



REVIEW OF

Processes for Establishing and Communicating Estimated Time of Restoration by Electric IOUs

NOVEMBER 2019

BY AUTHORITY OF

The Florida Public Service Commission
Office of Auditing and Performance Analysis

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1.0 Executive Summary

1.1 Purpose and Objectives

The Florida Public Service Commission's (FPSC or Commission) Office of Auditing and Performance Analysis initiated this operational audit at the request of the Commission's Division of Engineering. The purpose of the audit was to review the processes used by Florida electric investor-owned utilities (IOUs) for developing and communicating estimated times of service restoration.

The primary objectives of this audit were met by reviewing and documenting the following:

- ◆ Company outbound and customer inbound communications channels.
- ◆ Storm preparation activities including company storm-mode operations, infrastructure hardening, readiness planning, and restoration mutual assistance.
- ◆ Outage management systems (OMS) used for estimated time of restoration (ETR) data collection and dissemination.
- ◆ Post-storm restoration activities including prioritizing restoration, mobilization of crews, debris removal, and utility-government coordination.
- ◆ ETR process improvements and company best practices regarding development and communication of post-storm ETRs to customers.

1.2 Scope

At its July 10, 2018 Internal Affairs meeting, the Commission directed staff to initiate a management audit to examine the processes used by each IOU for establishing ETRs. Given this directive, the scope of the review focused on the organizations within each IOU responsible for developing, implementing, and monitoring the processes, policies, and procedures for establishing and communicating outage ETRs to customers and other stakeholders after storms.

As authorized by Sections 350.117(2) and (3), Florida Statutes, management audits are conducted by staff to assess utility performance and the adequacy of operations and controls:

- (2) The Commission may perform management and operation audits of any regulated company. The Commission may consider the results of such audits in establishing rates; however, the company shall not be denied due process as a result of the use of any such management or operation audit.

(3) As used in this section, “management and operation audit” means an appraisal, by a public accountant or other professional person, of management performance, including a testing of adherence to governing policy and profit capability; adequacy of operating controls and operating procedures; and relations with employees, customers, the trade, and the public generally.

Commission audit staff’s standard of review for internal controls is primarily the Institute of Internal Auditors’ Standards for the Professional Practice of Internal Auditing and the Internal Control - Integrated Framework developed by the Committee of Sponsoring Organizations (COSO) of the Treadway Commission. Internal controls assessments focus on the COSO framework’s five key elements of internal control: control environment, risk assessment, control activities, information and communication, and monitoring. Commission audit staff’s work is performed in compliance with Institute of Internal Auditors Performance Standards 2000 through 2500.

1.3 Methodology

The information in this audit report was gathered through responses to document requests and on-site interviews with key employees responsible for each IOU’s preparation, response, and recovery procedures, processes, and operations. Specific information collected and reviewed from each IOU included:

- ◆ Processes for assessing system damage and planning recovery action.
- ◆ Use of automated systems for collecting customer outage data.
- ◆ Processes for developing and disseminating initial and subsequent ETRs.
- ◆ Methods for sequencing and prioritizing service restoration.
- ◆ Processes for defining and identifying critical infrastructure facilities (CIF).
- ◆ Processes for requesting and managing mutual assistance resources for restoration.
- ◆ Use of third-party studies pertinent to ETR calculation and dissemination.

1.4 Audit Staff Observations

Below are Commission audit staff’s observations regarding the ETR processes in use by Florida IOUs. In Chapters 3 through 7, Commission audit staff also describes individual company ETR process changes and best practices, and urges all Florida IOUs to review and identify possible improvements to their own ETR processes.

- ◆ **Due to the complexities associated with widespread post-storm outage restoration activities, damage assessments must first be completed before an initial estimated time of restoration can be calculated.**
- ◆ **Within 24 hours of completing damage assessment, Florida IOUs all seek to provide an initial global estimated time of restoration to customers and thereafter to provide customers with successively more focused, detailed, and granular estimates.**

- ◆ **ETR calculation is more automated for outages in normal operations (blue sky) than for major storm conditions (dark sky) because of complications and contingencies that must be considered during storm restoration.**
- ◆ **The provision of an estimated time of restoration represents a significant advancement in customer service, reducing customer inconvenience and anxiety, simplifying decisions to return after evacuation, and managing their individual post-storm recovery efforts.**
- ◆ **Customer expectations regarding outage restoration speed continue to rise due to improved electric service reliability, ongoing infrastructure hardening improvements, advances in consumer connectivity, and automated technologies.**
- ◆ **All five IOUs are responding energetically to rising customer expectations by creating mobile apps, dedicated storm information webpages, interactive outage maps, and by utilizing social media staff to manage messaging.**
- ◆ **All five IOUs have taken measures to increase capacity for receiving incoming customer communications, internal cross-training, contracting with third-party vendors, and additional reliance on automated responses.**
- ◆ **Deployment of mutual assistance crews greatly assists restoration but introduces significant administrative and logistical challenges in managing restoration and estimating completion times.**
- ◆ **Predictive storm models are employed to improve damage estimation, personnel deployment, materials pre-positioning, and other storm response activities.**
- ◆ **All five IOUs activate centralized storm incident command centers to enhance coordination and streamline restoration activities.**
- ◆ **After system restoration is complete, all five IOUs perform a comparative analysis of estimated versus actual restoration times to identify best practices and lessons learned, and to improve future damage modeling, estimated time of restoration calculations, and achieved restoration times.**
- ◆ **All five IOUs conduct an annual review of the critical infrastructure facility list, provided by city and county officials for their service territories, to update and plan restoration priorities before storm season.**
- ◆ **All five IOUs annually update restoration plans based on lessons learned and storm-preparedness exercises with local, state, and regional government agencies.**
- ◆ **All five IOUs have increased the use of unmanned aircraft (drones) for post-storm damage and route assessment, leading to faster and more accurate restoration decision making.**

2.0 Background and Perspective

2.1 Estimated Time of Restoration

An ETR is a planning and management tool used by utilities to communicate when service is expected to be restored, based on the best information known. Customers experiencing a power outage rely on the ETR to make their own critical planning decisions such as whether to evacuate, purchase generators, or when to return to their homes.

The ETR process varies depending on the operating conditions at the time of outage. For example, under normal or “blue sky” operating conditions, a localized outage may result from a fallen tree during a brief thunderstorm. The ETR process works through algorithms in the Outage Management System (OMS), automatically calculating an ETR that can be provided to customers.

Under major storm or “dark sky” conditions, outages are more complicated, impact greater areas, and affect large numbers of customers. Consideration has to be given to managing contingencies like numerous inaccessible streets, widespread downed power lines, and coordinating an influx of mutual aid workers. Such events prompt utilities to activate Emergency Operations Centers (EOCs) and coordinate activities with government agencies and other stakeholders. OMS data is combined with field damage assessments to determine the number and location of outages, restoration resources required, restoration priority, and the recovery action plan. Beyond the basic calculated time estimates for dark sky events, determining ETRs requires that a degree of judgement and experience must also be applied and numerous factors must be considered.

An OMS uses historical restoration data and predictive algorithms to estimate the duration of power outages, and includes outage type, location, and number of impacted customers. To do so, the OMS is fully integrated with other operating systems to compile and display relevant outage information. These technologies include the following:

- ◆ Supervisory Control and Data Acquisition (SCADA) – Obtains data from devices like protective relays, provides breaker, switch, and re-closer status, provides remote control of these devices, and displays the status of the monitored equipment
- ◆ Distribution Automation (DA) – Monitors and controls devices on the distribution system (i.e., breakers, re-closers, distributed generators, etc.)
- ◆ Advanced Metering Infrastructure (AMI) – Integrated system of smart meters, communications networks, and data management systems that enables two-way automated communication between utilities and the meter at the customer premise
- ◆ Geographic Information System (GIS) – Collects, records, and displays geographically-referenced or spatially-oriented information to precisely identify locations of utility infrastructure

- ◆ Predictive Analytic Models – Florida IOUs employ predictive analytical outage models, relying on weather and geographic data as inputs to predict outages. These models can provide estimated outage counts and justification for pre-storm allocation of crews and equipment.

During dark sky events, upon approval of initial restoration plans by management and executives, Florida’s IOUs each have a goal to disseminate an initial global ETR within 24 hours after damage assessments are completed. When restoring power, the IOUs must balance individual customer needs with those of the community at large. Restoration activities are prioritized as follows:

1. Power plants and damaged transmission lines and substations
2. Critical facilities such as 911 centers, police and fire stations, hospitals, nursing homes, and water treatment systems
3. Concentrations of customers affected and needed community services, including supermarkets, pharmacies, and gas stations
4. More isolated groups and individuals affected

2.2 Customer Expectations and IOU Response

Customer expectations are rising in every segment of the electrical service experience, from outage prevention to rapid restoration and social media interaction with providers. Today’s customers are able to obtain information and provide feedback in ways and numbers inconceivable only a few years ago.

Improved electric service reliability, ongoing infrastructure hardening, and advances in consumer connectivity and technologies have raised customers’ expectations of outage restoration. The availability of smartphone applications (apps), websites, and social media channels has increased customer expectations of being provided real-time, accurate information. A high percentage of customers seek outage information via apps or utility websites to avoid waiting to interact with a customer service representative via telephone calls.

Florida IOUs have energetically responded to customer expectations, creating company-specific cellphone apps, dedicated storm information webpages, interactive online outage maps, and participating in social media platforms. Tailored messaging to the right customer at the correct time via effective channels is seen as imperative for customer satisfaction. These and other initiatives are discussed in the following individual company chapters.

2.3 Storm Hardening

The Commission has encouraged hardening against storm damage since the severe hurricane seasons of 2004 and 2005. In 2006, the Commission ordered the Florida IOUs to implement eight-year wood distribution pole inspection programs and the following 10 storm-preparedness initiatives:¹

- ◆ Three-year vegetation management cycle for distribution circuits
- ◆ Audit of joint-use pole attachment agreements
- ◆ Six-year transmission structure inspection program
- ◆ Hardening of existing transmission structures
- ◆ Transmission and distribution geographic information system
- ◆ Post-storm data collection and forensic analysis
- ◆ Increased utility coordination with local governments
- ◆ Collaborative research on the effects of hurricane winds and storm surge
- ◆ Natural disaster preparedness and recovery program
- ◆ Comparative reliability analysis for overhead and underground systems

In accordance with FPSC Rule 25-6.0342, F.A.C., since February 2007, Florida IOUs have filed annual storm hardening plans addressing the pole inspection program and these 10 initiatives. Each spring, workshops continue to address storm-preparedness plans, restoration processes, hardened versus non-hardened facility performance, underground versus overhead performance, impediments to restoration, improvements to service restoration times, and lessons learned from prior storms.

The intent of hardening electric infrastructure is to reduce damages, service restoration times, and costs associated with major storms. In June 2019, Senate Bill 796 was approved which enacted Section 366.96, F.S., requiring each IOU to file a 10-year storm protection plan and explain the systematic approach it will use to reduce outage times and restoration costs associated with extreme weather events. At least every three years after approval of an IOU's storm protection plan, the utility must file for Commission review an updated storm protection plan.

2.4 FPSC Restoration Oversight Role

The National Response Framework, as part of the National Strategy for Homeland Security, helps coordinate emergency response through 18 specified Emergency Support Functions (ESFs). Each state's energy sector is designated as ESF-12. For major events causing catastrophic damage and widespread outages to electric systems, the U.S. Department of Energy is the lead federal agency for energy system restoration, operating under the direction of Federal Emergency Management Agency.

¹ Commission Order Nos. PSC-06-0144-PA-EI and PSC-06-0351-PAA-EI

The Florida Division of Emergency Management coordinates federal assistance with FEMA, under the provisions of the federal emergency declaration. Florida Division of Emergency Management activates the state Emergency Response Team, which includes designated FPSC staff. The FPSC serves as the primary state agency addressing ESF-12 Energy. Designated FPSC staff members stationed at the Florida Emergency Operations Center are responsible for communicating with Florida electric utilities. This communication includes receiving utility outage reports every three hours. Commission staff also monitors the utilities' ability to respond to critical restoration requests, and observes the deployment of restoration crews and equipment.

3.0 Duke Energy Florida, LLC

Duke Energy Florida (DEF) generates nearly 9,500 MW of power for more than 1.8 million customers in 35 Florida counties. The company has 489 substations, 357,944 transformers, and nearly 33,000 miles of distribution lines (18,212 miles of overhead lines and 14,626 underground).

3.1 Storm Preparation Activities

Preparation is a year-round endeavor, beginning months before hurricane season, and includes new or refresher training, review of storm plans, response drills, and coordination with local and state agencies and EOCs. After a major storm, DEF must be ready to efficiently assess system damage, provide customers timely and accurate ETRs, and quickly restore the system. Preparation activities include activating internal emergency management operations, hardening of infrastructure, and government partnerships.

3.1.1 Company Storm-Mode Operations

DEF accomplishes pre-storm planning using the Incident Command Structure, a response organization responsible for developing restoration strategies and tactics, ordering and releasing resources, and overall operational authority until restoration is complete. The organizational structure allows quick scalability of company responses to address specific service interruptions and is built around three phases of restoration—pre-storm activation, outage restoration, and return of the grid to normal operations. Pre-storm activation begins five days prior to landfall. Its emphasis is on storm forecasting, modeling of potential damage and resources required for restoration, and preparation of logistical support. Outage restoration activities after storm impact involve the operational activities that restore service to all customers capable of receiving it.

For storm response and recovery, DEF employs a four-level system of response which ranges from Level I for typical summer storms to Level IV for major hurricanes. Operational functions remain constant across the four tiers, but as storm threat increases, resources expand to provide effective and timely system restoration. The DEF storm management team activates at the level appropriate to storm severity. Each level of response includes four strategic functional areas: operations, planning, logistics, and external coordination.

Several DEF business units play storm-specific roles to initially determine and later refine company responses. Among them:

- ◆ Meteorology – DEF’s Meteorology staff monitors storms prior to landfall, reviewing forecasts from the National Hurricane Center and other sources. An outage prediction tool called Pre-Landfall Outage Modeling uses forecast data to predict damage, estimating outage counts in three specific tiers (high, medium, and low). These predictions assist in developing recovery plans and estimated resource needs.

- ◆ **Damage Assessment** – The command center damage assessment team conducts an initial damage assessment using the damage models and other available data to calculate an initial internal global ETR for company use only. This internal ETR is for the entire area of impact within the company service territory. It is then supplied to Planning to support the development of more granular ETRs for dissemination to customers. In parallel, Damage Assessment also performs detailed outage damage and forensics assessments.
- ◆ **Operations** – The command center operations team conducts an internal form of damage assessment called AIR (assess, isolate, restore). Data is provided to Planning to support development of the global ETR. During AIR operations, one objective is to restore the feeder/backbone circuits while conducting outage restoration operations in parallel and to ensure that service is restored in a safe and efficient manner.
- ◆ **Planning** – The planning staff is responsible for creating the initial resource assignments for restoration, vegetation, and damage assessments crews based on pre-landfall predictive data. Planning is also responsible for setting the initial global ETR disseminated to customers, using inputs from Damage Assessment, Operations, the Outage Management System (OMS), and other data sources. After an initial global ETR is established and disseminated, Planning updates the ETR as required.

3.1.2 Storm Hardening and Grid Upgrades

DEF's storm hardening efforts are under continuing internal review and implementation. Duke must meet specified requirements of FPSC Rule 25-6.0342, F.A.C. Hardening initiatives, such as infrastructure upgrades, pole inspections, and vegetation management are intended to reduce outages, thereby improving restoration times.

DEF has installed approximately 540,000 Advanced Metering Infrastructure (AMI) devices, projects nearly 731,000 by the end of 2019, and 1,572,000 by the end of 2020. The company plans to finish system-wide installation by June 2021. AMI gives DEF the ability to “ping” meters to determine meter status and aid in confirming outages and restoration completion.

AMI meters currently deployed are not integrated into OMS and presently do not autonomously provide DEF with automatic outage notification. DEF is working to fully integrate AMI information with OMS by 2022, so that outage reporting will not require notification from customers.

Another new technology fielded by DEF is Viper, an automated power rerouting capability that automatically restores service after a momentary outage. Currently, 34 percent of DEF customers are on the system and the company plans to increase installations to 80 percent in 10 years.

During 2018, DEF used contractors to inspect nearly 102,000 wood distribution poles in its eight-year inspection cycle work.

