DRAFT 06-11-2020

Review of Florida's Investor-Owned Electric Utilities 2019 Service Reliability Reports

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State of Florida
Florida Public Service Commission
Division of Engineering

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Terms and Acronyms

AMI	Advanced Metering Infrastructure
ANSI	American National Standards Institute
CAIDI	Customer Average Interruption Duration Index
CEMI5	Customers Experiencing More Than Five Interruptions
CI	Customer Interruption
CME	Customer Momentary Events
CMI	Customer Minutes of Interruption
DSM	Demand Side Management
DEF	Duke Energy Florida, LLC
EOC	Emergency Operation Center
F.A.C.	Florida Administrative Code
FEMA	Federal Emergency Management Agency
FPL	Florida Power & Light Company
FPUC	Florida Public Utilities Company
GIS	Geographic Information System
Gulf	Gulf Power Company
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IOU	The Five Investor-Owned Electric Utilities: FPL, DEF, TECO, Gulf, and FPUC
L-Bar	Average of Customer Service Outage Events Lasting A Minute or Longer
MAIFIe	Momentary Average Interruption Event Frequency Index
N	Number of Outages
NWS	National Weather Service
OMS	Outage Management System
RDUP	Rural Development Utility Program
SCADA	Supervisory Control and Data Acquisition
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
TECO	Tampa Electric Company
VMP	Vegetation Management Program

Reliability Metrics

Average Duration of Outage Events (L-Bar) is the sum of each outage event duration for all outage events during a given time period, divided by the number of outage events over the same time within a specific area of service.

Customer Average Interruption Duration Index (CAIDI) is an indicator of average interruption duration, or the time to restore service to interrupted customers. CAIDI is calculated by dividing the total system customer minutes of interruption by the number of customer interruptions. (CAIDI = CMI ÷ CI, also CAIDI = SAIDI ÷ SAIFI).

Customers Experiencing More Than Five Interruptions (CEMI5) is the number of retail customers that have experienced more than five service interruptions. (CEMI5 in this review is a customer count shown as a percentage of total customers.)

Customer Interruptions (CI) is the number of customer service interruptions, which lasted one minute or longer.

Customer Minutes of Interruption (CMI) is the number of minutes that a customer's electric service was interrupted for one minute or longer.

Customer Momentary Events (CME) is the number of customer momentary service interruptions, which lasted less than one minute measured at the primary circuit breaker in the substation.

Momentary Average Interruption Event Frequency Index (MAIFIe) is an indicator of average frequency of momentary interruptions or the number of times there is a loss of service of less than one minute. MAIFIe is calculated by dividing the number of momentary interruption events recorded on primary circuits by the number of customers served. (MAIFIe = CME ÷ C)

Number of Outage Events (N) measures the primary causes of outage events and identifies feeders with the most outage events.

System Average Interruption Duration Index (SAIDI) is a composite indicator of outage frequency and duration and is calculated by dividing the customer minutes of interruptions by the number of customers served on a system. (SAIDI = CMI ÷ C, also SAIDI = SAIFI x CAIDI)

System Average Interruption Frequency Index (SAIFI) is an indicator of average service interruption frequency experienced by customers on a system. It is calculated by dividing the number of customer interruptions by the number of customers served. (SAIFI = CI ÷ C, also SAIFI = SAIDI ÷ CAIDI)

Executive Summary

The Florida Public Service Commission (FPSC or Commission) has jurisdiction to monitor the reliability of electric service provided by Florida's investor-owned electric utilities (IOUs) for maintenance, operational, and emergency purposes.[1] This report is a compilation of the 2019 electric distribution reliability data filed by Florida's IOUs. The data is presented using tables and figures so that trends in each IOU's service reliability may be easily observed. In addition, the scope of the IOUs' Annual Distribution Service Reliability Report was expanded to include status reports on the various storm hardening and preparedness initiatives required by the Commission.[2] This data may be used during rate cases, show cause dockets, and is helpful in resolving customer complaints.

Monitoring service reliability is achieved through a review of service reliability metrics provided by the IOUs pursuant to Rule 25-6.0455, Florida Administrative Code (F.A.C.).[3] Service reliability metrics are intended to reflect changes over time in system average performance, regional performance, and sub-regional performance. For a given system, increases in the value of a given reliability metric denote declining reliability in the service provided. Comparison of the year-to-year levels of the reliability metrics may reveal changes in performance, which indicates the need for additional investigation, or work in one or more areas. Rule 25-6.0455, F.A.C., requires the IOUs to file distribution reliability reports to track adjusted performance that excludes events such as planned outages for maintenance, generation disturbances, transmission disturbances, wildfires, and extreme acts of nature such as tornadoes and hurricanes. This "adjusted" data provides an indication of the distribution system performance on a normal day-to-day basis.

The active hurricane seasons of 2004 and 2005 revealed the importance of collecting reliability data that reflects the total reliability experience from the customer perspective. In June 2006, Rule 25-6.0455, F.A.C., was revised to require each IOU to provide both "actual" and "adjusted" performance data for the prior year. This data provides insight concerning the overall reliability performance of each utility.

The March 2020 Distribution Reliability Reports of Duke Energy Florida, LLC (DEF), Florida Power & Light Company (FPL), Florida Public Utilities Company (FPUC), Gulf Power Company (Gulf), and Tampa Electric Company (TECO) and responses to staff's data requests were sufficient to perform the 2019 review.

The following company specific summaries provide highlights of the observed patterns.

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[1]Sections 366.04(2)c and 366.05, Florida Statutes.

[2]Wooden Pole Inspection Orders: FPSC Order No. PSC-06-0144-PAA-EI, issued February 27, 2006, in Docket No. 20060078-EI; and FPSC Order Nos. PSC-06-0778-PAA-EU, issued September 18, 2006, PSC-07-0078-PAA-EU, issued January 29, 2007, in Docket No. 20060531-EU.
Storm Preparedness Initiative Orders: FPSC Order Nos. PSC-06-0351-PAA-EI, issued April 25, 2006, PSC-06-0781-PAA- EI, issued September 19, 2006, PSC-06-0947-PAA-EI, issued November 13, 2006, and PSC-07-0468-FOF-EI, issued May 30, 2007, in Docket No. 20060198-EI.

[3]The Commission does not have rules or statutory authority requiring municipal electric utilities and rural electric cooperative utilities to file service reliability metrics.

Service Reliability of Duke Energy Florida, LLC

The unadjusted data for DEF indicates that its 2019 allowable exclusions accounted for approximately 19 percent of all excluded Customer Minutes of Interruption (CMI). The "Named Storms" category accounted for approximately 3 percent of the CMI excluded. DEF experienced outages associated with Hurricane Dorian and Tropical Storm Nestor.

On an adjusted basis, DEF's 2019 System Average Interruption Duration Index (SAIDI) was 90 minutes, decreasing its adjusted SAIDI by 9 minutes from the 2018 results. The trend for the SAIDI over the five-year period of 2015 to 2019 is trending upward. The System Average Interruption Frequency Index (SAIFI) in 2019 was 0.97 interruptions, indicating a 4 percent decrease from 2018. The Customer Average Interruption Duration Index (CAIDI) decreased for 2019 compared to 2018. Over the five-year period, the SAIFI remains relatively flat as the CAIDI is trending upward.

In **Figure 3-8**, DEF's Top Five Outage Categories, the category "Defective Equipment" is in the top spot representing 28 percent of the top 10 outage categories. The subsequent categories were "Vegetation" (21 percent) and "Other Causes" (20 percent), followed by "Other Weather" (14 percent) and "Animals" (13 percent). The "Animals" and "Other Weather" outage categories are trending downward for the five-year period of 2015 to 2019 even though the "Animals" category had a 14 percent increase in 2019 and the "Other Weather" category had an 11 percent decrease. The "Defective Equipment" category had an increase between 2018 and 2019 and continued to trend upward for the five-year period. The "Vegetation" and "Other Causes" categories had increases in 2019 and the "Vegetation" category is trending upward as the "Other Causes" category is reaming relatively flat for the five-year period.

The percentage of reliability complaints compared to the total number of complaints filed with the Commission for DEF decreased to 3.3 percent in 2019 from 4.3 percent in 2018. Over the five-year period from 2015-2019, DEF's reliability related complaints have been trending downward.

In 2019, DEF completed 1,682 storm hardening projects for existing transmission structures. The projects included maintenance pole change-outs, insulator replacements, Department of Transportation/customer relocations, line rebuilds, and system planning additions. The transmission structures are designed to withstand the National Electrical Safety Code (NESC) wind requirements and are built utilizing steel or concrete structures. In addition, DEF replaced 1,107 wooden transmission poles in 2019. At year end 2019, DEF reported it had 20,520 transmission wooden poles left to harden and plans to harden 1,295 transmission structures in 2020.

Service Reliability of Florida Power & Light Company

The unadjusted data for FPL indicates that its 2019 allowable exclusions accounted for approximately 18 percent of the total CMI. The "Named Storms" category accounted for approximately 8 percent of the CMI excluded. In addition, FPL's service area was affected by 6 tornadoes, Hurricanes Barry, Dorian, Humberto, and Tropical Storm Nestor.

FPL's 2019 metrics on an adjusted basis include SAIDI which was reported as 49 minutes and represents a 4 minute decrease from last year's reported 53 minutes. The SAIFI improved in

2019 and the CAIDI remained the same. The SAIFI decreased from 0.89 interruptions in 2018 to 0.82 interruptions in 2019 and the CAIDI remained at 60 minutes, as it was in 2018.

"Defective Equipment" (37 percent) and "Vegetation" (20 percent) outages were the leading causes of outage events per customer for 2019. The next three outage causes are "Animals" (11 percent), "Other Causes" (9 percent), and "Unknown Causes" (9 percent). **Figure 3-16** shows an increasing trend in the number of outage events attributed to "Other Cause," which had decreased by 14 percent from 2018 to 2019. The analysis shows a decrease in the number of outage events caused by "Unknown Causes" in which it is trending downward. In addition, "Vegetation" is also trending downward. The analysis shows that the "Animals" and "Defective Equipment" categories are remaining relatively flat.

Complaints related to FPL's reliability did not change from 2018 to 2019, and stayed at 0.6 percent. FPL's reliability related complaints appear to be trending downward as shown in **Figure 4-10**.

In 2019, FPL replaced 1,986 wood transmission structures with spun concrete poles. By year end 2019, FPL has 2,888 wood transmission structures remaining to be replaced.

Service Reliability of Florida Public Utilities Company

The unadjusted data for FPUC indicates that its 2019 allowable exclusions accounted for approximately 37 percent of the total CMI. The "Named Storms" category accounted for approximately 2 percent of the CMI excluded. FPUC reported that during 2019, the Northeast division was impacted by Hurricane Dorian. The Northwest division was impacted by Tropical Storm Nestor.

The 2019 adjusted data for FPUC's SAIDI was 166 minutes, an 8 percent increase from 154 minutes reported in the previous year. The SAIFI increased from 1.45 interruptions in 2018 to 1.70 interruptions in 2019. The CAIDI value in 2019 was 98 minutes, a decrease from the 107 minutes in 2018.

FPUC's top five causes of outages included "Vegetation," "Animals," "Defective Equipment," "Lightning," and "Unknown" events. As shown in **Figure 3-21**, "Vegetation" (27 percent) was the number one cause of outages in 2019 followed by "Animals" (14 percent), "Defective Equipment" (13 percent), "Lightning" (13 percent), and "Vehicle" (10 percent). "Animals," and "Vegetation" attributed outages decreased in 2019, as "Defective Equipment," "Lightning," and "Vehicle" caused outages increased.

FPUC's reliability related complaints were minimal. In 2019, the Utility had one reliability related complaint filed with the Commission. The volatility in FPUC's results can be attributed to its small customer base that averages 28,000 or fewer customers. For the last five years, the percentage of reliability related complaints against FPUC have remained relatively flat.

All of the Northeast division's 138kV poles are constructed of concrete and steel. The Northeast division's 69kV transmission system consists of 217 poles, of which 105 are concrete. The Northwest division does not have transmission structures. In 2019, FPUC did not harden any of its transmission structures. However, FPUC plans to harden 19 structures in 2020 and has 112 transmission structures remaining to be hardened.

Service Reliability of Gulf Power Company

The adjusted data for Gulf indicates that its 2019 allowable exclusions accounted for 28 percent of exclusion to its CMI. The "Named Storms" category accounted for approximately 1 percent of the total CMI excluded. Gulf explained that Tropical Storm Barry and Tropical Storm Nestor affected its service area. In 2019, two tornadoes also affected its service area accounting for 1 percent of the total CMI.

The 2019 SAIDI for Gulf was reported to be 67 minutes, which decreased from the 97 minutes reported in 2018. The SAIFI decreased to 0.97 interruptions from 1.26 interruptions the previous year. The CAIDI decreased to 69 minutes from 77 minutes in 2018. Gulf stated that it continues to collect outage data, which extends to the customer meter level. The Utility reviews outage data and the resulting reliability indices at the system level and at its three regions. Gulf is analyzing 2019 data to determine the need for any specific improvement opportunities beyond the current programs and storm hardening initiatives.

Gulf's top five causes of outages were "Defective Equipment" (23 percent), "Vegetation" (21 percent), "Animals" (21 percent), "Lightning" (12 percent), and "Unknown Causes" (10 percent). As shown in **Figure 3-29**, the number of outages decreased for "Vegetation" and "Lightning" in 2019 when compared to 2018.

There were no complaints reported to the Commission against Gulf that were reliability related in 2019. Gulf's percentage of total complaints for the five-year period of 2015 to 2019 has remained relatively flat. Overall, as shown in **Figure 4-10,** Gulf has the lowest percentage of total complaints related to reliability.

Gulf had two priority goals for hardening its transmission structures: installation of guys on H-frame structures and replacement of wooden cross arms with steel cross arms. The replacement of wooden cross arms was completed in 2018. In addition, going forward, Gulf plans to replace all wooden structures on its transmission system with steel or concrete structures. In 2019, Gulf replaced 102 wood transmission structures with concrete or steel structures.

Service Reliability of Tampa Electric Company

The adjusted data for TECO indicates that its 2019 allowable exclusions accounted for approximately 16 percent of the CMI. The "Named Storms" category accounted for approximately 1 percent of the CMI. Tropical Storm Nestor affected TECO's service area in 2019.

The adjusted SAIDI decreased from 95 minutes in 2018 to 76 minutes in 2019 and represents a 20 percent improvement in performance. The SAIFI decreased to 1.07 interruptions from 1.18 interruptions in the previous year. The CAIDI decreased 11 percent, to 71 minutes from 80 minutes reported in 2018. TECO reported the decreases in SAIDI, SAIFI, and CAIDI were attributed to less severe weather events combined with quicker restoration times.

"Defective Equipment" (23 percent) and "Vegetation" (22 percent) were the largest contributors to TECO's causes of outage events followed by "Animals" (17 percent), "Lightning" (14 percent), and "Unknown Causes" (13 percent). **Figure 3-37** illustrates the top five outage causes. "Defective Equipment," the leading cause of outages, has been trending downward since 2015 and "Defective Equipment" had a 3 percent decrease in outages when compared to the previous year. "Lightning" related causes are also trending downward. "Vegetation", "Animals," and "Unknown Causes" related causes are trending upward.

TECO's percentage of total service reliability related complaints increased from 11.2 percent in 2018 to 17.1 percent in 2019. TECO's percentage of service reliability complaints is trending upward over the period of 2015 to 2019. TECO will continue to focus on vegetation management, circuit review activity, line improvements, and other maintenance activities to minimize service-related complaints, in 2020. Working through and responding to complaints at a regional level affords TECO an opportunity to be aware of any trends that may occur for a given feeder or lateral.

TECO's transmission system is hardened by utilizing its inspections and maintenance program to systematically replace wood structures with non-wood structures. In 2019, TECO hardened 149 structures including 144 pole replacements utilizing steel or concrete poles and replaced 5 sets of insulators with polymer insulators. TECO's future goal is to harden 120 transmission structures and it has approximately 4,960 wooden poles remaining to be replaced.

Review Outline

This review primarily relies on the March 2020 Reliability Reports filed by the IOUs for the 2019 reliability performance data and storm hardening and preparedness initiatives. A section addressing trends in reliability related complaints is also included. Staff's review consists of five sections:

- **Section I:** Storm hardening activities, which include each IOU's Eight-Year Wooden Pole Inspection Program and the Ten Storm Preparedness Initiatives.

- **Section II:** Each utility's actual 2019 distribution service reliability data and support for each of its adjustments to the actual service reliability data.

- **Section III:** Each utility's 2019 distribution service reliability based on adjusted service reliability data and staff's observations of overall service reliability performance.

- **Section IV:** Inter-utility comparisons and the volume of reliability related customer complaints for 2015 to 2019.

- **Section V:** Appendices containing detailed utility specific data of the IOUs and summaries of the municipal and rural cooperative utilities.

Section I: Storm Hardening Activities

Each IOU, pursuant to Rule 25-6.0342(2), F.A.C., must file a storm hardening plan which is required to be updated every three years. The IOU's fourth updated storm hardening plans were filed on March 2 and 3, 2019.[4] The following subsections provide a summary of each IOU's programs addressing an on-going Eight-Year Wooden Pole Inspection Program and the Ten Storm Preparedness Initiatives as directed by the Commission.

Eight-Year Wooden Pole Inspection Program

FPSC Order Nos. PSC-06-0144-PAA-EI, issued February 27, 2006, in Docket No. 20060078-EI and PSC-07-0078-PAA-EU, issued January 29, 2007, in Docket No. 20060531-EU, require each IOU to inspect 100 percent of their installed wooden poles within an eight-year inspection cycle. The National Electrical Safety Code (NESC) serves as a basis for the design of replacement poles for wooden poles failing inspection. Additionally, Rule 25-6.0342(3)(b), F.A.C., requires that each utility's storm hardening plan address the extent to which the plan adopts extreme wind loading standards as specified in Figure 250-2(d) of the most recent edition of the NESC.

[4]Docket Nos. 20180144-EI (FPL), 20180145-EI (TECO), 20180146-EI (DEF), 20180147-EI (Gulf), and 20180148-EI (FPUC), *In re: Review of 2019-2021 storm hardening plan.*

Table 1-1 shows a summary of the quantities of wooden poles inspected by all IOUs in 2019.

Table 1-1
2019 Wooden Pole Inspection Summary

Utility	Total Poles	Poles Planned 2019	Poles Inspected 2019	Poles Failed Inspection	% Failed Inspection	Years Complete in 8-Year Inspection Cycle
DEF	819,740	100,000	88,252	2,066	2.34%	5
FPL	1,075,419	124,915	129,563	5,345	4.13%	6
FPUC	26,646	7,415	7,415	522	7.04%	4
GULF	209,156	26,000	25,898	990	3.82%	6
TECO	285,000	39,500	38,940	1,726	4.43%	6

Source: The IOUs 2019 distribution service reliability reports.

Table 1-2 indicates the projected wooden pole inspection requirements for the IOUs.

Table 1-2
Projected 2020 Wooden Pole Inspection Summary

Utility	Total Poles	Total Number of Wood Poles Inspected in current cycle	Number of Wood Pole Inspections Planned for 2020	Percent of Wood Poles Planned 2020	Percent of Wood Pole Inspections Completed in 8-Year Cycle	Years Remaining in 8-Year Cycle After 2016
DEF	819,740	585,155	100,000	12.20%	71%	3
FPL	1,075,419	776,509	124,915	11.62%	72%	2
FPUC	26,646	13,998	3,680	13.81%	53%	4
GULF	209,156	158,204	26,000	12.43%	76%	2
TECO	285,000	240,499	24,000	8.42%	84%	2

Source: The IOUs 2019 distribution service reliability reports.

The annual variances shown in Tables 1-1 and 1-2 are allowable so long as each utility achieves 100 percent inspection within an eight-year period. Staff continues to monitor each utility's performance.

Ten Initiatives for Storm Preparedness

On April 25, 2006, the Commission issued FPSC Order No. PSC-06-0351-PAA-EI, in Docket No. 20060198-EI. This Order required that the IOUs file plans for Ten Storm Preparedness Initiatives (Ten Initiatives).[5] Storm hardening activities and associated programs are on-going parts of the annual reliability reports required from each IOU since rule changes in 2006. The status of these initiatives is discussed in each IOU's report for 2019. Separate from the Ten Initiatives, and not included in this review, the Commission established rules addressing storm hardening of transmission and distribution facilities for all of Florida's electric utilities.[6,7,8]

Initiative 1 - Three-Year Vegetation Management Cycle for Distribution Circuits

Each IOU continues to maintain the commitment to complete three-year trim cycles for overhead feeder circuits, except for TECO, which is on a four-year cycle, since feeder circuits are the main arteries from the substations to the local communities. The approved plans of all the IOUs also require a maximum of a six-year trim cycle for lateral circuits. In addition to the planned trimming cycles, each IOU performs hot-spot tree trimming[9] and mid-cycle trimming to address rapid growth problems.

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[5]Docket No. 20060198-EI, *In re: Requirement for investor-owned electric utilities to file ongoing storm preparedness plans and implementation cost estimates.*

[6]FPSC Order No. PSC-06-0556-NOR-EU, issued June 28, 2006, in Docket No. 20060172-EU, *In re: Proposed rules governing placement of new electric distribution facilities underground, and conversion of existing overhead distribution facilities to underground facilities, to address effects of extreme weather events*, and Docket No. 20060173-EU, *In re: Proposed amendments to rules regarding overhead electric facilities to allow more stringent construction standards than required by National Electric Safety Code*.

[7]FPSC Order Nos. PSC-07-0043-FOF-EU, issued January 16, 2007, and PSC-07-0043A-FOF-EU, issued January 17, 2007, both in Docket Nos. 20060173-EU and 20060172-EU.

[8]FPSC Order No. PSC-06-0969-FOF-EU, issued November 21, 2006, in Docket No. 20060512-EU, *In re: Proposed adoption of new Rule 25-6.0343, F.A.C., Standards of Construction - Municipal Electric Utilities and Rural Electric Cooperatives*.

[9]Hot-spot tree trimming occurs when an unscheduled tree trimming crew is dispatched or other prompt tree trimming action is taken at one specific location along the circuit. For example, a fast growing tree requires hot-spot tree trimming in addition to the cyclical tree trimming activities. TECO defines hot-spot trimming as any internal or external customer driven request for tree trimming. Therefore, all tree trim requests outside of full circuit trimming activities are categorized as hot-spot trims.

Table 1-3 is a summary of feeder vegetation management activities by each company's cycle.

Table 1-3
Vegetation Clearing from Feeder Circuits

IOU	# of Years in Cycle	1st Year of Cycle	Total Feeder Miles	Miles Trimmed				Total Miles Trimmed	% of Miles Trimmed
				1st Year	2nd Year	3rd Year	4th Year		
DEF	3	2018	5,350	662	2,358			3,020	56.5%
FPL	3	2019	12,803	4,256				4,256	33.2%
FPUC	3	2017	159	29	47	46		123	77.1%
GULF	3	2016	723	241	280	254		775	107.2%
TECO	4	2017	1,780	198.9	402.6	470.55		1,072	60.2%

Source: The IOUs 2019 distribution service reliability reports.
Note: In 2012, the Commission approved TECO's request to modify its trim cycle for feeders to four years.[10]

Based on the data in Table 1-3, it appears that Gulf has completed its feeder vegetation cycles and FPL is on schedule with its vegetation cycle. DEF appears to be behind schedule for its three-year feeder trim cycle. DEF explained that annual variations from target are expected as it manages resource and unit cost factors associated with its integrated vegetation management plan. DEF's trim cycle is based on the three-year system weighted average feeder and five-year system weighted average lateral tree trimming cycle. FPUC also appears to be behind schedule for the three-year feeder trim cycle with 77.1 percent competed. FPUC reported that it trimmed an additional 98.16 lateral miles to its trim cycle in 2019. The difference in remaining miles is attributable to the devastating effects of Hurricane Michael in 2018, which nearly destroyed its entire electrical system and forced crews to remove damaged and hazardous trees instead of tree trimming. FPUC is currently studying possible changes to its vegetation management cycle to determine if a more efficient and cost saving trim cycle is feasible. TECO indicated that it is behind schedule with its vegetation management cycles due to challenges experienced with contract workforce availability and contract rates. Increases in storm activity and exposure, along with the western United States wildfire response, have strained the industry workforce supply, causing sharp increases in wages. TECO worked with its contract partners to establish a schedule of wage increases that would both attract workers and allow the Utility to budget accordingly. For 2020, the Company has a strong contingent of experienced contract utility tree trimmers and expects to be on cycle by year's end.

[10]FPSC Order No. PSC-12-0303-PAA-EI, issued June 12, 2012, in Docket No. 20120038-EI, *In re: Petition to modify vegetation management plan by Tampa Electric Company*.

Table 1-4 is a summary of the lateral vegetation management activities by company.

Table 1-4
Vegetation Clearing from Lateral Circuits

IOU	# of Years in Cycle	1st Year of Cycle	Total Lateral Miles	Miles Trimmed						Total Lateral Miles Trimmed	% of Lateral Miles Trimmed
				1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year		
DEF	5	2016	12,796	2,173	1,909	2,626	3,122			9,830	76.8%
FPL	6	2019	22,974	3,822						3,822	16.6%
FPUC	6	2014	571	145	134	188	86	100	77	731	128.0%
GULF	4	2018	5,148	1,617	1,533					3,150	61.2%
TECO	4	2017	4,471	627	834	1,194				2,656	59.4%

Source: The IOUs 2019 distribution service reliability reports.
Note: In 2006, the Commission approved DEF's request to modify its lateral trim cycle to five years.[11] In the same docket, the Commission approved FPL's modified trim cycle for laterals to six years.[12] FPUC's lateral trim cycle was modified to six years in 2010.[13] The Commission approved Gulf's modified lateral trim cycle to four years in 2010.[14] In 2012, the Commission approved TECO's request to modify its trim cycle for laterals to four years.[15]

From the data in Table 1-4, it appears that FPUC have completed its lateral vegetation cycles. In addition, FPL, Gulf, and TECO are on schedule with their trim cycles for laterals. DEF is in the fourth year of its five-year lateral trim cycle with 76.8 percent laterals trimmed indicating that DEF is behind schedule. As previously discussed, annual variations are expected by DEF.

Tables 1-3 and **1-4** do not reflect hot-spot trimming and mid-cycle trimming activities. An additional factor to consider is that not all miles of overhead distribution circuits require vegetation clearing. Factors such as hot-spot trimming and open areas contribute to the apparent variances from the approved plans. Annual variances as seen in Tables 1-3 and 1-4 are allowable as long as each utility achieves 100 percent completion within the cycle-period stated in its approved plan for feeder and lateral circuits.

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[11]FPSC Order No. PSC-06-0947-PAA-EI, issued November 13, 2006, in Docket No. 20060198-EI, *In re: Requirement for investor-owned electric utilities to file ongoing storm preparedness plans and implementation cost estimates*.
[12]FPSC Order No. PSC-07-0468-FOF-EI, issued May 30, 2007, in Docket No. 20060198-EI, *In re: Requirement for investor-owned electric utilities to file ongoing storm preparedness plans and implementation cost estimates*.
[13]FPSC Order No. PSC-10-0687-PAA-EI, issued November 15, 2010, in Docket No. 20100264-EI, *In re: Review of 2010 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Public Utilities Company*.
[14]FPSC Order No. PSC-10-0688-PAA-EI, issued November 15, 2010, in Docket No. 20100265-EI, *In re: Review of 2010 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company*.
[15]FPSC Order No. PSC-12-0303-PAA-EI, issued June 12, 2012, in Docket No. 20120038-EI, *In re: Petition to modify vegetation management plan by Tampa Electric Company*.

Initiative 2 - Audit of Joint-Use Agreements

For storm hardening purposes, the benefits of fewer attachments are reflected in the extreme wind loading rating of the overall design of pole loading considerations. Each IOU monitors the impact of attachments by other parties to ensure the attachments conform to the utility's strength and loading requirements without compromising storm hardening performance. Each IOU's plan for performing pole strength assessments includes the stress impacts of all pole attachments as an integral part of its eight-year wood pole inspection program. In addition, these assessments are also conducted on concrete and steel poles. The following are some 2019 highlights:

- DEF performs its joint-use audit on an eight-year cycle with 2019 being the fifth year in the current cycle. In 2019, DEF audited one-eighth of its joint-use attachments. Of the 56,093 distribution poles that were strength tested 31 failed the test. DEF replaced all 31 failed poles. DEF found no unauthorized attachments on the poles. Of its 5,761 joint-use transmission poles, 728 poles were strength tested with 43 poles failing the test. DEF replaced 3 poles and have scheduled an additional 33 poles for replacement. After further detailed evaluation, 7 poles passed structural analysis and DEF deemed no further action is required for those 7 poles. DEF will schedule replacement for the remaining poles that failed the strength test.

- FPL audited approximately 20 percent of its service territory through its joint-use survey in order to determine the number and ownership of jointly used poles and associated attachments in 2019. Pole strength and loading tests were also performed on the joint-use poles. The results show that 24 poles (0.03 percent) failed the strength test due to overloading. The results also show that 1,553 poles (1.82 percent) failed the strength test due to other reasons, which could include pole decay or damage caused by lightning, woodpeckers, or vehicle accidents. There were 187 NESC violations involving FPL's facilities and 36 involving third-party facilities. The 2019 survey and inspection results show that no unauthorized attachments were found.

- FPUC added language to its Joint-Use Agreements to clarify joint-use safety audit instructions, in 2014. The additional language included a provision for an initial joint-use pole attachment audit to take place 12 months after the effective date of the Agreement, and on a five-year recurring cycle after the first audit. Currently, four Joint-Use Agreements have been executed. The other agreements are being negotiated and should be executed during 2020. FPUC completed the joint-use pole attachment audit in 2016 and discovered discrepancies in the total number of attachments. There were 2,054 attachments identified as unauthorized and no poles failed the strength test. The next audit should take place in 2021.

- Gulf performs its joint-use inventory audits every five years. The last audit was completed in October 2016 and the next audit will be conducted in 2021. As of 2019, Gulf has 236,628 distribution poles with 313,933 third-party attachments. Gulf is attached to 62,065 foreign poles (poles not owned by Gulf). Gulf's mapping system has been updated to reflect the third-party attachments.

- TECO conducted comprehensive loading analysis and continued to streamline its processes to better manage attachment requests from attaching entities, in 2019. A

comprehensive loading analysis was performed on 116 poles. TECO identified 5 distribution poles that were overloaded and 1,726 failed the strength test due to wood damage. All poles were corrected by being re-guyed, re-configured or reinforced with trusses. TECO also found 34 poles that had NESC violations due to joint-use attachments and zero poles with NESC violations due to TECO's attachments.

Initiative 3 - Six-Year Transmission Inspections

The IOUs are required by the Commission to inspect all transmission structures and substations, and all hardware associated with these facilities. Approval of any alternative to a six-year cycle must be shown to be equivalent or better than a six-year cycle, in terms of cost and reliability in preparing for future storms. The approved plans for DEF, FPL, FPUC, Gulf, and TECO require full inspection of all transmission facilities within a six-year cycle. DEF, which already had a program indexed to a five-year cycle, continues with its five-year program. Such variances are allowed so long as each utility achieves 100 percent completion within a six-year period, as outlined in FPSC Order No. PSC-06-0781-PAA-EI, issued September 19, 2006, in Docket No. 20060198-EI.

- DEF inspected 180 transmission circuits (23 percent), 510 transmission substations (100 percent), 1,102 transmission tower structures (33.3 percent), and 728 transmission poles (1.4 percent), in 2019. DEF plans to inspect 20 percent of the transmission system in 2020. DEF performs an aerial inspection of transmission structures twice a year. In addition, DEF performs visual inspections on segments containing wood poles on a four-year cycle and visual inspection on segments containing non-wood poles on a six-year cycle. A sound and bore inspection is performed on wooden poles on an eight-year cycle.

- FPL began a new six-year cycle, performing climbing inspections on all 500kV structures, in 2014. Climbing inspections for all other steel and concrete structures are on a ten-year cycle. In 2019, FPL inspected approximately 76 percent of transmission circuits, 100 percent of transmission substations, 100 percent of non-wood transmission tower structures, and 8.9 percent of wood transmission poles. In addition, FPL inspects 100 percent of its wooden poles and structures by performing a visual inspection at ground level each year. It appears that FPL is on target for its six-year transmission inspections.

- In 2019, FPUC reported that it did not perform any inspection of its transmission circuits, transmission substations, tower structures, and transmission poles. FPUC indicated that the inspections performed are visual; however, no visual inspections were performed in 2019 because the 2018 detailed inspections were delayed due to Hurricane Michael until December 2018/January 2019. The transmission inspections included climbing patrols of 95 138kV and 217 69kV structures. Transmission inspections will be conducted at a minimum every six years on all transmission facilities. FPUC is on schedule for its transmission facilities inspections, with the next inspection scheduled to be completed by year end 2024.

- Gulf inspected 56 transmission substations in 2019 and conducted 513 inspections of its metal poles and towers as well as 3,674 wood and concrete transmission poles. Gulf also performed two aerial inspections. The Utility replaced 33 of its wooden transmission poles. Gulf's transmission line inspections include a ground line treatment inspection, a comprehensive walking inspection, and aerial inspections. The transmission inspections are based on two alternating 12-year cycles, which results in the structures being inspected at least once every six years. It appears that Gulf is on schedule for its transmission inspections.

- TECO's transmission system inspection program includes ground patrol, aerial infrared patrol, substation inspections, which are on a one-year cycle, above ground inspection and ground line inspection, which is on an eight-year cycle. The above ground inspection was shifted from a six-year cycle to an eight-year cycle in 2015 by FPSC Order No. PSC-14-0684-PAA-EI, issued December 10, 2014, in Docket No. 20140122-EI. Additionally, pre-climb inspections are performed prior to commencing work on any structure. In 2019, TECO inspected 72 (100 percent) of its transmission substations and completed 209 (100 percent) of its planned transmission equipment inspections. There were 808 ground line and 3,271 above ground transmission circuit inspections performed in 2019. It appears that TECO is on target for its transmission inspection schedule.

Initiative 4 - Hardening of Existing Transmission Structures

Hardening transmission infrastructure for severe storms is important in order to continue providing transmission of electricity to high priority customers and key economic centers. IOUs are required by the Commission to show the extent of the utility's efforts in hardening of existing transmission structures. No specific activity was ordered other than developing a plan and reporting on storm hardening of existing transmission structures. In general, all of the IOU's plans continued pre-existing programs that focus on upgrading older wooden transmission poles. Highlights of 2019 and projected 2020 activities for each IOU are explained below.

- DEF planned 1,008 transmission structures for hardening and completed hardening of 1,682 transmission structures, which includes maintenance pole change-outs, insulator replacements, Department of Transportation/customer relocations, line rebuilds, and system planning additions. The transmission structures are designed to withstand the current NESC wind requirements and are built utilizing steel or concrete structures. In addition, DEF replaced 1,107 wooden transmission poles in 2019. In 2020, DEF plans to harden 1,295 transmission structures. DEF reported 20,520 transmission wooden poles that remain to be hardened.

- FPL completed all replacements of its ceramic post insulators with polymer insulators in 2014. In addition, FPL completed the installation of water-level monitoring systems and communication equipment in its 223 substations. In 2019, FPL replaced 1,986 wooden transmission structures with spun concrete poles. By year end, FPL had 2,888 (4 percent) wooden transmission structures that remain to be replaced.

- FPUC did not harden any of its transmission structures, in 2019. However, FPUC does plan to harden 19 structures in 2020. All of the Northeast division's 138kV poles are

constructed of concrete and steel therefore meet NESC standards. The Northeast division's 69kV transmission system consists of 217 poles of which 105 are concrete poles, 7 are wood span guys and 105 are wooden structures. FPUC has 112 transmission structures (51 percent) that remain to be hardened. FPUC explained that wood span guy poles are smaller sized poles that are installed to accept a span guy from the top of the 69kV poles to offset the strain from the line conductor. Span guys transmit horizontal force to another pole until an anchor guy can be used. FPUC indicated that during the hardening replacements, it designed and installed self-supporting structures, which in most cases eliminates the need to use span guys. The Northwest division does not have transmission structures.

- Gulf has two priority goals for hardening its transmission structures: installation of guys on H-frame structures and replacement of wooden cross arms with steel cross arms. The installation of guys on H-frame structures was completed in 2012. In 2018, the remaining wooden cross arms were replaced. The Utility plans to replace all wooden structures on the transmission system with steel or concrete structures. At this time, Gulf has not set a long-term goal (completion date) for the replacement of all wooden transmission structures on its system, and is currently working on the budget, engineering, and planning phases. In 2019, Gulf replaced 102 wooden transmission structures with concrete or steel structures.

- TECO is hardening the existing transmission system by utilizing its inspections and maintenance program to systematically replace wood structures with non-wood structures. In 2019, TECO hardened 149 structures including 144 structure replacements utilizing steel or concrete poles and replaced 5 sets of insulators with polymer insulators. TECO's goal for 2020 is to harden 120 transmission structures. TECO has approximately 4,960 (20 percent) wooden poles that remain to be replaced.

Initiative 5 - Transmission and Distribution Geographic Information System

Initiative 6 - Post-Storm Data Collection and Forensic Analysis

Initiative 7 - Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems

These three initiatives are addressed together because effective implementation of any one initiative is dependent upon effective implementation of the other two initiatives. The five IOUs have Geographic Information System (GIS) and other programs to collect post-storm data on competing technologies, perform forensic analysis, and assessment of the reliability of overhead and underground systems on an ongoing basis. Differentiating between overhead and underground reliability performance and costs is still difficult because underground facilities are typically connected to overhead facilities and the interconnected systems of the IOUs address reliability on an overall basis. The electric utility companies have implemented an Outage Management System (OMS). The collection of information for the OMS is being utilized in the form of a database for emergency preparedness. This will help utilities identify and restore outages sooner and more efficiently. The OMS also fills a need for systems and methods to facilitate the dispatching of maintenance crews during outages, and for providing an estimated time to restore power to customers. Effective restoration will also yield improved customer

service and increased electric utility reliability. The year 2019 highlights and projected 2020 activities for each IOU are listed below:

- DEF's forensics teams will participate in DEF's 2020 Storm Drill. During field observations, the forensics team collects various information regarding poles damaged during storm events and collects sufficient data at failure sites to determine the nature and cause of the failure. In collaboration with University of Florida's Public Utility Research Center (PURC), DEF and the other IOUs developed a common format to collect and track data related to damage discovered during forensics investigation. Weather stations were installed across Florida as part of the collaboration with PURC and the other IOUs. As a result, DEF is now able to correlate experienced outages with nearby wind speeds. This type of information is augmented with on-site forensics data following a major storm event. DEF collects information to determine the percentage of storm caused outages on overhead and underground systems.

  DEF's GIS provides several sets of data and information points regarding DEF's assets. DEF uses OMS, Customer Service System, and GIS to help analyze the performance of its overhead and underground facilities. DEF collects available performance information as part of the storm restoration process. DEF implemented a new GIS, Work Management System, and Asset Management System in 2017. These systems allow DEF to facilitate the compliance tracking, maintenance, planning, and risk management of the major distribution and transmission assets. One hundred percent of the overhead and underground distribution and transmission systems are in the GIS. In addition, in 2019, DEF installed approximately 567 circuit miles of new underground cable. DEF indicated that its distribution system consists of 45 percent underground circuit miles.

  In 2019, Hurricane Dorian and Tropical Storm Nestor impacted DEF's service territory. However, DEF did not perform any forensic analysis for either weather event.

- FPL completed its five approved Key Distribution GIS improvement initiatives in 2012. The initiatives include post-hurricane forensic analyses, the addition of poles, streetlights, joint-use survey, and hardening level data to the GIS. Data collection and updates to the GIS will continue through inspection cycles and other normal daily work activities. FPL has post-storm data collection and forensic analysis plans, systems and processes in place and ready for use. The forensic data is captured from portable field computers via a mobile mapping and field automation software. The software visually identifies the facilities to be patrolled and provides the tools needed to perform forensic work. As part of its forensics analysis, FPL collects the same data for both hardened and non-hardened feeders.

  FPL utilized its alternative plan to develop metrics to demonstrate the performance of, damage to, and causes of damage to overhead and underground facilities. This includes the population of overhead and underground feeders and laterals experiencing an outage versus the respective total population of feeders and laterals, the performance of overhead hardened versus non-hardened feeders, failure rates for overhead and underground

transformers, failure rates for underground facilities by type, major causes of system damage, and overhead pole performance.

In 2019, wind bands from Hurricane Dorian impacted FPL's territory. The post-storm forensics analysis results indicated that no feeder poles were damaged during the storm. The analysis showed that hardened feeders had 22 outages with a population of 1,194 and non-hardened feeders had 52 outages with a population of 1,733.

- FPUC uses GIS mapping for all of its deployed equipment and uses it to identify distribution and transmission facilities. The system interfaces with the Customer Information System to function as a Customer OMS. The implementation of the OMS has resulted in significant improvement in data collection and retrieval capability for analyzing and reporting reliability indices. During 2019, FPUC implemented an OMS enhancement. This enhancement grants managers, supervisors, and directors access to an electric outage webpage to view outages in real-time via a smart phone. In addition, FPUC implemented a process to enable customer outage calls to be automatically logged into the system. Field data will be collected, analyzed, and entered into the OMS. The process is triggered 72 hours prior to a storm event. FPUC collects outage data attributed to overhead and underground equipment failure in order to evaluate the associated reliability indices. In 2019, Hurricane Dorian and Tropical Storm Nester impacted FPUC's service territory, both produced only minimal damage. As such, FPUC decided the collection of forensics data was not necessary. During 2019, there were no projects to convert overhead facilities to underground on FPUC's system.

- Gulf's Distribution GIS and Transmission GIS are continually updated with any additions and changes as the associated work orders for maintenance, system improvements, and new business are completed. This ongoing process provides Gulf sufficient information to use with collected forensic data to assess performance of its overhead and underground systems in the event of a major storm. However, in 2019, Gulf is beginning to transition to a new GIS platform as part of the NextEra Energy acquisition. While the system transition continues in 2020, Gulf will maintain its existing Distribution GIS and Transmission GIS databases. Gulf reported that the two GIS systems are very similar in purpose and function and it will use a hybrid approach to collect damage assessment data for forensic analysis. The forensic data collection process was tested prior to storm season. However, the 2019 storm season did not provide an opportunity to activate the forensic data collection process.

  In 2019, Gulf adopted FPL's Trouble Call Management System software as part of its transition to NextEra Energy. Adoption of FPL's Trouble Call Management System will allow Gulf to track underground outages by construction type (i.e., direct buried, duct bank, conduit installation, or submarine installation). However, FPL's Trouble Call Management System does not track pole types. The pole type is tracked in the GIS system and can be correlated back to the Trouble Call Management System.

- TECO's GIS continues to serve as the foundational database for all transmission, substation and distribution facilities. Development and improvement of the GIS continues

on an ongoing basis. In 2019, over 20 changes and enhancements to the system were made including data updates and functionality changes to better conform to business processes which improves the user experience. TECO uses an outside contractor to execute the process that includes the establishment of a field asset database, forensic measurement protocol, integration of forensics activity with overall system restoration, forensics data sampling and reporting format. TECO incurs costs based on the category of storm and level of activation of the outside contractor depending upon the number of storm events in 2020. The data collected following a significant storm will be used to determine the root cause of damage. An established process is in place for collecting post-storm data, forensic analysis, and outage performance data for both overhead and underground systems.

In 2019, TECO was impacted by Tropical Storm Nestor. TECO also made preparations for the potential impacts of Hurricane Dorian. TECO's forensic consultant was on notice 72 hours prior to the expected impact. However, TECO cancelled the notice 24 hours later due to the shifting track of the storm; therefore, storm data collection was not initiated. Storm data collection is conducted following a Category One or greater storm that significantly impacts TECO's service area.

Initiative 8 - Increased Utility Coordination with Local Governments

The Commission's goal with this program is to promote an ongoing dialogue between IOUs and local governments on matters such as vegetation management and underground construction, in addition to the general need to increase pre- and post-storm coordination. The increased coordination and communication is intended to promote IOU collection and analysis of more detailed information on the operational characteristics of underground and overhead systems. This additional data is also necessary to inform customers and communities that are considering converting existing overhead facilities to underground facilities (undergrounding), as well as to assess the most cost-effective storm hardening options.

Each IOU's external affairs representatives or designated liaisons are responsible for engaging in dialog with local governments on issues pertaining to undergrounding, vegetation management, public rights-of-way use, critical infrastructure projects, other storm-related topics, and day-to-day matters. Additionally, each IOU assigns staff to each county's EOC to participate in joint training exercises and actual storm restoration efforts. The IOUs organize ongoing outreach and educational programs addressing underground construction, tree placement, tree selection, and tree trimming practices.

- DEF's storm planning and response program is operational year-round to respond to catastrophic events at anytime. There are approximately 70 employees assigned full-time, year-round to coordinate with local governments on issues such as emergency planning, vegetation management, undergrounding, and service related issues. In 2019, DEF visited several EOCs in different counties to review storm procedures and participated in several different storm drills, including Florida's state wide annual storm drill, and will continue in 2020. Also in 2019, DEF held eight individual live-line demonstration sessions across its service territory. These events addressed emergency response, general safety awareness, a utility's perspective on hurricane preparedness, and safety issues.

Representatives from the sheriff's departments, public schools, and fire/rescue departments attended these sessions. DEF will continue its "Make It Safe" road-clearing program and modify it to provide support to counties well beyond 24-48 hours.

DEF prepared for Hurricane Dorian's impact by providing support to 35 EOCs within its service territory, either remotely or in person. Staffing began on August 30, 2019, and lasted until September 4, 2019.

- FPL continued efforts to improve local government coordination, in 2019. The Company conducted meetings with county emergency operations managers to discuss critical infrastructure locations in each jurisdiction. FPL also invited federal and state emergency management personnel to participate in FPL's annual storm preparedness drill. In 2019, FPL conducted over 900 community presentations providing information on storm readiness and other topics of community interest. FPL's dedicated government portal website provides reliable information to government leaders, which is useful during storm recovery. The site contains media alerts and releases, customer outage information and maps, critical infrastructure facility information, estimated time of restoration information, FPL staging site locations, and available personnel resources. In addition, FPL meets with all counties and municipalities that request information on line clearing and underground conversions. In 2019, one municipality signed an agreement to move forward with its undergrounding project and 15 municipalities requested estimates for potential overhead to underground conversions during 2019.

