

State of Florida



Public Service Commission

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TALLAHASSEE, FLORIDA 32399-0850

-M-E-M-O-R-A-N-D-U-M-

DATE: November 22, 2016

TO: Office of Commission Clerk (Stauffer)

FROM: Division of Engineering (Buys, Graves) *PDB*
Office of the General Counsel (Leathers) *MSJ* *TJS*

RE: Docket No. 160105-EI – Petition for approval of 2016-2018 storm hardening plan, pursuant to Rule 25-6.0342, F.A.C., by Tampa Electric Company.

Docket No. 160106-EI – Petition for approval of 2016-2018 storm hardening plan, pursuant to Rule 25-6.0342, F.A.C., by Florida Public Utilities Company.

Docket No. 160107-EI – Petition for approval of 2016-2018 storm hardening plan, pursuant to Rule 25-6.0342, F.A.C., by Duke Energy Florida, LLC.

Docket No. 160108-EI – Petition for approval of 2016-2018 storm hardening plan, pursuant to Rule 25-6.0342, F.A.C., by Gulf Power Company.

AGENDA: 12/06/16 – Regular Agenda – Proposed Agency Action - Interested Persons May Participate

COMMISSIONERS ASSIGNED: All Commissioners

PREHEARING OFFICER: Brisé

CRITICAL DATES: None

SPECIAL INSTRUCTIONS: None

Case Background

The hurricanes of 2004 and 2005 that made landfall in Florida resulted in extensive storm restoration costs and lengthy electric service interruptions for millions of electric investor-owned

utility (IOU) customers. On January 23, 2006, the Florida Public Service Commission (Commission) staff conducted a workshop to discuss the damage to electric utility facilities resulting from these hurricanes and to explore ways of minimizing future storm damages and customer outages. State and local government officials, independent technical experts, and Florida's electric utilities participated in the workshop.

On February 27, 2006, the Commission issued Order No. PSC-06-0144-PAA-EI, in Docket No. 060078-EI, requiring that the IOUs begin implementing an eight-year inspection cycle of their respective wooden poles.¹ In that Order, the Commission noted:

The severe hurricane seasons of 2004 and 2005 have underscored the importance of system maintenance activities of Florida's electric IOUs. These efforts to maintain system components can reduce the impact of hurricanes and tropical storms upon utilities' transmission and distribution systems. An obvious key component in electric infrastructure is the transmission and distribution poles. If a pole fails, there is a high chance that the equipment on the pole will be damaged, and failure of one pole often causes other poles to fail. Thus, wooden poles must be maintained or replaced over time because they are prone to deterioration. Deteriorated poles have lost some or most of their original strength and are more prone to fail under certain environmental conditions such as high winds or ice loadings. The only way to know for sure which poles...must be replaced is through periodic inspections. (p. 2)

On April 25, 2006, the Commission issued Order No. PSC-06-0351-PAA-EI, in Docket No. 060198-EI, requiring all IOUs to file plans and estimated implementation costs for ten ongoing storm preparedness initiatives (Ten Initiatives) on or before June 1, 2006.² The Ten Initiatives are:

1. A Three-Year Vegetation Management Cycle for Distribution Circuits
2. An Audit of Joint-Use Attachment Agreements
3. A Six-Year Transmission Structure Inspection Program
4. Hardening of Existing Transmission Structures
5. A Transmission and Distribution Geographic Information System
6. Post-Storm Data Collection and Forensic Analysis
7. Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems
8. Increased Utility Coordination with Local Governments
9. Collaborative Research on Effects of Hurricane Winds and Storm Surge
10. A Natural Disaster Preparedness and Recovery Program

¹Docket No. 060078-EI, *In re: Proposal to require investor-owned electric utilities to implement ten-year wood pole inspection program.*

²Docket No. 060198-EI, *In re: Requirement for investor-owned electric utilities to file ongoing storm preparedness plans and implementation cost estimates.*

These Ten Initiatives were not intended to encompass all reasonable ongoing storm preparedness activities. Rather, the Commission viewed these initiatives as a starting point of an ongoing process.³ By Order Nos. PSC-06-0781-PAA-EI (addressing Tampa Electric Company, and Florida Public Utilities Company), PSC-06-0947-PAA-EI (addressing Progress Energy Florida, Inc., and Gulf Power Company), and PSC-07-0468-FOF-EI (addressing Florida Power & Light Company), the Commission addressed the adequacy of the IOU's plans for implementing the Ten Initiatives.

The Commission also pursued rulemaking to address the adoption of distribution construction standards more stringent than the minimum safety requirements of the National Electric Safety Code (NESC) and the identification of areas and circumstances where distribution facilities should be required to be constructed underground.⁴ Rule 25-6.0342, Florida Administrative Code (F.A.C.), was ultimately adopted.⁵

Rule 25-6.0342, F.A.C., requires each IOU to file an Electric Infrastructure Storm Hardening Plan for review and approval by the Commission which includes a description of construction standards, policies, practices, and procedures to enhance the reliability of overhead and underground electrical transmission and distribution facilities. The Rule calls for, at a minimum, each IOU's plan to address the following items.

- a. Compliance with the NESC
- b. Extreme Wind Loading (EWL) standards for:
 - i. New construction
 - ii. Major planned work, including expansion, rebuild, or relocation of existing facilities
 - iii. Critical infrastructure facilities and along major thoroughfares
- c. Mitigation of damage due to flooding and storm surges
- d. Placement of facilities to facilitate safe and efficient access for installation and maintenance
- e. A deployment strategy that includes:
 - i. The facilities affected
 - ii. Technical design specifications, construction standards, and construction methodologies

³Order No. PSC-06-09351-PAA-EI, p.2, issued April 25, 2006, in Docket No. 060198-EI, *In re: Requirement for investor-owned electric utilities to file ongoing storm preparedness plans and implementation costs estimates.*

⁴Order No. PSC-06-0556-NOR-EU, issued June 28, 2006, in Docket No. 060172-EU, *In re: Proposed rules governing placement of new electric distribution facilities underground, and conversion of existing overhead distribution facilities to underground facilities, to address effects of extreme weather events; and Docket No. 060173-EU, In re: Proposed amendments to rules regarding overhead electric facilities to allow more stringent construction standards than required by National Electric Safety Code.*

⁵Order No. PSC-07-0043A-FOF-EU, issued January 17, 2007, in Docket No. 060172-EU, *In re: Proposed rules governing placement of new electric distribution facilities underground, and conversion of existing overhead distribution facilities to underground facilities, to address effects of extreme weather events; and Docket No. 060173-EU, In re: Proposed amendments to rules regarding overhead electric facilities to allow more stringent construction standards than required by National Electric Safety Code.*

- iii. The communities and areas where the electric infrastructure improvements are to be made
 - iv. The impact on joint-use facilities on which third party attachments exist
 - v. An estimate of the costs and benefits to the utility of making the electric infrastructure improvements
 - vi. An estimate of the costs and benefits to third party attachers affected by the electric infrastructure improvements
- f. The inclusion of Attachment Standards and Procedures for Third Party Attachers

On May 3, 2013, the five IOU's filed 2013-2015 storm hardening plan updates. The Commission approved the storm hardening plans for Duke Energy Florida, LLC (DEF), Florida Public Utilities Company (FPUC), Florida Power and Light Company (FPL), Tampa Electric Company (TECO), and Gulf Power Company (Gulf), at the November 14, 2013 Commission Conference.⁶ On May 2 and 3, 2016, four IOU's filed 2016-2018 storm hardening plan updates as required. Docket Nos. 160105-EI (TECO), 160106-EI (FPUC), 160107-EI (DEF) and 160108-EI (Gulf) were opened. FPL filed its 2016-2018 storm hardening plan updates on March 15, 2016, and Docket No. 160061-EI was opened. That docket was consolidated with Docket No. 160021-EI, Petition for rate increase by Florida Power & Light Company. Staff did not conduct a workshop for these updated storm hardening plans as data request responses were sufficient in understanding the updated plans.

This recommendation addresses TECO, FPUC, DEF and Gulf's plan updates as required by Rule 25-6.0342, F.A.C. For each utility, staff's recommendation addresses:

- I. Wooden Pole Inspection Program
- II. Ten Initiatives
- III. National Electric Safety Code (NESC) Compliance
- IV. Extreme Wind Loading (EWL) Standards
- V. Mitigation of Flooding and Storm Surge Damage
- VI. Facility Placement
- VII. Deployment Strategies
- VIII. Attachment Standards and Procedures for Third Party Attachers

⁶Order No. PSC-13-0637-PAA-EI, issued December 3, 2013, in Docket No: 130129-EI, *In re: Petition for approval of 2013-2015 storm hardening plan, pursuant to Rule 25-6.0342, F.A.C., by Duke Energy Florida, Inc.*; Order No. PSC-13-0638-PAA-EI, issued December 3, 2013, in Docket No: 130131-EI, *In re: Petition for approval of 2013-2015 storm hardening plan, pursuant to Rule 25-6.0342, F.A.C., by Florida Public Utilities Company*; Order No. PSC-13-0639-PAA-EI, issued December 3, 2013, in Docket No: 130132-EI, *In re: Petition for approval of 2013-2015 storm hardening plan, pursuant to Rule 25-6.0342, F.A.C., by Florida Power and Light Company*; Order No. PSC-13-0640-PAA-EI, issued December 3, 2013, In Docket No: 130138-EI, *In re: Petition for approval of 2013-2015 storm hardening plan, pursuant to Rule 25-6.0342, F.A.C., by Tampa Electric Company*; Order No. PSC-13-0641-PAA-EI, issued December 3, 2013, in Docket No: 130139-EI, *In re: Petition for approval of 2013-2015 storm hardening plan, pursuant to Rule 25-6.0342, F.A.C., by Gulf Power Company*.

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Attachment A describes the storm hardening requirements of the wooden pole inspection program and the Ten Initiatives for each IOU. Attachments B through E contain a comparison of TECO, FPUC, DEF, and Gulf's provisions of the 2013-2015 approved and updated 2016-2018 wooden pole inspection programs and Ten Initiatives, and the cost of implementing the approved and updated programs and initiatives.

The Commission has jurisdiction over this matter pursuant to Sections 366.04 and 366.05, Florida Statutes (F.S.).

Discussion of Issues

Issue 1: Should the Commission approve Tampa Electric Company's 2016-2018 storm hardening plan filed in Docket No. 160105-EI?

Recommendation: Yes. Tampa Electric Company's (TECO) updated plan is largely a continuation of its current Commission-approved plan. A review of TECO's plan shows that it has the information required by Commission's Rule and Orders. Staff notes that approval of TECO's plan does not mean approval for cost recovery. TECO should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events. (P. Buys)

Staff Analysis: On Attachment B, staff provided a summary of TECO's current wooden pole inspection program and Ten Initiatives and the proposed changes. In addition, where available, staff has shown the costs associated with the wooden pole inspection program and Ten Initiatives for 2013-2015 and 2016-2018. Components of TECO's updated plan are summarized below.

Wooden Pole Inspection Program

TECO is continuing its eight-year wooden pole inspection.^{7,8} The program identifies poles that require repair, reinforcement or replacement. Currently, TECO is in its sixth year of its second eight-year cycle. TECO will continue to file the results of these inspections in TECO's Annual Electric Utility Distribution Reliability Report. The estimated cost for 2016-2018 related to the eight-year wooden pole inspection is \$112,300,000 as compared to \$126,100,000 spent for 2013-2015.

Ten Initiatives

Initiative One – Three-Year Vegetation Management Cycle for Distribution Circuits

TECO proposes no changes to its previously approved trim cycle.⁹ Currently, both feeder and lateral circuits are trimmed, on average, every four years. TECO reported that its plan allows for the flexibility to change the prioritization of the feeders and laterals depending on growth, reconfiguration or equipment additions to the distribution system. The estimated cost for 2016-2018 for Initiative One is \$28,900,000 as compared to \$30,500,000 spent for 2013-2015.