Vegetation management is an integral component of storm hardening. In 2018, DEF spent over \$36 million, clearing 662 miles of feeder lines and over 2,600 miles of laterals. During the year, DEF also removed more than 9,000 potentially problematic trees from its rights-of-way. The

2019 vegetation management budget increased to over \$50 million, with a goal of clearing an additional 2,267 miles of feeder lines.

3.1.3 Utility-Government Coordination

DEF believes that frequent and effective communication and coordination with local, state, and federal government entities allows it to restore service more efficiently. DEF's storm planning and response program is capable of implementation at any time. To comply with the Commission's storm hardening initiatives, DEF has established a team of planners and liaisons focused on local governmental coordination. The activities of this team include dedicating resources, training, ongoing coordination with government agencies, storm preparation, restoration, and an EOC program.

DEF provides liaison and restoration information to local governments before, during, and after storm events, to assist with local emergency response. There are approximately 90 DEF personnel with emergency planning and response program responsibilities, about 70 of which are assigned on a full-time basis. These personnel coordinate activities such as emergency planning, vegetation management, undergrounding, and service-related issues.

During named storm events, DEF provides around-the-clock support for the state EOC and county EOCs. Duke representatives staff the EOCs during daytime operations and monitor activities remotely after hours.

DEF works with county governments to identify and prioritize specific infrastructure. Prioritization of these critical accounts is updated annually and factored into DEF's tactical restoration plan. Company, county, and state EOC representatives coordinate and process critical activities from the EOCs.

In conjunction with local governments, DEF focuses on the following to implement its Storm Planning and Response Program:

- ◆ Identifying opportunities to improve preparedness by the utility and the public
- ◆ Leveraging local government knowledge, capabilities, and structure
- ◆ Enhancing company organization and planning to improve readiness
- ◆ Educating customers on proper storm preparation and restoration actions
- ◆ Supporting local governments to aid in a safe and efficient outage restoration
- ◆ Providing local governments updated data before, during, and after storms

3.2 Blue Sky Operations and ETR Process

During blue sky conditions, DEF receives outage reports from customers through a variety of inbound communications channels including:

- ◆ Call center customer service representatives
- ◆ Interactive voice response system
- ◆ Company website / online outage reporting tool and outage map

- ◆ Mobile application
- ◆ Text messaging
- ◆ Social media (Facebook Instagram, Twitter)

Outage information received directly from customers by service representatives is entered into OMS. Outages reported through the other inbound channels are captured automatically in OMS. Customers needing assistance in languages other than English and Spanish are handled through a third-party interpreter service which offers 223 languages to customers 24/7.

In blue sky conditions, OMS creates an outage ticket and automatically calculates and disseminates ETRs for individual outages. Calculation of an ETR is based on the type of outage, equipment affected, and historical outage restoration data. DEF field crews have access to OMS via portable devices and can adjust the ETR based on conditions found at the outage. Customers receive ETRs through one or more of the following outbound communication channels:

- ◆ Social media
- ◆ Company website / online outage reporting tool and outage map
- ◆ Mobile application
- ◆ Text messaging
- ◆ Email
- ◆ Phone calls

3.3 Dark Sky Operations and ETR Process

ETR calculation is more automated for outages in blue sky than for dark sky conditions because of complications and contingencies that must be considered during storm restoration. During dark sky events, DEF receives outage information through the same automated and customer-initiated inbound communication channels as during blue sky operations. However, due to the high volume of outage reports generated by OMS, an automated ETR is not provided to customers in response to outages. Instead, at the conclusion of its post-storm damage assessment process, DEF provides the initial global ETR to impacted customers. Increasingly granular and specific ETRs are later provided as restoration requirements are determined and priority restorations are completed.

3.3.1 Customer Communications

DEF prepares for anticipated higher call volumes prior to a dark storm event. This includes scheduling overtime for telephone teams, cross-regional support from corporate Duke Energy employees, use of DEF employees normally not handling customer calls, temporary use of former DEF customer service representatives, and external vendor support. Messaging and response procedures and protocols are identical whether a representative is in Florida or out of state. Customer service representatives are kept informed via access to all official communications regarding restoration progress and have access to these on a shared drive.

Customer care staff can be augmented to more than 2,000 representatives. Currently, the Interactive Voice Response system can handle 1,152 concurrent calls. The company plans to expand that capability to 2,500 by the end of 2019.

Prior to storm impact, the company begins outbound safety and preparedness messaging. DEF posts social media warnings and safety tips, sends mass emails to customers, and initiates media releases. These messages emphasize the importance of individual customer preparedness. Telephone calls are made to medical special-needs customers and critical care facilities, providing the latest storm updates and highlighting the possibility of extended outages. Banners on the company's main webpage provide storm and safety information and links to a separate storm-specific webpage. This dedicated storm page features safety information, storm updates, videos, restoration information, and links to other resources.

Before the 2019 hurricane season, DEF developed communication channel contingency plans to support business continuity and ensure effective and uninterrupted inbound and outbound communications with customers in the event of technology challenges. In addition, DEF is working to ensure its new Customer Connect system will allow customer service representatives access to customer and outage information simultaneously, enabling more effectively communicate with each customer. The software will combine information from multiple sources into a common platform for a more tailored response.

3.3.2 Pre-Landfall Planning

In dark sky conditions, DEF initiates its Pre-Landfall Outage Modeling Overview. This predictive model assists the company in determining where to efficiently stage and how to allocate recovery resources based on a predicted impact zone.

DEF modeling uses historic and real-time location-specific OMS data to project a total number of restoration events. Location-specific geographical factors and meteorological inputs are factored in to estimate system damage, where damage is most likely to occur, and restoration resource requirements. Modeling tools calculate restoration man-hours and personnel required (e.g., damage assessors, linemen, and tree trimmers). Variables such as the quantity and types of specific restoration resources available, estimated time of arrival for mutual assistance resources, and quantity of resources already deployed are factored in to increase the accuracy of the damage assessment.

An initial pre-landfall, area-wide ETR for DEF's internal use only is determined based on an assessment of Pre-Landfall Outage and Storm Caster modeling tools, Statistical Damage Assessment Tool, and field observations. Storm Caster, first employed in 2018, breaks the service territory into 26 operating centers, allowing DEF to analyze centers' actions, activities, and restoration progress. Results are then rolled up into a more accurate, combined predictive model.

3.3.3 Damage Assessment

Six to eight hours after the all-clear, damage assessors (DEF employees and contractors) are dispatched to collect data. Feeder damage information from those assessments is entered into a database for further analysis.

Drones are also used for post-storm damage assessment, route accessibility, and to estimate types and quantities of damage in severely affected areas. DEF drones have video capability, but review and planning cause a lag from video capture to ground action by work crews. DEF has three licensed pilots, but none have certification for non-line-of-sight flight.

The DEF damage assessment process has two focus areas: statistical assessment and targeted assessment. Statistical assessment estimates distribution system damage quickly, extrapolating estimated damage types and density across the entire area. Combined with resource data, it is used to determine an initial global ETR. Statistical damage assessment samples approximately 10 percent of facilities in any given area, forming a statistically valid sample which can be extrapolated with a high degree of confidence. This and a resulting Material Projection Report, along with an initial ETR, assist development of an Incident Action Plan.

Targeted assessment evaluates poles in a defined area identified from an initial post-storm patrol of the feeder by DEF Construction and Maintenance. In some instances, pole-to-pole patrols of feeders are performed downstream of an identified device such as a recloser, transformer, regulator, or fuse. As the restoration process matures, damage assessment resources may be redeployed to patrol distribution facilities immediately ahead of Construction and Maintenance crews, reporting on upcoming field conditions and facility damage. Resulting data helps develop specific restoration plans and updates for localized ETR.

The Incident Command Structure planning staff compares actual damage assessments, OMS data, and field outage observations to pre-landfall estimates and plans and adjusts recovery action plans as needed.

3.3.4 ETR Determination and Dissemination

DEF follows practices and procedures found in its ETR Development and Management Policy to determine ETRs. Storm data included in the process are storm strength, estimated date and time of landfall, probable area of impact, size and strength of wind fields, expected precipitation, strength of wind gusts, and when winds are expected to fall below 40 miles per hour.

The initial global ETR is calculated from assessments of a sampling of 160 quadrangles spread across the DEF service territories in the path of the storm track and winds. Quadrangles chosen capture data from eight percent of service territories, forming a statistically valid sample. This process leads to a public disclosure of an initial global ETR. The initial global ETR is adjusted as restoration efforts continue and area-specific, more granular ETRs are produced for each affected service area.

DEF communicates ETR and other storm-specific information to customers, providing restoration updates, storm tracking, and outage assessments. The company uses the following outbound communications channels:

- ◆ Social media (Facebook, Instagram, Twitter)
- ◆ Company website (storm-specific webpage)
- ◆ Interactive voice response system

- ◆ Mobile phone application
- ◆ Media messaging (television, radio, text, and social media)
- ◆ Email (customers enrolled in proactive communications program)
- ◆ Press releases
- ◆ Print ads
- ◆ Local, state, federal agencies and EOCs
- ◆ Automated and manual telephone calls
- ◆ Video updates from the DEF Storm Director

During and immediately after the storm, DEF prepares daily internal and external messaging. Examples of internal messages are restoration status updates for social media team members and field work crews. External messaging includes media releases and restoration updates to customers. Customers signed up for DEF's proactive communications programs receive email, phone, and text updates. At the conclusion of restoration operations, completion messages are provided to customers, community leaders, and company stakeholders.

3.4 Post-Storm Restoration Activities

3.4.1 Prioritizing Restoration

DEF prioritizes restoration efforts at the feeder level based on the number of customers without power, and critical facilities (e.g., hospitals, emergency dispatch centers, law enforcement, fire and rescue). Live downed wire calls and other emergencies receive the highest priority.

DEF meets annually with county EOCs and Operation Center leadership who identify the essential area infrastructure facilities. DEF identifies the feeder circuits providing power to these facilities and regularly reviews feeder circuit restoration plans using the following guidelines for internal prioritization planning:

- ◆ Priority 1 – Feeders, lines and service drops for hospitals, municipal water and sewer treatment plants, emergency shelters, nuclear sirens, and industrial plants with public safety concerns
- ◆ Priority 2 – Feeders, lines and service drops for EOCs, law enforcement, fire and rescue stations, military facilities, major airports or airports designated for response support, fuel distribution facilities, central communications centers and food distribution centers
- ◆ Priority 3 – Feeders, lines and service drops for medical assistance facilities and commercial nursing homes identified by Large Account Management
- ◆ Priority 4 – All other feeders, lines, service drops, equipment, and customers whose service has not yet been restored by the activities described above

After the storm passes and safe conditions exist, the company follows its prioritization plan designed to first restore power to critical infrastructure serving public health and welfare. DEF

states that although the company views all customer outages as important, restoring power to major facilities providing community health and welfare services is essential. Following restoration to the public health and welfare facilities, DEF shifts its focus to restoring the greatest number of customers as quickly and safely as possible, while retaining the ability to quickly respond to emerging issues from local and state EOCs. Many restoration activities occur simultaneously and overlap to varying degrees.

DEF states that the company considers restoration to be essentially complete when 98 percent of customers in a specified area impacted by the storm and capable of receiving power have been restored. According to the company, the remaining percentage represents customers with circumstances preventing restoration (e.g., customers unable to receive service due to damage to their homes).

3.4.2 Mutual Assistance and Crew Mobilization

Resources provided through mutual assistance agreements are essential to an IOU's ability to respond efficiently and safely. Mutual aid agreements are managed nationally by seven Regional Mutual Assistance Groups or RMAGs. Member companies pledge personnel and resources to aid impacted IOUs. DEF is a member of the Southeastern Electric Exchange (SEE) RMAG. SEE coordinates the identification, availability, and equitable dispatch of restoration resources (e.g., equipment, materials, and personnel) to assist with post-storm restoration. As a member, DEF follows additional mutual assistance guidelines created by the Edison Electric Institute (EEI) that aid communications, expediting mobilization and response efforts. DEF also participates in the Intrastate Mutual Aid Agreement facilitated by the Florida Electric Power Coordinating Group.

Over 500 DEF technicians are available to respond following a major storm event. During Hurricane Michael, DEF had as many as 5,100 restoration workers involved in restoring power, representing a 900 percent increase to its DEF restoration team. Decisions are made during the pre-storm planning and preparation phases on how to most effectively deploy DEF personnel and then arriving mutual assistance resources.

DEF supervises the activities of mutual assistance resources. Mutual assistance personnel are briefed and must adhere to all company operational and restoration protocols, practices, and procedures while working in DEF service areas. Mutual assistance personnel do not have direct access to OMS. Instead, restoration updates are provided to DEF field supervisors with OMS access.

DEF has access to resources throughout the Duke Energy multi-state corporate organization and all Duke Energy subsidiaries are prepared to provide assistance. The scope of mutual assistance is scalable and readily tailored to specific DEF service area damage and restoration requirements.

DEF mobilizes resources to support restoration work as directed by its initial mobilization plan. The plan is based on pre-storm damage forecasts along with estimates of equipment and personnel required for restoration. The DEF goal is to have restoration crews ready ahead of landfall and make staging sites operational 24 hours after the all-clear is given. Decisions are made during the pre-storm planning and preparation phases on how to most effectively deploy immediately available native assets and subsequently arriving mutual assistance resources.

Fuel for post-storm mobilization and operations is pre-positioned at company equipment yards two to five days before landfall. DEF's fuel vendor pre-stages additional fuel tankers in the Florida service territory and one in South Georgia to support a prolonged outage. Emergency fuel quantities have been adjusted to reflect lessons learned during Hurricane Irma recovery. Like fuel supplies, restoration crews are assigned based on pre-landfall information about the predicted storm path and estimated damages.

Mustering sites are located strategically to avoid projected storm path and direct impact areas. Mutual assistance crews deployed after landfall are directed to base camps and assigned restoration work after being processed and receiving safety updates.

As service restoration nears completion in any part of DEF's territory, the company begins demobilizing mutual assistance crews. This effort includes surveying management and feeder coordinators to assess whether to keep or release non-native line and debris removal crews. Balancing these assessments against daily costs, DEF formulates a plan to retain and continue to field what the company considers the most productive, effective mix of outside resources.

3.4.3 Road Congestion and Debris Removal

Depending on storm severity, DEF mobilization and restoration can be seriously impacted by storm debris. DEF requests and coordinates debris and route clearing assistance through the county EOCs.

Clearing congestion from roadways within the service territory is critical for providing customers with quick, successful outage restoration. DEF relies on state and local law enforcement to provide congestion relief and uses its multiple communications systems to urge customers to stay off the roadways.

In 2017, DEF initiated the new Make-It-Safe/Road-Clearing Program, designed to provide company resources to assist county EOC road clearing units within DEF service territories during the 24 to 48 hours following a storm. The program resulted from lessons learned in prior storms and ongoing collaboration with local governments. DEF believes that providing assets earlier leads to quicker outage restoration times.

Debris removal crews are assigned to DEF service territory zones and staged at county facilities or DEF operations centers. DEF states that this provides faster response to county priorities, increased customer satisfaction, reduced exposure to nighttime storm hazards, and added daytime productivity.

DEF resources work with county road-clearing crews to remove and render safe power lines downed across roadways. It coordinates with county EOCs to de-energize flooded areas and inspect lines and poles before re-energizing.

3.5 ETR Process Improvements and Best Practices

Based on a review of DEF processes for communicating with customers, collecting and disseminating outage information, and restoring service after a named storm, Commission audit staff recognizes the following company improvements and best practices:

3.5.1 Incident Command Structure

For dark sky planning and response, DEF uses the Incident Command Structure for quick, scalable decision making and restorative action. It is built around three phases of restoration: pre-storm activation, outage restoration, and return to normal operations.

3.5.2 Smart Grid Upgrade

The Viper grid technology upgrade provides automatic and autonomous power rerouting capability to reduce customer outages and restoration times. Approximately a third of the DEF system is equipped with Viper. The company plans to increase coverage to 80 percent within 10 years.

DEF plans to complete system-wide installation of AMI by June 2021, giving DEF the ability to ping meters to determine meter status and provide an aid in confirming outages and restoration completion. Full integration of AMI with OMS will be completed in 2022.

3.5.3 Strategic Staging of Restoration Resources

DEF has improved post-storm logistics by increasing strategically sited temporary or alternative lodging for mutual assistance restoration crews. This action maximizes productive daylight hours and minimizes travel time to and from restoration zones.

The company also pre-positions fuel at several company sites prior to storm landfall. The company has its fuel vendor disperse additional tankers in the DEF service territory and one more in South Georgia. This guarantees availability during prolonged outages. Quantity and location of pre-positioned fuel reflects lessons learned from Hurricane Irma recovery.