- FPUC has continued its involvement with local governments regarding reliability issues with emphasis on vegetation management. FPUC's current practice is to have its personnel located at the county EOCs on a 24-hour basis during emergency situations to ensure good communication. FPUC also has a dedicated Manager of Government Relations in each division. The manager's role is to maintain relationships with local and state government officials and staff, and business and community leaders. The manager is also responsible for responding to customer issues referred by governmental officials.

- Gulf meets with governmental entities for all major projects, as appropriate, to discuss the scope of the projects and coordinate activities involved with project implementation. Gulf maintains year-round contact with city and county officials to ensure cooperation in planning, good communications, and coordination of activities. In 2019, Gulf participated in hurricane drills, EOC training, and statewide exercises. Gulf assigns employees to county EOCs throughout Northwest Florida to assist during emergencies. Gulf also conducts a storm drill exercise each year. In 2019 and 2020, Gulf met with several county and city officials to discuss storm planning, the restoration process, storm priorities, critical infrastructures, and a storm drill exercise.

- TECO's communication efforts, in 2019, focused on maintaining existing vital governmental contacts and continued participation on standing disaster recovery planning committees. TECO participated in joint storm workshops, training involving governmental officials and exercises with Hillsborough, Polk, and Pinellas Counties and municipal agencies. TECO continues to work with local, state, and federal governments

to streamline the flow of information to help efforts to restore all service as quickly as possible.

In 2019, TECO met with several county officials to discuss critical facilities. These discussions involved prioritizing small and large assisted-living facilities and the need to update water and wastewater facilities across the county.

Hurricane Dorian and Tropical Storm Nestor triggered several county and municipal agencies to activate their EOCs. TECO participated in full activation of the State and Hillsborough County ECOs during Hurricane Dorian and partial activation of the ECOs for the City of Tampa, City of Temple Terrace, Pasco County, Pinellas County, and Polk County. TECO also participated in partial activation of the Polk County EOC during Tropical Storm Nestor.

Initiative 9 - Collaborative Research on Effects of Hurricane Winds and Storm Surge

PURC assisted Florida's electric utilities by coordinating a three-year research effort, from 2006 to 2009, in the area of hardening the electric infrastructure to better withstand and recover from hurricanes. Hurricane winds, undergrounding, and vegetation management research are key areas explored in these efforts by all of the research sponsors involved with PURC. Since that time, PURC compiles a research report every year and provides the utilities with results from its research. The latest report was issued February 2020.

Current projects in this effort include: (1) research on undergrounding existing electric distribution facilities by surveying the current literature including case analyses of Florida underground projects, and developing a model for projecting the benefits and costs of converting overhead facilities to underground; (2) data gathering and analysis of hurricane winds in Florida and the possible expansion of a hurricane simulator that can be used to test hardening approaches; and (3) an initiative to increase public outreach to address storm preparedness in the wake of Hurricane Sandy. This included reaching out to affected states for further data and a print debate surrounding overhead vs. underground installation of power lines.

The effort is the result of FPSC Order No. PSC-06-0351-PAA-EI, issued April 25, 2006, in Docket No. 20060198-EI, directing each investor-owned electric utility to establish a plan that increases collaborative research to further the development of storm resilient electric utility infrastructure and technologies that reduce storm restoration costs and outages to customers. The order directed the IOUs to solicit participation from municipal electric utilities and rural electric cooperatives in addition to available educational and research organizations.

The IOUs joined with the municipal electric utilities and rural electric cooperatives in the state (collectively referred to as the Project Sponsors) to form a steering committee of representatives from each utility and entered into a Memorandum of Understanding (MOU) with PURC. In serving as the research coordinator for the project outlined by the MOU, PURC manages the workflow and communications, develops work plans, serves as a subject matter expert and conducts research, facilitates the hiring of experts, coordinates with research vendors, advise the project sponsors, and provides reports for project activities.

Undergrounding Of Electric Utility Infrastructure: All five IOUs participate with PURC, along with the other cooperative and municipal electric utilities, to perform beneficial research regarding hurricane winds and storm surge within the State. The group's research shows that while underground systems on average have fewer outages than overhead systems, they can at times take longer to repair. Analyses of hurricane damage in Florida found that underground systems might be particularly susceptible to storm surge. The research on undergrounding has been the focus for understanding the economics and effects of hardening strategies, including undergrounding. As a result, Quanta Technologies was contracted to conduct a three-phase project to understand the economics and effect of hardening policies in order to make informed decisions regarding hardening of underground facilities.

Phase I of the project was a meta-analysis of existing research, reports, methodologies, and case studies. Phase II examined specific undergrounding project case studies in Florida and included an evaluation of relevant case studies from other hurricane prone states and other parts of the world. Phase III developed a methodology to identify and evaluate the costs and benefits of undergrounding specific facilities in Florida. The primary focus is the impact of undergrounding on hurricane performance. This study also considered benefits and drawbacks of undergrounding during non-hurricane conditions. The collaborative refined the computer model developed by Quanta Technologies. The reports for Phase I, Phase II, and Phase III are available at http://warrington.ufl.edu/purc/research/energy.asp.

The collaborative has refined the computer model and there has been a collective effort to learn more about the functionality of the computer code. PURC and the utilities have worked to fill information gaps for model inputs; however, there are still information gaps. These gaps include company specific storm related information, such as, specific equipment damage and associated restoration times and costs. There have also been significant investments and efforts in the area of forensic data collection, which includes the utilities' responses and plans to meet the FPSC's storm preparedness initiative.

PURC has worked with doctoral and master's candidates at the University of Florida to assess the inter-relationships between wind speed and other environmental factors on utility damage. PURC was contacted by the University of Wisconsin and North Carolina State University, who showed interest in the model, but no additional relationships have been established. The Government of Puerto Rico contacted PURC regarding strategies to make Puerto Rico's system more resilient and they expressed interest in the role that the model could play. PURC was also contacted by California stakeholders who are interested in applying the principles of the model toward efforts in the prevention of wildfires. The researchers that contacted PURC cite the model as the only non-proprietary model of its kind.

Hurricane Wind Effects: The collaborative group is trying to determine the appropriate level of hardening required for the electric utility infrastructure against wind damage from hurricanes. The project's focus was divided into two categories: (1) accurate characterization of severe dynamic wind loading; and (2) understanding the likely failure modes for different wind conditions. An agreement with WeatherFlow, Inc., to study the effects of dynamic wind conditions upon hurricane landfall includes 50 permanent wind-monitoring stations around the coast of Florida. This agreement expired in 2012; however, it was renewed in April 2017 and

will automatically renew annually on the effective date for an additional one-year period, unless terminated by the parties to the agreement.

Public Outreach: PURC researchers continue to discuss the collaborative effort in Florida with the engineering departments of the state regulators in New York, New Jersey, Pennsylvania, and regulators in Jamaica, Grenada, Curacao, St. Lucia, the Bahamas, Samoa, and the Philippines. Puerto Rico and California showed interest in 2019. The regulators and policymakers showed interest in the collaborative effort and its results, but have shown no further interest in participating in the research effort. In 2019, the media in California continued to show considerable interest in Florida's storm hardening efforts to apply toward wildfire prevention standards.

Initiative 10 - A Natural Disaster Preparedness and Recovery Program

Each IOU is required to maintain a copy of its current formal disaster preparedness and recovery plan with the Commission. A formal disaster plan provides an effective means to document lessons learned, improve disaster recovery training, pre-storm staging activities and post-storm recovery, collect facility performance data, and improve forensic analysis. In addition, participation in the Commission's annual pre-storm preparedness briefing is required which focuses on the extent to which all Florida electric utilities are prepared for potential hurricane events. The following are some 2018 highlights for each IOU.

- DEF's Storm Recovery Plan is reviewed and updated annually based on lessons learned from the previous storm season and organizational needs. The Distribution System Storm Operational Plan and the Transmission Storm Plan incorporates organizational redesign at DEF, internal feedback, suggestions, and customer survey responses. DEF uses the Extreme Wind Loading standards in accordance with the NESC, Rule 250C in all planning for transmission upgrades, rebuilds and expansions of existing facilities.

- FPL's Storm Emergency Plan identifies emergency conditions associated with natural disasters and responsibilities and duties of FPL's Emergency Response Organization. The plan provides a summary of overall emergency process, systems, accounting, safe work practices, etc. The plan also provides information on the Emergency Response Organization conducting damage assessment, restoration response, supporting organizations for external agency support, such as regulatory bodies, EOC's, local governments, etc., and support to major commercial and industrial customers. The plan is reviewed annually and revised as necessary.

- FPUC utilizes its Disaster Preparedness and Recovery Plan to prepare for storms annually and will ensure all employees are aware of their responsibilities. The objectives included in the plan to ensure orderly and efficient service restoration are: the safety of employees, contractors, and the general public; early damage assessment in order to develop manpower requirements; request additional manpower as soon as conditions and information indicate the need; provide for orderly restoration activities; provide all logistical needs for employees and contractors; provide ongoing preparation of FPUC's employee buildings, equipment and support functions; and provide support and additional resources for employees and their families. The plan was updated in 2019 and included: miscellaneous changes to employee names and titles, revised General Procedures to

correct language and provide some commonality between Divisions, added Propane/Natural Gas to storm procedures, revised storm materials, and updated contacts and telephone numbers, where appropriate.

- Gulf's 2020 Storm Restoration Procedures Manual is currently being revised and reviewed and all changes will be incorporated by August 2019. Gulf continues to provide annual refresher training in the area of storm preparedness for various storm roles at minimal cost. A mock hurricane drill was completed on April 22, 2019. The drill involved testing the readiness to deal with an unexpected event during a restoration effort. Gulf uses the strategy described in its Storm Restoration Procedures Manual to respond to any natural disaster that may occur. Annually, Gulf develops and refines its planning and preparations for the possibility of a natural disaster. Gulf's restoration procedures establish a plan of action to be utilized for the operation and restoration of generation, transmission, and distribution facilities during major disasters. Gulf held additional meetings in 2019 to discuss changes and best practices that needed to be implemented for the 2019/2020 storm season. Gulf also held a dry-run drill with FPL to take advantage of the best practices and to coordinate restoration efforts as part of NextEra's acquisition of Gulf. Gulf's 2020 annual hurricane drill is scheduled to take place at the end of May.

- TECO's Emergency Management Plans address all hazards, including extreme weather events. TECO continues to use the policy labeled Emergency Management and Business Continuity. This policy delineates the responsibility at employee, company, and community levels. TECO continues to participate in internal and external preparedness exercises, collaborating with government emergency management agencies, at local, state and federal levels. Prior to June 1, 2019, all emergency support functions were reviewed, personnel trained, and Incident Command System Logistics and Planning Section Plans were tested. TECO continues to participate in internal and external preparedness exercises, and collaborates with local, state, and federal government emergency management agencies. During the State's mock hurricane exercise, TECO confirmed its response and communications plans.

Section II: Actual Distribution Service Reliability

Electric utility customers are affected by all outage and momentary events, regardless of where problems originate. For example, generation events and transmission events, while remote from the distribution system serving a customer, affect the distribution service experience. Actual reliability data is the accumulation of these events.

The actual reliability data includes two subsets of outage data: (1) data on excludable events; and (2) data pertaining to normal day-to-day activities. Rule 25-6.0455(4), F.A.C., explicitly lists outage events that may be excluded:

- ♦ Planned service interruptions.
- ♦ A storm named by the National Weather Service.
- ♦ A tornado recorded by the National Weather Service.
- ♦ Ice on lines.
- ♦ A planned load management event.
- ♦ Any electric generation or transmission event not governed by subsection Rule 25-6.018(2) and (3) F.A.C.
- ♦ An extreme weather or fire event causing activation of the county emergency operation center.

This section provides an overview of each IOU's actual 2019 performance data and focuses on the exclusions allowed by the rule.

Duke Energy Florida, LLC: Actual Data

Table 2-1 provides an overview of key DEF metrics: Customer Minutes of Interruption (CMI) and Customer Interruptions (CI) for 2019. Excludable outage events accounted for approximately 19 percent of the minutes of interruption experienced by DEF's customers. In 2019, DEF experienced outages associated with Hurricane Dorian which impacted its service area on September 2-4 and Tropical Storm Nestor on October 18-20.

The biggest impact on CMI were the "Planned Service Interruptions" events, which accounted for approximately 8 percent of the excludable minutes of interruptions. "Planned Service Interruptions" include any outages that were part of any work, new revenue, relocations, or upgrades. DEF stated that the transmission events accounted for 7 percent of the minutes of interruptions. DEF asserted that the initiating causes varied from equipment failures to weather. The sustained causes also varied from vegetation to equipment failure.

Table 2-1
DEF's 2019 Customer Minutes of Interruptions and Customer Interruptions

2019	Customer Minutes of Interruption (CMI)		Customer Interruptions (CI)	
	Value	% of Actual	Value	% of Actual
Reported Actual Data	**208,319,515**		**2,592,102**	
Documented Exclusions				
Planned Service Interruptions	17,458,124	8.38%	389,685	15.03%
Named Storms	5,971,214	2.87%	67,886	2.62%
Tornadoes		0.00%		0.00%
Ice on Lines		0.00%		0.00%
Planned Load Management Events		0.00%		0.00%
Generation/Transmission Events	15,590,134	7.48%	315,812	12.18%
Extreme Weather (EOC Activation/Fire)		0.00%		0.00%
Reported Adjusted Data	**169,300,043**	**81.27%**	**1,818,719**	**70.16%**

Source: DEF's 2019 distribution service reliability report.

Florida Power & Light Company: Actual Data

Table 2-2 provides an overview of FPL's CMI and CI figures for 2019. Excludable outage events accounted for approximately 18 percent of the minutes of interruption experienced by FPL's customers. FPL reported six tornadoes, Hurricanes Barry, Dorian, Humberto, and Tropical Storm Nestor in 2019. FPL stated that even though Hurricanes Barry, Dorian, Humberto, and Tropical Storm Nestor did not make landfall in its service territory, all of FPL's management areas were impacted. Hurricane Barry impacted FPL's service territories on July 11-12, 2019, Hurricane Dorian on September 1-5, 2019, Hurricane Humberto on September 13-16, 2019, and Tropical Storm Nestor on October 18-19, 2019. FPL also reported that it had two EOC activations. On April 26, 2019, the Bradford County EOC was activated due to a strong adverse weather system that moved across Florida. On August 30, 2019, the EOC in Manatee, Brevard, Volusia, Indian River, Flagler, Seminole, Alachua, Putnam, Martin, St Lucie, Broward, Hendry, Charlotte, and Miami Dade counties were activated as Hurricane Dorian moved towards Florida. The six tornadoes affected the following regions:

- Central Florida and Boca Raton regions on January 24, 2019
- West Dade region on January 27, 2019
- West Palm Beach region on May 3, 2019
- West Palm Beach region on July 25, 2019
- Treasure Coast region on November 5, 2019
- North Florida and Central Florida regions on December 14, 2019

Table 2-2
FPL's 2019 Customer Minutes of Interruptions and Customer Interruptions

2019	Customer Minutes of Interruption (CMI)		Customer Interruptions (CI)	
	Value	% of Actual	Value	% of Actual
Reported Actual Data (1)	**306,317,023**		**4,875,977**	
Documented Exclusions				
Planned Service Interruptions	23,938,067	7.81%	320,732	6.58%
Named Storms	24,425,139	7.97%	306930	6.29%
Tornadoes	2,977,930	0.97%	41037	0.84%
Ice on Lines	0	0.00%	0	0.00%
Planned Load Management Events	0	0.00%	0	0.00%
Generation/Transmission Events (2)	10,273,906	3.35%	647,958	13.29%
Extreme Weather (EOC Activation/Fire)	3,876,315	1.27%	45,789	0.94%
Reported Adjusted Data	**251,099,572**	**81.97%**	**4,161,489**	**85.35%**

Source: FPL's 2019 distribution service reliability report.
Notes: (1) Excludes Generation/Transmission Events per Rule 25-6.0455(2), F.A.C., and (2) Information Only, as reported actual data already excludes Generation/Transmission Events.

Florida Public Utilities Company: Actual Data

Table 2-3 provides an overview of FPUC's CMI and CI figures for 2019. Excludable outage events accounted for approximately 37 percent of the minutes of interruption experienced by FPUC's customers. The "Named Storms" events accounted for approximately 2 percent of the minutes of interruption. FPUC reported that the following weather events impacted its service areas: Hurricane Dorian affected the Northeast division on September 4-5, 2019, and Tropical Storm Nestor affected the Northwest division on October 19, 2019, as did one tornado.

The biggest impact on CMI was "Generation/Transmission" events. The Northeast division experienced transmission events on August 22, and November 14, 2019, and substation events on May 28 and July 26, 2019, due to equipment failures and relay maintenance testing. The Northwest division experienced substation events on January 29, May 20, and December 22, 2019, due to a circuit breaker failure causing an interruption in Gulf's transmission to FPUC. Additionally, both divisions had several planned outages that allowed FPUC to perform maintenance to different sections of the distribution system.

Table 2-3
FPUC's 2019 Customer Minutes of Interruptions and Customer Interruptions

2019	Customer Minutes of Interruption (CMI)		Customer Interruptions (CI)	
	Value	% of Actual	Value	% of Actual
Reported Actual Data	**7,632,371**		**85,056**	
Documented Exclusions				
Planned Service Interruptions	47,331	0.62%	2,467	2.90%
Named Storms	135,843	1.78%	1,888	2.22%
Tornadoes	243,954	3.20%	2,082	2.45%
Ice on Lines	0	0.00%	0	0.00%
Planned Load Management Events	0	0.00%	0	0.00%
Generation/Transmission Events	2,402,079	31.47%	29,440	34.61%
Extreme Weather (EOC Activation/Fire)	0	0.00%	0	0.00%
Reported Adjusted Data	**4,803,164**	**62.93%**	**49,179**	**57.82%**

Source: FPUC's 2019 distribution service reliability report.

Gulf Power Company: Actual Data

Table 2-4 provides an overview of Gulf's CMI and CI figures for 2019. Excludable outage events accounted for approximately 9 percent of the minutes of interruption experienced by Gulf's customers. The "Named Storms" accounted for approximately 1 percent of the minutes of interruption. Tropical Storm Barry, on July 11-14, 2019, affected all three regions of Gulf's service area and Tropical Storm Nestor, on October 18-19, 2019, affected the Eastern region. Gulf reported two tornadoes, which accounted for approximately 1 percent of the minutes of interruption. The tornadoes affected the following regions:

- Eastern region on January 19, 2019, and March 3, 2019
- Central region on March 3, 2019

Table 2-4
Gulf's 2019 Customer Minutes of Interruption and Customer Interruptions

2019	Customer Minutes of Interruption (CMI)		Customer Interruptions (CI)	
	Value	% of Actual	Value	% of Actual
Reported Actual Data (1)	**34,556,016**		**514,302**	
Documented Exclusions				
Planned Service Interruptions	2,457,995	7.11%	50,144	9.75%
Named Storms	295,138	0.85%	6,477	1.26%
Tornadoes	345,276	1.00%	2,261	0.44%
Ice on Lines		0.00%		0.00%
Planned Load Management Events		0.00%		0.00%
Generation/Transmission Events (2)	6,613,005	19.14%	125,109	24.33%
Extreme Weather (EOC Activation/Fire)		0.00%		0.00%
Reported Adjusted Data	**31,457,607**	**91.03%**	**455,420**	**88.55%**

Source: Gulf's 2019 distribution service reliability report.
Notes: (1) Excludes Generation/Transmission Events per Rule 25-6.0455(2), .F.A.C., and (2) Information Only, as reported actual data already excludes Generation/Transmission Events.

Gulf's "Generation/Transmission Events" accounted for 19 percent of CMI. The causes for the transmission events included external substation equipment, deterioration, failed equipment, animals, vegetation, vandalism, and unknown. Gulf reports that no generation events were excluded.

Tampa Electric Company: Actual Data

Table 2-5 provides an overview of TECO's CMI and CI figures for 2019. Excludable outage events accounted for approximately 16 percent of the minutes of interruption experienced by TECO's customers. Tropical Storm Nestor caused 1 percent of the minutes of interruptions in 2019.

The "Planned Service Interruptions" events accounted for approximately 13 percent of the minutes of interruption. TECO reported that when working "Planned Service Interruptions," the affected system is temporarily de-energized to safely complete work that has been requested by customers for various reasons. In addition, "Generation/Transmission Events" accounted for approximately 2 percent of the minutes of interruptions. TECO reported 12 transmission outages in 2019. The causes listed included equipment failure, human error, vegetation, animals, and weather circumstances. TECO reported that all equipment failures were repaired, structures replaced, overgrown vegetation were trimmed, and poles were repaired.

Table 2-5
TECO's 2019 Customer Minutes of Interruptions and Customer Interruptions

2019	Customer Minutes of Interruption (CMI)		Customer Interruptions (CI)	
	Value	% of Actual	Value	% of Actual
Reported Actual Data	**71,466,578**		**1,079,714**	
Documented Exclusions				
Planned Service Interruptions	8,903,917	12.46%	204,171	18.91%
Named Storms	861,519	1.21%	13,794	1.28%
Tornadoes	0	0.00%	0	0.00%
Ice on Lines	0	0.00%	0	0.00%
Planned Load Management Events	0	0.00%	0	0.00%
Generation/Transmission Events	1,386,223	1.94%	89,761	8.31%
Extreme Weather (EOC Activation/Fire)	0	0.00%	0	0.00%
Reported Adjusted Data	**60,314,919**	**84.40%**	**771,988**	**71.50%**

Source: TECO's 2019 distribution service reliability report.

Section III: Adjusted Distribution Service Reliability Review of Individual Utilities

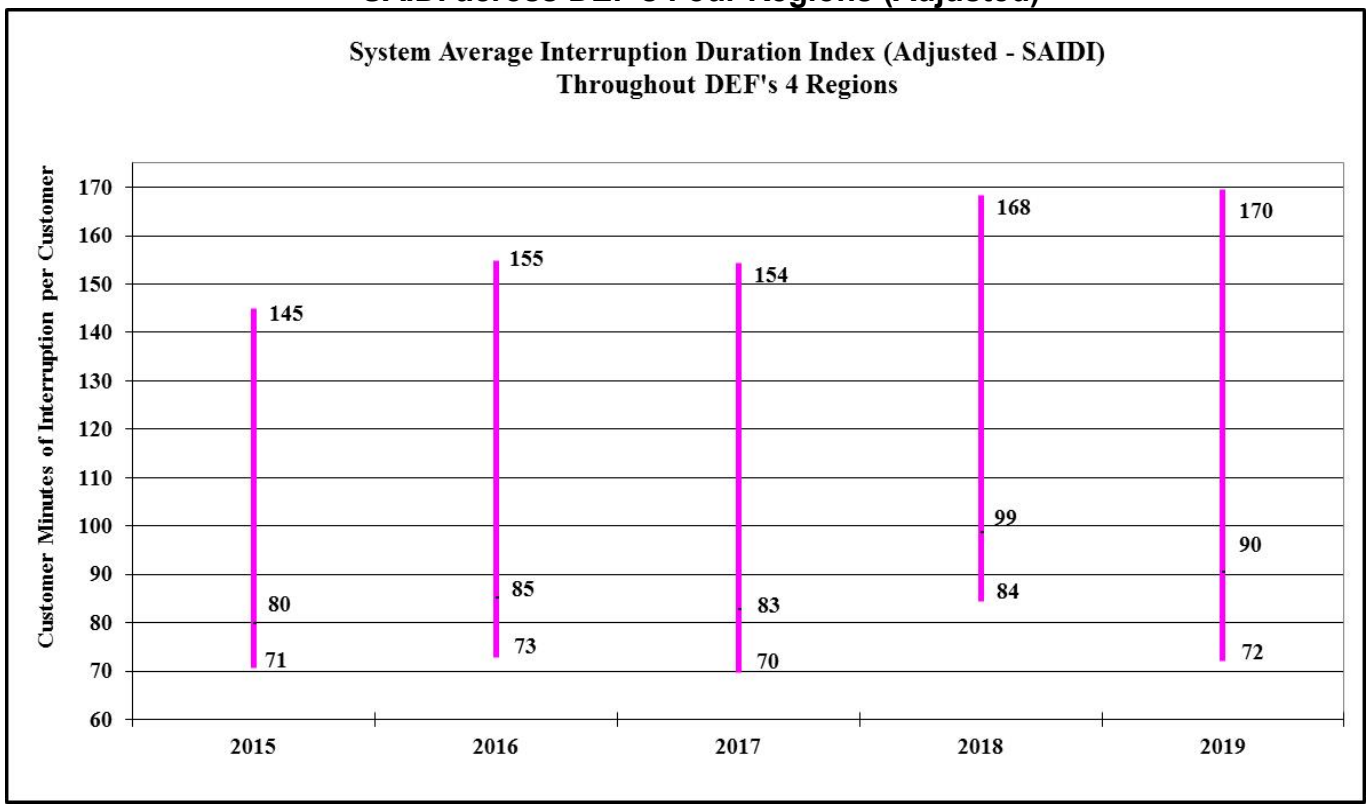
The adjusted distribution reliability metrics or indices provide insight into potential trends in a utility's daily practices and maintenance of its distribution facilities. This section of the review is based on each utility's reported adjusted data.

Duke Energy Florida, LLC: Adjusted Data

Figure 3-1 charts the adjusted SAIDI recorded across DEF's system and depicts decreases in the lowest and the average values in 2019. DEF reported that it saw a drop in the Excluded Weather SAIDI compared to the prior three years. Even with the decrease in adjusted SAIDI, there were eight days in 2019 that caused increases to the SAIDI minutes. Those outages were weather related but not excludable per Rule because the events were not related to a named storm or a tornado. In addition, DEF reported the two named storms that it experienced caused increases to its SAIDI minutes in 2019.

DEF's service territory is comprised of four regions: North Coastal, South Coastal, North Central, and South Central. **Figure 3-1** illustrates that the North Coastal region continues to report the poorest SAIDI over the last five years, fluctuating between 145 minutes and 170 minutes. While the South Coastal and South Central regions have the best or lowest SAIDI for the same period. The North Coastal region is predominantly a rural area and has more square miles when compared to the other regions. This region is also served by predominantly long circuits with approximately 7,700 miles of overhead and underground main circuits. DEF explained that these factors result in higher exposure to outage causes and higher reliability indices.

Figure 3-1
SAIDI across DEF's Four Regions (Adjusted)



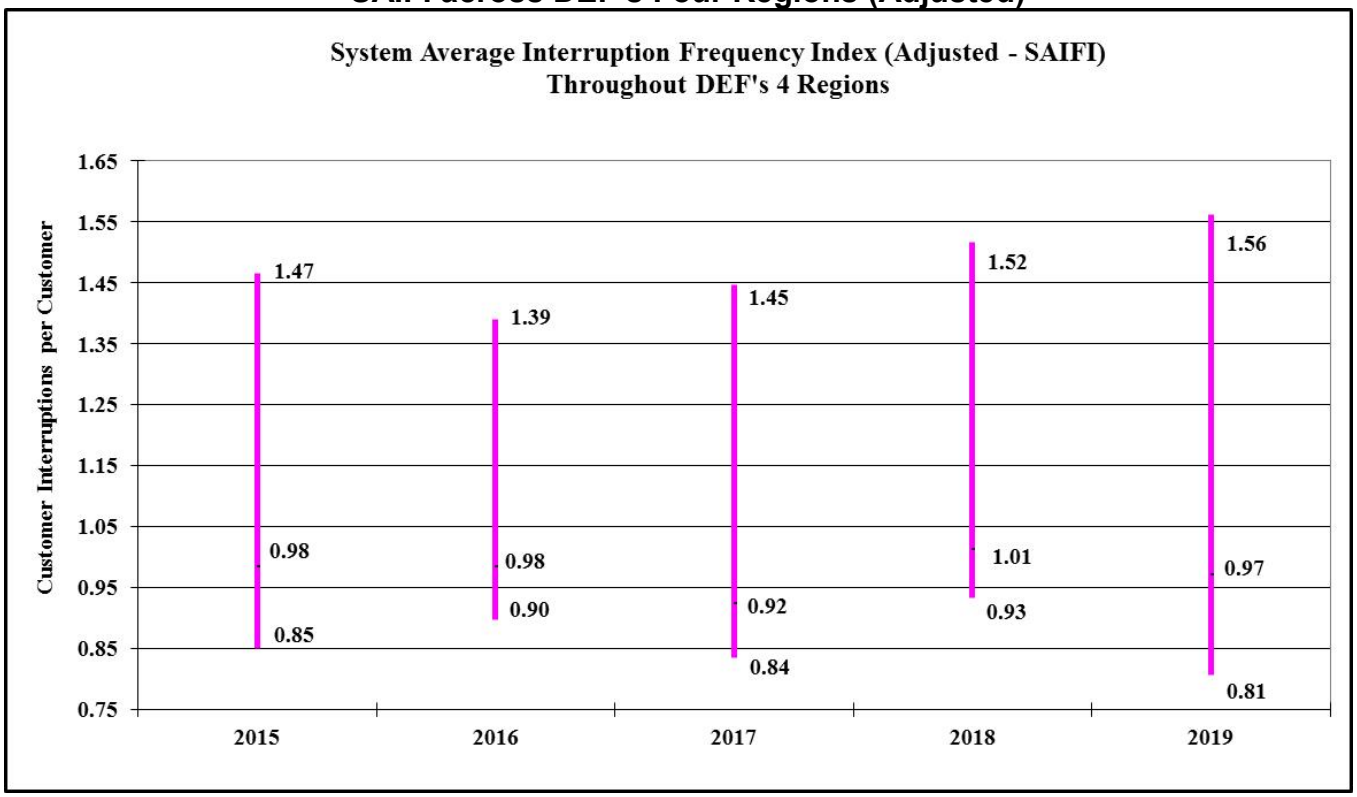
DEF's Regions with the Highest and Lowest Adjusted SAIDI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest SAIDI	North Coastal	North Coastal	North Coastal	North Coastal	North Coastal
Lowest SAIDI	South Central	South Coastal	South Central	South Central	South Coastal

Source: DEF's 2015-2019 distribution service reliability reports.

Figure 3-2 shows the adjusted SAIFI across DEF's system. The minimum SAIFI is trending downward as the maximum SAIFI is trending upward for the five-year period of 2015 through 2019. It appears the average SAIFI remains relatively flat for the same period. There was a 13 percent decrease for the minimum value, a 4 percent decrease for the average value, and a 3 percent increase for the maximum value. The North Central region had the lowest number of interruptions, while the North Coastal region continues to have the highest number of interruptions.

Figure 3-2
SAIFI across DEF's Four Regions (Adjusted)



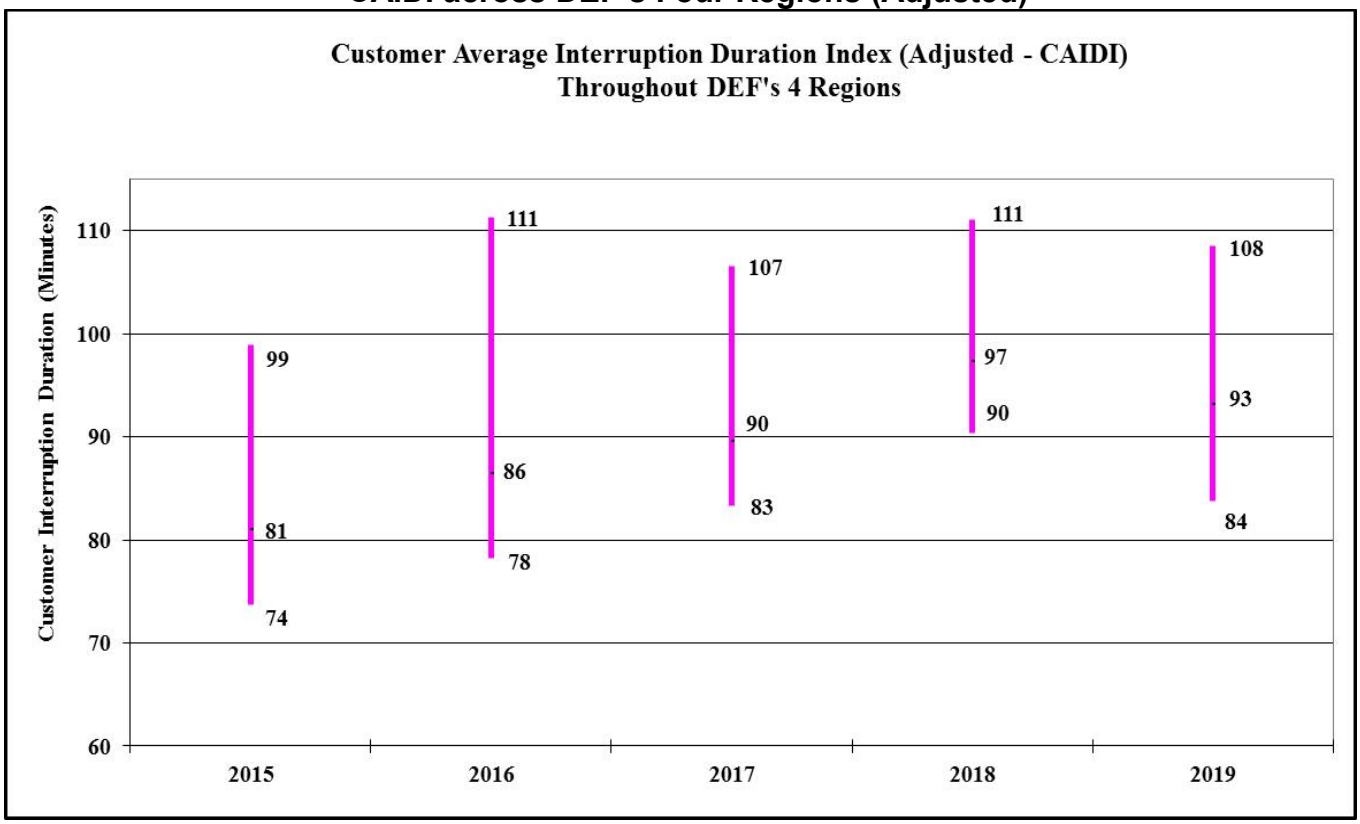
DEF's Regions with the Highest and Lowest Adjusted SAIFI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest SAIFI	North Coastal	North Coastal	North Coastal	North Coastal	North Coastal
Lowest SAIFI	North Central	South Coastal	South Central	South Central	North Central

Source: DEF's 2015-2019 distribution service reliability reports.

Figure 3-3 illustrates the CAIDI, or the average number of minutes a customer is without power when a service interruption occurs, for DEF's four regions. DEF's adjusted CAIDI is increasing for a five-year period from 81 minutes in 2015 to 93 minutes in 2019. The North Coastal region has continued to have the highest CAIDI level for the past five years with the maximum CAIDI trending upward. The South Coastal region had the lowest CAIDI level during the same period with the minimum CAIDI trending upward.

Figure 3-3
CAIDI across DEF's Four Regions (Adjusted)



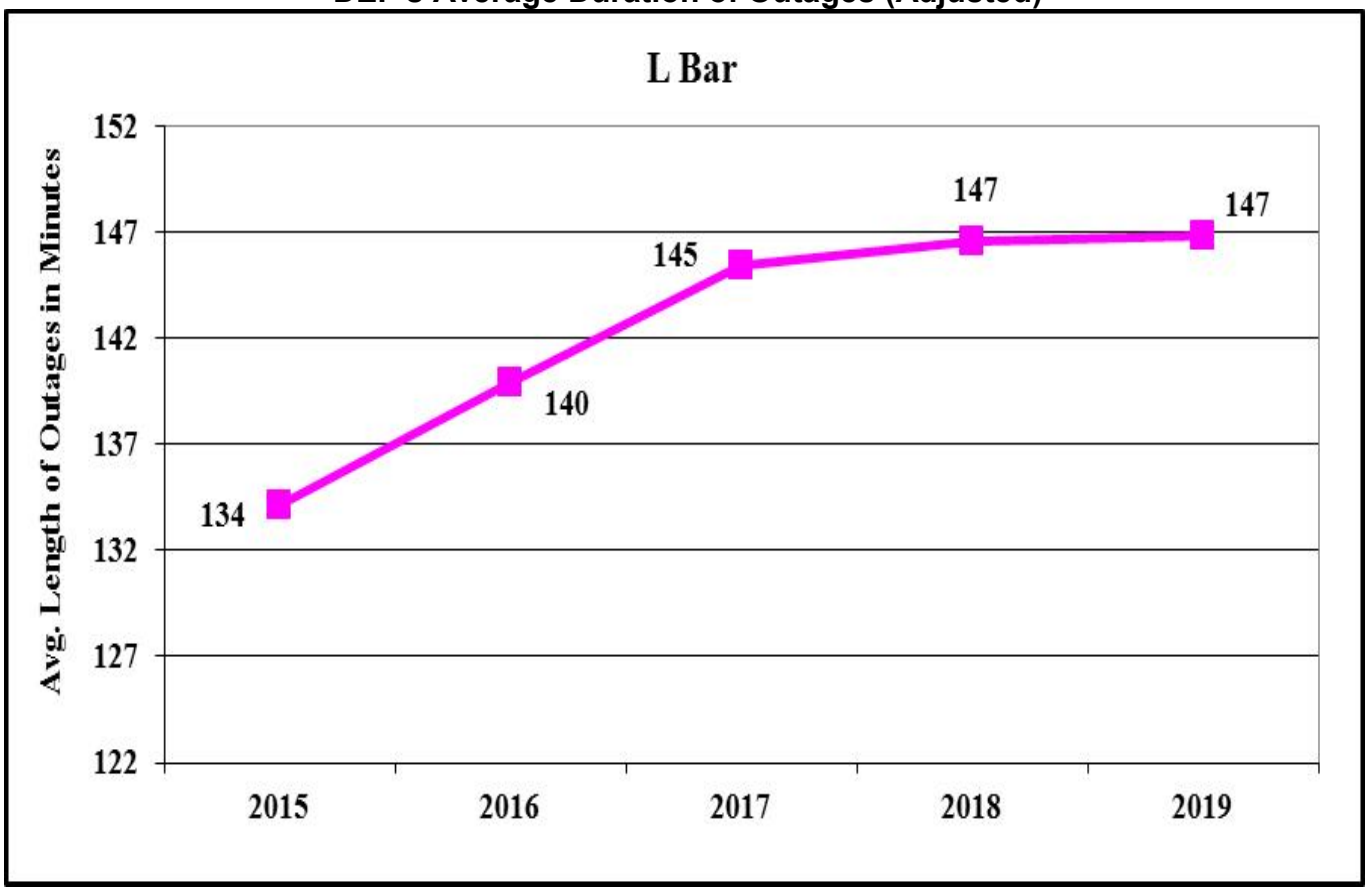
DEF's Regions with the Highest and Lowest Adjusted CAIDI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest CAIDI	North Coastal	North Coastal	North Coastal	North Coastal	North Coastal
Lowest CAIDI	South Coastal	South Central	South Central	South Central	South Coastal

Source: DEF's 2015-2019 distribution service reliability reports.

Figure 3-4 is the average length of time DEF spends restoring customers affected by outage events, excluding hurricanes and certain other outage events. This is displayed by the index L-Bar in the graph below. The data demonstrates an overall 8 percent increase of outage durations since 2015, however, the L-Bar remained unchanged from 2018 to 2019. DEF's overall L-Bar index is trending upward, indicating that DEF is spending more time restoring service from outage events.

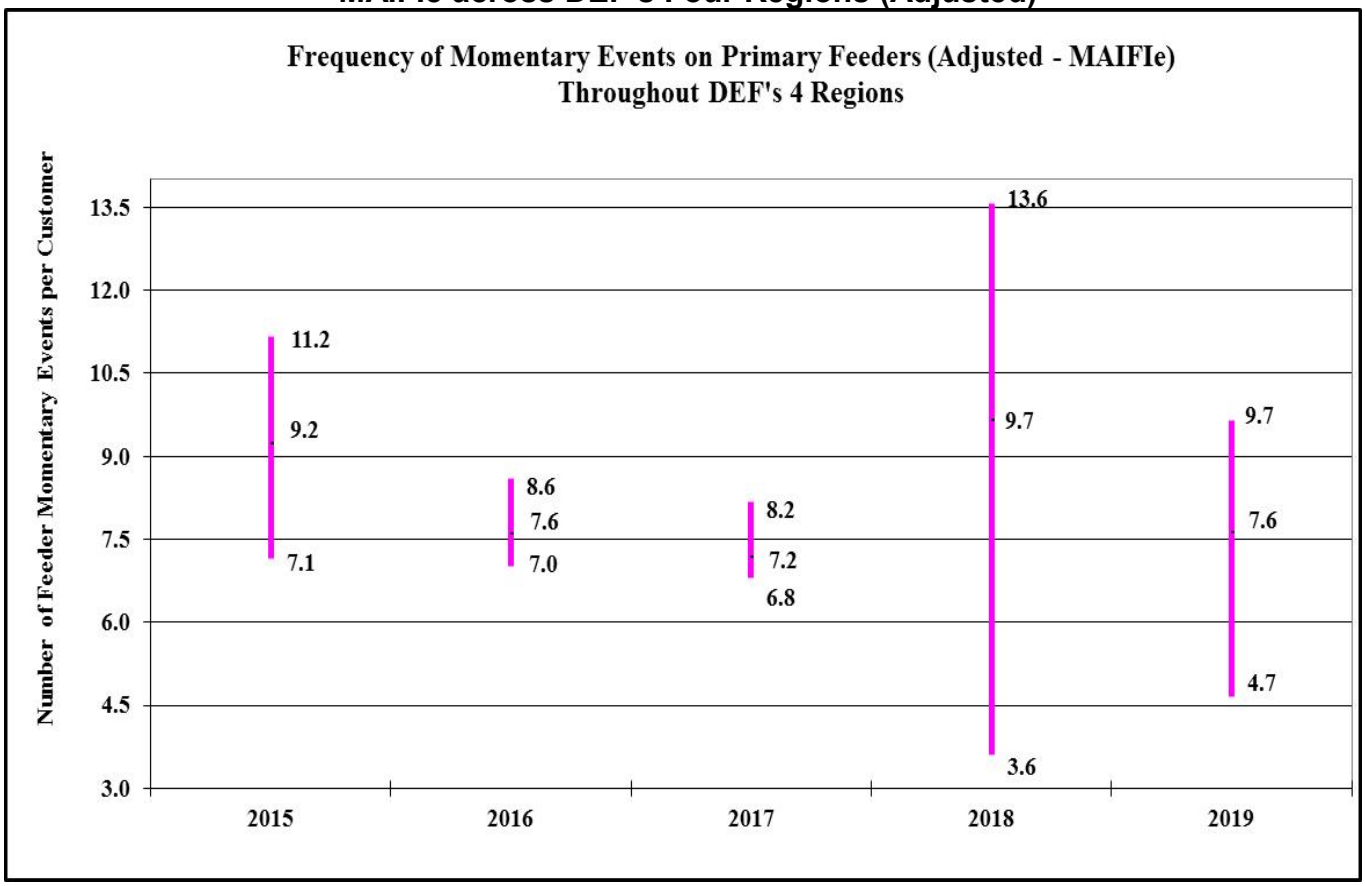
Figure 3-4
DEF's Average Duration of Outages (Adjusted)



Source: DEF's 2015-2019 distribution service reliability reports.

Figure 3-5 illustrates the frequency of momentary events on primary circuits for DEF's customers recorded across its system. These momentary events often affect a small group of customers. A review of the supporting data suggests that the MAIFIe results between 2015 and 2019 appear to be trending downward showing improvement and there was a decrease in the average MAIFIe of 22 percent from 2018 to 2019. All four regions appear to fluctuate between having the best (lowest) results to having the worst (highest) results. From 2018 to 2019, the lowest MAIFIe increased 31 percent and the highest MAIFIe decreased 29 percent.

Figure 3-5
MAIFIe across DEF's Four Regions (Adjusted)



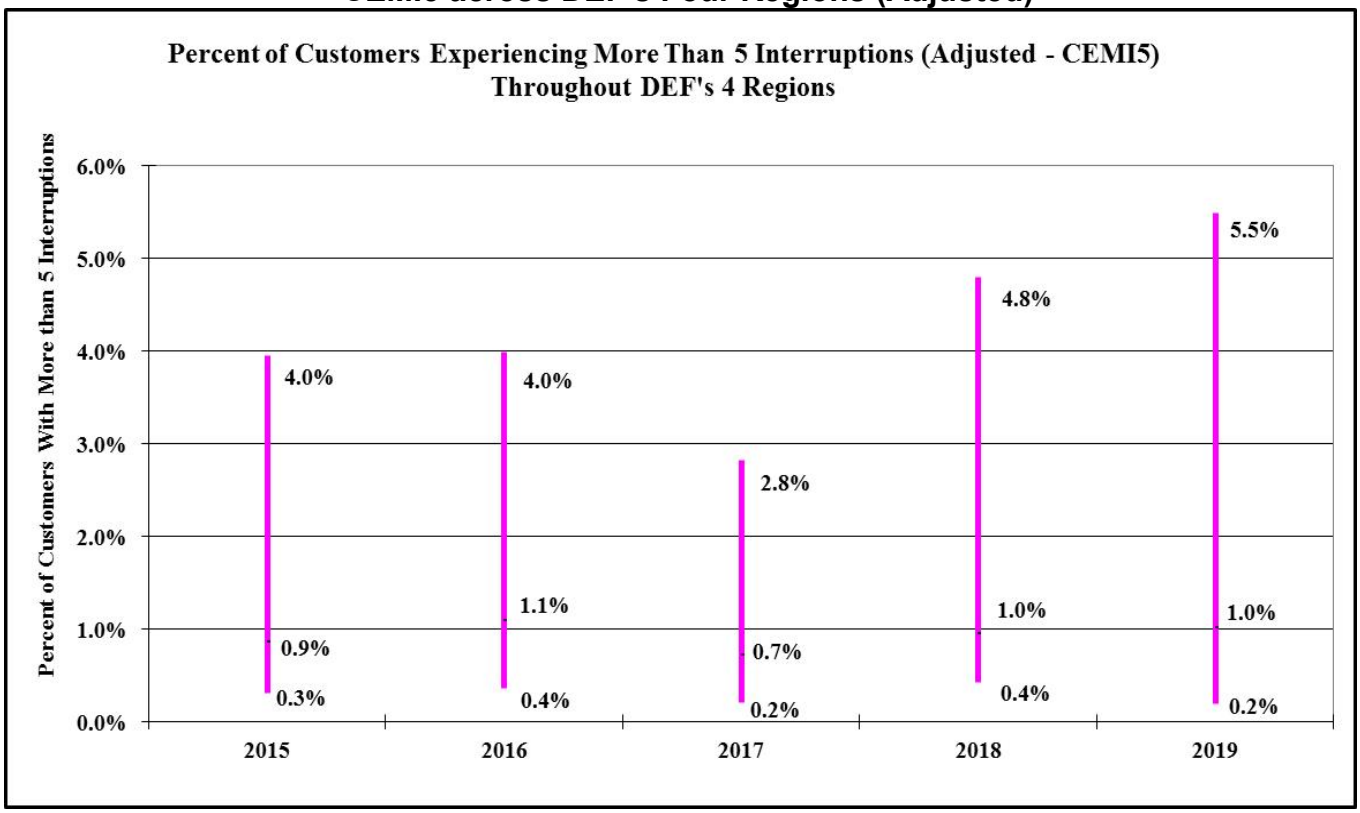
DEF's Regions with the Highest and Lowest Adjusted MAIFIe Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest MAIFIe	South Coastal	North Central	North Coastal	North Coastal	North Coastal
Lowest MAIFIe	North Coastal	South Central	South Coastal	North Central	North Central

Source: DEF's 2015-2019 distribution service reliability reports.