Initiative Two – Audits of Joint-Use Attachment Agreements

There are no proposed changes to this initiative. TECO will conduct an audit of all pole attachments on an eight-year cycle at a minimum.¹⁰ TECO conducts a comprehensive loading analysis on the joint-use poles to ensure the poles are not overloaded and meet the NESC or TECO's standards, whichever is more stringent. Once TECO receives an application for permission to attach to its poles, an engineering assessment, which includes a comprehensive

⁷Order No. PSC-06-0144-PAA-EI, issued February 27, 2006, in Docket No. 060078-EI, *In re: Proposal to require investor-owned electric utilities to implement ten-year wood pole inspection program.*

⁸Order No. PSC-07-0078-PAA-EU, issued January 29, 2007, in Docket No. 060531-EU, *In re: Review of all electric utility wooden pole inspection programs.*

⁹Order No. PSC-12-0303-PAA-EI, issued June 12, 2012, in Docket No. 120038-EI, *In re: Petition to modify vegetation management plan by Tampa Electric Company.*

¹⁰Order No. PSC-06-0351-PAA-EI, issued April 25, 2006, in Docket No. 060198-EI, *In re: Requirement for investor-owned electric utilities to file ongoing storm preparedness plans and implementation cost estimates.*

loading analysis, is performed. The estimated cost for 2016-2018 is \$0, as the requesting third party attacher pays for the comprehensive pole loading analyses. The costs for 2013-2015 were \$1,000,000.

Initiative Three- Six-Year Transmission Structure Inspection Program

TECO has a proposed change for this initiative as discussed below. TECO's transmission structure inspection program is a multi-pronged approach with different types of inspections performs on different cycles. Below is a list of the type of inspections:

1. One-year cycle:
 - (i) Ground patrol
 - (ii) Aerial infrared patrol
 - (iii) Substation inspection.
2. Eight-year cycle:
 - (i) Above ground inspection
 - (ii) Ground line inspection

The above ground inspection cycle was shifted from a six-year cycle to an eight-year cycle starting in 2015.¹¹ TECO will continue the one-year cycle inspections of the transmission structures. TECO will also continue to monitor and evaluate the appropriateness of the inspection program to ensure cost-effective storm hardening or reliability opportunities are taken advantage of. The estimated 2016-2018 cost for this initiative is \$3,200,000 as compared to \$4,400,000 spent for 2013-2015.

Initiative Four – Hardening of Existing Transmission Structures

There is no change in the plan for this initiative. TECO will continue to replace existing wood transmission structures with non-wood structures by utilizing the inspection and maintenance programs. All new transmission line construction projects, system rebuilds and line relocations will be engineered with non-wood structures. TECO will continue to replace insulators that have deteriorated with polymer insulators. TECO reports that 32 percent of its transmission structures remain to be hardened. The costs for 2016-2018 are estimated to be \$2,400,000 as compared to \$2,300,000 spent for 2013-2015.

Initiative Five – Transmission and Distribution Geographic Information System (GIS)

TECO is proposing no change for this initiative. TECO implemented its GIS in 2010. The GIS database contains all facility data for transmission, substation, and distribution system. The system will help with post-storm damage assessment, forensic analysis, joint-use administration, and the evaluation of construction standards and potential hardening projects. TECO will continue the development of its GIS to improve the functionality and ease of use. There are no incremental costs associated with this initiative.

¹¹Order No. PSC-14-0684-PAA-EI, issued December 10, 2014, in Docket No. 140122-EI, *In re: Petition to modify transmission structure inspection cycle, by Tampa Electric Company.*

Initiative Six – Post-Storm Data Collection and Forensic Analysis

There is no change to this initiative. TECO hired a third party to collect the following data in the event a major storm causes damage to its service area.

- Pole/Structure:
 - Type of damage
 - Size and type of pole
 - Likely cause of damage
- Conductor:
 - Type of damage
 - Conductor type and size
 - Likely cause of damage
- Equipment:
 - Type of damage
 - Overhead or underground
 - Size
 - Likely cause of damage
- Hardware:
 - Type of damage
 - Size
 - Likely cause of damage

The third party personnel will perform the forensic analysis on the data to evaluate the root cause of failure and assess future preventive measures where possible and practical. TECO reported the incremental cost is estimated to be approximately \$113,000 per storm, and will depend on the severity of the storm and the extent of its system damage.

Initiative Seven – Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems

TECO is proposing no changes to this initiative. TECO's overhead and underground facilities are tracked through its database called Distribution Outage Database (DOD). The DOD is programmed to distinguish between overhead and underground systems when tracking outage data. TECO has also established a process for collecting post-storm data and performing forensic analysis to ensure the performance of overhead and underground systems are correctly assessed. TECO reported the incremental cost of this initiative is estimated to be \$100,000 per storm.

Initiative Eight – Increased Coordination with Local Governments

There is no change in the plan for this initiative. TECO will continue to participate with local and municipal government agencies within its service area in planning and facilitating joint storm exercises. TECO will also continue to maintain governmental contacts and participate in disaster recovery committees. Participating in the committees will help with collaboration in planning, protection, response, recovery and mitigation efforts during disaster recovery efforts. There is no estimated cost for this initiative.

Initiative Nine – Collaborative Research on Effects of Hurricane Winds and Storm Surge

There is no change to this initiative. TECO will continue to participate in the collaborative research effort with the other Florida's IOUs, municipals, and cooperatives. The collaborative research is facilitated by the Public Utility Research Center (PURC) at the University of Florida and focuses on 1) undergrounding of electric utility infrastructure, 2) hurricane wind effects, and 3) public outreach. TECO has signed an extension of the memorandum of understanding with PURC, which extends the research through December 31, 2018. TECO reported that the incremental cost of this initiative would be determined by the research projects. TECO spent \$21,300,000 in 2013-2015 for this initiative.

Initiative Ten – Natural Disaster Preparedness and Recovery Program

TECO will continue to refine this initiative. TECO's Emergency Management Plan addresses all hazards, including extreme weather events. The plan is reviewed annually. TECO continues to use the policy labeled Emergency Management and Business Continuity, which delineates the responsibility at employee, company, and community levels. TECO will also continue to participate in internal and external preparedness exercises, collaborating with government emergency management agencies, at local, state, and federal levels. TECO has a full time position to work with other utilities and utility trade association committees to bring new technology and best practices to TECO, and guide the implementation and integration into TECO's emergency response plan. TECO will implement a Damage Assessment system software tool, which will automate input, tracking, reporting and dispatching of restoration work by June 2017. TECO estimates that the cost for this initiative will be \$600,000 for 2016-2018 as compared to \$500,000 spent in 2013-2015.

National Electric Safety Code Compliance

TECO's updated plan addresses how the Utility complies with the National Electric Safety Code (NESC) pursuant to Rule 25-6.0345, F.A.C. In most cases, TECO's distribution facilities exceed the minimum requirements of the NESC. TECO's transmission structures also comply with the NESC. More details are provided in the following sections.

Extreme Wind Loading (EWL) Standards

TECO explains that the pole loading requirements of the NESC are divided into three loading districts: Heavy, Medium, and Light. TECO's service area is located in the light loading district, which assumes no ice build up and a wind pressure rating of nine pounds per square foot or 60 miles per hour (mph). Another part of the NESC requires safety loading factors to be applied to the calculated wind forces to provide a conservative margin of safety when selecting appropriate pole size. Applying the safety loading factor to Grade B construction will result in a effective wind speed of approximately 116 mph. TECO's service area is divided into two wind regions, 120 mph and 110 mph. TECO ensures that poles used meet the strength and loading requirements up to 116 mph for facilities 60 feet in height and below and 120 mph for facilities exceeding 60 feet. TECO reported that the safety factors considered in the NESC construction Grade B criteria are approximately 87 percent stronger than the NESC construction Grade C. The NESC requires distribution poles to be designed at least to construction Grade C. Staff notes that while Rule 25-6.0342, F.A.C., requires that a utility's plan address the extent to which EWL

standards are adopted for various types of facilities, it does not require a utility adopt a particular standard.

New Construction

TECO proposes to continue its practice for distribution and transmission facilities based on the NESC Grade B construction. TECO's transmission structures are designed to withstand 120 mph wind for all 69 kV structures and 133 mph wind for all 138 kV and 230 kV structures.

Major Planned Work

TECO proposes to continue building to Grade B construction for all major planned expansions, rebuilds, or relocations of distribution facilities. TECO reports using the two different wind loads for new construction and replacements is the most cost-effective and reliable standard for its service area.

Critical Infrastructure

Critical infrastructure (CIF) are circuits feeding loads to critical community facilities such as hospitals, emergency shelters, master pumping stations, wastewater plants, major communications facilities, electric and gas utilities, Emergency Operation Centers, and police and fire stations. TECO's downtown network is also considered CIF due to the high concentration of business and governmental buildings in the area. TECO has hardened several CIFs to EWL standards and will continue to evaluate the remaining CIF for opportunities to harden. TECO proposes to test approximately eight network protectors per year in the 12 low-lying vaults downtown. In addition, a restoration plan for the downtown network has been developed to ensure that an efficient network distribution system recovery takes place in the event of total power loss. TECO has developed a plan to storm harden Tampa General Hospital located on Davis Island.

Mitigation of Flooding and Storm Surge Damage

TECO proposes to continue its current standard for all new and maintenance replacement of underground distribution facilities located in Flood Zone 1. TECO will focus on elevation and water resistance of control cabinets and related equipment. TECO reported that it began using submersible padmount switchgear to harden its underground system in 2015. The switchgear will be specifically used for CIF where storm surge is expected. TECO has deployed the switchgear in locations serving the Tampa International Airport and the Downtown Network. TECO plans to install the switchgear at Tampa General Hospital.

Facility Placement

TECO proposes to continue placement of all new distribution facilities in the public right-of-way. TECO's policy is new residential lines shall be front lot and truck accessible, while commercial lines may be rear lot but must be truck accessible. In addition, TECO proposes to continue evaluating community and customer requests to relocate overhead facilities from rear lot locations to the front of a customer's property on a case-by-case basis.

Deployment Strategies

TECO's updated plan contains a detailed three-year deployment strategy, which is a continuation of inspection programs, technical design specification, construction standards and methodologies.

Facilities Affected, Including Specifications and Standards

All of TECO's facilities are affected by the deployment strategy plan. For all new transmission, distribution and substation facilities, TECO will implement its enhanced construction standards. TECO reported that the majority of new distribution facilities are placed underground; however, it has approximately 67 miles of new overhead distribution construction, which included reconductoring, line extensions and new circuits/feeders. TECO plans to construct, rerate or rebuild approximately 90 miles of overhead transmission. TECO's maintenance programs will strengthen and upgrade its system, along with its storm hardening initiatives as addressed above. TECO will continue its construction programs piloting the EWL standard for distribution facilities serving CIF, also addressed above.

Areas of Infrastructure Improvements

TECO's updated plan provides a detailed description of areas where electric infrastructure improvements will be made. Below is a list of projects and a brief description.

- **Downtown Network:** As discussed earlier, the Downtown Network is a CIF. TECO will inspect and test eight low-lying vaults per year and if leaks are found, all pertinent gaskets will be replaced.
- **Overhead to Underground Conversion of Interstate Highway Crossings:** A fallen distribution line over an interstate highway can block traffic and the repairs can be lengthy. To help first responders and others during emergencies, all new distribution line interstate crossings will be underground. TECO has converted 16 interstate highway crossings with 15 remaining left to be converted.
- **Submersible Padmount Switchgear:** As discussed earlier, TECO is using submersible padmount switchgear designed to withstand intrusion from water while remaining in service. TECO's deployment strategy plan is to deploy the submersible gear for all new CIF and to retrofit switchgears serving CIF loads.
- **Tampa General Hospital:** Tampa General Hospital is a CIF and is located on Davis Island. TECO will replace three existing switchgears with submersible switchgears and relocate the primary feeds attached to the bridge. The primary feeds will be placed under the channel adjacent to the hospital.

Joint-Use Facilities

TECO plans to perform a pole loading analysis as part of the pole inspection program on any joint use pole with an attachment of one-half inch in diameter cable or greater. If a pole fails the preliminary stress test, a comprehensive pole loading analysis will be conducted to determine if the pole is in fact overloaded. TECO will continue conducting its pole attachment audit to identify the location of each pole, the facilities attached, and to obtain verification of current joint use agreements.