3.5.4 Use of Drones

Drones are increasingly used for post-storm damage assessment, determination of route accessibility, and to estimate the types and quantities of damage in company service areas. DEF drones have video capability but experience some delay from video capture to ground action. DEF currently has three licensed pilots, but they are not certified for non-line-of-sight flight.

3.5.5 ETR Model Accuracy and Retraining

DEF engages a process after every major storm to “retrain” its predictive models by incorporating information from the most recent storm into the historical database. The process provides company leaders and planners a better understanding of model performance, determines a new baseline for use, and improve future ETR accuracy.

3.5.6 Improved Customer Service Communications

Before the 2019 hurricane season, DEF developed communications channel contingency plans to support business continuity and ensure effective, uninterrupted inbound and outbound customer communications in the event of technology challenges. In addition, the company is working to

ensure its new Customer Connect system will allow customer service representatives access to customer and outage information simultaneously, enabling more effective communication with each customer. DEF states that the software will combine information from multiple sources into a common platform for a more tailored response.

The current Interactive Voice Response system can handle approximately 1,150 concurrent calls. DEF intends to expand capacity to 2,500 concurrent calls by the end of 2019.

3.5.7 More Focused, Granular ETR

DEF concentrates outage assessment and ETR development on smaller, more compact segments of its service territory. This allows the company to provide customers with more focused, detailed, and granular ETR outage information and restoration times.

3.5.8 Road Clearing Initiative

DEF developed a post-storm road clearing initiative called Make-It-Safe in 2017. This initiative provides company resources to assist county EOC road clearing units in the first two days following a major storm. DEF believes this program is a result of collaboration with local governments and lessons learned from previous storms.

4.0 Florida Power & Light Company

Florida Power & Light Company (FPL) currently serves over five million customers in 35 counties across the state of Florida with approximately 26,000 MW of generating capacity. The company has approximately 1.2 million poles and structures, 48,000 miles of overhead and 27,000 miles of underground power lines, 600 substations, and 890,000 transformers.

4.1 Storm Preparation Activities

Storm preparation activities include activating the company's storm command center, hardening of infrastructure, conducting annual hurricane drills, and coordination with local and state agencies and EOCs.

4.1.1 Company Storm-Mode Operations

FPL conducts hurricane response drills annually, simulating a named storm impacting the company's service territory. During this simulation, FPL employees practice initiating its Corporate Emergency Plan, which includes tracking outages, assessing damage, communicating with customers and employees, and working with contractors and suppliers to restore service when safe to do so.

The Corporate Emergency Plan, along with the principles of the National Incident Management Plan, provides the framework by which FPL responds to all threats and hazards, including named storms. FPL's Storm Command Center is the focal point of the company's storm preparedness and response efforts. The center is a hurricane Category 5-rated communications building, designed for 24/7 operations. The center houses the systems for tracking power outages and repair progress in real time, prioritizing power restoration to critical facilities, and media communications.

Key personnel from Power Delivery, Distribution Operations, and Transmission Operations also schedule regular conference calls to ensure key processes and guidelines are reviewed, operational barriers identified, needs for assistance determined, and policies and decisions communicated consistently.

4.1.2 Storm Hardening and Grid Upgrades

As provided in FPL's three-year hardening plan filings with the Commission under FPSC Rule 25-6.0342, F.A.C., the company's distribution network efforts are concentrated on:

- ◆ Hardening feeders (to National Electric Safety Code's extreme wind loading criteria) serving critical infrastructure (e.g., hospitals, 911 centers, police/fire stations), other essential community needs (e.g., gas stations, grocery stores, pharmacies), critical poles, and constructing new facilities to meet extreme wind loading criteria.
- ◆ Hardening 12 above-grade electric vaults in downtown Miami that are more susceptible to storm surge/flooding (completed in 2015).

- ◆ Initiating efforts to harden laterals by implementing FPL’s three-year Storm Secure Underground Program Pilot, whereby selected overhead laterals will be converted to underground.

By the end of 2018, FPL had hardened or placed underground approximately 47 percent of its distribution feeders. This includes the hardening of 98 percent of feeders serving critical infrastructure facilities or other essential community needs. FPL currently estimates that all feeders within its system will be hardened or placed underground by 2024.

In addition to the continued system strengthening of its electric system, FPL has installed more than 5 million smart meters on homes and businesses, and more than 36,000 advanced smart grid devices on its poles and wires. This technology enables FPL to continually monitor and assess its system to identify and restore power outages remotely, without customer intervention.

4.1.3 Utility-Government Coordination

FPL meets with representatives of local governments within FPL’s service territory before storm season. Discussions include the identification by the county EOC representatives of critical functions that are priorities for restoration, areas suitable for FPL staging sites to facilitate restoration efforts, vegetation management, hardening, and underground projects. FPL’s External Affairs Managers and Customer Service Advisors also work with local officials and governmental customers to keep them informed on topics including service reliability, energy conservation, storm readiness and power generation.

Lessons learned and key improvements that were addressed with county and local officials after Hurricane Irma include: an improved process to facilitate the identification of critical infrastructure functions by Emergency Operations Center personnel in coordination with FPL’s restoration priorities; and educating customers about FPL’s Right-Tree-Right-Place program. FPL determined that the primary cause of outages during Hurricane Irma was fallen trees, many of which were located outside of areas where FPL is allowed to trim.

4.2 Blue Sky Operations and ETR Process

During blue sky conditions, FPL’s Trouble Call Management System (TCMS) serves as the central point for disseminating ETRs for outages detected by FPL’s DSCADA and AMI systems, and those reported directly by customers.

DSCADA and AMI systems provide two-way telemetry monitoring of outages without the need of human intervention. When an outage is detected via DSCADA or AMI, the systems communicate with TCMS, automatically creating an outage ticket. The feeder and substation location, outage type, outage cause, customers re-routed, and timing of restoration are captured for these outages.

Customers can report an outage through the following FPL prescribed inbound communications channels:

- ◆ Call center customer service representative
- ◆ Interactive voice response system
- ◆ Company website
- ◆ Mobile phone application

Depending on the inbound communications channel used, customer reported outages are either captured directly in TCMS or in FPL's Customer Information System (CIS) which, in turn, feeds information directly into TCMS to create the outage ticket.

Information collected in TCMS includes outage location, outage type, number of customers interrupted, dispatched resources, time of dispatch, ETRs, and restoration completion time. TCMS automatically generates an ETR using this stored information.

Upon arriving at the outage site, FPL's field crew confirms the system-generated outage cause or inputs a different cause code via portable computers. If the different cause code requires an update to the initial ETR, a new outage ticket is created and the revised ETR is directly entered in TCMS from the portable computers.

To ensure all customers impacted by the outage have been restored, field crews request the Distribution Control Center to electronically "ping" or confirm customer meters in the outage area. This can prevent a second field call due to an overlooked customer during the initial dispatch. Meter pinging is carried out through FPL's AMI technology.

Once service has been restored to all customers capable of receiving power, the field crew reports the completion time via the portable computer. Ticket information is captured and stored for use in computing ETRs for future events.

In blue sky conditions, ETRs are provided to customers through one or more of the following outbound customer communications channels:

- ◆ Text messaging
- ◆ Mobile phone application
- ◆ Email
- ◆ Company Website

4.3 Dark Sky Operations and ETR Process

ETR calculation is more automated for outages in blue sky than for dark sky conditions because of complications and contingencies that must be considered during storm restoration. During dark sky events, FPL receives outage information through automated and customer-initiated inbound communication channels. Due to the high volume of outage reports generated by TCMS, an automated ETR is not provided to customers in response to outages. Instead, at the conclusion of post-storm damage assessment, FPL provides the initial global ETR to impacted customers. Increasingly granular and specific ETRs are later provided as restoration requirements are determined and priority restorations are completed.

4.3.1 Customer Communications

An extensive outbound communication campaign is executed to encourage customers to have a plan and be prepared. The company uses an array of broadcast and digital services to reach its customers. FPL begins communicating to customers 96 hours prior to a storm making landfall using automated calls, residential and commercial emails, texts, social media (Facebook and Twitter), the company's website (FPL.com), and its mobile app to reach customers digitally. Additionally, FPL reaches customers by leveraging traditional media (television, radio and print) through news conferences, media events and news releases. Media members are invited to ride out the storm in FPL's Command Center.

Customer Advisors assigned to large business and governmental accounts send emails to share important information and resources available to help customers stay informed. The emails address hurricane preparedness, outage reporting and identify who the customer can contact with account questions.

Customers who meet certification criteria and are enrolled in the company's Medically Essential Service Program, receive special communications during emergency events. Prior to a named storm approaching, these customers receive phone calls instructing them to activate emergency plans.

In anticipation of high volumes of customer contacts, FPL's call centers, company website, mobile application, and Interactive Voice Response system are available 24/7 for customers to report outages and obtain power status updates. Police and fire departments are assigned a dedicated phone number that is routed directly to an emergency handling specialist within FPL. These specialists are trained to interact with these departments in emergency situations involving life and safety issues.

FPL's call center, staffed by approximately 320 service representatives, may be augmented with up to 200 additional personnel who normally do not handle phone calls. FPL is contracted to obtain additional agents positioned out-of-state. Furthermore, if needed, the company can reach out to available electric utilities under a mutual assistance agreement to provide call center assistance.

If the number of customer outage calls exceeds FPL's capacity, the overflow calls are initially directed to its High Volume Call Answering System. The system provides an automated outage reporting and status option to customers. Customers calling to report downed wires and other emergencies are prioritized and will be routed to live agents. FPL's Facebook and Twitter social media channels are available for customers to report outages and obtain outage status updates. After a storm has passed, additional functionality is activated within the company's website and mobile application to allow customers to report wire-down situations.

During Hurricane Irma, an unprecedented storm that impacted more than 4.4 million FPL customers, FPL experienced longer than normal wait times to report downed wires to customer service representatives. In addition, a relatively small number of customers were disconnected due to system thresholds and line capacities being exceeded as a result of the extremely high number of customer contacts. These customers heard a message advising them that FPL was

unable to transfer their call to a representative. FPL's website and digital systems also experienced extremely high customer traffic. At times, the company's back-end systems supporting these systems were not able to handle the volume of customer inquiries.

FPL has since completed system improvements to ensure the capacity of its systems to handle extreme volumes of customer traffic, well beyond what was experienced during Hurricane Irma. Significant upgrades were made to the website and mobile application allowing the ability to handle customer volumes in excess of two times the volume experienced during Hurricane Irma. This will help ensure customers are able to report outages and wire down conditions without issue. The upgrades to the website and mobile application are also expected to reduce the number of contacts to the call center reporting outages and wire downs.

4.3.2 Pre-Landfall Planning

Consistent with the Corporate Emergency Plan, formal internal conference calls begin 72 to 96 hours prior to forecasted impact on FPL's service territory and continue daily until service is restored. Command Center calls include senior executives from NextEra and FPL. Call topics include weather updates, forecast damage estimates, system and resource status, projected resource needs, logistics, safety and human resource issues, IT systems updates, and critical checklist reminders.

The FPL External Response Team manages staffing at EOCs within its service territory. Staffing levels can vary depending on predicted strength and projected storm landfall as well as EOC capacity and activation plans. FPL's goal is to staff all county EOCs with at least two representatives who alternate shifts to match EOC needs. In more densely populated areas, such as Miami-Dade County, FPL provides additional staff. For small counties without an EOC, FPL's External Affairs Manager is available to provide assistance and information.

Some counties within the service territory have the capability of hosting FPL-assigned EOC representatives as the storm is passing (storm riders) which allows them to handle outage calls in real time. The number and location of customer service storm riders depends on the storm path and intensity. Approximately 80 FPL employees are trained as storm riders to support EOCs. These representatives serve as key points of contact for government stakeholders, delivering key messages and updates to local officials. They ensure that needed services and assistance are provided to aid restoration efforts of critical infrastructure. EOC representatives can also serve as regional spokespersons and provide assistance to local media.

Pre-landfall planning includes use of FPL's meteorological Storm Damage Model. The model computes forecasted damage assessments based on the storm's expected intensity as projected by the National Hurricane Center, and the number of facilities in the storm's path. The model projections include infrastructure damage and construction man-hours to restore service. These assessments project out five or more days prior to storm impact to facilitate determining initial resource needs and pre-positioning of resources.

4.3.3 Damage Assessment

The company uses a three-pronged approach for gathering damage assessments and identifying areas with the largest numbers of customer outages.

The Storm Damage Model is regularly rerun through landfall and the information is disseminated company-wide through an internal FPL website. The storm model's predictive analytics are compared to the influx of outage tickets from TCMS and detailed damage assessments conducted by air and land patrol.

Damage assessment teams and mobile command centers are pre-positioned based on the expected path of the storm and FPL's Storm Damage Model assessment projection. Air and land patrols of damaged feeders and laterals begin when winds subside below 35 mph. Depending upon storm size and scope, hundreds of personnel may be assigned to conduct air and land patrol damage assessments. The mobile centers enable FPL to monitor and manage its network on-scene and coordinate with other first responders in the field, support other utilities, and interact face-to-face with customers.

4.3.4 ETR Determination and Dissemination

Unlike the automated dissemination of blue sky ETRs via TCMS, the dissemination of initial dark sky ETRs to customers requires manual intervention. The Storm Damage Model, estimated construction man-hours, and the number of resources needed are updated daily and used to develop initial ETRs and restoration plans.

FPL's goal is to provide system-wide ETRs no later than 24 hours after a storm has cleared an impacted area. County-level ETRs are provided within 48 hours, and more area-specific, granular ETRs within 72 hours. Individual customer ETRs are refined as work is assigned and completed in the field.

The company deploys communication work groups (media relations, social media and visual communication professionals) to regions forecasted to be affected by the storm. This allows active communications within a particular region by both headquarters staff and teams in the field.

FPL's online outage map, Power Tracker, remains operational to communicate important updates. Power Tracker is an interactive map allowing customers to see outages in their county/neighborhood the number of customers affected and the number restored. If a county-wide ETR is available, it will also be displayed.

A dedicated government portal is also made available by FPL for public information officers and local government stakeholders. The portal provides various information, including statewide and county level outage information, critical infrastructure functions, outage reports, media releases, crew locations, and ETRs. The government portal is updated hourly.

Area-specific ETRs are trued up daily. FPL's Marketing and Communications organization uses this information to provide periodic updates for customers through the following outbound communications channels:

- ◆ Text messaging
- ◆ Mobile phone application
- ◆ Email

- ◆ Company Outage Map
- ◆ Social Media (Facebook, Twitter)
- ◆ Automated Calls

To improve the accuracy of ETRs, FPL reruns the storm damage model and uses actual outage data from the TCMS and other post-storm damage assessments to adjust the estimated construction man-hour and ETR information. This information is used to evaluate the deployment of resources and potential actions possible to reduce outage restoration times. To the extent process changes are identified, they are incorporated for future storm restoration events.

4.3.5 ETR Consultant Study and Resulting Initiatives

In response to concerns raised by customers and stakeholders during the recovery period after Hurricane Irma, FPL engaged a third-party consultant to launch a comprehensive review of all aspects associated with ETR in 2017. The review was completed in 2018 and identified the need for initiatives to create a new OMS, restoration application, ETR development process, and damage assessment process

The new OMS will replace the FPL legacy TCMS. FPL plans to include an enhanced automated process to verify meter status after crew work is completed. This process will assist in the identification of associated nested outages before a crew leaves the outage location (provided that the communications network is restored and working). Through customer reporting channels and automated systems such as DSCADA, GIS, and AMI, outage tickets can be created for the remaining few customers still experiencing outages. FPL has developed a Ping Team that will access outage tickets integrated in OMS and use AMI to bulk ping customer meters to verify customer counts and identify the nested outages. The new OMS is expected to be fully implemented by the end of 2021.

FPL is also in the process of enhancing the global ETR formula and protocol by developing a new algorithm that codifies the current basic inputs (i.e., construction man-hours, number of resources, and hours worked per day) and adds confidence intervals based on model inputs and statistical damage assessment. FPL plans to employ the advanced analytics to ETR by the end of 2021, as part of its triangulation process.

The purpose of the new restoration dashboard is to gather critical operational ticket, and resource data from multiple systems in a single view that can be used to support FPL's Command Center decisions. This will provide FPL analysis of restoration status and progress, crew staging, and the restoration strategy. The new dashboard will include the ability to filter outage tickets by area, to incorporate damage data, and display crew allocation. FPL expects the dashboard to will be fully implemented by the end of 2022.