Figure 3-6 charts the percentage of DEF's customers experiencing more than five interruptions over the last five years. DEF reported no change in the average CEMI5 performance from 2018 to 2019. The average CEMI5 is trending upward over the past five years. The South Coastal region has the lowest reported percentage for all of DEF's regions and the North Coastal region continues to have the highest reported percentage.

Figure 3-6
CEMI5 across DEF's Four Regions (Adjusted)



DEF's Regions with the Highest and Lowest Adjusted CEMI5 Distribution Reliability Performance by Year

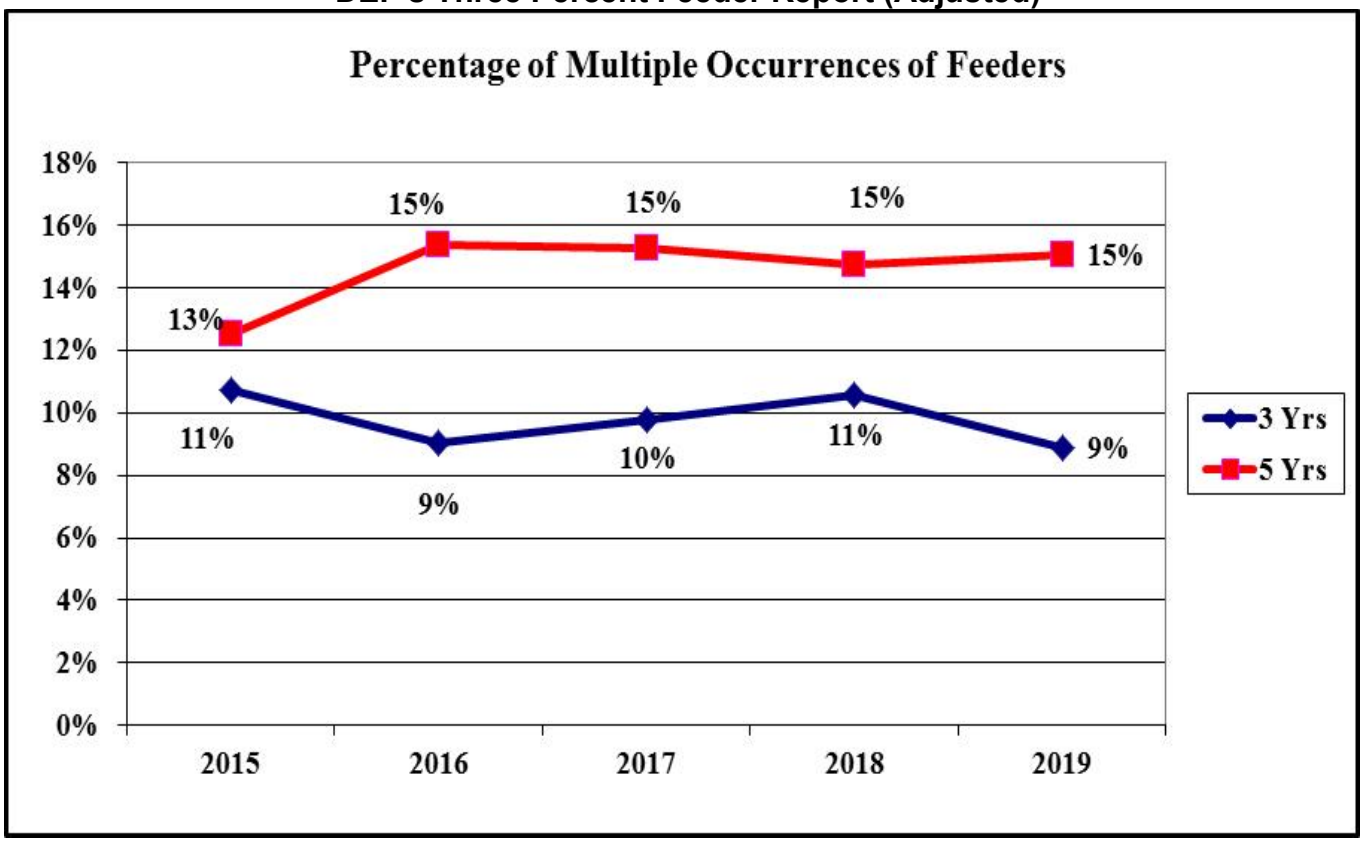
	2015	2016	2017	2018	2019
Highest CEMI5	North Coastal	North Coastal	North Coastal	North Coastal	North Coastal
Lowest CEMI5	North Central	North Central	South Coastal	North Central	South Coastal

Source: DEF's 2015-2019 distribution service reliability reports.

Figure 3-7 shows the fraction of multiple occurrences of feeders using a three-year and five-year basis. During the period of 2015 to 2019, the five-year fraction of multiple occurrences is trending upward as the three-year fraction of multiple occurrences is trending downward. The Three Percent Feeder Report lists the top 3 percent of feeders with the most feeder outage events. The fraction of multiple occurrences is calculated from the number of recurrences divided by the number of feeders reported.

Four of DEF's feeders have been on the Three Percent Feeder Report for the last two years consecutively. The outages varied from equipment failure, animals, vehicular accident, and vegetation. DEF replaced the failing equipment, trimmed trees, and performed infrared scans on the feeders. All issues found during the infrared scans were corrected. DEF is also using radio frequency technology to assist in detecting issues with the feeders. DEF explained radio frequency identifies the presence of arcing before it is visible to infrared or the unaided eye. The presence of arcing signals potential risks to reliability and identifying these in advance may allow DEF to mitigate the hazards earlier.

Figure 3-7
DEF's Three Percent Feeder Report (Adjusted)

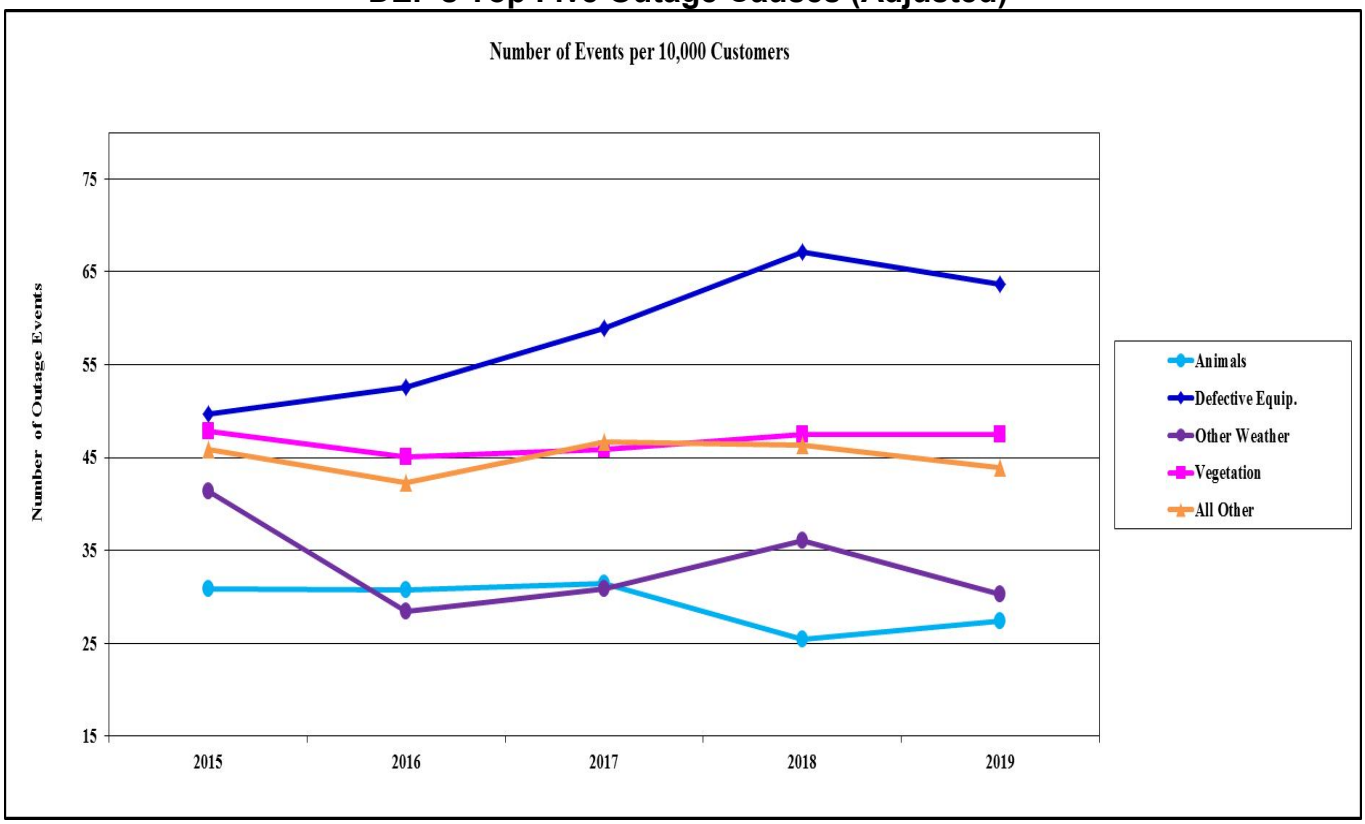


Source: DEF's 2015-2019 distribution service reliability reports.

Figure 3-8 shows the top five causes of outage events on DEF's distribution system normalized to a 10,000-customer base. The Figure is based on DEF's adjusted data and represents approximately 95 percent of the top 10 causes of outage events that occurred during 2019. For the five-year period, the top five causes of outage events were "Defective Equipment" (28 percent), "Vegetation" (21 percent), "Other Causes" (20 percent), "Other Weather" (14 percent) , and "Animals" (13 percent) on a cumulative basis. The outage events caused by "Other Weather," and "Animals" are trending downward even though the "Other Weather" category had a 11 percent decrease and "Animals" category had an 14 percent increase in 2019. DEF reported that it prioritizes the reliability improvements action plan by balancing historical and current year performance. In addition, current year performance is monitored monthly to identify emergent and seasonal issues including load balancing for cold weather and the need for foot patrols of devices experiencing multiple interruptions.

DEF will continue several programs that help mitigate outages. The Self-Optimizing Grid Team program will help reduce the impact of all types of outages. The Targeted Underground program will reduce the impact of "Vegetation," "Other Weather," and "Animals" related outages. The Transformer Retrofit Program will reduce the risk of "Defective Equipment" and "Animals" related outages. The Deteriorated Conductor Program will help mitigate the outages caused by "Defective Equipment," "Vegetation," "Animals," and "Other Weather" outage causes. In addition, DEF has five other programs to help reduce outages from "Defective Equipment," "Other Weather," "Animals," and "Vegetation."

Figure 3-8
DEF's Top Five Outage Causes (Adjusted)



Source: DEF's 2015-2019 distribution service reliability reports.

Observations: DEF's Adjusted Data

DEF's MAIFIe and the Three-Year Percent of Multiple Feeder Outage Events are trending downward over the past five years. The SAIDI, CAIDI, CEMI5, L-Bar, and the Five-Year Percent of Multiple Feeder Outage Events are all trending upward over the five-year period. It appears that DEF's SAIFI remains relativity flat over the same period. All of the reliability indices, except for CEMI5, L-Bar, and the Five-Year Percent of Multiple Feeder Outage Events, had decreased from 2018 to 2019. The results for the North Coastal Region have continually demonstrated the highest (poorest) service reliability indices of the four regions within DEF for the past five years. The North Coastal region is predominantly a rural area and has more square miles compared to DEF's other service territories.

DEF reported that it saw a drop in Excluded Weather SAIDI compared to the prior three years. The drop in Excluded Weather was a result of the decrease in intensity and number of "Named Storms" that made landfall. Even with the decrease in adjusted SAIDI, there were eight days in 2019 that increased the SAIDI minutes. The outages for those days were weather related that did not meet the exclusions identified in the Rule. In addition, DEF reported the two named storms that it experienced caused increases to its SAIDI minutes in 2019. In 2019, DEF continued work targeting the North Coastal region. The following are the completed projects:

- Reconductor projects for 8 miles
- Retrofitted 3,000 pole mounted transformers
- Underground 8 miles of lines
- Installation of 64 electronic reclosers
- Line patrols (visual and infrared) of the feeders

The following projects are planned in 2020:

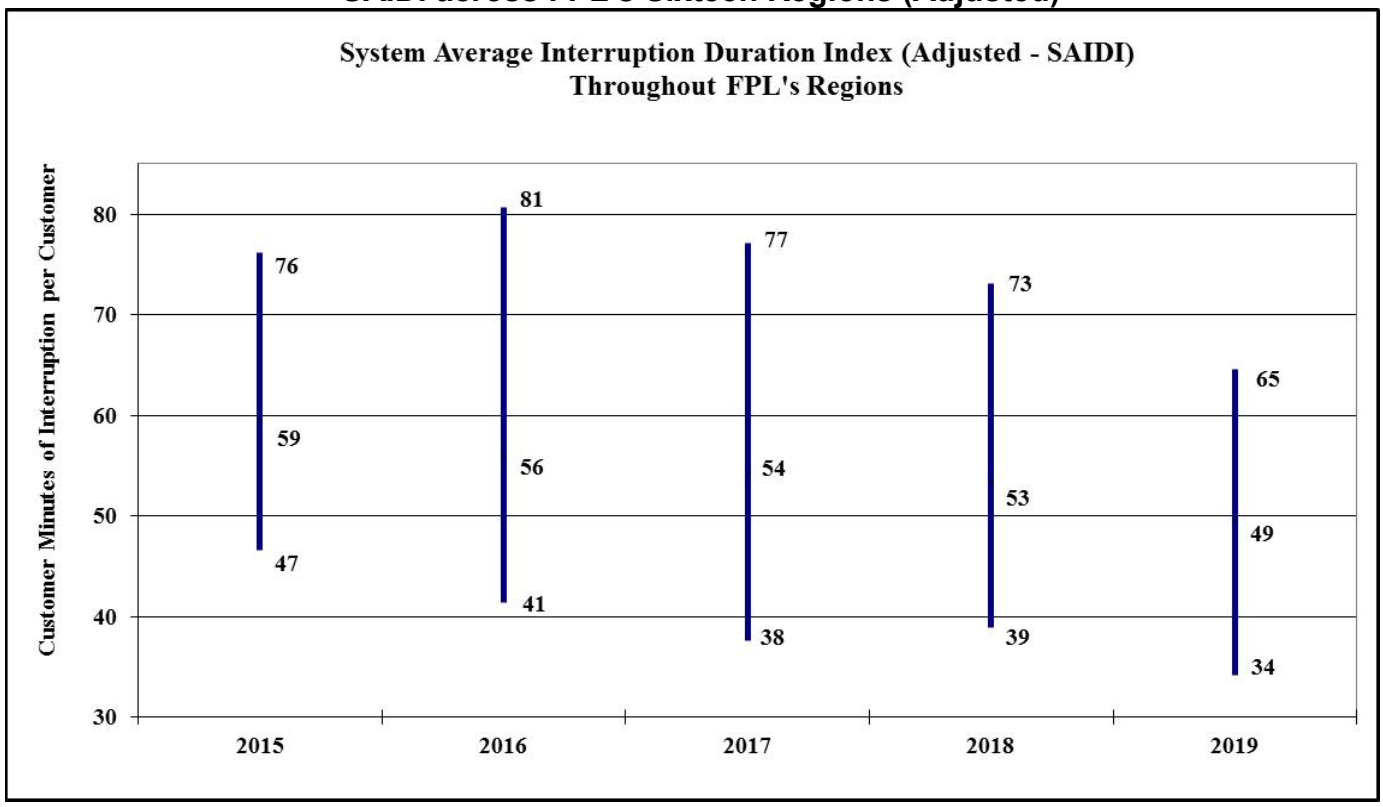
- Reconductor projects for 28 miles
- Retrofitting 800 pole mounted transformers
- Undergrounding 13 miles of lines
- Installation of 44 electronic reclosers
- Line patrols (visual and infrared) of the feeders

To help improve reliability to its customers, DEF has initiated a targeted undergrounding program. DEF reports the primary purpose of this program is to attempt to eliminate tree and debris related outages. The program is focused in heavily vegetated neighborhoods prone to power outages. The conversion of overhead laterals to underground facilities should decrease outages, reduce momentary interruptions, improve major storm restoration time, improve customer satisfaction, and reduce costs. In 2019, DEF completed three laterals projects converting 19.88 miles of overhead laterals to underground. There was another project planned for completion in 2019; however, DEF reported delays in securing easements from the customers. Currently, the easements have been secured and this project should be completed in 2020. Also in 2020, DEF is planning to complete 220 lateral projects converting 45 miles of overhead laterals to underground.

Florida Power & Light Company: Adjusted Data

Figure 3-9 shows the highest, average, and lowest adjusted SAIDI recorded across FPL's system that encompasses four management regions with 16 service areas. The highest and lowest SAIDI values are the values reported for a particular service area. FPL had an overall decrease of 4 minute (8 percent) to its average SAIDI results for 2019 compared to 2018. The average SAIDI appears to be trending downward over the five-year period of 2015 to 2019. The Manasota region had the best SAIDI results for 2019.

Figure 3-9
SAIDI across FPL's Sixteen Regions (Adjusted)



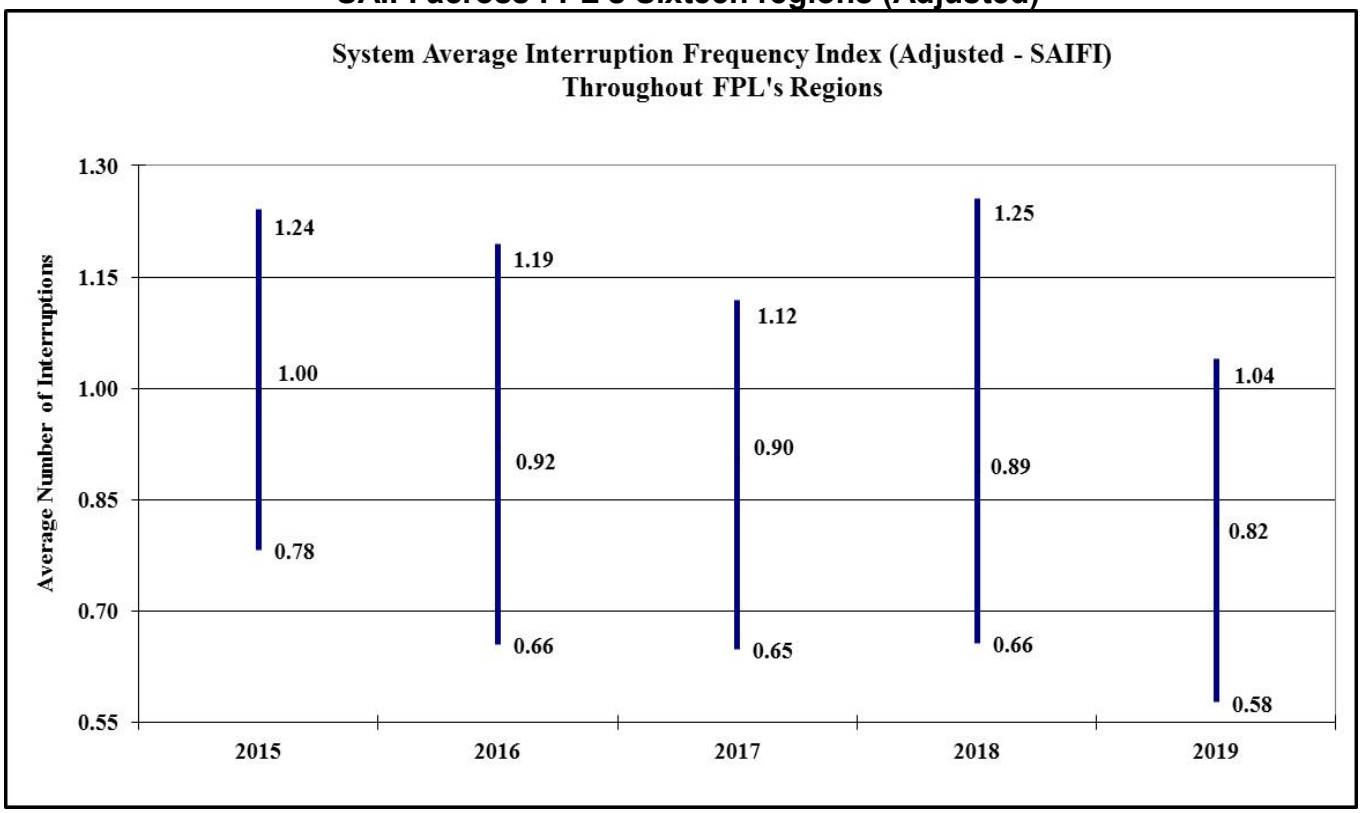
FPL's Regions with the Highest and Lowest Adjusted SAIDI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest SAIDI	South Dade	Treasure Coast	Toledo Blade	North Florida	Central Broward
Lowest SAIDI	Central Dade	Central Dade	Pompano	North Broward	Manasota

Source: FPL's 2015-2019 distribution service reliability reports.

Figure 3-10 is a chart of the highest, average, and lowest adjusted SAIFI across FPL's system. FPL had a decrease in the system average results to 0.82 outages in 2019, compared to 0.89 outages in 2018, which is a 9 percent decrease. FPL reported a decrease in the highest SAIFI of 1.04 interruptions in 2019 compared to 1.25 interruptions in 2018. The region reporting the lowest adjusted SAIFI for 2019 was Manasota at 0.58 interruptions compared to 0.66 interruptions in the North Broward region in 2018. During the period of 2015 to 2019 the highest, average, and lowest SAIFI appears to be trending downward.

Figure 3-10
SAIFI across FPL's Sixteen regions (Adjusted)



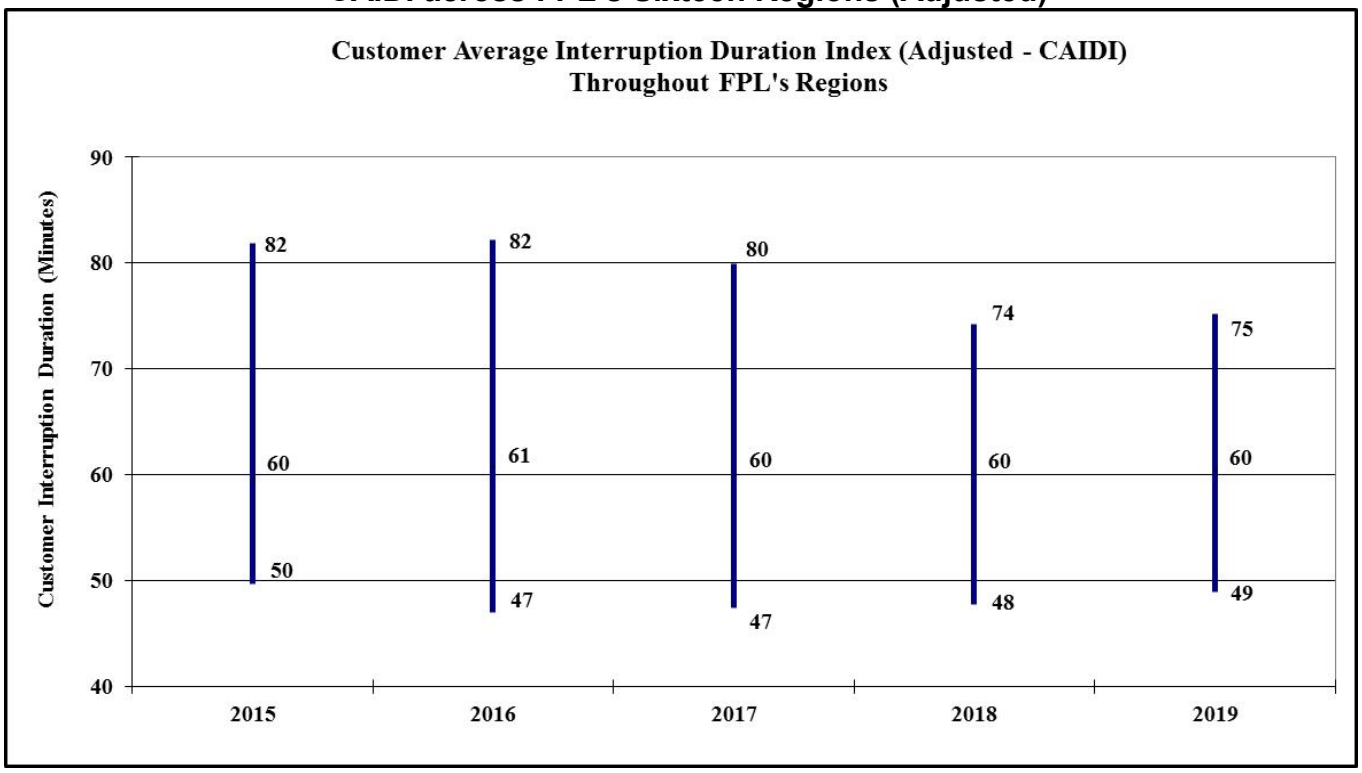
FPL's Regions with the Highest and Lowest Adjusted SAIFI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest SAIFI	West Dade	Treasure Coast	Toledo Blade	North Florida	North Florida
Lowest SAIFI	Central Dade	Central Dade	Pompano	North Broward	Manasota

Source: FPL's 2015-2019 distribution service reliability reports.

Figure 3-11 depicts FPL's highest, average, and lowest CAIDI expressed in minutes. FPL's adjusted average CAIDI did not decrease or increase and remained at 60 minutes for both 2018 and 2019. The average duration of CAIDI remains relatively flat. For 2019, the West Palm service area reported the lowest duration of CAIDI at 49 minutes. The highest duration of CAIDI was 75 minutes for the South Dade service area for 2019.

Figure 3-11
CAIDI across FPL's Sixteen Regions (Adjusted)



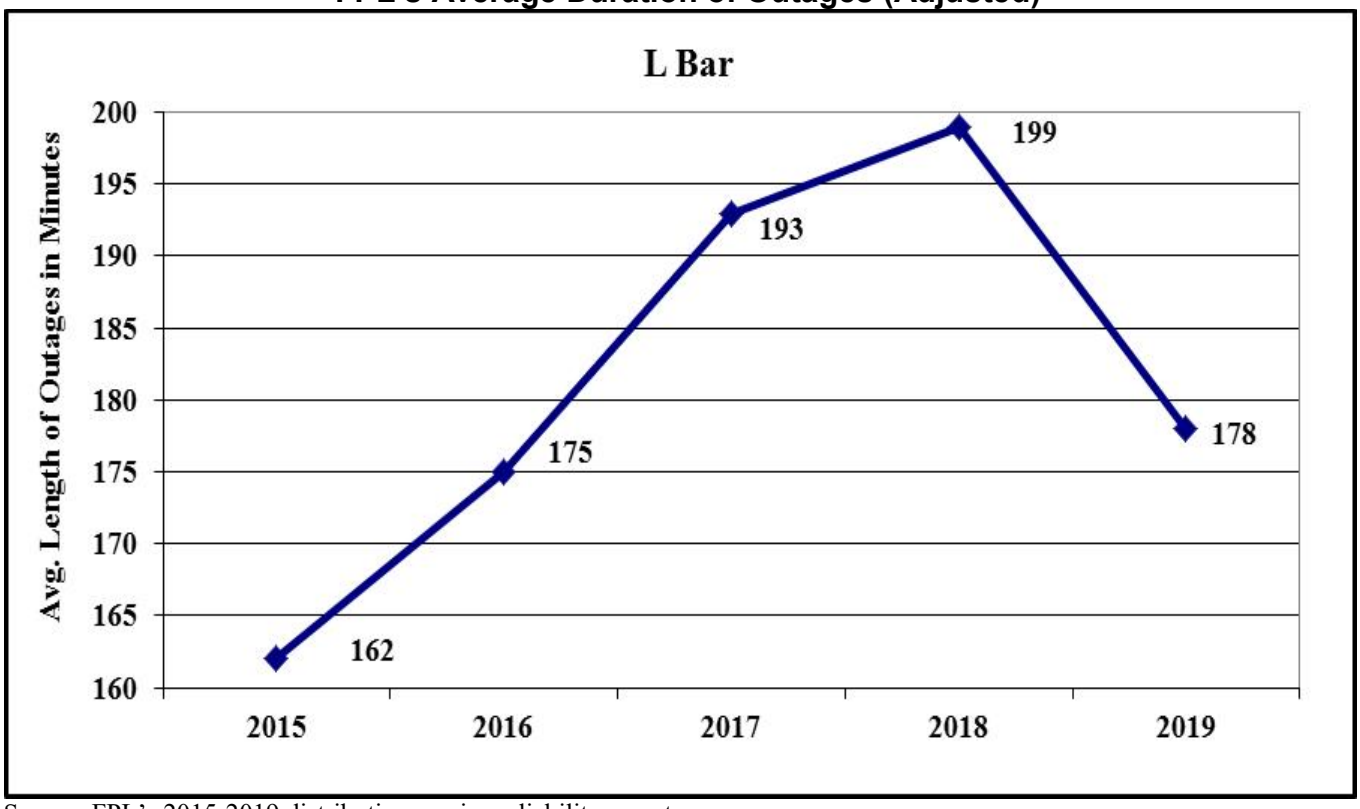
FPL's Regions with the Highest and Lowest Adjusted CAIDI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest CAIDI	North Dade	North Dade	South Dade	North Dade	South Dade
Lowest CAIDI	Boca Raton	Boca Raton	West Palm	West Palm	West Palm

Source: FPL's 2015-2019 distribution service reliability reports.

Figure 3-12 depicts the average length of time that FPL spends recovering from outage events, excluding hurricanes and other extreme outage events and is the index known as L-Bar (Average Service Restoration Time). FPL had an 11 percent decrease in L-Bar from 199 minutes in 2018 to 178 minutes in 2019. However, there is a 10 percent overall increase since 2015 and the L-Bar is trending upward, indicating FPL is spending more time restoring service to the last customer for that given outage.

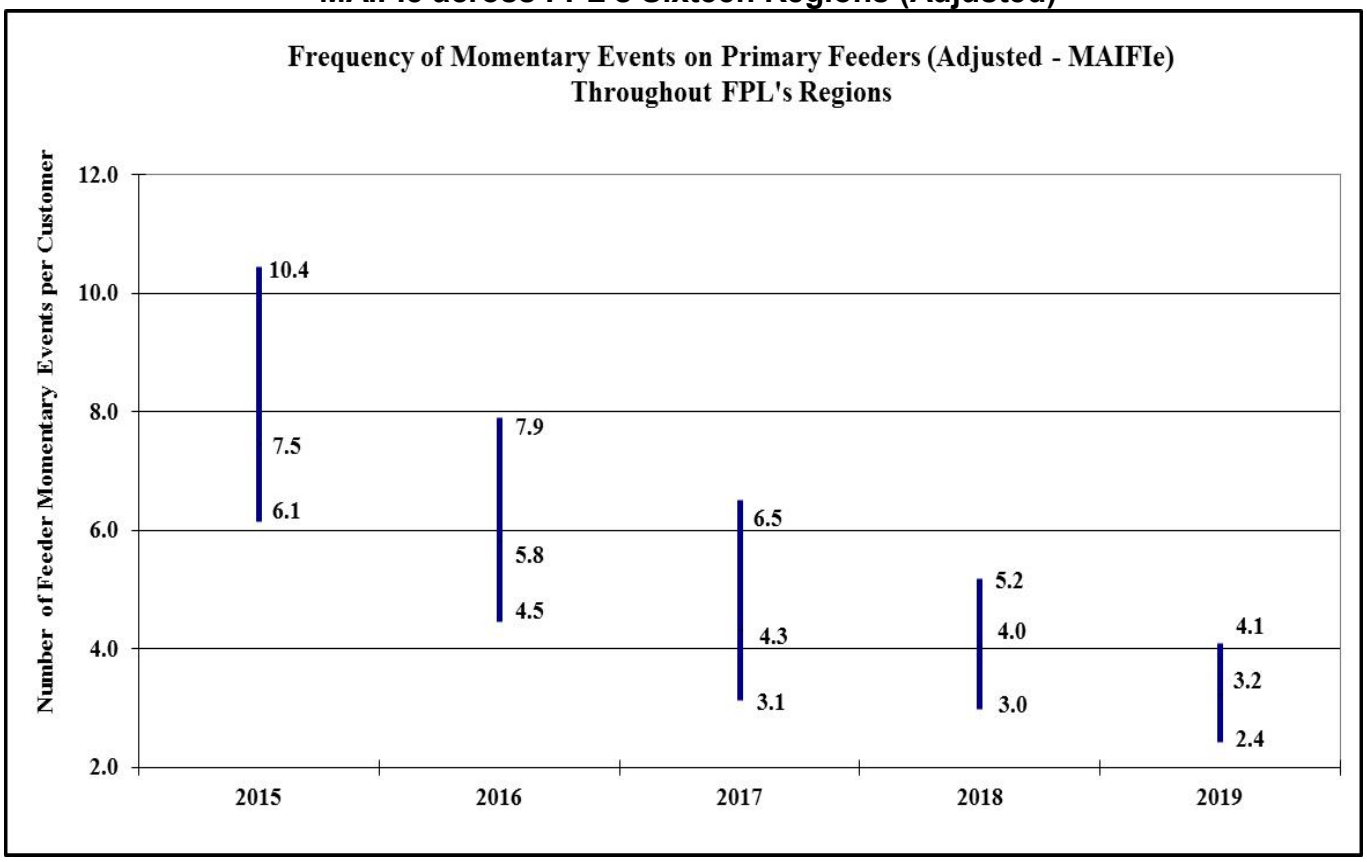
Figure 3-12
FPL's Average Duration of Outages (Adjusted)



Source: FPL's 2015-2019 distribution service reliability reports.

Figure 3-13 is the highest, average, and lowest adjusted MAIFIe recorded across FPL's system. FPL's Wingate, Toledo Blade, and West Palm service areas have experienced the least reliable MAIFIe results of the 16 service areas of FPL since 2015. The Pompano, Central Dade, and Manasota service areas had the fewest momentary events since 2015. The results have been trending downward (improving) over the last five years. There is a 20 percent decrease in the average MAIFIe results from 2018 to 2019. As a note, FPL calculates MAIFIe differently. Specifically, if a feeder begins in one region and crosses another region, all customers on that feeder are impacted by the MAIFIe event and are counted in the starting region. Therefore, the number of customers per region will be different.

Figure 3-13
MAIFIe across FPL's Sixteen Regions (Adjusted)



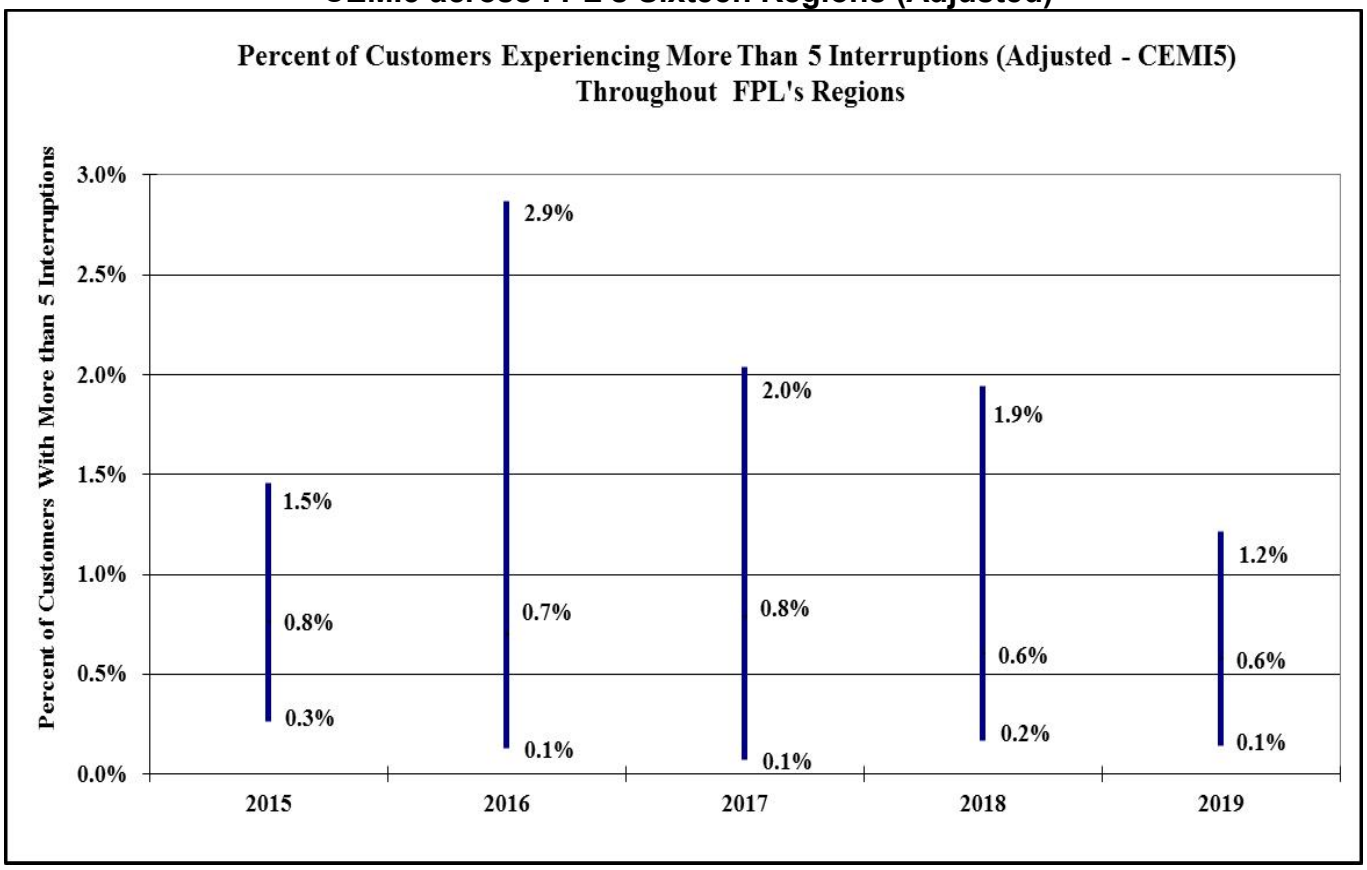
FPL's Regions with the Highest and Lowest Adjusted MAIFIe Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest MAIFIe	Wingate	Wingate	Wingate	Toledo Blade	West Palm
Lowest MAIFIe	Manasota	Pompano	Pompano	Central Dade	Manasota

Source: FPL's 2015-2019 distribution service reliability reports.

Figure 3-14 shows the highest, average, and lowest adjusted CEMI5. FPL's customers with more than five interruptions per year appear to be slightly trending downward. The service areas experiencing the highest CEMI5 over the five-year period appear to fluctuate among West Dade, Treasure Coast, West Palm, and Toledo Blade. Pompano, South Broward (Gulf Stream), Brevard, and Central Dade are reported as having the lowest percentages in the last five years. The average CEMI5 result for 2019 was 0.6 percent, which remains the same as in 2018.

Figure 3-14
CEMI5 across FPL's Sixteen Regions (Adjusted)



FPL's Regions with the Highest and Lowest Adjusted CEMI5 Distribution Reliability Performance by Year

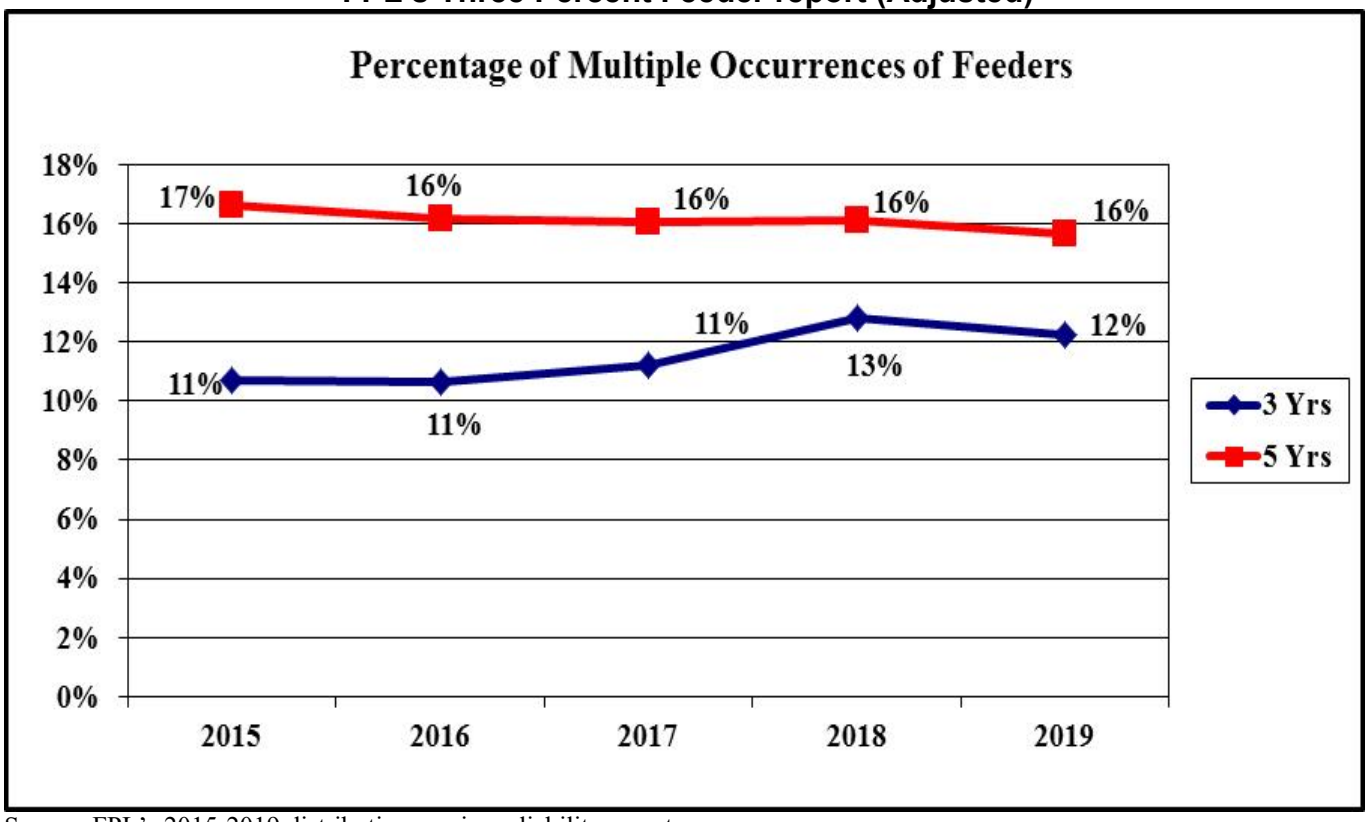
	2015	2016	2017	2018	2019
Highest CEMI5	West Dade	Treasure Coast	West Palm	Toledo Blade	Treasure Coast
Lowest CEMI5	Brevard	Gulf Stream	Pompano	South Broward	Central Dade

Source: FPL's 2015-2019 distribution service reliability reports.

Figure 3-15 is a graphical representation of the percentage of multiple occurrences of FPL's feeders and is derived from The Three Percent Feeder Report, which is a listing of the top three percent of problem feeders reported by the Utility. The fraction of multiple occurrences is calculated from the number of recurrences divided by the number of feeders reported. The three-year percentage had a decrease to 12 percent in 2019 from 13 percent in 2018. The five-year percentage was 16 percent in 2018 and 2019. The five-year percentage appears to be trending downward as the three-year percentage appears to be trending upward.

Staff notes ten feeders were on the Three Percent Feeder Report the last two years. FPL reported that visual/thermovision assessment follow-up work is scheduled for two feeders, repairs have been completed on six feeders, and automated feeder switches will be installed on seven feeders. FPL also reported that in 2019, approximately 157 miles of trimming was performed on these nine feeders, which is about 90 percent of the feeders' overhead facilities. FPL will continue repairs on four of the feeders and plans to harden four additional feeders during 2020 through 2022.

