3 three-phase reclosers on the Weibel Avenue 41551. These reclosers have assisted with minimizing customers interrupted and customer-hours interrupted since they were installed.
- A maintenance foot patrol was completed on the Weibel Avenue 41551 in 2018 and all identified level 1, 2, and 3 maintenance has been completed.
- Tree trimming and a hazard tree review was completed on the Weibel Avenue 41551 in 2018.
- A capital improvement project was completed to install a voltage regulator on State Highway 29 to mitigate the potential for low voltage during peak loading timeframes.

Action Plan:

- Tree trimming and a hazard tree review are scheduled to be performed on the Weibel Avenue 41551 in 2023.
- A capital improvement project is scheduled to relieve a step-down ratio transformer on State Highway 29 that is at risk of failing due to overload
- A capital improvement project is scheduled to improve fusing coordination on the Weibel Avenue 41551 which will assist in decreasing customer counts in the event of a sustained outage.
- A capital improvement project is scheduled to install one or more switches on the Weibel Avenue 41551 which will allow additional opportunity to isolate faults, thereby significantly decreasing outage times in the event of a sustained outage
- A capital improvement project is scheduled to remove over 1,800 feet of rear lot distribution along Burgoyne Road
- A capital improvement project is scheduled to close the distribution gap on State Highway 29 to provide further load relief on an overloaded step-down ratio transformer as well as decrease customer outages in the event of a sustained outage.

3. ACTION PLAN SUMMARIES

a. SUMMARY OF ACTION PLANS FOR 2022 WORST PERFORMING CIRCUITS

Station	Feeder	Year	Action Plan	Est. Completion Date	Approx. Cost	Comments
Port Henry	38551	2022	Complete level 3 maintenance.	Apr-25		
Port Henry	38551	2022	Hazard tree review.	Apr-24		
Port Henry	38551	2022	Convert Port Henry to 13.2 kV.	Apr-25	\$725K	Project C081529, WR# 30601236
Port Henry	38551	2022	Convert Broad Street to 13.2 kV.	Apr-26	\$750K	Project C081530
Port Henry	38551	2022	Ti-Whitehall #3 and Ti-Republic #2, 115 kV rebuild.	Apr-24		
Schroon Lake	42951	2022	Complete level 3 maintenance.	Apr-24		
Schroon Lake	42951	2022	Hazard tree review to first protective device.	Apr-24		
Schroon Lake	42951	2022	Fuse CSP's.	Apr-24	\$50K	WR# 30697446
Schroon Lake	42951	2022	Voltage improvement & load balancing.	Apr 24	\$30K	WR# 30695683
Schroon Lake	42951	2022	Replace & add voltage regulators on U.S. Hwy. 9.	Apr-24	\$120K	Project C091881, WR# 30742746
Schroon Lake	42951	2022	Install fault indicators on Chestertown-Schroon #3, 34.5 kV line.	Apr-24	\$50K	WR# 30738955
Gloversville	07253	2022	Construct Gloversville 53 – Stoner 51 feeder tie.	Apr-25	\$900K	Project C092238, WR# 30743755
Battenkill	34257	2022	Hazard tree review.	Apr-26		
Battenkill	34257	2022	Relocate rear lot distribution on Irwin Rd.	Apr-24	\$130K	Project C090810, WR# 30629843
Battenkill	34257	2022	County Hwy. 52 Storm Hardening.	Apr-24	\$340K	Project C057386, WR# 17760583
Battenkill	34257	2022	Install cutout-mounted recloser(s)	Apr-24		
Battenkill	34257	2022	Install sectionalizing switch(es)	Apr-24		
Port Henry	38552	2022	Complete level 3 maintenance.	Aug-24		
Port Henry	38552	2022	Federal St. ratio relief.	Sep-23	\$50K	WR# 30401674
Port Henry	38552	2022	Convert Moriah, Harry Allen & Breed Hill Rds..	Apr-24	\$257K	Project C088168, WR# 30393044
Port Henry	38552	2022	Ti-Whitehall #3 and Ti-Republic #2, 115 kV rebuild.	Apr-24		
Scotfield	45053	2022	Hazard tree review	Apr-25		
Scotfield	45053	2022	Harrisburg Road rebuild at Glass Creek Rd.	Apr-24	\$75K	WR#30757165
Scotfield	45053	2022	Harrisburg Road minor storm hardening.	Apr-25	\$300K	Project C057289, WR# 26513744
Pottersville	42451	2022	Complete level 3 maintenance.	Aug-24		
Pottersville	42451	2022	Hazard tree review	Apr-25		
Pottersville	42451	2022	Pottersville/Riparius single-phase tie	Apr-25	\$95K	WR# 13868440
Pottersville	42451	2022	Old Mill Lane cable replacement.	Jun-23	\$60K	WR# 30691255
Hague Road	41853	2022	Complete level 3 maintenance.	Apr-24		
Hague Road	41853	2022	Maintenance foot patrol.	Dec-23		
Hague Road	41853	2022	Hazard tree review.	Dec-23		
Hague Road	41853	2022	Rebuild & convert Alexandria Avenue.	Apr-26	\$500K	Project C081836
Hague Road	41853	2022	Ti-Whitehall #3 and Ti-Republic #2, 115 kV rebuild.	Apr-24		
East Springfield	47751	2022	Complete level 3 maintenance.	Apr-24		
East Springfield	47751	2022	Whiteman Rd. rear lot removal.	Dec-23		WR# 30659876
East Springfield	47751	2022	Fuse coordination.	Apr-24		
East Springfield	47751	2022	Monitor FY2022 vegetation work.	Apr-24		
Wilton	32951	2022	Complete level 3 maintenance.	Apr-24		
Wilton	32951	2022	Relocate rear lot distribution along Ballard Rd.	Apr-24	\$130K	Project C090565, WR# 30585701
Wilton	32951	2022	Rebuild State Hwy 32 to create a tie with Wilton 52.	Apr-24	\$680K	Project C019570, WR#30483647
Wilton	32951	2022	Rebuild State Hwy 50 to create a tie with Wilton 52.	Apr-26	\$637K	Project C089187, WR# 30489489
Wilton	32951	2022	Fuse coordination.	Apr-24		
Wilton	32951	2022	Install cutout-mounted recloser(s)	Apr-24		

Station	Feeder	Year	Action Plan	Est. Completion Date	Approx. Cost	Comments
Wilton	32951	2022	Install sectionalizing switch(es)	Apr-24		
Ashley	33151	2022	Complete level 2 maintenance.	Aug-23		
Ashley	33151	2022	Complete level 3 maintenance.	Aug-25		
Ashley	33151	2022	Tree trimming and hazard tree review.	Apr-24		
Ashley	33151	2022	State Hwy. 149 single-phase distribution relocation.	Apr-24	\$75K	WR# 30710730
Ashley	33151	2022	Eldridge Rd. single-phase distribution construction.	Apr-25	\$300K	Project C091948, WR# 30703041
Ashley	33151	2022	Cedar 51 to Ashley 51 feeder tie on State Hwy 149.	Apr-25	\$800K	Project C092239
Burgoyne	33751	2022	Complete level 2 maintenance.	Jun-23		
Burgoyne	33751	2022	Complete level 3 maintenance.	Nov-24		
Burgoyne	33751	2022	Hazard tree review.	Apr-24		
Burgoyne	33751	2022	Install recloser on County Hwy. 42.	Apr-23	\$80K	WR# 30657955
Burgoyne	33751	2022	State Hwy. 40 rebuild & conversion.	Sep-23	\$566K	Project C088851, WR# 30458546
Burgoyne	33751	2022	County Hwy. 42 regulator replacement.	Jun-23	\$60K	
Burgoyne	33751	2022	Convert Bean Hill Rd. to split West Rd. tap.	Apr-24	\$50K	WR# 30393188
Burgoyne	33751	2022	Rebuilt & convert Lick Springs Rd.	Apr-25	\$75K	WR# 26387081
Brook Road	36952	2022	Complete level 2 maintenance.	Apr-24		
Brook Road	36952	2022	Complete level 3 maintenance.	Apr-24		
Brook Road	36952	2022	Tree trimming and hazard tree review.	Dec-23		
Brook Road	36952	2022	Fuse coordination.	Apr-24		
Brook Road	36952	2022	Install three-phase recloser(s)	Apr-24		
Brook Road	36952	2022	Rebuild Greenfield Ave. to create a tie with Ballston 53.	Apr-26		
Union Street	37653	2022	Complete level 3 maintenance.	Apr-24		
Union Street	37653	2022	Tree trimming and hazard tree review.	Dec-23		
Union Street	37653	2022	Relocate rear lot distribution to Mc Millan Rd.	Apr-25	\$175K	Project C090094, WR# 30553018
Union Street	37653	2022	Fuse coordination.	Apr-24		
Union Street	37653	2022	Install three-phase recloser(s)	Apr-24		
Gilmantown	15451	2022	Complete level 3 maintenance.	Apr-24		
Gilmantown	15451	2022	Hazard tree review to the first protective device.	Apr-24		
Gilmantown	15451	2022	Replace State Hwy. 8, pole 253 ½ ratio transformer.	Jun-23	\$60K	WR# 21254408
Gilmantown	15451	2022	Replace State Hwy. 8, pole 256 recloser.	Apr-24	\$75K	
Gilmantown	15451	2022	Replace County Hwy. 24 ratio and recloser.	Apr-24	\$150K	
Gilmantown	15451	2022	Rebuild & convert the north side of Lake Pleasant.	Apr-26	\$1,346K	Project C082694, WR# 29795772
Gilmantown	15451	2022	Gilmantown battery storage.	Dec-28		Project C084937
Indian Lake	31076	2022	Complete level 3 maintenance.	Oct-23		
Indian Lake	31076	2022	Hazard tree review.	Apr-25		
Indian Lake	31076	2022	Fuse CSP's on State Hwy. 28.	Sep-23	\$35K	WR# 30675865
Chestertown	04251	2022	Complete level 3 maintenance.	Sep-24		
Chestertown	04251	2022	Hazard tree review to the first protective device.	Apr-24		
Chestertown	04251	2022	Investigate building three-phase tie to Warrensburg 52.	Apr-24		
Chestertown	04251	2022	Rebuild County Hwy. 8.	Apr-24	\$275K	Project C081454, WR# 30362261
Chestertown	04251	2022	U.S. Hwy. 9 rebuild/conversion.	Apr-25	\$330K	Project C081454, WR# 30563168
Sharon	36351	2022	Complete level 3 maintenance.	Apr-24		
Sharon	36351	2022	Route 20 4.8 kV conversion.	Apr-25	\$695K	Project C090689
Sharon	36351	2022	Hoose Rd. rear lot removal.	Apr-26	\$250K	Project C092362

Station	Feeder	Year	Action Plan	Est. Completion Date	Approx. Cost	Comments
Hudson Falls	08851	2022	Complete level 3 maintenance.	Feb-25		
Hudson Falls	08851	2022	Install recloser on Gibson St.	Dec-23	\$75K	WR# 30755355
Hudson Falls	08851	2022	Williams St. gap closing and load transfer.	Apr-24	\$80K	WR# 30756638
Hudson Falls	08851	2022	Denis St. gap closing and load transfer.	Apr-24	\$80K	WR# 30756640
Weibel Avenue	41551	2022	Tree trimming and a hazard tree review.	Dec-23		
Weibel Avenue	41551	2022	State Highway 29 overloaded ratio transformer relief.	Apr-24		
Weibel Avenue	41551	2022	Fuse coordination.	Apr-24		
Weibel Avenue	41551	2022	Install sectionalizing switch(es).	Apr-24		
Weibel Avenue	41551	2022	Burgoyne Rd. rear lot distribution removal.	Apr-24		
Weibel Avenue	41551	2022	State Highway 29 gap closing.	Apr-24		

b. STATUS OF ACTION PLANS FOR 2021 WORST PERFORMING CIRCUITS

Station	Feeder	Year	Action Plan	Est. Completion Date	Approx. Cost	Comments
Hague Road	41853	2022	Maintenance foot patrol.	Dec-23		On Schedule.
Hague Road	41853	2022	Rebuild & convert Alexandria Avenue.	Apr-24	\$500K	On Schedule.
Hague Road	41853	2022	Ti-Whitehall #3 and Ti-Republic #2, 115 kV rebuild.	Apr-24		On Schedule.
Indian Lake	31075	2022	Complete level 3 maintenance.	Oct-23		On Schedule.
Indian Lake	31075	2022	Install TripSavers on poles 87 & 170 ½ State Hwy 30.	Feb-23	\$25K	Complete.
Indian Lake	31075	2022	Fuse CSP's downstream of R89171.	Apr-23	\$15K	Under Construction.
Indian Lake	31075	2022	Fuse CSP's downstream of R89172.	Apr-23	\$15K	Under Construction.
Grand Street	43351	2022	Maintenance foot patrol.	Sep-22		Complete.
Grand Street	43351	2022	Tree trimming and hazard tree review.	Apr-23		75% Complete.
Grand Street	43351	2022	Rebuild State Hwy 145 to Ecker Hollow Rd.	Apr-23	\$277K	Under Construction.
Grand Street	43351	2022	Rebuild State Hwy. 145 west of Synders Corners Rd.	Apr-24	\$285K	Design complete. Awaiting construction.
Pottersville	42451	2022	Complete level 2 maintenance.	Sep-22		Complete.
Pottersville	42451	2022	Complete level 3 maintenance.	Aug-24		On Schedule.
Pottersville	42451	2022	Pottersville/Riparius Single Phase Tie	Apr-22	\$95K	Design complete. Stuck in ROW.
Indian Lake	31076	2022	Complete level 3 maintenance.	Oct-23		On Schedule.
Indian Lake	31076	2022	Fuse CSP's on State Hwy. 28.	Apr-23	\$15K	Design complete. Awaiting construction.
Sharon	36352	2022	Maintenance foot patrol.	Oct-22		Complete.
Sharon	36352	2022	Tree trimming and hazard tree review.	Apr-24		Out to bid, cyclic trim 23/24 on schedule.
Sharon	36352	2022	Relocate Sharon Hill Rd. recloser and install new Hoyt Rd recloser.	Apr-23	\$90K	Design complete, awaiting settings.
Cedar	45351	2022	Maintenance foot patrol.	Dec-23		On Schedule.
Cedar	45351	2022	Transfer load from Cedar 51 to Cedar 52.	Jun-22	\$40K	Complete.
Cedar	45351	2022	Joe Green Rd. ratio relief.	Apr-23	\$40K	Design complete. Stuck in ROW.
Cedar	45351	2022	Dean & Bardin Road rebuild.	Apr-23	\$65K	Design complete. Stuck in ROW.
Cedar	45351	2022	Cedar 51 to Ashley 51 feeder tie on State Hwy 149.	Apr-25		On Schedule.
Port Henry	38551	2022	Maintenance foot patrol.	Apr-22		Complete.
Port Henry	38551	2022	Tree trimming and hazard tree review.	Apr-23		75% Complete.
Port Henry	38551	2022	Convert Port Henry to 13.2 kV.	Apr-24	\$760K	Design complete. Awaiting construction.
Port Henry	38551	2022	Convert Broad Street to 13.2 kV.	Apr-25	\$750K	On Schedule.
Port Henry	38551	2022	Ti-Whitehall #3 and Ti-Republic #2, 115 kV rebuild.	Apr-24		On Schedule.
North Creek	12251	2022	Complete level 3 maintenance.	Dec-22		Complete.
Port Henry	38552	2022	Complete level 2 maintenance.	Sep-22		Complete.
Port Henry	38552	2022	Complete level 3 maintenance.	Aug-24		On Schedule.
Port Henry	38552	2022	TripSaver installations on Witherbee Rd.	Apr-22	\$10K	Complete.
Port Henry	38552	2022	Federal St. ratio relief.	Apr-23	\$50K	Under Construction.
Port Henry	38552	2022	Convert Moriah, Harry Allen & Breed Hill Rds. to 7.62 kV.	Apr-24	\$120K	Design complete. Awaiting construction.
Port Henry	38552	2022	Ti-Whitehall #3 and Ti-Republic #2, 115 kV rebuild.	Apr-24		On Schedule.
Crown Point	24951	2022	Complete level 3 maintenance.	Nov-23		On Schedule.
Crown Point	24951	2022	TripSaver installations on 4 distribution taps.	Apr-22	\$51K	Complete.
Crown Point	24951	2022	Pearl St. rebuild/conversion.	Apr-23	\$330K	Under Construction.
Crown Point	24951	2022	Creek Road rebuild/conversion.	Apr-24	\$175K	Design complete. Awaiting construction.
Crown Point	24951	2022	State Hwy. 9N rebuild/conversion.	Apr-25	\$500K	On Schedule.

Station	Feeder	Year	Action Plan	Est. Completion Date	Approx. Cost	Comments
Crown Point	24951	2022	Ti-Whitehall #3 and Ti-Republic #2, 115 kV rebuild.	Apr-24		On Schedule.
Middleburg	39051	2022	Complete level 3 maintenance.	Jul-23		On Schedule.
Middleburg	39051	2022	Middleburg 51 – Schoharie 51 loop scheme.	Jun-22	\$300K	Under Construction.
Middleburg	39051	2022	State Hwy 145 rebuild/conversion.	Apr-24	\$1,000K	Design complete. Awaiting construction.
Battenkill	34257	2022	Maintenance foot patrol.	Dec-23		On Schedule.
Battenkill	34257	2022	Relocate rear lot distribution on Irwin Rd.	Apr-23	\$100K	Under Construction.
Battenkill	34257	2022	County Hwy. 52 Storm Hardening.	Apr-23	\$500K	Under Construction.
Battenkill	34257	2022	Fuse coordination.	Apr-23		Under Construction.
Wilton	32951	2022	Complete level 3 maintenance.	Nov-23		On Schedule.
Wilton	32951	2022	Relocate rear lot distribution along Ballard Rd.	Apr-23	\$100K	Re-evaluating scope of project.
Wilton	32951	2022	Rebuild State Hwy 32 to create tie to Wilton 52.	Apr-24	\$680K	Design complete. Stuck in ROW.
Wilton	32951	2022	Rebuild State Hwy 50.	Apr-25		On Schedule.
Wilton	32951	2022	Replace vertical post insulators on Spier-Brook Rd #3, 34.5 kV line.	Apr-25		On Schedule.
Inghams	02051	2022	Complete level 3 maintenance.	Dec-22		Complete.
Inghams	02051	2022	Install TripSavers in various locations.	Jan-23		Complete.
Inghams	02051	2022	Tree trimming and hazard tree review.	Apr-24		Out to bid, cyclic trim 23/24 on schedule.
Inghams	02051	2022	Inghams substation rebuild & relocation.	Apr-26		On Schedule.
Brook Road	36952	2022	Maintenance foot patrol.	Nov-22		Complete.
Brook Road	36952	2022	Tree trimming and hazard tree review.	Apr-23		Complete.
EJ West	03851	2022	Tree trimming and hazard tree review.	Jun-22		Complete.
Sharon	36351	2022	Maintenance foot patrol.	Nov-22		Complete.
Sharon	36351	2022	State Hwy 10 rebuild/conversion.	Apr-25		On Schedule.
Hague Road	41851	2022	Maintenance foot patrol.	Dec-23		On Schedule.
Hague Road	41851	2022	Install TripSaver on State Hwy 74.	Apr-22	\$6K	Complete.
Hague Road	41851	2022	Ti-Whitehall #3 and Ti-Republic #2, 115 kV rebuild.	Apr-24		On Schedule.
Ashley	33151	2022	Rebuild & convert Goodman Road to 13.2 kV.	May-22	\$930K	Complete.
Ashley	33151	2022	Mid-cycle forestry review of Copeland Pond Road.	Sep-22		Out to bid, cyclic trim 23/24 on schedule.
Ashley	33151	2022	Maintenance foot patrol.	Aug-22		Complete.
Ashley	33151	2022	Hall Rd. & State Hwy 149 rebuild.	Apr-22	\$80K	Complete.
Ashley	33151	2022	State Hwy. 149 ratio relief.	Feb-23	\$25K	Complete.
Ashley	33151	2022	Hog Town Rd. ratio relief.	Jan-23	\$50K	Complete.
Ashley	33151	2022	Baldwin Corners Road rebuild/conversion, phase 4.	Jan-23	\$350K	Complete.
Ashley	33151	2022	Rebuild State Hwy. 149 between Hall Rd & Strainer Ln.	Nov-22	\$65K	Complete.
Ashley	33151	2022	Cedar 51 to Ashley 51 feeder tie on State Hwy 149.	Apr-25		On Schedule.

I. NORTHERN REGION

1. OPERATING REGIONAL PERFORMANCE

a. HISTORIC CAIDI AND SAIFI INDICES

IDS Info:

	2022	2021	2020	2019	2018	2017
CAIDI (Threshold 2.111)	1.49	1.81	2.07	2.00	1.84	2.34
SAIFI (Threshold 1.412)	1.61	1.29	1.28	1.15	1.34	1.48
SAIDI	2.41	2.34	2.65	2.29	2.47	3.45
Interruptions	1,644	1,717	1,797	1,673	1,683	1,831
Customers Interrupted	224,254	179,190	176,759	157,296	182,717	201,008
Customers Hours Interrupted	334,798	323,604	365,060	314,044	336,850	469,371
Customers Served	138,947	138,437	137,722	137,014	136,426	135,968
Customers Per Interruption	136.41	104.36	98.36	94.02	108.57	109.78
Availability Index	99.9725	99.9733	99.9698	99.9738	99.9718	99.9606
Interruptions/1000 Customers	11.83	12.40	13.05	12.21	12.34	13.47

b. DISCUSSION OF REGIONAL PERFORMANCE

In 2022, the Northern Region met its CAIDI reliability target and did not meet its SAIFI reliability target as set forth by the New York Public Service Commission (PSC). The final System Average Interruption Frequency Index (SAIFI) result was 1.61 interruptions, 14% above the PSC goal of 1.412 interruptions. As shown in the table above, the Customer Average Interruption Duration index (CAIDI) was 1.49 in 2022, 29% below the PSC's regional target of 2.111 hours.

The 2022 CAIDI result was 18% below the 2021 result of 1.81 hours, and 26% below the previous 5-year average of 2.02 hours. The 2022 SAIFI was 25% above the 2021 result of 1.29 interruptions, and 23% above the previous 5-year average of 1.31 interruptions.

In 2022, excluding major storms, the Northern Region experienced 15 transmission interruptions. These interruptions accounted for 1% of the region's total interruptions (15 of 1,644), 24% of the region's total customers interrupted (CI), (52,823 of 224,254), and 9% (28,469 of 334,798) of the region's total customer-hours interrupted (CHI). Overall, transmission interruptions had a CAIDI of .54 hours, and a SAIFI of 0.38 interruptions.

The number of transmission-related interruptions increased from 14 in 2021 to 15 in 2022 (an increase of 7%). The number of customers interrupted increased from 15,356 in 2021, to 52,823 in 2022 (an increase of 244%), while the customer-hours interrupted increased from 27,705 in 2021, to 28,469 in 2022 (an increase of 3%).