To meet customer expectations of timely, accurate, and granular ETRs, FPL is improving its damage assessment process. Through a variety of technologies, including drones, amphibious robots, image analytics, asset sensors, and smart grid data, FPL expects to increase the speed and accuracy in detecting damage. FPL anticipates these technologies to be fully implemented by 2022.

4.4 Post-Storm Restoration Activities

Post-storm, FPL accelerates use of outbound communications to report damage, numbers of customers affected, and ETRs. News briefings and media releases regarding post-storm activities are provided daily. Customer safety announcements are issued to address concerns such as downed power lines, inoperable traffic lights, and use of generators. FPL emails, texts, and posts images and messages to social media, keeping customers abreast of outage information. FPL's overall restoration strategy is to safely restore critical infrastructure and the greatest number of customers in the least amount of time.

4.4.1 Prioritizing Restoration

Restoration commences immediately after FPL begins to experience storm-related outages as smart grid equipment (e.g., automated feeder switches) and FPL's control centers reroute power to minimize and avoid outages.

EOCs that can withstand hurricane-force winds are staffed across FPL's service territory to provide localized information regarding storm status and restoration efforts. During and after the storm, customer-facing employees and call center representatives provide approved messaging prepared by FPL's Emergency Communication Team.

FPL's Community Action Team and Area Information Managers are activated and use the same messaging provided by the Emergency Communication Team, issued in a daily talking point document. Kiosks are set up in neighborhoods and staffed with customer service representatives to assist customers with reporting outages, providing restoration updates, information on local resources (e.g., Red Cross, FEMA), and assistance such as cell phone charging stations, Wi-Fi, and water. Critical Infrastructure Functions (CIF), including hospitals, 911 centers and other facilities designated by the respective EOC organizations for priority restoration, are contacted by phone or via site visits to confirm status of electrical service.

Area Information Managers are deployed to restoration areas and staging sites to monitor and provide restoration status reports. They maintain ongoing communication support with FPL's Command Center, Regional External Affairs Managers, EOC representatives, critical facility customers, and public schools to confirm the status of electric service.

FPL may activate the Easing Assistance for Storm Emergencies (EASE) Program to assist Medically Essential Service Program customers. FPL Customer Advocates reach out to these customers in impacted areas to assess their needs. Advocates may provide assistance and information about relief sites or agencies where customers may get additional assistance. Because of the number and geographic diversity of these customers, they cannot be guaranteed higher priority for restoration efforts.

FPL designates major hospitals and 911 dispatch centers as critical facilities for priority restoration. Beyond that, county emergency management leadership reviews and provides FPL an updated list of facilities designated critical for priority restoration. While FPL does not limit the type of functions that a county can identify as critical, it does limit the number of main power lines that can be assigned priority restoration. The prioritization of restoration of the critical

facilities identified by the county emergency management leadership is developed by FPL with input from county EOCs and other critical entities. Because the company is working at the same time to restore the largest number of customers in the shortest amount of time, FPL prioritizes restoring power to portions of main lines that directly serve critical customers.

A prioritization scoring methodology (algorithm) assigns weighted rating to each feeder based on its infrastructure combination. Over 80 different categories of infrastructure, equipment, and customer combinations have been identified that could be served by a feeder. The feeder priority file is reviewed and rerun twice a year and the final prioritized distribution feeder is integrated in the restoration and load management planning process.

FPL has determined that in prioritizing restoration of designated CIF, a limit of approximately 20 percent of feeders serving any county should be designated for priority restoration. Aside from major hospitals and 911 dispatch centers, counties are free to designate as critical any facility they deem vital to ensure the health, welfare, safety and security of their citizens. Counties may also modify their critical designations year to year. This may include water treatment plants, correctional facilities, blood banks, mission-critical cellular facilities, nursing homes, and other facilities. FPL notes it is imperative that facilities dependent on electricity for the health and well-being of occupants have backup plans and comply with applicable laws or regulations in case of an extended power outage.

The sequencing of distribution system components for restoration is distribution feeders first, followed by laterals, transformers, and service lines. To restore service as quickly as possible, FPL uses a hybrid approach for feeder restoration, allocating crews as follows:

- ◆ 60 percent of available crew resources are apportioned to restore feeder backbone of critical infrastructure (i.e., hospitals, 911 centers, police, fire, communications, water, sanitation services) and continue to the meter of all CIFs. Crews will remain until all facilities are restored. After all CIF's are restored, crews will assist with infrastructure function feeders until all feeders are restored.
- ◆ 30 percent of available crew resources are apportioned to work on infrastructure function feeders (i.e., correctional facilities, emergency broadcast centers, fuel suppliers, government offices, acute care facilities, military installations, shelters, transportation). Crews will restore feeder backbone until the first point of heavy damage, and then continue to the next IF feeder until all feeders are addressed.
- ◆ 10 percent of available crew resources are apportioned to work on specific requests for action. For example, a request may come from a critical customer whose generator has failed or an FPL facility that has lost power. Crews will restore feeder backbone, down to the meter of specific customers.

FPL considers restoration to be essentially complete when 99 percent of customers impacted have been restored power. According to FPL, the remaining one percent are, for the most part, customers with unique circumstances that prevent restoration from occurring such as customers that are unable to take service due to damage to their homes.

4.4.2 Mutual Assistance and Crew Mobilization

Mutual aid agreements are managed nationally by seven Regional Mutual Assistance Groups (RMAGs). Florida IOUs are members of the Southeastern Electric Exchange (SEE) RMAG. FPL can reach out to SEE for mutual assistance. SEE identifies available mutual assistance and helps coordinate the logistics to support restoration efforts. As a member of SEE, FPL must follow guidelines established by the Edison Electric Institute (EEI). EEI member companies may receive and provide assistance in the form of personnel and equipment to aid restoration of electric service.

FPL has pre-negotiated contracts in place with restoration vendors. As the result of the NextEra purchase of Gulf Power Company in January 2019, FPL will have the availability of assistance from its sister company.

Fleet route and movement decisions typically begin 72 hours prior to estimated storm impact and adjust accordingly until the storm hits, through post-landfall. FPL procures fuel in advance of storm season and maintains bulk storage in multiple areas throughout its service territory. Additionally, FPL owns fixed fuel tanks located at a number of company facilities. Multiple vendor contracts are in place to guarantee availability of fuel.

FPL initiates contact with its third-party lodging vendor 72 to 96 hours prior to estimated storm impact. Rooms are assigned for sites that are used for processing and pre-staging, typically within 48 hours prior to estimated storm impact. In conjunction with traditional hotel lodging, alternative lodging is secured based on projected need, typically 48 to 72 hours prior to estimated storm impact. Alternative lodging includes mobile sleepers, and cots in tents or fixed facilities. Lodging requirements may vary before and after landfall, based on updated resource summaries.

FPL uses a centralized management system, Resources for Emergency Deployment (REDi) to monitor and track internal and external restoration resources. Through a single platform, REDi helps FPL quickly identify which crews, vehicles, and equipment are on the system. An FPL or sometimes an external/contractor crew supervisor is assigned to oversee and coordinate activities of each dispatched restoration crew. Restoration is performed in accordance with FPL procedures and only FPL crews can access the company's TCMS.

According to FPL, the overall preparation for Hurricane Irma in 2017 resulted in the assembly and deployment of its largest storm restoration workforce. Over 28,000 total personnel were assembled, representing approximately a 200 percent increase over FPL's normal workforce. Mutual assistance crews were spread across 29 staging sites throughout FPL's service territory.²

As restoration is being completed, assessments of remaining restoration construction man-hours is evaluated against available resources. The process for releasing mutual aid resources, as well as other restoration contractors, is the same for all dark sky events. In general, once the available resources exceed remaining restoration construction man-hours, mutual aid and contractor resources are released. Other factors considered in releasing mutual aid include the mutual assistance providers' home need, distance from home, and resource costs.

² See FPSC Order No. PSC-2019-0205-PHO-EI, issued May 31, 2019.

4.4.3 Road Congestion and Debris Removal

Efforts to address and mitigate roadway congestion during storm restoration events include working with various local, state and federal organizations. This includes the state EOC, county EOCs, state and local law enforcement agencies, Department of Transportation, and National Guard. At the state EOC, the company works primarily through the State Coordinating Officer and the ESF-1 (Transportation) and ESF-16 (Law Enforcement) functions when there is a need for assistance with road clearing and traffic control for restoration support resources.

FPL's Corporate Security Department provides training and awareness to local law enforcement agencies about company staging and processing sites, restoration processes and traffic control needs unique to FPL. Additionally, FPL also uses information provided by the All Hazards Consortium, a non-profit organization from a network of organizations and individuals who share a common interest in preparing for, responding to, and recovering from crises. Information provided by the consortium includes identification of state emergency declarations, road hazards, road closures, and real-time data that helps locate available fuel, food, pharmacies and hotels.

During initial response and storm recovery, FPL provides crews to assist county road clearing efforts. FPL's Emergency Manager is responsible for providing county EOCs with the following travel-related information to assist with power restoration:

- ◆ Road, bridge, toll booth closings
- ◆ Evacuation plans
- ◆ Curfews and military blockades
- ◆ Flooding and other conditions that may cause restoration delays
- ◆ Information on special-needs shelter openings
- ◆ Assistance with crew movement and traffic control
- ◆ Compliance with downed line and pole reports

4.5 ETR Process Improvements and Best Practices

Based on information obtained from FPL regarding its processes for communicating with customers, collecting and disseminating outage data, and restoring service, Commission audit staff recognizes the following company improvements and best practices:

4.5.1 Dedicated Emergency Operations Centers

FPL has an established centralized Storm Command Center and a Mobile Command Center to allow field employees to operate remotely in the area hit hardest by a storm. Both command centers provide FPL with the capability to track power outages and repair progress in real time, and prioritize power restoration to critical facilities.

4.5.2 Third-Party Consultant Study

In 2018, FPL with a third-party consultant completed a comprehensive review of all facets of ETRS. The review resulted in short-term and long-term FPL initiatives including the

replacement of the legacy TCMS with a higher capability OMS, improvements to the ETR restoration and damage assessment processes, and to provide more accurate and granular ETRs.

4.5.3 Fully Integrated Smart Grid Technologies

FPL's TCMS is fully integrated with DSCADA and AMI systems to provide two-way telemetry monitoring of outages without the need of human intervention. DSCADA systems capture built-in redundancy and backup systems to provide sufficient reliability, and can be much faster-acting and consistent than manual processes. AMI outage data can increase the accuracy of outage predictions and help utility personnel to readily and accurately react to problems. The end result is that customers' power is restored more quickly and utilities operate more efficiently.

4.5.4 Monitoring and Tracking of Mutual Assistance Crews

FPL uses a centralized management system, Resources for Emergency Deployment (REDi) to monitor and track mutual assistance. Through a single platform, REDi helps FPL quickly identify which crews, vehicles, and equipment are on the system.

4.5.5 New Technologies to Assess Storm Damage

To meet customer expectations of receiving accurate and granular ETRs in a short timeframe, FPL made improvements to its damage assessment process. FPL field crews are now using emerging technologies to assess damage in the aftermath of a storm. Examples include drones that can survey overhead power line damage and amphibious robots that can provide access to unsafe flooded areas.

4.5.6 Rerun of Storm Damage Model to Develop Lessons Learned

FPL reruns its storm damage model and uses actual outages from the TCMS and other post-storm damage assessments to adjust the estimated construction man-hour and ETR information. To the extent process changes are identified, they are incorporated for future storm restoration events.

4.5.7 Upgrades to Customer Communications Channels

FPL made significant upgrades to the website and mobile application to handle extreme volumes of customer traffic. Both the website and mobile application are able to handle customer volumes in excess of two times the volume experienced during Hurricane Irma.

4.5.8 Assessment of EOC Representative Performance

The performance of EOC representatives is assessed and an improvement action plan is created following all event activations. Key opportunity areas addressed include: restoration work plan details, restoration verification, wire down reporting, more messaging, and better outage maps.

4.5.9 Provision for Alternative Lodging

To boost staging site efficiencies, FPL now provides alternative lodging near FPL staging sites. Alternative lodging includes mobile sleepers, cots and tents in fixed facilities. The alternative lodging provides increased restoration productivity by filling gaps created by hotel unavailability and eliminating travel time to and from hotels to staging sites.

4.5.10 Promoting the Right-Tree-Right-Place Program

FPL has determined that the number one cause of outages during Hurricane Irma was trees falling and debris blowing into the power lines, many of which were located outside of areas where FPL is allowed to trim. FPL has since committed to continue to work with local and state governments and communities to stress the importance FPL's Right-Tree-Right-Place Program. According to FPL, some local municipalities are beginning to adopt and enforce new ordinances that restrict the type and location of vegetation that can be planted near power lines.

5.0 Florida Public Utilities Company

Florida Public Utilities Company (FPUC) is a subsidiary of Chesapeake Utilities Corporation and serves over 28,000 electric customers in North Florida. FPUC has four substations, 10,399 transformers, approximately 905 miles of distribution lines and 16 miles of transmission lines.

FPUC's Northeast Division is located in Fernandina Beach and serves Nassau County through 100 miles of underground and 141 miles of overhead lines on 4,998 wood poles. The company's Northwest Division is located in Marianna and serves Jackson, Calhoun, and Liberty counties through 49 miles of underground and 615 miles of overhead lines on 21,550 wood poles.

5.1 Storm Preparation Activities

FPUC's ongoing storm preparations include activating the company's incident command centers, hardening its electric infrastructure, reviewing emergency response procedures, conducting hurricane drills, and coordinating with local and state government.

5.1.1 Company Storm-Mode Operations

FPUC's Northeast and Northwest command centers are constructed to withstand sustained winds of 160 and 100 mph, respectively. They serve as the company's Incident Command Centers for emergency response and recovery operations. The emergency operations teams consist of key Electric Operations personnel including the Manager, Assistant Manager, and Senior Engineer, with additional employees included based on the severity and timing of the emergency. The teams work closely with the state and local EOCs and are responsible for coordinating all restoration activities.

FPUC emergency response personnel are guided by documented emergency operations procedures for its Northeast and Northwest Divisions. The company annually reviews its emergency response procedures and plans and conducts storm drills internally and externally with the state and local EOCs. FPUC emergency procedures have the following objectives to ensure orderly and efficient service restoration:

- ◆ Assigning highest priority to safety of general public, customers, and employees
- ◆ Preparing employees, buildings, equipment, and support functions prior to hurricane
- ◆ Conducting early damage assessment to develop manpower requirements
- ◆ Requesting additional manpower as soon as conditions and data indicate need
- ◆ Monitoring restoration activities to achieve efficient and rapid restoration
- ◆ Providing all logistical needs for employees and contractors
- ◆ Assisting employees and their families to address injury or damage

When a named storm has potential to affect the FPUC service territory, company-wide and work group calls (i.e., customer care, safety, operations, and information services) are scheduled. These calls include executive and operational management, system planning, safety, customer care, marketing, regulatory, finance and information services. Topics include storm track,

customer and employee needs, communication strategy, resource planning and staging, mutual aid, logistics planning, site preparation, and security.

5.1.2 Storm Hardening and Grid Upgrades

According to its 2019-2021 Storm Hardening Plan, the company continues to evaluate the efficiency of its current three-year feeder and six-year lateral vegetation trimming cycles. FPUC has established pilot programs which evaluate whether trimming all the laterals associated with feeders simultaneously is more efficient. The outcome of this evaluation may modify trim cycles for feeders and laterals to a single four or five-year cycle.

Ten extreme wind loading construction projects are planned for the 2019–2021 time period. Included is an upgrade to a 7.2-mile distribution feeder serving critical customers (e.g., police and fire stations, high schools, and city offices) and another to upgrade 1.1 miles of an Amelia Island distribution line subject to salt spray corrosion.

FPUC continues to install self-healing reclosers³ on feeders and laterals and replace any decayed wooden transmission poles with concrete and higher grade wooden poles for distribution. The company states that the installations should improve electric reliability, decrease the number of storm outages, and reduce total costs. FPUC is evaluating the potential benefit of encasing existing underground distribution lines in concrete ducts and the need for additional overhead support mechanisms.

The company has not yet deployed AMI and its SCADA system is not integrated with OMS. As a result, FPUC relies on customers to report outages. Integration of AMI and SCADA with OMS is scheduled for completion in 2021. Outages will then be automatically captured in OMS without customer intervention and work orders generated. Additional operational benefits expected from deployment include:

- ◆ Detecting outage locations and extent of services affected.
- ◆ Predicting more accurate ETRs.
- ◆ Reducing response and restoration times.