Utility Cost/Benefit Estimates

TECO's updated plan includes estimates of costs to be incurred in connection with its updated plan for 2016 through 2018. This includes pole replacements, inspections of distribution and transmission facilities, vegetation management, and other projects. TECO spent a total of \$168,340,000 on its storm hardening plan for 2013-2015. In 2016-2018, TECO estimates it will

spend approximately \$163,020,000. TECO has not quantified the benefits of storm hardening due to a lack of forensic data. As more projects are completed, the incremental benefits will likely be reduced. Therefore, TECO should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events. Attachment B shows a comparison of cost associated with implementation of TECO's current and updated wooden pole inspections and Ten Initiatives.

Attachers Cost/Benefit Estimates

TECO's updated plan provided Attachment Standards and Procedures that will benefit, at minimal cost, third party attachers. The Utility did report that the largest impact would come from the increased pole inspections, which includes a pole loading analysis. In addition, TECO will conduct a joint-use audit to determine if any unauthorized attachments are found. The cost of this audit will be shared by all attaching entities. If an unauthorized attacher is found, the attachment owner will be responsible to pay for a complete engineering study and corrective actions required to meet the NESC standards. TECO worked with its attachers prior to making the modification to streamline the process for unauthorized attachments and unpermitted service drops.

Attachment Standards and Procedures

TECO's updated plan includes Attachment Standards and Procedures addressing safety, reliability, and pole loading capacity. The updated plan also addresses engineering standards and procedures for attachments by others to the Utility's transmission and distribution poles that meet or exceed the NESC (ANSI C-2) pursuant to Rule 25-6.034, F.A.C.

Conclusion

TECO's updated plan is largely a continuation of its current Commission-approved plan. Based on the review above, it indicates that TECO's plan has the information required by Commission's Rule and Orders and staff recommends it should be approved. Staff notes that approval of TECO's plan does not mean approval for cost recovery. TECO should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events.

Issue 2: Should the Commission approve Florida Public Utilities Company's 2016-2018 storm hardening plan filed in Docket No. 160106-EI?

Recommendation: Yes. Florida Public Utilities Company's (FPUC) updated plan is largely a continuation of its current Commission-approved plan. A review of FPUC's plan shows that it has the information required by Commission's Rule and Orders. Staff notes that approval of FPUC's plan does not mean approval for cost recovery. FPUC should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events. (P. Buys)

Staff Analysis: On Attachment C, staff provided a summary of FPUC's current wooden pole inspection program and Ten Initiatives and the proposed changes. In addition, where available, staff has shown the costs associated with the wooden pole inspections programs and Ten Initiatives for 2013-2015 and 2016-2018. Components of FPUC's updated plan are summarized below.

Wooden Pole Inspection Program

FPUC is continuing its eight-year wooden pole inspection.^{12,13} The program identifies poles that require repair, reinforcement or replacement. An outside contractor, Osmose Utilities Services, Inc., performs all wooden pole inspections, including strength and loading tests. Currently, FPUC is in its first year of its second eight-year cycle. FPUC will continue to file the results of these inspections in its Annual Electric Utility Distribution Reliability Report. The estimated cost for 2016-2018 related to the eight-year wooden pole inspection program is \$405,000 as compared to \$268,000 spent for 2013-2015.

Ten Initiatives

Initiative One – Three-Year Vegetation Management Cycle for Distribution Circuits

FPUC proposes no changes to its previously approved trim cycle. Currently, its feeder and lateral circuits are trimmed, on average, every three years and six years, respectively.¹⁴ FPUC reported that it has 139.63 miles of feeders and 570.87 miles of laterals. FPUC will continue to communicate with customers and local governments to address vegetation management. The estimated cost for 2016-2018 for Initiative One is \$2,940,000 as compared to \$2,718,143 spent for 2013-2015.

Initiative Two – Audits of Joint-Use Attachment Agreements

There are no proposed changes to this initiative. FPUC has joint use agreements with multiple third party attachers and although the agreements allow a joint use audit, audits have not been conducted since 2000. FPUC initiated an audit in 2016 to identify the total number of attachments and any violations that may exist. FPUC does not perform strength and loading assessments during the joint use audits as these tests are performed during the wooden pole inspections. The audits include:

¹²Order No. PSC-06-0144-PAA-EI, issued February 27, 2006, in Docket No. 060078-EI, *In re: Proposal to require investor-owned electric utilities to implement ten-year wood pole inspection program.*

¹³Order No. PSC-07-0078-PAA-EU, issued January 29, 2007, in Docket No. 060531-EU, *In re: Review of all electric utility wooden pole inspection programs.*

¹⁴Docket No. 100264-EI, *In re: Review of 2010 Electric Infrastructure Storm Hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Florida Public Utilities Company.*

- Pole Locations
- Owner of the pole
- City and county location
- Pole type, height, class and treatment
- Pole date manufactured, inspected, and retreated
- Joint use attacher name and type (telecommunication, cable)
- Violations
- Miscellaneous comments

Data collected from the audit will be analyzed to determine the number of poles found to be overloaded, number of unauthorized attachers and customer outages related to these situations. The estimated cost for 2016-2018 is \$0, which is what was spent in 2013-2015.

Initiative Three- Six-Year Transmission Structure Inspection Program

FPUC is proposing no change for this initiative. FPUC's transmission structure inspection program includes a climbing patrol of its 138 kV and 69 kV transmission lines on a six-year cycle and transmission substations on an annual cycle. The program includes inspecting transmission towers and transmission supporting equipment such as insulators, guying, grounding, conductor splicing, cross-braces, cross-arms, and bolts. The program also includes inspecting all structures, buss work, insulators, grounding, bracing and bolts at the transmission substations. The estimated cost for this initiative for 2016-2018 is \$87,000. FPUC did not track the operation and maintenance cost for this initiative for 2013-2015.

Initiative Four – Hardening of Existing Transmission Structures

There is no change in the plan for this initiative. FPUC's 138 kV transmission system is constructed using concrete and steel structures. The 69 kV transmission system consists of 221 poles, 98 of them are concrete. FPUC will continue to replace the wooden poles when it is necessary due to construction requirements or concerns with the integrity of the pole. FPUC reports that by the end of 2016, there will be 49 percent of its transmission structures left to be hardened. The costs for 2016-2018 are estimated to be \$750,000 as compared to \$2,392,000 spent in 2013-2015. FPUC explained that its current plan is to replace four poles per year, however, this could vary depending on the transmission inspection findings and new projects.

Initiative Five – Transmission and Distribution Geographic Information System

There is no proposed change for this initiative. FPUC implemented its GIS in 2008. The GIS identifies the distribution and transmission facilities on a land base map. This allows FPUC the ability to record data on all physical assets. The system communicates with FPUC's Customer Information System and functions as an Outage Management System (OMS) that allows collection of data used in determining reliability. FPUC's GIS also collects information regarding joint use attachments, which provide additional information in conducting the joint use audits. The costs for 2016-2018 are estimated to be \$62,100 as compared to \$60,000 spent in 2013-2015.

Initiative Six – Post-Storm Data Collection and Forensic Analysis

There is no change to this initiative. FPUC has a forensics team to coordinate communications, schedule data collection, and to report the findings. FPUC utilizes a contractor to collect, analyze and report on field data collected, which is entered into FPUC's OMS. The contractor will perform a forensic investigation at damage locations. The criteria for damage locations include, but are not limited to, poles, wires, crossarms, insulators, transformers, reclosers, capacitor banks, cutouts, and any other equipment that is damaged or has caused a customer outage. Data will also be collected on damaged facilities as defined as broken poles, leaning poles, broken or downed wires, damaged line equipment, and any other incident that has caused a customer outage.

Initiative Seven – Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems

FPUC is proposing no change for this initiative. FPUC will continue to collect outage data for overhead and underground systems in order to evaluate the reliability associated with the two systems. The forensic team report form allows for both overhead and underground damage to be entered. The data will be entered separately for each incident.

Initiative Eight – Increased Coordination with Local Governments

There is no change in the plan for this initiative. FPUC reports that it actively participates with local governments in planning for emergency situations. This includes establishing the necessary communications for these situations. FPUC will have personnel located at the county EOCs on a 24-hour basis during emergencies. FPUC reported that this allows for improved updating of outage information as storm restoration occurs. FPUC will continue discussing undergrounding and tree trimming issues with local governments. FPUC reported that involvement and discussion on these issues allowed for additional communication and education for both FPUC and the local governments.

Initiative Nine – Collaborative Research on Effects of Hurricane Winds and Storm Surge

There is no change to this initiative. FPUC will continue to participate in the collaborative research effort with the other Florida's IOUs, municipals and cooperatives. The collaborative research is facilitated by PURC at the University of Florida and focuses on 1) undergrounding of electric utility infrastructure, 2) hurricane wind effects, and 3) public outreach. FPUC will continue to support PURC's effort but does not intend to conduct other type of research at this time.

Initiative Ten – Natural Disaster Preparedness and Recovery Program

FPUC will continue to refine this initiative. FPUC's Disaster Preparedness and Recovery Plan provides guidelines under which the Utility will operate in emergency conditions. In order to ensure orderly and efficient service restoration, the guidelines address the following objectives:

- Safety of employees, contractors, and the general public
- Early damage assessment
- Request additional manpower
- Provide for orderly restoration activities

- Provide all logistical needs for employees and contractors
- Provide ongoing preparation of FPUC's employees, buildings, and equipment
- Provide support and additional resources for FPUC's employees and families

FPUC will utilize the plan to prepare for storms annually. The plan will also ensure that all employees are aware of their responsibilities during the storms. FPUC's plan is updated annually and the updates for 2015 and 2016 were: updated logos, removed a table, clarified roles and responsibilities of certain employees, updated the organization chart to reflect employee changes, updated emergency numbers, and updated logistic vendor information.

National Electric Safety Code Compliance

FPUC's updated plan addresses how the Utility complies with the NESC pursuant to Rule 25-6.0345, F.A.C. FPUC's distribution, transmission, and substations facilities have been installed in accordance with the NESC. FPUC increased the normal primary distribution pole size from Class 3 or 4 to Class 1 and FPUC is using EWL software to determine if these larger poles are sufficient. When necessary, FPUC will replace a wooden transmission pole with a concrete pole that meets the NESC, by withstanding higher wind loadings and meeting the NESC for conductor sagging, pole grounding, phase-to-phase spacing and phase-to-ground clearances. FPUC's substations meet the NESC for EWL criteria, buss spacing, phase-to-ground clearances and grounding.

Extreme Wind Loading Standards

FPUC incorporated EWL standards as specified in Rule 250C and in Figure 25-2(d) of the NESC. As discussed above, FPUC's distribution, transmission, and substations meet or exceed the NESC. For example, the current NESC code requires structures in Fernandina Beach to be designed to sustain wind loading of 120 mph. FPUC requires all new transmission pole structures in Fernandina Beach to withstand 130 mph winds. FPUC has also increased the primary distribution pole size from Class 3 or 4 to Class 1. FPUC reports that the upgrade to the Class 1 poles comply with EWL requirements. All poles in FPUC's system are constructed using Grade B construction. The NESC requires distribution poles to be designed at least to Grade C construction.

New Construction/Major Planned Work

FPUC reports that all future installations are designed to meet the NESC and EWL. As discussed above, FPUC designs its system to Grade B construction. In addition, FPUC increased the pole sizes. Therefore, FPUC's new construction and major planned projects are designed to meet EWL and the NESC.

Critical Infrastructure

Critical infrastructure (CIF) are circuits feeding loads to critical community facilities such as, hospitals, water plants, and wastewater plants. FPUC has hardened several CIFs to EWL standards and will continue to evaluate the remaining CIF for opportunities to harden. FPUC has four feeder projects in process for 2016. FPUC has two feeder projects planned for 2017 and two feeder projects for 2018.

Mitigation of Flooding and Storm Surge Damage

FPUC's transmission facilities are located in its Northeast Florida Division. The transmission lines are constructed near and across coastal waterways. The facilities were originally designed to meet the NESC. Foundations and castings were used to stabilize the structures due to the soil conditions. Overhead distribution lines are located in both divisions and are subject to storm surges and flooding. If needed, additional supporting mechanisms, such as storm guys or pole bracing, will be installed. Reclosers, capacitors, and regulators that require electronic controls will be mounted above the maximum surge or flood levels. FPUC's underground distribution lines that are subject to storm surges and flooding are located in the Northeast Florida Division. FPUC installs pads that are placed approximately two feet into the ground to provide additional stability to the installation of underground lines. Underground distribution lines are placed in conduits. For future installations, FPUC will evaluate the location for storm surges or flooding. If the possibility exists for storm surges, the underground lines will be encased in concrete ducts.