Figure 3-15
FPL's Three Percent Feeder report (Adjusted)

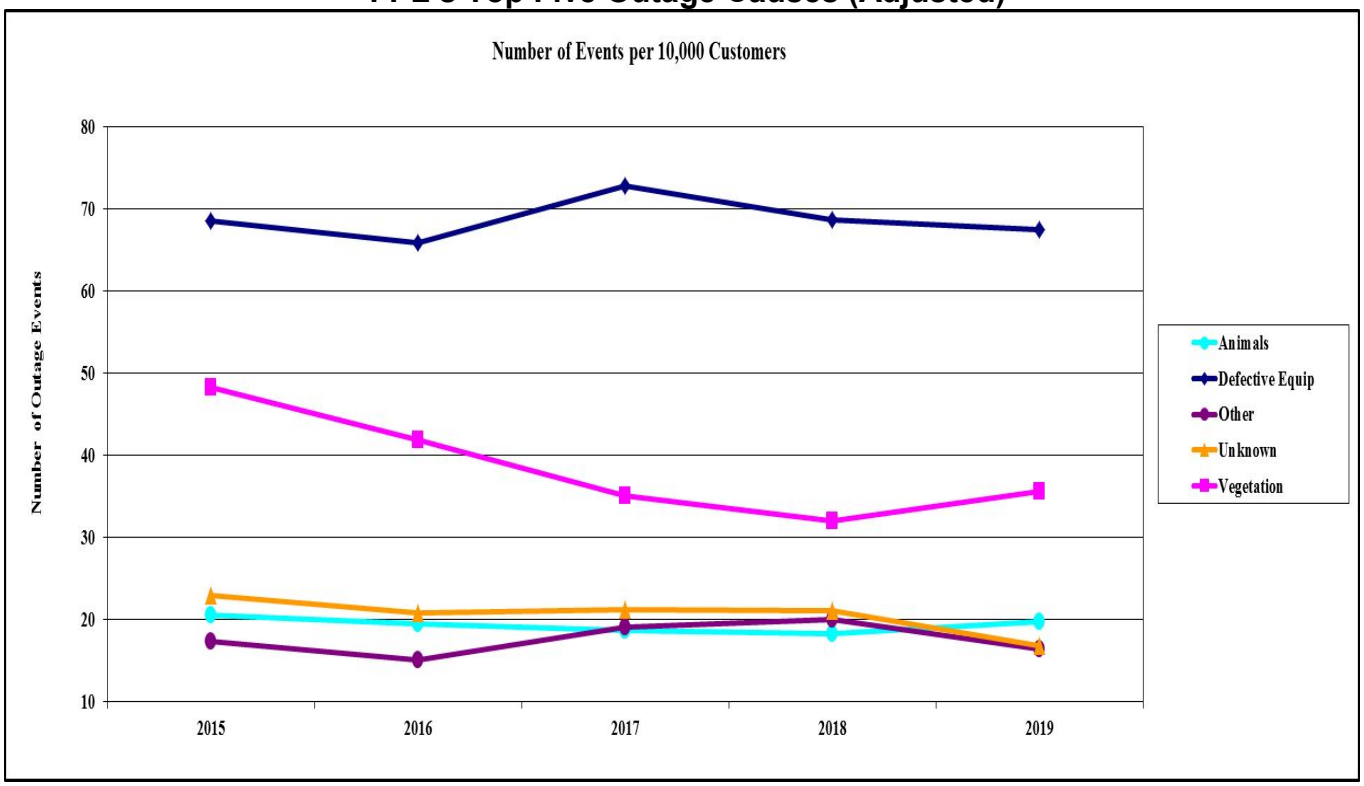


Source: FPL's 2015-2019 distribution service reliability reports.

Figure 3-16 depicts the top five causes of outage events on FPL's distribution system normalized to a 10,000-customer base. The graph is based on FPL's adjusted data of the top 10 causes of outage events. For the five-year period, the five top causes of outage events included "Defective Equipment" (37 percent), "Vegetation" (20 percent), "Animals" (11 percent), "Unknown Causes" (9 percent), and "Other Causes" (9 percent) on a cumulative basis. The outage events due to "Vegetation" and "Unknown Causes" are trending downward as the "Defective Equipment" and "Animals" categories are remaining relatively flat. The category "Other Causes" is slightly trending upward. The category "Defective Equipment" dominates the highest percentage of outage causes throughout the FPL regions and there was a 2 percent increase in the number of outages from 2018 to 2019.

Annually, FPL evaluates its current reliability remediation programs and verifies the program's need and/or existence. In addition, FPL proposes new reliability remediation programs to improve its reliability performance concentrating on the highest cause codes and those cause codes that have shown trends needing attention. FPL has 21 reliability programs listed for its 2020 budget. The programs include: distribution automation, system expansion, reduce the number of direct buried feeder and lateral cables, install feeder line covers to reduce vegetation related interruptions, and replace oil circuit reclosers with electronic reclosers. Sixteen programs are designed to improve the "Defective Equipment" cause code. Eleven programs will improve the "Vegetation" cause code and eight programs will improve the "Animals" cause code, both of which had increases in 2019.

Figure 3-16
FPL's Top Five Outage Causes (Adjusted)



Source: FPL's 2015-2019 distribution service reliability reports.

Observations: FPL's Adjusted Data

The least reliable overall results seem to fluctuate between FPL's different service areas, as do the best service reliability results. The 2019 report shows the system indices for SAIDI, SAIFI, CAIDI, MAIFe, CEMI5, L-Bar, and the Three-Year Percentages of Multiple Feeder Outage events are lower or better than the 2018 results. There was no change in the Five-Year Percentages of Multiple Feeder Outage events results. FPL explains that it evaluates its current reliability programs annually to verify the program's need and/or existence. In addition, FPL proposes new reliability programs to improve its reliability performance concentrating on the highest cause codes and those cause codes that have shown trends needing attention. The cause codes that FPL will be concentrating on to improve are "Equipment Failures," "Unknown Causes," and "Other Causes" of outages. FPL is also continuing to increase the utilization of automation to address feeder interruptions.

The North Florida region has had the highest SAIFI for two years consecutively. The SAIFI value for the North Florida region decreased by 17 percent in 2019. FPL stated that in 2019, the North Florida region, had 1,370 miles (57 percent) of overhead primary lines trimmed. In addition, FPL is installing 53 additional automated feeder switches in North Florida. FPL addressed 16 feeders through FPL's priority feeder program, completed overhead line inspections, and completed 120 visual Feeder Ownership Program assessments in the region.

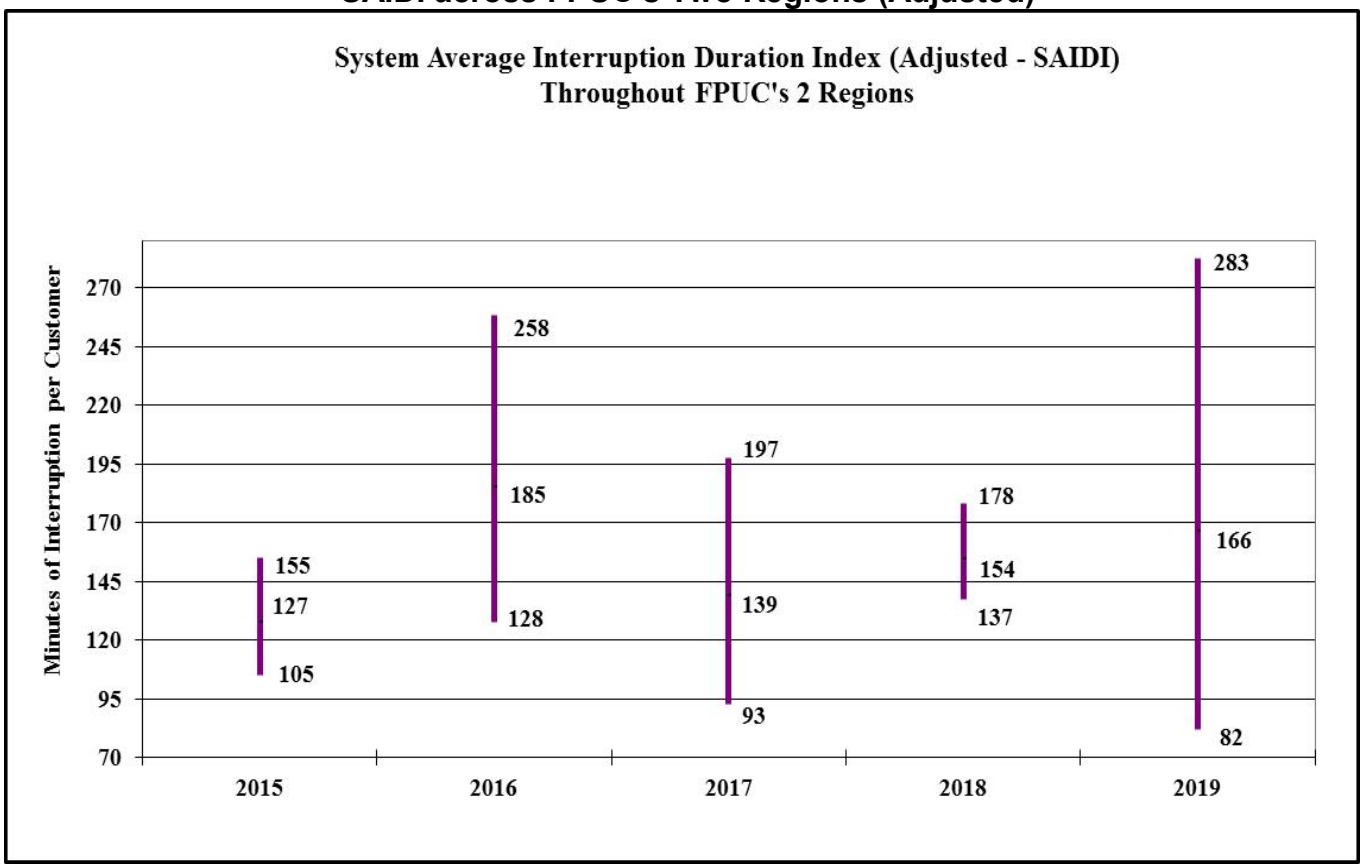
As a result of lessons learned from Hurricanes Matthew and Irma, FPL initiated a three year Storm Secure Underground Program pilot. This Program targets certain overhead laterals, which were impacted by recent storms, and have a history of vegetation related outages and other reliability issues. To date, FPL has completed 33 laterals conversions, which is approximately 12 miles. FPL reported that of the 117 laterals in the 2019 plan, 103 are scheduled to be completed between 2020 and 2022, 6 are in the pre-construction stage, 8 are delayed due to customer negotiations, and 1 lateral was removed and replaced by a feeder as part of area re-development. FPL has indicated that this three-year pilot Program will target less than 1 percent of its overall overhead laterals in its system. In addition, FPL reported that the increase in planned projects allows FPL to take advantage of experiences gained, incorporate lessons learned, and convert enough laterals to achieve a statistically valid sample. As of March 1, 2020, none of the 33 laterals completed have experienced an outage. In comparison, the 33 laterals experienced 82 interruptions, in total, from 2015 until they were converted.

Florida Public Utilities Company: Adjusted Data

FPUC has two electric divisions, the Northwest division, referred to as Marianna (NW) and the Northeast division, referred to as Fernandina Beach (NE). Each division's results is reported separately because the two divisions are 250 miles apart and not directly interconnected. Although the divisions may supply resources to support one another during emergencies, each division has diverse situations to contend with, making it difficult to compare the division's results and form a conclusion as to response and restoration time.

Figure 3-17 shows the highest, average, and lowest adjusted SAIDI values recorded by FPUC's system. The data shows the average SAIDI index is trending upward for the five-year period of 2015 to 2019 and there was an 8 percent increase from 2018 to 2019.

Figure 3-17
SAIDI across FPUC's Two Regions (Adjusted)



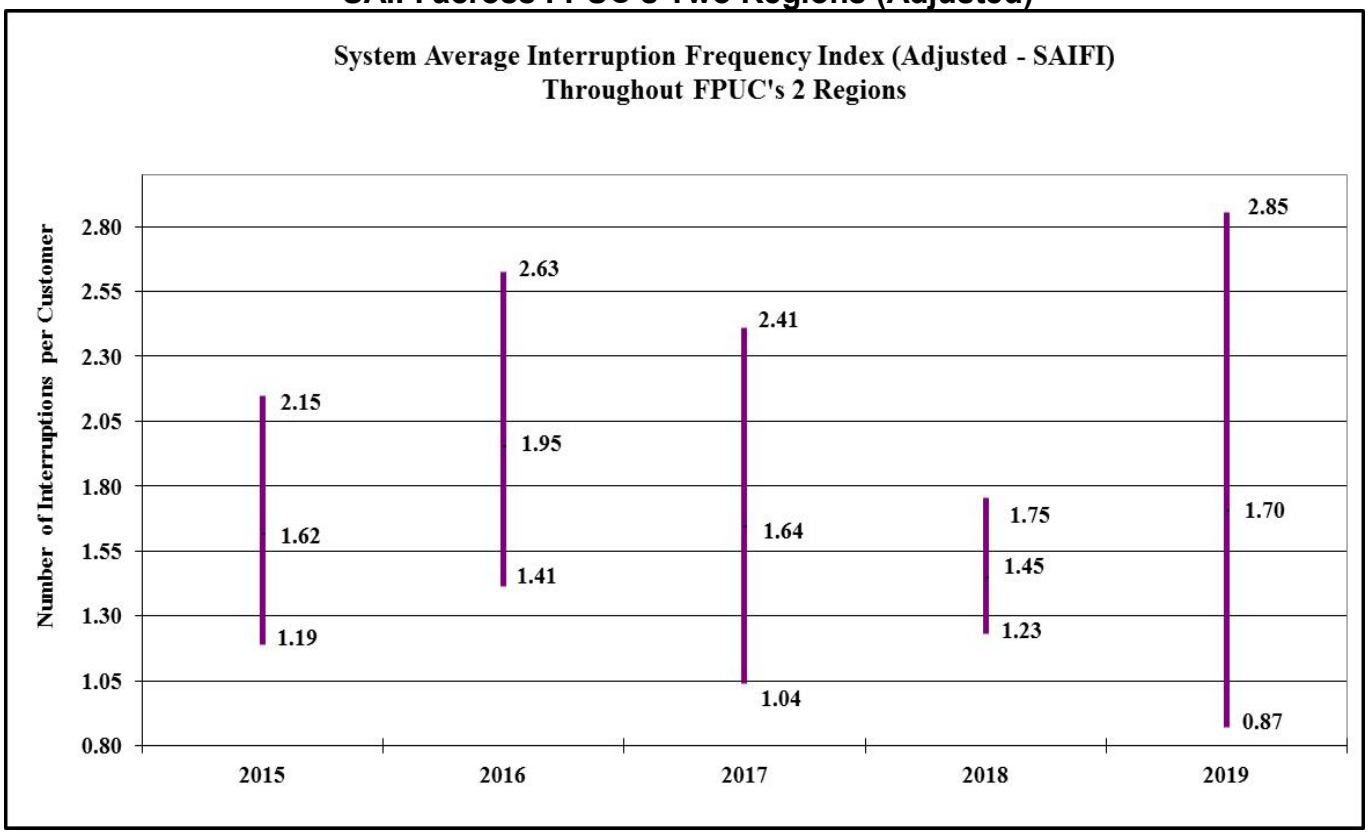
FPUC's Regions with the Highest and Lowest Adjusted SAIDI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest SAIDI	Marianna (NW)	Marianna (NW)	Marianna (NW)	Marianna (NW)	Marianna (NW)
Lowest SAIDI	Fernandina(NE)	Fernandina(NE)	Fernandina(NE)	Fernandina(NE)	Fernandina(NE)

Source: FPUC's 2015-2019 distribution service reliability reports.

Figure 3-18 shows the adjusted SAIFI across FPUC's two divisions. The data depicts a 17 percent increase in the 2019 average SAIFI reliability index from 2018. The data for the average and maximum SAIFI values are trending downward as the minimum SAIFI value is trending upward over the five-year period of 2015 to 2019.

Figure 3-18
SAIFI across FPUC's Two Regions (Adjusted)



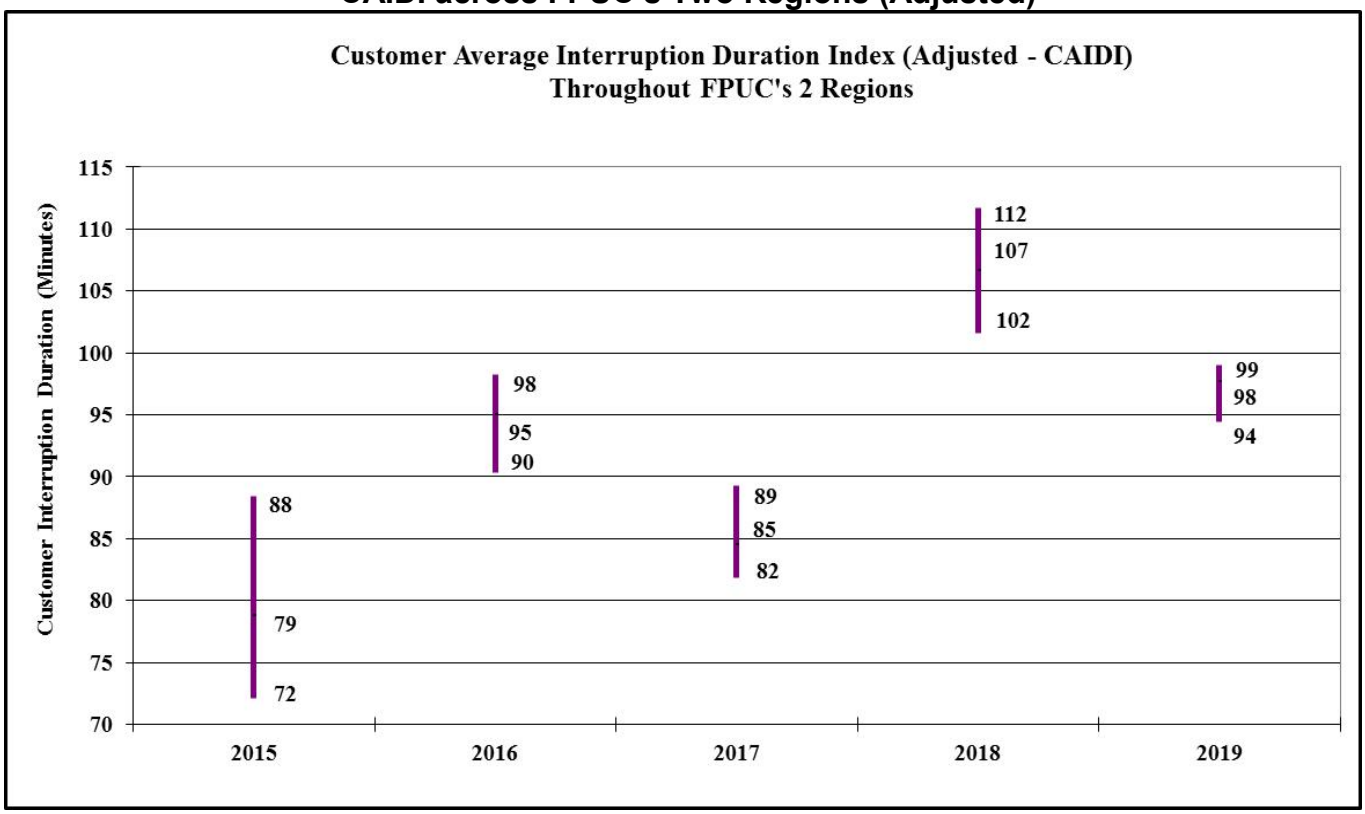
FPUC's Regions with the Highest and Lowest Adjusted SAIFI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest SAIFI	Marianna (NW)	Marianna (NW)	Marianna (NW)	Marianna (NW)	Marianna (NW)
Lowest SAIFI	Fernandina(NE)	Fernandina(NE)	Fernandina(NE)	Fernandina(NE)	Fernandina(NE)

Source: FPUC's 2015-2019 distribution service reliability reports.

Figure 3-19 shows the highest, average, and lowest adjusted CAIDI values across FPUC's system. FPUC's data shows the average CAIDI value decreased by 8 percent for 2019 (98 minutes) when compared to 2018 (107 minutes). For the past five years, the maximum, the minimum, and the average CAIDI values are trending upward.

Figure 3-19
CAIDI across FPUC's Two Regions (Adjusted)



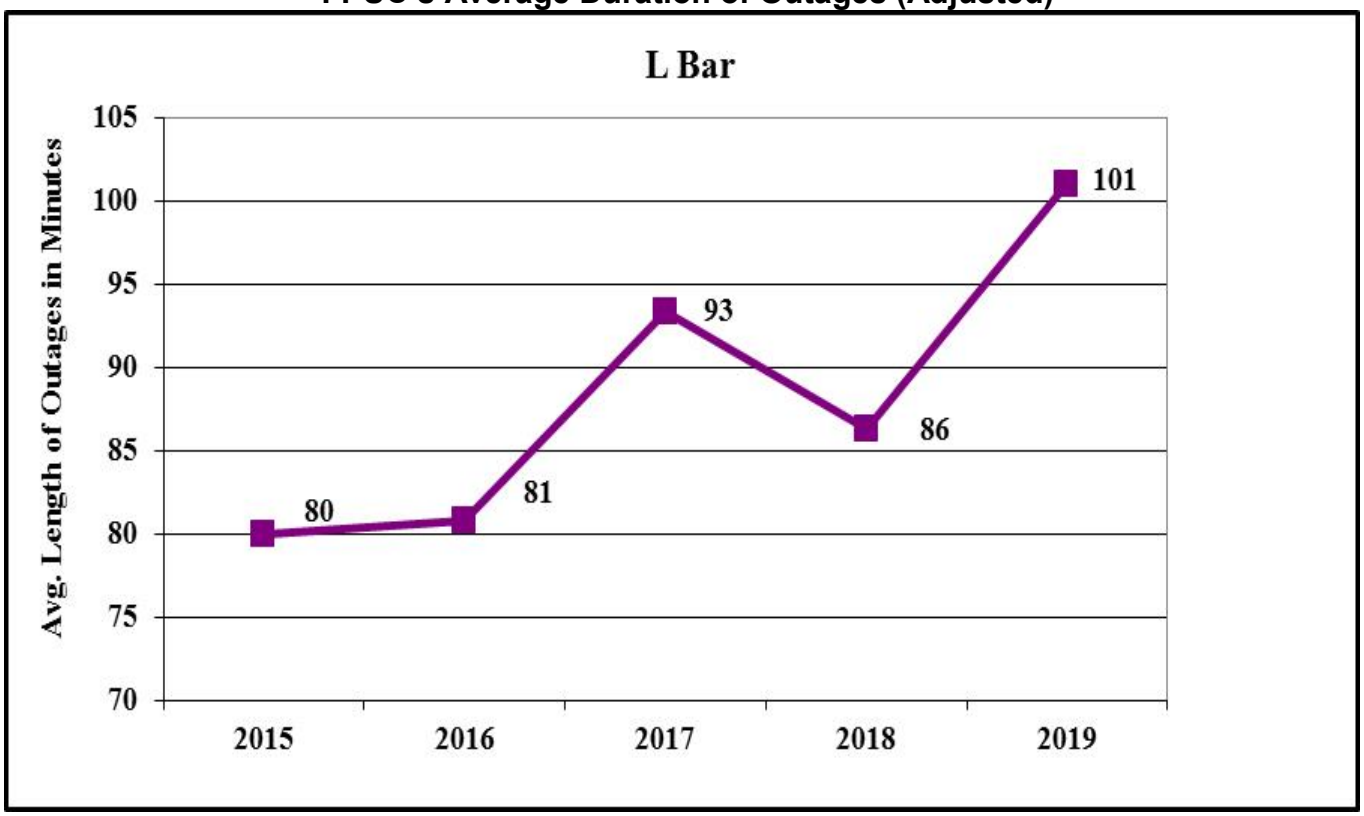
FPUC's Regions with the Highest and Lowest Adjusted CAIDI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest CAIDI	Fernandina(NE)	Marianna (NW)	Fernandina(NE)	Fernandina(NE)	Marianna (NW)
Lowest CAIDI	Marianna (NW)	Fernandina(NE)	Marianna (NW)	Marianna (NW)	Fernandina(NE)

Source: FPUC's 2015-2019 distribution service reliability reports.

Figure 3-20 is the average length of time FPUC spends recovering from outage events (adjusted L-Bar). There was a 17 percent increase in the L-Bar value from 2018 to 2019. The data for the five-year period of 2015 to 2019 suggests that the L-Bar index is trending upward indicating FPUC is taking additional time to restore service after an outage event.

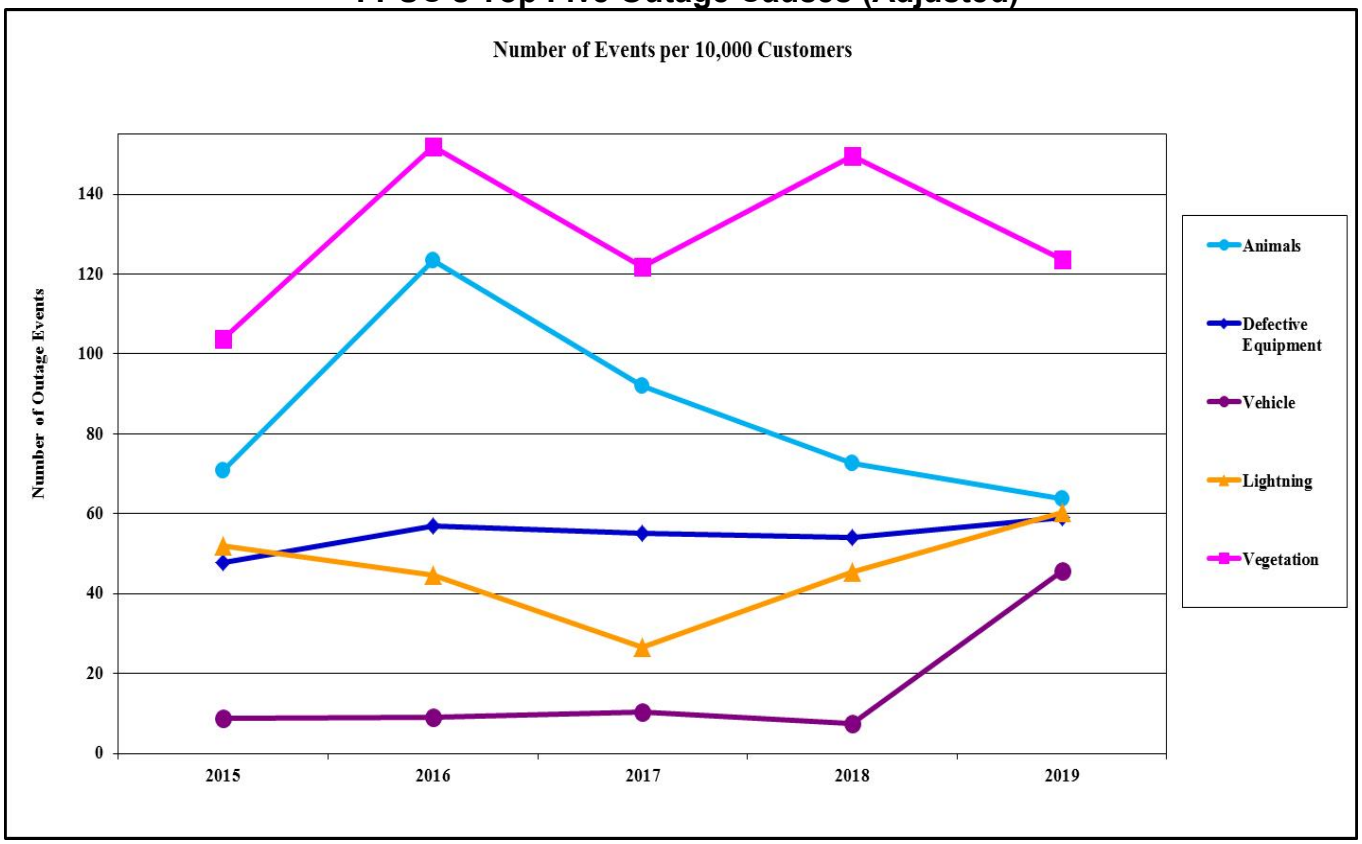
Figure 3-20
FPUC's Average Duration of Outages (Adjusted)



Source: FPUC's 2015-2019 distribution service reliability reports.

Figure 3-21 shows the top five causes of outage events on FPUC's distribution system normalized to a 10,000-customer base. The figure is based on FPUC's adjusted data of the top 10 causes of outages. For 2019, the top five causes of outage events were "Vegetation" (27 percent), "Animals" (14 percent), "Defective Equipment" (13 percent), "Lightning" (13 percent), and "Vehicle" (10 percent). These five factors represent 76 percent of the total adjusted outage causes in 2019. The "Vegetation" category is trending upward even though there was a 15 percent decrease from 2018 to 2019. The causes by "Defective Equipment," "Lightning," and "Vehicle" are also trending upward. "Defective Equipment" increased 12 percent from 2018 to 2019. The "Lightning" and "Vehicle" category increased 36 percent and 80 percent during the same time period, respectively. The "Animals" category caused outages is trending downward over the five-year period of 2015 to 2019 and there was a 10 percent decrease from 2018 to 2019.

Figure 3-21
FPUC's Top Five Outage Causes (Adjusted)



Source: FPUC's 2015-2019 distribution service reliability reports.

FPUC filed a Three Percent Feeder Report listing the top 3 percent of feeders with the outage events for 2019. FPUC has so few feeders that the data in the report has not been statistically significant. There were two feeders on the Three Percent Feeder Report, one in each division. The feeder from the Northeast division was listed on the report for the last five years.

Observations: FPUC's Adjusted Data

The SAIDI and SAIFI average indices have increased compared to 2018. For the five-year period of 2015 to 2019, the average index for SAIFI is trending downward as the SAIDI, CAIDI, and L-Bar are trending upward. FPUC reported that it continues to invest in its storm hardening initiatives, infrastructure improvements, and system upgrades in both divisions. FPUC believes this will generate reliability improvements in the future. The Utility reviewed its five-year reliability indicator trends, averages and outage causes, and determined the reliability indexes continue to be significantly influenced by weather. In addition to the weather having an impact on FPUC's service territories, FPUC reported that the effects of Hurricane Michael, which occurred in 2018, are still a major contributor to the increase in the reliability indices. Specifically, the Northwest division saw an increase in the number of outages due to many low hanging cables and telephone wires being damaged by debris hauling vehicles. This resulted in broken poles, conductors, and impaired equipment.

To improve its reliability, in 2018, FPUC planned to implement a new lateral protection strategy by installing cutout-mounted recloser units. This program deploys TripSaver cutout-mounted reclosers on the worst performing laterals over the last three years. The TripSaver recloser works the same as an electronic recloser but for a smaller number of customers. The reclosers offer protection to upstream customers by giving a utility the ability to isolate faults and shorten the outage time experienced by customers. In 2020, the project was continued in both divisions. However, FPUC experienced some protection issues in the Northeast division, which caused it to reconsider its implementation approach. FPUC is working with a device manufacturer to resolve the issues. In addition, FPUC is planning to implement SCADA enhancements in 2020 in the Northwest division and an Advanced Metering Infrastructure project for both divisions in 2024 to 2025.

In addition, to help mitigate the situation with vegetation caused outages, FPUC, in cooperation with its contractor, is currently studying possible changes to its vegetation management cycle to determine if a more efficient trim cycle is feasible. This will affect both the Northeast and Northwest divisions. To help mitigate the situation with animal caused outages, FPUC plans to continue to implement the standard practice of installing animal guards and covering riser wire between the cutout, arrester, and transformer. In addition, if metal brackets are in use, they will be replaced with fiberglass brackets to help control animal related outages. FPUC reported that the deployment of the TripSavers should also help with animal related outages.

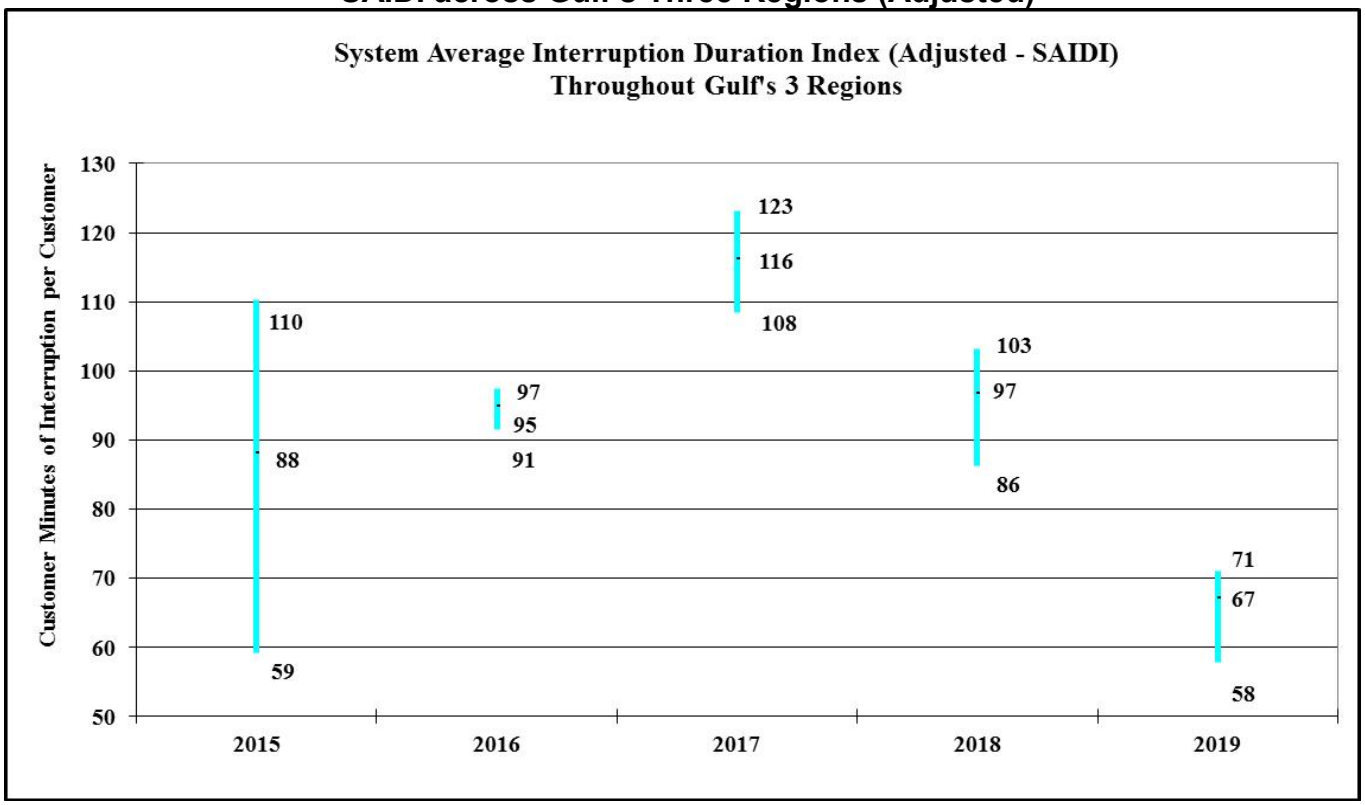
FPUC is not required to report MAIFIe or CEMI5 because Rule 25-6.0455, F.A.C., waives the requirement. The cost for the information systems necessary to measure MAIFIe and CEMI5 has a higher impact on small utilities compared to large utilities on a per customer basis.

Gulf Power Company: Adjusted Data

Gulf's service area includes much of the Florida panhandle and covers approximately 7,550 square miles in eight Florida counties – Bay, Escambia, Holmes, Jackson, Okaloosa, Santa Rosa, Walton, and Washington. This geographic area is divided into three regions known as the Western, Central, and Eastern. The region distribution metrics and overall distribution system metrics are presented in the following figures.

Figure 3-22 illustrates Gulf's SAIDI minutes, or the interruption duration minutes on a system basis. The chart depicts a 31 percent decrease in the average SAIDI in Gulf's combined regions when compared to the 2018 results. Gulf's 2019 average performance was 67 minutes compared to 97 minutes in 2018. The highest SAIDI value for 2018 was the Western region as the Central region had the best or lowest SAIDI value. The maximum, minimum, and average SAIDI indices are trending downward.

Figure 3-22
SAIDI across Gulf's Three Regions (Adjusted)



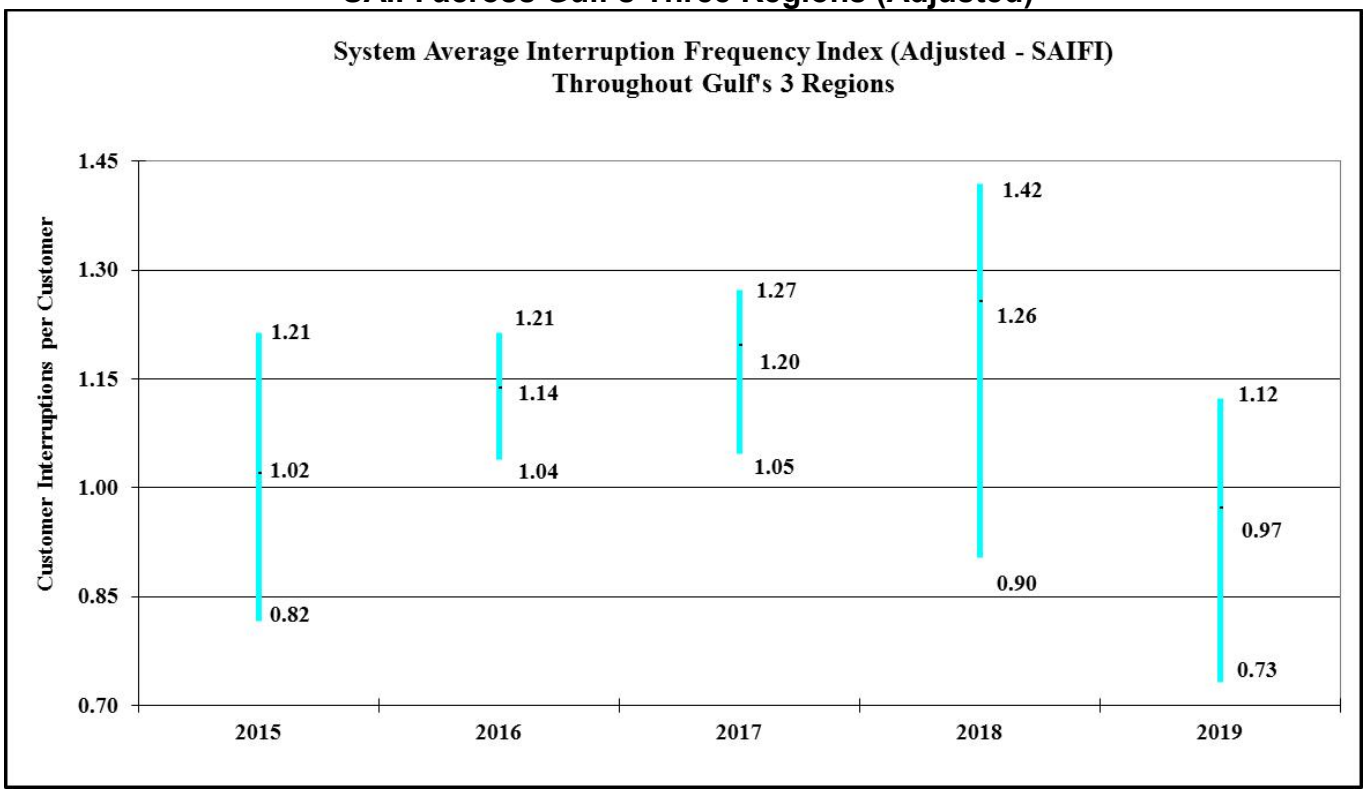
Gulf's Regions with the Highest and Lowest Adjusted SAIDI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest SAIDI	Western	Western	Western	Eastern	Western
Lowest SAIDI	Eastern	Central	Eastern	Central	Central

Source: Gulf's 2015-2019 distribution service reliability reports.

Figure 3-23 illustrates that Gulf's SAIFI had a 23 percent decrease in 2019 when compared to 2018. The highest SAIFI value for the past five years has fluctuated between the Eastern and Western regions. The lowest values appear to be in the Central region. The maximum and average SAIFI values appear to be trending upward while the minimum SAIFI value appears to be trending downward.

Figure 3-23
SAIFI across Gulf's Three Regions (Adjusted)



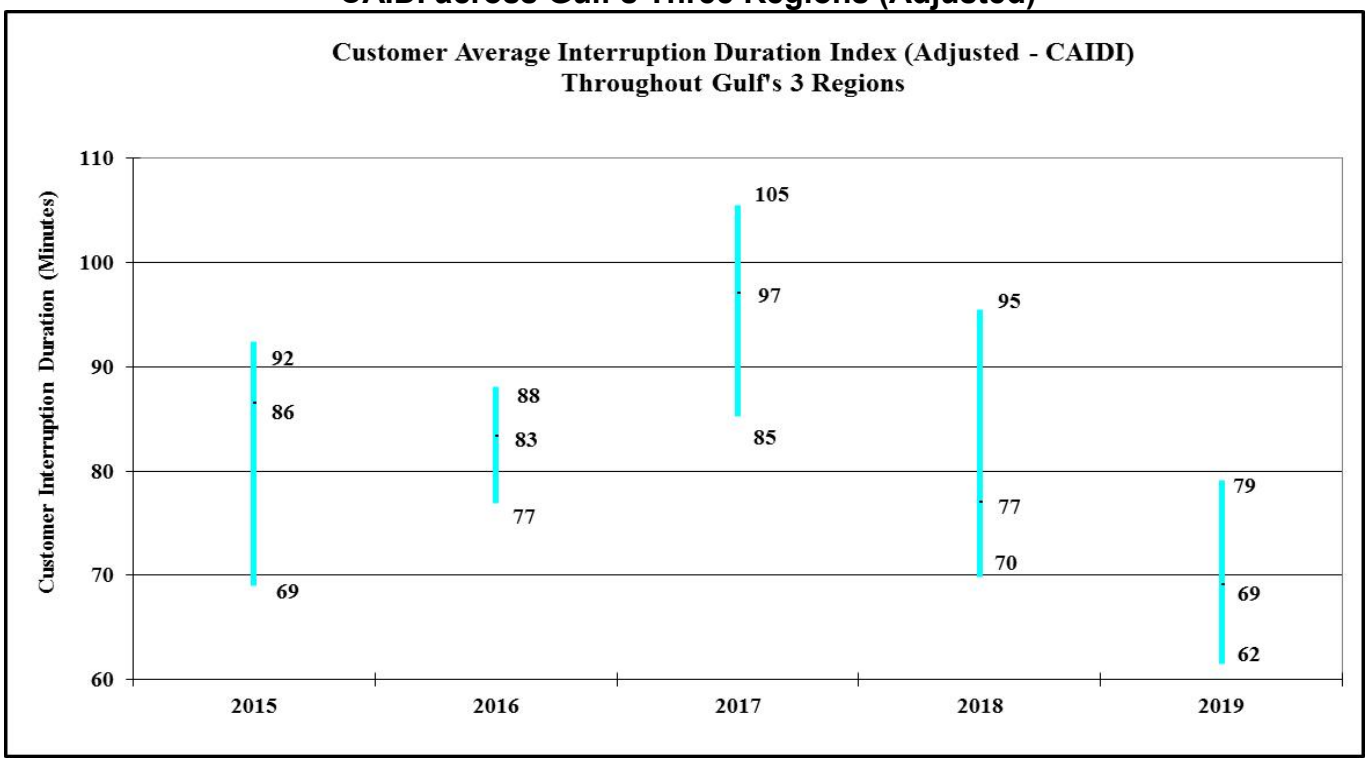
Gulf's Regions with the Highest and Lowest Adjusted SAIFI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest SAIFI	Western	Eastern	Eastern	Western	Eastern
Lowest SAIFI	Central	Central	Central	Central	Central

Source: Gulf's 2015-2019 distribution service reliability reports.

Figure 3-24 is Gulf's adjusted CAIDI. For 2019, the average CAIDI is 69 minutes and represents a 10 percent decrease from the 2018 value of 77 minutes. In 2019, the Central region continued to have the highest CAIDI value, as the Eastern region had the lowest CAIDI. Staff notes that the average, maximum, and minimum CAIDI values are trending downward.

Figure 3-24
CAIDI across Gulf's Three Regions (Adjusted)



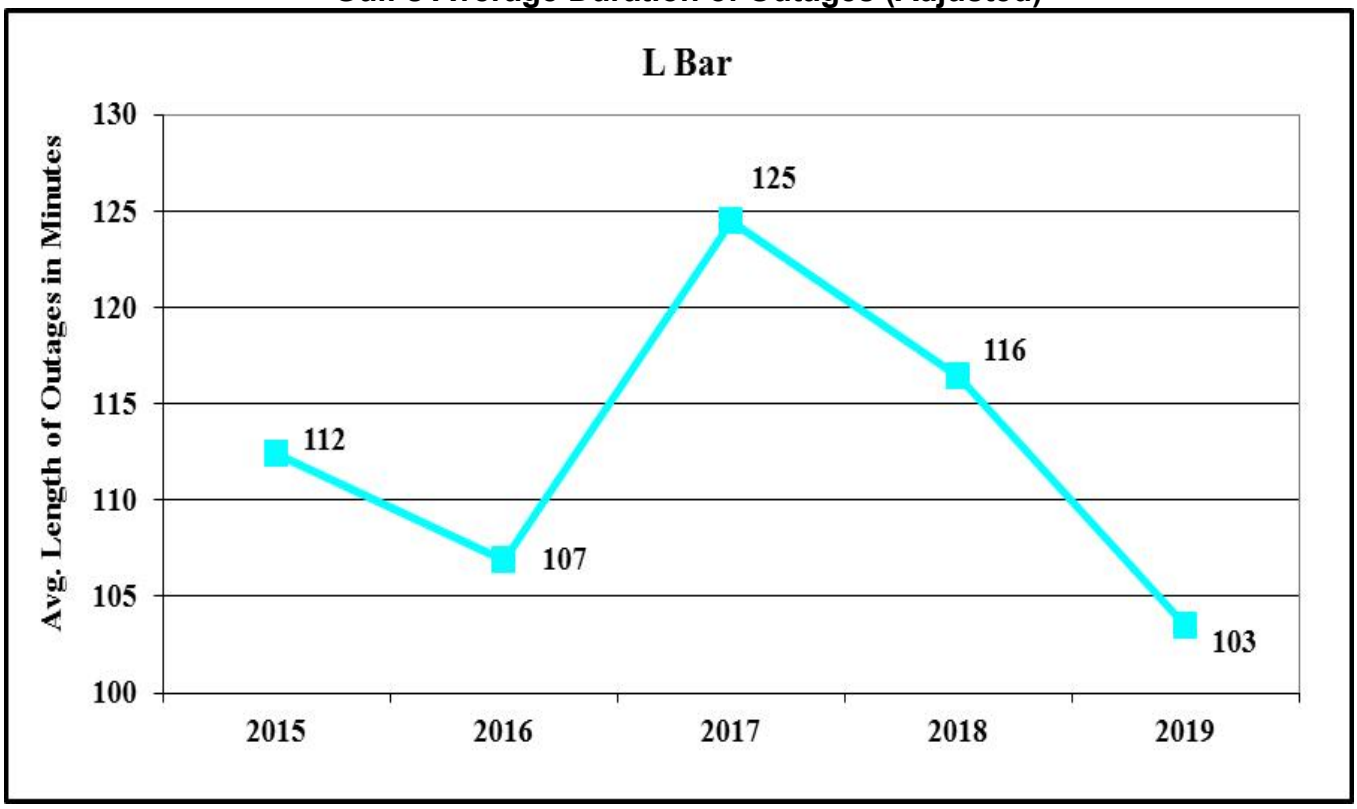
Gulf's Regions with the Highest and Lowest Adjusted CAIDI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest CAIDI	Central	Central	Central	Central	Central
Lowest CAIDI	Eastern	Eastern	Eastern	Western	Eastern

Source: Gulf's 2015-2019 distribution service reliability reports.