FPUC aligns its storm-hardening initiatives and grid modernization projects with its priorities of improving electric reliability to reduce storm damage and service restoration times and costs.

5.1.3 Utility-Government Coordination

Strategically placed FPUC team members, including executives, gather information and share restoration updates daily with EOCs before, during, and after a storm. FPUC staffs personnel at county EOCs on a 24/7 basis. In lessons learned from Hurricane Michael, the company intends to have continuous representation at the state EOC to provide and receive the most current information.

The company's Government Affairs personnel interact with EOCs, and federal, state, and local government to facilitate restoration efforts. FPUC continues its involvement with local governments to ensure restoration activities comply with local ordinances. The Manager of

³Type of circuit breaker that senses and interrupts faults and automatically restores service after momentary outage.

Government Relations (Northeast) is responsible for maintaining relationships with local and state government officials, business, and community leaders to address storm-related activities. The manager is also responsible for quickly responding to customer issues referred by these entities.

FPUC leadership provides in-person updates to local and state EOCs, law enforcement agencies, and state government including elected officials. Additionally, FPUC's communications team partners with local trade and national media to provide real-time storm updates.

5.2 Blue Sky Operations and ETR Process

FPUC employs several inbound communications channels for customers to report outages and request an ETR during blue sky conditions:

- ◆ Call center customer service representatives
- ◆ Interactive voice response system
- ◆ Email
- ◆ Social media (Facebook, Twitter, LinkedIn)
- ◆ Company website
- ◆ Text messaging (by year-end 2019)

Customer service representatives assist with inbound communications in either English or Spanish. Outages reported via the interactive voice response system are automatically entered into OMS. The outages reported by customers through the other incoming channels are manually entered into OMS by customer service representatives.

Customer service representatives also handle incoming service-related issues received via telephone calls, written correspondence, and emails. Response to customer contact involving potential harm to a person or property (e.g., a downed power line) is dispatched immediately.

After an outage report is entered into OMS, the Geographic Information System (GIS) and Customer Information System (CIS) identify and document the outage location, impacted facilities, and suspected cause. An OMS outage ticket is transmitted to a service technician for restoration work.

Once a work ticket is dispatched, field crews use FPUC's Lineman Application to determine an initial ETR based on the type of facility or equipment damaged. The Lineman App has a number of features that allow linemen to update repair orders and ETRs in OMS, add comments, obtain information about facilities involved, or reassign outages to other crews.

Outages that do not require an ETR entry into OMS are those with a restoration time of one hour or less. Most blue sky outages fall in this category. When available, upon customer request, FPUC provides individual ETRs through the following outbound communications channels:

- ◆ Call center customer service representatives

- ◆ Email
- ◆ Text messaging (by year-end 2019)

An ETR is manually entered into OMS during the following major outage conditions:

- ◆ Loss of power from generation supplier (FPL, Gulf, or JEA)
- ◆ Supervisor-On-Call escalations
- ◆ Main feeder
- ◆ More than one hour to restore service
- ◆ More than one repair crew to restore service

To determine an ETR for an outage involving loss of power from a generation supplier, FPUC requests an ETR from that supplier. For Supervisor-On-Call outages, FPUC management determines an ETR based on engineering estimates and past experience. The ETR for main feeders and other outages involving more than one hour to restore service is calculated by the on-call service technician based on field conditions. For outages requiring more than one repair crew, the on-call service technician and supervisor establish an ETR based on field conditions.

Customer-reported outages are entered into OMS and the company's interactive voice response system informs callers that FPUC is aware of outages in the area. Callers may choose to speak with a customer service representative who provides an ETR if requested. The anticipated integration of AMI and SCADA with OMS will enable automatic dissemination of ETRs to customers.

Closed outage tickets in OMS are reviewed by an assigned engineer for procedural and factual accuracy, including ETRs. Any necessary corrective actions are implemented.

5.3 Dark Sky Operations and ETR Process

Customers may report outages via the same incoming communications channels associated with blue sky operations. ETR calculation is more automated for outages in blue sky than for dark sky conditions because of complications and contingencies that must be considered during storm restoration. FPUC performs damage assessment for dark sky events depicting level of damage to its electric system operations. Based on this, the company develops a recovery action plan to determine and disseminate ETRs to customers.

5.3.1 Customer Communications

FPUC's website features several banner and pop-up messages containing notifications such as office closures, detailed power restoration information, and safety updates. The website also includes a dedicated link to a storm landing page which is monitored and updated 24/7 until power is restored to all customers. An online outage map is available, indicating restoration status and ETR information by date and zone (i.e., one or more counties). The landing page provides power restoration information, frequently asked questions, diagrams depicting customer-owned equipment, lists of authorized electrical contractors, and information on its emergency temporary payment plan, and emergency resources. FPUC plans to provide an

enhanced outage map with more defined ETR data with the future implementation of AMI. Through the use of email and social media addresses on file, FPUC conveys daily restoration updates, including ETRs, and safety messages to customers with links to the online outage map.

Before, during, and after a dark sky event, the company places automated and live outbound calls to pre-qualified customers enrolled in FPUC's Medical Alert Program. These customers are provided with a direct telephone number for contacting the company, if necessary. Designated FPUC personnel also conduct on-site visits to Medical Alert or other customers in distress as reported by field crews, incoming calls, or through other communications channels.

FPUC Operations Management provides storm preparedness and recovery talking points to customer service representatives. This information reminds customers of the company's storm landing page, outage map, safety updates, etc. Operations personnel also provide real-time restoration information to further assist service representatives with handling customer inquiries.

FPUC's interactive voice response system handles customer outage calls to more efficiently route calls for restoration. The call prompts may direct a customer to speak directly to a service representative to report a downed wire or other emergency. A customer may also opt to leave a voicemail and receive a call back. In June 2019, the company increased its interactive voice response system call capacity from 2,000 to 3,000 calls per hour. The interactive voice response system also provides messaging and storm updates including ETR information.

A third-party answering service, implemented in 2018, is available for handling outage calls received after hours, weekends, and holidays. Information is automatically entered into OMS for processing. The company states that this allows work orders to be generated on a real-time basis and enables faster dispatching of service tickets leading to more timely restoration.

Based on storm severity, FPUC prepares for a higher call volume by increasing staffing and management oversight through extended hours and alternative shifts. The company also has contracts with third-party call centers in Tallahassee and California to assist with customer inquiries on a 24/7 basis. Employees from FPUC parent Chesapeake Utilities Corporation can be made available to support incoming calls, correspondence, voice mails, social media inquiries, etc. The company seeks to communicate consistent ETR messaging to customers and other stakeholders.

5.3.2 Pre-Landfall Planning

FPUC monitors local and national weather forecasts and publishes storm warning and watch notifications 72, 48, and 12 hours prior to landfall. The company uses radio and television to provide storm updates, including safety tips, emergency contacts, etc. The broadcasts direct customers to the FPUC communications channels, such as its interactive voice response system, email, website, and social media platforms.

FPUC collaborates internally and with other electric utilities and third-party organizations such as the Southeastern Electric Exchange (SEE) to better respond to anticipated restoration efforts. When major storms cause loss of cellphone and wireline telecommunications services, the

company uses satellite phones to facilitate communications among emergency operations personnel which allows for quicker response times and ETRs.

The company does not use in-house analytical or predictive models for pre-landfall planning. Instead, FPUC's Operations Management team uses OMS data, weather forecasts, and SEE storm reports to determine an initial storm assessment, including potential impact areas, damage estimates, and an internal system-wide ETR. FPUC communicates to SEE the number of line and tree crew resources needed.

The team also shares this initial storm assessment with the company's forensic team to aid in the pre-landfall phase of the storm data collection and reporting process. The team leader is responsible for tracking storm progress, coordinating team deployment, communicating with Command Centers, reviewing findings, and generating damage reports. At 72, 48, and 24 hours prior to landfall, respectively, the FPUC forensic team leader:

- ◆ Alerts team, verifies contact information, and checks restoration equipment
- ◆ Assesses storm track and intensity to determine appropriate staging locations
- ◆ Notifies team of crew members, mobilization plan, safety and reporting procedures

5.3.3 Damage Assessment

FPUC Electric Operations personnel perform damage assessment after sustained storm winds drop below 40 miles per hour. The process involves conducting transmission line patrols and substation investigations to: verify transmission service from service providers, assess equipment damage, and identify feeder lockouts (i.e., breakers automatically opened due to fault conditions).

As part of its damage assessment process, FPUC executes procedures to isolate and restore outages. The Storm Director identifies out-of-service feeders and schedules service restorations based on the priority feeder lists.

After the isolate-and-restore phase, damage assessment teams patrol the backbone portion of restored feeders and record location, type of damage, and materials needed for repair. Summaries are prepared for the Electric Operations Director and Storm Director to prioritize and schedule restoration, determine manpower and equipment requirements, and monitor inventory. As work is completed and updated in OMS, manpower and material needs are evaluated and adjusted.

FPUC inspects feeders and laterals and the results are matched to a system map so that reported damage can be pinpointed. The FPUC Director and the Manager of Electric Operations are responsible for analyzing the damage assessment and ensuring restoration is properly completed.

Using the overall damage assessment, the Operations Management team develops the recovery action plan incorporating several factors such as number of poles damaged, trees impacting electrical facilities, substations impacted, and transformers damaged. Also considered are roadway conditions, lodging of crews, and inventory of materials and human resources. The damage assessment and recovery action plan are updated based on the most current information

available. Key leadership reviews the damage assessment and recovery plan, refining strategies to ensure the most effective and efficient recovery actions are implemented.

In July 2019, FPUC introduced an application enabling electronic entry of damage assessments into OMS. The company expects this to improve ETR timeliness and accuracy.

5.3.4 ETR Determination and Dissemination

The outage collection and ETR dissemination process for dark sky outages are identical to blue sky, with the exception that field crews do not enter ETR data via the Lineman Application. ETRs must be entered into OMS by supervisors or assigned engineers.

For dark sky outages, the company must consider not only its OMS data, but also status reports from EMS, fire and police departments, and local, state, and federal agencies. These reports typically include emergency response information, critical customers without power, incident location, damage assessment, and potential causes.

Based on the OMS data, feedback from field crews and key personnel, completed damage assessment, and updated recovery action plan, an initial global ETR is determined and approved by the Assistant Vice President of Electric Operations. FPUC's goal is to disseminate the global ETR to customers within 24 hours after damage assessment is completed. The company disseminates ETRs through the previously described outbound communications channels.

FPUC currently posts ETRs to its online outage map by date and zone. With the implementation of AMI, the company anticipates being able to provide a more enhanced outage map that includes specific restoration times and more defined outage locations.

As restoration work progresses, FPUC further refines and provides ETRs to customers at a more granular level by zone. The company's restoration target is 100 percent of customers that can receive power. FPUC provides notices at its website urging customers without power to contact the company so that service can be restored. FPUC continues to post restoration updates, safety information, and other notifications until the restoration target is achieved.

After a dark sky event, FPUC conducts a review of the outages and associated ETRs released throughout the event to determine ETR accuracy with respect to actuals. They also review final reports based on investigative results from consultants or SEE member teams detailing the types of damage to FPUC substations, transmission and distribution lines, structures, poles, and any other equipment that caused customer outages.

FPUC documents estimated and actual outage restoration times in OMS history files for evaluation by Division Management for accuracy. Management reviews and compares the estimated and actual restoration times periodically for estimation accuracy and verifies that actual restoration times for the particular incident are reasonable. The results of these reviews are used as training tools for linemen in determining accurate ETRs for similar events in the future and in discussions on ways to reduce restoration times.

A lessons-learned list is generated and shared with company personnel and contractors. FPUC also presents the lessons learned list to the FPSC during its annual hurricane preparedness workshop.

5.4 Post-Storm Restoration Activities

To ensure public safety while restoring service to customers quickly, FPUC executes its priority restoration protocols which include restoration of service to critical customers, mutual assistance and crew mobilization, and road congestion and debris removal, through coordination with local industry and government.

5.4.1 Prioritizing Restoration

When sustained storm winds subside below 40 mph, designated FPUC scout crews de-energize downed wires and open damaged laterals so that undamaged feeders can be energized. Service restoration continues in the following sequence:

- ◆ Transmission
- ◆ Substations
- ◆ Main feeders to critical customers
- ◆ Other main feeders
- ◆ Damaged primary and secondary laterals
- ◆ Service lines
- ◆ Street and security lights

If other outages occur close to a priority restoration area, those outages are still subject to the priority restoration procedures. The company's priority guidelines, however, do not prevent responding to emergencies.

FPUC's Operations Management compiles and maintains an updated critical customers list including hospitals, police, fire, healthcare, public works, storm shelters, and EOCs. The list contains information collected from EOCs and city and county officials within the service territories. The company gives its critical customers the highest restoration priority. Within the critical customer category, FPUC sequences priority restoration as follows:

- ◆ Municipal and state emergency services
- ◆ Public utilities
- ◆ Hospitals, clinics, nursing homes and assisted-living
- ◆ Disaster shelters and motels
- ◆ Major food storage and processing
- ◆ Correctional facilities
- ◆ Communication and broadcasting services
- ◆ Airports

FPUC tracks whether nursing homes within its operating territories have backup generators. The company reaches out to them as it does medical-alert customers prior to a storm.

FPUC's Customer Care Logistics Manager in the Northeast Division and the Senior Engineer in the Northwest Division are responsible for comparing the previous and current year's list and updating their respective critical infrastructure lists by name, address, telephone, and contact person. The updated lists are to be provided annually to the Storm Director prior to the start of hurricane season.

The company has a post-storm Forensic Data Collection and Reporting process for documenting damage to its transmission and distribution structures and equipment. The company uses consultants or SEE forensic investigation teams to collect the storm damage data in an orderly manner with minimal interference with ongoing restoration.

5.4.2 Mutual Assistance and Crew Mobilization

Initial storm projections, followed by actual damage assessments and recovery action plans facilitate mobilizing crews for service restoration. When storm winds subside and it is safe to perform repairs, company resources and mutual assistance crews are mobilized. FPUC uses contractor crews to restore services such as removing broken poles and setting new ones, repairing or replacing conductors, transformers, insulators, and surge arrestors. The company also hires additional contractors to clear power lines of vegetation.

Most mutual assistance agreements among electric companies across the country are managed by seven Regional Mutual Assistance Groups (RMAG). Florida IOUs are members of the Southeastern Electric Exchange (SEE) RMAG. SEE coordinates restoration services including locating and mobilizing resources such as line crews, tree trimmers, damage assessors, and provides other logistical support (e.g., food, lodging, and staging sites.) For Hurricane Michael in October 2018, FPUC had 1,155 mutual assistance contractors working to clear debris and restore power. These contractors in addition to FPUC's 35 Northwest and 50 Northeast Division employees represented about a 13-fold increase in restoration personnel.

FPUC is also a member of EEI that facilitates industry partnership with several government agencies, such as the DOE, FEMA, DOT, DHS, DOD, National Guard, and state agencies to: improve communication and coordination, streamline transportation, and enhance logistical support, security, and access. The company supplements restoration efforts through participation in EEI's mutual assistance program. The agreement allows FPUC and the other electric utility members to share resources such as personnel, equipment, and materials.

FPUC assigns an employee to supervise each mutual assistance restoration crew. The assigned employees coordinate contractor activities and monitor the work to ensure that it is performed safely, efficiently, and consistent with good utility practices. To facilitate the restoration efforts and to ensure proper control of its outage data, only FPUC technicians have access to the company's OMS data. FPUC is responsible for covering the costs for the mutual assistance crews and handling liability and other related expenses. The contractors handle the logistics of traveling to the company's service areas to restore power to customers through rebuilding power lines, replacing poles, etc.

As restoration continues, Operations Management determines when demobilization should begin and informs Logistics. Operations then notifies the mutual assistance resources of the release date and time, and SEE is informed that these resources will be available.

FPUC's two divisions employ separate contingency plans for fuel availability. The Northeast Division procures fuel through local fueling stations. Prior to each storm season, the company pre-positions 500 gallon emergency storage tanks. The Northwest Division contracts with a local supplier to provide fueling services at staging areas.

To track mutual assistance repair work, in August 2018, FPUC implemented new contractor invoice requirements and an approval documentation process. Company employees supervise and monitor mutual assistance crews throughout the restoration process. SEE Mutual Assistance Procedures and Guidelines govern these activities. The procedures, manuals, and official practices used by FPUC during mutual assistance activities are the same for company crews and private contractors.