Facility Placement

FPUC's facilities are located in areas that are easily accessible. The facilities will be placed along public right-of-ways or located on private easements that are readily accessible from public streets. FPUC reports that these requirements are necessary to efficiently and safely perform installation and maintenance on the facilities. FPUC notes that placing facilities along rear lot lines will only be constructed as a "last resort."

Deployment Strategies

FPUC's plan contains its deployment of storm hardening strategy that will have an impact on future storm restoration activities.

Facilities Affected, Including Specifications and Standards

The significant areas of implementation from the deployment of FPUC storm hardening strategy are:

- Wooden poles will be inspected at least every eight years
- Vegetation management activities will ensure that feeders are trimmed every three years and laterals are trimmed every six years
- Joint use audits will be conducted every five years to identify pole loading issues
- Detailed climbing inspections on all transmission facilities will be conducted every six years
- FPUC will continue to replace wood transmission structures with concrete
- FPUC will continue to rebuild its CIF to EWL
- FPUC will use techniques to mitigate damage from storm surges and floods
- FPUC will continue to place facilities on public right-of-ways

Areas of Infrastructure Improvements

Most of the items listed above will affect all areas of FPUC service territory. The transmission inspection and replacement of transmission structures will only affect the Northeast Florida Division. The Northwest Florida Division does not have any transmission facilities. The rebuilding of CIF to EWL will equally benefit both divisions.

Joint-Use Facilities

FPUC plans to begin the upgrades on joint use facilities in 2016 through 2018 as a result of its joint use audit. A significant amount of pole upgrades will have one or more joint use attachments and EWL will be applied to all poles upgraded. Current contract language for joint use attachers will be used as a guide for the rebuilding process.

Utility Cost/Benefit Estimates

FPUC's updated plan includes estimates of costs to be incurred in connection with its updated plan for 2016 through 2018. This includes pole replacements, inspections of distribution and transmission facilities, vegetation management, and other projects. For 2013 through 2015, FPUC spent a total of \$5,976,771 on its storm hardening plan. FPUC estimates it will spend approximately \$4,846,500 for 2016 through 2018. FPUC is indicating a decrease in hardening of transmission structures in next the three years. FPUC has not quantified the benefits of storm hardening due to a lack of forensic data. As more projects are completed, the incremental benefits will likely be reduced. Therefore, FPUC should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events. Attachment C shows a comparison of cost associated with implementation of FPUC's current and updated wooden pole inspection program and Ten Initiatives.

Attachers Cost/Benefit Estimates

FPUC's updated plan provides that it anticipates up to 190 joint use poles will be identified for replacement annually. During its wooden pole inspections, FPUC will inspect its owned poles, while all third party poles will be inspected by the owner of the pole. FPUC ensures that the poles will be evaluated for structural soundness and strength and load testing will be performed. Documentation will be developed on the poles that do not meet the requirements. FPUC has elected to replace all poles failing inspection and as this occurs, with joint use attachers' input, procedures for the replacement and transfer of necessary attachments will be developed. In accordance with FPUC's joint use agreements, all joint use attachers will be included in the joint use audit to determine attachment amounts and to identify possible loading issues that need to be addressed.

Attachment Standards and Procedures

FPUC's updated plan includes the current Joint Use Attachment Specifications addressing safety, reliability, and pole loading capacity. The current contracts with third party attachers are being renegotiated. The updated contracts will continue to govern attachment standards and procedures and when additional specifications are developed, third party attachers will have the ability to provide input into the new specifications.

Conclusion

FPUC's updated plan is largely a continuation of its current Commission-approved plan. Based on the review above, it indicates that FPUC's plan has the information required by Commission's Rule and Orders and staff recommends it should be approved. Staff notes that approval of FPUC's plan does not mean approval for cost recovery. FPUC should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events.

Issue 3: Should the Commission approve Duke Energy Florida, LLC's 2016-2018 storm hardening plan filed in Docket No. 160107-EI?

Recommendation: Yes. Duke Energy Florida, LLC's (DEF) updated plan is largely a continuation of its current Commission-approved plan. A review of DEF's plan shows that it has the information required by Commission's Rule and Orders. Staff notes that approval of DEF's plan does not mean approval for cost recovery. DEF should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events. (P. Buys)

Staff Analysis: On Attachment D, staff provided a summary of DEF's current wooden pole inspection program and Ten Initiatives and the proposed changes. In addition, where available, staff has shown the costs associated with the wooden pole inspection programs and Ten Initiatives for 2013-2015 and 2016-2018. Components of DEF's updated plan are summarized below.

Wooden Pole Inspection Program

DEF is continuing its eight-year wooden pole inspection.¹⁵ The program includes inspection of DEF's transmission, distribution, and joint-use wooden poles. Poles are identified that require repair, reinforcement or replacement. Currently, DEF is in its second year of its second eight-year cycle. DEF will continue to file the results of these inspections in its Annual Electric Utility Distribution Reliability Report. The estimated cost for 2016-2018 related to the eight-year wooden pole inspection is \$9,700,000. DEF reported that it maintains approximately 800,000 wood poles in the highest decay zone. DEF plans to increase its spending on the wooden pole inspection program by approximately \$160,000 each year.

Ten Initiatives

Initiative One – Three-Year Vegetation Management Cycle for Distribution Circuits

DEF proposes no changes to its previously approved trim cycle. Currently, its feeder and lateral circuits are trimmed, on average, every three years and five years, respectively.¹⁶ DEF reported that annual variations for projected miles to be trimmed are expected as the Utility manages its resources and unit cost factors associated with its vegetation management. The estimated cost for 2016-2018 for Initiative One is \$104,700,000 as compared to \$100,600,000 spent in 2013-2015.

Initiative Two – Audits of Joint-Use Attachment Agreements

There is no change to this initiative. DEF will conduct an audit of all pole attachments on an eight-year cycle at a minimum.¹⁷ DEF conducts partial audits of its pole attachments throughout the year. The Utility performs a full Joint-Use Pole Loading Analysis on an eight-year cycle. DEF reported that when it discovers unauthorized attachments on its poles, DEF follows up with the unauthorized attacher. DEF explained that for each group of poles in a tangent line, the pole that had the most visible loading, line angle, and longest or uneven span length was selected for

¹⁵Order No. PSC-06-0144-PAA-EI, issued February 27, 2006, in Docket No. 060078-EI, *In re: Proposal to require investor-owned electric utilities to implement ten-year wood pole inspection program.*

¹⁶Order No. PSC-06-0947-PAA-EI, issued November 13, 2006, in Docket No. 060198-EI, *In re: Requirement for investor-owner electric utilities to file ongoing storm preparedness plans and implementation cost estimates.*

¹⁷Order No. PSC-06-0351-PAA-EI, issued April 25, 2006, in Docket No. 060198-EI, *In re: Requirement for investor-owned electric utilities to file ongoing storm preparedness plans and implementation cost estimates.*

wind loading analysis. If that pole failed, the next worst-case pole would be analyzed as well. The estimated cost for 2016-2018 is \$1,370,000 as compared to \$1,380,000 spent in 2013-2015.

Initiative Three- Six-Year Transmission Structure Inspection Program

DEF is proposing no change for this initiative. DEF's transmission structure inspection program is on a five-year cycle. DEF inspects transmission circuits, substations, tower structures and poles. DEF performs ground patrol of transmission line structures, associated hardware, and conductors on a routine basis to identify potential problems. DEF reported that the estimated and actual amounts for the transmission inspections include the inspections, emergency response, preventative maintenance, and training. The estimated cost for this initiative for 2016-2018 is \$68,360,000 as compared to \$62,560,000 spent in 2013-2015.

Initiative Four – Hardening of Existing Transmission Structures

There is no change in the plan for this initiative. DEF will continue to harden its transmission structures, which includes maintenance pole change-outs, insulator replacements, Department of Transportation/customer relocations, line rebuilds, and system planning additions. DEF notes that the transmission structures are designed to withstand the current NESC requirements and are built utilizing steel or concrete structures. DEF reports that there is 45 percent of its transmission structures left to be hardened. The costs for 2016-2018 are estimated to be \$315,700,000 as compared to \$417,400,000 spent in 2013-2015. DEF is reporting that there will be a decrease in governmental (projects requested by the Department of Transportation), rebuild (projects which will include a complete replacement of transmission line structures, conductors, and all supporting equipment) and line (projects which replace a portion or specific equipment) projects for the next three years.

Initiative Five – Transmission and Distribution Geographic Information System

This initiative has no changes. DEF implemented its new GIS in 2008. The new GIS database is an asset-based GIS instead of a location-based GIS. DEF's Facilities Management Data Repository and Compliance Tracking System facilitate the compliance tracking, maintenance, planning, and risk management of the major distribution assets. DEF has created and enhanced key performance indicators that are used to measure and monitor the quality of its GIS and Outage Management System (OMS) data. DEF reports that the consistency, accuracy, and dependability of these systems have led to improvements in the reliability and performance of its system, and it has also contributed to the safety of DEF's field employees. The estimated costs for 2016-2018 are \$810,000, which is the same that was spent in 2013-2015.

Initiative Six – Post-Storm Data Collection and Forensic Analysis

DEF is proposing no change for this initiative. DEF has established forensic teams that collect information regarding poles damaged during storm events and data at failure sites to determine the nature and causes of failure. DEF also collects available performance information on overhead and underground facilities as part of its storm restoration process. In collaboration with University of Florida's PURC, DEF and the other IOUs developed a common format to collect and track data related to damage discovered during forensic investigations. In addition, weather stations were installed across Florida as part of the collaboration with PURC and the other IOUs.

As a result, DEF is now able to correlate experienced outages with nearby wind speeds. This type of information is augmented with on-site forensic data following a major storm event.

Initiative Seven – Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems

There is no change for this initiative. As referenced above, DEF collects available performance information on overhead and underground facilities as part of its storm restoration process. DEF uses its OMS, Customer Service System, and GIS to help analyze the percentage of storm caused outages on overhead and underground systems. One hundred percent of the overhead and underground distribution and transmission systems are in the GIS.

Initiative Eight – Increased Coordination with Local Governments

No change is being proposed for this initiative. DEF's storm planning and response program is operational year-round with approximately 40 employees assigned full-time to coordinate with local governments on issues such as emergency planning, vegetation management, undergrounding, and service related issues. DEF will continue to visit the different EOCs to review storm procedures and participate in several different storm drills. DEF will also continue to hold forums for commercial, industrial, and governmental customers and "Live Line" demonstration sessions across its service territory.

Initiative Nine – Collaborative Research on Effects of Hurricane Winds and Storm Surge

There is no change for this initiative. DEF will continue to participate in the collaborative research effort with the other Florida's IOUs, municipals and cooperatives. The collaborative research is facilitated by PURC at the University of Florida and focuses on 1) undergrounding of electric utility infrastructure, 2) hurricane wind effects, and 3) public outreach. DEF has signed an extension of the memorandum of understanding with PURC, which extends the research through December 31, 2018. In addition to DEF's involvement with PURC, DEF actively engages as both participant and presenter with different organizations. These organization, such as, Southeastern Electric Exchange, Edison Electric Institute, and Institute of Electrical and Electronics Engineers, review and assess hardening alternatives.

Initiative Ten – Natural Disaster Preparedness and Recovery Program

DEF will continue to refine this initiative. DEF's Storm Recovery Plan is reviewed and updated annually based on lessons learned from the previous storm season and organizational needs. The Distribution System Storm Operational Plan and the Transmission Storm Plan incorporates organizational redesign at DEF, internal feedback, suggestions, and customer survey responses. DEF uses the EWL standards in accordance with the NESC in all planning of transmission upgrades, rebuilds and expansions of existing facilities.

National Electric Safety Code Compliance

All standards, practices, policies, and procedures in DEF's manuals and plan are designed to meet or exceed the requirements of the NESC. Theses standards, practices, policies, and procedures are followed on all new construction and all rebuilding and relocations of existing facilities.