Figure 3-25 illustrates Gulf's L-Bar or the average length of time Gulf spends recovering from outage events, excluding hurricanes and other allowable excluded outage events. Gulf's L-Bar showed an 11 percent decrease from 2018 to 2019. In addition, the data for the five-year period of 2015 to 2019 shows a downward trend. This indicates that Gulf is spending less time restoring service to customers.

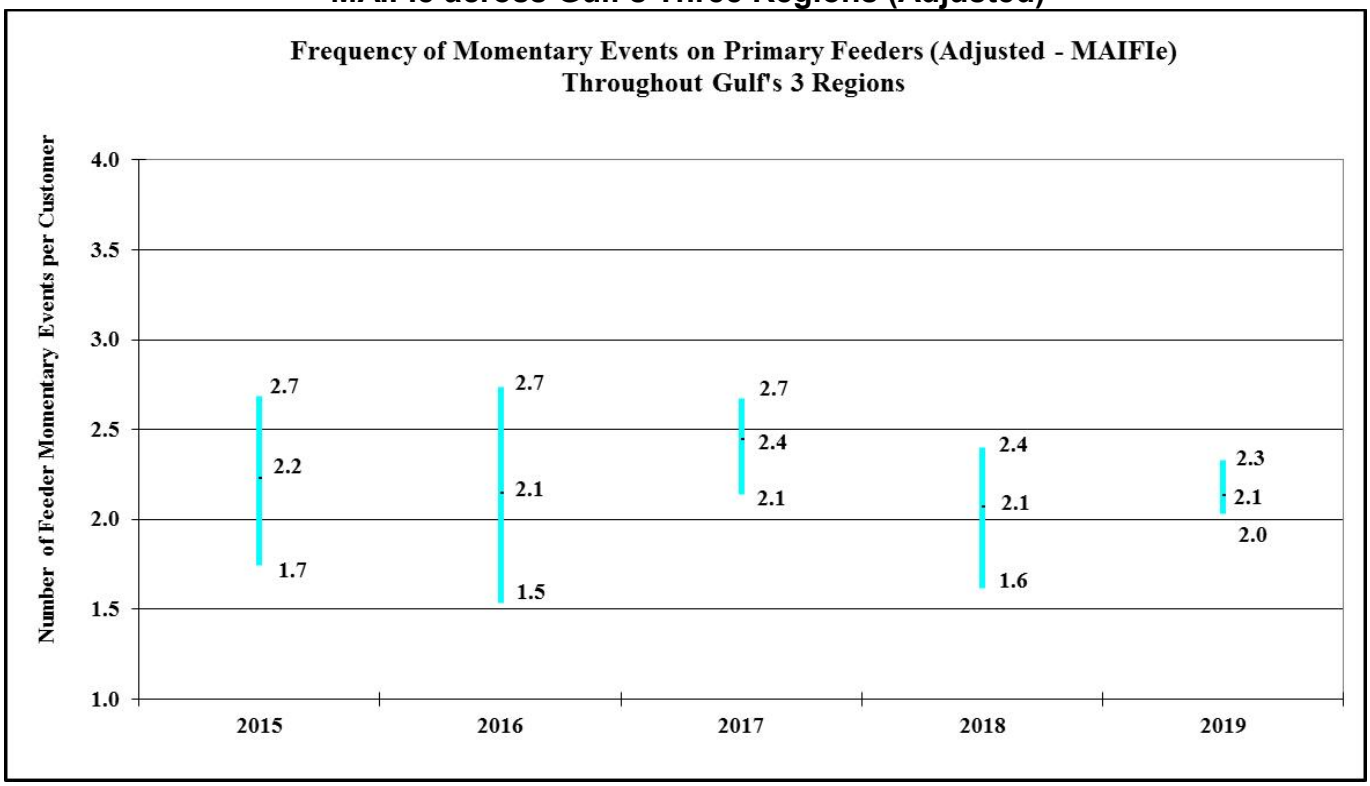
Figure 3-25
Gulf's Average Duration of Outages (Adjusted)



Source: Gulf's 2015-2019 distribution service reliability reports.

Figure 3-26 is the adjusted MAIFIe recorded across Gulf's system. The adjusted MAIFIe results by region show that the Central region had the lowest frequency of momentary events on primary feeders. The Eastern region has the highest MAIFIe index in 2019. The average MAIFIe remained the same as in 2018. The data suggest that the highest, average, and lowest MAIFIe are all continuing to trend downward, suggesting improvement.

Figure 3-26
MAIFIe across Gulf's Three Regions (Adjusted)



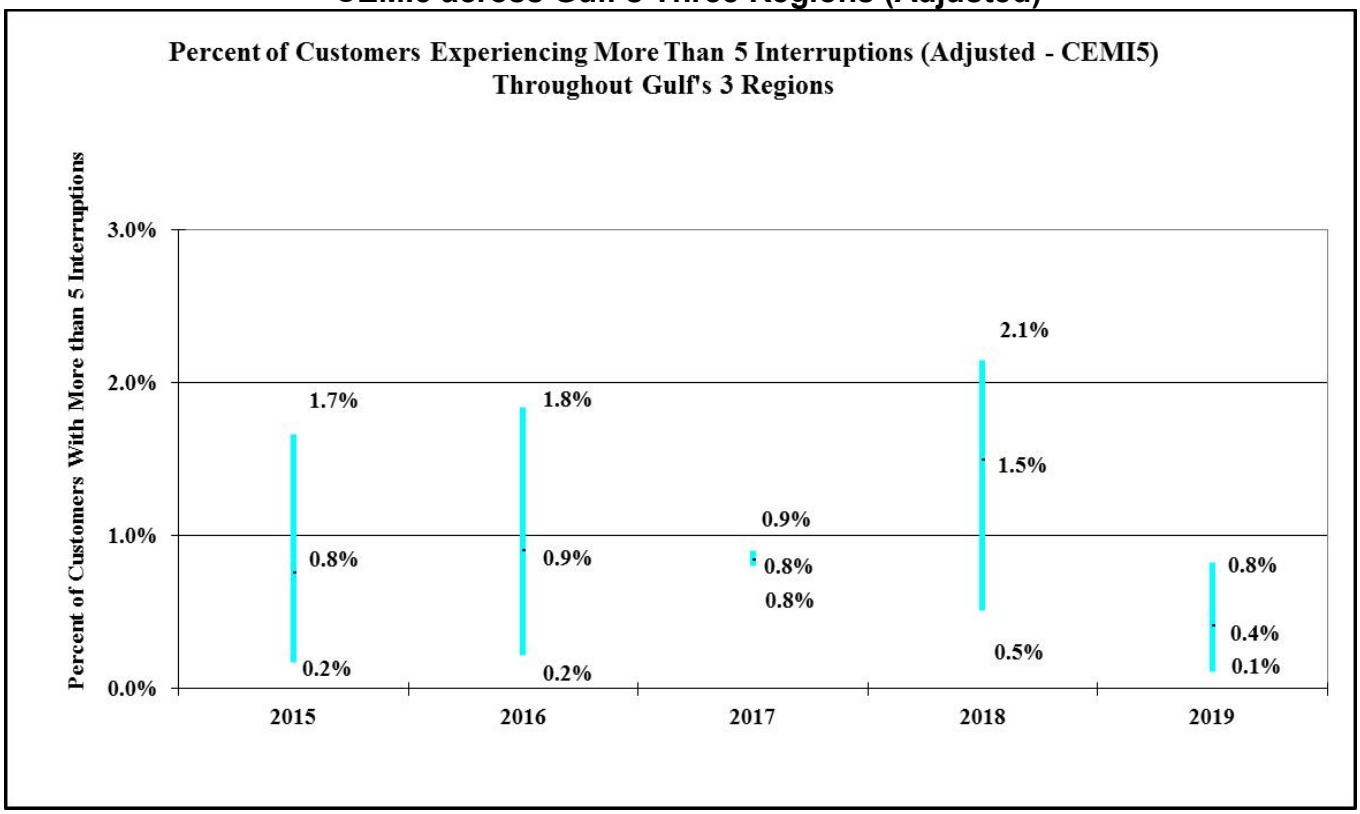
Gulf's Regions with the Highest and Lowest Adjusted MAIFIe Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest MAIFIe	Western	Western	Western	Western	Eastern
Lowest MAIFIe	Eastern	Central	Central	Central	Central

Source: Gulf's 2015-2019 distribution service reliability reports.

Figure 3-27 shows the highest, average, and lowest adjusted CEMI5 across Gulf's Western, Central, and Eastern regions. Gulf's 2019 results illustrate a 73 percent decrease in the average CEMI5 percentage when compared to 2018. The minimum CEMI5 appears to be trending upward over the five-year period of 2015 to 2019 as the maximum CEMI5 appears to be trending downward. The average CEMI5 appears to remain relatively flat.

Figure 3-27
CEMI5 across Gulf's Three Regions (Adjusted)



Gulf's Regions with the Highest and Lowest Adjusted CEMI5 Distribution Reliability Performance by Year

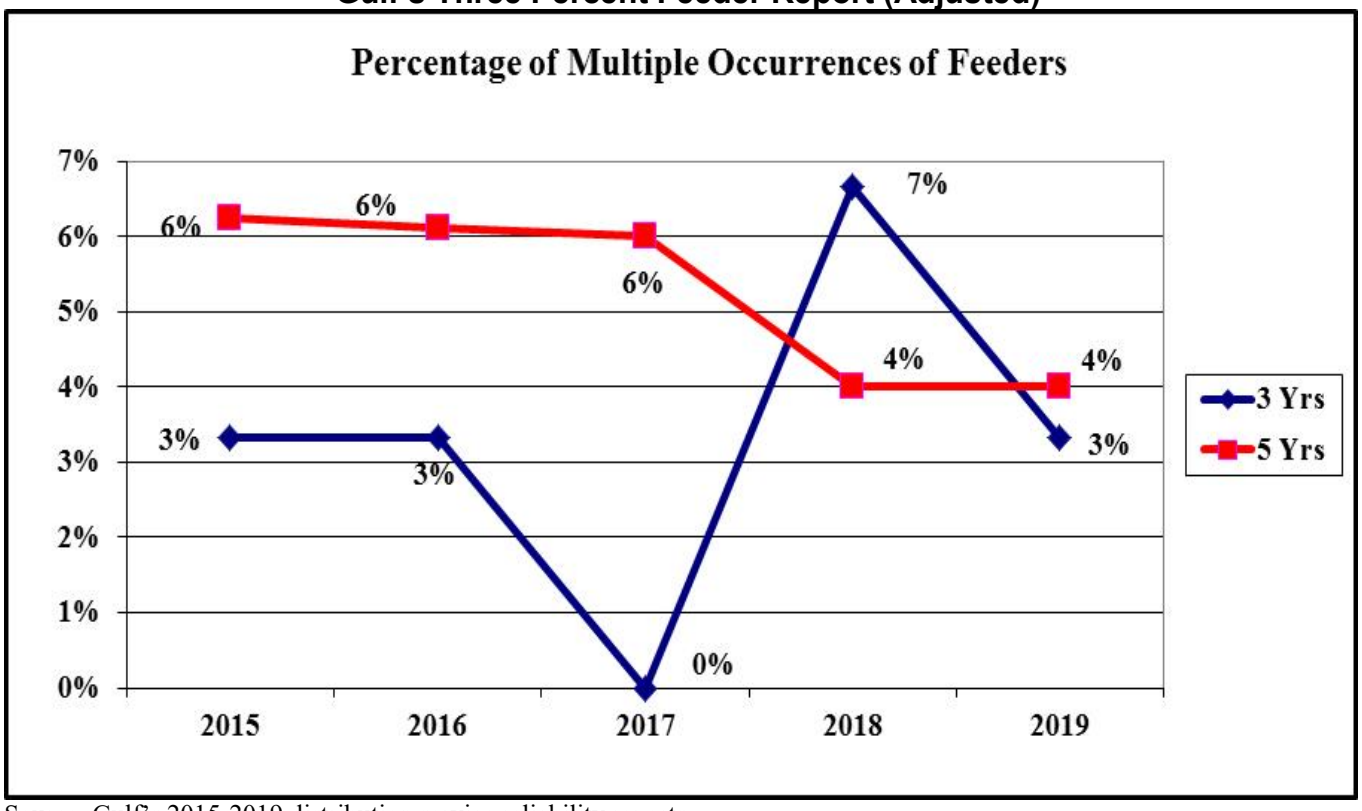
	2015	2016	2017	2018	2019
Highest CEMI5	Eastern	Eastern	Central	Eastern	Eastern
Lowest CEMI5	Central	Central	Western	Central	Central

Source: Gulf's 2015-2019 distribution service reliability reports.

Figure 3-28 shows the multiple occurrences of feeders using the Utility's Three Percent Feeder Report and is analyzed on a three- and five-year basis. The Three Percent Feeder Report is a listing of the top 3 percent of feeders that have the most feeder outage events. The supporting data illustrates that the five-year multiple occurrences were unchanged from 2018 to 2019 as the three-year multiple occurrences decreased by 57 percent. The five-year period of 2015 to 2019 indicates overall that the five-year index is trending downward, as the three-year multiple occurrences index is trending upward.

There were 10 feeders on the Three Percent Feeder Report. Gulf reported that the three top causes of the outages associated with the 10 feeders listed were "Other Causes," "Lightning," and "Vegetation." Gulf reported that the "Other Causes" category is used to track outages associated with manually opening a device to safely make repairs or safely operate downstream devices that need to be de-energized. Gulf continues to focus on eliminating breaker outages by installing additional lightning protection, installing Automatic Feeder Switches, and creating Self-Healing Networks. Gulf continues to maintain its vegetation trimming cycle on feeders to reduce tree related outages. In addition, Gulf continues to seek additional vegetation trimming easements as it upgrades/reconfigures its mainline circuits as part of the feeder hardening program.

Figure 3-28
Gulf's Three Percent Feeder Report (Adjusted)

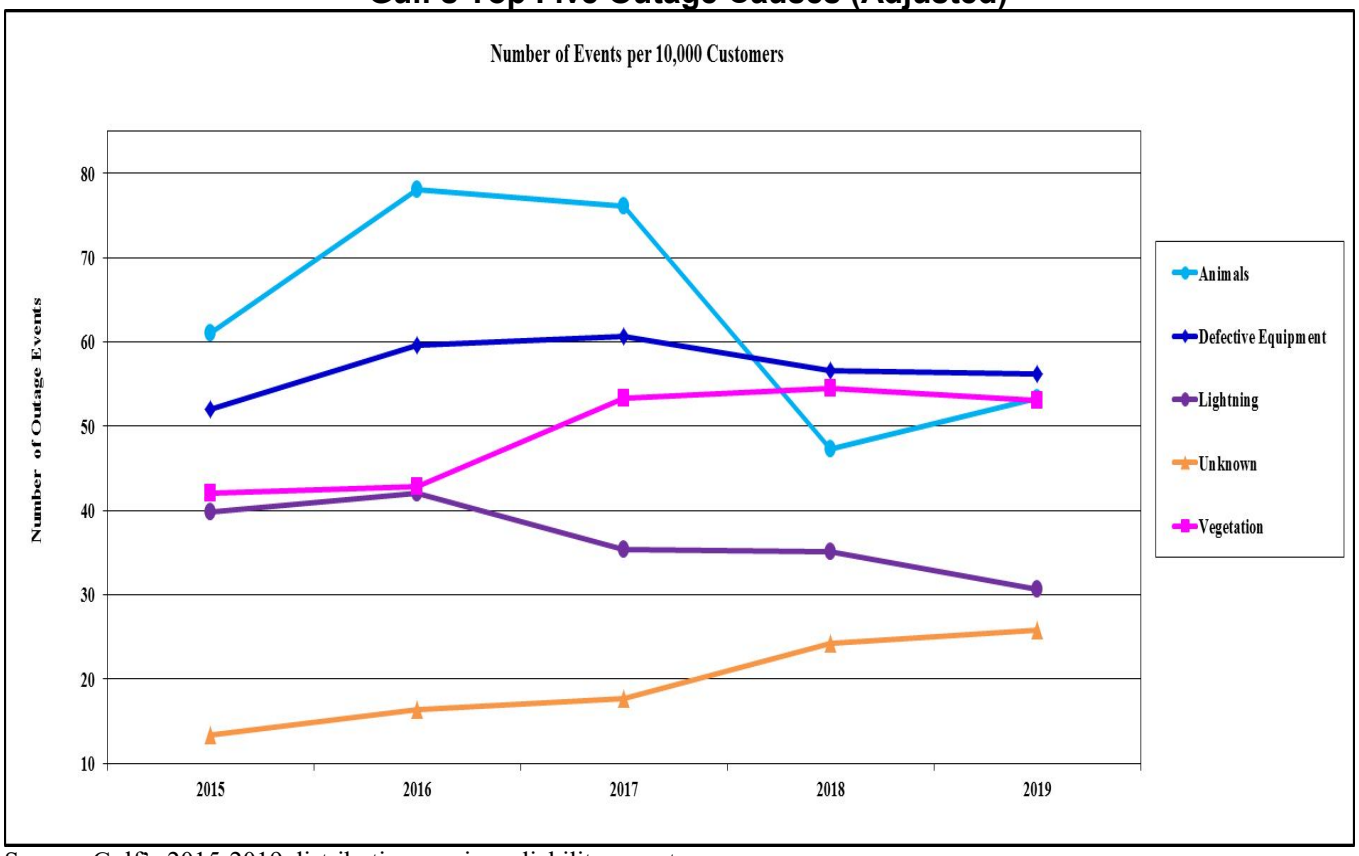


Source: Gulf's 2015-2019 distribution service reliability reports.

Figure 3-29 shows the top five causes of outage events on Gulf's distribution system normalized to a 10,000-customer base. The figure is based on Gulf's adjusted data of the top 10 causes of outage events and represents 88 percent of the total adjusted outage events that occurred during 2019. The top five causes of outage events were "Defective Equipment" (23 percent), "Vegetation" (21 percent), "Animals" (21 percent), "Lightning" (12 percent), and "Unknown Causes" (10 percent). The percentage of outages due to "Defective Equipment" was the highest cause of outages. The number of outage events due to "Defective Equipment" is trending upward and there was a 0.5 percent increase in 2019. The numbers of outage events due to "Vegetation" and "Unknown Causes" are trending upward. The number of outages due to "Animals" and "Lightning" are trending downward.

Gulf continues to focus its process improvement efforts on the system wide top outage causes through its existing programs and storm hardening efforts. Gulf is proposing 12 different reliability programs aimed at reducing customer interruptions. Some examples include, adding automated equipment to reduce temporary faults and outages, reducing direct buried lateral cables faults, and replacing and modernizing aging equipment. Nine programs are designed to mitigate the outages caused by defective equipment, five programs should reduce animal related causes, and six programs should assist with unknown causes. Outages due to "Defective Equipment," "Animals," and "Unknown Causes" categories each had increases in 2019.

Figure 3-29
Gulf's Top Five Outage Causes (Adjusted)



Source: Gulf's 2015-2019 distribution service reliability reports.

Observations: Gulf's Adjusted Data

There were improvements seen in Gulf's SAIDI, SAIFI, CAIDI, MAIFe, CEMI5, L-Bar, the Three-Year Percentages of Multiple Feeder Outage events and the Five-Year Percentages of Multiple Feeder Outage events indices in 2019. Overall it appears that the trend lines of the reliability indices for the five-year period of 2015 to 2019 are primarily trending downward.

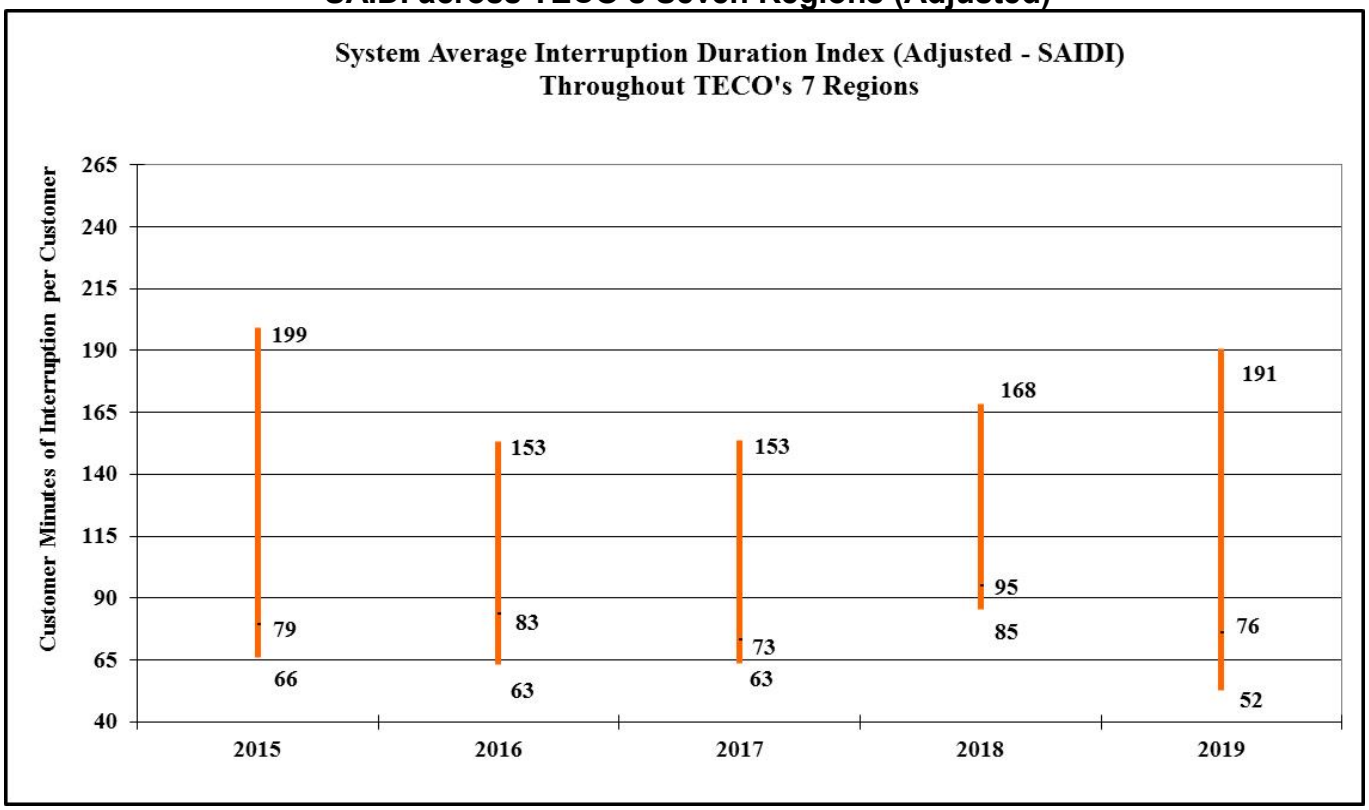
Gulf tracks the following data associated with each individual interruption: customers affected, minutes interrupted, cause of outage, percentage of customers partially restored, device affected by interruption, and location of the device. Gulf produces daily reports with detailed information such as previous day interruptions by device, as well as month-to-date and year-to-date reliability indices. Management reviews the report to identify lessons learned, any areas for improvement, assessment of upcoming weather, and potential impacts and operational risks. In 2019, Gulf's reliability data detail had been increased to be in line with FPL's standards based on industry practices, internal needs, and external requirements.

Gulf reported that its Eastern region, located in the area around Panama City, Florida, was heavily impacted by Hurricane Michael in 2018. As such, its grid continues to be impacted by residual and latent conditions created by unseen storm damage which has also negatively impacted three out of five reliability indices. As part of the ongoing work to return the system to its previous condition, Gulf is planning over four miles of feeder storm hardening to include new ties between feeders. Work will include replacing and strengthening an estimated 180 poles and the installation of approximately 16 Automated Feeder Switches.

Tampa Electric Company: Adjusted Data

Figure 3-30 shows the adjusted SAIDI values recorded by TECO's system. Five of the seven TECO regions had improvements in SAIDI performance during 2019, with the South Hillsborough region having the lowest SAIDI performance results. The Dade City region continues to have the poorest SAIDI performance results for the five-year period of 2015 to 2019. The lowest SAIDI index for the seven regions appears to be trending downward. The average SAIDI index decreased 20 percent from 2018 to 2019. Even with the decrease, the average SAIDI index appears to be trending upward. The Central, Eastern, South Hillsborough, and Winter Haven regions recorded the lowest SAIDI indices for the five-year period. Dade City, Plant City, and South Hillsborough regions have the fewest customers and represent the most rural, lowest customer density per line-mile in comparison to the other four TECO regions.

Figure 3-30
SAIDI across TECO's Seven Regions (Adjusted)



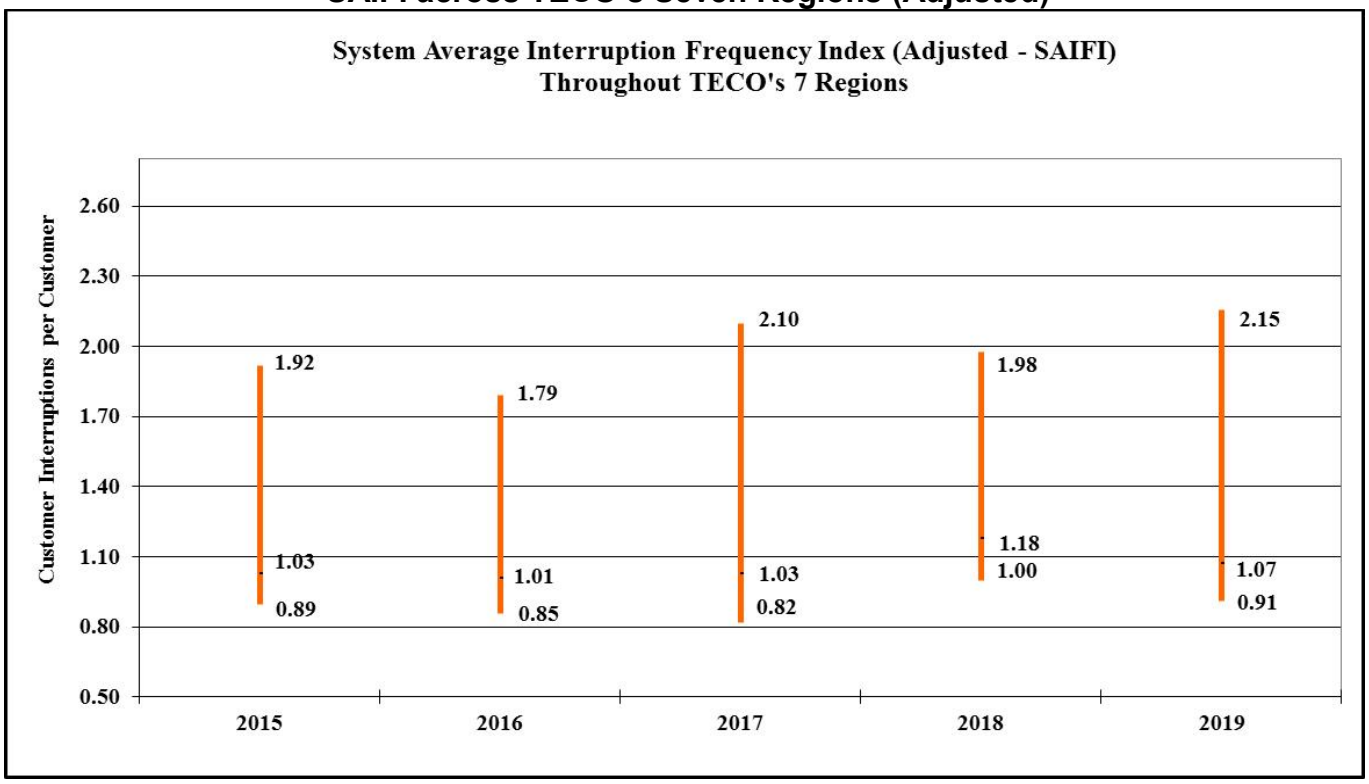
TECO's Regions with the Highest and Lowest Adjusted SAIDI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest SAIDI	Dade City	Dade City	Dade City	Dade City	Dade City
Lowest SAIDI	Winter Haven	Central	Eastern	Eastern	South Hillsborough

Source: TECO's 2015-2019 distribution service reliability reports.

Figures 3-31 illustrates TECO's adjusted frequency of interruptions per customer reported by the system. TECO's data represent a 9 percent decrease in the SAIFI average from 1.18 interruptions in 2018 to 1.07 interruptions in 2019. TECO's Dade City region continues to have the highest frequency of service interruptions when compared to TECO's other regions. The maximum, minimum, and average SAIFI are trending upward.

Figure 3-31
SAIFI across TECO's Seven Regions (Adjusted)



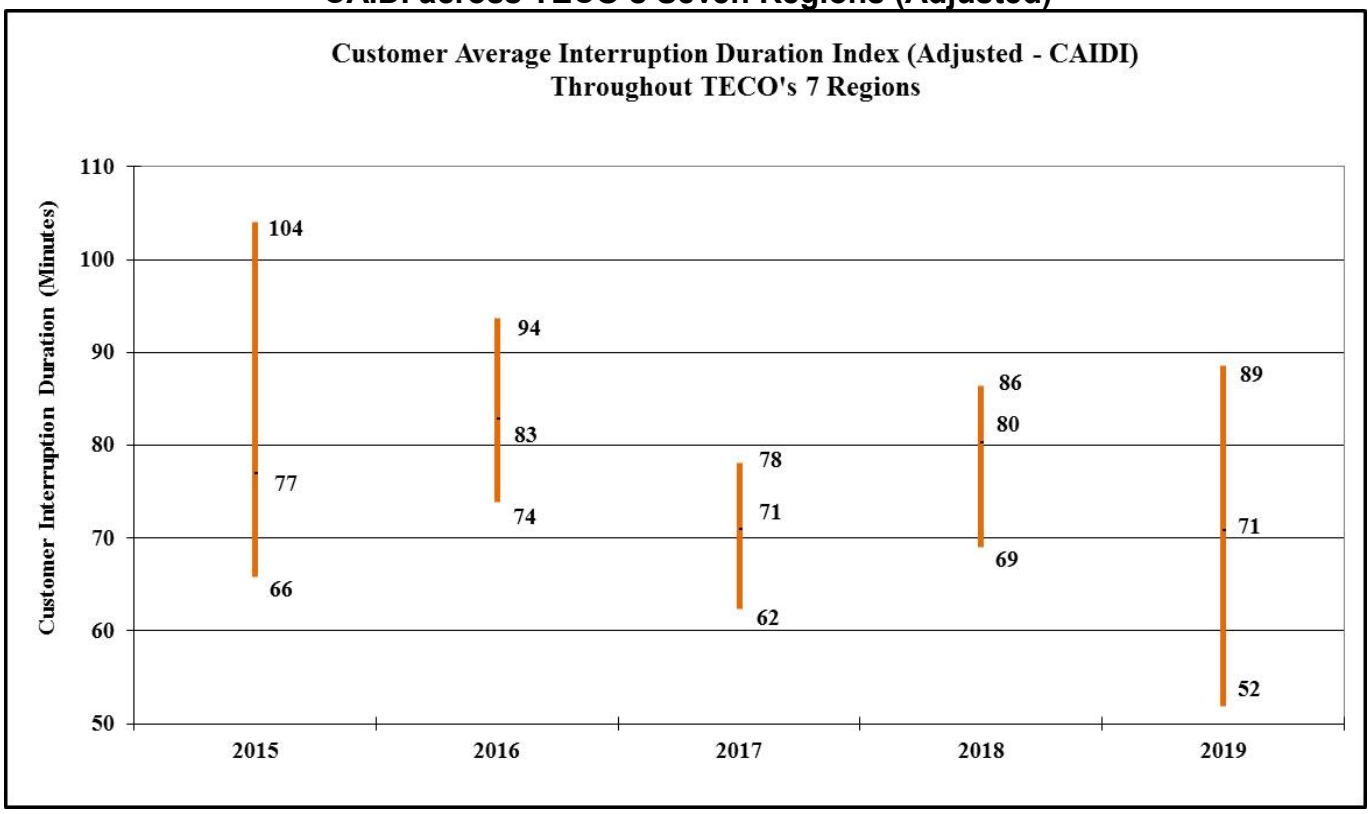
TECO's Regions with the Highest and Lowest Adjusted SAIFI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest SAIFI	Dade City	Dade City	Dade City	Dade City	Dade City
Lowest SAIFI	Western	Central	Central	Eastern	Central

Source: TECO's 2015-2019 distribution service reliability reports.

Figure 3-32 charts the length of time that a typical TECO customer experiences an outage, which is known as CAIDI. The highest CAIDI minutes appear to be confined to the Dade City, Plant City, and Western regions. Winter Haven, Central, and South Hillsborough regions have had the lowest (best) results for the last five years. The average CAIDI is trending downward at this time suggesting TECO's customers are experiencing shorter outages, with the 11 percent decrease in the average CAIDI when comparing 2018 to 2019.

Figure 3-32
CAIDI across TECO's Seven Regions (Adjusted)



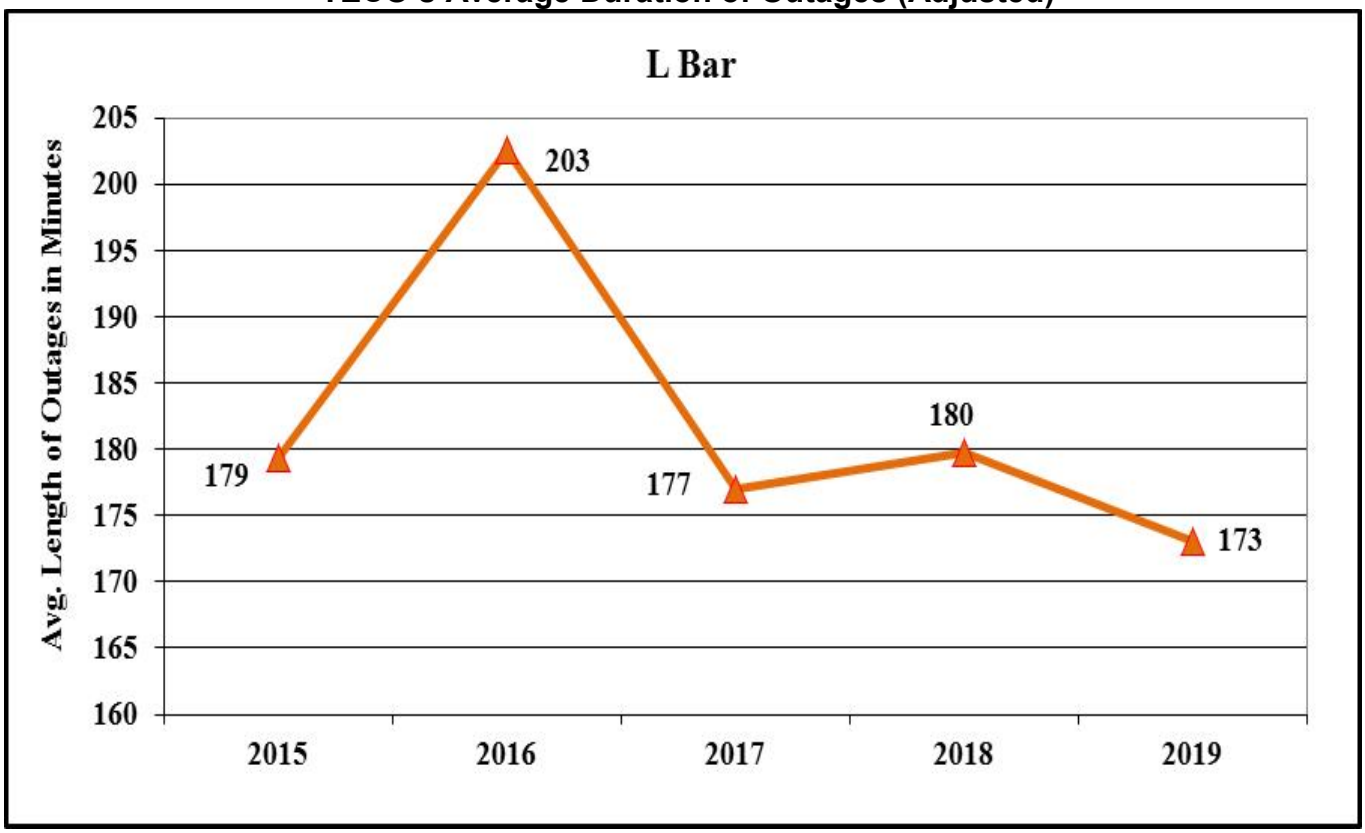
TECO's Regions with the Highest and Lowest Adjusted CAIDI Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest CAIDI	Dade City	Plant City	Central	Western	Dade City
Lowest CAIDI	Central	Central	Winter Haven	South Hillsborough	South Hillsborough

Source: TECO's 2015-2019 distribution service reliability reports.

Figure 3-33 denotes a 3.9 percent decrease in outage durations for the period from 2018 to 2019 for TECO. The average length of time TECO spends restoring service to its customers affected by outage events, excluding hurricanes and other allowable excluded outage events is shown in the L-Bar index. The L-Bar index appears to trend downward for the five-year period of 2015 to 2019, suggesting shorter restoration times.

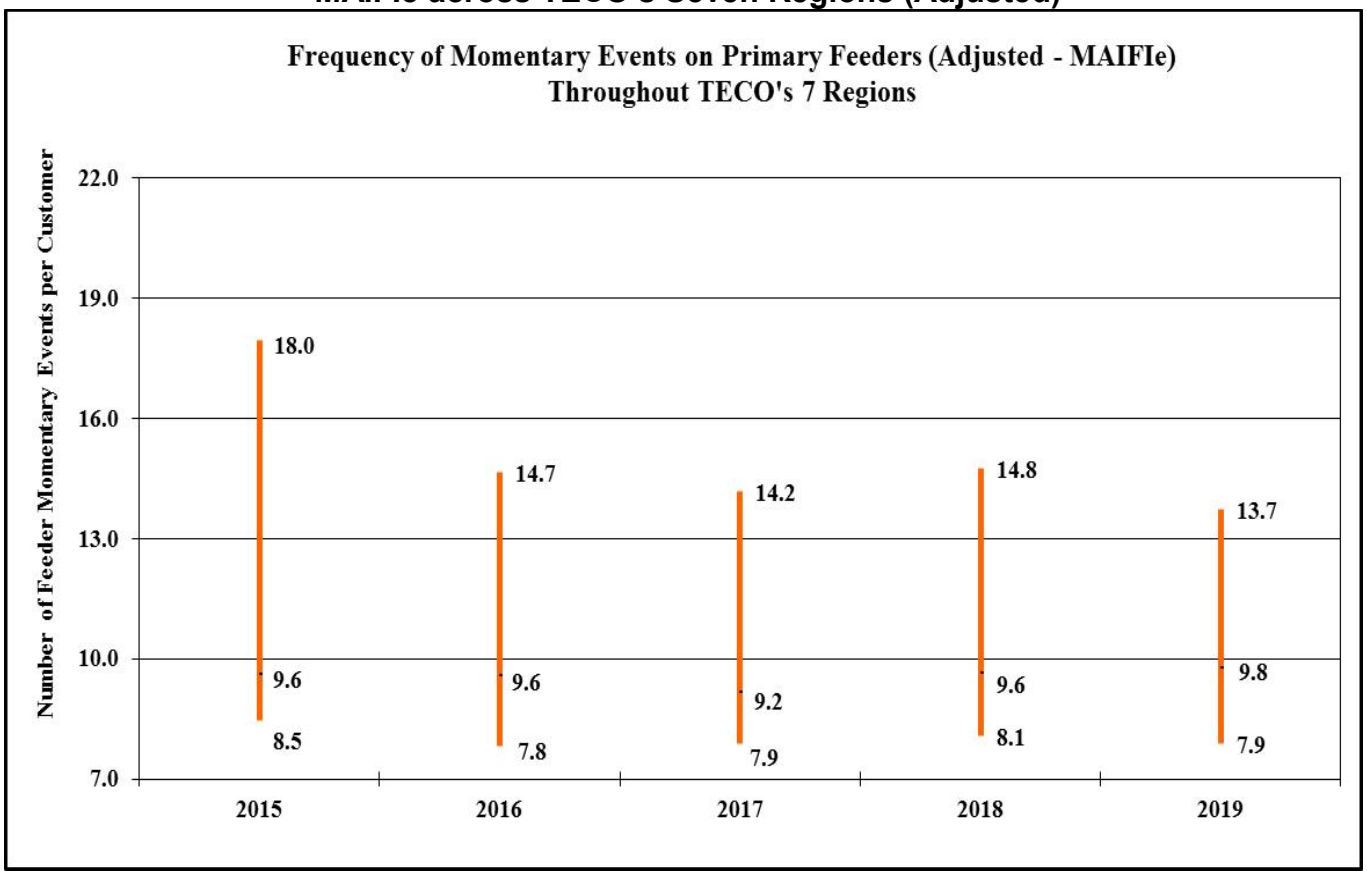
Figure 3-33
TECO's Average Duration of Outages (Adjusted)



Source: TECO's 2015-2019 distribution service reliability reports.

Figure 3-34 illustrates TECO's number of momentary events on primary circuits per customer recorded across its system. In 2019, the MAIFIe performance improved over the 2018 results in all regions except Eastern, Western, and Winter Haven regions. The average MAIFIe increased by 2 percent from 2018 to 2019. Figure 3-34 also indicates that the average MAIFIe is trending upward, which suggests a decline in performance over the five-year period of 2015 to 2019.

Figure 3-34
MAIFIe across TECO's Seven Regions (Adjusted)



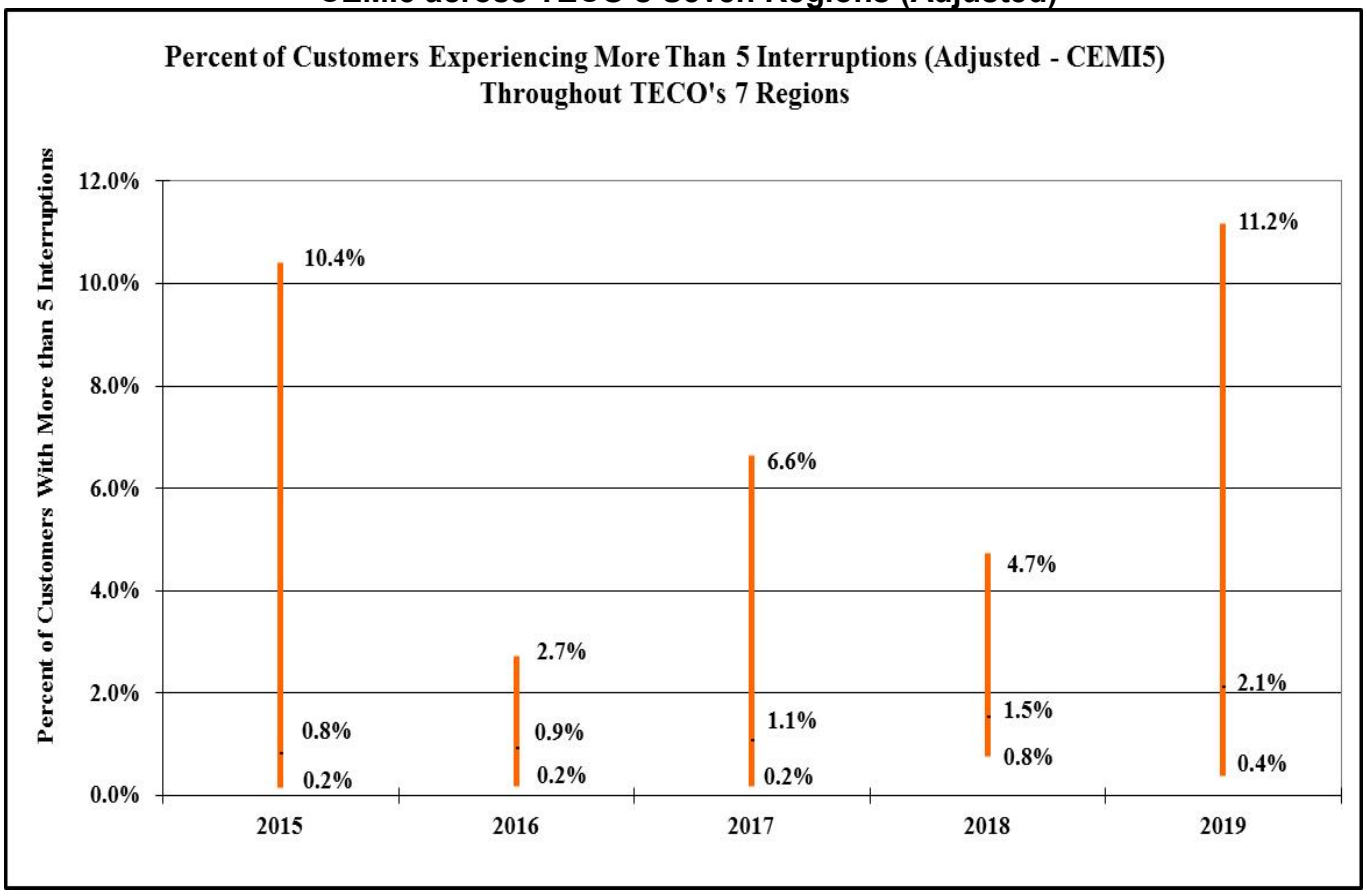
TECO's Regions with the Highest and Lowest Adjusted MAIFIe Distribution Reliability Performance by Year

	2015	2016	2017	2018	2019
Highest MAIFIe	Dade City	Dade City	Dade City	Dade City	Plant City
Lowest MAIFIe	Central	Central	Central	Central	Central

Source: TECO's 2015-2019 distribution service reliability reports.

Figure 3-35 indicates that the percent of TECO's customers experiencing more than five interruptions. Two regions in TECO's territory experienced a decrease in the CEMI5 results for 2019. The Dade City, Eastern, Plant City, South Hillsborough, and Western regions experienced an increase in the CEMI5 index. Dade City reported the highest CEMI5 percentage for 2019. With TECO's results for this index varying for the past five years, the average CEMI5 index appears to be trending upward indicating a decline in performance. There was a 40 percent increase in the average CEMI5 index from 2018 to 2019.