5.4.3 Road Congestion and Debris Removal

Windblown debris together with storm surge and flooding add to the challenges electric utilities face when trying to gain access to damaged facilities to perform necessary restoration repairs.

FPUC initially designates a team member to act as a lead for debris removal. This individual makes assignments, monitors contractor progress, and coordinates activities with the restoration management team. The company attempts to include debris removal crews with mutual assistance linemen and third-party tree removal crews to assist in clearing areas for restoration. Crew leads meet several times a day with management to report and update resource needs.

FPUC's management coordinates with municipalities to attain easement waivers to facilitate repair crew access to damage facilities. Law enforcement assists with roadway congestion issues, coordinating through local EOCs. FPUC also posts website reminders for customers to avoid the roadways involved with restoration efforts.

5.5 ETR Process Improvements and Best Practices

Based on the review of FPUC processes for establishing and communicating ETRs, Commission audit staff recognizes the following company improvements and best practices:

5.5.1 Incident Command Centers

Hardened FPUC incident command centers in its Northeast and Northwest service territories centralize emergency response operations. The emergency operations team consists of key Electric Operations personnel including the Operations Manager, Assistant Operations Manager, and Senior Engineer, with additional employees included based on the severity and timing of the emergency.

5.5.2 Smart Grid Technologies

FPUC plans to implement AMI by 2021 and other grid technologies within five to 10 years. The technologies will allow pinpointing of outage locations, predicting more accurate ETRs, and reducing response and recovery times. The integration of the smart meters with OMS and SCADA will also provide operators with real-time outage information rather than waiting for customers to report outages.

FPUC continues to install self-healing reclosers to restore power automatically during temporary faults on feeders and laterals and replace poles with concrete for transmission and higher class (greater strength) wood for distribution. The company states that these installations should improve electric reliability, reduce the number of storm outages and ETRs, and reduce costs.

5.5.3 Evaluation of Mutual Assistance Activities

To track mutual assistance repair work, FPUC implemented a new contractor invoice requirements and approval documentation process in August 2018. Company employees supervise and monitor mutual assistance crews throughout the restoration process. SEE Mutual Assistance Procedures and Guidelines govern these activities. The procedures, manuals, and official practices used by FPUC during mutual assistance activities are the same for company crews and private contractors.

5.5.4 Lineman and Damage Assessment Applications

FPUC implemented its Lineman Application in 2016, providing service technicians with direct access to OMS. Field evaluated ETRs are now more accurately and effectively applied.

In July 2019, FPUC implemented the Damage Assessment Application allowing automated damage assessments. Data now can be entered directly from the field into OMS and includes a damage description with photos and projected materials and other resources needed for restoration.

5.5.5 Enhanced IVR and Customer Care

In 2019, FPUC increased its interactive voice response system call capacity from 2,000 to 3,000 calls per hour. For improved customer care, the company has contracted with a vendor providing 24/7 call center services. Opened in April 2019, the new call center in Tallahassee serves both divisions with additional capacity.

5.5.6 Answering Service Assistance

In 2018, FPUC implemented a third-party answering service for after hours, weekends, and holidays. Direct feed of call information into OMS allows work orders to be generated on a real-time basis and enables faster service ticket dispatch and ETR entry in OMS.

5.5.7 Expanded Communications Channels

In September 2019, FPUC upgraded its website to allow customers to report outages and request ETRs. By year-end 2019, the company plans to implement text messaging as an additional customer channel for outage reporting.

5.5.8 Feeder and Lateral Vegetation Management Pilot Programs

The company continues to evaluate the efficiency of its current three-year feeder and six-year lateral vegetation trimming cycles. FPUC has established pilot programs evaluating the efficiency of trimming vegetation from feeders and associated laterals simultaneously. Any resulting increases in efficiencies could help reduce customer outages and ETRs.

5.5.9 Outage Estimation Restoration Time Evaluation

FPUC documents estimated and actual outage restoration times in OMS history files for evaluation by management for accuracy. Management reviews and compares the estimated and actual restoration times periodically for estimation accuracy and that actual restoration times for the particular incident are reasonable. The results of these reviews are used as training tools for linemen in determining accurate ETRs for similar events in the future and in discussions on ways to reduce restoration times.

5.5.10 Forensic Data Collection and Reporting

The company has a documented Forensic Data Collection and Reporting process for storm-related damage to its transmission, substation, and distribution structures and equipment. The company uses consultants or SEE forensic investigation teams to safely collect storm damage data in an orderly manner with minimal interference to the ongoing restoration process.

5.5.11 Automated and Live Outbound Calling

Before, during, and after a dark sky event, the company places automated and live outbound calls to pre-qualified customers enrolled in FPUC's Medical Alert Program. These customers are provided with a direct telephone number for contacting the company, if necessary. Designated FPUC personnel also conduct on-site visits to Medical Alert or other customers in distress as reported by field crews, incoming calls, or through other communications channels.

5.5.12 Use of Drone Technology

FPUC used drones to assess damage caused by Hurricane Michael. Based on lessons learned and collaboration with industry leaders from various organizations such as EEI and EPRI, the company continues to gain a better understanding of how to effectively use drones to assist with restoration efforts. Overall, FPUC states that these efforts should allow it to more accurately determine ETRs.

6.0 Gulf Power Company

Gulf Power Company (Gulf) currently serves over 462,000 customers in 8 counties across Northwest Florida with approximately 2,277 MW of generating capacity. The company has 12,243 transmission poles, 234,262 distribution poles, 5,822 miles of distribution overhead lines, 1,993 miles of underground lines, 135 substations, and 131,648 transformers. Effective January 1, 2019, Gulf became a NextEra Energy company. As such, Gulf is in the process of consolidating many of its systems and processes with NextEra Energy's other Florida utility, FPL.

6.1 Storm Preparation Activities

Restoring power after a named storm is a complex task, and timely restoration requires significant preparation activities. Prior to a dark sky event, Gulf prepares to determine the nature of the storm, to effectively assess damage to its system after the storm, and to provide customers with timely ETRs. Preparation activities include activating internal emergency management operations, hardening of infrastructure, and meeting with local and state government representatives.

6.1.1 Company Storm-Mode Operations

Gulf's Corporate Emergency Management Center supports advance preparation, damage assessment, and power restoration. This center is broken down into 22 functional teams which provide support to generation, transmission, and distribution. With executive involvement, storm restoration plans are developed and shared throughout the Corporate Emergency Management Center organization to make sure support teams are in step with the restoration efforts. To provide a coordinated response and maximize restoration effectiveness, the company organizes into three major restoration areas headquartered in Pensacola, Fort Walton Beach, and Panama City. The actions at each restoration area include coordinating mutual assistance resources, securing infrastructure and facilities, evacuating employees, moving equipment and materials, planning for staging sites and logistics, and activating fueling contracts.

The Power Delivery business unit is accountable for storm damage assessment and outage restoration. To accomplish this, Gulf currently employs 177 distribution and eight transmission linemen. Following a dark sky event, Power Delivery is responsible for managing the process, including coordinating crews and acquiring needed resources to assess system damage.

6.1.2 Storm Hardening and Grid Upgrades

The recent hurricane seasons highlight the need for utilities to continue hardening and upgrading electric distribution infrastructure. Pursuant to FPSC Order No. PSC-07-1022-FOF-EI, Gulf is required to file a three-year Storm Hardening Plan. The company's plan for the years 2019–2021 incorporates the 10 storm preparedness initiatives ordered by the Commission in 2006.

Gulf's process for identifying storm hardening projects has included focus on interstate crossings, double circuit pole lines, and key infrastructure that would affect large numbers of customers. Recent projects have migrated to include hardening of critical infrastructure (e.g.,

hospitals, storm shelters, and EOCs) and commercial corridors that would provide needed community support. Each year, Gulf evaluates possible projects based on input and collaboration from each of the company's operating districts and the marketing team. This collaborative effort identifies feeders that serve critical customers, large numbers of customers, and those that may have experienced below-normal reliability performance. Projects are then selected to allocate resources among the three operating districts.

6.1.3 Utility-Government Coordination

Gulf's district managers and account managers meet with local and county governmental officials prior to hurricane season to ensure good communication and planning. Topics include plans, procedures and priorities for storm restoration.

Members of Gulf's Emergency Management Center attend annual conferences, such as SEE mutual assistance meetings, in an effort to benefit from lessons learned by others. The company also participates in an annual statewide storm drill under the direction of the State EOC.

During named storms, certain company employees are assigned to ESF-12, one of the 18 Emergency Support Functions designated by Homeland Security. ESF-12 operates to restore infrastructure delivering energy services to the community. The employees are placed at all affected county EOCs as well as the State EOC and provide progress reports and restoration status to local and state EOC staff. After a storm passes, Gulf issues at least two news releases a day with updates on storm restoration, and is shared with the county and state EOCs.

Since Hurricane Michael, the company has developed a new communication plan for the Gulf EOC team that standardizes information flowing to and from the local EOC, state EOC, and Gulf Corporate Emergency Management Center. This plan establishes set times for calls, check-ins, and provides both a high-level and tactical-level picture of the EOC and the Gulf service area. Documents are kept as a log for after-action reports and lessons learned.

6.2 Blue Sky Operations and ETR Process

During a blue sky event, customers may report outages through the following communications channels:

- ◆ Call center customer service representative
- ◆ Interactive voice response system
- ◆ Website
- ◆ Mobile app
- ◆ Email
- ◆ Text messaging
- ◆ Social media (Facebook, Twitter, Instagram)

Collecting outage information, creating the outage ticket, and completing the restoration process are all functions within the Gulf Distribution Control Center. During a blue sky event, outage notifications arrive in the Gulf Trouble Call Management System (TCMS).

TCMS is the centralized system that combines information from the Customer Information System, DSCADA, and AMI to give operators and engineers in the Distribution Control Center the most accurate and up-to-date information to assist in restoration activities. The Customer Information System integrates software providing Gulf a complete record of customer information needed to provide service.

Customer outages reported via text messages, email, mobile app, or company website are routed directly to TCMS for creation of an outage ticket. Outages received via the call center, social media or IVR communication channels are manually entered into the Customer Information System before being routed to TCMS.

Gulf's DSCADA and AMI systems are capable of detecting an outage and automatically alerting TCMS without customer involvement. TCMS can calculate the number of customers impacted downstream from the failed device. During a blue sky event, TCMS automatically populates the initial ETRs provided to customers. Any updated ETRs are entered into TCMS by onsite field crews while restoration work is being performed. Gulf's field crews have direct access to TCMS through portable laptops.

6.3 Dark Sky Operations and ETR Process

ETR calculation is more automated for outages in blue sky than for dark sky conditions because of complications and contingencies that must be considered during storm restoration. During dark sky events, Gulf receives outage information through automated and customer-initiated inbound communication channels. Due to the high volume of outage reports generated by TCMS, an automated ETR is not provided to customers in response to outages. Instead, at the conclusion of post-storm damage assessment, Gulf provides the initial global ETR to impacted customers. Increasingly granular and specific ETRs are later provided as restoration requirements are determined and priority restorations are completed.

6.3.1 Customer Communications

Gulf maintains a 24/7 communications presence throughout a dark sky event. The company develops multimedia messages to help customers understand the overall storm damage to the electric system, plans and process for rebuild, real-time updates of the magnitude of the work, and restoration times. In anticipation of a named storm moving into the Gulf of Mexico, Gulf begins outbound communications to provide customers with safety information to encourage them to plan and prepare for a power outage. Information is provided on what to expect before, during, and after the storm.

Gulf's website and mobile app are converted to a pre-, during-, and post-storm home page format to allow customers to find needed information. This information includes pre-storm preparations, local emergency management websites, shelter locations, storm safety tips, and methods to connect with Gulf for updates, etc. Customers can log into their accounts to report an outage, request text alerts, emails, or phone calls with outage updates.

Customer service representatives are available to answer calls, respond to online requests, and communicate through online customer chat. The company subscribes to a language translation service for non-English speaking customers. The service is available 24/7 and provides translation for more than 170 languages. During the translation, the customer service representative and the interpreter work together on the phone to ensure the customer's needs are addressed.

After a dark sky event, 100 percent of Gulf's Customer Care Center staff is dedicated to answering phone calls, including employees whose normal job duties do not include phone activities. Work shifts are extended to accommodate additional call volume. To ensure continuous coverage, normal staffing is expanded and includes customer service representatives from the Customer Care Center, contract labor, affiliate company resources, and other Gulf employees on storm-duty assignments. Emergency and outage-related phone calls receive the highest priority. After Hurricane Michael, the company increased the capacity of its high-volume answering system by 80 percent and contracted with a third-party vendor to assist with call overflow.

While Customer Care Center service representatives receive official company communications regarding restoration progress from Corporate Communications, they do not have a script to recite to customers concerning restoration. The representatives use Sharepoint, an internal social media platform, to augment information from official communications. Sharepoint also allows for representatives to pose questions internally.

In the event there are no communications available to customers after a storm passes, field crews hand out restoration and safety information flyers at distribution sites, EOCs, shelters, and open businesses. The flyers include information such as community distribution points for food, water, fuel, and key telephone numbers for support organizations such as FEMA and the Red Cross. As restoration progresses, new flyers are distributed that include maps and estimated restoration times for different areas.

6.3.2 Pre-Landfall Planning

Before a storm makes landfall, Gulf focuses on preparation, securing facilities, and ensuring employees are prepared and safe. Pre-storm damage projections are based on current storm track, intensity, and previous experience with similar storms and conditions. These pre-storm projections are used to estimate needed resources, pre-position resources (materials, equipment, employees, crews, etc.), and prepare for an initial response following an event. Material inventory levels on critical items are increased prior to storm season.

Preparing for damage assessment and restoration begins prior to landfall, with a coordinated company effort to monitor storm movement and wind speeds. These predictions are used to determine landfall location, estimate damage, and allocate resources. The company contracts with a vendor to provide overhead and underground forensic data collection in an electronic format ahead of a major storm. Overhead data includes location, pole identifier, pole construction, devices, circuit information, wire size, anchors, damage description, break location, and cause of damage. Underground data includes location, identifier, damage description, and cause of damage.

In some situations, the vendor may not be available to collect data due to working at another utility that has been impacted or the storm cut them off from reporting to Gulf's system in a timely manner. If so, Gulf has a plan to manually collect a limited amount of data using internal damage assessment teams through line patrols and initial assessments, including the use of drones. Substations and feeders are identified as part of the backup plan and communicated to leaders in the field. Gulf will not delay restoration activities to collect forensic data.

Local EOCs are staffed with Gulf representatives upon activation. The representatives remain in communication with law enforcement for traffic control, crew security, and other necessary local coordination. Gulf security investigators serve as liaisons with law enforcement entities across the company's service area. The security personnel maintain contact for necessary coordination, including facility and staging-site security.

6.3.3 Damage Assessment

The Transmission and Distribution Control Centers direct damage assessment activities. Resources are initially assigned to staging areas to aid quick response and keep vital resources out of harm's way. Once sustained winds fall below 40 mph, personnel are allowed to access impacted areas and perform initial damage assessments. Initial storm assessments determine resource needs and begin the process of directing personnel into the heaviest damaged areas and with the greatest number of customers affected.

Evaluators and engineering personnel make initial damage assessments of each feeder in a given area. This data is collected on a paper or electronic distribution map and brought back to the Substation Team Leader for evaluation. Substation team leaders report substation and feeder damage information to an area manager responsible for the restoration of several substations.

These area managers communicate to a district manager responsible for restoration within one of Gulf's three service area districts. District managers and Gulf's Corporate Emergency Management Center consider information received from the field, status of resources, and develop a restoration plan allocating resources to most efficiently restore power.

6.3.4 ETR Determination and Dissemination

Once restoration and recovery plans are developed, an initial global ETR is determined, approved by senior management, and disseminated to customers. The company's goal is to disseminate a global ETR to customers within 24 hours after the storm damage assessment is completed. By 48 hours, ETRs are further refined to sub-areas, such as counties and, by 72 hours, ETRs are more granular to include specific neighborhoods or streets.

Due to the high volume of outage reports generated by TCMS and the conflicting priorities associated with those outages, Gulf relies on a degree of human judgement and intervention to determine initial ETRs during a dark sky event. TCMS algorithms still generate outage information as process inputs, but other factors are incorporated to develop ETRs for areas and specific customers.