Extreme Wind Loading Standards

DEF explains that it has extensive experience with Grade C and Grade B construction standards as defined by the NESC, properly constructed and maintained distribution lines meeting all provisions of the NESC perform satisfactorily and provide a prudent and responsible balance between cost and performance. DEF reports that its design standards can be summarized as:

- 1) Quality construction in adherence with the current NESC requirements,
- 2) Well defined and consistently executed maintenance plan, and
- 3) Prudent end-of-life equipment replacement programs.

New Construction

DEF reports that all new transmission poles are constructed with either steel or concrete pole material. Since virtually all transmission structures exceed a height of 60 feet above ground, they are constructed using the NESC EWL criteria. DEF explained that it has not adopted EWL standards for all new distribution construction because of the following:

- 1) Section 250C of the 2012 version of the NESC does not call for EWL standard for distribution poles under 60 feet. DEF's distribution poles are less than 60 feet.
- 2) All credible research, which includes studies by the NESC rules committee, demonstrates that applying EWL standards would not benefit distribution poles.
- 3) Utility experience from around the country further indicates that trees, tree limbs, and other flying debris damage electrical distribution structures less than 60 feet. DEF reports that applying the EWL standards to distribution poles would result in large increases in cost and design complexity without a commensurate benefit.
- 4) DEF reported that its experience found that vegetation and flying debris were the main causes of distribution pole damage. DEF believes the EWL standard will not address this condition. DEF further states that in 2004, 96 percent of DEF's pole failures were attributable to flying debris and/or super extreme wind events such as tornadoes and microbursts.

Staff notes that while Rule 25-6.0342, F.A.C., requires that a utility's plan address the extent to which EWL standards are adopted for various types of facilities, it does not require a utility to adopt a particular standard.

Major Planned Work

Consistent with the NESC, DEF uses the EWL for all major planned transmission work, which includes expansions, rebuilds, and relocations of existing facilities. DEF has not adopted the EWL standard for major planned distribution work, as discussed above.

Critical Infrastructure (CIF)

CIF are circuits feeding loads to critical community facilities such as hospitals, emergency shelters, master pumping stations, wastewater plants, major communications facilities, electric and gas utilities, EOCs, and police and fire stations. DEF's transmission facilities are constructed to the EWL standards irrespective of whether it can be classified as "critical" or "major." As discussed above, DEF's distribution facilities are not constructed to the EWL standards. DEF is

using its prioritization model for implementation of EWL projects in selected locations throughout the service territory. Projects are submitted for possible construction on an annual basis for implementation of DEF's prioritization model. DEF has constructed several pilot projects using EWL standards since 2007. However, to date, DEF reported there has not been a significant weather event that allowed the Utility to assess the performance of these projects. DEF will continue to study the performance of the EWL standards at the various sites when a weather event allows for such analysis.

Mitigation of Flooding and Storm Surge Damage

In areas where underground equipment may be exposed to storm surge and/or flooding, DEF utilizes its prioritization model. The model identifies areas where certain projects will be put into place to test whether flood mitigation techniques and devices can be used to protect the equipment. One area where DEF has employed its submersible underground strategy is St. George Island in Franklin County. DEF retrofitted its existing facilities using the submersible standards of stainless steel equipment, submersible connectors, raised mounting boxes, cold shrink sealing tubes, and submersible secondary blocks. However, there have not been any weather events of significant enough scale to test the equipment on St. George Island. DEF will continue to monitor this installation to collect and analyze data to determine how the equipment performs with respect to outage prevention, reduced maintenance, and reduced restoration times. In addition, during major storm events, DEF will place sandbags in strategic areas around substations that are in forecasted flood zones. In the event that water intrusion causes extensive damage requiring prolonged repairs, DEF will employ mobile substations to affected areas in order to restore power.

Facility Placement

DEF reported that it will continue to use frontlot construction for all new distribution facilities and all replacement distribution facilities unless specific operational, safety, or other site-specific reasons exist. As specified in DEF's Distribution Engineering Manual, lines outside of a residential development should be located to allow for truck access and reduced tree exposure and trimming on one side of the line when possible.

Deployment Strategies

DEF engaged Davies Consulting (DCI) to develop a comprehensive prioritization model. DEF uses the model to help identify potential hardening projects, procedures, and strategies. DEF reported that the model has been improved and enhanced to better reflect the changes in its overall storm hardening strategy throughout the years. DEF will continue to adjust its prioritization model as appropriate. The prioritization model is set up to analyze the following hardening alternatives for DEF:

- Overhead to underground conversions
- Small wire upgrade
- Backlot to frontlot conversion
- Submersible underground facilities
- Alternative NESC construction standards

- Feeder ties

The prioritization model compiles a list of desired projects and is evaluated based on the following criteria:

- Major storm outage reduction impact
- Community storm impact
- Third party impact
- Overall reliability
- Financial cost

The prioritization model is based on a structured methodology for evaluating the benefits associated with various hardening options. DEF reported that it is using its prioritization model to ensure a systematic and analytical approach to deploying storm hardening options within the service territory.

Facilities Affected, Including Specifications and Standards/ Areas of Infrastructure Improvements

All of DEF's facilities are affected by its standards, policies, procedures, practices, and applications discussed in its Storm Hardening Plan. Specific facility types are addressed within the plan (e.g., upgrading all transmission poles to concrete and steel, using frontlot construction for all new distribution lines were possible). As a result, all areas of DEF's service territory are impacted by its storm hardening efforts. Below is a brief list of the distribution projects.

- Saint Petersburg – one feeder tie project
- Highlands – three feeder tie projects
- Buena Vista – one feeder tie project
- Lake Wales – one feeder tie project, one small wire upgrade project
- Clermont – one small wire upgrade project
- Winter Garden – two feeder tie projects
- Longwood – one overhead to underground conversion project
- Jamestown – one small wire upgrade project
- Apopka – two feeder tie projects
- Deland – one feeder tie project
- Monticello – two feeder tie projects, one alternative NESC construction standards (EWL) project
- Ocala – two feeder tie projects, one alternative NESC construction standards (EWL), five small wire upgrade projects

- Inverness – one feeder tie project
- Clearwater – two small wire upgrades, one submersible underground facilities project

DEF's approach in deciding the storm hardening projects is to consider the unique circumstances of each potential location. Below are the variables DEF considers:

- Operating history and environment
- Community impact and customer input
- Exposure to storm surge and flooding
- Equipment condition
- Historical and forecast storm experience
- Potential impacts on third parties

DEF believes this approach leads to the best solution for each discrete segment of its system. As discussed in Initiative 4, DEF is planning to continue to replace transmission poles with either concrete or steel poles. Most projects are identified during the transmission pole inspections. For the North Florida area, DEF listed 72 new, rebuilds or relocation projects for its transmission system. The projects are planned over the three-year period 2016 through 2018. For the South Florida area, DEF listed 48 transmission projects for the same time period.

Joint-Use Facilities

DEF provided information to third parties who would be affected by the storm hardening projects. DEF notifies the third parties at the time of the pole change out that transfers are needed. DEF completed its joint use attachment audit in 2013 and is currently in the third year of the second round of wooden pole inspections.

Utility Cost/Benefit Estimates

DEF's updated plan includes estimates of costs to be incurred in connection with its updated plan for 2016 through 2018. This includes pole replacements, inspections of distribution and transmission facilities, vegetation management, and other projects. For 2013 through 2015, DEF spent a total of \$610,730,000 on its storm hardening plan. DEF estimates it will spend approximately \$520,440,000 for 2016 through 2018. DEF is proposing a decrease in transmission facilities hardening projects, small wire upgrade feeder projects, backlot to frontlot conversion feeder projects, and overhead to underground conversation feeder projects in next three years. DEF has not quantified the benefits of storm hardening due to a lack of forensic data. As more projects are completed, the incremental benefits will likely be reduced. Therefore, DEF should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events. Attachment D shows a comparison of cost associated with implementation of DEF's current and updated wooden pole inspection program and Ten Initiatives.

Attachers Cost/Benefit Estimates

DEF believes that any entity jointly attached to its equipment would benefit, as DEF would, from the proposed storm hardening projects. DEF provided available cost/benefit information to the third party attachers.

Attachment Standards and Procedures

DEF's updated plan includes Joint Use Pole Guidelines addressing its joint use process, construction standards, timelines, financial responsibilities, and key company contacts responsible for the completing permit requests. DEF reports that all newly proposed joint use attachments are field checked and designed using generally accepted engineering practices to assure that the new attachments do not overload the poles. Additionally, DEF performs annual and full-system audits on joint use attachments.

Conclusion

DEF's updated plan is largely a continuation of its current Commission-approved plan. Based on the review above, it indicates that DEF's plan has the information required by Commission's Rule and Orders and staff recommends it should be approved. Staff notes that approval of DEF's plan does not mean approval for cost recovery. DEF should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events.

Issue 4: Should the Commission approve Gulf Power Company's 2016-2018 storm hardening plan filed in Docket No. 160108-EI?

Recommendation: Yes. Gulf Power Company's (Gulf) updated plan is largely a continuation of its current Commission approved plan. A review of Gulf's plan shows that it has the information required by Commission's Rule and Orders. Staff notes that approval of Gulf's plan does not mean approval for the cost recovery. Gulf should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events. (P. Buys)

Staff Analysis: On Attachment E, staff provided a summary of Gulf's current wooden pole inspection program and Ten Initiatives and the proposed changes. In addition, where available, staff has shown the costs associated with the wooden pole inspection program and Ten Initiatives for 2013-2015 and 2016-2018. Components of Gulf's updated plan are summarized below.

Wooden Pole Inspection Program

Gulf is continuing its eight-year wooden pole inspection.¹⁸ Gulf utilizes an inspection matrix that ensures that all poles receive a visual inspection with sounding, boring, and excavation as appropriate. The program identifies poles that require repair, reinforcement or replacement. Currently, Gulf is in its third year of its second eight-year cycle. Gulf will continue to file the results of these inspections in its Annual Electric Utility Distribution Reliability Report. The estimated cost for 2016-2018 related to the eight-year wooden pole inspection program is \$7,047,000 as compared to \$6,236,000 spent in 2013-2015. Gulf's costs for 2016-2018 reflect anticipated increases in contract labor and equipment rates.

Ten Initiatives

Initiative One –Three-Year Vegetation Management Cycle for Distribution Circuits

Gulf proposes no changes to its previously approved trim cycle.¹⁹ Currently, the feeders are trimmed on a three-year cycle and laterals circuits are trimmed on a four-year cycle. Gulf's vegetation management plan includes annual inspection and corrective action plan on the remaining two-thirds of the main feeders, not part of the trim cycle that year. Lateral distribution lines are managed on a reliability-based program to achieve a four-year average cycle. The estimated cost for 2016-2018 for Initiative One is \$17,847,000 as compared to \$16,794,000 spent in 2013-2015. As discussed above, Gulf anticipates increases in contract labor and equipment rates.

Initiative Two – Audits of Joint-Use Attachment Agreements

There is no change to this initiative. Gulf performs field audits of joint-use poles every five years, which is outlined in contractual agreements with third party attachers. Both utility owned poles with third party attachers and non-utility poles where Gulf is the third party attacher, are

¹⁸Order No. PSC-07-0078-PAA-EU, issued January 29, 2007, in Docket No. 060531-EU, *In re: Review of all electric utility wooden pole inspection programs*.

¹⁹Order No. PSC-10-0688-PAA-EI, issued November 15, 2010, in Docket No. 100265-EI, *In re: Review of 2010 Electric Infrastructure Storm hardening Plan filed pursuant to Rule 25-6.0342, F.A.C., submitted by Gulf Power Company*.

included in the audit. Information collected during the last audit, which was conducted in 2011 was the following:

- GPS pole location
- Pole owner
- Pole type
- Pole treatment
- Pole height and class
- Manufacture date
- Attachment information
- Pole identification numbers

Gulf reported that any dangerous situations identified during the audits are immediately reported to the pole owner. Dangerous conditions may include buckling, splitting or broken poles, or low hanging conductors or cables. Gulf anticipates similar data will be collected and/or verified in the next field audit scheduled for 2016. The estimated cost for 2016-2018 is \$300,000 while no cost were incurred for 2013-2015. The \$300,000 is the cost of the audit.