In 2022, excluding major storms, the Northern Region experienced 12 substation interruptions. These interruptions accounted for 1% of the region's total interruptions (12 of 1,644), 14% of the region's total customers interrupted, (30,552 of 224,254), and 21% (70,437 of 334,798) of the region's total customer-hours interrupted. Overall, substation interruptions had a CAIDI of 2.31 hours, and a SAIFI of 0.22 interruptions.

The number of substation-related interruptions increased from 9 to 12 from 2021 to 2022 (an increase of 33%). The number of customers interrupted increased from 24,922 in 2021, to 30,552 in 2022 (an increase of 23%), while the customer-hours interrupted increased from 56,315 in 2021, to 70,437 in 2022 (an increase of 25%).

In 2022, excluding major storms, the Northern Region experienced 1,617 distribution interruptions. These interruptions accounted for 98% of the region's total interruptions (1,617 of 1,644), 63% of the region's total customers interrupted, (140,879 of 224,254), and 70% (235,892 of 334,798) of the region's total customer-hours interrupted. Overall, distribution interruptions had a CAIDI of 1.67 hours, and a SAIFI of 1.01 interruptions.

c. MONTHLY CAIDI AND SAIFI GRAPHS

The graphs on the following page show the monthly CAIDI and Year-to-Date SAIFI for the Northern Region for 2022 (Excluding Major Storms).

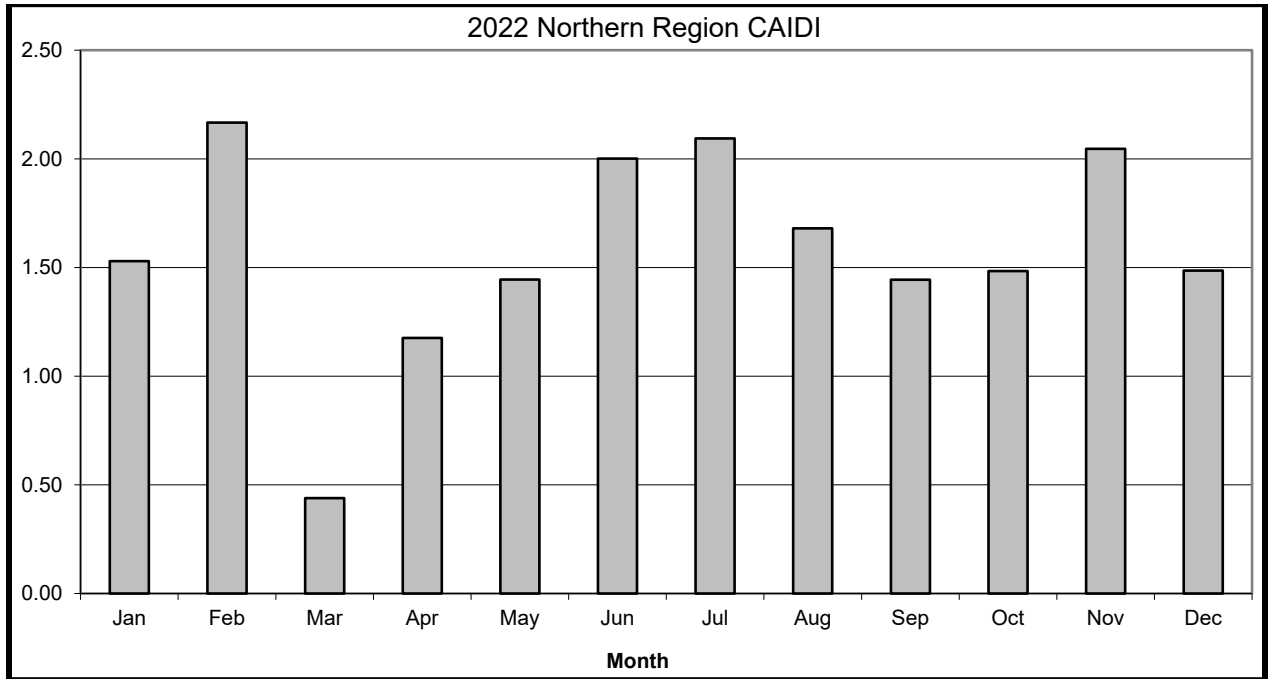
The CAIDI graph shows the individual CAIDI by month. The Northern Region was below the CAIDI threshold of 2.111 hours for 11 of the 12 months in 2022, with February being the one month above threshold.

- December was the highest month with a CAIDI of 2.17 hours, accounting for 3% of the customers interrupted (6,308 of 224,254) and 3% of the customer-hours interrupted (9,373 of 334,798). The Northern Region ended the year with an overall CAIDI of 1.49.

The SAIFI graph shows the cumulative SAIFI by month. The Northern Region ended the year at 1.61 interruptions, above the SAIFI threshold of 1.412 interruptions.

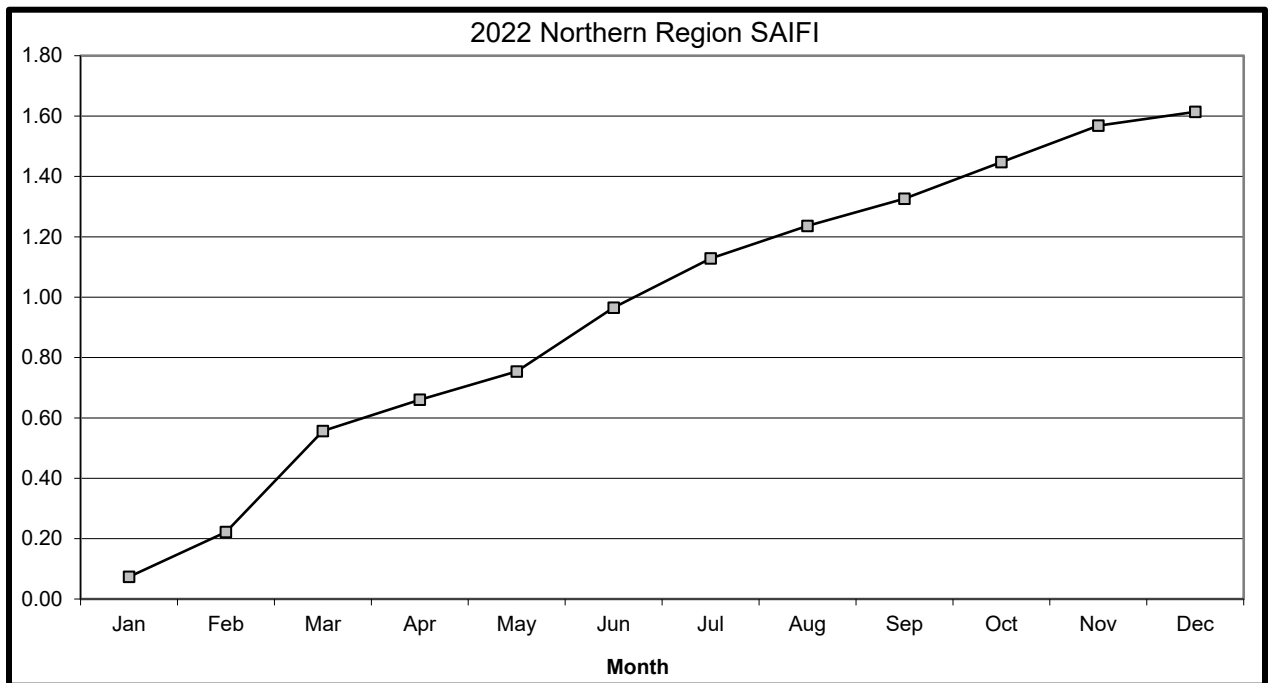
- Excluding Major Storms, there were 20,564 customers interrupted from February to March. Between February through March SAIFI increased by 0.34. This is mainly due to the 14,547 customer interruptions caused by device failures.

GRAPH OF MONTHLY CAIDI AND SAIFI FOR THE NORTHERN REGION



PSC CAIDI Goal:	
Threshold	2.111
2022 Actual	1.49

PSC SAIFI Goal:	
Threshold	1.412
2022 Actual	1.61



d. PSC CAUSE CODES

1) Number of Events by Cause – Historical

IDS Info:

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	1,286	670	945	1,144	180	109
02 Tree Contacts	433	536	480	504	651	550
03 Overloads	6	8	5	5	7	8
04 Oper. Error	2	8	3	6	2	4
05 Equipment	360	382	425	408	454	385
06 Accidents	350	284	248	262	250	245
07 Prearranged	52	62	48	35	23	36
08 Cust. Equip.	0	0	0	0	0	0
09 Lightning	127	124	115	63	118	61
10 Unknown	314	313	349	400	326	365
Total	2,930	2,387	1,898	2,618	2,827	2,011

2) Customers Interrupted by Cause – Historical

IDS Info:

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	102,811	65,782	67,523	84,763	24,128	7,270
02 Tree Contacts	50,158	50,011	51,796	37,260	63,157	44,582
03 Overloads	428	247	10	18	4,534	49
04 Oper. Error	14	9,352	216	199	1,227	3,063
05 Equipment	104,230	53,029	50,671	75,891	57,339	65,689
06 Accidents	43,175	28,386	23,453	21,395	21,261	29,019
07 Prearranged	9,326	11,909	4,693	11,819	18,165	5,229
08 Cust. Equip.	0	0	0	0	0	0
09 Lightning	3,782	4,583	3,459	3,710	5,987	4,255
10 Unknown	13,141	21,673	22,998	32,425	29,338	30,260
Total	327,065	244,972	186,042	224,819	267,480	225,136

3) Customer-Hours Interrupted by Cause – Historical

IDS Info:

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	543,011	585,445	598,233	694,029	108,835	51,793
02 Tree Contacts	95,121	111,124	105,293	94,622	158,959	126,982
03 Overloads	827	161	30	79	24,363	86
04 Oper. Error	17	7,022	121	331	616	1,719
05 Equipment	121,165	110,743	98,734	134,501	168,457	115,525
06 Accidents	73,153	35,798	59,150	38,125	33,613	38,178
07 Prearranged	16,618	11,707	4,463	19,859	12,312	4,545
08 Cust. Equip.	0	0	0	0	0	0
09 Lightning	6,184	9,314	7,427	5,054	10,919	7,665
10 Unknown	21,714	37,737	38,826	44,277	60,133	46,143
Total	877,810	909,050	393,578	912,278	1,030,877	578,206

4) Interruptions, Customers Interrupted and Customer-Hours Interrupted – 2022

Cause Code	Interruptions		Customers Interrupted		Customer-hours Interrupted	
	Number	% Total	Number	% Total	Number	% Total
01 Major Storms	1,286	43.9%	102,811	31.4%	543,011	61.9%
02 Tree Contacts	433	14.8%	50,158	15.3%	95,121	10.8%
03 Overloads	6	0.2%	428	0.1%	827	0.1%
04 Oper. Error	2	0.1%	14	0.0%	17	0.0%
05 Equipment	360	12.3%	104,230	31.9%	121,165	13.8%
06 Accidents	350	11.9%	43,175	13.2%	73,153	8.3%
07 Prearranged	52	1.8%	9,326	2.9%	16,618	1.9%
08 Cust. Equip.	0	0.0%	0	0.0%	0	0.0%
09 Lightning	127	4.3%	3,782	1.2%	6,184	0.7%
10 Unknown	314	10.7%	13,141	4.0%	21,714	2.5%
Total	2,930	100.0%	327,065	100.0%	877,810	100.0%

e. **INTERRUPTION REVIEW BY PSC CAUSE CODES**

Cause Code 01 - Major Storms

In 2022, Major Storms accounted for 44% of interruptions, 31% of customers interrupted, and 62% of Customer-Hours Interrupted.

Interruptions due to Major Storm were up 92% from 2021, and up 112% over the 5-year average. Customers interrupted due to Major Storms were up 56% from 2021, and up 104% over the 5-year average. Customer-Hours interrupted were down 7% from 2021 and up 35% over the 5-year average.

The remaining PSC code descriptions do not include Major Storms in the percentages.

Cause Code 02 - Tree Contacts

In 2022, Tree Contacts accounted for 26% of interruptions, 22% of customers interrupted, and 28% of Customer-Hours Interrupted.

Interruptions due to Tree Contacts were down 19% from 2021, and down 21% over the 5-year average. Customers interrupted due to Tree Contacts were up 0% from 2021, and up 1% over the 5-year average. Customer-Hours interrupted were down 14% from 2021 and down 18% over the 5-year average.

Tree Contacts were the largest cause of interruptions in 2022.

Cause Code 03 - Overloads

In 2022, Overloads accounted for 0% of interruptions, 0% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Overloads were down 25% from 2021, and down 14% over the 5-year average. Customers interrupted due to Overloads were up 73% from 2021, and down 56% over the 5-year average. Customer-Hours interrupted were up 415% from 2021 and down 83% over the 5-year average.

Overloads were the 7th largest cause of interruptions in 2022.

Cause Code 04 - Operator Error

In 2022, Operator Errors accounted for 0% of interruptions, 0% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Operator Error were down 75% from 2021, and down 60% over the 5-year average. Customers interrupted due to Operator Error were down 100% from 2021, and down 100% over the 5-year average. Customer-Hours interrupted were down 100% from 2021 and down 99% over the 5-year average.

Operator Error was the 8th largest cause of interruptions in 2022.

Cause Code 05 - Equipment Failure

In 2022, Equipment Failure accounted for 22% of interruptions, 46% of customers interrupted, and 36% of Customer-Hours Interrupted.

Interruptions due to Equipment Failure were down 6% from 2021, and down 13% over the 5-year average. Customers interrupted due to Equipment Failure were up 97% from 2021, and up 80% over the 5-year average. Customer-Hours interrupted were up 9% from 2021 and down 5% over the 5-year average.

Equipment Failures were the 2nd largest cause of interruptions in 2022.

Cause Code 06 - Accidents

In 2022, Accidents accounted for 21% of interruptions, 19% of customers interrupted, and 22% of Customer-Hours Interrupted.

Interruptions due to Accidents were up 23% from 2021, and up 30% over the 5-year average. Customers interrupted due to Accidents were up 52% from 2021, and up 66% over the 5-year average. Customer-Hours interrupted were up 104% from 2021 and up 52% over the 5-year average.

Accidents were the 3rd largest cause of interruptions in 2022.

Cause Code 07 - Prearranged

In 2022, Prearranged accounted for 3% of interruptions, 4% of customers interrupted, and 5% of Customer-Hours Interrupted.

Interruptions due to Prearranged were down 16% from 2021, and up 13% over the 5-year average. Customers interrupted due to Prearranged were down 22% from 2021, and down 19% over the 5-year average. Customer-Hours interrupted were up 42% from 2021 and up 45% over the 5-year average.

Prearranged was the 6th largest cause of interruptions in 2022.

Cause Code 08 - Customer Equipment

There were no Customer Equipment interruptions in 2022.

Cause Code 09 - Lightning

In 2022, Lightning accounted for 8% of interruptions, 2% of customers interrupted, and 2% of Customer-Hours Interrupted.

Interruptions due to Lightning were up 2% from 2021, and up 28% over the 5-year average. Customers interrupted due to Lightning were down 17% from 2021, and down 9% over the 5-year average. Customer-Hours interrupted were down 34% from 2021 and down 16% over the 5-year average.

Lightning was the 5th largest cause of interruptions in 2022.

Cause Code 10 - Unknown

In 2022, Unknown causes accounted for 19% of interruptions, 6% of customers interrupted, and 6% of Customer-Hours Interrupted.

Interruptions due to Unknown causes were up 0% from 2021, and down 10% over the 5-year average. Customers interrupted due to Unknown causes were down 39% from 2021, and down 49% over the 5-year average. Customer-Hours interrupted were down 42% from 2021 and down 51% over the 5-year average.

Unknown causes were the 4th largest cause of interruptions in 2022.

f. DISCUSSION OF REGIONAL CAPEX PROJECTS WITH 2021/2022 SPENDS:

The Northern Region continues to work on capital projects in order to maintain customer satisfaction and future reliability. Some specific projects that were constructed in either CY22 or will be constructed in CY23 are listed below, in addition to a description of a major infrastructure project.

There are load relief projects scheduled to be completed throughout the Northern Region. Most of these load relief projects are ratio transformer replacements or voltage conversions. Line reconductoring is also included in the voltage conversions where appropriate.

There are projects where lines are being rebuilt or reconductored. These projects are either the result of the company's Storm Hardening program, engineering reliability reviews (ERRs) conducted on the Worst Performing Circuits, or are the responses to customer inquiries via the Quick Resolution System (QRS).

Major Capital Projects for Northern Region:

Region	Project Name	Project Type	Fin Sys Proj. No.	Finish	Total Spend
	Malone-Lake Colby #5		C088406	10/3/22	\$2,750,000
	Lake Colby-Lake Placid #3 -		C088407	10/3/22	\$1,750,000
	Coffeen-Black River Woodpecker Part 1		C084018	11/10/22	\$1,790,000
	Coffeen-Black River Woodpecker Part 2		C084018	11/10/22	\$1,790,000
	NR Lyme 73351 81455 NYS Hwy12E		CD01295	7/25/22	\$1,244,000
	Fort Covington-N Bombay Fdr Tie1		C077854	8/15/22	\$1,608,033
	Fort Covington-N Bombay Fdr Tie 2		C077856	8/15/22	\$1,802,007
	OGDENSBURG M9000 RTU - C069437		C069437	4/29/22	\$1,870,000
	MCADOO STATION M9000 RTU - C069687		C069687	11/23/22	\$1,251,00

g. DISCUSSION OF REGIONAL PERFORMANCE OF LVAC NETWORK DISTRIBUTION SYSTEM(S):

City of Watertown – Mill Street LVAC Network

The Watertown LVAC Network serves the Public Square area of the City of Watertown as well as one or two blocks of the following streets: Court Street, Arsenal Street, Stone Street, Washington Street, Clinton Street, Franklin Street, and State Street. This network is supplied by 6 – 4.8kV feeders, all from the Mill Street Substation. This system serves approximately 667 customer accounts and experienced a peak load of approximately 3.815 MVA in 2022 With the 75

The table below lists the breaker operations in 2022 that were a result of a fault and/or failure.

Substation	Feeder Number	Breaker Number	# Breaker Operations from Failures
Mill Street	74860	R600	0
Mill Street	74871	R710	0
Mill Street	74872	R720	0
Mill Street	74873	R730	0
Mill Street	74874	R740	0
Mill Street	74875	R750	0

As shown above, the Watertown LVAC Network experienced zero feeder outages in 2022. At no time was the network operated beyond its single contingency (N-1) design criteria.

There were no major events associated with the network in 2022.

Annual maintenance consisted of manhole and vault inspections, network protector and transformer inspections and network protector operation checks.

Equipment maintenance consisted of manhole and vault rebuilds, network protector and transformer replacements.

There are two major projects being worked upon:

1. Mill Street - 2014 Upgrades - N-1 Project

Resulting from the 04/2014 Network Study,

- 4.8kV Feeder 74875 was extended into the network and now is the 6th network feeder where transformers N7403, N7324, City Hall, & Flower Library Customer-owned Vault 104 have been transferred.
- The transfer of Vault N7106 from Feeder 74871 to 74874 has been completed.

- The reconfiguration of non-standard switching arrangement within Vault 104 to a padmount switchgear arrangement has been completed.

Upon completion of the addition of automatic reclosing relays associated with feeder breakers R720 & R750, then 4.8kV Network Feeders 74872 and 74875 are to be reconnected onto Bus "E" to eliminate the potential loss of 3 network feeders for either a 4.8kV station Bus "C" or a Bus "D" failure.

These network feeder transfers also involve two overhead feeders where one will be placed on 4.8kV station Bus "C" & another on Bus "D" which will provide an additional benefit of eliminating the potential loss of all four overhead feeders for a 4.8kV station Bus "E" failure.

A review of the Mill Street station feeders' relay settings has begun to determine if the present operational practice of opening the bus tie breakers can be eliminated for Arc Flash Mitigation at the station.

The project started in FY2020.

2. Mill Street - 2014 Upgrades - N-2 Project

Resulting from the 04/2014 Network Study, two 500kVA network transformers are proposed to be installed to support the general network during a double contingency condition:

- (1) One near the corner of Mill Street & Factory Avenue.
- (2) One near the corner of Franklin Street & Public Square.

The project is scheduled to start in FY2026.

2. OPERATING CIRCUIT LISTS

This section includes the following three tables and Worst Performing Circuit analysis for the Northern Region.

- a. Worst Performing Circuit List
- b. Worst Performing Circuits with 3 Year History for CAIDI and SAIFI Indices
- c. Worst Performing Circuits by number of Momentary Interruptions

a. NATIONAL GRID WORST PERFORMING CIRCUIT LIST

NORTHERN REGION

FEEDER #	A CUST. SERVED	B TOTAL INTER.	C # CUST. INTER.	D CUST. HRS. INTER.	C/A SAIFI	D/A SAIDI	D/C CAIDI	NUMBER OF MOMENTARIES
CHASM FALLS 85251	1,123	31	4,650	14,902	4.14	13.27	3.20	1
THOUSAND ISL 81452	2,183	39	7,357	17,783	3.37	8.15	2.42	7
HIGLEY 92452	1,404	30	7,816	7,675	5.57	5.47	0.98	2
DEKALB 98455	1,158	25	4,566	7,901	3.94	6.82	1.73	2
THOUSAND ISL 81456	989	24	4,401	7,235	4.45	7.32	1.64	3
W ADAMS 87554	2,545	33	6,325	11,264	2.49	4.43	1.78	1
N GOUVERNEUR 98352	1,620	23	4,486	7,873	2.77	4.86	1.76	1
E WATERTOWN 81756	2,779	28	9,610	9,480	3.46	3.41	0.99	3
THOUSAND ISL 81458	2,316	35	5,261	8,848	2.27	3.82	1.68	7
OGDENSBURG 93852	1,595	17	4,751	8,662	2.98	5.43	1.82	1
NORTH CARTHAGE 81652	2,315	45	4,997	7,901	2.16	3.41	1.58	6
NORTH CARTHAGE 81653	2,288	29	5,941	7,473	2.60	3.27	1.26	6
HAMMOND 37061	977	16	2,264	7,608	2.32	7.79	3.36	1
W ADAMS 87551	2,089	30	5,466	6,030	2.62	2.89	1.10	4

Regional Goals:
CAIDI 2.111
SAIFI 1.412

b. NATIONAL GRID WORST PERFORMING CIRCUITS WITH 3 YEAR HISTORY FOR CAIDI AND SAIFI INDICES

NORTHERN REGION

FEEDER #	2022 CAIDI	2021 CAIDI	2020 CAIDI	2019 CAIDI	2022 SAIFI	2021 SAIFI	2020 SAIFI	2019 SAIFI
CHASM FALLS 85251	3.20	3.35	2.72	3.08	4.14	0.71	0.68	0.68
THOUSAND ISL 81452	2.42	2.45	2.50	4.52	3.37	1.65	4.68	1.40
HIGLEY 92452	0.98	1.72	0.85	2.64	5.57	1.21	2.81	0.27
DEKALB 98455	1.73	1.81	2.56	1.74	3.94	1.07	1.60	0.54
THOUSAND ISL 81456	1.64	2.76	1.94	3.69	4.45	1.44	1.27	0.64
W ADAMS 87554	1.78	1.94	2.40	2.11	2.49	2.69	1.87	1.21
N GOUVERNEUR 98352	1.76	2.79	1.38	2.98	2.77	1.61	1.50	0.36
E WATERTOWN 81756	0.99	1.19	1.94	1.45	3.46	0.56	1.19	1.42
THOUSAND ISL 81458	1.68	3.10	1.69	2.07	2.27	0.69	2.08	1.31
OGDENSBURG 93852	1.82	1.74	2.10	0.46	2.98	0.62	1.02	0.04
NORTH CARTHAGE 81652	1.58	2.25	1.77	2.04	2.16	2.04	3.19	3.22
NORTH CARTHAGE 81653	1.26	1.40	1.72	2.43	2.60	2.64	4.41	2.03
HAMMOND 37061	3.36	1.10	1.52	3.04	2.32	1.75	1.88	2.28
W ADAMS 87551	1.10	2.09	1.93	2.03	2.62	1.71	1.02	1.96

Regional Goals:
 CAIDI 2.111
 SAIFI 1.412

c. NATIONAL GRID WORST PERFORMING CIRCUITS BY # OF MOMENTARY INTERRUPTIONS

NORTHERN REGION

Feeders			Customer Momentaries				Ranks		
Volts (kV)	Station Name	Ckt/F No.	Substation	Transmission	Distribution	Total	Within Region	Within System	Reliability Ranking
No circuits experienced 10 or more momentary interruptions in 2022.									

d. WORST PERFORMING CIRCUIT ANALYSIS

For 2022, the Company identified fourteen Worst Performing Circuits in the Northern Region. The list consists of thirteen 13.2kV circuits and one 4.8kV circuit.