Figure 3-35
CEMI5 across TECO's Seven Regions (Adjusted)



TECO's Regions with the Highest and Lowest Adjusted CEMI5 Distribution Reliability Performance by Year

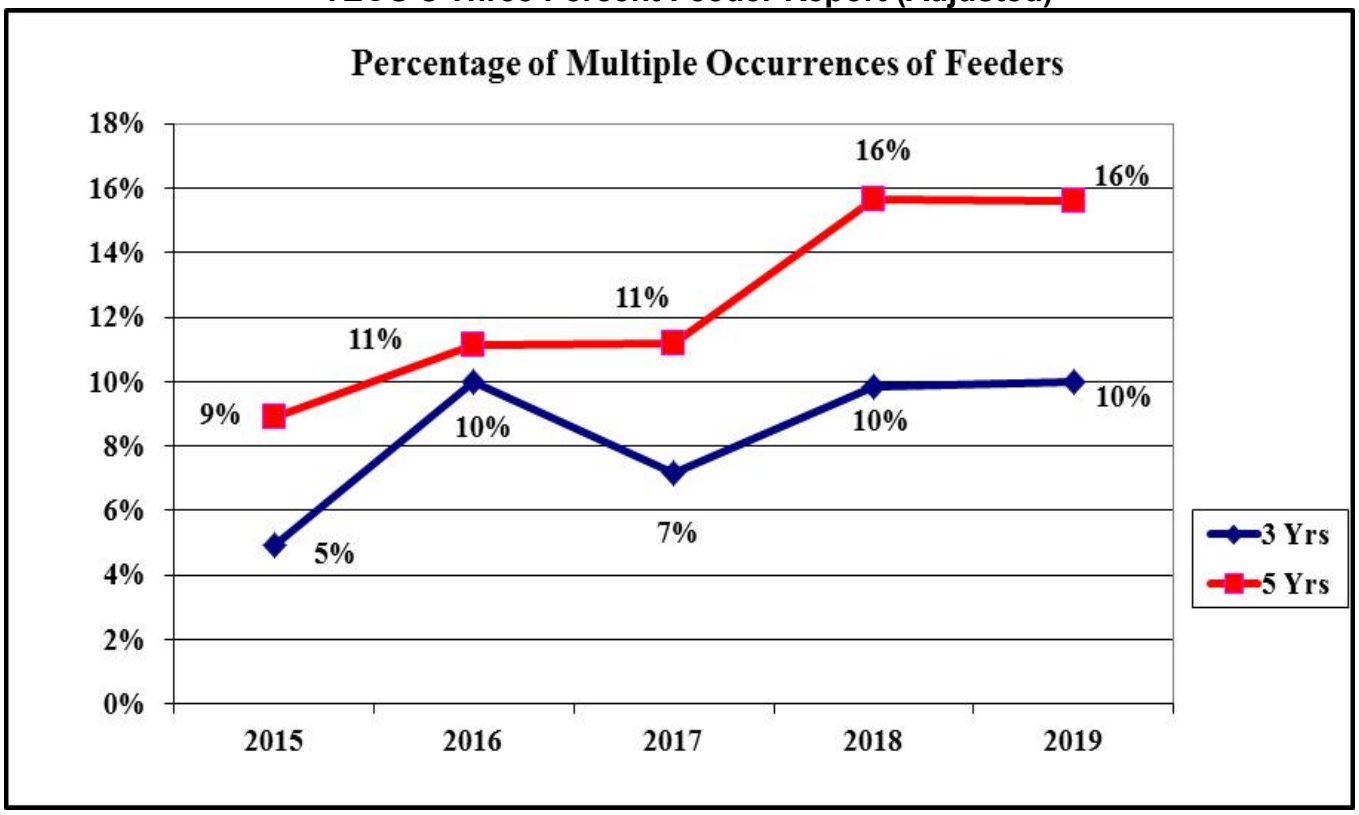
	2015	2016	2017	2018	2019
Highest CEMI5	Dade City	Dade City	Dade City	Dade City	Dade City
Lowest CEMI5	Winter Haven	South Hillsborough	Central	Eastern	Winter Haven

Source: TECO's 2015-2019 distribution service reliability reports.

Figure 3-36 represents an analysis of TECO's top 3 percent of problem feeders that have reoccurred (appeared on the Three Percent Feeder Report) on a five-year and three-year basis. The graph is developed using the number of recurrences divided by the number of feeders reported. The five-year average of outages per feeder remained the same from 2018 to 2019. The three-year average of outages also remained the same at 10 percent in 2018 and 2019. However, both the five-year average of outages per feeder and the three-year average of outages appear to continue to trend upward for the five-year period of 2015 to 2019.

Staff notes that there were three feeders on the Three Percent Feeder Report for the last two years consecutively. Eight, six, and two circuit outages were reported for these feeders in 2019. The causes for the outages varied from lightning to vehicle accidents that resulted in electrical wire/pole damage. Damaged equipment was repaired, poles were replaced, and trees and vegetation were trimmed in 2019. TECO stated that it will continue to monitor circuit outage performance as part of its daily and ongoing review of system reliability and will respond accordingly at a regional level.

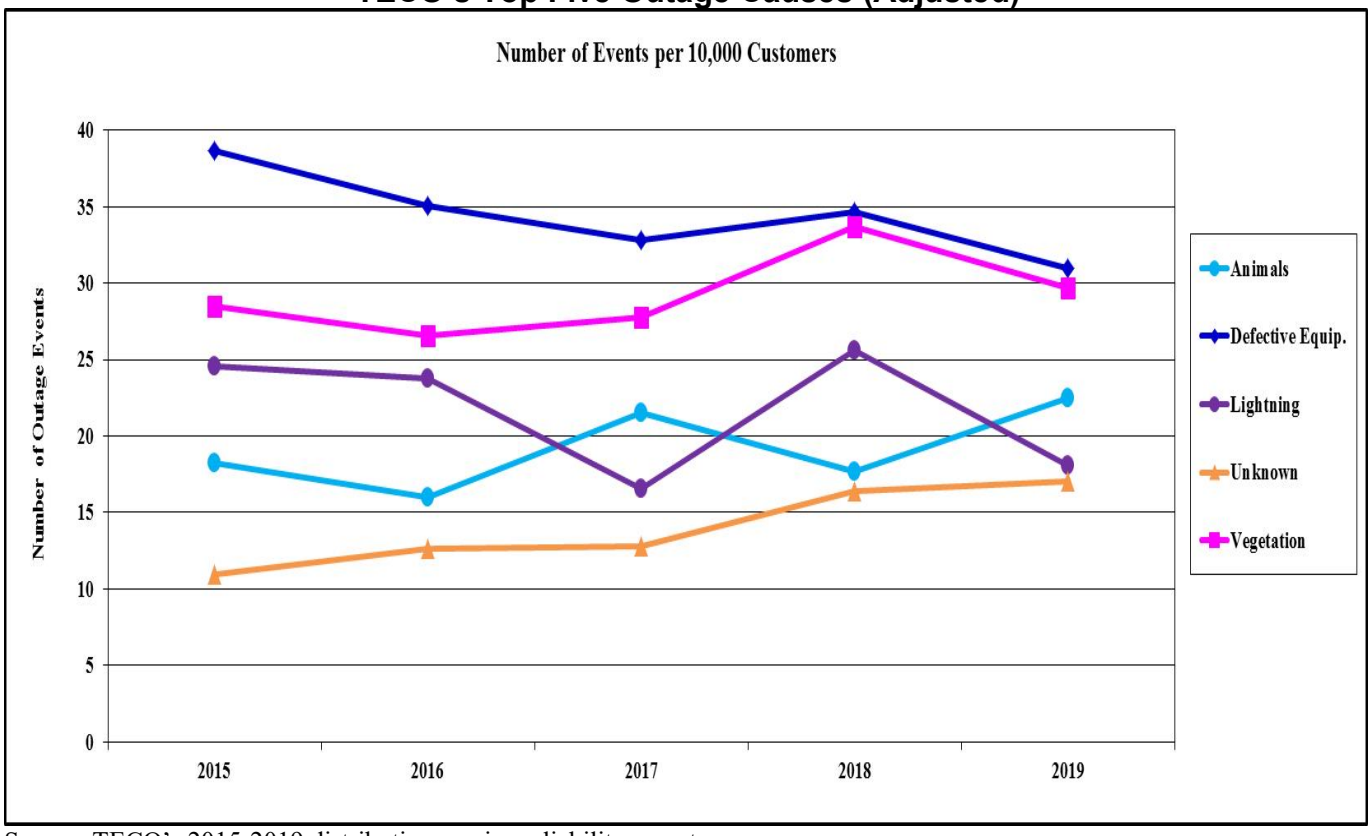
Figure 3-36
TECO's Three Percent Feeder Report (Adjusted)



Source: TECO's 2015-2019 distribution service reliability reports.

Figure 3-37 indicates that the top five causes of outage events on TECO's distribution system normalized to a 10,000-customer base. The figure is based on TECO's adjusted data of the top 10 causes of outage events and represents 90 percent of the total outage events that occurred during 2019. For the five-year period, the five top causes of outage events included "Defective Equipment" (23 percent), "Vegetation" (22 percent), "Animals" (17 percent), "Lightning" (14 percent), and "Unknown Causes" (13 percent) on a cumulative basis. "Defective Equipment" is the highest cause of outages for 2019. "Vegetation" and "Animals" causes are the next two top problem areas for TECO. The outages due to "Animals" increased 37 percent from 2018 to 2019. The outages from "Unknown Causes" increased 13 percent for the same time period. The numbers of outages due to "Vegetation," "Animals," and "Unknown Causes" are trending upward while the number of outages due to "Defective Equipment" and "Lightning" are trending downward.

Figure 3-37
TECO's Top Five Outage Causes (Adjusted)



Source: TECO's 2015-2019 distribution service reliability reports.

Observations: TECO's Adjusted Data

Two of TECO's 2019 reliability indices declined in performance compared to 2018. For the five-year period of 2015 to 2019, the indices for SAIDI, SAIFI, MAIFe, CEMI5, the Three-Year Percent of Multiple Feeder outage events, and the Five-Year Percent of Multiple Feeder outage events are all trending upward. The indices for CAIDI and L-Bar are trending downward. TECO reported the increase in MAIFe was due to an increase of breaker events. The increase in CEMI5 was due to "Vegetation" and "Animals" interruptions. TECO reported that the improvements in SAIDI, CAIDI and L-Bar were attributed to less severe weather events combined with much quicker restoration times. TECO notes that the Dade City, Plant City, and Winter Haven regions have the fewest customers and represent the most rural, lowest customer density per line mile. TECO indicated that the rural areas typically have higher reliability indices due to the greater distance of travel for service restoration.

In 2019, the Dade City region had the highest reliability indices in all five categories. The Dade City region has a total of 14 feeders/circuits. In 2018, TECO installed new reclosers along with other activities to improve the reliability of the Dade City region. In 2019, TECO installed additional reclosers and trimmed trees in the Dade City area. For 2020, TECO is planning on performing additional work to improve the Dade City region's reliability.

Section IV: Inter-Utility Reliability Comparisons

Section IV contains comparisons of the utilities' adjusted data for the various reliability indices that were reported. It also contains a comparison of the service reliability related complaints received by the Commission.

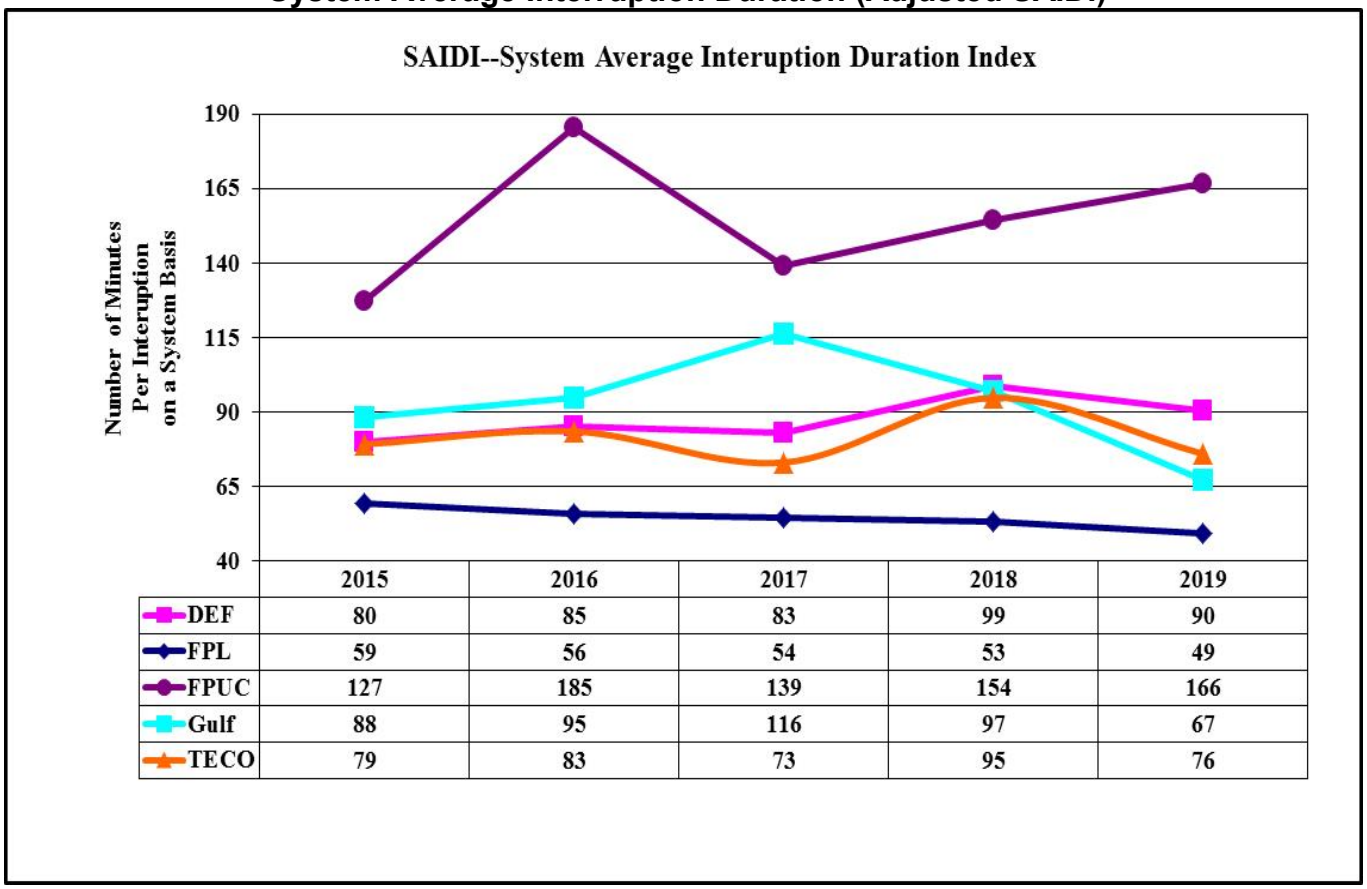
Inter-Utility Reliability Trend Comparisons: Adjusted Data

The inter-utility trend comparison focuses on a graphical presentation that combines all of the IOUs' distribution reliability indices for the years 2015 to 2019. **Figures 4-1** through **4-3** apply to all five utilities while **Figures 4-4** and **4-5** do not apply to FPUC because it is not required to report MAIFIe and CEMI5 due to the size of its customer base. The adjusted data is used in generating the indices in this report and is based on the exclusion of certain events allowed by Rule 25-6.0455(4), F.A.C. Generalizations can be drawn from the side-by-side comparisons; however, any generalizations should be used with caution due to the differing sizes of the distribution systems, the degree of automation, and the number of customers. The indices are unique to each IOU.

Figure 4-1 indicates that DEF's, FPUC's, and TECO's SAIDI has been trending upward since 2015, while FPL and Gulf are trending downward. Comparing the 2018 and 2019 SAIDI values, all utilities have improved except for FPUC; FPUC's SAIDI value increased by 8 percent from 2018 to 2019. Gulf's SAIDI value decreased 31 percent, DEF decreased 9 percent, TECO decreased 20 percent, and FPL decreased 8 percent from 2018 to 2019.

SAIDI is the average amount of time a customer is out of service per retail customers served within a specified area of service over a given period. It is determined by dividing the total Customer Minutes of Interruption by total Number of Customers Served for the respective area of service.

Figure 4-1
System Average Interruption Duration (Adjusted SAIDI)



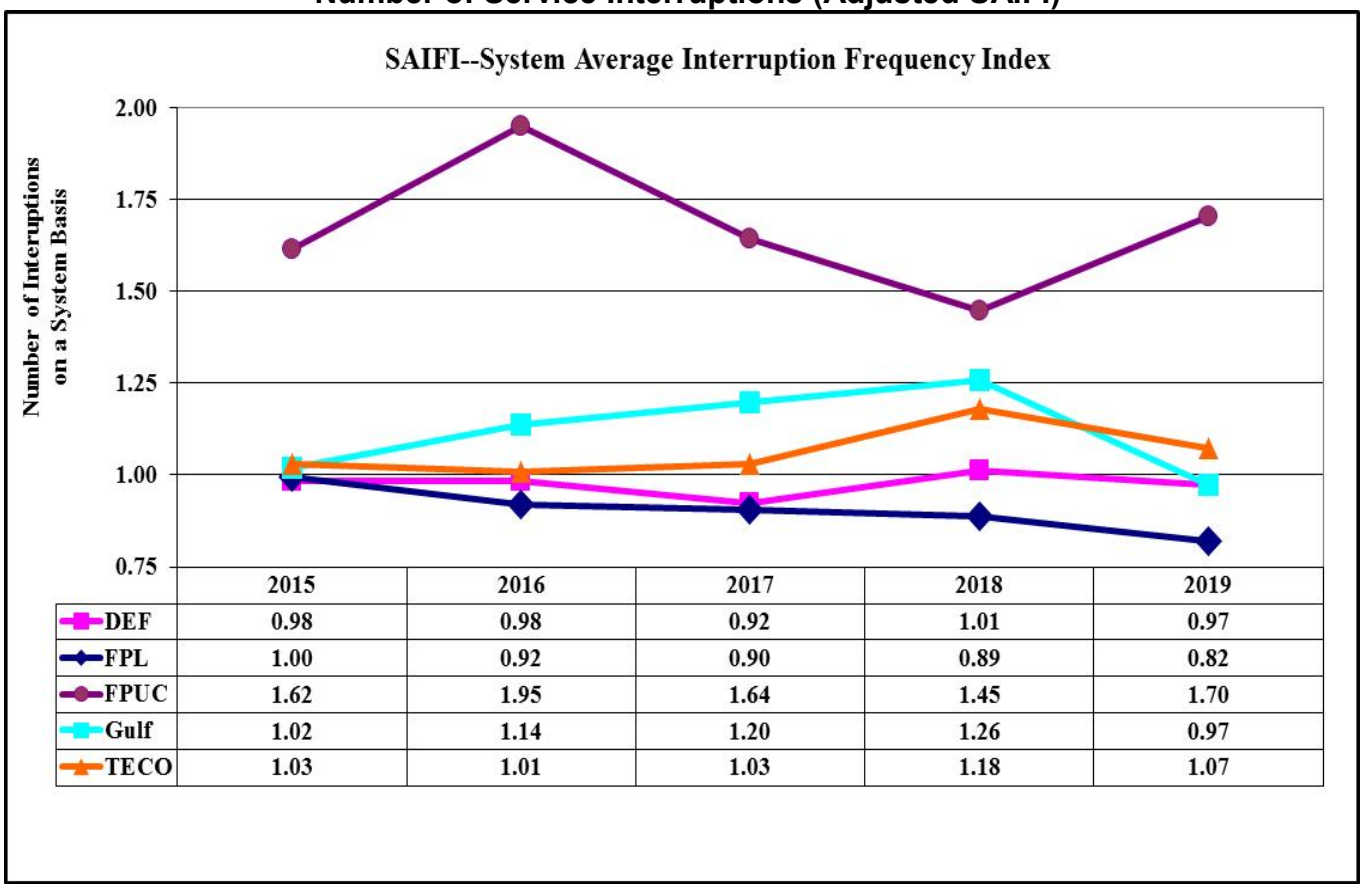
	2015	2016	2017	2018	2019
DEF	80	85	83	99	90
FPL	59	56	54	53	49
FPUC	127	185	139	154	166
Gulf	88	95	116	97	67
TECO	79	83	73	95	76

Source: The IOUs' 2015-2019 distribution service reliability reports.

Figure 4-2 shows a five-year graph of the adjusted SAIFI for each IOU. The 2019 data shows FPL, Gulf, DEF, and TECO's SAIFI values decreased (improved) from the 2018 results as FPUC's SAIFI values increased. Over the five-year period of 2015 to 2019, Gulf and TECO's SAIFI values are all trending upward as DEF's SAIFI value appears to remain relatively flat. FPL and FPUC's SAIFI value is trending downward for the period of 2015 to 2019.

SAIFI is the average number of service interruptions per retail customer within a specified area of service over a given period. It is determined by dividing the Sum of Service (a/k/a Customer) Interruptions (CI) by the total Number of Customers Served for the respective area of service.

Figure 4-2
Number of Service Interruptions (Adjusted SAIFI)



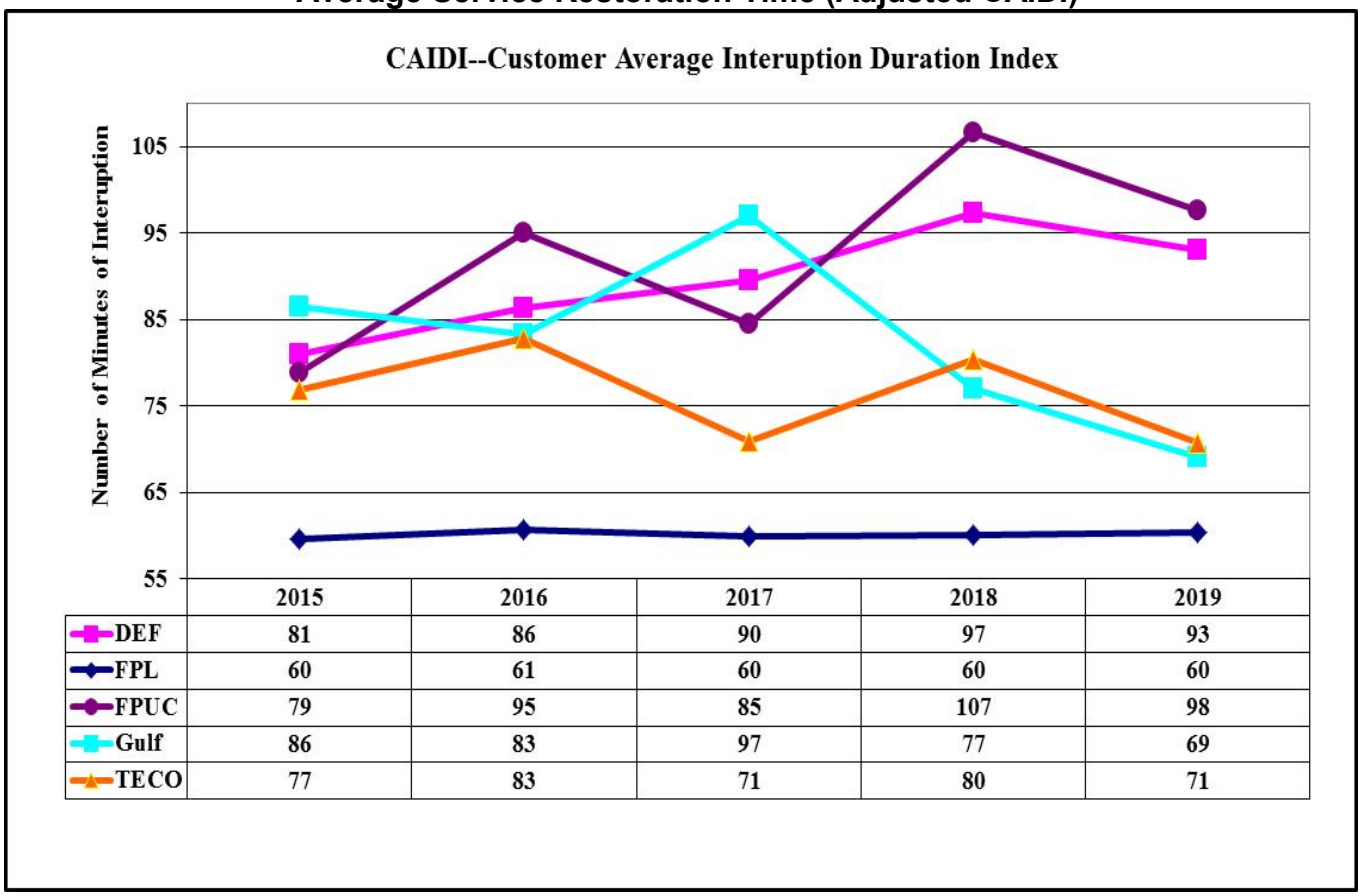
	2015	2016	2017	2018	2019
DEF	0.98	0.98	0.92	1.01	0.97
FPL	1.00	0.92	0.90	0.89	0.82
FPUC	1.62	1.95	1.64	1.45	1.70
Gulf	1.02	1.14	1.20	1.26	0.97
TECO	1.03	1.01	1.03	1.18	1.07

Source: The IOUs' 2015-2019 distribution service reliability reports.

Figure 4-3 shows a five-year graph of the adjusted CAIDI for each IOU. All the utilities, except FPL, had decreases in the CAIDI from 2018 to 2019. FPL's CAIDI value was the same for 2019 as it was for 2018. Gulf and TECO's CAIDI values are trending downward for the five-year period of 2015 to 2019. DEF's and FPUC's CAIDI value is trending upward for the same period. It appears that FPL remains relatively flat for the same period.

CAIDI is the average interruption duration or the time to restore service to interrupted customers. CAIDI is calculated by dividing the total system CMI by the number of customer interruptions, which is also SAIDI, divided by SAIFI.

Figure 4-3
Average Service Restoration Time (Adjusted CAIDI)



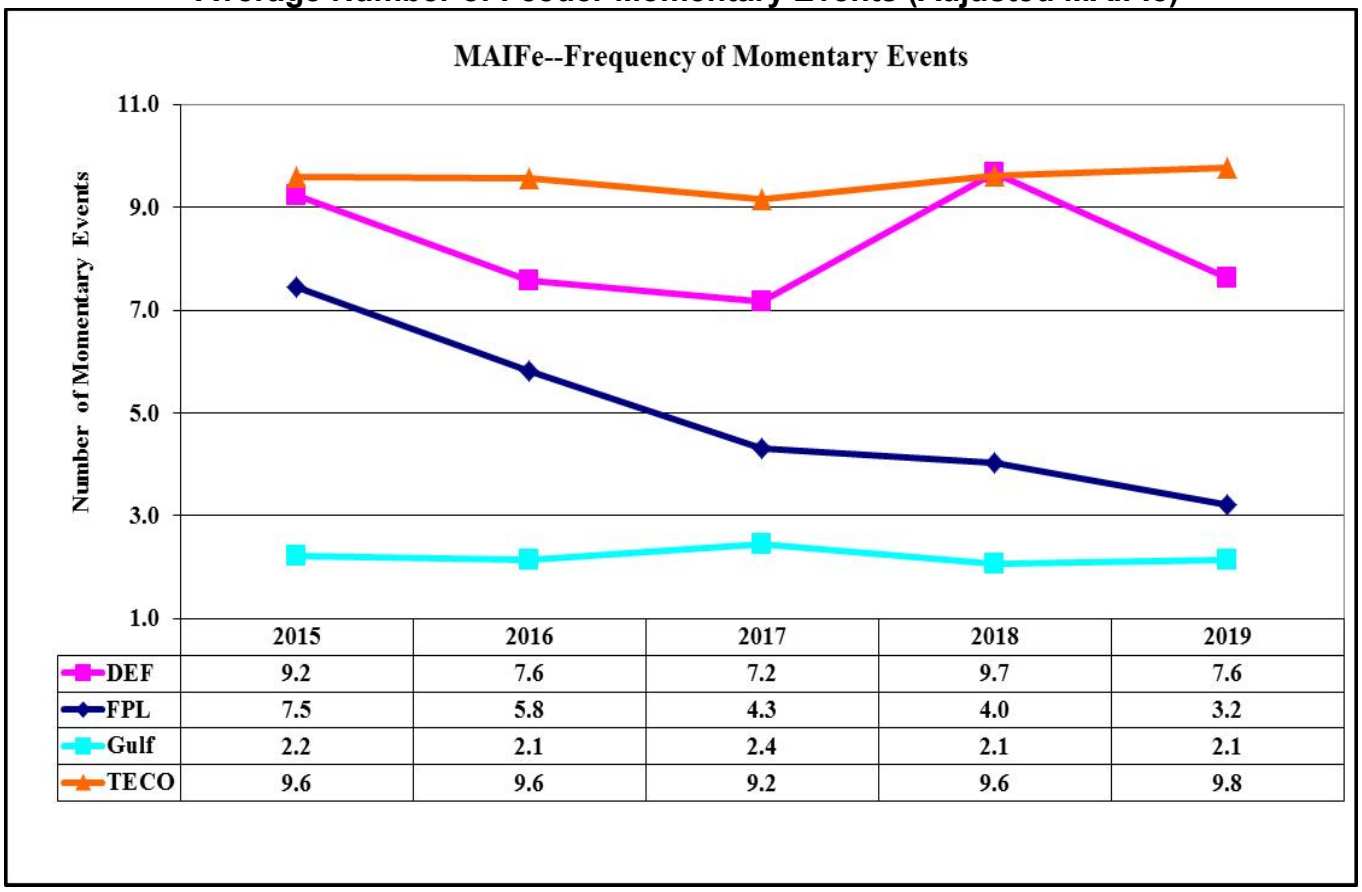
	2015	2016	2017	2018	2019
DEF	81	86	90	97	93
FPL	60	61	60	60	60
FPUC	79	95	85	107	98
Gulf	86	83	97	77	69
TECO	77	83	71	80	71

Source: The IOUs' 2015-2019 distribution service reliability reports.

Figure 4-4 shows a five-year graph of the adjusted MAIFIe for DEF, FPL, Gulf, and TECO. DEF, FPL, and Gulf's MAIFIe indices are all trending downward for the five-year period of 2015 to 2019. TECO's MAIFIe index is trending upward for the five-year period. Comparing the MAIFIe for 2018 to 2019, DEF decreased by 22 percent, FPL decreased by 20 percent, Gulf had no change and TECO increased by 40 percent. FPUC is exempt from reporting MAIFIe and CEMI5 because it has fewer than 50,000 customers.

MAIFIe is the average frequency of momentary interruptions events or the number of times there is a loss of service of less than one minute. MAIFIe is calculated by dividing the number of momentary interruptions events recorded on primary circuits (CME) by the number of customers served.

Figure 4-4
Average Number of Feeder Momentary Events (Adjusted MAIFIe)

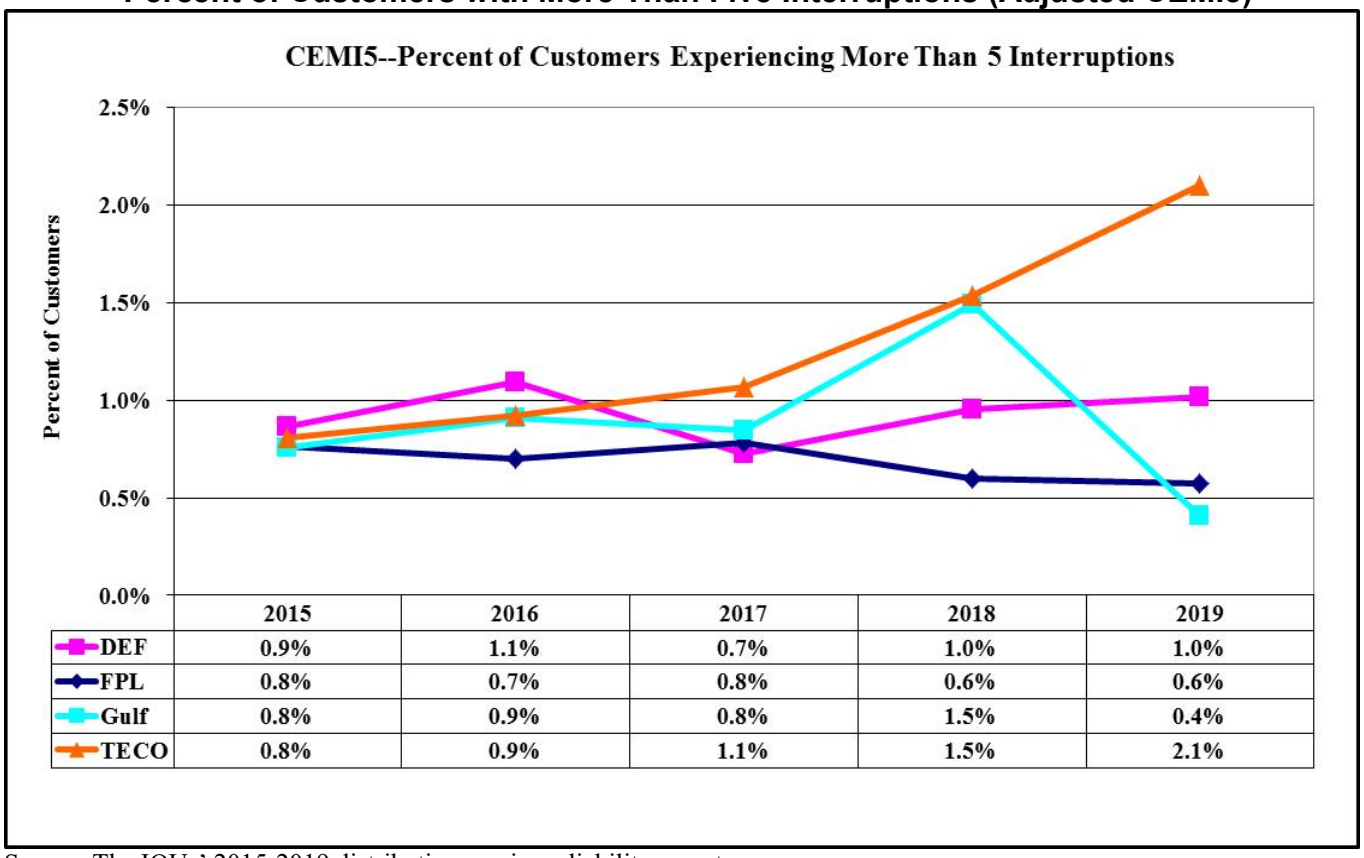


	2015	2016	2017	2018	2019
DEF	9.2	7.6	7.2	9.7	7.6
FPL	7.5	5.8	4.3	4.0	3.2
Gulf	2.2	2.1	2.4	2.1	2.1
TECO	9.6	9.6	9.2	9.6	9.8

Source: The IOUs' 2015-2019 distribution service reliability reports.

Figure 4-5 shows a five-year graph of the adjusted CEMI5 for FPL, Gulf, DEF, and TECO. CEMI5 is a percentage. It represents the number of customers that experienced more than five service interruptions in the year divided by the total number of customers. In 2019, TECO's CEMI5 percent increased to 2.1 percent from 1.5 percent in 2018 as Gulf's CEMI5 percentage decreased from 1.5 percent in 2018 to 0.4 percent in 2019. DEF and FPL had no change in their CEMI5 percentages between 2018 and 2019. FPL is trending downward as DEF and TECO are trending upward for the period of 2015 to 2019. For the period of 2015 to 2019, Gulf's CEMI5 percentage trended upward, but sharply declined between 2018 and 2019.

Figure 4-5
Percent of Customers with More Than Five Interruptions (Adjusted CEMI5)

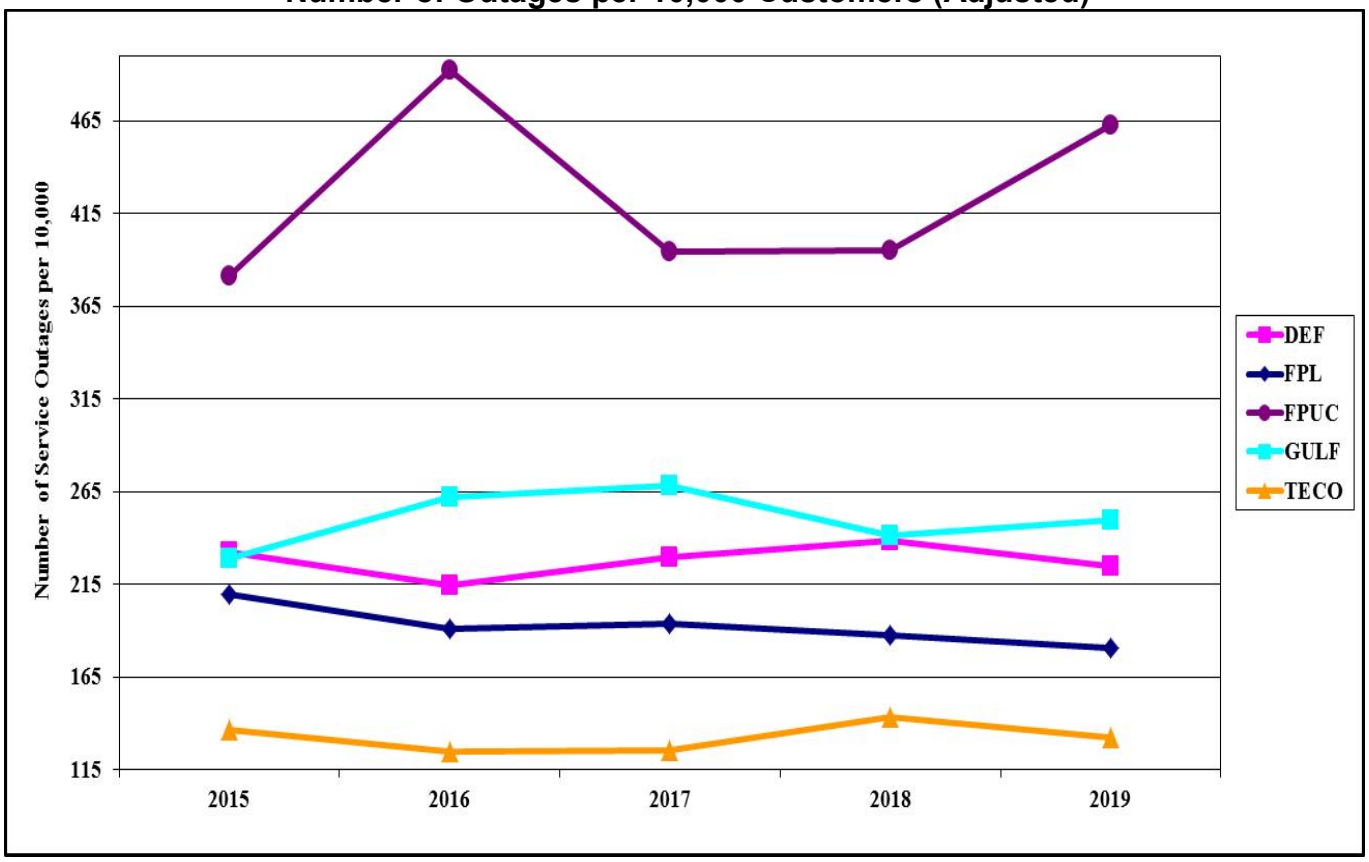


	2015	2016	2017	2018	2019
DEF	0.9%	1.1%	0.7%	1.0%	1.0%
FPL	0.8%	0.7%	0.8%	0.6%	0.6%
Gulf	0.8%	0.9%	0.8%	1.5%	0.4%
TECO	0.8%	0.9%	1.1%	1.5%	2.1%

Source: The IOUs' 2015-2019 distribution service reliability reports.

Figure 4-6 shows the number of outages per 10,000 customers on an adjusted basis for the five IOUs over the last five years. The graph displays each utility's adjusted data concerning the number of outage events and the total number of customers on an annual basis. The number of FPL outages decreased from 93,306 in 2018 to 91,979 in 2019, and the number of outages per 10,000 customers is trending downward for the five-year period. TECO's results are trending upward for the five-year period. DEF's number of outages decreased for 2019 and the results are relatively flat for the five-year period. Gulf's number of outages increased for 2019, and is trending upward for the five-year period. FPUC's results increased for 2015 to 2016, decreased for 2016 to 2017, decreased for 2017 to 2018 and increased for 2018 to 2019. Due to its small customer base, FPUC's number of outages per 10,000 customers may be more volatile.

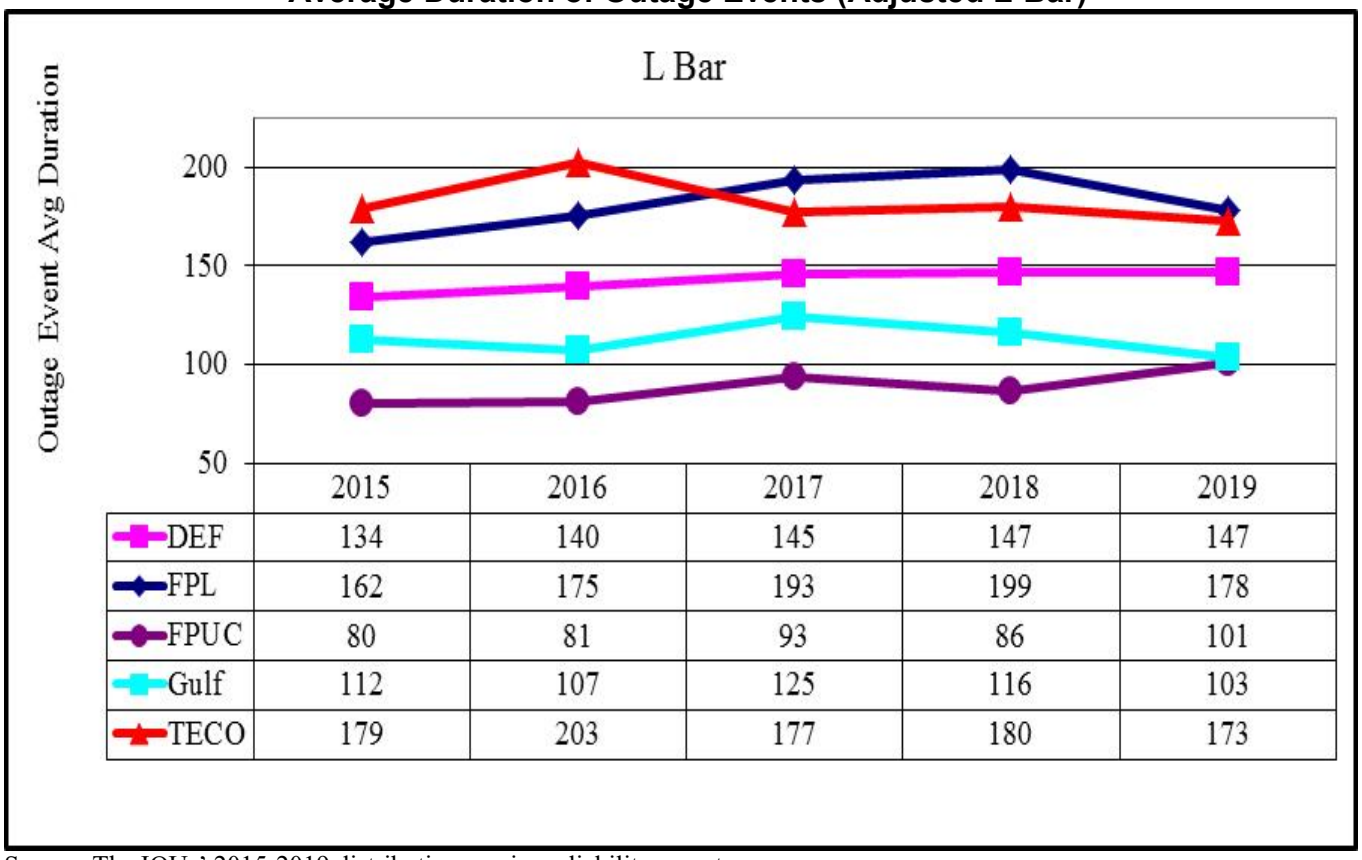
Figure 4-6
Number of Outages per 10,000 Customers (Adjusted)



Source: The IOUs' 2015-2019 distribution service reliability reports.

Figure 4-7 represents the average duration of outage events (Adjusted L-Bar) for each IOU. From the data shown, it appears that the utilities have been consistent with their restoral times for the five-year period of 2015 to 2019, even with increases from 2018 to 2019.

Figure 4-7
Average Duration of Outage Events (Adjusted L-Bar)



	2015	2016	2017	2018	2019
DEF	134	140	145	147	147
FPL	162	175	193	199	178
FPUC	80	81	93	86	101
Gulf	112	107	125	116	103
TECO	179	203	177	180	173

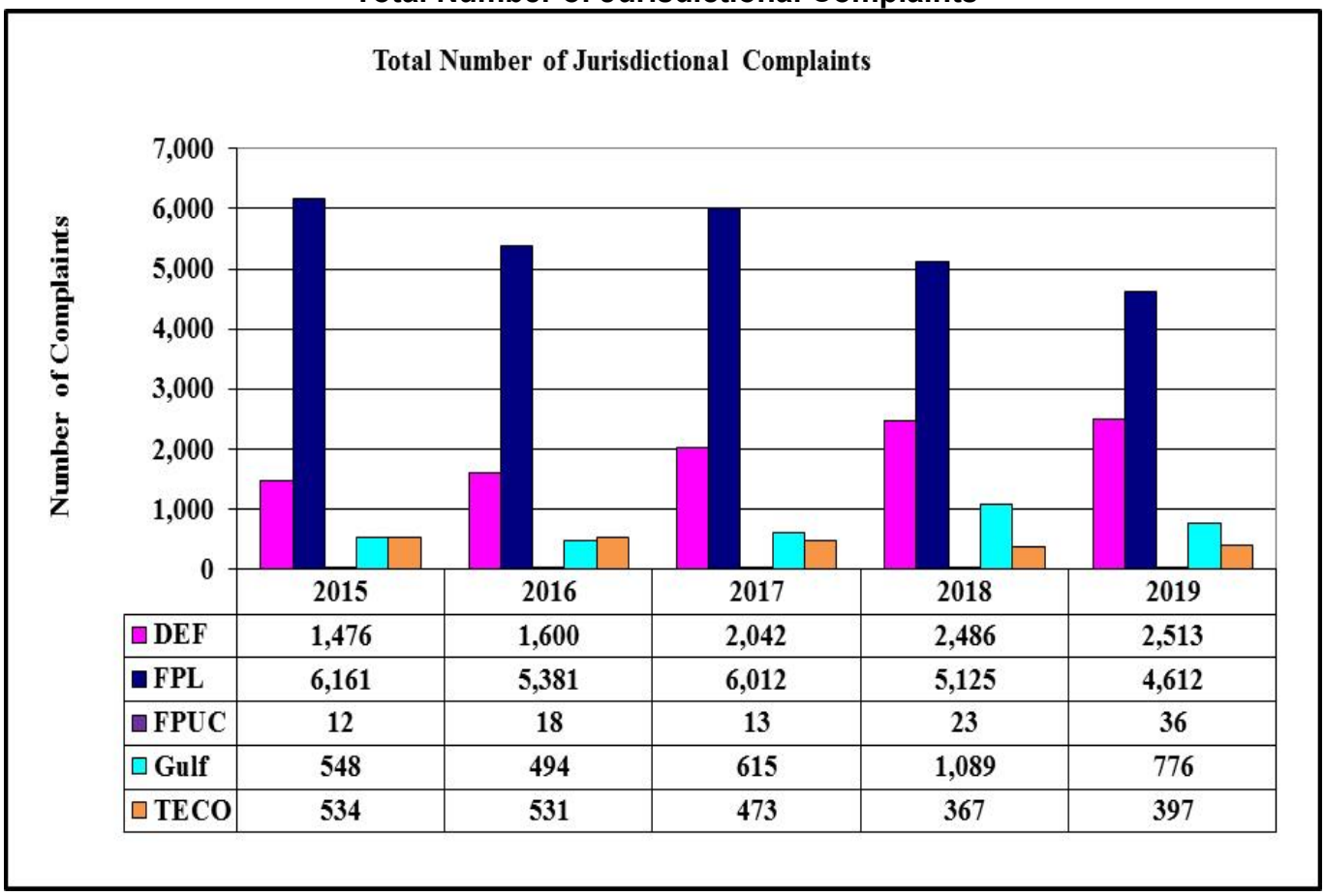
Source: The IOUs' 2015-2019 distribution service reliability reports.