Initiative Three- Six-Year Transmission Structure Inspection Program

There are no proposed changes to this initiative. Gulf's transmission line inspections include a ground line treatment inspection, a comprehensive walking inspection, and aerial inspections. The transmission inspections are based on two alternating 12-year cycles, which results in structures being inspected at least once every six years. Gulf inspects all of its substations at least once annually. The inspections include visual inspections of all structures. The estimated cost for this initiative for 2016-2018 is \$726,000 as compared to \$663,000 spent in 2013-2015. Gulf is budgeting for increased cost in labor and equipment rates.

Initiative Four – Hardening of Existing Transmission Structures

There is no change in the plan for this initiative. Gulf will continue the design and construction of its new facilities based on the NESC and EWL. The standard for all new transmission lines used by Gulf is Grade B construction. Gulf's main objective is to design a structure that has a capacity greater than the maximum expected load. Gulf plans to continue the replacement of wooden H-frame cross-arms with steel cross-arms on transmission facilities. Cross-arms are mounted horizontally and distribute the load between the two poles. If the wooden cross-arms have small pockets of rot, the strength of the structure could be reduced. Gulf has 355 cross-arm replacements remaining and plans to complete this initiative by 2017. The cost for 2016-2018 is estimated to be \$29,933,000 as compared to \$26,139,000 spent in 2013-2015.

Initiative Five – Transmission and Distribution Geographic Information System

There is no change to this initiative. Gulf reported that its GIS uses database information that is continuously maintained and updated with transmission, distribution and land information across its service area. Gulf completed its distribution facilities mapping transition to its Distribution

GIS in 2009. The transmission system has been completely captured in the Transmission GIS database. The Distribution GIS and Transmission GIS are continually updated with any additions and changes as the associated work orders for maintenance, system improvements, and new business are completed. This ongoing process provides Gulf sufficient information to use with collected forensic data to assess performance of its overhead and underground systems in the event of a major storm. There are no incremental costs associated with this initiative.

Initiative Six – Post-Storm Data Collection and Forensic Analysis

Gulf is not proposing a change to this initiative. Contractors will aid Gulf in the collection of field data after a major storm. In addition, data will be collected on pre-determined projects constructed to EWL criteria and in other designated overhead and underground areas. The information collected by Gulf's contractor will be utilized to perform a forensic analysis. Gulf reported that this "fact finding" assessment of existing facilities would help in the evaluation of its construction standards going forward.

Initiative Seven – Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems

There is no change for this initiative. Gulf will continue its record keeping and analysis of data associated with overhead and underground outages. Gulf collects data on outages as they occur, for the following situations:

- If underground cables are:
 - Direct buried
 - Direct buried with injection treatment
 - In a conduit
- Whether the pole type is:
 - Concrete
 - Wood
 - Steel

Initiative Eight – Increased Coordination with Local Governments

No change is being proposed to this initiative. Gulf meets with governmental entities for all major projects, as appropriate, to discuss the scope of the project and coordinate activities involved with project implementation. Gulf maintains year-round contact with city and county officials to ensure cooperation in planning, good communication, and coordination of activities. Gulf assigns employees to county EOCs throughout Northwest Florida to assist during emergencies. Gulf also conducts a storm drill each year. There is no estimated cost for this initiative.

Initiative Nine – Collaborative Research on Effects of Hurricane Winds and Storm Surge

There is no change to this initiative. Gulf will continue to participate in the collaborative research effort with other Florida IOUs, municipals, and cooperatives. The collaborative research is facilitated by PURC at the University of Florida and focuses on 1) undergrounding of electric utility infrastructure, 2) hurricane wind effects, and 3) public outreach. Gulf has signed an

extension of the memorandum of understanding with PURC, which extends the research through December 31, 2018. Gulf estimated the cost for 2016-2018 for this initiative would be \$96,000 as compared to \$92,177 spent in 2013-2015.

Initiative Ten – Natural Disaster Preparedness and Recovery Program

Gulf will continue to refine this initiative. Gulf uses the strategy described in its Storm Restoration Procedures Manual to respond to any natural disaster that may occur. Annually, Gulf develops and refines its planning and preparations for the possibility of a natural disaster. Gulf's restoration procedures establish a plan of action to be utilized for the operation and restoration of generation, transmission, and distribution facilities during disasters. Gulf continues to provide annual refresher training in the area of storm preparedness for various storm roles at minimal cost. Mock hurricane drills are held annually.

National Electric Safety Code Compliance

Gulf's distribution system complies with all applicable sections of the NESC and exceeds the NESC with the transition to Grade B construction on all new construction, major projects and maintenance work. In addition, Gulf's transmission system complies with all applicable sections of the NESC in effect at the time of initial construction. For Gulf' substations, the Utility uses ASCE 7 EWL criteria for structure design and selection.

Extreme Wind Loading Standards

Gulf's plan exceeds the NESC standards by using Grade B construction on all new distribution construction, major projects and maintenance work. Gulf's EWL pilot projects included:

- Interstate Crossings – Installed extra down guys to existing wooden poles to bring them to EWL standards.
- Feeders service Critical Loads – Depending on the feeder locations, Gulf piloted E-truss installations to existing poles, replaced wood poles with concrete poles and added extra down guys. These installations brought the CIF up to EWL standards.
- Multi-feeder Pole Lines – In coastal areas serving critical loads, existing wooden poles were replaced with Grade B concrete poles.

Gulf reports that it lacks the data, at the time of this filing, to support the benefits associated with the upgrades due to a lack of major storms.

New Construction/Major Planned Work

Gulf proposed to continue focusing on upgrading all new construction and major planned work to Grade B construction standards. Gulf reported that if a district service area encompasses two different wind zones as defined by the NESC, then that district would have multiple construction standards. Each specific pole would be constructed to the wind zone rating for that location.

Critical Infrastructure

Critical infrastructure (CIF) are circuits feeding loads to critical community facilities such as hospitals, emergency shelters, master pumping stations, wastewater plants, major communications facilities, electric and gas utilities, EOCs, and police and fire stations. Gulf

proposes to continue to use Grade B construction of all maintenance work, including any work performed on CIF.

Mitigation of Flooding and Storm Surge Damage

Gulf has developed distribution overhead and underground storm hardening specifications to minimize damage in areas subject to flooding and storm surges. The specifications will continue to evolve as Gulf seeks out the best practices and learns from the review of its forensic data. Gulf reported that new underground installations and conversion of overhead facilities to underground facilities is customer driven. Gulf utilizes overload and strength factors greater than or equal to those required in Section 25 and 26 of the NESC for its transmission facilities. Gulf's loading criteria for new line design is derived from Section 25 of the NESC and at this time, Gulf is not designing transmission for any type of storm surge or flooding damage. Gulf's future underground transmission projects, located within a possible storm surge area, will be engineered to consider the impact of flooding or storm surge.

Facility Placement

Gulf proposes to continue placement of all new distribution facilities in the public right-of-way. Gulf reported that it would continue to promote replacement of facilities adjacent to public roads; to use easements, public streets, roads, and highways; to obtain easements for underground facilities; and to use road right-of-ways for conversions of overhead to underground facilities.

Deployment Strategies

Gulf's updated plan contains a detailed three-year deployment strategy, which is a continuation of inspection programs, technical design specification, construction standards and methodologies.

Facilities Affected, Including Specifications and Standards

Gulf will continue to develop overhead and underground storm hardening specifications for its distribution system. Gulf reported that these specifications would continue to evolve as the Utility seeks out best practices and learns from the review of gathered forensic data. As discussed, Gulf will continue transitioning to Grade B construction on all new construction, major projects and maintenance work. Gulf proposes to target CIF by focusing on sections of feeder pole lines that due to their geographic locations, have a higher exposure to possible storm damage and convert them to Grade B construction. Gulf will continue to utilize overload and strength factors greater than or equal to those required in the NESC for its transmission system. These design criteria are used on all new installation and completed rebuild projects throughout Gulf's service area. Gulf performed a risk assessment on all its substations. The risk assessment was completed based on information provided by a National Oceanic and Atmospheric Administration's (NOAA) Sea, Lake and Overland Surges from Hurricanes (SLOSH) model. The results from the risk assessment indicated that hardening measures are not required for Gulf's substations. Gulf's Emergency Response Plan has been established for all substations.

Areas of Infrastructure Improvements

Gulf's updated plan provides a detailed description of the electric infrastructure improvements that will be made. All three regions (Central, Eastern, and Western) of Gulf's service territory will be impacted. Below is a brief description of its important projects.

- **Feeder Patrols:** Gulf reports annually, by June 1, all of its critical lines would be inspected up to the first protective device for loose down guys, slack primary and leaning poles. Gulf will correct all problems found during the inspection.
- **Infrared Patrols:** Also, annually, by June 1, Gulf will perform infrared inspections of critical equipment on main line three phase feeders. The devices with problems, such as feeder switches, capacitors, regulators and automatic over-current protective devices will be repaired.
- **Wind Monitors:** Gulf believes a key part of forensic data gathering is obtaining “granular” storm wind speeds at strategic locations. The data will be systematically obtained through meteorological data resources such as existing wind stations and commercial weather reporting sources.
- **Distribution Automation:** Gulf proposes to continue the installation of additional distribution automation devices to further segment the feeders for outage restoration. The devices will protect its customers by limiting the affected of temporary faults and sustained outages. The devices will be either controlled by Gulf’s Distribution Supervisory Control and Data Acquisition (DSCADA) system and/or function as part of automated restoration schemes.
- **Strategic Installation of Automated overhead Faulted Circuit Indicators:** Gulf explained that Faulted Circuit Indicators (FCI) are devices designed to indicate the passage of fault current. The FCI will reduce customer outage time by expediting the location of outage causes, thereby aiding in the isolation of the problem. This will help to restore service to some customers while Gulf is correcting the problem.

Joint-Use Facilities

Gulf evaluated third party attachments through the following means:

- **Pole Strength and Loading Engineering:** Calculations are performed before attachment to any pole, tower or structure and before any existing cables are upgraded or over lashed. This is to determine if the increase in pole loading would necessitate pole modifications.
- **Pre-notification Process:** Gulf ensures that attachers comply with its pre-notification process, which is deigned to inform Gulf of plans to attach, upgrade, or over lash cables to any of its poles, towers, or structures. The process includes a field pre-inspection with pole measurements, strength and loading calculations, work order preparation, if necessary, and a post inspection of all the work. The requesting attacher is responsible for post inspections costs and any corrective actions if needed.
- **Specification Plates:** Gulf reported that specification plates reflect storm hardening initiatives such as additional guying standards and the use of pole foam in potential flood prone or storm surge areas.
- **Agreement with Florida Cable Telecommunication Association (FCTA):** Gulf has provisions in its agreement with FTCA to place identification tags on their facilities for ease of contacting the third party attachers. The tags will help with contacting the proper attacher when supporting poles or facilities are damaged and the attacher is needed to help remove, clear the right-of-way, or transfer their cables to a new pole in emergencies.

- Not to Box or Bracket Poles, Towers, or Structures: Gulf ensures that every effort is made by all pole attachers not to box or bracket a pole, tower, or structure on both sides. Gulf explains that this practice ensures that the attachment will not encumber the climbing space or impede the ability to straighten a leaning pole in timely manner.

Gulf's third party attacher contracts have details on notification protocol for new attachment permits and over lashing projects and any associated construction coordination. Gulf uses the national Joint Use Notification System for joint-use notifications and coordination of construction activities with affected parties.

Utility Cost/Benefit Estimates

Gulf's updated plan includes estimates of costs to be incurred in connection with its updated plan for 2016 through 2018. These cost include, continuation of its transition and implementation of Grade B construction, CIF improvements, feeder patrols, and other projects. For 2013 through 2015, Gulf spent a total of \$49,602,000 on its storm hardening plan. Gulf estimates it will spend approximately \$51,643,000 for 2016 through 2018. Gulf is proposing an increase in its transmission wooden crossarm replacement project, which is scheduled to be completed in 2017. Gulf also estimated costs for anticipated increases in contract labor and equipment rates. Gulf has not quantified the benefits of storm hardening due to a lack of forensic data. As more projects are completed, the incremental benefits will likely be reduced. Therefore, Gulf should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events. Attachment E shows a comparison of cost associated with implementation of Gulf's current and updated wooden pole inspections and Ten Initiatives.