For the Northern Region, the CAIDI threshold is 2.111 hours and the SAIFI threshold is 1.412 interruptions.

1. CHASM FALLS 85251 - 13.2kV

Profile: 1,123 Customers, 82.9 Circuit Miles
 Indices: CAIDI = 3.20, SAIFI = 4.14

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	19	61.29%	1,181	25.40%	3,585	24.06%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	4	12.90%	1,130	24.30%	2,303	15.46%
6	ACCIDENTS	1	3.23%	1,127	24.24%	5,753	38.60%
7	PREARRANGED	1	3.23%	1,127	24.24%	3,027	20.31%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	6.45%	2	0.04%	6	0.04%
10	UNKNOWN	4	12.90%	83	1.78%	229	1.53%
Totals		31	100.00%	4,650	100.00%	14,902	100.00%

Problem Analysis:

- There were 31 interruptions on the Chasm Falls 85251 in 2022.
- There were 3 transmission interruptions.
 - The first Transmission interruption occurred on June 24, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 24% of the total customers interrupted (1,119 of 4,650), and 15% of the total customer-hours interrupted (2,238 of 14,902).
 - The second Transmission interruption occurred on June 08, 2022, coded as a cause of no cause associated (PSC cause code 07). This lockout accounted for 24% of the total customers interrupted (1,127 of 4,650), and 20% of the total customer-hours interrupted (3,027 of 14,902). This outage was due to planned maintenance.
 - The third Transmission interruption occurred on June 24, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 24% of the total customers interrupted (1,127 of 4,650), and 39% of the total customer-hours interrupted (5,753 of 14,902). This outage was due to a motor vehicle accident.
- There were no substation interruptions.
- The remaining 28 events occurred at the distribution level.
- The distribution circuit breaker for the Chasm Falls 85251 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Chasm Falls 85251 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Chasm Falls 85251 in 2022, accounting for 61% of total interruptions (19 of 31). Equipment Failures were the 2nd leading cause of

interruptions, accounting for 13% of total interruptions (4 of 31). Unknown were the 3rd leading cause of interruptions, accounting for 13% of total interruptions (4 of 31).

- Trees were the leading cause of customers interrupted (CI) on the Chasm Falls 85251 in 2022, accounting for 25% of total customers interrupted (1,181 of 4,650). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 24% of total customers interrupted (1,130 of 4,650). Accidents were the 3rd leading cause of customers interrupted, accounting for 24% of total customers interrupted (1,127 of 4,650).
- Accidents were the leading cause of customer-hours interrupted (CHI) on the Chasm Falls 85251 in 2022, accounting for 39% of total customer-hours interrupted (5,753 of 14,902). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 24% of total customer-hours interrupted (3,585 of 14,902). Prearranged were the 3rd leading cause of customer-hours interrupted, accounting for 20% of total customer-hours interrupted (3,027 of 14,902).
- Of the 31 interruptions on this circuit, 28 affected 10 customers or less, with 20 being single customer outages.

Action Taken:

- In 2021, the Regional Forestry Department completed scheduled distribution cycle pruning.
- In May 2021, an I&M foot patrol was completed.
- All level 2 maintenance work identified from the feeder inspection was completed in 2022.

Action Plan:

- The next scheduled distribution cycle pruning will be completed in 2027.
- In 2023, the Regional Forestry Department will complete the hazard tree removal.
- All level 3 maintenance work identified from the feeder inspection will be completed in 2024.
- This feeder is scheduled to be inspected again in 2026.
- No further action is required.

2. THOUSAND ISL 81452 - 13.2kV

Profile: 2,183 Customers, 112.6 Circuit Miles
 Indices: CAIDI = 2.42, SAIFI = 3.37

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	12	30.77%	469	6.37%	2,226	12.52%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	17	43.59%	3,672	49.91%	7,188	40.42%
6	ACCIDENTS	6	15.38%	2,317	31.49%	6,180	34.76%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	3	7.69%	9	0.12%	55	0.31%
10	UNKNOWN	1	2.56%	890	12.10%	2,133	12.00%
Totals		39	100.00%	7,357	100.00%	17,783	100.00%

Problem Analysis:

- There were 39 interruptions on the Thousand Isl 81452 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on March 02, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 29% of the total customers interrupted (2,143 of 7,357), and 1% of the total customer-hours interrupted (263 of 17,783). This outage was due to a wire failure.
- There was 1 substation interruption.
 - This Substation interruption occurred on June 19, 2022, coded as a cause of animal (PSC cause code 06). This lockout accounted for 30% of the total customers interrupted (2,216 of 7,357), and 34% of the total customer-hours interrupted (6,020 of 17,783). This outage was due to a squirrel on the bus tie.
- The remaining 37 events occurred at the distribution level.
- The distribution circuit breaker for the Thousand Isl 81452 experienced 7 momentary operations in 2022.
- The distribution circuit breaker for the Thousand Isl 81452 experienced 0 sustained operations (lockouts) in 2022.
- Equipment Failures were the leading cause of interruptions on the Thousand Isl 81452 in 2022, accounting for 44% of total interruptions (17 of 39). Trees were the 2nd leading cause of interruptions, accounting for 31% of total interruptions (12 of 39). Accidents were the 3rd leading cause of interruptions, accounting for 15% of total interruptions (6 of 39).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Thousand Isl 81452 in 2022, accounting for 50% of total customers interrupted (3,672 of 7,357). Accidents were the 2nd leading cause of customers interrupted, accounting for 31% of total

customers interrupted (2,317 of 7,357). Unknown were the 3rd leading cause of customers interrupted, accounting for 12% of total customers interrupted (890 of 7,357).

- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Thousand Isl 81452 in 2022, accounting for 40% of total customer-hours interrupted (7,188 of 17,783). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 35% of total customer-hours interrupted (6,180 of 17,783). Trees were the 3rd leading cause of customer-hours interrupted, accounting for 13% of total customer-hours interrupted (2,226 of 17,783).
- Of the 39 interruptions on this circuit, 34 affected 10 customers or less, with 18 being single customer outages.

Action Taken:

- In 2022, the Regional Forestry Department completed the scheduled distribution cycle pruning.
- In November 2022, an I&M foot patrol was completed.

Action Plan:

- The next distribution cycle pruning is scheduled for 2028.
- All level 2 maintenance work identified from the feeder inspection will be completed in 2023.
- All level 3 maintenance work identified from the feeder inspection will be completed in 2025.
- The next I&M foot patrol is scheduled for 2027.
- There are no further actions required.

3. HIGLEY 92452 - 13.2kV

Profile: 1,404 Customers, 78.9 Circuit Miles
 Indices: CAIDI = 0.98, SAIFI = 5.57

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	12	40.00%	2,648	33.88%	2,675	34.85%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	20.00%	3,295	42.16%	4,022	52.40%
6	ACCIDENTS	4	13.33%	1,642	21.01%	610	7.95%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	8	26.67%	231	2.96%	368	4.80%
Totals		30	100.00%	7,816	100.00%	7,675	100.00%

Problem Analysis:

- There were 30 interruptions on the Higley 92452 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 30 events occurred at the distribution level.
- The distribution circuit breaker for the Higley 92452 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Higley 92452 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 36% of the total amount of customers interrupted (2,810 out of 7,816) and 32% of the total amount of the customer-hours interrupted (2,433 out of 7,675).
 - The first lockout occurred on July 12, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 18% of the total customers interrupted (1,408 of 7,816), and 3% of the total customer-hours interrupted (197 of 7,675). This outage is due to a motor vehicle crash that broke a pole.
 - The second lockout occurred on March 20, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 18% of the total customers interrupted (1,402 of 7,816), and 29% of the total customer-hours interrupted (2,236 of 7,675). This outage is due to an insulator failure.
- Trees were the leading cause of interruptions on the Higley 92452 in 2022, accounting for 40% of total interruptions (12 of 30). Unknown were the 2nd leading cause of interruptions, accounting for 27% of total interruptions (8 of 30). Equipment Failures were the 3rd leading cause of interruptions, accounting for 20% of total interruptions (6 of 30).

- Equipment Failures were the leading cause of customers interrupted (CI) on the Higley 92452 in 2022, accounting for 42% of total customers interrupted (3,295 of 7,816). Trees were the 2nd leading cause of customers interrupted, accounting for 34% of total customers interrupted (2,648 of 7,816). Accidents were the 3rd leading cause of customers interrupted, accounting for 21% of total customers interrupted (1,642 of 7,816).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Higley 92452 in 2022, accounting for 52% of total customer-hours interrupted (4,022 of 7,675). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 35% of total customer-hours interrupted (2,675 of 7,675). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 8% of total customer-hours interrupted (610 of 7,675).
- Of the 30 interruptions on this circuit, 19 affected 10 customers or less, with 11 being single customer outages.

Action Taken:

- In June 2021, an I&M foot patrol was completed.
- All level 2 maintenance work identified from the feeder inspection was completed in 2022.
- In 2020, the Regional Forestry Department completed the scheduled distribution cycle pruning.

Action Plan:

- The next I&M foot patrol will be completed in 2026.
- All level 3 maintenance work identified from the feeder inspection will be completed in 2024.
- The next distribution cycle pruning is scheduled for 2026.
- There are no further actions required.

4. DEKALB 98455 – 13.2kV

Profile: 1,158 Customers, 109.1 Circuit Miles
 Indices: CAIDI = 1.73, SAIFI = 3.94

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	10	40.00%	2,470	54.10%	5,546	70.20%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	2	8.00%	19	0.42%	49	0.63%
6	ACCIDENTS	6	24.00%	1,611	35.28%	2,055	26.01%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	8.00%	3	0.07%	7	0.08%
10	UNKNOWN	5	20.00%	463	10.14%	244	3.08%
Totals		25	100.00%	4,566	100.00%	7,901	100.00%

Problem Analysis:

- There were 25 interruptions on the Dekalb 98455 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 25 events occurred at the distribution level.
- The distribution circuit breaker for the Dekalb 98455 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Dekalb 98455 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 25% of the total amount of customers interrupted (1,150 out of 4,566) and 22% of the total amount of the customer-hours interrupted (1,761 out of 7,901).
 - This lockout occurred on July 25, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 25% of the total customers interrupted (1,150 of 4,566), and 22% of the total customer-hours interrupted (1,761 of 7,901). This outage is due to a tree branch falling across the phases.
- Trees were the leading cause of interruptions on the Dekalb 98455 in 2022, accounting for 40% of total interruptions (10 of 25). Accidents were the 2nd leading cause of interruptions, accounting for 24% of total interruptions (6 of 25). Unknown were the 3rd leading cause of interruptions, accounting for 20% of total interruptions (5 of 25).
- Trees were the leading cause of customers interrupted (CI) on the Dekalb 98455 in 2022, accounting for 54% of total customers interrupted (2,470 of 4,566). Accidents were the 2nd leading cause of customers interrupted, accounting for 35% of total customers interrupted (1,611 of 4,566). Unknown were the 3rd leading cause of customers interrupted, accounting for 10% of total customers interrupted (463 of 4,566).

- Trees were the leading cause of customer-hours interrupted (CHI) on the Dekalb 98455 in 2022, accounting for 70% of total customer-hours interrupted (5,546 of 7,901). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 26% of total customer-hours interrupted (2,055 of 7,901). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (244 of 7,901).
- Of the 25 interruptions on this circuit, 26 affected 10 customers or less, with 15 being single customer outages.

Action Taken:

- An I&M foot patrol was completed in March 2022.
- In 2019, the Regional Forestry Department completed the scheduled distribution cycle pruning.

Action Plan:

- The next I&M foot patrol will be completed in 2027.
- All level 2 maintenance work identified from the feeder inspection will be completed in 2023.
- All level 3 maintenance work identified from the feeder inspection will be completed in 2025.
- The next distribution cycle pruning is scheduled for 2025.
- No further actions are required.

5. THOUSAND ISL 81456 - 13.2kV

Profile: 989 Customers, 81.5 Circuit Miles
 Indices: CAIDI = 1.64, SAIFI = 4.45

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	4	16.67%	407	9.25%	911	12.58%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	9	37.50%	1,815	41.24%	2,537	35.07%
6	ACCIDENTS	7	29.17%	2,175	49.42%	3,776	52.18%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	4.17%	1	0.02%	4	0.05%
10	UNKNOWN	3	12.50%	3	0.07%	8	0.11%
Totals		24	100.00%	4,401	100.00%	7,235	100.00%

Problem Analysis:

- There were 24 interruptions on the Thousand Isl 81456 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on March 02, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 22% of the total customers interrupted (988 of 4,401), and 2% of the total customer-hours interrupted (121 of 7,235). This outage is the result of an insulator failure.
- There was 1 substation interruption.
 - This Substation interruption occurred on June 19, 2022, coded as a cause of animal (PSC cause code 06). This lockout accounted for 22% of the total customers interrupted (989 of 4,401), and 20% of the total customer-hours interrupted (1,467 of 7,235). This outage is due to a squirrel on the station bus tie.
- The remaining 22 events occurred at the distribution level.
- The distribution circuit breaker for the Thousand Isl 81456 experienced 3 momentary operations in 2022.
- The distribution circuit breaker for the Thousand Isl 81456 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 22% of the total amount of customers interrupted (989 out of 4,401) and 26% of the total amount of the customer-hours interrupted (1,873 out of 7,235).
 - This lockout occurred on June 29, 2022, coded as a cause of animal (PSC cause code 06). This lockout accounted for 22% of the total customers interrupted (989 of 4,401), and 26% of the total customer-hours interrupted (1,873 of 7,235). This outage is due to an Osprey nest on the primary.
- Equipment Failures were the leading cause of interruptions on the Thousand Isl 81456 in 2022, accounting for 38% of total interruptions (9 of 24). Accidents were the 2nd leading

cause of interruptions, accounting for 29% of total interruptions (7 of 24). Trees were the 3rd leading cause of interruptions, accounting for 17% of total interruptions (4 of 24).

- Accidents were the leading cause of customers interrupted (CI) on the Thousand Isl 81456 in 2022, accounting for 49% of total customers interrupted (2,175 of 4,401). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 41% of total customers interrupted (1,815 of 4,401). Trees were the 3rd leading cause of customers interrupted, accounting for 9% of total customers interrupted (407 of 4,401).
- Accidents were the leading cause of customer-hours interrupted (CHI) on the Thousand Isl 81456 in 2022, accounting for 52% of total customer-hours interrupted (3,776 of 7,235). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 35% of total customer-hours interrupted (2,537 of 7,235). Trees were the 3rd leading cause of customer-hours interrupted, accounting for 13% of total customer-hours interrupted (911 of 7,235).
- Of the 24 interruptions on this circuit, 12 affected 10 customers or less, with 7 being single customer outages.

Action Taken:

- In 2022, the Regional Forestry Department completed the scheduled distribution cycle pruning.
- In April 2019, an I&M foot patrol was completed.
- The level 2 maintenance work identified from the feeder inspection was completed in 2020.
- The level 3 maintenance work identified from the feeder inspection was completed in 2022.

Action Plan:

- The next I&M foot patrol is scheduled for 2024.
- The next distribution cycle pruning is scheduled for 2028.
- At this time, no further action is required.

6. W ADAMS 87554 – 13.2kV

Profile: 2,545 Customers, 169.0 Circuit Miles
 Indices: CAIDI = 1.78, SAIFI = 2.49

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	6	18.18%	1,832	28.96%	6,631	58.87%
3	OVERLOADS	1	3.03%	1	0.02%	1	0.01%
4	OPER. ERROR	1	3.03%	1	0.02%	10	0.09%
5	EQUIPMENT	7	21.21%	4,257	67.30%	4,270	37.91%
6	ACCIDENTS	11	33.33%	212	3.35%	289	2.57%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	6.06%	15	0.24%	40	0.36%
10	UNKNOWN	5	15.15%	7	0.11%	22	0.20%
Totals		33	100.00%	6,325	100.00%	11,264	100.00%

Problem Analysis:

- There were 33 interruptions on the W Adams 87554 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on March 02, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 40% of the total customers interrupted (2,537 of 6,325), and 3% of the total customer-hours interrupted (311 of 11,264). This outage was due to an insulator failure.
- There were no substation interruptions.
- The remaining 32 events occurred at the distribution level.
- The distribution circuit breaker for the W Adams 87554 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the W Adams 87554 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 25% of the total amount of customers interrupted (1,591 out of 6,325) and 54% of the total amount of the customer-hours interrupted (6,047 out of 11,264).
 - This lockout occurred on June 25, 2022, coded as a cause of tree growth (PSC cause code 02). This lockout accounted for 25% of the total customers interrupted (1,591 of 6,325), and 54% of the total customer-hours interrupted (6,047 of 11,264). This outage is due to tree growth that resulted in a switch catching fire.
- Accidents were the leading cause of interruptions on the W Adams 87554 in 2022, accounting for 33% of total interruptions (11 of 33). Equipment Failures were the 2nd leading cause of interruptions, accounting for 21% of total interruptions (7 of 33). Trees were the 3rd leading cause of interruptions, accounting for 18% of total interruptions (6 of 33).

- Equipment Failures were the leading cause of customers interrupted (CI) on the W Adams 87554 in 2022, accounting for 67% of total customers interrupted (4,257 of 6,325). Trees were the 2nd leading cause of customers interrupted, accounting for 29% of total customers interrupted (1,832 of 6,325). Accidents were the 3rd leading cause of customers interrupted, accounting for 3% of total customers interrupted (212 of 6,325).
- Trees were the leading cause of customer-hours interrupted (CHI) on the W Adams 87554 in 2022, accounting for 59% of total customer-hours interrupted (6,631 of 11,264). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 38% of total customer-hours interrupted (4,270 of 11,264). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (289 of 11,264).
- Of the 33 interruptions on this circuit, 22 affected 10 customers or less, with 16 being single customer outages.

Action Taken:

- In 2019, the Regional Forestry Department completed the scheduled distribution cycle pruning.
- In September 2021, an I&M foot patrol was completed.
- The level 2 maintenance work identified was completed in 2022.

Action Plan:

- The level 3 maintenance work identified will be completed in 2024.
- The next I&M foot patrol is scheduled for 2026.
- The next distribution cycle pruning is scheduled for 2025.
- In 2025, the Regional Forestry Department will be performing hazard tree removal.
- No further actions are required.

7. N GOUVERNEUR 98352 – 13.2kV

Profile: 1,620 Customers, 122.3 Circuit Miles
 Indices: CAIDI = 1.76, SAIFI = 2.77

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	8	34.78%	802	17.88%	2,292	29.12%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	8	34.78%	3,457	77.06%	5,402	68.61%
6	ACCIDENTS	1	4.35%	4	0.09%	10	0.12%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	6	26.09%	223	4.97%	170	2.15%
Totals		23	100.00%	4,486	100.00%	7,873	100.00%

Problem Analysis:

- There were 23 interruptions on the N Gouverneur 98352 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 23 events occurred at the distribution level.
- The distribution circuit breaker for the N Gouverneur 98352 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the N Gouverneur 98352 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 36% of the total amount of customers interrupted (1,602 out of 4,486) and 42% of the total amount of the customer-hours interrupted (3,312 out of 7,873).
 - The first lockout occurred on February 17, 2022, coded as a cause of deterioration (PSC cause code 05). This lockout accounted for 1% of the total customers interrupted (25 of 4,486), and 0% of the total customer-hours interrupted (37 of 7,873). This outage was due to a switch failure.
 - The second lockout occurred on October 16, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 35% of the total customers interrupted (1,577 of 4,486), and 42% of the total customer-hours interrupted (3,274 of 7,873). This outage was due to an insulator failure.
- Trees were the leading cause of interruptions on the N Gouverneur 98352 in 2022, accounting for 35% of total interruptions (8 of 23). Equipment Failures were the 2nd leading cause of interruptions, accounting for 35% of total interruptions (8 of 23). Unknown were the 3rd leading cause of interruptions, accounting for 26% of total interruptions (6 of 23).

- Equipment Failures were the leading cause of customers interrupted (CI) on the N Gouverneur 98352 in 2022, accounting for 77% of total customers interrupted (3,457 of 4,486). Trees were the 2nd leading cause of customers interrupted, accounting for 18% of total customers interrupted (802 of 4,486). Unknown were the 3rd leading cause of customers interrupted, accounting for 5% of total customers interrupted (223 of 4,486).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the N Gouverneur 98352 in 2022, accounting for 69% of total customer-hours interrupted (5,402 of 7,873). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 29% of total customer-hours interrupted (2,292 of 7,873). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 2% of total customer-hours interrupted (170 of 7,873).
- Of the 23 interruptions on this circuit, 19 affected 10 customers or less, with 10 being single customer outages.

Action Taken:

- In 2018, the Regional Forestry Department completed the scheduled distribution cycle pruning.
- In July 2018, an I&M foot patrol was completed.
- The level 2 maintenance work identified from the feeder inspection was completed in 2019.
- The level 3 maintenance work identified from the feeder inspection was completed in 2021.

Action Plan:

- The next I&M foot patrol will be completed in 2023.
- The next distribution cycle pruning is scheduled for 2024.
- In 2023, the Regional Forestry Department will be performing hazard tree removal.
- No further actions are required.