Inter-Utility Comparisons of Reliability Related Complaints

Figures 4-8, **4-9**, **4-10**, and **4-11** represent consumer complaint data that was extracted from the Commission's Consumer Activity Tracking System (CATS). Each consumer complaint received by the Commission is assigned a code after the complaint is resolved. Reliability related complaints have 10 specific category types and typically pertain to "Trees," "Safety," "Repairs," "Frequent Outages," and "Momentary Service Interruptions."

Figure 4-8 shows the total number of jurisdictional complaints[16] for each IOU. In comparing the number of complaints by the different companies, the total number of customers should be considered. FPL has the higher number of complaints, but FPL also has more customers than the other companies.

Figure 4-8
Total Number of Jurisdictional Complaints



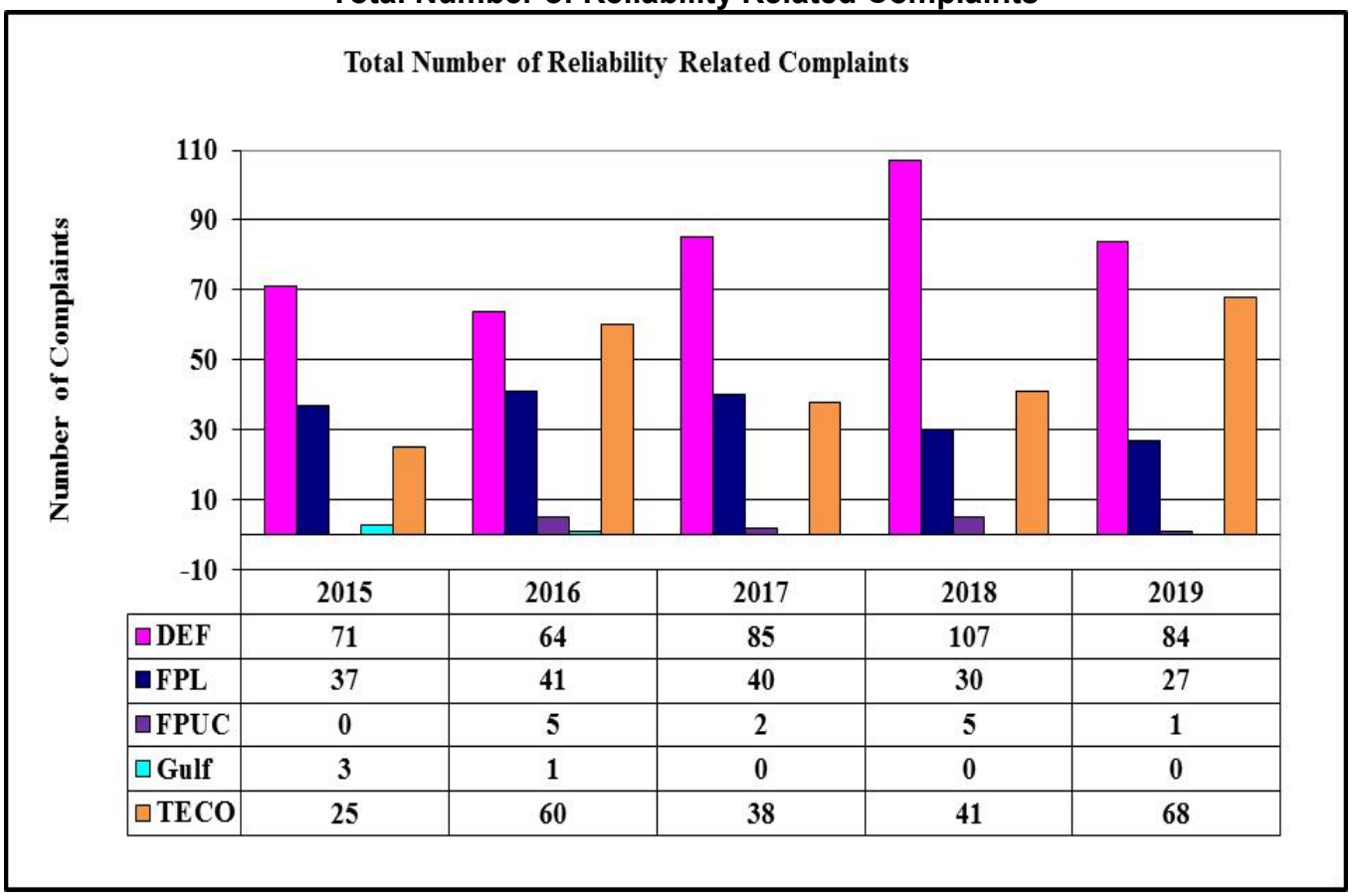
	2015	2016	2017	2018	2019
DEF	1,476	1,600	2,042	2,486	2,513
FPL	6,161	5,381	6,012	5,125	4,612
FPUC	12	18	13	23	36
Gulf	548	494	615	1,089	776
TECO	534	531	473	367	397

Source: FPSC CATS.

[16]Non-jurisdictional complaint codes include load management, hurricanes, and damage claims.

Figure 4-9 charts the total number of reliability related complaints for the IOUs. DEF is showing the largest amount of reliability complaints for the five-year period of 2015 to 2019 with FPUC and Gulf showing the least amount. FPL, FPUC, and Gulf are trending downward in the number of reliability complaints, while DEF and TECO are trending upward.

Figure 4-9
Total Number of Reliability Related Complaints

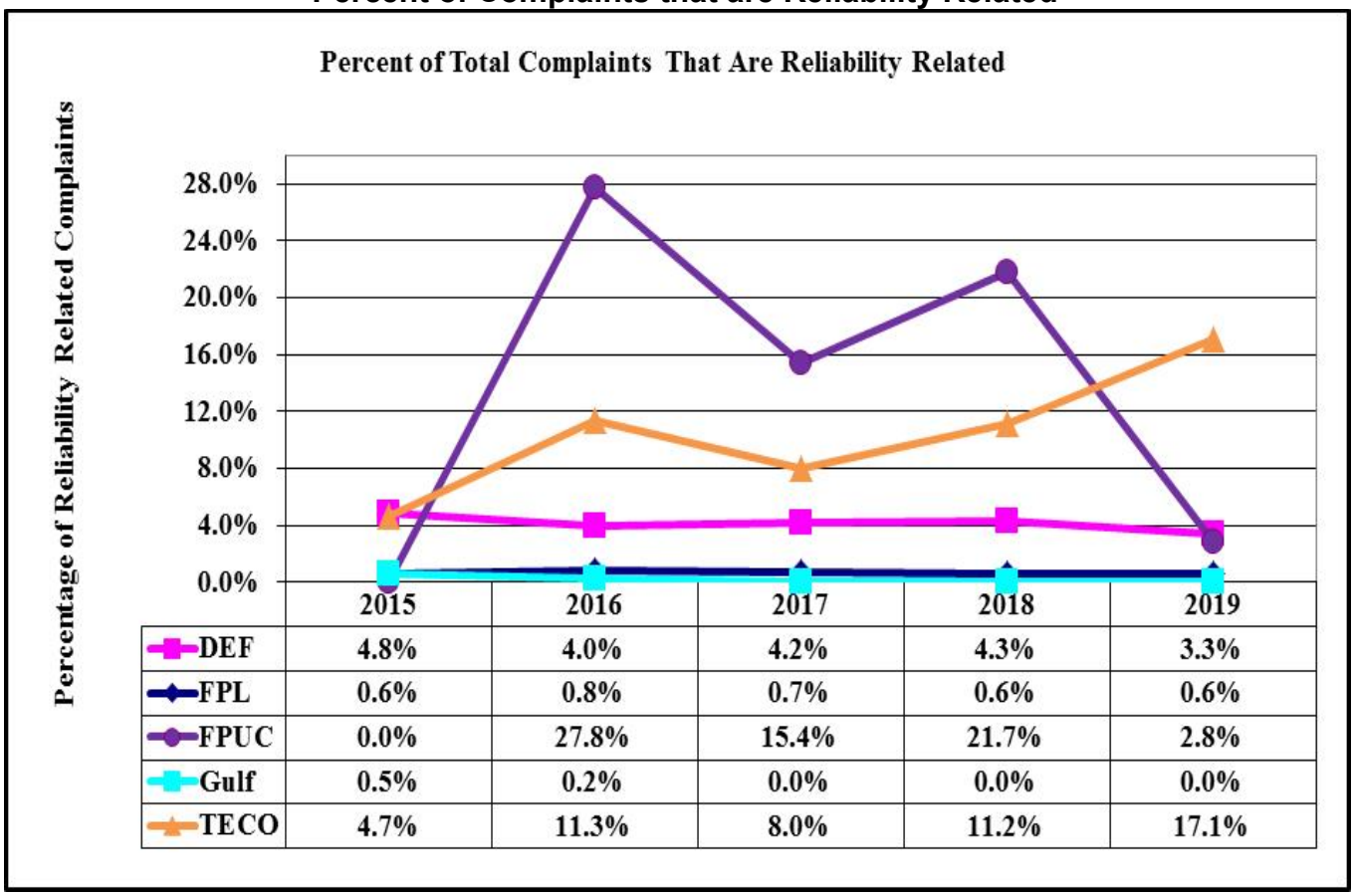


	2015	2016	2017	2018	2019
DEF	71	64	85	107	84
FPL	37	41	40	30	27
FPUC	0	5	2	5	1
Gulf	3	1	0	0	0
TECO	25	60	38	41	68

Source: FPSC CATS.

Figure 4-10 shows the percentage of reliability related customer complaints in relation to the total number of complaints for each IOU. DEF, FPL and Gulf appear to be trending downward as FPUC and TECO are trending upward. The percentages of FPUC complaints compared to the other companies appears high, however FPUC has fewer customers and fewer complaints in total.

Figure 4-10
Percent of Complaints that are Reliability Related



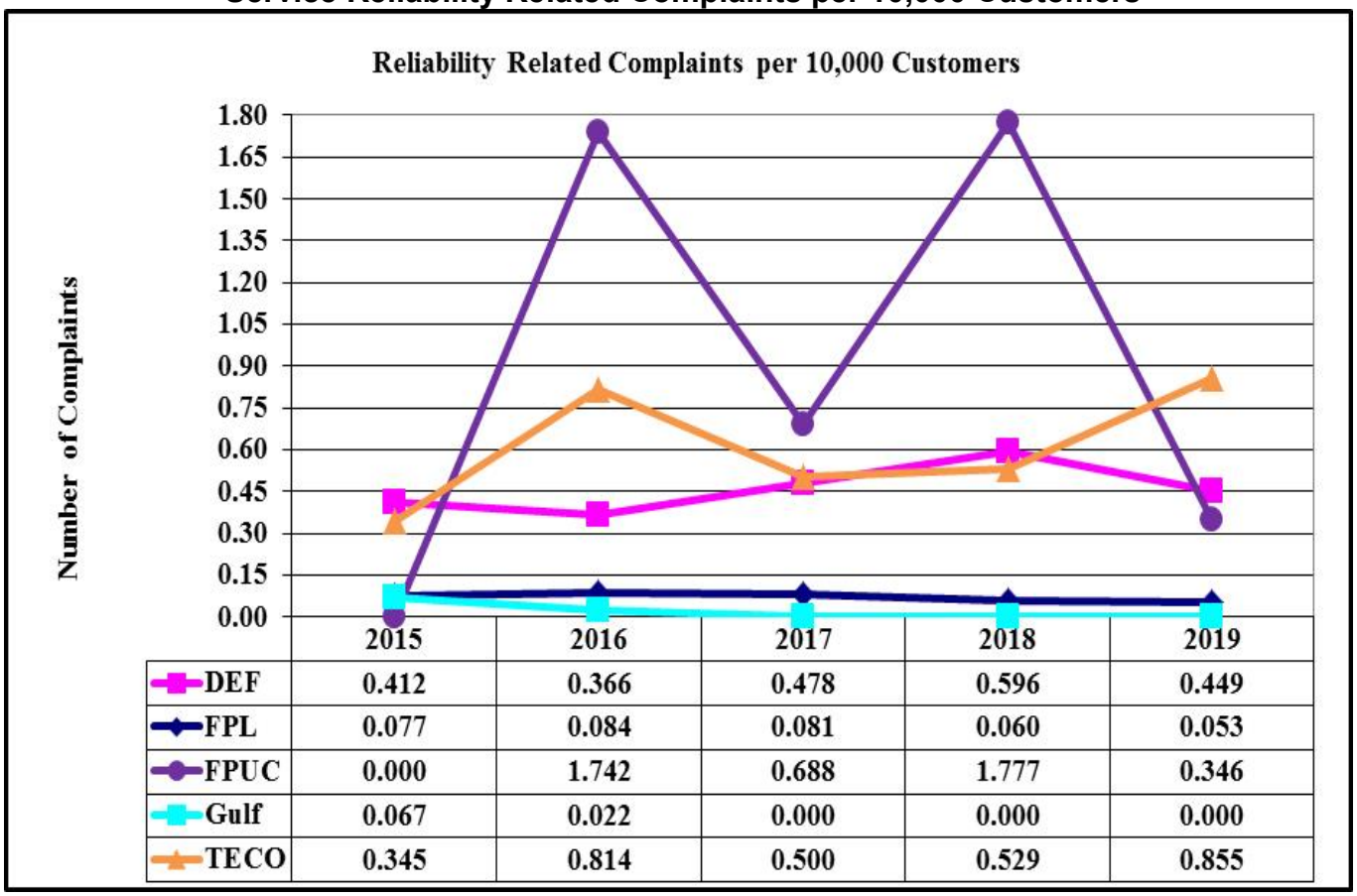
	2015	2016	2017	2018	2019
DEF	4.8%	4.0%	4.2%	4.3%	3.3%
FPL	0.6%	0.8%	0.7%	0.6%	0.6%
FPUC	0.0%	27.8%	15.4%	21.7%	2.8%
Gulf	0.5%	0.2%	0.0%	0.0%	0.0%
TECO	4.7%	11.3%	8.0%	11.2%	17.1%

Source: FPSC CATS.

Figure 4-11 charts the volume of reliability related complaints per 10,000 customers for the IOUs. The volume of service reliability complaints is normalized to a 10,000-customer base for comparative purposes. This is calculated for each IOU by dividing the total number of reliability complaints reported to the Commission by the total number of the utility's customers. This fraction is then multiplied by 10,000 for graphing purposes.

All the IOUs have less than one reliability complaint per 10,000 customers since 2015 except FPUC. For the five-year period, Gulf and FPL remain relatively flat. DEF, FPUC, and TECO are trending upward for the five-year period. The volatility of FPUC's results can be attributed to its small customer base, which typically averages 28,500 customers.

Figure 4-11
Service Reliability Related Complaints per 10,000 Customers



	2015	2016	2017	2018	2019
DEF	0.412	0.366	0.478	0.596	0.449
FPL	0.077	0.084	0.081	0.060	0.053
FPUC	0.000	1.742	0.688	1.777	0.346
Gulf	0.067	0.022	0.000	0.000	0.000
TECO	0.345	0.814	0.500	0.529	0.855

Source: The IOUs' 2015-2019 distribution service reliability reports and FPSC CATS.

Section V: Appendices

Appendix A – Adjusted Service Reliability Data

Duke Energy Florida, LLC

Table A-1
DEF's Number of Customers (Year End)

	2015	2016	2017	2018	2019
North Central	396,395	400,510	406,483	409,949	425,895
North Coastal	198,525	200,565	203,300	204,915	214,245
South Central	458,457	470,534	484,848	493,782	520,699
South Coastal	670,743	677,255	682,618	686,076	710,806
DEF System	**1,724,120**	**1,748,864**	**1,777,249**	**1,794,722**	**1,871,645**

Source: DEF's 2015-2019 distribution service reliability reports.

Table A-2
DEF's Adjusted Regional Indices SAIDI, SAIFI, and CAIDI

	Average Interruption Duration Index (SAIDI)					Average Interruption Frequency Index (SAIFI)					Average Customer Restoration Time Index (CAIDI)				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
North Central	72	78	75	86	87	0.85	0.90	0.84	0.96	0.81	84	87	90	90	108
North Coastal	145	155	154	168	170	1.47	1.39	1.45	1.52	1.56	99	111	107	111	108
South Central	71	79	70	84	86	0.91	1.01	0.84	0.93	1.02	77	78	83	90	85
South Coastal	71	73	75	95	72	0.97	0.90	0.88	0.95	0.86	74	81	85	100	84
DEF System	**80**	**85**	**83**	**99**	**90**	**0.98**	**0.98**	**0.92**	**1.01**	**0.97**	**81**	**86**	**90**	**97**	**93**

Source: DEF's 2015-2019 distribution service reliability reports.

Table A-3
DEF's Adjusted Regional Indices MAIFIe and CEMI5

	Average Frequency of Momentary Events on Feeders (MAIFIe)					Percentage of Customers Experiencing More than 5 Service Interruptions (CEMI5)				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
North Central	8.3	8.6	7.6	3.6	4.67	0.32%	0.36%	0.37%	0.42%	0.41%
North Coastal	7.1	7.8	8.2	13.6	9.66	3.96%	4.00%	2.83%	4.80%	5.50%
South Central	8.1	7.0	6.9	11.4	8.78	0.64%	1.06%	0.87%	0.44%	0.79%
South Coastal	11.2	7.3	6.8	10.8	7.93	0.43%	0.68%	0.21%	0.49%	0.19%
DEF System	**9.2**	**7.6**	**7.2**	**9.7**	**7.62**	**0.87%**	**1.09%**	**0.73%**	**0.95%**	**1.02%**

Source: DEF's 2015-2019 distribution service reliability reports.

Table A-4
DEF's Primary Causes of Outages Events

	Adjusted Number of Outages Events						Adjusted L-Bar Length of Outages				
	2015	2016	2017	2018	2019	Percentages	2015	2016	2017	2018	2019
Animals	5,321	5,369	5,597	4,566	5,127	12.2%	75	80	80	82	82
Unknown	1,224	1,097	998	766	859	2.0%	77	90	94	83	85
All Other	7,900	7,390	8,287	8,310	8,223	19.6%	167	174	180	173	169
Defective Equipment	8,572	9,195	10,475	12,038	11,921	28.3%	142	147	150	152	146
Lightning	1,201	1,216	1,261	1,517	943	2.2%	145	150	151	157	168
Vegetation	8,240	7,879	8,143	8,522	8,883	21.1%	136	145	150	148	160
Other Weather	7,141	4,965	5,478	6,463	5,658	13.5%	134	134	145	144	153
Vehicle	412	429	505	599	445	1.1%	227	235	223	233	250
DEF System	**40,011**	**37,540**	**40,744**	**42,781**	**42,059**	**100%**	**134**	**140**	**145**	**147**	**147**

Source: DEF's 2015-2019 distribution service reliability reports.
Note: (1) "Other Causes" category is the sum of diverse causes of outage events which individually are not among the top 10 causes of outage events.

Florida Power & Light Company

Table A-5
FPL's Number of Customers (Year End)

	2015	2016	2017	2018	2019
Boca Raton	370,266	374,080	378,125	380,552	383,429
Brevard	301,843	305,151	307,825	312,017	316,529
Central Broward*	271,478	273,692	276,218	278,910	282,135
Central Dade	287,147	292,421	297,237	314,448	320,532
Central Florida	283,868	286,492	289,426	293,507	298,186
Manasota	384,138	390,400	395,636	401,766	408,944
Naples	386,710	394,355	399,295	406,500	414,696
North Broward*	314,209	317,731	319,630	321,508	323,531
North Dade	237,328	240,194	241,259	248,900	251,793
North Florida	153,683	157,967	161,216	166,703	171,801
South Broward*	335,006	337,828	339,518	342,226	344,502
South Dade	304,336	309,022	311,692	299,375	303,306
Toledo Blade	260,053	265,547	269,787	275,688	281,994
Treasure Coast	287,508	291,334	294,545	299,495	340,658
West Dade	257,539	261,484	264,888	266,629	270,975
West Palm	361,717	364,292	366,570	370,077	373,533
FPL System	**4,796,829**	**4,861,990**	**4,912,867**	**4,978,301**	**5,086,544**

Source: FPL's 2015-2019 distribution service reliability reports.
Note: Three management regions were renamed: Pompano became North Broward, Wingate became Central Broward and Gulf Stream became South Broward.

Table A-6
FPL's Adjusted Regional Indices SAIDI, SAIFI, and CAIDI

	Average Interruption Duration Index (SAIDI)					Average Interruption Frequency Index (SAIFI)					Average Customer Restoration Time Index (CAIDI)				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Boca Raton	54	51	45	50	42	1.08	1.08	0.89	1.00	0.80	50	47	50	49	52
Brevard	53	53	56	44	44	0.96	0.87	1.04	0.87	0.81	55	60	54	50	55
Central Broward*	64	58	61	60	65	1.14	0.86	1.11	0.90	0.88	57	67	55	66	74
Central Dade	47	41	42	42	54	0.78	0.66	0.79	0.77	0.78	60	63	53	54	69
Central Florida	50	49	46	47	40	0.90	0.80	0.85	0.84	0.77	55	61	54	56	53
Manasota	55	52	50	52	34	1.00	0.91	0.77	0.73	0.58	55	57	65	72	59
Naples	57	56	64	55	50	0.91	0.97	0.92	0.89	0.82	62	57	69	62	61
North Broward*	57	48	38	39	37	1.03	0.80	0.65	0.66	0.61	55	60	58	59	61
North Dade	71	59	69	69	64	0.87	0.72	0.96	0.94	1.00	82	82	72	74	64
North Florida	68	64	64	73	60	1.08	1.00	1.04	1.25	1.04	63	64	62	58	58
South Broward*	52	43	42	51	51	0.88	0.83	0.79	0.90	0.85	59	51	54	56	60
South Dade	76	68	63	59	56	1.08	0.99	0.79	0.83	0.74	71	69	80	71	75
Toledo Blade	65	75	77	70	56	0.98	1.14	1.12	1.01	0.88	66	66	69	69	64
Treasure Coast	72	81	66	47	54	1.05	1.19	1.11	0.81	0.97	69	68	59	59	55
West Dade	68	56	54	67	61	1.24	0.99	0.85	1.03	0.96	55	57	63	65	63
West Palm	55	51	46	46	41	1.01	0.88	0.96	0.97	0.83	55	58	47	48	49
FPL System	**59**	**56**	**54**	**53**	**49**	**1.00**	**0.92**	**0.90**	**0.89**	**0.82**	**60**	**61**	**60**	**60**	**60**

Source: FPL's 2015-2019 distribution service reliability reports.
Note: Three management regions were renamed: Pompano became North Broward, Wingate became Central Broward and Gulf Stream became South Broward.

Table A-7
FPL's Adjusted Regional Indices MAIFIe and CEMI5

	Average Frequency of Momentary Events on Feeders (MAIFIe)					Percentage of Customers Experiencing More than 5 Service Interruptions (CEMI5)				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Boca Raton	7.4	5.6	4.6	4.3	3.8	0.76%	1.36%	0.37%	0.90%	1.01%
Brevard	7.8	5.2	4.0	3.5	3.0	0.27%	0.17%	0.86%	0.27%	0.21%
Central Broward*	10.4	7.9	6.5	4.5	3.5	0.59%	0.53%	0.66%	0.17%	0.47%
Central Dade	7.5	5.0	3.6	3.0	2.8	0.29%	0.55%	0.78%	0.73%	0.14%
Central Florida	6.5	5.2	3.4	3.8	2.8	0.30%	0.15%	0.24%	0.84%	0.37%
Manasota	6.1	5.3	4.0	3.8	2.4	0.91%	0.21%	0.34%	0.26%	0.27%
Naples	7.1	6.8	6.0	4.7	3.3	0.56%	0.44%	0.34%	0.35%	1.00%
North Broward*	6.1	4.5	3.1	3.4	2.4	1.01%	1.23%	0.07%	0.54%	0.20%
North Dade	7.7	5.3	3.3	3.2	2.8	1.01%	0.28%	1.23%	0.70%	1.03%
North Florida	8.7	5.8	4.2	3.2	2.8	0.71%	0.44%	0.72%	1.44%	0.74%
South Broward*	6.6	5.1	4.0	4.4	3.4	0.79%	0.13%	0.60%	0.17%	0.34%
South Dade	7.1	5.8	4.3	3.8	3.3	0.89%	0.24%	0.67%	0.29%	0.72%
Toledo Blade	8.2	7.8	4.5	5.2	3.5	0.65%	1.57%	1.48%	1.94%	0.66%
Treasure Coast	8.1	6.4	4.0	3.5	3.2	1.03%	2.87%	1.73%	0.51%	1.22%
West Dade	7.8	6.4	4.4	4.5	3.9	1.46%	0.57%	0.72%	0.49%	0.61%
West Palm	7.5	5.5	4.4	4.7	4.1	1.01%	0.50%	2.04%	0.63%	0.26%
FPL System	**7.5**	**5.8**	**4.3**	**4.0**	**3.2**	**0.76%**	**0.70%**	**0.78%**	**0.60%**	**0.57%**

Source: FPL's 2015-2019 distribution service reliability reports.
Note: Three management regions were renamed: Pompano became North Broward, Wingate became Central Broward and Gulf Stream became South Broward.

Table A-8
FPL's Primary Causes of Outage Events

	Adjusted Number of Outage Events						Adjusted L-Bar Length of Outages				
	2015	2016	2017	2018	2019	Percentages	2015	2016	2017	2018	2019
Unknown	11,022	10,139	10,436	10,482	8,593	9.3%	124	133	163	145	132
Vegetation	23,155	20,331	17,264	15,949	18,123	19.7%	182	197	205	199	193
Animals	9,878	9,506	9,219	9,131	10,046	10.9%	93	100	109	104	105
Remaining Causes	3,147	2,821	3,308	3,394	3,449	3.7%	140	158	167	172	147
Other Weather	9,426	7,978	7,458	7,335	6,592	7.2%	167	173	215	194	190
Other	8,358	7,340	9,402	9,959	8,367	9.1%	149	161	217	198	171
Lightning	1,770	1,647	1,192	1,902	1,644	1.8%	241	255	245	282	260
Vehicle	969	911	1,026	954	883	1.0%	230	248	253	275	259
Defective Equipment	32,838	32,013	35,772	34,200	34,282	37.3%	179	195	206	238	198
FPL System	**100,563**	**92,686**	**95,077**	**93,306**	**91,979**	**100%**	**162**	**175**	**193**	**199**	**178**

Source: FPL's 2015-2019 distribution service reliability reports.
Notes: (1) "Other Causes" category is a sum of outages events that require a detailed explanation.
(2) "Remaining Causes" category is the sum of many diverse causes of outage events, which individually are not among the top 10 causes of outage events, and excludes those identified as "Other Causes."

Florida Public Utilities Company

Table A-9
FPUC's Number of Customers (Year End)

	2015	2016	2017	2018	2019
Fernandina(NE)	15,787	16,037	16,286	16,410	16,727
Marianna (NW)	12,649	12,663	12,764	11,729	12,135
FPUC System	**28,436**	**28,700**	**29,050**	**28,139**	**28,862**

Source: FPUC's 2015-2019 distribution service reliability reports.

Table A-10
FPUC's Adjusted Regional Indices SAIDI, SAIFI, and CAIDI

	Average Interruption Duration Index (SAIDI)					Average Interruption Frequency Index (SAIFI)					Average Customer Restoration Time Index (CAIDI)				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
NE	105	128	93	137	82	1.19	1.41	1.04	1.23	0.87	88	90	89	112	94
NW	155	258	197	178	283	2.15	2.63	2.41	1.75	2.85	72	98	82	102	99
FPUC System	**127**	**185**	**139**	**154**	**166**	**1.62**	**1.95**	**1.64**	**1.45**	**1.70**	**79**	**95**	**85**	**107**	**98**

Source: FPUC's 2015-2019 distribution service reliability reports.

Table A-11
FPUC's Primary Causes of Outage Events

	Adjusted Number of Outage Events						Adjusted L-Bar Length of Outages				
	2015	2016	2017	2018	2019	Percentages	2015	2016	2017	2018	2019
Vegetation	295	436	354	421	357	26.7%	76	78	83	86	100
Animals	201	354	267	204	184	13.8%	53	51	56	62	66
Lightning	148	128	77	128	174	13.0%	90	82	81	98	115
Unknown	75	89	62	69	125	9.4%	64	75	89	88	78
Corrosion	-	12	-	-	-	-	-	102	-	-	-
All Other	27	58	44	61	64	4.8%	94	65	86	76	89
Other Weather	178	148	152	55	130	9.7%	94	147	168	101	140
Vehicle	25	26	30	21	132	9.9%	130	121	94	148	95
Defective Equipment	136	163	160	152	170	12.7%	97	94	117	101	123
FPUC System	**1,085**	**1,414**	**1,146**	**1,111**	**1,336**	**100%**	**80**	**81**	**93**	**86**	**98**

Source: FPUC's 2015-2019 distribution service reliability reports.
Notes: (1) "Other Causes" category is the sum of many diverse causes of outage events which individually are not one of the top 10 causes of outage events.
(2) Blanks are shown for years where the quantity of outages was less than one of the top 10 causes of outage event.

Gulf Power Company

Table A-12
Gulf's Number of Customers (Year End)

	2015	2016	2017	2018	2019
Central	115,524	116,745	118,010	119,219	120,399
Eastern	115,099	116,702	117,847	114,413	115,446
Western	218,848	221,968	225,949	229,351	232,438
Gulf System	**449,471**	**455,415**	**461,806**	**462,983**	**468,283**

Source: Gulf's 2015-2019 distribution service reliability reports.

Table A-13
Gulf's Adjusted Regional Indices SAIDI, SAIFI, and CAIDI

	Average Interruption Duration Index (SAIDI)					Average Interruption Frequency Index (SAIFI)					Average Customer Restoration Time Index (CAIDI)				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Central	75	91	110	86	58	0.82	1.04	1.05	0.90	0.73	92	88	105	95	79
Eastern	59	93	108	103	69	0.86	1.21	1.27	1.30	1.12	69	77	85	79	62
Western	110	97	123	99	71	1.21	1.15	1.24	1.42	1.02	91	85	100	70	69
Gulf System	**88**	**95**	**116**	**97**	**67**	**1.02**	**1.14**	**1.20**	**1.26**	**0.97**	**86**	**83**	**97**	**77**	**69**

Source: Gulf's 2015-2019 distribution service reliability reports.

Table A-14
Gulf's Adjusted Regional Indices MAIFIe and CEMI5

	Average Frequency of Momentary Events on Feeders (MAIFIe)					Percentage of Customers Experiencing More than 5 Service Interruptions (CEMI5)				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Central	1.8	1.5	2.1	1.6	2.0	0.17%	0.22%	0.91%	0.51%	0.11%
Eastern	1.7	1.6	2.3	1.9	2.3	1.66%	1.84%	0.86%	2.15%	0.82%
Western	2.7	2.7	2.7	2.4	2.1	0.59%	0.77%	0.80%	1.68%	0.36%
Gulf System	**2.2**	**2.1**	**2.4**	**2.1**	**2.1**	**0.76%**	**0.91%**	**0.84%**	**1.49%**	**0.41%**

Source: Gulf's 2015-2019 distribution service reliability reports.

Table A-15
Gulf's Primary Causes of Outage Events

	Adjusted Number of Outage Events						Adjusted L-Bar Length of Outages				
	2015	2016	2017	2018	2019	Percentages	2015	2016	2017	2018	2019
Animals	2,743	3,557	3,514	2,189	2,495	21.4%	60	65	70	69	65
Lightning	1,788	1,913	1,633	1,623	1,437	12.3%	134	138	164	131	117
Unknown	598	748	818	1,121	1,211	10.4%	79	82	101	102	89
Vehicle	293	381	377	389	443	3.8%	170	164	171	181	150
All Other	379	457	428	442	652	5.6%	101	100	113	110	98
Vegetation	1,888	1,954	2,460	2,521	2,485	21.3%	138	116	144	119	102
Other Weather	251	220	366	257	331	2.8%	137	126	243	145	116
Defective Equipment	2,340	2,714	2,804	2,618	2,630	22.5%	137	132	140	140	132
Gulf System	**10,280**	**11,944**	**12,400**	**11,160**	**11,684**	**100%**	**112**	**107**	**125**	**116**	**103**

Source: Gulf's 2015-2019 distribution service reliability reports.
Notes: (1) "Other Causes" category is the sum of many diverse causes of outage events, which individually are not among the top 10 causes of outages events.

Tampa Electric Company

Table A-16
TECO's Number of Customers (Year End)

	2015	2016	2017	2018	2019
Central	193,436	196,431	202,572	205,611	209,057
Dade City	14,372	14,492	14,801	14,954	15,305
Eastern	117,268	119,286	122,667	125,030	127,437
Plant City	58,472	59,381	61,187	62,131	63,502
South Hillsborough	72,340	75,450	80,194	84,636	91,219
Western	198,224	199,891	203,805	206,962	210,151
Winter Haven	70,799	71,888	74,403	75,778	78,282
TECO System	**724,911**	**736,819**	**759,629**	**775,102**	**794,953**

Source: TECO's 2015-2019 distribution service reliability reports.

Table A-17
TECO's Adjusted Regional Indices SAIDI, SAIFI, and CAIDI

	Average Interruption Duration Index (SAIDI)					Average Interruption Frequency Index (SAIFI)					Average Customer Restoration Time Index (CAIDI)				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Central	70	63	64	87	63	1.06	0.85	0.82	1.04	0.91	66	74	78	83	70
Dade City	199	153	153	168	191	1.92	1.79	2.10	1.98	2.15	104	86	73	85	89
Eastern	67	85	63	85	83	0.90	0.99	0.89	1.00	1.15	75	86	72	86	72
Plant City	117	113	92	112	114	1.46	1.20	1.44	1.55	1.60	80	94	64	72	71
South Hillsborough	86	104	84	99	52	1.10	1.35	1.20	1.43	1.01	78	77	70	69	52
Western	78	81	71	97	77	0.89	0.94	0.99	1.12	1.00	87	86	72	86	78
Winter Haven	66	82	76	93	67	0.93	0.94	1.21	1.27	1.01	71	87	62	73	67
TECO System	**79**	**83**	**73**	**95**	**76**	**1.03**	**1.00**	**1.03**	**1.18**	**1.07**	**77**	**83**	**71**	**80**	**71**

Source: TECO's 2015-2019 distribution service reliability reports.

Table A-18
TECO's Adjusted Regional Indices MAIFIe and CEMI5

	Average Frequency of Momentary Events on Feeders (MAIFIe)					Percentage of Customers Experiencing More than 5 Service Interruptions (CEMI5)				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Central	8.5	7.8	7.9	8.1	7.9	0.51%	0.96%	0.18%	1.41%	0.81%
Dade City	18.0	14.7	14.2	14.8	12.3	10.41%	2.72%	6.64%	4.73%	11.17%
Eastern	9.1	9.2	8.8	10.2	10.8	0.27%	0.47%	1.79%	0.77%	2.10%
Plant City	11.8	13.4	12.8	14.7	13.7	2.61%	2.15%	3.02%	1.10%	4.03%
South Hillsborough	11.0	12.8	10.8	11.1	9.4	0.82%	0.17%	2.43%	2.93%	4.62%
Western	8.7	8.8	8.4	8.3	9.5	0.42%	0.63%	0.30%	1.19%	1.69%
Winter Haven	11.1	9.7	9.7	9.9	10.7	0.15%	1.81%	0.20%	2.23%	0.39%
TECO System	**9.6**	**9.6**	**9.2**	**9.6**	**9.8**	**0.81%**	**0.92%**	**1.07%**	**1.54%**	**2.10%**

Source: TECO's 2015-2019 distribution service reliability reports.

Table A-19
TECO's Primary Causes of Outage Events

	Adjusted Number of Outage Events						Adjusted L-Bar Length of Outages				
	2015	2016	2017	2018	2019	Percentages	2015	2016	2017	2018	2019
Lightning	1,779	1,751	1,258	1,258	1,436	13.7%	218	255	206	207	222
Animals	1,321	1,178	1,632	1,632	1,788	17.0%	100	97	105	96	94
Vegetation	2,064	1,959	2,108	2,108	2,357	22.4%	190	214	195	200	197
Unknown	792	931	972	972	1,356	12.9%	125	144	141	134	129
Other Weather	166	-	-	-	-	-	192	-	-	-	-
Vehicle	397	363	401	401	387	3.7%	199	211	214	78	231
Defective Equipment	2,803	2,581	2,494	2,494	2,459	23.4%	198	243	203	190	190
All Other	559	428	649	408	721	6.9%	166	173	147	188	148
TECO System	**9,881**	**9,191**	**9,514**	**9,273**	**10,504**	**100%**	**179**	**203**	**177**	**180**	**173**

Source: TECO's 2015-2019 distribution service reliability reports.
Notes: (1) "Other Causes" category is the sum of many diverse causes of outage events which individually are not among the top 10 causes of outages events.
(2) Blanks are shown for years where the number of outages was too small to be among the top 10 causes of outage events.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)										
Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Alachua, City of	Yes	Yes. The City design is based on 110 mph wind load with a 1.25 (minimum) safety factor for wind gusts.	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	The City's inspection cycle is on an eight-year cycle (12.5% per year) The City of Alachua owns only distribution poles, no transmission poles. In October 2015, the City completed its first eight-year cycle.	For 2019, the City inspected 423 (17%) of its 2,492 distribution poles.	From the 2019 inspection report: 31 (7.3%) poles were rejected. Six poles were deemed priority rejects requiring immediate change-out due to shell rot at ground level. 25 poles were deemed non-priority rejects due to shell rot, decay top, split top and woodpecker damage.	From the 2019 inspection report: the failed poles were 30, 35, 40, or 45 feet, Class 4, 5 or 6 and replaced accordingly. The non-priority reject poles were treated and wrapped.	The City continues to use the information from the PURC conference held in 2007 and 2009, to improve vegetation management.	The City trims approximately 62 miles of overhead distribution on a three-year cycle. Approximately 20% of the facilities are trimmed each year. GIS mapping system is used to track trimming annually and to budget annual trimming projects.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Bartow, City of	Yes. The City is currently guided by the EWL standards as specified in the 2017 edition of the NESC. The City lies within the 100-110 mph region.	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	The facilities are inspected on an eight-year cycle. Inspections are visual, and tests are made to identify shell rot, insect infestation, and excavated to determine strength.	The City began round two of its eight-year pole inspection cycle in 2016 and elected to perform pole inspections every other year. In 2019, the City did not inspect any poles.	No inspections were completed in 2019.	98 poles were replaced ranging in size from 30 to 50 feet Classes 3 to 5 in 2019. Also in 2019, 5 poles had the equipment lowered and the top of the pole cut. These poles ranged in size from 30 to 40 feet, Class 5.	The City is on a four-year trim cycle with trim out at 6-10-foot clearance depending on the situation and type of vegetation, along with foliage and herbicidal treatments.	The City feels that its four-year cycle and other vegetation management practices are effective in offering great reliability to its customers. The City is currently contracting additional line clearance personnel to maintain the four-year cycle.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
City of Jacksonville Beach d/b/a Beaches Energy Services	Yes. BES has a program in place where all OH distribution lines, roughly three city blocks inland of the Atlantic Ocean, will be replaced with UG conductors, pad mounted transformers, switches, and junction cabinets.	Yes. BES uses stronger concrete poles rather than wood poles and eliminates of static lines with shorter distribution structures to reduce moment loads on the structures. BES has a distribution wooden pole replacement program where BES will replace the wooden poles with concrete. To date, 759 concrete poles have been placed in service.	BES eliminated all exposed "live-front" connected transformers. The high voltage cables are connected to the transformers with sealed "dead front" elbows. Fiberglass foundations for pad mounted equipment have been replaced with thick heavy concrete foundations.	Yes. "Back lot line" construction has been eliminated, all electric kWh meters are located outside & near the front corner of buildings, all replacement or new URD underground cables are being installed in conduits & have a plastic, jacketed sheath, & all pad mounted equipment located near buildings have minimum access clearance.	Yes	The transmission structure is inspected annual, which includes insulators, downguys, grounding, and pole integrity. The distribution poles are inspected on an eight-year cycle using sound and bore method for every wood pole. Poles 10 years old and older were treated at ground level for rot and decay.	424 (100%) transmission structure inspections were planned and completed. In 2019, 165 (3.1%) distribution poles were inspected.	No transmission structures failed the inspection. In 2019, three distribution structures failed inspection due to decay.	No transmission structures failed the inspection. In 2019, three poles were replaced.	The transmission line rights-of-way are mowed and maintained annually. Tree trimming crews work year round to maintain a two to three year VMP cycle for transmission and distribution lines.	All vegetation management activities for 2019 have been fully completed and the vegetation management activities for 2020 are on schedule.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)										
Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Blountstown, City of	Yes	Yes. The City of Blountstown adopted a larger minimum pole standard of a Class 3 pole in 2007 in an effort to harden facilities.	The City does not have any underground facilities. The City raised its substation facilities above historical flooding so that the components at the facilities will not suffer directly from flooding.	Yes	No. Guidelines do not include written safety, pole reliability, pole loading, capacity and engineering standards and procedures for attachments by others to the transmission and distribution poles.	The City owns 1,947 utility poles and does visual inspections of all poles once a year. The City took a direct hit from Hurricane Michael, which resulted in a rebuild of its system. The City is retagging all poles due to this event.	100% of all poles are visually inspected annually.	46 (2.4%) poles required replacement because of ground rot, extreme cracking and warping and upgrading the lines. The City also reconductored about 4,300 linear feet of distribution line.	46 Class 5 poles were replaced with Class 3 poles.	The City has a four-year tree trimming cycle with a 10-foot clearance of lines and facilities. The City has policies to remove dead, dying, or problematic trees before damage occurs.	The City will trim 25% of the system with a 10-foot clearance in 2020.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Bushnell, City of	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes	The agreements include language that specifies that the third-party attacher, not the City, has the burden of assessing pole strength and safety before they attach to the pole. The City performs follow-up audits on the attachments.	The City has no transmission facilities. All distribution poles are on a three-year cycle. The inspection includes visual, sound/bore, pole condition, and wind loading.	In 2019, the City inspected 315 poles.	Of the poles inspected in 2019, 21 (1%) poles failed. The reasons for the failures were age, shell flake, and ground rot.	Of the 21 poles that failed inspections, to date, all poles will be replaced in 2020.	Tree removal, power line trim, and rights-of-way clearing are on a three-year cycle. Distribution lines not located on rights-of-way are trimmed on an “as needed” basis.	The City is working on major additions to the system which has and will continue to increase the City’s VM area.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Chattahoochee, City of	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	The distribution facilities are on a three-year cycle inspection using visual, excavation around base, sounding, and probing with steel rod. The City does not have any transmission facilities.	1,957 distribution poles were inspected in January 2019.	In 2019, 39 (2%) poles failed the inspection due to ground line and pole top decay.	No poles were replaced. A schedule has yet to be determined.	The City trims the distribution system on an annual basis. This cuts down on animal related outages by limiting their pathways to poles and conductors.	The 2007 and 2009 PURC workshops reports are used to improve vegetation management.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

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	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Clewiston, City of	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes	The City does not have standard guidelines for pole attachments as all attachments are reviewed by engineers, and place all new construction underground.	The facilities are on a five-year inspection cycle, which began in 2014, using sound, prod and visual inspections. In 2019, the cycle was extended two more years to complete the inspections. The City performs infrared inspections on the facilities on a three- to four-year cycle.	In 2019, 312 (20%) poles were scheduled for inspection; however the City did not perform any inspections. The City experienced staffing shortages, however, are now fully staffed and are expected to meet its 20% inspection goal in 2020.	The City did not replace any poles in 2019.	The City did not replace any poles in 2019.	The City has a City ordinance that prohibits planting in easements. 100% of the distribution system is inspected annually for excessive tree growth. The City trims the entire system continuously as needed. The City will also accept requests from customers for tree trimming.	All transmission and feeders checked and trimmed in 2019 as every year, and the City completed 30 customer requests for tree trimming.

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Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
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Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Fort Meade, City of	Yes	Yes	The current procedures address flooding & storm surges. Participant in PURC study on conversion of OH to UG.	Yes	Yes	The City's facilities are on an eight-year cycle using visual and sound and probe technique.	The City has distribution lines only. The City replaced 29 poles in 2019.	The City has approximately 2,800 dist. poles. Of those poles 29 (>1%) poles failed inspection. The poles failed inspection due to age deterioration and animal infestation.	The City replaced 29 (> 1%) poles with poles ranging from 45 feet to 30 feet, Class 5 to Class 4.	The facilities are on a three-year inspection cycle, and have a low outage rate due to problem vegetation.	The City has completed approximately 33% of trimming. The city reported 96 outages in 2019, with 10.4% (10) due to vegetation.