Attachers Cost/Benefit Estimates

Gulf continues to seek input from third party attachers in the development of its Storm Hardening Plan. Gulf provided 20 attachers a draft copy of its plan. No cost and benefit data was received from third party attachers prior to the published date of Gulf's plan. Gulf reported that it would continue to coordinate face-to-face semi-annual meetings with interested third party attachers to discuss major company and customer construction projects, construction standards, inspect programs, and operational issues.

Attachment Standards and Procedures

Gulf's updated plan includes EWL standards as specified by Figure 250-2(d) of the NESC. Also included in its plan are engineering standards for overhead and underground storm hardening that meet or exceed the NESC pursuant to Rule 25-6.034, F.A.C., and procedures for attachments by others to the Utility's systems.

Conclusion

Gulf's updated plan is largely a continuation of its current Commission-approved plan. Based on the review above, it indicates that Gulf's plan has the information required by Commission's Rule and Orders and staff recommends it should be approved. Staff notes that approval of Gulf's plan does not mean approval for cost recovery. Gulf should consider the rate impact before taking proactive steps to improve its system to withstand severe weather events.

Issue 5: Should these dockets be closed?

Recommendation: If no person whose substantial interests are affected by the proposed agency action files a protest within 21 days of the issuance of the orders, these dockets should be closed upon the issuance of the consummating orders. A protest by an affected person in a docket will not preclude the non-protested dockets from closing. (Leathers)

Staff Analysis: At the conclusion of the protest period, if no protest is filed these dockets should be closed upon the issuance of the consummating orders. Separate orders will be issued for each docket to reflect the Commission's vote. For each such order, if no person whose substantial interests are affected by the proposed agency action files a protest within 21 days of the issuance of the respective docket's order, each docket should be closed upon issuance of a separate consummating order. A protest by an affected person in a docket will not preclude the non-protested dockets from closing.

Storm Hardening Requirements: Wooden Pole Inspection Program & Ten Initiatives

Eight-Year Wooden Pole Inspection Program
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| 1. Implement an eight-year wooden pole inspection cycle by Order Nos. PSC-06-0144-PAA-EI and PSC-07-0078-PAA-EU. |
| 2. File an annual report with the Commission. |
| 3. Provide cost estimates. |

Initiative 1 – A Three-Year Vegetation Management Cycle for Distribution Circuits
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| 1. Three-year tree trim cycle for primary feeders (minimum). |
| 2. Three-year cycle for laterals as well, if not cost-prohibitive. |
| 3. Provide cost estimate. |

Initiative 2 – Audit of Joint-Use Attachment Agreements
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| 1. (a) Each investor-owned electric utility shall develop a plan for auditing joint-use agreements that includes pole strength assessments. |
| (b) These audits shall include both poles owned by the electric utility poles owned by other utilities to which the electric utility has attached its electrical equipment. |
| 2. The location of each pole, the type and ownership of the facilities attached, and the age of the pole and the attachments to it should be identified. |
| 3. Each investor-owned utility shall verify that such attachments have been made pursuant to a current joint-use agreement. |
| 4. Stress calculations shall be made to ensure that each joint-use pole is not overloaded or approaching overloading for instances not already addressed by Order No. PSC-06-0144-PAA-EI. |
| 5. Provide compliance cost estimate and cost estimate for alternative action, if any. |

Initiative 3 – Six-Year Transmission Inspection Program
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| 1. Develop a plan to fully inspect all transmission towers and other transmission supporting equipment (such as insulators, guying, grounding, splices, cross-braces, bolts, etc.). |
| 2. Develop a plan to fully inspect all substations (including relay, capacitor, and switching stations). |
| 3. Provide compliance cost estimate and cost estimate for alternative actions, if any. |

Initiative 4 – Hardening of Existing Transmission Structures

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| 1. Develop a plan to upgrade and replace existing transmission structures. Provide a scope of activity, limiting factors, and criteria for selecting structure to upgrade and replace. |
| 2. Provide a timeline for implementation. |
| 3. Provide compliance cost estimate and cost estimate for alternative actions, if any. |

Initiative 5 – Transmission and Distribution Geographic Information System

1. To conduct forensic review.
2. To assess the performance of underground systems relative to overhead systems.
3. To determine whether appropriate maintenance has been performed.
4. To evaluate storm hardening options.
5. Provide a timeline for implementation.

The utilities have the flexibility to propose a methodology that is efficient and cost-effective.

Initiative 6 – Post-Storm Data Collection and Forensic Analysis

1. Develop a program that collects post-storm information for performing forensic analyses.
2. Provide a timeline for implementation.

The utilities have the flexibility to propose a methodology that is efficient and cost-effective.

Initiative 7 – Collection of Detailed Outage Data Differentiating between the Reliability Performance of Overhead and Underground Systems

1. Collect specific storm performance data that differentiates between overhead and underground systems, to determine the percentage of storm-caused outages that occur on overhead and underground systems, and to assess the performance and failure mode of competing technologies, such as direct bury cable versus cable-in-conduit, concrete poles versus wooden poles, location factors such as front-lot versus back-lot, and pad-mounted versus vault.
2. Provide a timeline for implementation.

The utilities have the flexibility to propose a methodology that is efficient and cost-effective.

Initiative 8 – Increased Coordination with Local Governments

1. Each utility should actively work with local communities year-round to identify and address issues of common concern, including the period following a severe storm like a hurricane and also ongoing, multi-hazard infrastructure issues such as flood zones, area prone to wind damage, development trends in land use and coastal development, joint-use of public right-of-way, undergrounding facilities, tree trimming, and long-range planning and coordination.
2. Incremental plan costs.

Initiative 9 – Collaborative Research

1. Must establish a plan that increases collaborative research.
2. Must identify collaborative research objective.
3. Must solicit municipals, cooperatives, educational and research institutions.
4. Must establish a timeline for implementation.
5. Must identify the incremental costs necessary to fund the organization and perform the research.

Initiative 10 – A Natural Disaster Preparedness and Recovery Program

1. Develop a formal Natural Disaster Preparedness and Recovery Plan that outlines the utility's disaster recovery procedures if the utility does not already have one.

Tampa Electric Company

Eight-Year Wooden Pole Inspection Program	
Current Plan	Updated Plan
1. Implement an eight-year wooden pole inspection cycle for distribution poles.	1. No change
2. File the progress of this inspection in the Annual Reliability Report.	2. No change
3. Costs for 2013-2015 were \$126,100,000.	3. Costs for 2016-2018 are estimated to be \$112,300,000.

Initiative 1 – A Three-Year Vegetation Management Cycle for Distribution Circuits	
Current Plan	Updated Plan
1. Average four-year trim cycle for feeders.	1. No change
2. Average four-year trim cycle for laterals. Targeted trimming is also achieved through its “mid-cycle” program that addresses critical circuits.	2. No change
3. Costs for 2013-2015 were \$30,500,000.	3. Costs for 2016-2018 are estimated to be \$28,900,000.

Initiative 2 – Audit of Joint-Use Attachment Agreements	
Current Plan	Updated Plan
1. (a) Perform pole strength assessment during eight-year wooden pole inspection cycle.	1. (a) No change
(b) Audit all TECO-owned poles and third party poles per Joint-Use contract agreements on an eight-year cycle.	(b) No change
2. All required data will be collected during eight-year wooden pole inspection cycle and stored in GIS database.	2. No change
3. Verify attachments have been made pursuant to current joint-use agreements during the eight-year wooden pole inspection cycle.	3. No change
4. Stress calculations will be performed during eight-year wooden pole inspection cycle.	4. No change
5. Costs for 2013-2015 were \$1,000,000.	5. Costs for 2016-2018 are estimated to be \$0 due to paying the requesting third party attacher for the analysis.

Initiative 3 – Six-Year transmission Inspection Program	
Current Plan	Updated Plan
1. Wooden pole inspection activities (PSC-06-0144-PAA-EI, Docket No. 060078-EI). Structures on a six-year cycle, all other portions of the system inspected annually.	1. Per Order No. PSC-14-0684-PAA-EI, Docket No. 140122-EI, the inspection cycle was shifted from a six-year cycle to an eight-year cycle starting in 2015.
2. Substations inspected annually.	2. No change
3. Costs for 2013-2015 were \$4,400,000.	3. Costs for 2016-2018 are estimated to be \$3,200,000.

Initiative 4 – Hardening of Existing Transmission Structures	
Current Plan	Updated Plan
1. Incremental phase out of wooden transmission structures during all new construction, relocations, and other maintenance.	1. No change
2. Plan is ongoing with no completion date.	2. No change
3. Costs for 2013-2015 were \$2,300,000.	3. Costs for 2016-2018 are estimated to be \$2,400,000.

Initiative 5 – Transmission and Distribution Geographic Information System	
Current Plan	Updated Plan
1. Forensic reviews on statistical sampled basis.	1. No change
2. Forensic review with respect to types of materials and construction, and location.	2. No change
3. Plan includes determination of appropriate maintenance.	3. No change
4. Access future preventive measures where possible.	4. No change
5. Implementation began in 2010.	5. No change

Initiative 6 – Post-Storm Data Collection and Forensic Analysis	
Current Plan	Updated Plan
1. Hire consultant to perform forensic analyses.	1. No change
2. Implementation is dependent on the severity of the weather event.	2. No change

Initiative 7 – Collection of Detailed Outage Data Differentiating between the Reliability Performance of Overhead and Underground Systems	
Current Plan	Updated Plan
1. Measures are in place should it experience a major storm.	1. No change
2. Implementation will begin when TECO experiences major storm activity.	2. No change

Initiative 8 – Increased Coordination with Local Governments	
Current Plan	Updated Plan
1. TECO’s Plan calls for building on past community involvement by including local government, fire, police and water officials in storm preparation workshops, including local government in local Emergency Operations Centers, increased vegetation management including government and consumer education, undergrounding planning and education, and damage reporting prior, during, and after storms.	1. No change
2. Costs for 2013-2015 were \$0.	2. Costs for 2016-2018 are estimated to be \$0.

Initiative 9 – Collaborative Research	
Current Plan	Updated Plan
1. Collaborative research efforts, led by PURC, which began in 2007.	1. No change
2. Research vegetation management during storm and non-storm times, wind during storm and non-storm events, hurricane and damage modeling towards further understanding the costs and benefits of undergrounding.	2. No change
3. TECO will solicit participation from other utilities and organizations.	3. No change
4. Implementation is ongoing	4. TECO has entered into a Memorandum of Understanding with the University of Florida’s PURC, which extends research through December 31, 2018.
5. Costs for 2013-2015 were \$21,300,000.	5. Costs would be determined by the research projects.

Initiative 10 – A Natural Disaster Preparedness and Recovery Program	
Current Plan	Updated Plan
1. Disaster Preparedness/Recovery Plan has been developed and filed.	1. Continue to refine.
2. Costs for 2013-2015 were \$500,000.	2. Costs for 2016-2018 are estimated to be \$600,000.

Florida Public Utilities Company

Eight-Year Wooden Pole Inspection Program	
Current Plan	Updated Plan
1. Implement an eight-year wooden pole inspection cycle for distribution poles.	1. No change
2. File the progress of this inspection in the Annual Reliability Report.	2. No change
3. Costs for 2013-2015 were \$268,000.	3. Costs for 2016-2018 are estimated to be \$405,000.

Initiative 1 – A Three-Year Vegetation Management Cycle for Distribution Circuits	
Current Plan	Updated Plan
1. All feeders are on a three-year trim cycle.	1. No change
2. Laterals are on a six-year trim cycle.	2. No change
3. Costs for 2013-2015 were \$2,718,000.	3. Costs for 2016-2018 are estimated to be \$2,940,000.

Initiative 2 – Audit of Joint-Use Attachment Agreements	
Current Plan	Updated Plan
1. (a) Perform pole strength assessment during the eight-year wooden pole inspection cycle	1. (a) No change
(b) FPUC conducts a thorough joint-use audit once every five years in addition to the eight-year pole inspection.	(b) No change
2. All required data collected during inspections and stored in a database.	2. No change
3. Verify attachments have been made pursuant to current joint-use agreements during the eight-year wooden pole inspection cycle.	3. No change
4. Stress calculations performed on select poles during eight-year wooden pole inspection cycle.	4. No change
5. Costs for 2013-2015 were \$0.	5. Costs for 2016-2018 are estimated to be \$0.