8. E WATERTOWN 81756 - 13.2kV

Profile: 2,779 Customers, 74.2 Circuit Miles
 Indices: CAIDI = 0.99, SAIFI = 3.46

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	8	28.57%	2,519	26.21%	4,550	48.00%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	9	32.14%	5,739	59.72%	3,286	34.67%
6	ACCIDENTS	7	25.00%	1,291	13.43%	1,443	15.22%
7	PREARRANGED	1	3.57%	2	0.02%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	3	10.71%	59	0.61%	200	2.11%
Totals		28	100.00%	9,610	100.00%	9,480	100.00%

Problems Analysis:

- There were 28 interruptions on the E Watertown 81756 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on March 02, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 29% of the total customers interrupted (2,777 of 9,610), and 4% of the total customer-hours interrupted (341 of 9,480). This outage was due to an insulator failure.
- There were no substation interruptions.
- The remaining 27 events occurred at the distribution level.
- The distribution circuit breaker for the E Watertown 81756 experienced 3 momentary operations in 2022.
- The distribution circuit breaker for the E Watertown 81756 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 29% of the total amount of customers interrupted (2,824 out of 9,610) and 25% of the total amount of the customer-hours interrupted (2,345 out of 9,480).
 - This lockout occurred on September 28, 2022, coded as a cause of fire on company equipment (PSC cause code 05). This lockout accounted for 29% of the total customers interrupted (2,824 of 9,610), and 25% of the total customer-hours interrupted (2,345 of 9,480). This outage was due to an insulator failure.
- Equipment Failures were the leading cause of interruptions on the E Watertown 81756 in 2022, accounting for 32% of total interruptions (9 of 28). Trees were the 2nd leading cause of interruptions, accounting for 29% of total interruptions (8 of 28). Accidents were the 3rd leading cause of interruptions, accounting for 25% of total interruptions (7 of 28).

- Equipment Failures were the leading cause of customers interrupted (CI) on the E Watertown 81756 in 2022, accounting for 60% of total customers interrupted (5,739 of 9,610). Trees were the 2nd leading cause of customers interrupted, accounting for 26% of total customers interrupted (2,519 of 9,610). Accidents were the 3rd leading cause of customers interrupted, accounting for 13% of total customers interrupted (1,291 of 9,610).
- Trees were the leading cause of customer-hours interrupted (CHI) on the E Watertown 81756 in 2022, accounting for 48% of total customer-hours interrupted (4,550 of 9,480). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 35% of total customer-hours interrupted (3,286 of 9,480). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 15% of total customer-hours interrupted (1,443 of 9,480).
- Of the 28 interruptions on this circuit, 13 affected 10 customers or less, with 4 being single customer outages.

Action Taken:

- An I&M foot patrol was completed in April 2021.
- The level 2 maintenance work identified from the feeder inspection was completed in 2022.
- In 2019, the Regional Forestry Department completed the scheduled distribution cycle pruning.

Action Plan:

- The level 3 maintenance work identified from the feeder inspection will be completed by 2024.
- The next I&M foot patrol is scheduled to be completed in 2026.
- The next distribution cycle pruning is scheduled for 2025.
- In 2023, the Regional Forestry Department is performing hazard tree removal.
- No further actions are required.

9. THOUSAND ISL 81458 - 13.2kV

Profile: 2,316 Customers, 132.7 Circuit Miles
 Indices: CAIDI = 1.68, SAIFI = 2.27

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	4	11.43%	102	1.94%	612	6.92%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	11	31.43%	2,533	48.15%	1,690	19.10%
6	ACCIDENTS	9	25.71%	2,404	45.69%	6,223	70.33%
7	PREARRANGED	2	5.71%	5	0.10%	19	0.21%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	5	14.29%	6	0.11%	24	0.28%
10	UNKNOWN	4	11.43%	211	4.01%	279	3.16%
Totals		35	100.00%	5,261	100.00%	8,848	100.00%

Problem Analysis:

- There were 35 interruptions on the Thousand Isl 81458 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on March 02, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 44% of the total customers interrupted (2,305 of 5,261), and 3% of the total customer-hours interrupted (283 of 8,848). This outage was due to an insulator failure.
- There was 1 substation interruption.
 - This Substation interruption occurred on June 19, 2022, coded as a cause of animal (PSC cause code 06). This lockout accounted for 44% of the total customers interrupted (2,321 of 5,261), and 67% of the total customer-hours interrupted (5,957 of 8,848). This outage was due to a squirrel on the station bus tie.
- The remaining 33 events occurred at the distribution level.
- The distribution circuit breaker for the Thousand Isl 81458 experienced 7 momentary operations in 2022.
- The distribution circuit breaker for the Thousand Isl 81458 experienced 0 sustained operations (lockouts) in 2022.
- Equipment Failures were the leading cause of interruptions on the Thousand Isl 81458 in 2022, accounting for 31% of total interruptions (11 of 35). Accidents were the 2nd leading cause of interruptions, accounting for 26% of total interruptions (9 of 35). Lightning were the 3rd leading cause of interruptions, accounting for 14% of total interruptions (5 of 35).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Thousand Isl 81458 in 2022, accounting for 48% of total customers interrupted (2,533 of 5,261). Accidents were the 2nd leading cause of customers interrupted, accounting for 46% of total

customers interrupted (2,404 of 5,261). Unknown were the 3rd leading cause of customers interrupted, accounting for 4% of total customers interrupted (211 of 5,261).

- Accidents were the leading cause of customer-hours interrupted (CHI) on the Thousand Isl 81458 in 2022, accounting for 70% of total customer-hours interrupted (6,223 of 8,848). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 19% of total customer-hours interrupted (1,690 of 8,848). Trees were the 3rd leading cause of customer-hours interrupted, accounting for 7% of total customer-hours interrupted (612 of 8,848).
- Of the 35 interruptions on this circuit, 24 affected 10 customers or less, with 14 being single customer outages.

Action Taken:

- In 2017, the Regional Forestry Department completed the scheduled distribution cycle pruning.
- An I&M foot patrol was completed in October 2019.
- The level 2 maintenance work identified from the feeder inspection was completed in 2020.
- The level 3 maintenance work identified from the feeder inspection was completed in 2022.

Action Plan:

- The next I&M foot patrol is scheduled for 2024.
- The next distribution cycle pruning is scheduled for 2023.
- There are no further actions required.

10. OGDENSBURG 93852 – 13.2kV

Profile: 1,595 Customers, 55.8 Circuit Miles
 Indices: CAIDI = 1.82, SAIFI = 2.98

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	0	0.00%	0	0.00%	0	0.00%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	5	29.41%	2,487	52.35%	4,230	48.83%
6	ACCIDENTS	4	23.53%	1,662	34.98%	3,663	42.29%
7	PREARRANGED	1	5.88%	45	0.95%	203	2.34%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	5	29.41%	529	11.13%	531	6.13%
10	UNKNOWN	2	11.76%	28	0.59%	35	0.41%
Totals		17	100.00%	4,751	100.00%	8,662	100.00%

Problem Analysis:

- There were 17 interruptions on the Ogdensburg 93852 in 2022.
- There were no transmission interruptions.
- There was 1 substation interruption.
 - This Substation interruption occurred on February 09, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 34% of the total customers interrupted (1,595 of 4,751), and 34% of the total customer-hours interrupted (2,924 of 8,662). This outage was due to breaker failure.
- The remaining 16 events occurred at the distribution level.
- The distribution circuit breaker for the Ogdensburg 93852 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Ogdensburg 93852 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 34% of the total amount of customers interrupted (1,605 out of 4,751) and 41% of the total amount of the customer-hours interrupted (3,577 out of 8,662).
 - This lockout occurred on June 21, 2022, coded as a cause of animal (PSC cause code 06). This lockout accounted for 34% of the total customers interrupted (1,605 of 4,751), and 41% of the total customer-hours interrupted (3,577 of 8,662). This outage was due to an Osprey nest.
- Equipment Failures were the leading cause of interruptions on the Ogdensburg 93852 in 2022, accounting for 29% of total interruptions (5 of 17). Lightning were the 2nd leading cause of interruptions, accounting for 29% of total interruptions (5 of 17). Accidents were the 3rd leading cause of interruptions, accounting for 24% of total interruptions (4 of 17).

- Equipment Failures were the leading cause of customers interrupted (CI) on the Ogdensburg 93852 in 2022, accounting for 52% of total customers interrupted (2,487 of 4,751). Accidents were the 2nd leading cause of customers interrupted, accounting for 35% of total customers interrupted (1,662 of 4,751). Lightning were the 3rd leading cause of customers interrupted, accounting for 11% of total customers interrupted (529 of 4,751).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Ogdensburg 93852 in 2022, accounting for 49% of total customer-hours interrupted (4,230 of 8,662). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 42% of total customer-hours interrupted (3,663 of 8,662). Lightning were the 3rd leading cause of customer-hours interrupted, accounting for 6% of total customer-hours interrupted (531 of 8,662).
- Of the 17 interruptions on this circuit, 9 affected 10 customers or less, with 7 being single customer outages.

Action Taken:

- In 2022, the Regional Forestry Department completed the scheduled distribution cycle pruning.
- An I&M foot patrol was completed in October 2019.
- All level 2 maintenance work identified during the inspection was completed in 2020.
- All level 3 maintenance work identified during the inspection was completed in 2022.

Action Plan:

- The next I&M foot patrol is scheduled for 2024.
- The next distribution cycle pruning is scheduled for 2028.
- In 2023, the Regional Forestry Department is performing extended hazard tree maintenance.
- No further actions are required.

11. NORTH CARTHAGE 81652 - 13.2kV

Profile: 2,315 Customers, 160.5 Circuit Miles
 Indices: CAIDI = 1.58, SAIFI = 2.16

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	11	24.44%	833	16.67%	2,795	35.37%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	9	20.00%	3,524	70.52%	3,304	41.81%
6	ACCIDENTS	5	11.11%	204	4.08%	320	4.05%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	4	8.89%	8	0.16%	21	0.26%
10	UNKNOWN	16	35.56%	428	8.57%	1,462	18.51%
Totals		45	100.00%	4,997	100.00%	7,901	100.00%

Problem Analysis:

- There were 45 interruptions on the North Carthage 81652 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 45 events occurred at the distribution level.
- The distribution circuit breaker for the North Carthage 81652 experienced 6 momentary operations in 2022.
- The distribution circuit breaker for the North Carthage 81652 experienced 0 sustained operations (lockouts) in 2022.
- Unknown were the leading cause of interruptions on the North Carthage 81652 in 2022, accounting for 36% of total interruptions (16 of 45). Trees were the 2nd leading cause of interruptions, accounting for 24% of total interruptions (11 of 45). Equipment Failures were the 3rd leading cause of interruptions, accounting for 20% of total interruptions (9 of 45).
- Equipment Failures were the leading cause of customers interrupted (CI) on the North Carthage 81652 in 2022, accounting for 71% of total customers interrupted (3,524 of 4,997). Trees were the 2nd leading cause of customers interrupted, accounting for 17% of total customers interrupted (833 of 4,997). Unknown were the 3rd leading cause of customers interrupted, accounting for 9% of total customers interrupted (428 of 4,997).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the North Carthage 81652 in 2022, accounting for 42% of total customer-hours interrupted (3,304 of 7,901). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 35% of total customer-hours interrupted (2,795 of 7,901). Unknown were

the 3rd leading cause of customer-hours interrupted, accounting for 19% of total customer-hours interrupted (1,462 of 7,901).

- Of the 45 interruptions on this circuit, 35 affected 10 customers or less, with 23 being single customer outages.

Action Taken:

- In 2022, the Regional Forestry Department completed the scheduled distribution cycle pruning.
- An I&M foot patrol was completed in December 2019.
- All level 2 maintenance work identified during the inspection was completed in 2020.
- All level 3 maintenance work identified during the inspection was completed in 2022.

Action Plan:

- The next I&M foot patrol is scheduled for 2024.
- The next distribution cycle pruning is scheduled for 2028.
- No further actions are required.

12. NORTH CARTHAGE 81653 – 13.2kV

Profile: 2,288 Customers, 102.1 Circuit Miles
 Indices: CAIDI = 1.26, SAIFI = 2.60

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	4	13.79%	2,399	40.38%	3,532	47.27%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	9	31.03%	2,980	50.16%	2,852	38.17%
6	ACCIDENTS	8	27.59%	258	4.34%	618	8.28%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	3.45%	3	0.05%	12	0.16%
10	UNKNOWN	7	24.14%	301	5.07%	458	6.13%
Totals		29	100.00%	5,941	100.00%	7,473	100.00%

Problem Analysis:

- There were 29 interruptions on the North Carthage 81653 in 2022.
- There were no transmission interruptions.
- There were no substation interruptions.
- All 29 events occurred at the distribution level.
- The distribution circuit breaker for the North Carthage 81653 experienced 6 momentary operations in 2022.
- The distribution circuit breaker for the North Carthage 81653 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 39% of the total amount of customers interrupted (2,295 out of 5,941) and 44% of the total amount of the customer-hours interrupted (3,271 out of 7,473).
 - This lockout occurred on September 27, 2022, coded as a cause of tree - broken limb (PSC cause code 02). This lockout accounted for 39% of the total customers interrupted (2,295 of 5,941), and 44% of the total customer-hours interrupted (3,271 of 7,473). This outage is due to a tree branch on the primary.
- Equipment Failures were the leading cause of interruptions on the North Carthage 81653 in 2022, accounting for 31% of total interruptions (9 of 29). Accidents were the 2nd leading cause of interruptions, accounting for 28% of total interruptions (8 of 29). Unknown were the 3rd leading cause of interruptions, accounting for 24% of total interruptions (7 of 29).
- Equipment Failures were the leading cause of customers interrupted (CI) on the North Carthage 81653 in 2022, accounting for 50% of total customers interrupted (2,980 of 5,941). Trees were the 2nd leading cause of customers interrupted, accounting for 40% of total customers interrupted (2,399 of 5,941). Unknown were the 3rd leading cause of customers interrupted, accounting for 5% of total customers interrupted (301 of 5,941).

- Trees were the leading cause of customer-hours interrupted (CHI) on the North Carthage 81653 in 2022, accounting for 47% of total customer-hours interrupted (3,532 of 7,473). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 38% of total customer-hours interrupted (2,852 of 7,473). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 8% of total customer-hours interrupted (618 of 7,473).
- Of the 29 interruptions on this circuit, 13 affected 10 customers or less, with 4 being single customer outages.

Action Taken:

- In 2020, the Regional Forestry Department completed the scheduled distribution cycle pruning.
- An I&M foot patrol was completed in August 2021.
- The level 2 maintenance work identified from the feeder inspection was completed in 2022.

Action Plan:

- The level 3 maintenance work identified from the feeder inspection will be completed in 2024.
- The next I&M foot patrol is scheduled for 2026.
- The next distribution cycle pruning is scheduled for 2026.
- No further actions are required.

13. HAMMOND 37061 – 4.8kV

Profile: 977 Customers, 56.6 Circuit Miles
 Indices: CAIDI = 3.36, SAIFI = 2.32

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	6	37.50%	127	5.61%	625	8.21%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	4	25.00%	993	43.86%	2,792	36.70%
6	ACCIDENTS	1	6.25%	1	0.04%	2	0.02%
7	PREARRANGED	1	6.25%	972	42.93%	3,775	49.62%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	4	25.00%	171	7.55%	415	5.45%
10	UNKNOWN	0	0.00%	0	0.00%	0	0.00%
Totals		16	100.00%	2,264	100.00%	7,608	100.00%

Problem Analysis:

- There were 16 interruptions on the Hammond 37061 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on February 26, 2022, coded as a cause of no cause associated (PSC cause code 07). This lockout accounted for 43% of the total customers interrupted (972 of 2,264), and 50% of the total customer-hours interrupted (3,775 of 7,608). This outage was due to planned maintenance for pole replacements.
- There was 1 substation interruption.
 - This Substation interruption occurred on February 09, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 43% of the total customers interrupted (972 of 2,264), and 33% of the total customer-hours interrupted (2,527 of 7,608). This outage was due to a breaker failure.
- The remaining 14 events occurred at the distribution level.
- The distribution circuit breaker for the Hammond 37061 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Hammond 37061 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Hammond 37061 in 2022, accounting for 38% of total interruptions (6 of 16). Equipment Failures were the 2nd leading cause of interruptions, accounting for 25% of total interruptions (4 of 16). Lightning was the 3rd leading cause of interruptions, accounting for 25% of total interruptions (4 of 16).
- Equipment Failures were the leading cause of customers interrupted (CI) on the Hammond 37061 in 2022, accounting for 44% of total customers interrupted (993 of 2,264).

Prearranged were the 2nd leading cause of customers interrupted, accounting for 43% of total customers interrupted (972 of 2,264). Lightning was the 3rd leading cause of customers interrupted, accounting for 8% of total customers interrupted (171 of 2,264).

- Prearranged were the leading cause of customer-hours interrupted (CHI) on the Hammond 37061 in 2022, accounting for 50% of total customer-hours interrupted (3,775 of 7,608). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 37% of total customer-hours interrupted (2,792 of 7,608). Trees were the 3rd leading cause of customer-hours interrupted, accounting for 8% of total customer-hours interrupted (625 of 7,608).
- Of the 16 interruptions on this circuit, 15 affected 10 customers or less, with 12 being single customer outages.

Action Taken:

- In 2022, the Regional Forestry Department completed the scheduled distribution cycle pruning.
- An I&M foot patrol was completed in December 2019.
- The level 2 maintenance work identified during the inspection was completed in 2020.
- The level 3 maintenance work identified during the inspection was completed in 2022.

Action Plan:

- In 2028, the Regional Forestry Department will be completing the scheduled distribution cycle pruning.
- In 2023, the Regional Forestry Department will be performing extended hazard tree maintenance.
- The next I&M foot patrol is scheduled for 2024.
- No further actions are required.

14. W ADAMS 87551 – 13.2kV

Profile: 2,089 Customers, 119.9 Circuit Miles
 Indices: CAIDI = 1.10, SAIFI = 2.62

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	5	16.67%	133	2.43%	266	4.41%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	7	23.33%	2,216	40.54%	546	9.06%
6	ACCIDENTS	11	36.67%	2,891	52.89%	4,754	78.84%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	6.67%	6	0.11%	14	0.23%
10	UNKNOWN	5	16.67%	220	4.02%	450	7.46%
Totals		30	100.00%	5,466	100.00%	6,030	100.00%

Problem Analysis:

- There were 30 interruptions on the W Adams 87551 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on March 02, 2022, coded as a cause of device failed (PSC cause code 05). This lockout accounted for 38% of the total customers interrupted (2,078 of 5,466), and 4% of the total customer-hours interrupted (255 of 6,030). This outage was due to an insulator failure.
- There were no substation interruptions.
- The remaining 29 events occurred at the distribution level.
- The distribution circuit breaker for the W Adams 87551 experienced 4 momentary operations in 2022.
- The distribution circuit breaker for the W Adams 87551 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 38% of the total amount of customers interrupted (2,068 out of 5,466) and 55% of the total amount of the customer-hours interrupted (3,325 out of 6,030).
 - This lockout occurred on July 05, 2022, coded as a cause of animal (PSC cause code 06). This lockout accounted for 38% of the total customers interrupted (2,068 of 5,466), and 55% of the total customer-hours interrupted (3,325 of 6,030). This outage was due to an Osprey nest.
- Accidents were the leading cause of interruptions on the W Adams 87551 in 2022, accounting for 37% of total interruptions (11 of 30). Equipment Failures were the 2nd leading cause of interruptions, accounting for 23% of total interruptions (7 of 30). Trees were the 3rd leading cause of interruptions, accounting for 17% of total interruptions (5 of 30).

- Accidents were the leading cause of customers interrupted (CI) on the W Adams 87551 in 2022, accounting for 53% of total customers interrupted (2,891 of 5,466). Equipment Failures were the 2nd leading cause of customers interrupted, accounting for 41% of total customers interrupted (2,216 of 5,466). Unknown were the 3rd leading cause of customers interrupted, accounting for 4% of total customers interrupted (220 of 5,466).
- Accidents were the leading cause of customer-hours interrupted (CHI) on the W Adams 87551 in 2022, accounting for 79% of total customer-hours interrupted (4,754 of 6,030). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 9% of total customer-hours interrupted (546 of 6,030). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 7% of total customer-hours interrupted (450 of 6,030).
- Of the 30 interruptions on this circuit, 18 affected 10 customers or less, with 11 being single customer outages.

Action Taken:

- In 2018, the Regional Forestry Department completed the scheduled distribution cycle pruning.
- An I&M foot patrol was completed in November 2020.
- The level 2 maintenance work identified during the inspection was completed in 2021.

Action Plan:

- The next distribution cycle pruning is scheduled for 2024.
- In 2023, the Regional Forestry Department will be performing extended hazard tree maintenance.
- The level 3 maintenance work identified during the inspection will be completed in 2023.
- The next I&M foot patrol is scheduled for 2025.
- No further actions are required.