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Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

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	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Fort Pierce Utilities Authority	Yes	Yes	Yes. FPUA references FEMA 100 Year Flood Zone for pad mounted equipment installation and alternatively, may elect to install fully submersible equipment as deemed necessary.	Yes	Yes	FPUA utilizes a contractor to perform inspection of all wood distribution poles on an eight-year cycle and the transmission poles on a three-year cycle. The inspection includes visual inspection from ground line to the top and some excavation is performed on older poles.	3,000 distribution and 100 transmission poles were planned for inspection in 2019. 2,871 distribution and 112 transmission poles were inspected in 2019 indicating 14.6% were inspected. FPUA notes that the inspections are performed by section, which has a combination of structures, so the yearly target is based on area, not on structure.	No transmission pole failed inspection in 2019. 155 (5.2%) distribution pole failed inspection in 2019. 91 failures are non-priority because the calculated strength fell below 67% due to decay at ground line but had sufficient integrity for reinforcement.	FPUA replaced 115 wood distribution poles in 2019. The 91 non-priority poles will be reinforced or replaced during the 2020 and 2021 fiscal years.	FPUA maintains a three-year VM cycle for transmission and distribution system. FPUA also aggressively seeks to remove problem trees when trimming is not an effective option.	FPUA spent $330,000 for the trimming, removal and disposal of vegetation waste in fiscal year 2019, which was sufficient to meet the yearly target of addressing one-third of the system.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

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	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Gainesville Regional Utilities	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes; GRU has instituted a Continuous Improvement Program, which identifies the worst performing devices, circuits and most compromised primary voltage underground cable.	Yes	The facilities are on an eight-year cycle for all lines and includes visual, sound, and bore, and below ground line inspection to 18 inches around the base of each pole.	No transmission poles were inspected 2019. GRU inspected 3,866 distribution poles in 2019.	No transmission poles were rejected. 39 (1.0%) distribution poles failed due to shell rot, mechanical damage, exposed pocket, enclosed pocket, split top, woodpecker damage, and decayed tops.	39 distribution poles were replaced in 2019, ranging in size from 30 feet to 55 feet Class 3 to Class 6.	The VMP includes 560 miles of overhead distribution lines on a three-year cycle. The VMP includes an herbicide program and standards from NESC, ANSI A300, and Shigo-Tree Pruning.	The VMP is an on going and year round program. 100% of the transmission facilities were inspected in 2019, with 30 trees identified for trimming and /or removal. 200 distribution circuit miles were trimmed in 2019.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

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	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Green Cove Springs, City of	Yes	Yes	Yes, all facilities are installed a minimum 8 inches above the roadway.	Yes	Yes	The City does not have transmission lines as defined by 69kV and above. The City's goal is to ride its electric distribution system once a year and identify poles that will need to be replaced in the following year budget process.	In 2019, the City planned to inspect 25% of its poles and actually inspected approximately 1,400 or 30% of its poles.	In 2019, 53 (4%) wood distribution poles were replaced. The poles failed visual inspection due to base rot and wood decay.	The poles that were replaced ranged from 40 feet to 50 feet, all Class 2.	The City contracts annually to trim 100% of the system three-phase primary circuits including all sub-transmission and distribution feeder facilities. Problem trees are trimmed and removed as identified.	96 miles of 3 phase circuits was trimmed in 2019. PURC held two vegetation management workshops in 2007 and 2009 and the City has a copy of the report and will use the information.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
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	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Havana, Town of	Yes	No. Participating in PURC granular wind research study through the Florida Municipal Electric Assoc.	Non-coastal utility; therefore storm surge is not an issue	Yes	Yes	Total system is 1,173 poles; inspected several times annually using sound and probe method.	100% planned and completed in 2019.	5 (0.004%) poles failed inspection.	All 5 poles were replaced. The poles were 30 feet, Class 3. The Town also replaced a 150-foot #2 conductor and a 50-foot #4 conductor.	Written policy requires one-third of entire system trimmed annually.	10% of the system was trimmed in 2019. Due to the long term recovery efforts from Hurricane Michael, the percentage of vegetation management was lower than anticipated.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

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	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Homestead Energy Services	Yes	Yes	Yes. Participating in PURC's study on the conversion of overhead to underground facilities through the Florida Municipal Electric Association.	Yes	Yes	All transmission poles concrete. With the use of drone technology, the transmission system will be on a three-year cycle performing thermographic inspection. The distribution facilities are on an eight-year cycle using sound and bore and loading evaluations and the annual thermographic inspection was completed June 2019.	50% of the transmission system was scheduled for inspection during the 2018/2019 fiscal year with 25% of the transmission system inspected. Approximately 50% of the distribution poles were inspected during 2016/2017 fiscal year. HES completed 7.6% (2,382 poles) of its distribution poles drone inspection during the 2018/2019 fiscal year.	From the 2017 inspection, 2 (1.5%) transmission poles of the 135 poles inspected failed inspection due to cracks in the concrete top. From the 2017 inspection, 101 (2.1%) distribution poles of the 4,713 poles inspected failed inspections due to ground rot, upper roof rot and split tops.	Two transmission poles were remediation in 2020. Based on the results of the 2016 and 2017 inspections, HES installed 15 new poles and replaced 68 poles in 2019. The poles ranged from 30 to 55 feet, Class 2 to Class 5.	Trimming services are contracted out and entire system is trimmed on a two-year cycle. HES added an additional tree trimming crew at the end of 2016. There are no issues for transmission facilities.	HES enacted code changes, which require property owners to keep vegetation trimmed to maintain 6-feet of clearance from city utilities.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

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	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
JEA	Yes	Yes	Yes. Currently has written Storm Policy and associated procedures addressed for Category 3 storms or greater.	Yes	Yes	Transmission circuits are on a five-year cycle, except for the critical N-1 240kV, which is on a two-year cycle. Distribution poles are on an eight-year inspection cycle, using sound and bore with excavation.	22 transmission circuits (which includes many poles on each circuit) and 16 distribution circuits were inspected in 2019.	Based on 2019 inspection: 26 transmission wooden poles failed inspection and 15% distribution poles failed inspection due to ground decay, pole top decay, and middle decay.	In 2019, 60 transmission wood poles and 1,684 distribution poles were replaced. The poles listed as emergency poles (under 1%) are replaced immediately. Two poles failing the 2019 inspections were listed as emergency poles.	The transmission facilities are in accordance with NERC FAC-003-1. The distribution facilities are on a 2.5-year trim cycle as requested by their customers to improve reliability.	JEA fully completed all 2019 VM activities and is fully compliant with NERC standard for vegetation management.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

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	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Keys Energy Services, City of Key West	Yes	Yes	Yes	Yes. The Keys will ensure all future construction occurs adjacent to public roads, will relocate all primary high voltage facilities that are currently inaccessible over a three-year period, and will develop a multi-year program to relocate all secondary facilities that are currently inaccessible. Phase I was completed in 2018 and Phase II was completed in 2019. Phase III is a multi-year program.	Yes	The Keys does not have any wooden transmission poles. The concrete and metal transmission poles are inspected every two years by helicopter and infrared survey. 100% of the distribution poles were inspected in 2015 by Osmose, Inc.	An inspection of all transmission facilities was completed in 2019. From the 2015 inspection, 5,823 concrete poles, 6,616 wooden, and 6 other type of distribution poles were inspected. The Keys plans to inspect 50% of its distribution poles in 2020.	No transmission poles failed inspection. 70 (1.2%) concrete poles and 484 (7.3%) wooden poles failed inspection in 2015. The reasons for the failures are decayed top, excessive cracking, excessive spur cuts, hollow, mechanical damage, rotten ground rot, ground shell rot, wind shake, wood borers, and woodpecker damage.	No transmission facilities failed inspection. The Keys repaired concrete spalling on transmission structures in 2019. The Keys approved a multi-year contract to manufacture 485 new ductile iron poles, which was completed in 2018. Due to Hurricane Irma, 519 poles were replaced in 2017 and 98 poles were replaced in 2018.	The Keys' 241 miles 3 Phase distribution lines are on a two-year trim cycle and 68 miles of transmission lines are a quarterly cycle. The Keys tree crews remove all invasive trees in the rights-of-way and easements. The trees are cut to ground level and sprayed with an herbicide to prevent re-growth.	In 2019, the Keys had 4 feeder outages and 8 lateral outages due to trees. The Keys will strive to continue to improve its VMP to further reduce outages.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Kissimmee Utility Authority	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue. Low areas susceptible to flooding have been identified and are monitored.	Yes	Yes	All transmission and distribution inspections are outsourced to experienced pole inspector who utilizes sound and bore and ground-line excavation method for all wood poles. Transmission poles are inspected on a three-year cycle and distribution poles are inspected on an eight-year cycle.	No transmission poles were inspected in 2019, as it was a non-inspection year. 1,839 distribution poles were inspected in 2019, which is 12.8% of the system.	27 (1.5%) distribution poles failed inspection due to mechanical damage, exposed pocket, shell rot, enclosed pocket, and woodpecker damage. No new failures were identified during the transmission inspection.	No transmission poles were replaced and 17 distribution poles were replaced in 2019. The distribution poles were 35 to 55 feet and range from Class 1 to Class 6.	KUA has a written Transmission Vegetation Management Plan (TVMT) where it conducts visual inspection of all transmission lines semi-annually. The guidelines for KUA's distribution facilities are on a three-year trim cycle.	100% required remediation during the transmission facilities inspection was completed in 2019. Approximately 104 miles (33%) of distribution facilities were inspected and remediated in 2019.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Lake Worth Utilities, City of	Yes	The facilities are not designed to be guided by the extreme loading standards on a system wide basis. However, now, CLW is guided by EWL standards for new construction and major planned work.	Underground distribution construction practices require installation of dead front pad mounted equipment in areas susceptible to flooding.	Yes	Yes	Visual inspections are performed on all CLW transmission facilities on an annual basis. The transmission poles are concrete and steel. CLW performs an inspection of the distribution facilities on an eight-year cycle. Pole tests include hammer sounding and pole prod penetration 6 inches below ground.	In 2019, CLW inspected 390 poles.	166 poles were deemed unsatisfactory in 2019. Poles are replaced when pole prod penetration exceeds 2 inches or there is evidence of pole top shell rot.	CLW replaced 137 poles in 2019, with 29 poles pending replacement.	CLW has an on-going VMP on a system wide, two-year cycle. Minimum clearance of 10 feet in any direction from CLW conductors is obtained.	Contractor attempts to get property owners permission to remove trees which are dead or defective and are a hazard; fast growing soft-wooded or weed trees, small trees which do not have value but will require trimming in the future, tress that are unsightly as a result of trimming and have no chance for future development, and trees that are non native and invasive.

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Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Lakeland Electric	Yes	Yes. For all pole heights 60 feet and above; and meet or exceed Grade B construction below this height.	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	The facilities are on an eight-year inspection cycle using visual, sound and bore, with ground line excavation and in addition; visual inspection during normal course of daily activities. Lakeland Electric initiated its second eight-year cycle in 2017.	There were 81 (12.5%) transmission poles planned for inspection and 75 (11.6%) were completed. There were 7,080 (12.5%) distribution poles planned for inspection and 6,960 (12.3%) completed.	2 (2.7%) transmission poles failed inspection due to decay. 220 (3.7%) distribution poles failed inspection due to decay.	All poles recommended in 2019 were assessed for appropriate action. 7 distribution poles were reinforced and 348 distribution poles were replaced, repaired, or removed in 2019. 1,795 distribution poles were deferred to 2020. 43 transmission pole was repaired or replaced in 2019 and 8 replacements were deferred to 2020.	The facilities are on a three-year inspection cycle for transmission and distribution circuits. VMP also provides in between cycle trim to enhance reliability.	15.55 miles of 230kV transmission lines were inspected in 2019. 26 miles of 69kV transmission lines were inspected in 2019. LE completed 367 miles of distribution lines for 2019.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)										
Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Leesburg, City of	Yes	Yes.	Leesburg is approximately 60 miles inland from the Atlantic and Gulf coasts and is not subject to major flooding or storm surge.	Yes	Yes. Foreign utility attachments are inspected on an eight-year cycle.	No transmission facilities. The Distribution facilities are on an eight-year cycle using visual, sound/bore, excavation method, and ground level strength test.	No poles were inspected in 2019. The current inspection cycle was started in 2016. The city has one section, with approximately 3,000 poles, left to inspect.	No inspections were completed in 2019.	During 2019, 101 poles were replaced. In some areas, underground distribution facilities were installed in place of the rejected poles.	Four-year trim cycle for feeder and lateral circuits. Problem trees are trimmed or removed as identified.	In 2019, 48.5 miles of distribution lines were trimmed as planned.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Moore Haven, City of	Yes	At this time, the facilities are not designed to be guided by the extreme loading standards on a system wide basis. The City is participating in PURC granular wind research study through the Florida Municipal Electric Assoc.	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	The City inspects all the distribution facilities annually by visual and sound inspections.	The City continuously inspected the distribution facilities in 2019 by visual and sound method. The City is one square mile and easily inspected during routine activities. The City does not own any transmission facilities. The City is upgrading its 3 Phase poles.	The City is working on the rear-of secondary, making them more accessible. The City has approximately 410 poles in the distribution system and streetlights.	The City replaced seven 30-foot poles, six 35-foot poles, and, nine 40-foot poles.	The City is continuous tree trimming in easements and rights-of-way. 100% of distribution system is trimmed each year.	The City expended approximately 20% of Electric Dept. Resources to vegetation management. All vegetation management is performed in house.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Mount Dora, City of	The City retained an engineering firm and developed construction standards for 12kV distribution poles.	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes	A new construction standard was developed to use guy wires for all levels on poles. The standards for poles that the City developed in 2012 reflect the impact of pole attachments on pole loading capacity.	The City does not own any transmission lines. Distribution lines and structures are visually inspected for cracks and a sounding technique used to determine rot annually. The City engaged a contractor to inspect and treat all wood poles on December 5, 2017. The project was completed in March 2018.	The City completed 100% of planned distribution inspections in 2019.	The City had 116 distribution poles in 2019 that failed inspection. The reasons for the failures were loose or missing guy, damaged or missing guy guard, rotten or damaged pole, missing or damaged squirrel guard, insulators or grounds, blown lightning arrestor, and damaged pole attachment.	The city had 1,742 wooden poles as of January 1, 2019. The City's table shows 35 wooden poles were replaced. The wooden replaced range from 25 feet to 40 feet. The wooden poles were replaced with 30 to 45 feet concrete, fiberglass, or steel poles and 30-foot wooden poles.	An outside contractor working two crews 40 hours per week completes tree trimming on a 12-month cycle.	The City trimmed trees on a 12-month cycle, and removed limbs from trees in rights-of-way and easements that could create clearance problems.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
New Smyrna Beach Utilities Commission, City of	Yes	Yes	Yes. The City only installs stainless steel dead front pad mounted transformers in its system and existing pad mounted transformers are being upgraded to dead front stainless steel transformers.	Yes	Yes	The transmission and distribution facilities are on an eight-year inspection cycle. Additionally, the facilities are inspected as part of the City's normal maintenance when patrolling the facilities.	0 (0%) transmission poles were inspected during 2019 as 100% transmission poles were inspected in 2012 and 18% were inspected in 2017. 1,500 (12.5%) distribution poles were inspected in 2019.	0 (0%) transmission poles were rejected in 2019. 106 (7.1%) distribution poles failed inspection due to decay, split top, and woodpecker damage.	No transmission poles were replaced in 2019. The City replaced/ repaired 146 distribution poles. The poles are sizes 30-60 feet and Class 2-4.	The City maintains three crews on continuous basis to do main feeder and hot spot trimming. The City mows its transmission lines on a yearly basis.	The City trimmed approximately 50% of distribution system in 2019, and performed annual vegetation maintenance on 100% of the transmission lines.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Newberry, City of	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	Distribution poles are inspected on an eight-year inspection cycle at ground line for deterioration, entire upper part of the pole for cracks, and soundness of upper part of pole.	The City inspected 200 (12.80%) of 1,562 the poles in 2019.	11 (5%) of the poles were rejected due to rot or split from the inspection in 2019.	Eleven distribution poles were replaced in 2019: nine wooden poles were 45 feet, Class 3 and two were 40 feet, Class 3. They were replaced with 45 and 40 feet, Class 3 CCA poles.	The City trims all distribution lines on a three-year trim cycle, with attention given to problem trees during the same cycle. Problem trees not in the rights-of-way are addressed with the property owner.	One third of distribution facilities are trimmed each year to obtain a three-year cycle.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Ocala Electric Utility, City of	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	The City inspects its system on an eight-year inspection cycle, which include above ground inspection, sounding, boring, excavation, chipping, internal treatment, and evaluation of each pole to determine strength. 2019 is the fifth year in the second eight-year cycle.	No transmission poles were inspected in 2019, since 100% were inspected in 2015. The transmission poles will again be inspected in 2023, which is the beginning of the next cycle. 5,274 (16.7%) of the 31,577 wood distribution poles were inspected in 2019.	182 (3.45%) distribution poles failed inspection due to shell rot, decayed top, split top, woodpecker damage, exposed pocket, enclosed pocket and hollow.	43 (0.8%) of the distribution poles were braced and 182 (3.5%) poles were replaced. Ocala noted that poles remediated by bracing are not counted in the rejection numbers, since they still meet the standards with the immediate bracing applied. Bracing occurs at the time of inspection.	The City is on a four-year trim cycle for distribution and three-year trim cycle for transmission, with additional pruning over areas allowed minimal trimming. In 2013, an IVM style-pruning program was implemented which uses manual, mechanical, and chemical control methods for managing brush.	In 2019, the City trimmed one-fourth of the distribution system and 100% the transmission system. Ocala uses mechanical trimmer, trim lifts and herbicide methods for its VM.

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Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Orlando Utilities Commission, City Orlando	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	OUC facilities are on an eight-year inspection cycle, which includes visual inspection, sounding & boring, excavation, removal of exterior decay, ground line and internal treatments.	OUC planned 2,998 (6%) inspection for distribution and transmission facilities and completed 2,990 (6%) inspections in 2019.	372 poles (12.4%) failed inspection. Failure causes include: shell rot, hollow, enclosed pocket, decayed top, split top and woodpecker damage.	17 poles were deemed priority replacement, 17 were completed. 29 poles required restoration using reinforcing truss, which was completed. The remaining 274 will be replaced in 2020.	222 miles of transmission facilities are on a three-year trim cycle. 1,323 miles of distribution facilities are on a three-year trim cycle. OUC follows safety methods in ANSI A300 & Z133.1.	For 2019, 426 distribution miles were planned and 94% were completed. For 2019, 107 transmission miles were planned and 100% were completed.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)										
Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Quincy, City of	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue	Yes	Yes	The City's pole inspection procedures include visual and sound and bore methods for an inspection cycle of eight years.	Visual inspections were carried out on all 2,869 distribution poles in 2019. Detailed inspections were carried out on all 31 transmission poles for 2019. All transmission poles are made of concrete and found to be in good condition.	19 distribution poles (0.6%) failed inspection. The poles showed signs of rotting around the base of the pole or the top of the pole. The poles were replaced with wood poles. No transmission poles failed inspection.	22 (0.7%) distribution poles were replaced. The poles ranged from 25 feet to 55 feet, Class 3 to Class 7 The extra poles were replaced due to vehicle accidents and tree damage.	The City trims its electric system rights-of-way on a regular basis using in-house crews. The City strives to trim 25% of the system per year.	Approximately 45 miles (50%) of vegetation trimming was planned and completed on the distribution system in 2019. 100% of the City's transmission lines were inspected in 2019.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

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	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Reedy Creek Improvement District	Yes. The District has less than 2 miles of overhead distribution lines and roughly 297 miles of underground distribution.	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes	The District does not have any foreign attachments on the facilities.	The District performs a visual inspection monthly of its overhead transmission system and inspects the distribution facilities every eight years.	All distribution poles were inspected and treated by an outside contractor in 2013. The District has 8 wooden distribution poles. No inspections were completed in 2019. The next inspection is scheduled to begin in 2021.	All distribution poles passed inspection.	The District's transmission system has no wooden poles in service. The transmission system includes approximately 14 miles of overhead transmission ROW. The distribution system is essentially an underground system with 8 wooden poles.	14 miles of transmission rights-of-way is ridden monthly for visual inspection. The District contracts tree trimming each spring to clear any issues on rights-of-way.	Periodic inspections in 2019 yielded minimal instances of vegetation encroachment. In each scenario, tree-trimming services were engaged to remove any concerns. The District continues its long-term vegetation management plan to ensure all clearances remain within acceptable tolerances.

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Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Starke, City of	Yes	Yes. The City participates in the PURC granular wind research study through the Florida Municipal Electric Association.	Non-coastal utility; therefore storm surge is not an issue.	Yes	The City allowed pole attachments from three third-party attachers.	The City is in process of having all their poles GIS mapped. To date, they have approximately two-thirds of their poles mapped and inspected. The poles are replaced as needed on a visual basis.	One third of the City's poles (1,261) poles were inspected.	In 2019, 32 poles (2.54%) were found to be rotten, needed support, or damage caused by a vehicle accident.	The City has no transmission poles. The distribution poles that were replaced in 2019 ranged from Class 2 40-foot poles to Class 7 25-foot poles.	The City trims their trees upon visual inspection. The City trims 33% of their electrical distribution system annually.	The City trims distribution lines throughout the year as needed and when applicable removes dead or decayed trees. The City trimmed 33% of distribution system in 2019. The City will use the information from PURC's VM workshops to improve their VM.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Tallahassee, City of	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue. However, the City's Electric Purdom Generation Station in St. Marks is subject to storm surge and flooding. There is a plan in place to address flooding and storm surge that is reviewed annually.	Yes	Yes	Every 8 years a new pole inspection cycle is initiated to inspect all poles over a three-year period. The inspection includes visual inspection, sound & bore, internal & fumigant treatment, assessment & evaluation for strength standards. The City performs a climbing and physical inspection of its transmission structures on a five-year cycle.	In 2019, a complete inspection of the City's transmission poles was completed. All distribution poles were inspected from FY 2013-FY 2014. No distribution pole inspections were performed in 2019. The next cycle will begin in 2020 for both transmission and distribution poles and structures.	The annual climbing inspection identified 0 (0.0%) transmission poles/structures to be rejected. The City found 7 (0.0014%) wooden transmission poles failed inspection due to woodpecker damage and plans to replace them in 2020.	0 (0.0%) transmission poles were replaced. The City replaced 48 distribution poles and structures in 2019. The poles ranged from 30 feet to 45 feet, Classes 4 to 7. These poles were replaced with a stronger Class size pole.	The transmission facilities are on a 3-year trim cycle with target of 25 to 32 feet clearance on lines. The distribution facilities are on an 18-month trim cycle on overhead lines to 6 feet clearances.	The transmission rights-of-way & easements were mowed in 2019. Approximately 1,114 (29%) miles of overhead distribution lines were managed in 2019. Tallahassee uses a mechanical trimmer and trim lifts to trim vegetation. In addition, Tallahassee does periodic spot spraying and vegetation maintenance.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Wauchula, City of	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	The City of Wauchula has a third-party contractor inspect its substation yearly and 100% of distribution poles in 2016-18. The next scheduled pole inspection will be in 2023.	The City of Wauchula has a third-party contractor inspect its substation yearly and 100% of distribution poles in 2016-2018. The poles have been treated and are expected to have a minimum of 10 years of service left.	Approximately 4% (out of 3,200 poles) have failed due to poles rotting.	118 distribution poles were replaced in 2019 ranging from 35 feet to 55 feet, all Class 4 and one 60 foot Class 3 pole.	The policy on vegetation management includes trimming trees and herbicides for vines annually or as needed.	The City completed herbicide spraying in 2019. The City also uses PURC's 2007 and 2009 vegetation management reports to help improve its practices.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)										
Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Williston, City of	Yes	Yes	Not applicable, the City of Williston is a non-costal utility; therefore storm surge/flooding is not an issue.	Yes	As a result of employee turnover within the management ranks the City has not established any data on pole reliability, pole loading capacity, or engineering standards and procedures for attachments by others to our distribution poles.	All distribution poles are visual and sound inspection on a three-year cycle. The city uses both the bore method and the visual and sound method to inspect poles.	66% of 1,102 poles were inspected in 2019. This is the second year of the three-year cycle.	In 2019, no poles were found defective during the inspection.	No poles were replaced in 2019 since no poles were found defective.	The distribution lines are on a three-year trim cycle with attention to problem trees during the same cycle. Any problem tree not in rights-of-way is addressed to the property owner to correct.	One-third of distribution facilities are trimmed every year to obtain a three-year cycle.

Appendix B. Summary of Municipal Electric Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Winter Park, City of	The City has an initiative to put its entire distribution system underground The City requires new residential service to be installed underground and to date, 55% of the system is underground.	The facilities are not designed to meet extreme loading standards on a system wide basis. The City participates in PURC's granular wind research study through the Florida Municipal Electric Association.	Non-coastal utility; therefore storm surge is not an issue	Yes	Yes	The City does not own transmission poles or lines. The distribution facilities are on an eight-year cycle, which the City is evaluating the cycle for length. The inspection includes visual, assessment prior to climbing and sounding with a hammer.	The City does not own transmission poles. The City did not conduct pole inspections in 2019; however, WPE routinely inspect poles that are involved with daily jobs and work orders.	The City replaced one pole in 2019. The cause was damaged during a seasonal storm.	Based on the 2007 full system inspections, all repairs and replacements have been made. The City routinely inspects the poles involved with daily jobs and work orders. The pole replaced was a 30 feet Class 1 wood pole. This pole was replaced with a 30 feet concrete light pole.	Vegetation management is performed on a three-year trim cycle, which is augmented as needed between cycles.	The trimming crews trimmed approximately 33.5 miles of distribution lines in 2019. The City is using the PURC 2007 and 2009 reports to improve VMP practices.

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Central Florida Electric Cooperative, Inc.	Yes	Central Florida's facilities are not designed to be guided by the extreme loading standards on a system wide basis. However, the wind standard for Central Florida's facilities is between 100 mph inland and 130 mph at the coast.	Central Florida continues to participation in evaluation of PURC study to determine effectiveness of relocating to underground.	Yes	Yes	100% of the transmission facilities are inspected annually using above and ground level inspections. The distribution facilities are on a nine-year cycle for inspections using above and ground level inspections.	Central Florida planned and inspected 43 miles of the transmission facilities in 2019. 9,055 (10%) distribution poles were inspected in 2019.	Of the 9,055 distribution poles inspected in 2019, 79 (0.87%) were rejected. These poles are scheduled to be replaced.	362 distribution poles were replaced in 2019. The poles varied from 30 feet to 55 feet, Class 2 to Class 7.	Trees are trimmed or removed within 15 feet of main lines, taps, and guys on a four-year plan.	In 2019, 631 miles of the 3,158 miles of primary overhead line on the system were trimmed.

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Choctawhatchee Electric Cooperative, Inc.	Yes	Yes	Yes	Yes	Yes. Inspect and physically count every attachment on a three-year cycle.	The Coop inspects new construction of power lines on a monthly basis and has an eight-year cycle to cover all poles.	During 2019, 8,233 poles or 7.34% of 60,459 total poles were inspected.	943 poles or 11.5% of the poles failed inspection ranging from spit top to wood rot.	29% of 943 failed poles were replaced.	Current rights-of-way program is to cut, mow, or otherwise manage 20% of its rights-of-way on an annual basis. Standard cutting is 10 feet on either side of primary from ground to sky. In 2015, the Coop increased the standard overhead primary line easement area from 20 feet to 30 feet.	In 2019, 555 miles were cut on primary lines and the Coop worked to remove problem tress under the primary lines, which reduces hot-spotting requirements between cycles. The Coop also established herbicidal spraying program.

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Clay Electric Cooperative, Inc.	Yes	Clay's distribution facilities are not designed to be guided by the extreme wind loading standards specified by Figure 250-2(d) except as required by rule 250-C, but Clay's transmission facilities are guided by the extreme wind loading. Clay is participating in the PURC's granular wind research study through the Florida Municipal Electric Association.	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	Clay's transmission facilities are on a ten-year cycle, which includes sound/bore techniques, excavation, climbing inspection (four-year cycle), and ground (two-year) patrol. Clay's distribution system is now on a ten-year cycle using excavation, sound and bore at the ground line and visual inspection (five-year cycle) and system feeder inspection excluding ground line (five-year cycle).	Clay completed the transmission ground patrol inspection in 2016 & the next inspection will be done in 2026. In 2018, Clay performed the system feeder and ground line pole inspection. The total number of distribution poles inspected was 37,603.	The inspection found 90 (3.7%) transmission poles inspected required some form of maintenance. 10,876 (5.1%) distribution poles were rejected due to various reasons including ground rot, top decay, holes high, and split.	83 (3.4%) transmission poles required maintenance. 7 (0.29%) transmission poles were replaced with 55 to 75 feet, Class 1 poles. 2,275 distribution poles were replaced with poles ranging from 20 feet to 60 feet, Class 1 to 7.	Clay's VMP for the transmission facilities is on a three-year cycle and includes mowing, herbicide spraying and systematic re-cutting. Clay's VMP for the distribution facilities is on a three-year cycle for city, a four-year cycle for urban and five-year cycle for rural and includes mowing spraying and re-cutting.	In 2019, Clay mowed 57.31 miles, sprayed 56.37 miles, and recut 42.4 miles of its transmission rights-of-way. In 2019, Clay mowed 2,323.24 miles, sprayed 2,334.83 miles, and recut 2,077.78 miles of its distribution circuits.

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)										
Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Escambia River Electric Cooperative	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	Escambia River inspects its distribution facilities on an eight-year cycle using visual, sound, and bore techniques in accordance with RUS standards.	2,400 (7%) distribution poles were planned and 784 (2.3%) inspections were completed in 2019. Escambia River had contractor delays and focused most of its time and resources in the repair/ replacement of the rejected poles from prior years. Escambia River does not own any transmission poles.	Approximately 41 (5%) poles failed inspection in 2019. The common cause was pole rot at the top and bottom of the poles.	In 2019, Escambia River replaced 260 poles from the 2018 inspection. These numbers reflect various pole sizes and Classes.	Escambia River's distribution facilities are on a five-year trim cycle. Distribution lines and rights-of-way is cleared 20 feet; 10 feet on each side.	In 2019, approximately 336 miles (21.2%) of the power lines were trimmed with 317 miles (20%) planned.

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Florida Keys Electric Cooperative Association, Inc.	Yes	The facilities were not designed to the extreme loading standards on a system wide basis. However, the Company has adopted the extreme wind loading standard in April 2007.	Yes	Yes	Yes	The company inspects 100% of the transmission structures annually by helicopter. The distribution poles are on an eight-year cycle and was completed in 2018. All 10,698 distribution poles have been inspected and 11,808 wood poles were tested and treated with a reject rate of 3.85%.	100% of the transmission poles were inspected in 2019 by helicopter. Routine distribution pole replacement continues as new construction, upgrades and relocations efforts require.	No transmission structures failed inspections in 2019. 114 transmission water structures were inspected in 2017 and are scheduled for foundation repairs in 2020.	One transmission structure was replaced in 2019. It was heavily guyed and replaced with a self-supporting structure. 158 distribution poles that failed inspection in 2018 were scheduled to be replaced in 2019 and were replaced prior to the 2019 hurricane season.	100% of the transmission system is inspected and trimmed annually. The distribution system is on a three-year trimming cycle. The trade-a-tree program was implemented in 2007 for problem trees within the rights-of-way.	100% of the transmission facilities are inspected annually and VM tasks are performed as needed. In addition, all substation properties are inspected annually and VM tasks are performed as needed. Approximately 528 circuit miles of distribution lines were trimmed in 2019. Additional distribution spot trimming was conducted as necessary.

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Glades Electric Cooperative, Inc.	Yes	Yes	Non-coastal utility; therefore storm surge is not an issue; GEC participated in a workshop hosted by Florida Catastrophic Planning that addressed flooding and storm surges.	Yes	Yes	The facilities are on a 10-year sound and bore inspection cycle with excavation inspection cycle for all wood poles in addition to System Improvement Plan inspections.	100% of total 83 miles of transmission lines were planned and completed by visual inspections. 2,377 miles of distribution lines and 134 miles of underground distribution lines were planned and inspected in 2019. GEC inspected 3,661 poles in 2019.	362 (9.8%) distribution poles failed during the 2019 inspection due to decay, rot and top splits.	362 distribution poles rejected in the 2019 inspection were replaced. In addition, 953 distribution and 69 transmission poles were replaced from an upgrade/ maintenance standpoint. The poles varied in height and Classes.	All trimming is on a three-year cycle. The rights-of-way are trimmed for 10-foot clearance on both sides, and herbicide treatment is used where needed.	GEC trimmed 623 miles of distribution circuits in 2019. The transmission rights-of-way are inspected annually and trimmed if necessary. Vegetation growth is not an issue for the transmission lines.

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)										
Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Gulf Coast Electric Cooperative, Inc.	Not bound by the extreme loading standards due to system is 99.9% under the 60 feet extreme wind load requirements.	The method of construction used by GCEC does, however, meet the "design to withstand, without conductors, extreme wind loading in Rule 250C applied in any direction on the structure."	Yes. GCEC continues to evaluate the PURC study to determine effectiveness of relocating to underground	Yes	Yes	No transmission lines. Performs general distribution pole inspections on an eight-year cycle. Also, GECE inspects underground transformers and other padmount equipment on a four-year cycle.	As a result of Hurricane Michael, in 2018, GCEC focused on field inventory and re-mapping of its distribution system. Approximately 23,798 (46.2%) poles have been inventoried.	Of the 23,798 poles inventoried in 2019, 110 (0.5%) poles were rejected. The poles were rejected due to mechanical damage.	After Hurricane Michael, GCEC replaced over 3,000 wood poles and in 2019, GCEC replaced 63 additional wooden poles.	GCEC owns approximately 2,165 miles of overhead and 442 miles of underground distribution lines. GCEC strives to clear the entire ROW on a five-year cycle. GCEC clears between 20 and 30 feet width, from ground to sky.	GCEC trimmed approximately 500 miles of ROW in 2019. GCEC also works closely with property owners for danger tree removal.

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Lee County Electric Cooperative, Inc.	Yes	Yes	Yes. The majority of LCEC's underground facilities, excluding conduits and cables, are at or above existing/ surrounding grade.	Yes	Yes	Transmission facilities are inspected ever two years for 138kV systems. The inspections are done by climbing or the use of a bucket truck. The distribution facilities are on a two-year visual inspection cycle and on a ten-year climbing inspection cycle for splitting, cracking, decay, twisting, and bird damage.	In 2019, 876 (37.8%) transmission poles were inspected, which was 100% of the poles that were scheduled. 25,247 (15.5%) distribution poles were inspected, which was over 100.0% of the inspections scheduled.	0 (0%) transmission poles failed inspection due to rot. 1,176 (5%) distribution poles failed inspection due to rot/split top and woodpecker damage.	24 transmission poles were replaced with concrete and steel poles. 186 (8%) distribution poles were repaired through re-plumbing and patching. 524 poles were replaced in 2019. The sizes varied by Class 2 to Class 6.	VMP strategies include cultural, mechanical, manual, & chemical treatments and the plan is on a six-year cycle for 1 Phase distribution facilities and three years for 2 & 3 Phase distribution facilities. The 138kV transmission systems are on an annual cycle.	LCEC completed 48.5 miles (100% planned) of Transmission trimming, 174 miles (100% planned) three-phase trimming, and 512 (100% planned) miles of single-phase trimming,

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Okefenoke Rural Electric Membership Cooperative	Yes	The facilities are not designed to be guided by the extreme loading standards on a system wide basis. OREMC is participating in PURC's granular wind research study.	OREMC is continuing the evaluation of the PURC study to determine effectiveness of relocating to underground.	Yes	Yes	OREMC owns no transmission facilities. The inspections for the distribution systems include visual, sound/bore with excavations, and chemical treatment. The pole inspections are on an eight-year cycle.	In 2019, OREMC performed inspections on 7,144 (12.2%) poles. OREMC has 58,735 wood poles as of December 31, 2019.	In 2019, 157 (2.2%) poles were rejected. The cause of the rejection was ground rot and above ground damage.	The 150 poles failing inspection in 2019 are scheduled to be replaced in 2020. During the course of other projects, 784 new poles were added and 584 poles were retired in 2019.	Vegetation control practices consist of complete clearing to the ground line, trimming, and herbicides. The VMP is on a five-year trim cycle. OREMC utilizes contractors for its VM programs.	OREMC planned 500 miles of rights-of-way for trimming and completed 510 miles in 2019. Also in 2019, contractors sprayed 506 miles of rights-of-way.

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)										
Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Peace River Electric Cooperative, Inc.	Yes	The facilities are not designed to be guided by the extreme loading standards on a system wide basis. Peace River is currently participating in PURC granular wind research study.	Peace River is continuing the evaluation of PURC study to determine effectiveness of relocating to underground to prevent storm damage and outages.	Yes	Yes	Peace River currently uses RDUP bulletin 1730B-121 for planned inspection and maintenance. The facilities are located in Decay Zone 5 and are inspected on an eight-year cycle. The transmission poles are visually inspected every two years.	393 transmission (172 concrete, 3 steel, 218 wooden) poles are inspected every two years. 5,970 (10.5%) of 57,115 distribution poles were inspected.	Peace River did not replace any transmission poles in 2019. 291 (4.87%) distribution poles were rejected in 2019.	Peace River replaced 177 poles in 2019. The distribution poles receiving remediation in 2019 varied from 25 feet to 75 feet, Class 1 to 7.	Peace River utilized guidelines in either RUS bulletins or other materials available through RUS. In addition, Peace River uses a Georgia Rights-of-way program, which uses a ground to sky method by removing trees. The VMP is on a four- to five-year cycle.	In 2019, the Company completed rights-of-way maintenance on 2,000 (71%) of its 2,804 miles of overhead distribution.

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

Utility	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Sumter Electric Cooperative, Inc.	Yes	Transmission and distribution facilities are designed to withstand winds of 110 MPH in accordance with 2017 NESC extreme wind load	Non-coastal utility; therefore storm surge is not an issue.	Yes	Yes	The transmission facilities are on a five-year cycle using ground line visual inspections, which includes sounding and boring and excavation. The distribution facilities are on an eight-year cycle using sound, bore, & excavation tests.	138 (12.7%) transmission poles were planned and inspected in 2019. 14,231 (12%) distribution poles were planned and inspected in 2019. 4,928 (8.1%) distribution underground structures were planned and inspected in 2019.	Zero transmission poles failed inspection. 1,707 (12%) distribution poles failed inspection. The causes are due to ground rot and top deterioration.	16 (100%) wooden transmission poles were replaced with spun-concrete poles. 1,482 (86.8%) distribution poles were replaced. The transmission and distribution poles ranged from 25 to 80 feet and Class 1 to Class 7.	Distribution and transmission systems are on a three-year trim cycle for feeder and laterals. SECO's VM includes tree trim cycles, tree removals, and herbicide treatment with a minimum 10-foot clearance and a desired clearance of 15-feet from its distribution system. The transmission system specification is a 30-foot clearance.	In 2019, SECO trimmed 470 miles for its cycle and an extra 6 miles of its distribution system. In addition, an extra 16 miles were trimmed on its transmission system. SECO removed 44,753 trees in 2019.

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	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Suwannee Valley Electric Cooperative, Inc.	Yes	SVEC facilities are not designed to be guided by the extreme loading standards on a system wide basis. SVEC participates in PURC wind study.	Non-coastal utility; therefore storm surge is not an issue	Yes	Yes	SVEC inspects all structures on an eight-year cycle using sound/bore and visual inspection procedures.	SVEC inspected five (100%) transmission structures in 2019. 11,284 (13%) distribution structures were inspected in 2019.	541 (5%) inspections of distribution poles failed due to ground line decay and excessive splitting. Zero inspections of transmission poles failed.	991 (9%) distribution poles of total inspected were remediated by ground line treatment and 826 (7%) distribution poles were replaced. Zero transmission structures were remediated.	SVEC's facilities are on a four- to three-year inspection cycle includes cutting, spraying and visual on as-needed basis.	In 2019, 1,253 (32%) miles of rights-of-way were cut and in 2020, there are plans to cut an additional 860 (22%) miles. In 2019, zero miles were reported being sprayed (herbicide), nor are there any plans for spraying in 2020.

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	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)										
Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Talquin Electric Cooperative, Inc.	Yes	Yes	Talquin has a very small percentage subject to storm surge. The anchoring system that Talquin applied to padmount transformers did not perform well during Hurricane Michael. Talquin is now applying a different method used by other utilities. The method involves attaching the surface equipment to a below grade vault that acts as the anchoring system.	Yes	Yes, inspecting on a five-year cycle.	Annual inspections in house of transmission lines are performed by checking the pole, hardware, and conductors. An outside pole-treating contractor inspects distribution and transmission poles each year. The poles are inspected on an eight-year rotation cycle since 2007.	8,414 distribution poles were inspected in 2019. 163 transmission poles were inspected in 2019.	180 (2.14%) of the distribution poles inspected were rejected. 8 (4.91%) of the transmission poles inspected were rejected.	The priority poles were replaced and the rejected poles are being inspected and repaired or replaced if necessary. Talquin replaces 30-feet Class 7 poles with stronger 35-feet Class 6 poles with guys and 35-feet Class 6 poles with 40 feet Class 4 poles as a minimum standard.	Talquin maintains its rights-of-way by mechanical cutting, mowing, and herbicidal applications.	427.26 (17%) miles of distribution and 3.18 (19%) miles of transmission rights-of-way were treated in 2019. In addition, Talquin received 1,400 non-routine requests for tree maintenance.

Appendix C. Summary of Rural Electric Cooperative Utility Reports Pursuant to Rule 25-6.0343, F.A.C. – Calendar Year 2019

	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
	Guided by Extreme Wind Loading per Figure 250-2(d)		Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares									
Tri-County Electric Cooperative, Inc.	Yes	Yes	The current standard practice is to restrict electrification of flood prone areas. Due to natural landscape within area, storm surge issues are low.	Yes	Yes	The transmission facilities are inspected on a five-year cycle by both ground line and visual inspections. The distribution facilities are on an eight-year cycle using both ground line and visual inspections.	During 2019, the transmission poles were visually inspected. Tri-County inspected 6,768 (12%) distribution poles in 2019.	175 (2.6%) distribution poles were rejected. The Coop repaired 101 broken ground wires.	The 175-rejected distribution poles found during the 2019 inspection, which required replacement, are in the process of being changed out.	The Coop attempts to acquire 30-foot rights-of-way easement for new construction. The entire width of the obtained ROW easement is cleared from ground level to a maximum height of 60 feet in order to minimize vegetation and ROW interference with the facilities.	In 2019, approximately 595 distribution miles were trimmed and sprayed. The Coop has approximately 2,787 miles of overhead distribution lines in four counties.

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Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
West Florida Electric Cooperative Association, Inc.	Yes	Yes.	Non-coastal utility; therefore, storm surge is not an issue. Some areas in territory are subject to flooding. In these areas, line design is modified to compensate for known flooding conditions.	Yes	Yes. General inspections are completed on an eight-year cycle.	West Florida continues to use RUS Bulletin 1730B-121 as its guideline for pole maintenance and inspection. In addition, WFEC contracted with Osmose Utilities Services to enhance the pole inspection program.	Prior to Hurricane Michael, WFEC inspected 7% of its poles.	Out of the 7% inspected, 5% required maintenance or replacement.	West Florida suspended its pole inspection in 2019 to concentrate on repairing the damage caused by Hurricane Michael. West Florida expects to restart the program in 2021.	West Florida's VM includes ground to sky side trimming along with mechanical mowing and tree removal.	During 2019, WFEC mowed and side trimmed 632 miles of its distribution system. Also, WFEC chemically sprayed approximately 0 miles of rights-of-way. Approximately 720 miles will be trimmed and mowed during 2020.

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	The extent to which Standards of construction address:					Transmission & Distribution Facility Inspections				Vegetation Management Plan (VMP)	
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Utility	Major Planned Work Expansion, Rebuild or Relocation	Targeted Critical Infrastructures and major thoroughfares	Effects of flooding & storm surges on UG and OH distribution facilities	Placement of distribution facilities to facilitate safe and efficient access	Written safety, pole reliability, pole loading capacity and engineering standards for attachments	Description of policies, guidelines, practices, procedures, cycles, and pole selection	Number and percent of poles and structures planned and completed	Number and percent of poles and structures failing inspections with reasons	Number and percent of poles and structures by class replaced or remediated with description	Description of policies, guidelines, practices, procedures, tree removals, with sufficient explanation	Quantity, level, and scope of planned and completed for transmission and distribution
Withlacoochee River Electric Cooperative, Inc.	Yes	The facilities are not designed to be guided by the extreme wind loading standards on a system wide basis. However, most new construction, major planned work and targeted critical infrastructure meets the design criterions that comply with the standards.	Yes. In addition to using stainless steel construction for pad mounted equipment, WREC uses Ethylene-Propylene-Rubber insulated cable for all underground primary distribution installation.	Yes. In 2019, WREC relocated 21 miles of overhead primary lines from rear lots to street, changing out hundreds of older poles and facilities; this will continue until older areas are all upgraded.	Yes	WREC inspects the transmission and distribution facilities annually (approximately 3,649 miles for 2019) by line patrol, physical and visual inspections.	68 miles or 100% of transmission facilities were inspected by walking, riding or aerial patrol. 3,581 miles of distribution facilities were inspected annually by line patrol, voltage conversion, rights-of-way, and Strategic Targeted Action and Repair (S.T.A.R.).	OSMOSE (a contractor for pole inspection and treatment) found 6.2% poles with pole rot and 1.0% poles were rejected in 2003 to 2004. WREC discontinued this type of inspection/ treatment plan and now data is unavailable on the exact failure rates.	4,233 wooden, composite, cement, concrete, steel, aluminum, and fiberglass poles ranging in size from 12 to 100 feet were added; 2,905 poles were retired.	In 2017, WREC contracted with an arborist company to assist with the aggressive VMP that includes problem tree removal, horizontal/vertical clearances and under-brush to ground. WREC maintains over 180 overhead feeder circuits (over 7,100 miles of line) on a trim cycle between four to five years.	All transmission lines are inspected annually. 4.5 miles of transmission rights-of-way issues were addressed in 2019. In addition, during 2019, WREC addressed 4,308 rights-of-way service orders ranging from trimming a single account to trimming an entire subdivision or area.