Initiative 3 – Six-Year transmission Inspection Program	
Current Plan	Updated Plan
1. Develop procedures for climbing inspections of Company-owned 69 and 138 kV structures.	1. No change
2. Substations are fully inspected at least once a year.	2. No change
3. Costs for 2013-2015 were not tracked.	3. Costs for 2016-2018 are estimated to be \$87,000.

Initiative 4 – Hardening of Existing Transmission Structures	
Current Plan	Updated Plan
1. Continue to replace wooden poles on 69 kV lines.	1. No change
2. Plan is ongoing with no completion date.	2. No change
3. Costs for 2013-2015 were \$2,392,000.	3. Costs for 2016-2018 are estimated to be \$750,000.

Initiative 5 – Transmission and Distribution Geographic Information System	
Current Plan	Updated Plan
1. FPUC’s plan includes forensic reviews.	1. No change
2. FPUC’s plan includes underground versus overhead.	2. No change
3. Plan includes determination of appropriate maintenance.	3. No change
4. Plan includes evaluation of storm hardening options.	4. No change
5. Currently being implemented.	5. No change
6. Costs for 2013-2015 were \$60,000	6. Costs for 2016-2018 are estimated to be \$62,100.

Initiative 6 – Post-Storm Data Collection and Forensic Analysis	
Current Plan	Updated Plan
1. FPUC has procedures developed to track all specific hurricane outages, post-storm data collection, and forensic analysis.	1. No change
2. Data is dependent upon storm events in FPUC’s service area.	2. No change

Initiative 7 – Collection of Detailed Outage Data Differentiating between the Reliability Performance of Overhead and Underground Systems	
Current Plan	Updated Plan
1. Collect outage data of overhead and underground facilities to evaluate reliability indices.	1. No change
2. Implementation is ongoing.	2. No change

Initiative 8 – Increased Coordination with Local Governments	
Current Plan	Updated Plan
1. Coordinate with local and county emergency service agencies within its service area. In addition, to provide personnel at county EOC's, during emergencies.	1. No change
2. Costs for 2013-2015 were \$0.	2. Costs for 2016-2018 are estimated to be \$0.

Initiative 9 – Collaborative Research	
Current Plan	Updated Plan
1. Collaborative research efforts, led by PURC, which began in 2007.	1. No change
2. Research vegetation management during storm and non-storm times, wind during storm and non-storm events, hurricane and damage modeling towards further understanding the costs and benefits of undergrounding.	2. No change
3. FPUC will solicit participation from other utilities and organizations.	3. No change
4. Implementation is ongoing	4. FPUC has entered into a Memorandum of Understanding with the University of Florida's PURC, which extends research through December 31, 2018.
5. Costs for 2013-2015 were \$3,000.	5. Costs for 2016-2018 are estimated to be \$3,000.

Initiative 10 – A Natural Disaster Preparedness and Recovery Program	
Current Plan	Updated Plan
Disaster Preparedness/Recovery Plan has been developed and filed.	Continue to refine.

Duke Energy Florida, LLC

Eight-Year Wooden Pole Inspection Program	
Current Plan	Updated Plan
1. Implement an eight-year wooden pole inspection cycle for distribution poles.	1. No change
2. File the progress of this inspection in the Annual Reliability Report.	2. No change
3. Costs for 2013-2015 were \$7,380,000.	3. Costs for 2016-2018 are estimated to be \$9,700,000.

Initiative 1 – A Three-Year Vegetation Management Cycle for Distribution Circuits	
Current Plan	Updated Plan
1. Implement a three-year average trim cycle for feeders with targeted feeder trims based on prioritization.	1. No change
2. Implement an average five-year trim cycle for laterals.	2. No change
3. Costs for 2013-2015 were \$100,600,000.	3. Costs for 2016-2018 are estimated to be \$104,700,000.

Initiative 2 – Audit of Joint-Use Attachment Agreements	
Current Plan	Updated Plan
1. (a) Perform a Comprehensive Loading Analysis and annual partial system audits.	1. (a) No change
(b) Audit all DEF-owned and joint-use poles during eight-year wooden pole inspection cycle.	(b) No change
2. All required data collected on select poles and stored in electronic format.	2. No change
3. Verify attachments have been made pursuant to current joint-use agreements.	3. No change
4. Stress calculations performed on select poles during eight-year wooden pole inspection cycle.	4. No change
5. Cost for 2013-2015 were \$1,380,000	5. Costs for 2016-2018 are estimated to be \$1,370,000.

Initiative 3 – Six-Year transmission Inspection Program	
Current Plan	Updated Plan
1. Inspection program is multi-pronged approach with inspection cycles of one, six, or eight years depending on the goals or requirements of the individual inspection activity.	1. No change
2. Annual substation inspections.	2. No change
3. Costs for 2013-2015 were \$62,560,000.	3. Costs for 2016-2018 are estimated to be \$68,360,000.

Initiative 4 – Hardening of Existing Transmission Structures	
Current Plan	Updated Plan
1. Incremental upgrades during relocations, replacement of existing wooden transmission pole, and other maintenance.	1. No change
2. Plan completed in 10 or more years starting in 2007.	2. No change
3. Costs for 2013-2015 were \$417,400,000.	3. Costs for 2016-2018 are estimated to be \$315,700,000.

Initiative 5 – Transmission and Distribution Geographic Information System	
Current Plan	Updated Plan
1. Plan includes forensic review.	1. No change
2. Plan includes underground system relative to overhead.	2. No change
3. Plan includes determination of appropriate maintenance.	3. No change
4. Plan includes evaluation of storm hardening options.	4. No change
5. Continue use of G-electric system	5. No change
6. Costs for 2013-2015 were \$810,000.	6. Costs for 2016-2018 are estimated to be \$810,000.

Initiative 6 – Post-Storm Data Collection and Forensic Analysis	
Current Plan	Updated Plan
1. DEF has forensic teams in place and will collect and analyze samples.	1. No change
2. Plan continues to be implemented as severe weather events occur.	2. No change

Initiative 7 – Collection of Detailed Outage Data Differentiating between the Reliability Performance of Overhead and Underground Systems	
Current Plan	Updated Plan
1. DEF’s Storm Preparedness Plan has been initiated.	1. No change
2. Implement in 2007. Storm performance results are obtained from DEF’s GIS.	2. No change

Initiative 8 – Increased Coordination with Local Governments	
Current Plan	Updated Plan
1. DEF focuses on year-round communication with local governments. In addition, DEF implements meetings to discuss city and county projects.	1. No change
2. Costs for 2013-2015 were \$0.	2. Costs for 2016-2018 are estimated to be \$0.

Initiative 9 – Collaborative Research	
Current Plan	Updated Plan
1. Collaborative research efforts, led by PURC, which began in 2007.	1. No change
2. Research vegetation management during storm and non-storm times, wind during storm and non-storm events, hurricane and damage modeling towards further understanding the costs and benefits of undergrounding.	2. No change
3. DEF will solicit participation from other utilities and organizations.	3. No change
4. Implementation is ongoing	4. DEF has entered into a Memorandum of Understanding with the University of Florida’s PURC, which extends research through December 31, 2018.
5. Costs for 2013-2015 were \$0	5. Costs for 2016-2018 are estimated to be \$0.

Initiative 10 – A Natural Disaster Preparedness and Recovery Program	
Current Plan	Updated Plan
Disaster Preparedness/Recovery Plan has been developed and filed.	Continue to refine.

Gulf Power Company

Eight-Year Wooden Pole Inspection Program	
Current Plan	Updated Plan
1. Implement an eight-year wooden pole inspection cycle for distribution poles.	1. No change
2. File the progress of this inspection in the Annual Reliability Report.	2. No change
3. Costs for 2013-2015 were \$6,236,000.	3. Costs for 2016-2018 are estimated to be \$7,044,000.

Initiative 1 – A Three-Year Vegetation Management Cycle for Distribution Circuits	
Current Plan	Updated Plan
1. Implement a three-year trim cycle on all main line feeders.	1. No change
2. Shorten the trim-cycle length on lateral lines to four years and reduce the emphasis on danger tree removal in residential areas.	2. No change
3. Costs for 2013-2015 were \$16,794,000.	3. Costs for 2016-2018 are estimated to be \$17,846,000.

Initiative 2 – Audit of Joint-Use Attachment Agreements	
Current Plan	Updated Plan
1. (a) Discontinue the pole strength assessment on 5% random sample.	1. (a) No change
(b) Audit all Gulf-owned poles and third party poles per Joint-Use contract agreements on a five-year cycle.	(b) No change
2. All required data will be collected and stored during the five-year inspection cycle.	2. No change
3. Verify attachments have been made pursuant to current joint-use agreements through a five-year cycle.	3. No change
4. Discontinue the 5% random sample due to low failure rates over the three-year pilot project.	4. No change
5. Cost for 2013-2015 were \$0	5. Costs for 2016-2018 are estimated to be \$300,000.

Initiative 3 – Six-Year transmission Inspection Program	
Current Plan	Updated Plan
1. Wooden pole inspection activities (PSC-06-0144-PAA-EI, Docket No. 060078-EI). All other portions of the system: Gulf does not hold itself to a rigid number of annual inspections. Period of 12 years will show that on average a six-year cycle is achieved.	1. No change
2. Substations inspected at least annually. Structures inside new substations built to withstand wind speed in excess of 150 MPH.	2. No change
3. Costs for 2013-2015 were \$663,000.	3. Costs for 2016-2018 are estimated to be \$726,000.

Initiative 4 – Hardening of Existing Transmission Structures	
Current Plan	Updated Plan
1. Install storm guy H-Frames. Replace wooden cross-arms with steel cross-arms and other activities.	1. No change (installation of storm guy on H-frame structures was completed in 2012).
2. Adhere to current design and construction standards using generally accepted engineering practices, in conjunction with the recommended six-year structure inspection program.	2. No change
3. Costs for 2013-2015 were \$26,139,000.	3. Costs for 2016-2018 are estimated to be \$29,933,000.

Initiative 5 – Transmission and Distribution Geographic Information System	
Current Plan	Updated Plan
1. Gulf's plan includes forensic reviews.	1. No change
2. Gulf's plan includes underground versus overhead.	2. No change
3. Plan includes determination of appropriate maintenance.	3. No change
4. Plan includes evaluation of storm hardening options.	4. No change
5. Data is currently being captured.	5. No change

Initiative 6 – Post-Storm Data Collection and Forensic Analysis	
Current Plan	Updated Plan
1. Distribution & Transmission: Concurrent with storm restoration, crews of contractors to survey a sample of lines affected by the storm. Inland and coastal areas to be surveyed.	1. No change
2. Costs for 2013-2015 were \$0.	2. Costs for 2016-2018 are estimated to be \$0.
Initiative 7 – Collection of Detailed Outage Data Differentiating between the Reliability Performance of Overhead and Underground Systems	
Current Plan	Updated Plan
1. Record number of overhead and underground customers and calculate SAIDI and SAIFI for each outage. As outages occur, collect data by type of buried cable and type of pole.	1. No change
2. Implementation is ongoing.	2. No change
Initiative 8 – Increased Coordination with Local Governments	
Current Plan	Updated Plan
1. Gulf plan builds on existing programs of years round activities like workshops with community leaders, pre-hurricane planning with participation in all local government hurricane preparedness drills, exercises, information fairs by line clearing specialists, and a standing Emergency Operations Center staffed 24 hours a day.	1. No change
2. Costs for 2013-2015 were \$0.	2. Costs for 2016-2018 were estimated to be \$0.

Initiative 9 – Collaborative Research	
Current Plan	Updated Plan
1. Collaborative research efforts, led by PURC, which began in 2007.	1. No change
2. Research vegetation management during storm and non-storm times, wind during storm and non-storm events hurricane and damage modeling towards further understanding the costs and benefits of undergrounding.	2. No change
3. Gulf will solicit participation from other utilities and organizations.	3. No change
4. Implementation is ongoing	4. Gulf has entered into a Memorandum of Understanding with the University of Florida’s PURC, which extends research through December 31, 2018.
5. Costs for 2013-2015 were \$92,177.	5. Costs for 2016-2018 are estimated to be \$96,000.

Initiative 10 – A Natural Disaster Preparedness and Recovery Program	
Current Plan	Updated Plan
Disaster Preparedness/Recovery Plan has been developed and filed.	Continue to refine.