3. ACTION PLAN SUMMARIES

a. SUMMARY OF ACTION PLANS FOR 2022 WORST PERFORMING CIRCUITS

Station	Circuit	Report Year	Action Plan	Projected Completion Date	Estimated Cost	Comments
Chasm Falls	85251	2022	The next scheduled distribution cycle pruning will be completed in 2027.	2027	-----	-----
Chasm Falls	85251	2022	In 2023, the Regional Forestry Department will complete the hazard tree removal.	2023	-----	-----
Chasm Falls	85251	2022	All level 3 maintenance work identified from the feeder inspection will be completed in 2024.	2024	-----	-----
Chasm Falls	85251	2022	This feeder is scheduled to be inspected again in 2026.	2026	-----	-----
Thousand Isl	81452	2022	The next distribution cycle pruning is scheduled for 2028.	2028	-----	-----
Thousand Isl	81452	2022	All level 2 maintenance work identified from the feeder inspection will be completed in 2023.	2023	-----	-----
Thousand Isl	81452	2022	All level 3 maintenance work identified from the feeder inspection will be completed in 2025.	2025	-----	-----
Thousand Isl	81452	2022	The next I&M foot patrol is scheduled for 2027.	2027	-----	-----
Higley	92452	2022	The next I&M foot patrol will be completed in 2026.	2026	-----	-----
Higley	92452	2022	All level 3 maintenance work identified from the feeder inspection will be completed in 2024.	2024	-----	-----
Higley	92452	2022	The next distribution cycle pruning is scheduled for 2026.	2026	-----	-----
Dekalb	98455	2022	The next I&M foot patrol will be completed in 2027.	2027	-----	-----
Dekalb	98455	2022	All level 2 maintenance work identified from the feeder inspection will be completed in 2023.	2023	-----	-----
Dekalb	98455	2022	All level 3 maintenance work identified from the feeder inspection will be completed in 2025.	2025	-----	-----
Dekalb	98455	2022	The next distribution cycle pruning is scheduled for 2025.	2025	-----	-----
Thousand Isl	81456	2022	The next I&M foot patrol is scheduled for 2024.	2024	-----	-----
Thousand Isl	81456	2022	The next distribution cycle pruning is scheduled for 2028.	2028	-----	-----
W Adams	87554	2022	The level 3 maintenance work identified will be completed in 2024.	2024	-----	-----
W Adams	87554	2022	The next I&M foot patrol is scheduled for 2026.	2026	-----	-----
W Adams	87554	2022	The next distribution cycle pruning is scheduled for 2025.	2025	-----	-----
W Adams	87554	2022	In 2025, the Regional Forestry Department will be performing hazard tree removal.	2025	-----	-----
N Gouverneur	98352	2022	The next I&M foot patrol will be completed in 2023.	2023	-----	-----
N Gouverneur	98352	2022	The next distribution cycle pruning is scheduled for 2024.	2024	-----	-----
N Gouverneur	98352	2022	In 2023, the Regional Forestry Department will be performing hazard tree removal.	2023	-----	-----
E Watertown	81756	2022	The level 3 maintenance work identified from the feeder inspection will be completed by 2024.	2024	-----	-----
E Watertown	81756	2022	The next I&M foot patrol is scheduled to be completed in 2026.	2026	-----	-----
E Watertown	81756	2022	The next distribution cycle pruning is scheduled for 2025.	2025	-----	-----
E Watertown	81756	2022	In 2023, the Regional Forestry Department is performing hazard tree removal.	2023	-----	-----
Thousands Isl	81458	2022	The next I&M foot patrol is scheduled for 2024.	2024	-----	-----
Thousands Isl	81458	2022	The next distribution cycle pruning is scheduled for 2023.	2023	-----	-----
Ogdensburg	93852	2022	The next I&M foot patrol is scheduled for 2024.	2024	-----	-----

Station	Circuit	Report Year	Action Plan	Projected Completion Date	Estimated Cost	Comments
Ogdensburg	93852	2022	The next distribution cycle pruning is scheduled for 2028.	2028	-----	-----
Ogdensburg	93852	2022	In 2023, the Regional Forestry Department is performing extended hazard tree maintenance.	2023	-----	-----
North Carthage	81652	2022	The next I&M foot patrol is scheduled for 2024.	2024	-----	-----
North Carthage	81652	2022	The next distribution cycle pruning is scheduled for 2028.	2028	-----	-----
North Carthage	81653	2022	The level 3 maintenance work identified from the feeder inspection will be completed in 2024.	2024	-----	-----
North Carthage	81653	2022	The next I&M foot patrol is scheduled for 2026.	2026	-----	-----
North Carthage	81653	2022	The next distribution cycle pruning is scheduled for 2026.	2026	-----	-----
Hammond	37061	2022	In 2028, the Regional Forestry Department will be completing the scheduled distribution cycle pruning.	2028	-----	-----
Hammond	37061	2022	In 2023, the Regional Forestry Department will be performing extended hazard tree maintenance.	2023	-----	-----
Hammond	37061	2022	The next I&M foot patrol is scheduled for 2024.	2024	-----	-----
W. Adams	87551	2022	The next distribution cycle pruning is scheduled for 2024.	2024	-----	-----
W. Adams	87551	2022	In 2023, the Regional Forestry Department will be performing extended hazard tree maintenance.	2023	-----	-----
W. Adams	87551	2022	The level 3 maintenance work identified during the inspection will be completed in 2023.	2023	-----	-----
W. Adams	87551	2022	The next I&M foot patrol is scheduled for 2025.	2025	-----	-----

b. STATUS OF ACTION PLANS FOR 2021 WORST PERFORMING CIRCUITS

Station	Circuit	Report Year	Action Plan	Actual Completion Date	Actual Cost	Comments
Lowville	77354	2021	The next scheduled distribution cycle pruning will be completed in 2026.	2026	-----	-----
Lowville	77354	2021	In 2022, the Regional Forestry Department will be completing the extended hazard tree maintenance.	2022	-----	-----
Lowville	77354	2021	All level 2 maintenance work identified from the feeder inspection will be completed in 2022	2022	-----	-----
Lowville	77354	2021	All level 3 maintenance work identified from the feeder inspection will be completed in 2024.	2024	-----	-----
Lowville	77354	2021	The next I&M foot patrol is scheduled for 2026.	2026	-----	-----
Brady	95755	2021	The next distribution cycle pruning is scheduled for 2027.	2027	-----	-----
Brady	95755	2021	All level 3 maintenance work identified from the feeder inspection will be completed in 2023.	2023	-----	-----
Brady	95755	2021	The next I&M foot patrol will be completed in 2025.	2025	-----	-----
West Adams	87554	2021	The next I&M foot patrol will be completed in 2026.	2026	-----	-----
West Adams	87554	2021	All level 2 maintenance work identified from the feeder inspection will be completed in 2022	2022	-----	-----
West Adams	87554	2021	All level 3 maintenance work identified from the feeder inspection will be completed in 2024.	2024	-----	-----
West Adams	87554	2021	The next scheduled distribution cycle pruning will be completed in 2025.	2025	-----	-----
Moira	85961	2021	The next I&M foot patrol will be completed in 2026.	2026	-----	-----
Moira	85961	2021	All level 2 maintenance work identified from the feeder inspection will be completed in 2022	2022	-----	-----
Moira	85961	2021	All level 3 maintenance work identified from the feeder inspection will be completed in 2024.	2024	-----	-----
Moira	85961	2021	The next scheduled distribution cycle pruning will be completed in 2022.	2022	-----	-----
Bremen	81556	2021	The next distribution cycle pruning is scheduled for 2022.	2022	-----	-----
Bremen	81556	2021	The next I&M foot patrol will be completed in 2022.	2022	-----	-----
McAdoo	91451	2021	The next I&M foot patrol will be completed in 2026.	2026	-----	-----
McAdoo	91451	2021	All level 2 maintenance work identified from the feeder inspection will be completed in 2022	2022	-----	-----
McAdoo	91451	2021	All level 3 maintenance work identified from the feeder inspection will be completed in 2024.	2024	-----	-----
McAdoo	91451	2021	The next scheduled distribution cycle pruning will be completed in 2023.	2023	-----	-----
Brady	95758	2021	The next distribution cycle pruning is scheduled for 2025.	2025	-----	-----
Brady	95758	2021	The next I&M foot patrol will be completed in 2022.	2022	-----	-----
North Carthage	81652	2021	All level 3 maintenance work identified from the feeder inspection will be completed in 2022.	2022	-----	-----
North Carthage	81652	2021	The next distribution cycle pruning is scheduled for 2022.	2022	-----	-----
North Carthage	81652	2021	The next I&M foot patrol will be completed in 2024.	2024	-----	-----
Brady	95756	2021	The next I&M foot patrol is scheduled for 2024.	2024	-----	-----
Brady	95756	2021	The next distribution cycle pruning is scheduled for 2024.	2024	-----	-----
Brady	95756	2021	All level 3 maintenance work identified from the feeder inspection will be completed in 2022.	2022	-----	-----

Station	Circuit	Report Year	Action Plan	Actual Completion Date	Actual Cost	Comments
Ausable Forks	84661	2021	The next distribution cycle pruning is scheduled for 2027.	2027	-----	-----
Ausable Forks	84661	2021	The next I&M foot patrol is scheduled for 2022.	2022	-----	-----
North Carthage	81653	2021	The next I&M foot patrol will be completed in 2026.	2026	-----	-----
North Carthage	81653	2021	All level 2 maintenance work identified from the feeder inspection will be completed in 2022.	2022	-----	-----
North Carthage	81653	2021	All level 3 maintenance work identified from the feeder inspection will be completed in 2024.	2024	-----	-----
North Carthage	81653	2021	The next scheduled distribution cycle pruning will be completed in 2026.	2026	-----	-----
Gilpin Bay	95661	2021	The next I&M foot patrol is scheduled for 2023.	2023	-----	-----
Gilpin Bay	95661	2021	The next distribution cycle pruning is scheduled for 2022.	2022	-----	-----
Thousand Isl	81452	2021	The next I&M foot patrol is scheduled for 2022.	2022	-----	-----
Thousand Isl	81452	2021	The next distribution cycle pruning is scheduled for 2022.	2022	-----	-----
Moira	85962	2021	The next I&M foot patrol will be completed in 2026.	2026	-----	-----
Moira	85962	2021	All level 2 maintenance work identified from the feeder inspection will be completed in 2022.	2022	-----	-----
Moira	85962	2021	All level 3 maintenance work identified from the feeder inspection will be completed in 2024.	2024	-----	-----
Moira	85962	2021	The next scheduled distribution cycle pruning will be completed in 2022.	2022	-----	-----
Port Leyden	75563	2021	The next I&M foot patrol is scheduled for 2023.	2023	-----	-----
Port Leyden	75563	2021	The next distribution cycle pruning is scheduled for 2025.	2025	-----	-----
West Adams	87551	2021	The next I&M foot patrol is scheduled for 2025.	2025	-----	-----
West Adams	87551	2021	The next distribution cycle pruning is scheduled for 2024.	2024	-----	-----
West Adams	87551	2021	All level 3 maintenance work identified from the feeder inspection will be completed in 2023.	2023	-----	-----
N Gouverneur	98352	2021	The next I&M foot patrol is scheduled for 2023.	2023	-----	-----
N Gouverneur	98352	2021	The next distribution cycle pruning is scheduled for 2024.	2024	-----	-----
West Adams	87552	2021	The next I&M foot patrol is scheduled for 2023.	2023	-----	-----
West Adams	87552	2021	The next distribution cycle pruning is scheduled for 2022.	2022	-----	-----
Nicholville	86062	2021	The next I&M foot patrol is scheduled for 2024.	2024	-----	-----
Nicholville	86062	2021	The next distribution cycle pruning is scheduled for 2023.	2023	-----	-----
Nicholville	86062	2021	All level 3 maintenance work identified from the feeder inspection will be completed in 2022.	2022	-----	-----

4. OPERATING REGION PERFORMANCE BELOW MINIMUM

a. MAINTENANCE HISTORY AND ANALYSIS OF FACTORS THAT CAUSED THE BELOW MINIMUM PERFORMANCE.

In 2022 the Northern Region failed to meet the PSC minimum SAIFI requirement after meeting the requirement in 2021. The Northern Region has been below the target of 1.412 since 2018. However, the Northern Region failed to meet the target in 2022 with an annual SAIFI of 1.61. Meanwhile, the Northern Region met the annual CAIDI goal of 2.11 in 2022 with a CAIDI of 1.49.

In 2022, the Northern Region experienced 1,644 interruptions. Most of these interruptions (98%) occurred on the distribution system. However, 15 of these interruptions (1%) occurred on the transmission or sub-transmission systems, interrupting 52,823 customers (24%) and accounting for 28,469 customer-hours interrupted (9%). The SAIFI and CAIDI of the transmission and sub-transmission systems in 2021 were 0.38 interruptions and 0.54 hours respectively. The impact of these 15 interruptions on SAIFI, (0.38 interruptions per year for just 15 interruptions, or a SAIFI of 0.025 per interruption), versus a distribution SAIFI of 1.01 interruptions per year or 0.0006 per interruption, made the overall annual SAIFI in the Northern Region worse, ultimately causing it to fail the SAIFI target. The number of customers interrupted increased from 15,356 in 2021, to 52,823 in 2022 (an increase of 244%), while the customer-hours interrupted increased from 27,705 in 2021, to 28,469 in 2022 (an increase of 3%).

There were also 12 substation-related interruptions in the Northern Region in 2022, interrupting 30,552 customers (14%) and accounting for 70,437 customer-hours interrupted (21%). The number of customers interrupted increased from 24,922 in 2021, to 30,552 in 2022 (an increase of 23%), while the customer-hours interrupted increased from 56,315 in 2021, to 70,437 in 2022 (an increase of 25%).

The distribution system accounted for 98% of the interruptions in the Northern Region in 2022, interrupting 140,879 customers (63%) and accounting for 235,892 customer-hours interrupted (70%). The SAIFI of the distribution system in 2022 met the SAIFI goal for the Northern Region, with a distribution SAIFI of 1.01 interruptions per year. This represents a slight increase in distribution SAIFI from 2021, when it was 1.0 interruptions per year.

b. **PLANNED PROGRAMS OR PLANNED CORRECTIVE ACTIONS AND PROPOSED IMPROVEMENTS TO THE PERFORMANCE INDICES.**

Interruptions on the transmission and sub-transmission systems have a very significant impact on reliability in the Northern Region. This is because many of these lines are radial through heavily forested, environmentally sensitive, inaccessible areas. Many projects have been completed and more are planned to improve the performance of the transmission system. The Inspection & Maintenance program itself is also continually improving the sub-transmission and transmission systems by identifying equipment in need of replacement before it fails. In addition, the Forestry Department is widening the rights-of-way of many of the transmission and sub-transmission lines, as far as easement areas and adjacent property owners will allow, in an attempt to reduce the impact of trees in what is a very heavily forested area. It is expected that the combination of these efforts will improve the performance of the transmission and sub-transmission systems; however, no manner of improvement will eliminate all interruptions.

The contribution of transmission outages is significant to the regional performance indices, as can be seen in the data provided in the previous section. It is very difficult to predict transmission equipment failures in advance, and in a continued attempt to minimize these interruptions, Transmission Planning and Asset Management (TPAM) has several projects in the works to improve the performance of some of the worst performing transmission lines.

Tree trimming around the distribution system will remain a priority in 2022, in order to address what is typically the single largest contributor to customer interruptions within the Central Region. In addition, there is a list of distribution improvement capital projects to be designed and/or constructed in FY2023, which can be viewed in the 1.f section of this report.

Additional efforts to improve restoration times are listed below:

- The Divisional Reliability Team will continue to investigate and analyze outages impacting greater than 2,500 customers or more than 50,000 customer-minutes-interrupted (CMI). This effort will look at the interruptions impacting the greatest number of customers to see what could have been done better to reduce the length of the interruption or to have eliminated it altogether.
- The review of suitable locations for the installation of new cutout mounted reclosers (CMRs) will continue to reduce the number of temporary faults that result in permanent outages on smaller side taps.

J. SOUTHWEST REGION

1. OPERATING REGIONAL PERFORMANCE

a. HISTORIC CAIDI AND SAIFI INDICES

IDS Info:

	2022	2021	2020	2019	2018	2017
CAIDI (Threshold 1.950)	1.72	1.74	1.70	1.68	1.86	2.04
SAIFI (Threshold 1.181)	1.32	1.06	0.99	1.11	1.02	1.13
SAIDI	2.27	1.85	1.67	1.86	1.90	2.30
Interruptions	1,207	1,192	1,088	1,126	1,050	1,318
Customers Interrupted	139,448	112,268	103,991	116,388	106,962	117,713
Customer-Hours Interrupted	240,403	195,894	176,339	195,716	198,886	239,895
Customers Served	106,001	105,961	105,512	105,136	104,824	104,199
Customers Per Interruption	115.53	94.18	95.58	103.36	101.87	89.31
Availability Index	99.9741	99.9789	99.9810	99.9787	99.9783	99.9737
Interruptions/1000 Customers	11.39	11.25	10.31	10.71	10.02	12.65

b. DISCUSSION OF REGIONAL PERFORMANCE

In 2022, the Southwest Region met its CAIDI reliability target and did not meet its SAIFI reliability target as set forth by the New York Public Service Commission (PSC). The final System Average Interruption Frequency Index (SAIFI) result was 1.32 interruptions, 12% above the PSC goal of 1.181 interruptions. As shown in the table above, the Customer Average Interruption Duration index (CAIDI) was 1.72 in 2022, 12% below the PSC's regional target of 1.950 hours.

The 2022 CAIDI result was 1% below the 2021 result of 1.74 hours, and 5% below the previous 5-year average of 1.81 hours. The 2022 SAIFI was 25% above the 2021 result of 1.06 interruptions, and 25% above the previous 5-year average of 1.06 interruptions.

In 2022, excluding major storms, the Southwest Region experienced 23 transmission interruptions. These interruptions accounted for 2% of the region's total interruptions (23 of 1,207), 31% of the region's total customers interrupted (CI), (43,148 of 139,448), and 24% (57,154 of 240,402) of the region's total customer-hours interrupted (CHI). Overall, transmission interruptions had a CAIDI of 1.32 hours, and a SAIFI of 0.41 interruptions.

The number of transmission-related interruptions increased from 14 in 2021 to 23 in 2022 (an increase of 64%). The number of customers interrupted increased from 31,360 in 2021, to 43,148 in 2022 (an increase of 38%), while the customer-hours interrupted increased from 45,580 in 2021, to 57,154 in 2022 (an increase of 25%).

In 2022, excluding major storms, the Southwest Region experienced 8 substation interruptions. These interruptions accounted for 1% of the region's total interruptions (8 of 1,207), 10% of the region's total customers interrupted, (13,858 of 139,448), and 12% (27,905 of 240,402) of the region's total customer-hours interrupted. Overall, substation interruptions had a CAIDI of 2.01 hours, and a SAIFI of 0.13 interruptions.

The number of substation-related interruptions increased from 7 to 8 from 2021 to 2022 (an increase of 14%). The number of customers interrupted increased from 12,584 in 2021, to 13,858 in 2022 (an increase of 10%), while the customer-hours interrupted increased from 13,218 in 2021, to 27,905 in 2022 (an increase of 111%).

In 2022, excluding major storms, the Southwest Region experienced 1,176 distribution interruptions. These interruptions accounted for 97% of the region's total interruptions (1,176 of 1,207), 59% of the region's total customers interrupted, (82,442 of 139,448), and 65% (155,343 of 240,402) of the region's total customer-hours interrupted. Overall, distribution interruptions had a CAIDI of 1.88 hours, and a SAIFI of 0.78 interruptions.

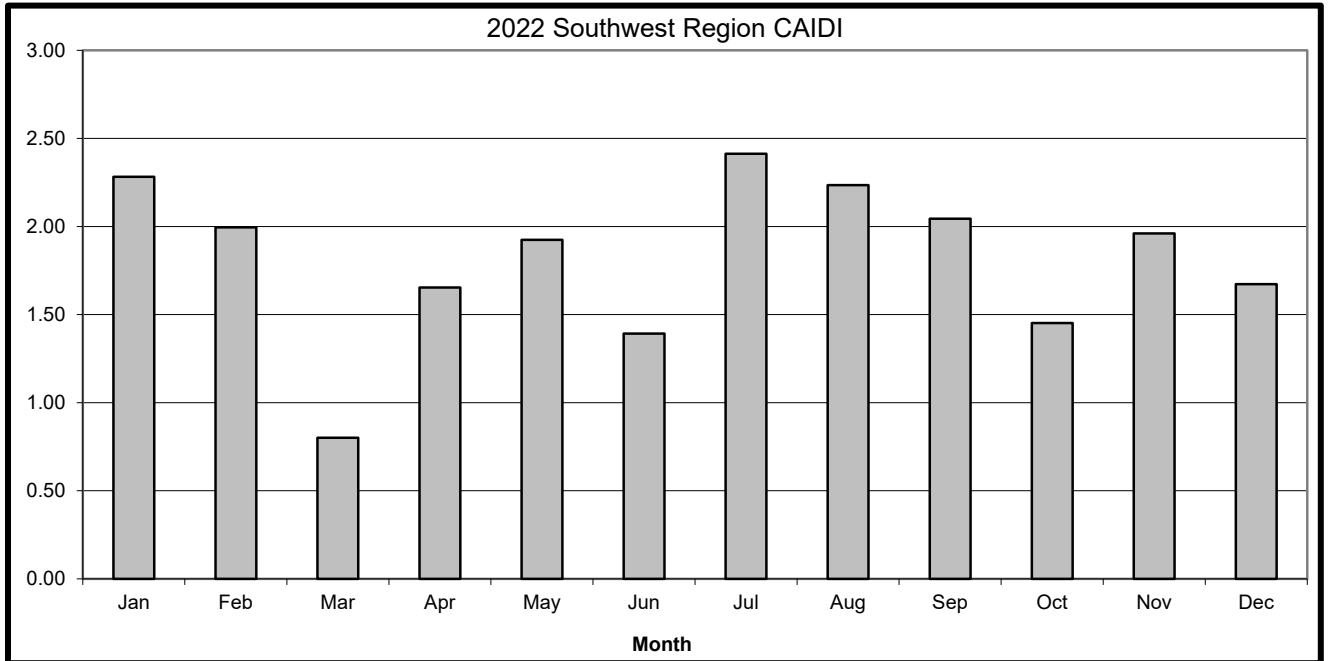
The number of distribution-related interruptions increased from 1,171 to 1,176 from 2021 to 2022 (an increase of 0.4%). The number of customers interrupted increased from 68,324 in 2021, to 82,442 in 2022 (an increase of 21%), while the customer-hours interrupted increased from 137,097 in 2021, to 155,343 in 2022 (an increase of 13%).

c. MONTHLY CAIDI AND SAIFI GRAPHS

The graphs on the following page show the monthly CAIDI and SAIFI for the Southwest Region for 2022. The Southwest Region met the CAIDI goals during six months, with the lowest two months being March (0.80) and June (1.39). CAIDI was above the threshold for six months in 2022: January (2.28), February (1.99), July (2.41), August (2.24), September (2.04) and November (1.96).

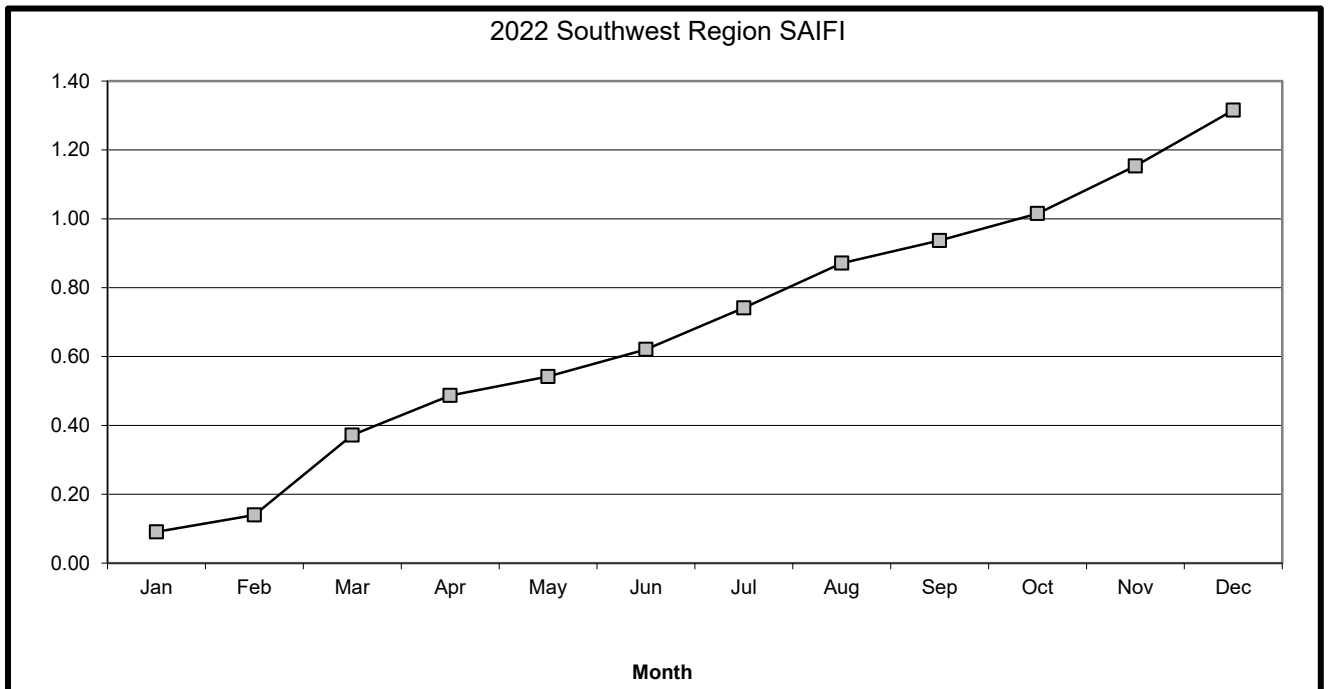
The year-end SAIFI for 2022 did not meet the target for the Southwest Region. It showed the greatest increase during the months of March (0.23), November (0.14) and December (0.16); 40% of the SAIFI was accrued during these three months. The lowest five months for SAIFI were February (0.05), May (0.06), June (0.08), September (0.07) and October (0.08); the interruptions which occurred during these five months contributed 34% of the total SAIFI.