Gulf uses various communication channels to provide ETRs and storm restoration updates. Public service announcements are made through radio, television, and social media such as Twitter, Facebook, and Instagram. Social media is a primary channel used for proactive customer

messaging. Social media posts include unique content and updates including photos, videos, and infographics.

The company's website and mobile app provide customers an outage map to view power outage status in real time and track ETRs. The map highlights specific outage areas with tailored customer messaging. ETRs are displayed for remaining areas with outages. Customers can sign up to the company's Power Out alert system to receive ETR updates via text, phone, or email.

Outage maps are color-coded to indicate restored areas. Gulf considers restoration to be essentially complete when 95 percent of customers in a specified area impacted by the storm, and capable of receiving power, have been restored. These areas are color-coded in green. The remaining out-of-service customers may have sustained damage preventing them from receiving service (e.g., broken riser) and may not yet have been identified. Gulf relies on these customers to report their outage.

The IVR system is used to inform customers of current outages, how best to report outages, and any restoration updates. The instruction message is updated regularly so that customers can receive all necessary information. A special transfer option was recently added that allows impacted customers to have quick, direct access to a representative without having to navigate through the normal menu. This option is reserved only for customers impacted by the storm and is effective in prioritizing response to storm-related calls as a subset of non-emergency calls. The need for a special transfer option was identified after Hurricane Michael to prioritize calls from outage customers over normal business calls from non-impacted customers.

The accuracy of initial ETRs is reviewed annually. Actual restoration times are compared to an average of historical outage restoration times to identify opportunities for process improvement. Actual restoration times are sorted by service area, time of day, and the type of damaged device. Using the same criteria, an average is determined for the previous two years for the same type of damaged device that caused the outage. The actual and historical average ETRs are compared and used as a basis for future initial ETRs when similar outages occur.

6.4 Post-Storm Restoration Activities

6.4.1 Prioritizing Restoration

Gulf sequences and prioritizes post-storm distribution restoration to safely and efficiently restore the largest number of customers in the shortest period of time. Restoration efforts focus first on substations, then toward restoring main line feeders, followed by laterals and, finally, service lines to customers. Substation team leaders reference critical customer lists that include hospitals, nursing homes, lift stations, first responders, and EOCs. Following restoration to these critical customers, focus turns to prioritizing restoration to sites serving concentrations of customers based on damage assessments and available resources.

Many of Gulf's customers who are classified as critical are located on mainline feeders and restored as soon as the feeder is rebuilt to that point. Others may have to be given lower prioritization due to the amount of damage between the substation and their location. Marketing

and other assigned customer-facing groups communicate with these customers and provide information about their restoration progress.

Once mainline feeder circuits have been repaired, restoration efforts focus on neighborhoods and smaller groups of customers. Finally, services to homes and businesses are restored as crews repair individual service drops. Where necessary, field personnel explain that some customers may have had power restored while neighbors remain without service because homes in the same neighborhood are often served by different circuits or transformers.

Gulf's Medical Essential Service Program is for customers who are dependent upon continuous operation of medical equipment. The purpose of the program is to provide such customers with reasonable notice before dark sky events or planned outages. These customers should secure backup power for their essential equipment or make arrangements to temporarily relocate. These customers do not receive a higher priority for restoration efforts after a named storm.

6.4.2 Mutual Assistance and Crew Mobilization

When Gulf's service area is affected by significant outages, the company turns to the industry's mutual assistance network to facilitate restoration. As the result of NextEra's purchase of Gulf in January 2019, in the future Gulf will have the availability to receive assistance from its sister company, FPL. Given that FPL and Gulf are located on different coastlines, there will be a natural advantage to assist each other in restoration activities.

Gulf can presently obtain mutual assistance from operating companies within Southern Company and from agreements in place with utilities and contractors available through SEE and the Florida Coordinating Group. For Hurricane Michael, Gulf acquired 6,600 outside resources, representing a 36-fold increase over the company's own restoration personnel. It should be noted that all mutual assistance completed work must be entered into OMS by a Gulf supervisor.

The Logistics team within the Corporate Emergency Management Center implemented the Resources for Emergency Deployment (REDi) system used by FPL to track mutual assistance resources and lodging services. During dark sky events in which lodging needs are expected to exceed hotel capacity, contracts are in place for vendor lodging (mobile sleepers). These sleepers are placed 48 hours prior to impact.

Gulf maintains fuel supplies during dark sky events that affect the Panhandle. To do so, the company uses its primary blue sky fuel supplier along with two backup suppliers able to provide fuel, fueling equipment, and support personnel. Gulf's Corporate Security provides security details for fueling locations and staging sites.

6.4.3 Road Congestion and Debris Removal

Gulf works with local, state, and federal authorities on navigating roadway congestion and debris removal. Gulf pursues assistance from local law enforcement resources, then requests assistance from outside law enforcement through the state EOC and other means.

Gulf's Corporate Security team works daily with law enforcement to facilitate the moving of crews, resources, and equipment in affected areas. Company resources and debris removal crews are moved to staging sites prior to a storm to provide a quicker response.

6.5 ETR Process Improvements and Best Practices

Based on the review of Gulf's ETR processes, Commission audit staff recognizes the following company improvements and best practices:

6.5.1 Dedicated Emergency Operations

Gulf's Corporate Emergency Management Center supports advance preparation, damage assessment, and power restoration. Designated functional teams provide support to generation transmission, and distribution. With executive involvement, storm restoration plans are developed and shared through the Corporate Emergency Management Center organization to coordinate restoration efforts.

6.5.2 Fully Integrated Smart Grid Technologies

Gulf's OMS is fully integrated with DSCADA and AMI systems to provide two-way telemetry monitoring of outages without human intervention. DSCADA systems have built-in redundancy to restore outages quickly. AMI outage data can increase the accuracy of outage predictions and help utility personnel to accurately react to problems. The end result is that customers' power is restored more quickly.

6.5.3 New Automated Tracking of Resources and Crews

The company has implemented a new crew management system (REDi) to meet the needs of responding resources and improve the ability to assign, manage and track these resources. Through a single platform, REDi helps Gulf to quickly identify which crews, vehicles, and equipment are available for work.

6.5.4 Pre-Storm Forensic Data Projection

Gulf's contracted vendor is available to provide electronic overhead and underground forensic data projections ahead of a major storm, based on storm track information. These resources are dispatched based on the expected storm path and mapping information. If the vendor is not available to collect data, Gulf has a plan to manually collect a limited amount of data using internal damage assessment teams as part of their identified line patrols and initial assessments, including the use of drones.

6.5.5 Improved Customer Communications Channels

The company has increased the capacity of its high-volume answer system by 80 percent and has contracted with a third-party vendor to assist with call overflow. Also, a transfer option was added at the beginning of the IVR recorded message, providing storm-impacted customers direct access to a representative. This option separates and prioritizes storm-related customer calls over normal business calls. During dark sky events, the company notes that social media is now monitored 24/7 and every customer post receives an interaction or response from Gulf.

6.5.6 Enhanced Outage Maps

Outage maps now display more granular estimated restoration times. Areas experiencing an outage are highlighted and the map displays current ETRs.

6.5.7 Established Government Partnerships Communication Plan

The company has developed a communication plan for the Gulf EOC team that standardizes information flowing to and from the EOC, State EOC and Gulf Corporate Emergency Management Center. This plan establishes times for calls, check-ins, and provides high-level and tactical-status updates for the EOC and Gulf service territories. Documents are kept as a log for after-action reports and lessons learned.

7.0 Tampa Electric Company

Tampa Electric Company (TEC) is an investor-owned utility serving over 770,700 customers. Its system has approximately 11,600 miles of distribution lines (6,248 miles of overhead and 5,403 miles of underground), 1,300 miles of transmission lines, and more than 410,000 poles. Electrical delivery is supported by 231 substations and over 145,000 transformers. The company generates approximately 5,000 MW, accounting for 8.4 percent of Florida energy sales.

7.1 Storm Preparation Activities

7.1.1 Company Storm-Mode Operations

TEC's approach to storm preparation and restoration features centralized planning and decentralized response. TEC believes this approach provides better and faster assessments, increased situational flexibility, and quicker outage restoration.

Before a major storm, TEC shifts focus from normal operations to storm preparations, to include:

- ◆ Gathering system operating condition information.
- ◆ Communicating and coordinating with state and local EOCs.
- ◆ Communicating with customers, including medically sensitive and Key Customers.
- ◆ Shifting communications and IT functions to hardened sites for uninterrupted services.
- ◆ Reviewing existing support relationships and mutual assistance agreements.
- ◆ Confirming employee emergency contact lists.
- ◆ Pre-staging restoration personnel, equipment and materials.
- ◆ Identifying locations for lodging and feeding mutual assistance personnel.

TEC uses the Incident Command Structure (ICS) to prepare for and manage emergencies, including dark sky storm events. ICS is a standardized, tailorable approach to the command, control, and coordination of emergency responses, providing a management hierarchy and set of procedures for managing temporary events. ICS uses common terminology, for clear communication across multiple agencies. It consists of five functional areas (Command, Operations, Planning, Logistics, and Finance) capable of adjusting response scope to address event demands.

TEC's ICS structure is comprised of employees identified to fulfill storm-mode operations, consisting of a Unified Command and Commander (65 personnel), staff (19), and general staff (351). The Unified Commander is responsible for ICS activation in response to a possible business disruption crisis, including storms. Staff includes personnel and sections responsible for emergency management, security, regulatory, environmental, corporate communications, public information, legal, community relations, safety, human resources, and federal affairs.

The TEC Corporate Communications and Customer Experience teams are responsible for customer communications and maintain a suite of channels for 24/7 inbound and outbound communications, tailoring its messaging and staffing for pre-, during-, and post-storm

operations. This also includes a mix of technologies, in person interactions, and proactive and reactive communications.

Restoration of power after a major storm requires extensive preparation and involves a multitude of coordinated, interconnected, and complex tasks. TEC states that the company must be fully prepared, well trained, and rehearsed prior to storm season and remain fully informed as storms approach. Resources must be staged to quickly and effectively assess system damage, provide timely ETRs to customers, and execute necessary repairs. Critical pre-storm preparation activities include infrastructure hardening, activation of internal emergency management operations, and coordination of mutual assistance resources.

TEC exercises its storm readiness plans throughout each year, increasing preparation as the annual hurricane season approaches. Emergency management and business continuity plans are exercised prior to storm season each year, evaluating all facets of storm response and restoration. Functionalities tested include energy supply and delivery, customer experience, planning, logistics, and emergency response teams. All Contact Center customer service personnel are required to participate in an annual Emergency Certification course covering TEC procedures. Mastery is required and demonstrated by correctly responding to a monitored emergency call and getting a 100-percent score on a corresponding test. Auxiliary outage call takers also receive annual refresher training.

Pre-storm season exercises help TEC determine key leader and employee comprehension of storm-related roles, readiness levels, and areas in need of further training. Other pre-season activities include coordination meetings with local municipal leaders, emergency responders, and EOC officials to determine infrastructure vital to public health and safety. TEC readiness plans are coordinated with statewide response through participation in the state EOC drill each May.

In preparation for storm season each year, TEC holds coordination meetings with local and state agencies, first responders (i.e., police, fire, and EMS), the Red Cross, NOAA, and other utilities. TEC conducts tree inspections along its feeder backbones, scheduling and completing any required corrective work prior to storm season. Other activities include:

- ◆ Company storm drills for business units responsible for restoration. The drills review storm plans, incorporate previous lessons learned, and are coordinated with EOCs throughout the TEC service territory.
- ◆ TEC readiness planners participate in local storm preparedness exercises and visit county EOCs for discussions about prioritizing critical facilities for restoration of critical infrastructure and road clearing operations.
- ◆ Company representatives take part in the annual state-level hurricane exercise. TEC leadership, government and community liaisons, and company EOC representatives meet with EOC staff in all TEC service area counties to discuss storm coordination.
- ◆ Meeting with staff from nursing homes and assisted living facilities in the TEC service territory, identifying which have backup emergency generators.

For 2019 state-level storm preparedness, TEC participated in the Florida Division of Emergency Management's Severe Weather Awareness Week and the annual Governor's Hurricane Conference.

7.1.2 Storm Hardening and Grid Upgrades

Storm hardening works towards goals of eliminating or minimizing outages and providing quick, efficient restoration to the greatest number of customers possible. Infrastructure hardening is a vital, ongoing, and year-round TEC activity.

TEC's 2019–2021 Storm Hardening Plan includes:

- ◆ Hardening wood transmission structures based on inspections
- ◆ Deploying submersible switchgear able to withstand immersion without failing
- ◆ A pilot program to underground facilities in the Dana Shores service area
- ◆ Continuing deployment of AMI, with 100 percent installation by the end of 2021
- ◆ Adding more SCADA-controlled items, with automated switches and reclosers
- ◆ Undertaking an Advanced Distribution Management System project

TEC's vegetation management program is also a key component of providing safe and reliable electrical service during normal operations, and essential to limiting outages and minimizing restoration times during dark sky events. TEC uses software to determine areas to be trimmed annually in its four-year trim cycle. The software uses several variables including multi-year circuit performance, cost, and trim history to create trim recommendations. TEC vegetation management has eight fulltime company employees and over 200 contract employees. Quality control of third party work includes field inspections, reviews of job completion reports, and regular project status updates at management meetings. Since 2016, TEC has trimmed more than 3,300 miles of line. Annual program spending exceeds \$10 million.

Pole inspection and maintenance is another key component of distribution storm hardening. TEC's wood pole inspection program is on an eight-year cycle. From 2015 to 2018, TEC replaced nearly 7,000 of its 285,000 wooden distribution poles.

7.1.3 Utility-Government Coordination

TEC collects storm-related service and restoration data and reports it regularly to the EOC during and after a storm event. The company coordinates with the FPSC and other government agencies to update restoration progress while addressing specific service area outages. The company also interfaces with local government, law enforcement, and provides storm updates to storm and restoration response organizations.

Company storm updates, including safety and power restoration concerns, are provided to local law enforcement and government agencies by TEC liaisons at four county EOCs (Hillsborough, Pasco, Pinellas, Polk) when activated. The number of liaisons to county EOCs is based on the amount of damage, EOC capacity, hours, and available TEC personnel. Additional liaisons may be assigned to four municipalities (Tampa, Plant City, Oldsmar, Temple Terrace) as requested. Liaisons are also furnished to the state EOC.

7.2 Blue Sky Operations and ETR Process

During blue sky days, TEC employs 223 customer service representatives, providing 24/7 service during blue sky outages via automated and telephonic customer support. The company states that it uses a layered network of human and autonomous systems to capture, process, and communicate outage information, centralizing data capture by integrating communications networks, control systems, and field devices. Outage information may be automatically communicated from the portions of its service territory with installed AMI and DSCADA capabilities that identify and communicate data to OMS without customer intervention. Customers may also report outages through these inbound communication channels:

- ◆ Call center customer service representatives
- ◆ Interactive voice response telephone system
- ◆ High volume call answering interactive voice response system
- ◆ Company website
- ◆ Email
- ◆ Mobile responsive website
- ◆ Text messaging
- ◆ Social media (Facebook, Instagram, Twitter, LinkedIn)
- ◆ Customer account portal

Customers whose primary language is other than English and Spanish may select a language from a drop-down menu on the home page to report an outage if the customer's browser supports translation services. Outages reported via the company website, text messaging, IVR, or customer account portals are automatically captured in OMS to include call times, location, and fault data from substations or feeder line monitoring devices. Outage reported by email, social media, or through a customer service representative must be manually entered into OMS.

OMS interacts with a variety of TEC outage recognition systems such as DSCADA, the Geographic Information System, the Customer Information System, AMI, and the High-Volume Call Answering Interactive Voice Response (HVCA IVR) System. Analyzing outage information from these sources, TEC states that OMS provides repair crews with specific, actionable tasks to efficiently and cost-effectively restore outages occurring during normal operations. OMS functionalities include:

- ◆ Pinpointing location of the open fuse or breaker
- ◆ Prioritizing restoration efforts and managing resources
- ◆ Determining the scope of outages and number of customers impacted
- ◆ Reporting the information to TEC management, media and regulators
- ◆ Calculating ETRs for single outages, multiple outages, or a total restoration effort
- ◆ Managing restoration crew usage

OMS automatically generates an outage ticket for outages identified by autonomous systems or from customer calls. DSCADA can provide real-time grid monitoring and control while allowing two-way communication with substation breakers, eliminating the need for a customer to contact

TEC when an outage occurs. However, TEC has not yet fully deployed AMI and DSCADA system wide. The company anticipates completion of its AMI installation by the end of 2021 and is expanding DSCADA capability with automated switches and reclosers. According to TEC, the advent of AMI meters and additional DSCADA controlled switching devices will significantly reduce outage duration and improve restoration efficiency.