GRAPH OF MONTHLY CAIDI AND SAIFI FOR THE SOUTHWEST REGION



PSC CAIDI Goal:	
Threshold	1.950
2022 Actual	1.72

PSC SAIFI Goal:	
Threshold	1.181
2022 Actual	1.32



d. PSC CAUSE CODES

1) Number of Events by Cause – Historical

IDS Info:

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	264	300	264	809	347	52
02 Tree Contacts	554	507	469	391	596	495
03 Overloads	5	7	3	11	3	5
04 Oper. Error	9	4	3	6	4	5
05 Equipment	255	191	248	235	266	253
06 Accidents	157	156	112	120	165	130
07 Prearranged	20	33	19	22	17	18
08 Cust. Equip.	0	0	0	0	0	0
09 Lightning	56	123	70	82	108	98
10 Unknown	151	171	202	183	159	142
Total	1,471	1,492	1,796	1,390	1,859	1,665

2) Customers Interrupted by Cause – Historical

Cause Code	2022	2021	2020	2019	2018	2017
01 Major Storms	24,060	21,813	50,280	58,846	37,960	10,626
02 Tree Contacts	59,477	46,680	36,522	32,021	39,946	40,125
03 Overloads	17	439	42	839	73	13
04 Oper. Error	7,070	277	1,005	84	856	2,498
05 Equipment	24,143	24,740	25,493	18,232	29,519	27,475
06 Accidents	14,734	12,525	16,737	11,418	13,087	12,340
07 Prearranged	9,476	3,654	1,375	1,778	7,031	3,297
08 Cust. Equip.	0	0	0	0	0	0
09 Lightning	2,918	10,144	1,591	3,614	7,404	11,284
10 Unknown	21,613	13,809	33,623	38,976	19,797	7,754
Total	163,508	134,081	174,666	166,668	165,808	155,673

3) Customer-Hours Interrupted by Cause – Historical

Cause Code	2022	2021	2020	2019	2018	2017
Major Storms	110,325	141,665	136,780	890,163	377,373	28,094
Tree Contacts	129,551	92,454	94,555	61,644	116,292	99,144
Overloads	47	641	80	1,073	293	38
Oper. Error	1,474	111	187	36	1,133	308
Equipment	52,288	43,633	47,833	67,679	51,858	43,388
Accidents	18,803	22,955	18,831	19,995	17,279	22,068
Prearranged	10,265	3,080	1,144	2,460	5,966	3,203
Cust. Equip.	0	0	0	0	0	0
Lightning	6,321	20,180	3,833	6,615	16,571	20,843
Unknown	21,653	12,841	29,254	39,385	30,504	11,512
Total	350,727	337,560	532,440	332,496	1,089,050	617,269

4) Interruptions, Customers Interrupted, and Customer-Hours Interrupted – 2022

Cause Code	Interruptions		Customers Interrupted		Customer Hours Interrupted	
	Number	% Total	Number	% Total	Number	% Total
01 Major Storms	264	17.9%	24,060	14.7%	110,325	31.5%
02 Tree Contacts	554	37.7%	59,477	36.4%	129,551	36.9%
03 Overloads	5	0.3%	17	0.0%	47	0.0%
04 Oper. Error	9	0.6%	7,070	4.3%	1,474	0.4%
05 Equipment	255	17.3%	24,143	14.8%	52,288	14.9%
06 Accidents	157	10.7%	14,734	9.0%	18,803	5.4%
07 Prearranged	20	1.4%	9,476	5.8%	10,265	2.9%
08 Cust. Equip.	0	0.0%	0	0.0%	0	0.0%
09 Lightning	56	3.8%	2,918	1.8%	6,321	1.8%
10 Unknown	151	10.3%	21,613	13.2%	21,653	6.2%
Total	1,471	100.0%	163,508	100.0%	350,727	100.0%

e. **INTERRUPTION REVIEW BY PSC CAUSE CODES**

Cause Code 01 - Major Storms

In 2022, Major Storms accounted for 18% of interruptions, 15% of customers interrupted, and 31% of Customer-Hours Interrupted.

Interruptions due to Major Storm were down 12% from 2021, and down 46% over the 5-year average. Customers interrupted due to Major Storms were up 10% from 2021, and down 50% over the 5-year average. Customer-Hours interrupted were down 22% from 2021 and down 71% over the 5-year average.

The remaining PSC code descriptions do not include Major Storms in the percentages.

Cause Code 02 - Tree Contacts

In 2022, Tree Contacts accounted for 46% of interruptions, 43% of customers interrupted, and 54% of Customer-Hours Interrupted.

Interruptions due to Tree Contacts were up 9% from 2021, and up 15% over the 5-year average. Customers interrupted due to Tree Contacts were up 27% from 2021, and up 50% over the 5-year average. Customer-Hours interrupted were up 40% from 2021 and up 44% over the 5-year average.

Tree Contacts were the largest cause of interruptions in 2022.

Cause Code 03 - Overloads

In 2022, Overloads accounted for 0% of interruptions, 0% of customers interrupted, and 0% of Customer-Hours Interrupted.

Interruptions due to Overloads were down 29% from 2021, and down 17% over the 5-year average. Customers interrupted due to Overloads were down 96% from 2021, and down 94% over the 5-year average. Customer-Hours interrupted were down 93% from 2021 and down 90% over the 5-year average.

Overloads were the 8th largest cause of interruptions in 2022.

Cause Code 04 - Operator Error

In 2022, Operator Error accounted for 1% of interruptions, 5% of customers interrupted, and 1% of Customer-Hours Interrupted.

Interruptions due to Operator Error were up 125% from 2021, and up 80% over the 5-year average. Customers interrupted due to Operator Error were up 2452% from 2021, and up 1289% over the 5-year average. Customer-Hours interrupted were up 1233% from 2021 and up 270% over the 5-year average.

Operator Error was the 7th largest cause of interruptions in 2022.

Cause Code 05 - Equipment Failure

In 2022, Equipment Failures accounted for 21% of interruptions, 17% of customers interrupted, and 22% of Customer-Hours Interrupted.

Interruptions due to Equipment Failure were up 34% from 2021, and up 12% over the 5-year average. Customers interrupted due to Equipment Failure were down 2% from 2021, and up 10% over the 5-year average. Customer-Hours interrupted were up 20% from 2021 and up 13% over the 5-year average.

Equipment Failures were the 2nd largest cause of interruptions in 2022.

Cause Code 06 - Accidents

In 2022, Accidents accounted for 13% of interruptions, 11% of customers interrupted, and 8% of Customer-Hours Interrupted.

Interruptions due to Accidents were up 1% from 2021, and up 11% over the 5-year average. Customers interrupted due to Accidents were up 18% from 2021, and up 4% over the 5-year average. Customer-Hours interrupted were down 18% from 2021 and down 12% over the 5-year average.

Accidents were the 3rd largest cause of interruptions in 2022.

Cause Code 07 - Prearranged

In 2022, Prearranged accounted for 2% of interruptions, 7% of customers interrupted, and 4% of Customer-Hours Interrupted.

Interruptions due to Prearranged were down 39% from 2021, and down 13% over the 5-year average. Customers interrupted due to Prearranged were up 159% from 2021, and up 183% over the 5-year average. Customer-Hours interrupted were up 233% from 2021 and up 235% over the 5-year average.

Prearranged was the 6th largest cause of interruptions in 2022.

Cause Code 08 - Customer Equipment

There were no Customer Equipment interruptions in 2022.

Cause Code 09 - Lightning

In 2022, Lightning accounted for 5% of interruptions, 2% of customers interrupted, and 3% of Customer-Hours Interrupted.

Interruptions due to Lightning were down 54% from 2021, and down 41% over the 5-year average. Customers interrupted due to Lightning were down 71% from 2021, and down 52% over the 5-year average. Customer-Hours interrupted were down 69% from 2021 and down 44% over the 5-year average.

Lightning was the 5th largest cause of interruptions in 2022.

Cause Code 10 - Unknown

In 2022, Unknown causes accounted for 13% of interruptions, 15% of customers interrupted, and 9% of Customer-Hours Interrupted.

Interruptions due to Unknown causes were down 12% from 2021, and down 13% over the 5-year average. Customers interrupted due to Unknown causes were up 57% from 2021, and down 15% over the 5-year average. Customer-Hours interrupted were up 69% from 2021 and down 24% over the 5-year average.

Unknown causes were the 4th largest cause of interruptions in 2022.

f. DISCUSSION OF REGIONAL CAPEX PROJECTS WITH 2022/23 SPENDS:

The Southwest Region continues to work on capital-related projects in order to maintain customer satisfaction and future reliability. Some specific projects constructed either in 2022 or planned for construction in 2023 are discussed below. An additional table of major infrastructure projects follows and includes distribution, sub-transmission, and transmission-related projects.

Some projects on the list or discussed below are substation-related projects located throughout the Region intended to address reliability, loading concerns or equipment condition issues, including Delameter #93 and Eden Switch Structure.

There are numerous distribution projects where lines are being rebuilt or reconducted. These projects resulted from reliability reviews, responses to QRS inquiries, results of implementing asset strategies, and/or responses to load-related issues. Some specific reliability-related projects in the Southwest Region follow below:

Delameter Substation #93

Delameter substation is an 115kV/13.2kV substation with one transformer bank, which serves over 9,342 customers. A project is underway to add another for reliability and reconfigure two new feeders. Transformer bank #1 violates the 240MWhr criteria. The station has only one tie to an adjacent 13.2kV station (Lakeview). This project will improve asset condition and reliability. The project is expected to be completed by the end of 2027.

Eden Switch Structure Substation

Eden Switch Structure substation will be a 34.5kV/13.2kV substation with one transformer banks, which serves customers from North Eden, Delameter, Eden Center, and North Collins. A project is underway to purchase the land nearby the existing structures and create a standard 13.2 distribution station. This project will improve surround area system capacity and reliability. The project is expected to be completed by the end of 2027.

Sub-Transmission Infrastructure Projects:

The 34.5kV system in the Southwest Region consists of several very long loops, which traverse through some of the most rugged terrain in the Western Division. Additionally, there are numerous distribution circuits built below the sub-transmission circuits on shared poles. If either circuit fails, often times both are affected. The following sub-transmission projects were completed in 2022: Dunkirk Steam-Rel/Repl 34.5 Ins-West Portland 851, Hartfield -South Dow 859 34.5 kV part 3., W. Salamanca-Homer Hill 805-34.5kV, and Homer Hill-Nile 811-34.5 kV Insulator. Several the projects planned for 2023/2024 will maintain and upgrade the system, including the projects following the sub-transmission lines: Install DA Scheme on the 863 Sherman-Ashville Line, Sherman-Ashville 863-Ref/Rec, install DA Scheme on Line 811 Homer Hill-Nile. These projects will improve asset condition and reliability.

Major Capital Projects for Southwest Region:

Region	Project Name	Project Type	Fin Sys Proj No.	Finish	Total Spend
Southwest	GARDENVILLE-DUNKIRK 73&74 BONDING & GROUNDING – WO27141687	Trans	C080523	02/11/22	\$2,851,000
Southwest	WPC HOMER HILL-BENNETT 157 – WO30200824	Trans	C084553	05/05/22	\$6,493,000
Southwest	WELLS ENTRPRISES TAP DUNKIRK LAONA 161&162	Trans	C084083	12/22/22	\$3,324,000
Southwest	FALCONER-HOMER HILL REINSULATING PHASE 2 (STR 300-399)	Trans	C088552	3/23/22	\$5,420,000
Southwest	HARTFIELD-S. DOW 859 34.5KV PART 3	SubTrans	C074502	4/26/22	\$7,155,000
Southwest	W. SALAMANCA-HOMER HILL 805-34.5	SubTrans	C085253	5/20/22	\$1,013,000
Southwest	BERRY RD STATION 153- DSCADA(FULL RTU UPGRADE)	Dist Sub	C077972	7/28/22	\$2,344,000
Southwest	BENNET RD STATION 99- DSCADA(FULL RTU UPGRADE)	Dist Sub	C077972	1/13/22	\$2,344,000
Southwest	BAKER ST STATION 99- DSCADA(FULL RTU UPGRADE)	Dist Sub	C077972	5/13/22	\$2,344,000
Southwest	DUGAN RD STATION 22- DSCADA(FULL RTU UPGRADE)	Dist Sub	C077972	5/20/22	\$2,344,000
Southwest	DAKE HILL SWITCH STRUCTURE-DSCADA(FULL UPGRADE)	Trans Sub	C081809	6/17/22	\$2,190,000
Southwest	BERRY ROAD VVO 153 LTC & ORBIT	Trans Sub	C076105	7/5/22	\$2,520,000

2. OPERATING CIRCUIT LISTS

This section includes the following three (3) tables and Worst Performing Circuit analysis for the Southwest Region.

- a. Worst Performing Circuit List
- b. Worst Performing Circuits with Three-Year History for CAIDI and SAIFI Indices
- c. Worst Performing Circuits by number of Momentary Interruptions

a. NATIONAL GRID WORST PERFORMING CIRCUIT LIST

SOUTHWEST REGION

FEEDER #	A CUST. SERVED	B TOTAL INTER.	C #CUST. INTER.	D CUST. HRS. INTER.	C/A SAIFI	D/A SAIDI	D/C CAIDI	NUMBER OF MOMENTARIES
CATTARAUGUS STA 15 1562	698	21	2,703	13,020	3.87	18.65	4.82	4
DELAMETER 9354	3,115	38	10,685	16,070	3.43	5.16	1.50	2
DELAMETER 9353	2,839	32	8,484	13,427	2.99	4.73	1.58	1
BAKER ST 15055	1,902	14	6,797	9,990	3.57	5.25	1.47	1
BERRY RD 15352	2,607	24	10,766	7,093	4.13	2.72	0.66	2
BAKER ST 15056	2,236	32	7,512	6,064	3.36	2.71	0.81	0

Regional Goals:
CAIDI 1.95
SAIFI 1.181

b. NATIONAL GRID WORST PERFORMING CIRCUITS WITH A 3 YEAR HISTORY FOR CAIDI AND SAIFI INDICES.

SOUTHWEST REGION

FEEDER #	2022 CAIDI	2021 CAIDI	2020 CAIDI	2019 CAIDI	2022 SAIFI	2021 SAIFI	2020 SAIFI	2019 SAIFI
CATTARAUGUS STA 15 1562	4.82	5.49	4.23	1.96	3.87	2.32	0.81	3.56
DELAMETER 9354	1.50	2.33	1.66	2.25	3.43	1.18	1.94	0.21
DELAMETER 9353	1.58	1.79	1.39	2.22	2.99	2.26	2.74	1.04
BAKER ST 15055	1.47	1.07	1.34	1.79	3.57	2.08	1.45	4.10
BERRY RD 15352	0.66	1.80	0.66	0.70	4.13	0.05	0.26	1.08
BAKER ST 15056	0.81	1.80	1.53	0.82	3.36	0.38	0.51	2.51

Regional Goals:
 CAIDI 1.95
 SAIFI 1.181

c. NATIONAL GRID WORST PERFORMING CIRCUITS BY # OF MOMENTARY INTERRUPTIONS

SOUTHWEST REGION

Feeders			Customer Momentaries				Ranks		
Volts (kV)	Station Name	Ckt/F No.	Substation	Transmission	Distribution	Total	Within Region	Within System	Reliability Ranking
No circuits experienced 10 or more momentary interruptions in 2022.									

d. WORST PERFORMING CIRCUIT ANALYSIS

For 2021, the Company is reporting on the six worst performing feeders in the Southwest Region. The list consists of five 13.2kV feeders and one 4.8kV feeder.

For the Southwest Region, the CAIDI threshold is 1.95 hours and the SAIFI threshold is 1.181 interruptions.

1. CATTARAUGUS STA 15 1562– 4.8kV

Profile: 698 Customers, 73.4 Circuit Miles

Indices: CAIDI = 4.82, SAIFI = 3.87

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	13	61.90%	1,269	46.95%	3,622	27.82%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	3	14.29%	704	26.05%	5,846	44.91%
6	ACCIDENTS	0	0.00%	0	0.00%	0	0.00%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	9.52%	6	0.22%	18	0.14%
10	UNKNOWN	3	14.29%	724	26.79%	3,533	27.14%
Totals		21	100.00%	2,703	100.00%	13,020	100.00%

Problem Analysis:

- There were 21 interruptions on the Cattaraugus Sta 15 1562 in 2022.
- There were 3 transmission interruptions.
- The first Transmission interruption occurred on January 11, 2022, coded as a cause of deterioration (PSC cause code 05). This lockout accounted for 26% of the total customers interrupted (702 of 2,703), and 45% of the total customer-hours interrupted (5,838 of 13,020). Dake Hill - West Salamanca line 816; West Salamanca R56 trip & reclose. Dake Hill R765 3 trips & R770 4 trips to lockout. Phase C load lost between (NYSEG) New Albion tap & Cattaraugus Sta causing single phase condition & manual de-energization. The total duration of this interruption was 8 hours and 19 minutes.
- The second Transmission interruption occurred on April 18, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 26% of the total customers interrupted (700 of 2,703), and 26% of the total customer-hours interrupted (3,407 of 13,020). L816 Tripped and lockout; Opened switch 16 P227 L816 ROW to energize Cattaraugus and Little Valley found tree at P419 on Line 816. The total duration of this interruption was 4 hours and 52 minutes.
- The third Transmission interruption occurred on July 18, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 26% of the total customers interrupted (696 of 2,703), and 12% of the total customer-hours interrupted (1,624 of 13,020). Cattaraugus L/O; Isolated and restored - lockout on l816/ Sectionalized line to isolate section from West Salamanca, restored load from Dake Hill - tree fell on primary. The total duration of this interruption was 2 hours and 20 minutes.
- There were no substation interruptions.
- The remaining 18 events occurred at the distribution level.

- The distribution circuit breaker for the Cattaraugus Sta 15 1562 experienced 4 momentary operations in 2022.
- The distribution circuit breaker for the Cattaraugus Sta 15 1562 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Cattaraugus Sta 15 1562 in 2022, accounting for 62% of total interruptions (13 of 21). Equipment Failures were the 2nd leading cause of interruptions, accounting for 14% of total interruptions (3 of 21). Unknown were the 3rd leading cause of interruptions, accounting for 14% of total interruptions (3 of 21).
- Trees were the leading cause of customers interrupted (CI) on the Cattaraugus Sta 15 1562 in 2022, accounting for 47% of total customers interrupted (1,269 of 2,703). Unknown were the 2nd leading cause of customers interrupted, accounting for 27% of total customers interrupted (724 of 2,703). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 26% of total customers interrupted (704 of 2,703).
- Equipment Failures were the leading cause of customer-hours interrupted (CHI) on the Cattaraugus Sta 15 1562 in 2022, accounting for 45% of total customer-hours interrupted (5,846 of 13,020). Trees were the 2nd leading cause of customer-hours interrupted, accounting for 28% of total customer-hours interrupted (3,622 of 13,020). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 27% of total customer-hours interrupted (3,533 of 13,020).
- Of the 21 interruptions on this circuit, 15 affected 10 customers or less, with 9 being single customer outages.

Action Taken:

- Distribution Line Inspection was completed in September 2020. All level 1 and Level 2 maintenance has been completed.
- Sub-T Line Inspection was completed in May 2018. All levels of maintenance have been completed.
- Hazard Tree Removal performed in FY2023

Action Plan:

- Complete Level 3 Distribution Line Inspection work due in 2023
- Sub-T L816 Dake Hill to Cattaraugus line inspection due in 2023
- Distribution cycle tree trimming scheduled for FY2024

2. DELAMETER 9354 – 13.2kV

Profile: 3,115 Customers, 65.94 Circuit Miles
 Indices: CAIDI = 1.50, SAIFI = 3.43

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	15	39.47%	5,407	50.60%	11,467	71.35%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	10	26.32%	37	0.35%	149	0.93%
6	ACCIDENTS	10	26.32%	3,208	30.02%	756	4.70%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	5.26%	2,032	19.02%	3,697	23.01%
10	UNKNOWN	1	2.63%	1	0.01%	1	0.01%
Totals		38	100.00%	10,685	100.00%	16,070	100.00%

Problem Analysis:

- There were 38 interruptions on the Delameter 9354 in 2022.
- There were no transmission interruptions.
- There was 1 substation interruption.
 - This Substation interruption occurred on August 08, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 29% of the total customers interrupted (3,118 of 10,685), and 39% of the total customer-hours interrupted (6,236 of 16,070). A tree fell on the distribution feeder causing station bus breaker lock out. This was due to identified and corrected miscoordination. The outage was approximately 2.7 hrs.
- The remaining 37 events occurred at the distribution level.
- The distribution circuit breaker for the Delameter 9354 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Delameter 9354 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 48% of the total amount of customers interrupted (5,141 out of 10,685) and 27% of the total amount of the customer-hours interrupted (4,266 out of 16,070).
 - The first lockout occurred on November 06, 2022, coded as a cause of lightning (PSC cause code 09). This lockout accounted for 19% of the total customers interrupted (2,029 of 10,685), and 23% of the total customer-hours interrupted (3,692 of 16,070). This event was caused by a lightning strike on P30 Eden Evans Center Rd. The station breaker was opened to safely make repairs. The duration of the outage was 1hr 49min.

- The second lockout occurred on December 03, 2022, coded as a cause of vehicle (PSC cause code 06). This lockout accounted for 29% of the total customers interrupted (3,112 of 10,685), and 4% of the total customer-hours interrupted (574 of 16,070). A motor vehicle accident was called in due to entrapment at the scene. The vehicle struck and broke P77 on Lakeshore Rd. The feeder was de-energized to allow National Grid line crews to safely rehang primary and make the situation safe. The duration of the outage lasted for 11 min.
- Trees were the leading cause of interruptions on the Delameter 9354 in 2022, accounting for 39% of total interruptions (15 of 38). Equipment Failures were the 2nd leading cause of interruptions, accounting for 26% of total interruptions (10 of 38). Accidents were the 3rd leading cause of interruptions, accounting for 26% of total interruptions (10 of 38).
- Trees were the leading cause of customers interrupted (CI) on the Delameter 9354 in 2022, accounting for 51% of total customers interrupted (5,407 of 10,685). Accidents were the 2nd leading cause of customers interrupted, accounting for 30% of total customers interrupted (3,208 of 10,685). Lightning were the 3rd leading cause of customers interrupted, accounting for 19% of total customers interrupted (2,032 of 10,685).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Delameter 9354 in 2022, accounting for 71% of total customer-hours interrupted (11,467 of 16,070). Lightning were the 2nd leading cause of customer-hours interrupted, accounting for 23% of total customer-hours interrupted (3,697 of 16,070). Accidents were the 3rd leading cause of customer-hours interrupted, accounting for 5% of total customer-hours interrupted (756 of 16,070).
- Of the 38 interruptions on this circuit, 33 affected 10 customers or less, with 19 being single customer outages.

Action Taken:

- Distribution line inspection was last completed in June 2021. All Level 1 work has been completed.
- 72 trees and 160 Ash trees were removed in 2022.

Action Plan:

- All Level 2 distribution line inspection work scheduled for completion by 2023.
- All Level 3 distribution line inspection work scheduled for completion by 2024.
- Hazard Tree Removal work in FY 2023.

3. DELAMETER 9353 - 13.2kV

Profile: 2,839 Customers, 72.89 Circuit Miles
 Indices: CAIDI = 1.58, SAIFI = 2.99

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	16	50.00%	6,883	81.13%	10,851	80.81%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	4	12.50%	10	0.12%	37	0.27%
6	ACCIDENTS	6	18.75%	1,431	16.87%	2,359	17.57%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	3.13%	2	0.02%	6	0.05%
10	UNKNOWN	5	15.63%	158	1.86%	174	1.30%
Totals		32	100.00%	8,484	100.00%	13,427	100.00%

Problem Analysis:

- There were 32 interruptions on the Delameter 9353 in 2022.
- There were no transmission interruptions.
- There was 1 substation interruption.
 - This Substation interruption occurred on August 08, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 35% of the total customers interrupted (2,936 of 8,484), and 43% of the total customer-hours interrupted (5,774 of 13,427). A tree fell on the distribution feeder causing station bus breaker lock out. This was due to identified and corrected miscoordination. The outage was approximately 2.7 hrs.
- The remaining 31 events occurred at the distribution level.
- The distribution circuit breaker for the Delameter 9353 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Delameter 9353 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 34% of the total amount of customers interrupted (2,913 out of 8,484) and 19% of the total amount of the customer-hours interrupted (2,500 out of 13,427).
 - This lockout occurred on November 17, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 34% of the total customers interrupted (2,913 of 8,484), and 19% of the total customer-hours interrupted (2,500 of 13,427). A tree fell on the primary and broke Pole 36 on Main St. National Grid line crews were able to use switching devices to restore the majority of the customers while making repairs. Most of the customers experienced a 47 min outage while the rest experienced a 4 hr. and 25 min outage.

- Trees were the leading cause of interruptions on the Delameter 9353 in 2022, accounting for 50% of total interruptions (16 of 32). Accidents were the 2nd leading cause of interruptions, accounting for 19% of total interruptions (6 of 32). Unknown were the 3rd leading cause of interruptions, accounting for 16% of total interruptions (5 of 32).
- Trees were the leading cause of customers interrupted (CI) on the Delameter 9353 in 2022, accounting for 81% of total customers interrupted (6,883 of 8,484). Accidents were the 2nd leading cause of customers interrupted, accounting for 17% of total customers interrupted (1,431 of 8,484). Unknown were the 3rd leading cause of customers interrupted, accounting for 2% of total customers interrupted (158 of 8,484).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Delameter 9353 in 2022, accounting for 81% of total customer-hours interrupted (10,851 of 13,427). Accidents were the 2nd leading cause of customer-hours interrupted, accounting for 18% of total customer-hours interrupted (2,359 of 13,427). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 1% of total customer-hours interrupted (174 of 13,427).
- Of the 32 interruptions on this circuit, 39 affected 10 customers or less, with 29 being single customer outages.

Action Taken:

- Distribution Line Inspection was completed in September 2022.
- All level 1 distribution line inspection maintenance work has been completed.
- 136 trees and 142 Ash trees were removed in 2022.

Action Plan:

- Complete Level 2 Distribution Line Inspection work due in 2024.
- Complete Level 3 Distribution Line Inspection work due in 2025.

4. BAKER ST 15055 – 13.2kV

Profile: 1,902 Customers, 32.35 Circuit Miles
 Indices: CAIDI = 1.47, SAIFI = 3.57

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	4	28.57%	3,824	56.26%	7,678	76.85%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	1	7.14%	897	13.20%	1,173	11.74%
6	ACCIDENTS	4	28.57%	100	1.47%	145	1.45%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	1	7.14%	64	0.94%	61	0.61%
10	UNKNOWN	4	28.57%	1,912	28.13%	934	9.35%
Totals		14	100.00%	6,797	100.00%	9,990	100.00%

Problem Analysis:

- There were 14 interruptions on the Baker St 15055 in 2022.
- There was 1 transmission interruption.
 - This Transmission interruption occurred on March 23, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 28% of the total customers interrupted (1,904 of 6,797), and 9% of the total customer-hours interrupted (920 of 9,990). The transmission line serving Baker St 15055 tripped and locked out on a radial feed to municipality. Transmission line crews were able to switch and isolate the fault and restore all customers on 15055. The duration of the outage 29 min.
- There were no substation interruptions.
- The remaining 13 events occurred at the distribution level.
- The distribution circuit breaker for the Baker St 15055 experienced 1 momentary operation in 2022.
- The distribution circuit breaker for the Baker St 15055 experienced 2 sustained operations (lockouts) in 2022. These interruptions accounted for 56% of the total amount of customers interrupted (3,794 out of 6,797) and 76% of the total amount of the customer-hours interrupted (7,635 out of 9,990).
 - The first lockout occurred on November 12, 2022, coded as a cause of tree fell (PSC cause code 02). This lockout accounted for 28% of the total customers interrupted (1,899 of 6,797), and 34% of the total customer-hours interrupted (3,407 of 9,990). Tree took down primary wire between P55 and P54 on Winch Rd. National Grid line crews were able to isolate the downed wire and restore the majority of the customers while crews made repairs. The majority of customers were out for 1 hr. and 44 min while the remaining were out for 3 hrs and 49 min.

- The second lockout occurred on September 25, 2022, coded as a cause of tree fell - emerald ash borer (PSC cause code 02). This lockout accounted for 28% of the total customers interrupted (1,895 of 6,797), and 42% of the total customer-hours interrupted (4,227 of 9,990). On P2, Fairdale Ave, a transformer had a blown fuse causing the feeder to trip and lockout. National Grid line crews were able to patrol the feeder and determine no other cause found. The durations of the outage lasted for 48 min.
- Trees were the leading cause of interruptions on the Baker St 15055 in 2022, accounting for 29% of total interruptions (4 of 14). Accidents were the 2nd leading cause of interruptions, accounting for 29% of total interruptions (4 of 14). Unknown were the 3rd leading cause of interruptions, accounting for 29% of total interruptions (4 of 14).
- Trees were the leading cause of customers interrupted (CI) on the Baker St 15055 in 2022, accounting for 56% of total customers interrupted (3,824 of 6,797). Unknown were the 2nd leading cause of customers interrupted, accounting for 28% of total customers interrupted (1,912 of 6,797). Equipment Failures were the 3rd leading cause of customers interrupted, accounting for 13% of total customers interrupted (897 of 6,797).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Baker St 15055 in 2022, accounting for 77% of total customer-hours interrupted (7,678 of 9,990). Equipment Failures were the 2nd leading cause of customer-hours interrupted, accounting for 12% of total customer-hours interrupted (1,173 of 9,990). Unknown were the 3rd leading cause of customer-hours interrupted, accounting for 9% of total customer-hours interrupted (934 of 9,990).
- Of the 14 interruptions on this circuit, 8 affected 10 customers or less, with 4 being single customer outages.

Action Taken:

- In October 2022, distribution line inspection was completed. All level distribution line inspection maintenance was completed.
- In 2022, 136 trees and 100 Ash trees were removed.

Action Plan:

- All level 2 distribution line inspection maintenance will be completed in 2024.
- All level 3 distribution line inspection maintenance will be completed in 2025.
- Actively monitor 2023 hazard tree events and will escalate if necessary.

5. BERRY RD 15352 – 13.2V

Profile: 2,607 Customers, 38.31 Circuit Miles
 Indices: CAIDI = 0.66, SAIFI = 4.13

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	6	25.00%	3,352	31.14%	3,226	45.48%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	0	0.00%	0	0.00%	0	0.00%
5	EQUIPMENT	6	25.00%	1,812	16.83%	1,588	22.40%
6	ACCIDENTS	8	33.33%	336	3.12%	348	4.91%
7	PREARRANGED	2	8.33%	2,630	24.43%	309	4.36%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	0	0.00%	0	0.00%	0	0.00%
10	UNKNOWN	2	8.33%	2,636	24.48%	1,621	22.85%
Totals		24	100.00%	10,766	100.00%	7,093	100.00%

Problem Analysis:

- There were 24 interruptions on the Berry Rd 15352 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on March 23, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 24% of the total customers interrupted (2,610 of 10,766), and 22% of the total customer-hours interrupted (1,566 of 7,093). The transmission line serving Berry Rd Station locked out. National Grid transmission line crews were able to switch, isolate the fault and reenergize the line. The outage was 36 min.
 - The second Transmission interruption occurred on March 24, 2022, coded as a cause of prearranged associated (PSC cause code 07). This lockout accounted for 24% of the total customers interrupted (2,582 of 10,766), and 4% of the total customer-hours interrupted (301 of 7,093). This outage was to test the low side station breaker at TB1 Berry Road. The outage was 7 min.
- There were no substation interruptions.
- The remaining 22 events occurred at the distribution level.
- The distribution circuit breaker for the Berry Rd 15352 experienced 2 momentary operations in 2022.
- The distribution circuit breaker for the Berry Rd 15352 experienced 1 sustained operation (lockout) in 2022. This interruption accounted for 24% of the total amount of customers interrupted (2,608 out of 10,766) and 33% of the total amount of the customer-hours interrupted (2,350 out of 7,093).

- This blackout occurred on December 15, 2022, coded as a cause of tree fell (PSC cause code 02). This blackout accounted for 24% of the total customers interrupted (2,608 of 10,766), and 33% of the total customer-hours interrupted (2,350 of 7,093). A tree fell and took down primary conductors on P21 Chestnut St and P2 Fallen St. National Grid line crews were able to switch and energize most of the customers while making the repair. The majority of customers were out for 51 min while the remaining customers were out for 2 hr. and 31 min.
- Accidents were the leading cause of interruptions on the Berry Rd 15352 in 2022, accounting for 33% of total interruptions (8 of 24). Trees were the 2nd leading cause of interruptions, accounting for 25% of total interruptions (6 of 24). Equipment Failures were the 3rd leading cause of interruptions, accounting for 25% of total interruptions (6 of 24).
- Trees were the leading cause of customers interrupted (CI) on the Berry Rd 15352 in 2022, accounting for 31% of total customers interrupted (3,352 of 10,766). Unknown were the 2nd leading cause of customers interrupted, accounting for 24% of total customers interrupted (2,636 of 10,766). Prearranged were the 3rd leading cause of customers interrupted, accounting for 24% of total customers interrupted (2,630 of 10,766).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Berry Rd 15352 in 2022, accounting for 45% of total customer-hours interrupted (3,226 of 7,093). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 23% of total customer-hours interrupted (1,621 of 7,093). Equipment Failures were the 3rd leading cause of customer-hours interrupted, accounting for 22% of total customer-hours interrupted (1,588 of 7,093).
- Of the 24 interruptions on this circuit, 11 affected 10 customers or less, with 6 being single customer outages.

Action Taken:

- Distribution line inspection was last completed June 2021. All level 1 work has been completed.
- Distribution line cycle tree trimming was completed in 2022.

Action Plan:

- Distribution line inspection Level 2 work will be completed in 2023.
- Distribution line inspection Level 3 work will be completed in 2024.

6. BAKER ST 15056 – 13.2V

Profile: 2,236 Customers, 96.39 Circuit Miles
 Indices: CAIDI = 0.81, SAIFI = 3.36

CAUSE CODE PERFORMANCE TABLE

Code	Category	Interruptions		Customers Interrupted		Customer Hours	
		Number	% Total	Number	% Total	Number	% Total
2	TREE	16	50.00%	2,774	36.93%	4,599	75.85%
3	OVERLOADS	0	0.00%	0	0.00%	0	0.00%
4	OPER. ERROR	1	3.13%	2,244	29.87%	211	3.48%
5	EQUIPMENT	7	21.88%	218	2.90%	117	1.94%
6	ACCIDENTS	1	3.13%	13	0.17%	12	0.19%
7	PREARRANGED	0	0.00%	0	0.00%	0	0.00%
8	CUST. EQUIP.	0	0.00%	0	0.00%	0	0.00%
9	LIGHTNING	2	6.25%	18	0.24%	22	0.36%
10	UNKNOWN	5	15.63%	2,245	29.89%	1,103	18.18%
Totals		32	100.00%	7,512	100.00%	6,064	100.00%

Problem Analysis:

- There were 32 interruptions on the Baker St 15056 in 2022.
- There were 2 transmission interruptions.
 - The first Transmission interruption occurred on March 23, 2022, coded as a cause of unknown (PSC cause code 10). This lockout accounted for 30% of the total customers interrupted (2,235 of 7,512), and 18% of the total customer-hours interrupted (1,080 of 6,064). The transmission line serving Baker St 15055 tripped and locked out on a radial feed to municipality. Transmission line crews were able to switch and isolate the fault and restore all customers on 15055. The duration of the outage 29 min.
 - The second Transmission interruption occurred on April 28, 2022, coded as a cause of operating / testing error (PSC cause code 04). This lockout accounted for 30% of the total customers interrupted (2,244 of 7,512), and 3% of the total customer-hours interrupted (211 of 6,064). Switching was required on the transmission line feeding Baker St Station. The outage lasted for 5 min.
- There were no substation interruptions.
- The remaining 30 events occurred at the distribution level.
- The distribution circuit breaker for the Baker St 15056 experienced 0 momentary operations in 2022.
- The distribution circuit breaker for the Baker St 15056 experienced 0 sustained operations (lockouts) in 2022.
- Trees were the leading cause of interruptions on the Baker St 15056 in 2022, accounting for 50% of total interruptions (16 of 32). Equipment Failures were the 2nd leading cause of interruptions, accounting for 22% of total interruptions (7 of 32). Unknown were the 3rd leading cause of interruptions, accounting for 16% of total interruptions (5 of 32).

- Trees were the leading cause of customers interrupted (CI) on the Baker St 15056 in 2022, accounting for 37% of total customers interrupted (2,774 of 7,512). Unknown were the 2nd leading cause of customers interrupted, accounting for 30% of total customers interrupted (2,245 of 7,512). Operators Errors were the 3rd leading cause of customers interrupted, accounting for 30% of total customers interrupted (2,244 of 7,512).
- Trees were the leading cause of customer-hours interrupted (CHI) on the Baker St 15056 in 2022, accounting for 76% of total customer-hours interrupted (4,599 of 6,064). Unknown were the 2nd leading cause of customer-hours interrupted, accounting for 18% of total customer-hours interrupted (1,103 of 6,064). Operators Errors were the 3rd leading cause of customer-hours interrupted, accounting for 3% of total customer-hours interrupted (211 of 6,064).
- Of the 32 interruptions on this circuit, 22 affected 10 customers or less, with 11 being single customer outages.

Action Taken:

- 59 Ash trees have been removed in 2022.

Action Plan:

- Distribution line inspection to be completed in 2023.

3. ACTION PLAN SUMMARIES

a. SUMMY OF ACTION PLANS FOR 2022 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Estimated Compl. Date	Estimated Cost	Comments
Cattaraugus	10-1562	2022	Distribution cycle tree trimming scheduled for FY2024.	2023	TBD	
Cattaraugus	10-1562	2022	L816 SubT line inspection	2023	TBD	
Cattaraugus	10-1562	2022	Complete Level 3 maintenance work	2023	TBD	
Delameter	07-9354	2022	Complete Level 2 maintenance work	2023	TBD	
Delameter	07-9354	2022	Complete Level 3 maintenance work	2024	TBD	
Delameter	07-9354	2022	Hazard Tree Removal work in FY 2023.	2023	TBD	
Delameter	07-9353	2022	Complete Level 2 maintenance work	2024	TBD	
Delameter	07-9353	2022	Complete Level 3 maintenance work	2025	TBD	
Baker St	09-15055	2022	Complete Level 2 maintenance work	2023	TBD	
Baker St	09-15055	2022	Actively monitor 2023 hazard tree events and will escalate if necessary.	2023	TBD	
Berry Rd	08-15352	2022	Complete Level 2 maintenance work	2023	TBD	
Berry Rd	08-15352	2022	Complete Level 3 maintenance work	2024	TBD	
Baker St	09-15056	2022	Distribution line inspection to be completed	2023	TBD	

b. STATUS OF ACTION PLANS FOR 2021 WORST PERFORMING CIRCUITS

Station	Feeder	Report Year	Action Plan	Estimated Compl. Date	Estimated Cost	Comments
Cattaraugus	10-1562	2021	Distribution cycle tree trimming scheduled for FY2023.	2023	TBD	Complete
Cattaraugus	10-1562	2021	Complete Level 2 maintenance work	2022	TBD	Complete
Cattaraugus	10-1562	2021	Complete Level 3 maintenance work	2023	TBD	
Prices Corners	10-1452	2021	Distribution Line Inspection scheduled in FY2023	2023	TBD	Complete
Prices Corners	10-1452	2021	Hazard Tree removal.	2022	TBD	Complete
Prices Corners	10-1452	2021	Complete Level 2 SubT maintenance work Line 804	2023	TBD	
Prices Corners	10-1452	2021	Complete Level 3 SubT maintenance work Line 804	2024	TBD	
North Eden	07-8251	2021	Complete Level 3 maintenance work	2022	TBD	Complete
Vandalia	10-10451	2021	Distribution cycle tree pruning will be due in FY 2023.	2023	TBD	Complete
Vandalia	10-10451	2021	Distribution Line Inspection scheduled in FY2022.	2022	TBD	Complete
Vandalia	10-10451	2021	Complete Level 3 SubT maintenance work Line 805	2022	TBD	Complete
Delameter	07-9353	2021	Complete Level 3 maintenance work	2022	TBD	Complete

4. OPERATING REGION PERFORMANCE BELOW MINIMUM

a. MAINTENANCE HISTORY AND ANALYSIS OF FACTORS THAT CAUSED THE BELOW MINIMUM PERFORMANCE.

In 2022 the Southwest Region failed to meet the PSC minimum SAIFI requirement after meeting the requirement in 2021. The Southwest Region has been below the target of 1.181 for the previous five years and passed in 2021 with an annual SAIFI of 1.06. However, the Southwest Region failed to meet the target in 2022 with an annual SAIFI of 1.32. Meanwhile, the Southwest Region met the annual CAIDI goal of 1.95 in 2022 with a CAIDI of 1.72.

In 2022, the Southwest Region experienced 1,207 interruptions. Most of these interruptions (97%) occurred on the distribution system. However, 23 of these interruptions (2%) occurred on the transmission or sub-transmission systems, interrupting 43,148 customers (31%) and accounting for 57,154 customer-hours interrupted (24%). The SAIFI and CAIDI of the transmission and sub-transmission systems in 2022 were 0.41 interruptions and 1.32 hours respectively. The impact of these 23 interruptions on SAIFI, (0.41 interruptions per year for just 23 interruptions, or a SAIFI of 0.018 per interruption), versus a distribution SAIFI of 0.78 interruptions per year or 0.0006 per interruption, made the overall annual SAIFI in the Southwest Region worse, ultimately causing it to fail the SAIFI target. Transmission SAIFI was 37% greater in 2022 as compared to 2021.

There were also 8 substation-related interruptions in the Southwest Region in 2022, interrupting 13,858 customers (10%) and accounting for 27,95 customer-hours interrupted (12%). The SAIFI and CAIDI of substation-related interruptions in 2022 was 0.13 interruptions per year and 2.01 hours.

The distribution system accounted for 97% of the interruptions in the Southwest Region in 2022, interrupting 82,442 customers (59%) and accounting for 155,343 customer-hours interrupted (65%). The SAIFI of the distribution system in 2022 met the SAIFI goal for the Southwest Region, with a distribution SAIFI of 0.78 interruptions per year. This represents a slight increase in distribution SAIFI from 2021, when it was 0.64 interruptions per year.

b. **PLANNED PROGRAMS OR PLANNED CORRECTIVE ACTIONS AND PROPOSED IMPROVEMENTS TO THE PERFORMANCE INDICES.**

Interruptions on the transmission and sub-transmission systems have a very significant impact on reliability in the Southwest Region. This is because many of these lines are radial through heavily forested, environmentally sensitive, inaccessible areas. Many projects have been completed and more are planned to improve the performance of the transmission system. The Inspection & Maintenance program itself is also continually improving the sub-transmission and transmission systems by identifying equipment in need of replacement before it fails. In addition, the Forestry Department is widening the rights-of-way of many of the transmission and sub-transmission lines, as far as easement areas and adjacent property owners will allow, in an attempt to reduce the impact of trees in what is a very heavily forested area. It is expected that the combination of these efforts will improve the performance of the transmission and sub-transmission systems; however, no manner of improvement will eliminate all interruptions.

The contribution of transmission outages is significant to the regional performance indices, as can be seen in the data provided in the previous section. It is very difficult to predict transmission equipment failures in advance, and in a continued attempt to minimize these interruptions, Transmission Planning and Asset Management (TPAM) has several projects in the works to improve the performance of some of the worst performing transmission lines.

Tree trimming around the distribution system will remain a priority in 2022, in order to address what is typically the single largest contributor to customer interruptions within the Southwest Region. In addition, there is a list of distribution improvement capital projects to be designed and/or constructed in FY2024, which can be viewed in the 1.f section of this report.

Additional efforts to improve restoration times are listed below:

- The Divisional Reliability Team will continue to investigate and analyze outages impacting greater than 2,500 customers or more than 50,000 customer-minutes-interrupted (CMI). This effort will look at the interruptions impacting the greatest number of customers to see what could have been done better to reduce the length of the interruption or to have eliminated it altogether.
- The review of suitable locations for the installation of new cutout mounted reclosers (CMRs) will continue to reduce the number of temporary faults that result in permanent outages on smaller side taps.

K. GLOSSARY

CAIDI - Customer Average Interruption Duration Index is the average service restoration time for customers interrupted. It is determined by dividing the sum of all customer interruption durations by the total number of customers interrupted in a year.

Customer Hours of Interruption - The hours of interruption duration multiplied by the number of customers interrupted for a given interruption.

Distribution Circuit - An electric feeder line serving customers and operating at voltage levels below 23,000 volts - Typically, 4.16, 4.8 or 13.2kV.

Failed Region - Any region whose indices exceed the CAIDI or SAIFI performance level set for that region.

Fiscal Year – Beginning in 2002 the Company changed the cycle of its annual budgeting and reporting process from a calendar year beginning January 1st and ending December 31st to a fiscal year beginning April 1st and ending March 31st of the following year. Budget estimates for work to be performed on worst performing feeders will most likely reflect this shift in fiscal year budgeting while actual costs typically reflect work completed by the end of the calendar year.