Restoration work crews in the field can access real-time OMS information via laptops. At the outage location, crews are required to fill out a field report which is sent to and maintained in the Computer Aided Dispatch system. Report data includes failed device type, cause code, restoration time, overhead versus underground, and additional comments about restoration.

The ETR for a blue sky outage is automatically calculated and disseminated by OMS based on outage type and historical restoration times for identical outages. The ETR can be changed or a multiplier set manually as more outage site data is gathered. In 2016, TEC analyzed 2013–2016 ETR data, establishing a multiplier of 1.5 hours that can be added to automatically generate a longer ETR for summer months and high-impact outage days. TEC Distribution Services Operations has the authority to institute and manually introduce this multiplier into ETRs.

Customers may receive ETRs through one or more of the following outbound communication channels:

- ◆ Call center representative
- ◆ Interactive voice response telephone system
- ◆ Social media
- ◆ Company website (outage map)
- ◆ Mobile responsive website
- ◆ Text messaging
- ◆ Email
- ◆ Customer Account Portal (outage map)

7.3 Dark Sky Operations and ETR Process

During dark sky events, TEC receives outage information through the same automated and customer-initiated inbound communication channels as during blue sky operations. However, due to the high volume of outage reports generated by OMS, an automated ETR is not provided to customers in response to outages. Instead, at the conclusion of its post-storm damage assessment process, TEC provides the initial global ETR to impacted customers. Increasingly granular and specific ETRs are later provided as restoration requirements are determined and priority restorations are completed.

7.3.1 Customer Communications

Calls and contact volumes increase significantly during and after major storm events. Inbound customer communication channels include phone, text, website, IVR, social media and email. TEC's Customer Experience Department's Outage Communications Team monitors call volume

and customer contacts prior to and during storms. TEC states it can handle an increased call load of up to 24,000 calls per day, three times the normal blue sky volume of 8,000 to 8,500.

TEC's call centers, its website, the customer account portal, and a dedicated storm-related IVR are available 24/7 for outage reporting and email response. IVR can handle up to 200 concurrent calls through which customers can access storm information, report service outages, and learn the latest estimated ETR. If inbound customer call volume transferred to customer service representatives exceed capacity, customers reporting emergencies (e.g., downed wires, life or serious injury) are given priority and routed to live agents.

During high-volume events, customer service representatives work 12-hour shifts from TEC locations in Ybor City, Plant City, and Miami. Approximately 100 additional employees who normally have other duties are added to call center customer service staffing as augmentation. If volume strains this additional capacity, TEC can draw more representatives from its parent corporation EMERA or through a request for assistance to the southeastern Regional Mutual Assistance Group. The company can also obtain additional agents through a contractor, mutual aid agreements, and other IOUs.

Prior to a major storm making landfall, medical essential customers are notified and reminded that emergency response is an individual responsibility. These customers are identified annually prior to storm season. Automated calls, bill inserts, and website notices instruct them to create and be prepared to execute an individual emergency plan of action.

TEC Key Account Managers also engage in ongoing pre-storm communication about power restoration issues and activities with critical accounts such as hospitals, nursing homes, assisted living centers, schools, and water treatment facilities. TEC Corporate Communications Department reaches out pre-storm via social media and email, asking customers to update emergency contact information and account managers make direct contact with all assigned key customer accounts. Of its approximately 85,000 commercial and industrial customers, TEC has about 400 business partners that have over 12,000 key customer accounts. The social media section can handle up to 24,000 inbound messages per day during dark sky events. Supervisors review outbound messaging and the Corporate Communications Director approves all messaging intended for global dissemination.

After a storm, TEC outbound communications focus on providing updated information about damage, current outages, number of customers affected, an initial ETR, and ongoing efforts to restore service. TEC uses the outbound communications methods already discussed to provide updates at least daily, with urgent bulletins provided immediately (e.g., down lines and impassable routes).

From lessons learned during the 2017 hurricane season, TEC increased its trunk capacity to handle an additional 1,000 concurrent calls. While overall IVR capacity remains the same, transferred calls no longer occupy trunk space, freeing up lines more quickly for other customers. TEC uses a third party's high-volume call answering service to handle all automated outage reporting calls. Customers reporting emergencies (e.g., downed wires, life or serious injury) are always given priority and routed to live agents.

TEC is further upgrading its technology used for outage communication with several enhancements that include establishing a Customer Preference Center, upgrading existing IVR to a state-of-the-art digital system, and incorporation of AMI and the Advanced Distribution Management System (ADMS). TEC states that these upgrades will allow more customer options, personalization of outage alerts and notifications, and a quicker and improved service experience.

7.3.2 Pre-Landfall Planning

As a storm approaches, TEC gathers information from multiple weather forecasting sources and uses modeling software to predict storm path and to estimate potential damage. TEC also uses a company-produced, Excel-based model called FORECASTER that estimates man-hours and materials required for restoration. Variables estimated by other models, such as wind speed, storm path and width through a service area can be introduced to FORECASTER for different scenarios. The model is adjusted after each storm to improve its future accuracy. Electric Delivery management uses the results to estimate required restoration resources and an initial global ETR.

7.3.3 Damage Assessment

Initial post-storm damage assessment data gathering is performed by TEC crews augmented by contractors. This Day 1 data is returned to the Damage Assessment Unit via the D-280 damage forms for analysis using the DART program. Once data is entered into DART, the global ETR will be developed and provided to TEC customers.

Ongoing damage assessment is key to becoming able to provide more granular, circuit-level ETRs. Transitioning from the global ETR to more specific circuit ones, company and contract personnel perform full circuit damage assessments by physical inspection. Assessors are primarily TEC Energy Delivery personnel or those who previously worked in that business unit.

Two-man teams use primary circuit maps to perform circuit patrol of damage. Specifics are marked on circuit maps and a distribution damage assessment form (D-280). Completed maps and forms are turned in to the Distribution Design Technician Supervisor.

D-280 information is entered into an internal database, compiled, assessed, and used in producing a restoration forecast plan. The plan is posted to an internal SharePoint site accessible to all Electric Delivery personnel.

Planning groups at the Energy Control Center run system impact simulations using the storm track and intensity data. These, combined with D-280 field reports, assist the Planning Section to allocate restoration assets to areas most impacted.

DSCADA identifies feeder lockouts, and two-man crews patrol the lines to make repairs. The number of customers out, as is indicated in OMS, helps determine where and how many restoration crews to stage. Customer reported outages in OMS provide most of the feedback regarding progress of restoration. ETR Teams in TEC regional operation centers continue to refine ETR at circuit levels by having crews report back remaining damage.

The TEC outage map is the main resource for disseminating ETRs. TEC dissemination channels include the IVR system, news releases, social media posts, customer service representatives, and news conferences.

7.3.4 ETR Determination and Dissemination

TEC's dark sky ETR development process mirrors the company's overall approach to restoration which consists of the following five steps:

- ◆ Inform customers of the storm's approach and include necessary precautions.
- ◆ Wait until conditions are safe to start the restoration process.
- ◆ Assess the types and extent of damage to TEC infrastructure.
- ◆ Prioritize restoration efforts using CIF, outage reports, and damage estimates.
- ◆ Repair and rebuild the infrastructure, restoring power in a safe, efficient manner.

Using FORECASTER and other storm models, a pre-storm initial ETR is calculated for internal company use only. This ETR is based on estimates of the number of customers impacted, available number of internal crews, and external resources to be available. This internal ETR is re-calculated as predictions of storm path, intensity, customer outages, and restoration assets available become more defined. It may also change as post-storm damage assessment and restoration efforts begin.

In the first 24 hours after the all-clear, TEC assesses impacted area systems and validates an initial global ETR for dissemination to customers. Corporate officers approve the initial global ETR prior to release to customers. The global ETR is then placed on every initial outage ticket and the online outage map. TEC's goal is to transition from a global ETR to a ticket-level ETR as quickly as possible as restoration progresses and more info is derived on the effort. TEC believes that its decentralized restoration effort contributes to more refined ETRs sooner.

In widespread or prolonged outages, TEC assesses damage in detail and at the conclusion of its post-storm assessment process, provides an initial global ETR to impacted customers. Following this global estimate, more granular and specific ETRs are provided as restoration requirements are determined.

After each major storm, TEC captures outage restoration data and develops lessons learned, seeking ways to improve its ETR process.

7.4 Post-Storm Restoration Activities

Restoration activities include prioritizing response, mobilizing company and mutual assistance assets, pre-positioning materials, clearing debris, and partnering with industry and government agencies.

7.4.1 Prioritizing Restoration

In 2008, TEC created its Critical Facility Index (CFI) list, used for circuit prioritization, restoration coordination, and debris clearing route development by counties and municipalities. It is a flexible restoration hierarchy and can be customized to a particular outage event.

The list results from an annually-coordinated effort between the company, municipal emergency management agencies, CFI owners, and account managers. The TEC Emergency Management and Business Continuity Group coordinates the CFI with Tampa Bay area EOCs to ensure that the lists are synchronized.

TEC has a master CFI, in accordance with the critical infrastructure sectors defined by the U.S. Department of Homeland Security guidelines. Several CFI lists have been created from the master, to identify CFI under different scenarios. CFI consists of five prioritized segments:

- ◆ Priority 1 – Facilities critical to public health and safety or the national/global economy
- ◆ Priority 2 – Same types of facilities as Priority 1 but deemed less critical
- ◆ Priority 3 – Same types as Priority 1 and 2, but deemed less critical
- ◆ Priority 4 – Customers with 500kVA demand or more
- ◆ Priority 5 – Customers with less than 500kVA demand

Restoration prioritization is tracked in the Automation of Reports and Consolidated Orders System (ARCOS), TEC's automated tracking, prioritizing, and crew management system. ARCOS is updated by damage assessors embedded with line crews and critical facilities in an impacted area and the priority given to the circuits serving it.

TEC states that its representatives meet each May with staff from all known nursing homes and assisted-living facilities in its service area to discuss storm preparation and response. TEC is aware of which facilities have in-house emergency generation capability.

TEC considers restoration to be essentially complete when 90 percent of customers impacted by the storm and capable of receiving power have been restored. Although the company at this point considers restoration essentially complete, it continues efforts to restore power to those customers with circumstances that prevented earlier restoration (e.g., customers that were unable to take service due to damage to their homes).

7.4.2 Mutual Assistance and Crew Mobilization

TEC has 139 distribution linemen prepared to respond to storm events. Should restoration requirements exceed TEC's ability to respond internally, the company requests and receives mutual assistance. TEC uses multiple sources and a variety of storm models to assess post-storm mutual assistance needs. Agreements are in place, reviewed annually, and ready to be implemented. During Hurricane Irma, TEC acquired over 2300 mutual assistance personnel to assist with recovery, representing a 16-fold increase over normal manning.

Based on estimated landfall time, TEC Command Staff sets arrival times and dates for mutual assistance. Some may be pre-positioned out of the storm path for immediate response. Other mutual assistance crews and equipment arrive at staggered times after the storm has passed.

Mutual assistance personnel and materials can be requested from U.S. and Canadian affiliates of TEC's corporate parent, Emera. TEC is also a member utility of the SEE Regional Mutual Assistance Group (RMAG) and may request assistance from member utilities. If RMAG assets are unavailable, TEC requests assistance from fellow Edison Electric Institute members and Florida municipal utilities. Projected availability, distance, response time, operational support costs (e.g., transportation, fuel, lodging, and food) and historical effectiveness influence assistance requests.

TEC supervises mutual assistance resource activity within its service territory. Mutual assistance workers receive operation briefings prior to beginning work and are required to follow TEC practices and procedures for restoration operations. Mutual assistance crews do not have direct access to DEF OMS.

TEC manages and tracks both native and mutual assistance crews in ARCOS. Release and demobilization of mutual assistance crews is also tracked and documented in the system.

Prior to a storm, TEC Workforce Management in conjunction with Call Center leadership activates the MARS (mutual assistance) system, requesting support for customer outage calls from other utilities and US affiliates.

7.4.3 Road Congestion and Debris Removal

TEC relies on state and local law enforcement to assist with roadway congestion that would delay restoration and coordinates congestion clearing assistance through the EOCs.

TEC uses a contracted vendor for storm debris removal from TEC facilities. The company has also agreed to provide native contractor crews to the City of Tampa to assist with debris removal. For certain priority routes, TEC crews embedded with these entities, de-energizing downed lines and advising city and county crews, beginning immediately upon passage of the storm. If needed, TEC requests assistance from the EOCs in removing debris and route clearing.

TEC deploys drones to more rapidly discern the type and extent of debris or obstruction on routes to major outages. Drones are deployed by a pilot and an observer. According to TEC, in the most recent storms, drones quickly identify blocked routes, providing observers insights into the quantity and type of equipment needed to clear a passage.

7.5 ETR Process Improvements and Best Practices

Based on its review of TEC processes for customer communication, collecting and disseminating outage data, and restoring service after a named storm, Commission audit staff recognizes the following company improvements and best practices:

7.5.1 Dedicated Emergency Operations

TEC centralizes its dark sky emergency response operations using its Incident Command Structure. ICS provides a standardized, tailorable approach to command, control, and

coordination of company responses and uses common terminology for clear communication across multiple agencies. Teams with expertise in five functional areas (i.e., command, operations, planning, logistics, and finance) support the ICS. Executive-level managers interact to develop the initial ETR and outage restoration plan.

7.5.2 Smart Grid Upgrades

TEC plans to complete installation of AMI throughout its service territory by mid-2021 and is also expanding DSCADA with automated switches and reclosers. The company anticipates that these upgrades will improve outage restoration times.

7.5.3 Managing Mutual Assistance Resources

Integrated in 2017, ARCOS is centralized, automated system for tracking, prioritizing, and managing native and mutual assistance work crews during outage restoration. ARCOS provides effective prioritization and management of mobilization, scheduling, use, and demobilization of restoration resources. Additionally, damage assessment information is fed into ARCOS which assists restoration management and resource deployment.

7.5.4 New Technology for Damage Assessment

TEC is increasing use of drones for post-storm damage assessment. Drones more rapidly identify extent of debris blockage and the least-obstructed outage restoration routes. TEC believes drones offer a near real time information gathering and interpretation capability which will speed ETR determination.

TEC is also investigating the use of helicopter or drone photogrammetry and light detection and ranging technology to reduce time required to perform damage assessment and improve assessment accuracy. This may allow TEC to process a larger damage assessment sample, leading to more accurate ETRs. This technology could reduce manpower requirements and avoid post-storm road hazards that slow the damage assessment process.

7.5.5 Improved Customer Communications Channels

From lessons learned during the 2017 hurricane season, TEC increased its incoming call trunk capacity by 1,000 concurrent calls. Its overall IVR capacity remained the same, but transferred calls no longer occupied trunk space, freeing up lines more quickly for other customers.

TEC is improving outage communication with several enhancements that include establishing a Customer Preference Center, upgrading existing IVR to a state-of-the-art digital system, and incorporation of AMI and ADMS. TEC states that these upgrades will allow more customer options, personalization of outage alerts and notifications, and a quicker and improved service experience.

7.5.6 Predictive Statistical Sampling

TEC produces a system-wide damage assessment from a statistically valid sample of damage to an impacted area. Using the predicted results, TEC is able to start system outage restoration sooner, without disruption to internal assets or mutual assistance crew arrivals. According to TEC, predictive sampling fosters better understanding of damage and leads to quicker calculation of an initial system-wide ETR.

7.5.7 Forensic Analyses

TEC utilizes two third-party contractors for the performance of post-storm forensic analysis. The contractors are notified for mobilization 72 hours prior to projected storm impact and complete mobilization 24 hours before the storm makes landfall.

The performance of post-storm data collection is performed by one contractor and the other provides forensic analysis and root cause determination. Methodology is reviewed annually. The current database was revised in 2018.

7.5.8 More Accurate ETRs to Customers

From previous dark sky events, TEC identified the need for quicker, more accurate ETRs was dependent on information from the field. The company now requires twice daily progress reports from restoration field crews, leading to greater frequency and accuracy of ETRs. TEC states that more accurate ETRs will be realized by upgrades to outage communication technology (e.g. AMI and ADMS) when incorporated into the company systems.

7.5.9 Wire-Down Response

TEC refined its response procedures and added a Wire-Down Liaison resource. The liaison now provides communication support directly from the field to the TEC Emergency Response Team in the Energy Control Center.