Interruption - Loss of electric service for five minutes or more to one or more customers. This is a reliability issue rather than a power quality issue.

Major Storm - A storm that causes at least 10% of the metered customers in a region to be without service or a storm that results in metered customers to be without service for 24 hours or more.

Minimum Goal - As defined by the Company and the PSC, this is the level of service reliability below which a region fails and additional analysis is required.

Momentary Interruption - Loss of electric service for less than five minutes to one customer or more. This a power quality rather than a reliability issue.

Objective Goal - The target level of service reliability as defined by the Company and the PSC.

Power Quality - The performance of a circuit other than that defined by reliability. It is characterized by parameters such as the number of momentary (less than 5 minute) interruptions, steady state voltage sags, swells, surges, noise and harmonics.

Recloser - A loadbreak device that operates when a fault current of pre-determined level and duration flows through it.

Region - One of eight geographic areas within the Company's electric territory. For the purpose of this report, the eight regions are: Capital (Albany, Troy, Schenectady, Hudson); Central (Syracuse, Fulton, Oswego, Pulaski, Cortland); Frontier (Buffalo, Niagara Falls); Genesee (Batavia, Avon,

Albion, Medina); Mohawk Valley (Utica, Rome, Oneida, Herkimer); Northeast (Glens Falls, Saratoga, Ticonderoga); Northern (Watertown, Ogdensburg, Malone, Potsdam); And Southwest (Angola, Fredonia, Stow, Olean).

Reliability - The electric performance of a distribution circuit as experienced by its customers. It is based on interruptions of five (5) minutes or longer, their duration, frequency and number of customers affected.

SAI - System Availability Index is the percent of time that service was available during the year. The SAI is derived from the ratio of the total number of customer hours that service was available during the year (24/hour/day x 365 days/year - SAIDI) to the total customer hours available per year (8,760 = 24 hours/day x 365 days/year) multiplied by 100 percent.

SAIDI - System Average Interruption Duration Index is an average interruption duration per customers served per year. It is the ratio of the customer hours interrupted to the total number of customers served.

SAIFI - System Average Interruption Frequency Index is the average number of times that a customer is interrupted in a year. It is determined by dividing the number of customers interrupted in a year by the average number of customers connected during the year.

SECTIONALIZER - A non-loadbreak circuit device that works with substation breaker or a recloser to minimize the number of customers involved in an interruption.

Worst-Performing Circuits - Circuits in the system or a given region that are the worst performing based on the Company's combined rankings of:

- a. SAIFI
- b. SAIDI
- c. Number of Interruptions
- d. Number of Customer Hours Interrupted

NATIONAL GRID
ELECTRIC SERVICE INTERRUPTION - ACTIVE FEEDER RANKING
DURING TIME PERIOD JAN 01, 2022 TO DEC 31, 2022
FACILITY TYPE(S) INCLUDE: DISTRIBUTION, SUBSTATION, AND TRANSMISSION
EXCLUDING PSC CODE(S): 01
REPORT # 4
SYSTEM REPORT

Region	Station Name	Ckt/F No.	No. Cst. Served	No. Intr.	Intr. Rank	Tot. Dur. Hours	Avg. Dur.	Max. Dur.	Cust. Intr.	Max. Cust.	Tot. Cust. Hours	Tot. CH Rank	SAIFI	SAIFI Rank	SAIDI	SAIDI Rank	CAIDI	Fdr Rank	Mmty Intr.
Mohawk	Poland - Utica	17-62258	1588	60	2103	272	4.5	16.6	11327	1606	29505.23	2104	7.13	2101	18.58	2094	2.6	8402	2
Mohawk	Eagle Bay	17-38272	1056	34	2056	227.5	6.7	15.6	8423	1057	34591.23	2105	7.98	2103	32.76	2101	4.11	8365	3
Northeast	Northville	35-33252	2429	46	2095	232.9	5.1	21.1	10400	2415	38815.5	2107	4.28	2074	15.98	2079	3.73	8355	2
Northeast	North Creek	40-12252	1198	35	2060	134.5	3.8	13.3	7507	1208	24195.43	2097	6.27	2098	20.2	2098	3.22	8353	3
Mohawk	Raquette Lake	17-39861	495	30	2033	344.6	11.5	36.1	4816	496	26285.56	2101	9.73	2106	53.1	2107	5.46	8347	2
Northern	Thousand Isl	26-81452	2160	40	2082	272.9	6.8	32.7	10101	2217	25301.64	2099	4.68	2086	11.71	2068	2.5	8335	3
Mohawk	Eagle Bay	17-38271	933	26	2005	179.2	6.9	30.5	8022	936	38536.31	2106	8.6	2104	41.3	2106	4.8	8321	3
Mohawk	Old Forge	17-38361	610	26	2005	151.1	5.8	12.3	5659	613	23497.36	2096	9.28	2105	38.52	2105	4.15	8311	2
Mohawk	Old Forge	17-38362	738	25	1990	185.1	7.4	21.8	5860	738	26447.69	2102	7.94	2102	35.84	2104	4.51	8298	2
Northeast	Vail Mills	35-39252	2735	49	2098	214.8	4.4	19.8	8929	2739	25295.85	2098	3.26	2026	9.25	2033	2.83	8255	2
Capital	Grooms Road	32-34555	2341	28	2021	126.9	4.5	19.1	10869	2355	23247.7	2095	4.64	2084	9.93	2047	2.14	8247	2
Northeast	Warrensburg	40-32152	2207	37	2073	152.3	4.1	21.9	9940	2221	16564.89	2083	4.5	2079	7.51	2009	1.67	8244	5
Central	Duguid	11-26555	2313	27	2015	115.4	4.3	17.1	7652	2305	39054.07	2108	3.31	2037	16.88	2081	5.1	8241	3
Northeast	Whitehall	38-18751	1745	59	2102	394.1	6.7	26.6	4746	1699	22263.21	2094	2.72	1970	12.76	2071	4.69	8237	2
Northeast	Hague Road	41-41853	2257	36	2068	129.3	3.6	14.1	8172	1247	20294.55	2089	3.62	2050	8.99	2029	2.48	8236	4
Central	Lighthouse Hill	16-6144	2268	44	2093	139.3	3.2	8.8	10106	2284	14263.63	2076	4.46	2078	6.29	1979	1.41	8226	1
Northeast	Indian Lake	40-31076	767	28	2021	107.5	3.8	11.2	4049	771	8992.97	2038	5.28	2090	11.72	2070	2.22	8219	2
Northern	North Carthage	23-81653	2263	32	2045	96.5	3	13.9	9984	2273	17173.08	2084	4.41	2077	7.59	2011	1.72	8217	3
Northeast	Gilmantown	35-15451	2048	38	2077	227.6	6	48.3	6145	2037	20838.67	2090	3	1989	10.18	2053	3.39	8209	3
Northeast	Brook Road	39-36955	3221	65	2105	284.2	4.4	20	9609	3211	25740.5	2100	2.98	1983	7.99	2016	2.68	8204	2
Northeast	Vail Mills	35-39253	3102	47	2096	205.1	4.4	14	10064	3188	21513.53	2091	3.24	2022	6.94	1990	2.14	8199	3
Genesee	W Hamlin	06-8254	1893	38	2077	113.6	3	11.2	5687	1894	17826.68	2086	3	1989	9.42	2038	3.13	8190	0
Northeast	Northville	35-33251	1655	23	1969	99.1	4.3	22.3	6129	1671	17785.11	2085	3.7	2054	10.75	2059	2.9	8167	2
Northeast	Indian Lake	40-31075	803	23	1969	112.6	4.9	30.2	4348	809	8868.46	2035	5.41	2092	11.04	2064	2.04	8160	6
Mohawk	Alder Creek	17-70152	1063	31	2042	100.8	3.3	11.5	5837	1058	7954.55	2015	5.49	2093	7.48	2006	1.36	8156	2
Frontier	Swann Road	03-10558	1706	23	1969	65.6	2.9	15.5	10521	1707	12787.09	2069	6.17	2097	7.5	2008	1.22	8143	3
Northeast	Union St-Saratoga	39-37653	1407	40	2082	128.3	3.2	10.5	4982	1409	8695.2	2031	3.54	2046	6.18	1977	1.75	8136	1
Northern	Brady	25-95756	1245	30	2033	77.1	2.6	9.3	3110	1137	14587.96	2077	2.5	1948	11.72	2070	4.69	8128	1
Capital	Blue Stores	33-30351	2180	62	2104	345.6	5.6	25.4	5465	2096	15252.27	2081	2.51	1949	7	1993	2.79	8127	5
Northern	North Carthage	23-81652	2277	41	2085	143.1	3.5	9.1	7273	2283	12860	2070	3.19	2012	5.65	1957	1.77	8124	0
Capital	Boyntonville	31-33351	2011	57	2100	248.4	4.4	16.5	5611	2681	12199.11	2067	2.79	1975	6.07	1976	2.17	8118	3
Mohawk	Alder Creek	17-70161	988	31	2042	133.8	4.3	14.7	3133	926	8605.9	2028	3.17	2008	8.71	2025	2.75	8103	1
Northeast	Schroon Lake	41-42951	2350	78	2107	258.7	3.3	10.8	7429	2313	11832.47	2063	3.16	2006	5.04	1923	1.59	8099	3
Genesee	Royalton	06-9863	721	18	1885	41.2	2.3	7.9	4137	722	9378.79	2045	5.74	2094	13.01	2072	2.27	8096	0
Northeast	E J West	35-03851	1462	44	2093	273.1	6.2	14.8	2985	777	16008.89	2082	2.04	1857	10.95	2063	5.36	8095	6

Region	Station Name	Ckt/F No.	No. Cst. Served	No. Intr.	Intr. Rank	Tot. Dur. Hours	Avg. Dur.	Max. Dur.	Cust. Intr.	Max. Cust.	Tot. Cust. Hours	Tot. CH Rank	SAIFI	SAIFI Rank	SAIDI	SAIDI Rank	CAIDI	Fdr Rank	Mmty Intr.
Central	Ballina	11-22151	1185	19	1907	66.6	3.5	13.2	4987	1184	11801.58	2062	4.21	2072	9.96	2050	2.37	8091	6
Northeast	Vail Mills	35-39251	2019	25	1990	104.5	4.2	16.2	7094	2020	13351.73	2072	3.51	2044	6.61	1982	1.88	8088	2
Mohawk	Poland - Utica	17-62257	1614	28	2021	73.8	2.6	14.1	7311	2796	8707.07	2033	4.53	2081	5.39	1944	1.19	8079	1
Mohawk	White Lake	17-39963	968	15	1807	86.1	5.7	11.4	4535	974	18825.16	2088	4.68	2086	19.45	2097	4.15	8078	1
Mohawk	Old Forge	17-38364	870	14	1766	58.6	4.2	11.4	6171	870	29035.17	2103	7.09	2100	33.37	2103	4.71	8072	2
Northeast	Ashley	38-33151	1150	34	2056	181.3	5.3	22	3693	1149	7754.62	2013	3.21	2015	6.74	1986	2.1	8070	3
Northeast	Caroga Lake	35-21932	1989	30	2033	124.6	4.2	11.3	4375	2038	18492.59	2087	2.2	1903	9.3	2035	4.23	8058	0
Northern	Lowville	23-77354	2699	82	2108	264.2	3.2	13.4	7288	1112	13103.29	2071	2.7	1967	4.85	1911	1.8	8057	3
Northern	East Norfolk	25-91361	1546	17	1861	48.2	2.8	10.2	5003	1550	22215.46	2093	3.24	2022	14.37	2076	4.44	8052	2
Capital	Schodack	30-45151	2470	42	2088	174.3	4.2	11.2	5630	2327	14616.24	2078	2.28	1917	5.92	1968	2.6	8051	3
Capital	Everett Road	30-42054	1216	38	2077	160.4	4.2	23.5	4071	1219	6594.03	1985	3.35	2038	5.42	1949	1.62	8049	4
Central	Niles	11-29451	1317	37	2073	213.5	5.8	18.4	2769	1317	11160.65	2059	2.1	1880	8.47	2021	4.03	8033	0
Mohawk	Salisbury	19-67857	1027	39	2079	174.4	4.5	19.5	2505	1042	7392.06	2005	2.44	1941	7.2	1998	2.95	8023	1
Northeast	Scotfield	38-45052	1638	53	2099	168.1	3.2	8.3	4081	1650	8479.11	2027	2.49	1947	5.18	1929	2.08	8002	6
Northeast	Chestertown	40-04251	1420	33	2048	137.1	4.2	16.9	3020	1415	10465.59	2052	2.13	1887	7.37	2003	3.47	7990	5
Capital	Elnora	32-44258	1759	36	2068	67.2	1.9	6.2	7131	1768	7010.14	1992	4.05	2070	3.99	1847	0.98	7977	1
Mohawk	Sherman	17-33352	1488	36	2068	116.4	3.2	13.3	3524	1495	8294.74	2021	2.37	1929	5.57	1955	2.35	7973	2
Capital	Rotterdam	32-13853	1381	29	2027	93.4	3.2	11.4	4123	1380	7541.15	2009	2.99	1984	5.46	1951	1.83	7971	5
Genesee	Mumford	05-5051	2072	23	1969	43.5	1.9	6.9	7660	2067	9023.78	2039	3.7	2054	4.36	1869	1.18	7931	1
Genesee	Southland Sta 84	06-8462	762	19	1907	66.5	3.5	13	3629	764	5252.59	1940	4.76	2088	6.89	1988	1.45	7923	6
Northern	Riverview	24-84762	239	17	1861	58.6	3.4	17.1	764	242	5045.59	1933	3.2	2013	21.11	2099	6.6	7906	6
Capital	Front St	32-36051	3264	20	1926	53.9	2.7	11.5	10327	3283	15072.16	2079	3.16	2006	4.62	1890	1.46	7901	1
Central	Truxton	12-7473	540	16	1835	48.5	3	7.8	2859	542	4968.08	1927	5.29	2091	9.2	2032	1.74	7885	3
Central	Ridge Road	11-21964	862	23	1969	94	4.1	11.5	3104	857	4671.57	1912	3.6	2048	5.42	1949	1.51	7878	2
Northern	Sunday Creek	23-87651	269	24	1978	92.8	3.9	11.7	984	268	3085.3	1779	3.66	2052	11.47	2067	3.14	7876	1
Capital	Selkirk	30-14952	1704	27	2015	122.2	4.5	19.2	2988	931	12116.87	2066	1.75	1785	7.11	1995	4.06	7861	1
Southwest	Delameter	07-9353	2918	25	1990	99.5	4	11.3	8006	2925	11125.95	2058	2.74	1971	3.81	1837	1.39	7856	2
Central	Milton Ave	11-26656	1477	19	1907	62.2	3.3	9.5	6825	1454	6552.86	1983	4.62	2083	4.44	1877	0.96	7850	2
Capital	Burdeck St	32-26554	1178	15	1807	102.1	6.8	17.4	2921	1181	11101.95	2057	2.48	1946	9.42	2038	3.8	7848	12
Northern	Lyme	13-73352	2825	36	2068	145.2	4	9.2	5018	2772	13407.5	2073	1.78	1792	4.75	1904	2.67	7837	1
Northern	Nicholville	27-86062	1147	22	1955	77.7	3.5	12.7	3219	1147	5984.62	1965	2.81	1978	5.22	1936	1.86	7834	1
Central	Gilbert Mills	11-24753	1542	21	1941	64.7	3.1	9.5	4395	1541	7305.74	2002	2.85	1980	4.74	1902	1.66	7825	0
Southwest	Valley	10-4457	1338	21	1941	56	2.7	7.9	4380	1343	6019.8	1968	3.27	2029	4.5	1881	1.37	7819	0
Central	West Cleveland	11-32651	740	22	1955	75.4	3.4	11	2881	744	3931.37	1857	3.89	2064	5.31	1938	1.36	7814	3
Mohawk	Lehigh	18-66953	1477	42	2088	121.9	2.9	7.6	3054	919	6506.74	1982	2.07	1867	4.41	1872	2.13	7809	1
Northern	W Adams	13-87554	2518	34	2056	132.5	3.9	12.6	4710	2474	11311.73	2060	1.87	1813	4.49	1880	2.4	7809	3
Capital	Elnora	32-44257	1460	17	1861	81.1	4.8	22	3816	1469	8069.69	2017	2.61	1958	5.53	1953	2.11	7789	4
Northern	Higley	25-92451	1080	34	2056	74.8	2.2	6.4	3673	1094	4008.23	1862	3.4	2040	3.71	1825	1.09	7783	0
Frontier	Swann Road	03-10557	1843	15	1807	41.9	2.8	9.4	6060	1865	8699.68	2032	3.29	2034	4.72	1900	1.44	7773	0
Capital	Grooms Road	32-34557	1907	29	2027	113.6	3.9	10.6	4365	1208	7128.07	1995	2.29	1918	3.74	1830	1.63	7770	2
Capital	Swaggertown	32-36452	2538	36	2068	115	3.2	11.2	5170	2427	8771.01	2034	2.04	1857	3.46	1799	1.7	7758	1
Northern	Indian River	13-32358	1842	31	2042	133.2	4.3	19.7	3031	1890	8621.02	2030	1.65	1768	4.68	1897	2.84	7737	2
Northern	Thousand Isl	26-81458	2298	31	2042	130	4.2	15.8	4788	2233	8095.61	2018	2.08	1869	3.52	1804	1.69	7733	0

Region	Station Name	Ckt/F No.	No. Cst. Served	No. Intr.	Intr. Rank	Tot. Dur. Hours	Avg. Dur.	Max. Dur.	Cust. Intr.	Max. Cust.	Tot. Cust. Hours	Tot. CH Rank	SAIFI	SAIFI Rank	SAIDI	SAIDI Rank	CAIDI	Fdr Rank	Mmty Intr.
Northern	Star Lake	29-72762	672	14	1766	54.2	3.9	9.1	1521	661	7101.6	1994	2.26	1915	10.57	2056	4.67	7731	0
Mohawk	Old Forge	17-38363	378	8	1461	33.6	4.2	11.4	2649	379	12478.04	2068	7.01	2099	33.01	2102	4.71	7730	3
Genesee	Leroy	04-0457	1030	12	1676	34.5	2.9	15.1	2896	1034	9153.32	2042	2.81	1978	8.89	2028	3.16	7724	1
Capital	North Troy	31-12351	1339	27	2015	118.8	4.4	23.2	2337	727	6950.57	1990	1.75	1785	5.19	1931	2.97	7721	0
Central	Duguid	11-26554	2163	17	1861	60.3	3.5	17.3	3043	2358	21543.79	2092	1.41	1704	9.96	2050	7.08	7707	1
Northern	Bremen	23-81556	1721	59	2102	177	3	23.8	2980	362	6497.36	1981	1.73	1782	3.78	1835	2.18	7700	1
Capital	Hemstreet	31-32851	1965	40	2082	191.2	4.8	15.5	3114	1965	8008.7	2016	1.58	1748	4.08	1853	2.57	7699	2
Frontier	Shawnee Rd	03-7652	1999	13	1725	27.3	2.1	5.6	5414	2002	10779.24	2055	2.71	1969	5.39	1944	1.99	7693	1
Capital	Valkin	33-42753	2310	33	2048	130.9	4	11.7	3542	2124	9507.89	2046	1.53	1738	4.12	1857	2.68	7689	1
Southwest	Delameter	07-9354	3102	30	2033	97.9	3.3	7.5	6020	3222	10012.73	2050	1.94	1830	3.23	1768	1.66	7681	1
Capital	Bethlehem	30-02158	2708	26	2005	125.2	4.8	16.1	5065	2722	9773.57	2049	1.87	1813	3.61	1811	1.93	7678	1
Central	Wetzel Rd	11-690055	1438	11	1617	50.7	4.6	16.4	5818	1524	8324.37	2023	4.05	2070	5.79	1966	1.43	7676	2
Capital	Pinebush	30-37153	1704	20	1926	84.3	4.2	16.7	2682	1706	9561.76	2047	1.57	1744	5.61	1956	3.57	7673	3
Capital	Greenbush	30-07852	2325	36	2068	151	4.2	13.1	3936	2329	8304.12	2022	1.69	1773	3.57	1809	2.11	7672	0
Central	Ash St	11-22351	3602	13	1725	30.3	2.3	4.3	11326	3615	15145.22	2080	3.14	2002	4.2	1859	1.34	7666	11
Central	Duguid	11-26552	1877	18	1885	65.1	3.6	12.6	4805	1912	7014.56	1993	2.56	1954	3.74	1830	1.46	7662	4
Mohawk	Turin Rd	18-65358	2245	12	1676	47.8	4	12.2	6762	2245	11698.14	2061	3.01	1990	5.21	1934	1.73	7661	4
Southwest	Reservoir Sta 103	10-10361	202	11	1617	48.7	4.4	8.5	1229	203	3861.31	1850	6.08	2096	19.12	2096	3.14	7659	0
Capital	Hoags Corners	30-22151	951	21	1941	132.2	6.3	15.6	2066	955	4627.45	1908	2.17	1896	4.87	1913	2.24	7658	0
Frontier	Ransomville Sta 89	03-8963	1079	10	1580	22.8	2.3	5.6	4214	1084	7721.87	2012	3.91	2065	7.16	1997	1.83	7654	1
Central	Southwood	11-24452	1973	24	1978	86.2	3.6	9.5	3035	1978	9149.3	2041	1.54	1740	4.64	1893	3.01	7652	0
Central	Sandy Creek	16-6651	1765	36	2068	91.6	2.5	9.3	3581	1766	5744.89	1959	2.03	1850	3.25	1773	1.6	7650	2
Southwest	Machias Sta 13	10-1362	715	14	1766	61.5	4.4	12.4	1526	714	5834.76	1962	2.13	1887	8.16	2018	3.82	7633	0
Central	Duguid	11-26553	1267	14	1766	42.9	3.1	5.8	4107	1271	5779.37	1961	3.24	2022	4.56	1884	1.41	7633	1
Genesee	Leroy	04-0456	2446	18	1885	46.6	2.6	6.6	5280	2442	8921.19	2036	2.16	1895	3.65	1816	1.69	7632	3
Southwest	Franklinville Sta 24	10-2461	1399	15	1807	55.7	3.7	10.4	4528	1401	5245.88	1939	3.24	2022	3.75	1831	1.16	7599	0
Genesee	Lyndonville Sta 95	06-9561	828	12	1676	49.3	4.1	19.6	2810	837	4770.92	1919	3.39	2039	5.76	1964	1.7	7598	6
Southwest	Frewsburg Sta 69	09-6961	873	17	1861	44.2	2.6	7.7	3009	882	3636.62	1833	3.45	2041	4.17	1858	1.21	7593	1

**2022 HIGHEST NUMBER OF MOMENTARIES CIRCUIT LIST
(Circuits with 10 or more Momentaries)**

Region	Station Name	Ckt/F No.	Circuit kV	# of MI's	Rank		
					Within Region	Within System	Reliability Ranking
Central	West Monroe	11-27451	13.2	11	1	4	10