

**Addendum to the July 2007
Report to the Legislature
On Enhancing the Reliability of
Florida's Distribution and Transmission Grids
During Extreme Weather**

**SUMMARY OF COMMISSION ACTIONS
May 1, 2007 - December 15, 2007**

**Submitted to the Governor and Legislature
To Fulfill the Requirements of Chapter 2006-230,
Sections 19(2) and (3), at 2615, Laws of Florida,
Enacted by the 2006 Florida Legislature
(Senate Bill 888)**

**Florida Public Service Commission
February 1, 2008**

Background

Chapter 2006-230, Sections 19(2) and (3), Laws of Florida, enacted by the 2006 Florida Legislature required the Commission to conduct a review to determine what should be done to enhance the reliability of Florida's transmission and distribution grids during extreme weather events, including the strengthening of distribution and transmission facilities. In July 2007, the Commission submitted to the Governor and Legislature its Report to the Legislature on Enhancing the Reliability of Florida's Distribution and Transmission Grids During Extreme Weather as a partial fulfillment of this requirement. The report covered a wide range of Commission storm hardening activities carried out from January 2006 through April 2007. Because a number of these activities are ongoing, the report stated that an addendum summarizing actions completed between May 1, 2007, and December 15, 2007, would be provided to the Governor and Legislature by February 1, 2008. Additionally, the Commission will provide a complete update by July 1, 2008, with recommendations for any needed legislative action.

Ongoing Activities

As part of the Commission's ongoing multi-faceted storm hardening efforts, further activity to enhance the reliability of Florida's transmission and distribution grids has continued during the period of May 1 - December 15, 2007, in the following areas:

- Annual electric industry briefing on hurricane preparedness
- Implementation of rules requiring storm hardening standards
- Adoption of utility tariffs promoting underground electric distribution facilities
- Collaborative university research on the costs and benefits of underground electric distribution facilities
- Assessment of annual distribution service reliability reports filed by investor-owned electric utilities

Annual Electric Industry Briefing on Hurricane Preparedness

On May 23, 2007, in response to the Commission's direction, electric utilities reported on their state of preparedness for the 2007 storm season at a public workshop. Each utility reported it was ready for the 2007 hurricane season and gave examples of actions taken including establishing staging sites, updating contracts with personnel and equipment suppliers, completing vegetation inspections of primary distribution circuits, completing annual emergency training and coordination exercises, and updating emergency response manuals and procedures. Investor-owned utilities also annually file a Distribution Service Reliability Report that includes information on implementation of the ten storm hardening initiatives previously approved by the Commission and discussed on page eight of this report.

Implementation of Rules Requiring Storm Hardening Standards

On February 1, 2007, Commission amendments to Rule 25-6.034, Florida Administrative Code (F.A.C.), Standard of Construction, became effective. The new rule requires each investor-owned utility (IOU) to file, for Commission review and approval, a comprehensive storm hardening plan with updates every three years. Pursuant to the rule, each utility's plan is required to address:

- (1) All prior Commission-ordered storm hardening initiatives
- (2) Compliance, at a minimum, with the National Electric Safety Code
- (3) The applicability of extreme wind loading standards for new and replacement distribution facilities
- (4) Mitigation of damage to underground facilities and supporting overhead facilities due to flooding and storm surge
- (5) Safe and efficient access for the installation and maintenance of new and replacement distribution facilities

The investor-owned utility storm hardening plans were filed on May 7, 2007. The plans included input from telecommunications and cable companies whose facilities are attached to electric distribution poles.

Evidentiary Hearing

On October 3-4, 2007, the Commission held an evidentiary hearing to review the investor-owned utility storm hardening plans. Public input and testimony was received, and cross-examination of expert witnesses on the content of each of the investor-owned utility storm hardening plans was conducted.

Embarq, Verizon, TCG South Florida, AT&T Florida, and the Florida Cable Telecommunication Association, Inc. (FCTA) were concerned about how electric utilities would treat third-party pole attachers and were granted intervenor status in the proceedings. During the hearing, the electric utilities and cable and telecommunications intervenors were able to resolve their concerns through a stipulated agreement called a "Process to Engage Third-Party Attachers," which the Commission approved. This process allows for the exchange of information between the parties and requires annual status reports to be filed with the Commission.

The Municipal Underground Utilities Consortium, the Town of Palm Beach, the Town of Jupiter Island, the City of Panama City Beach, and the Panama City Beach Community Redevelopment Agency (collectively, the municipalities) participated as intervenors in the Gulf Power Company and Florida Power and Light Company dockets. The municipalities asserted that neither company adequately considered undergrounding as a storm hardening technique. Based on the hearing evidence, the Commission determined that significant use of underground construction as a system-wide storm hardening option is cost prohibitive and noted that the Companies were coordinating with local governments to establish pilot projects to gather additional performance data for underground versus overhead construction.

The plans of Progress Energy Florida, Inc. (PEF), Tampa Electric Company (TECO), Florida Power & Light Company (FPL), and Gulf Power Company (Gulf Power) were ultimately approved by the Commission. With respect to Florida Public Utilities Company, the remaining investor-owned electric utility, the Commission will consider its storm hardening plan as part of its upcoming rate case proceeding.

Summary of Storm Hardening Plans

Each electric utility's approved plan contains the ten ongoing storm preparedness initiatives and pole inspection requirements previously approved by the Commission and discussed in the July 2007 Report. A short synopsis of each plan follows.

FPL's Plan proposes a three-prong approach to hardening its distribution infrastructure: proactive implementation of extreme wind loading¹ (EWL) construction standards for critical facilities; incremental hardening for commercial facilities that serve important roles following a storm; and revised design guidelines that are designed to move FPL's system toward overall EWL hardening gradually over time. All of FPL's transmission construction is designed using extreme wind loading criteria.

Gulf Power's Plan adopts Grade B² construction standards on all new distribution, construction, maintenance work and major distribution rebuilds. Gulf Power uses an EWL pilot project approach to determine the effectiveness of EWL on critical infrastructure facilities. All of Gulf Power's transmission construction is designed using EWL criteria. Gulf Power's Plan emphasizes learning from experience by gathering and evaluating storm forensic data to determine the benefits of particular approaches to hardening as they might be applied to new construction and major planned work, including expansion, rebuilding, and relocation of existing facilities. Undergrounding facilities is one of the potential damage mitigation techniques that Gulf Power indicates it will consider on a project specific basis.

PEF's Plan relies on the company's experience with Grade C and Grade B construction standards for distribution poles and the performance of these poles during prior severe weather events. PEF will analyze the extreme wind standard, along with other grades of distribution construction, and consider implementing it in selected locations. PEF estimates that 74 percent of its current distribution system already meets or exceeds Grade B construction standards. All new transmission structures are constructed using the National Electrical Safety Code (NESC) EWL criteria, as well as rebuilds, and relocations of existing facilities. PEF's Plan identifies multiple locations where various hardening projects will be undertaken for transmission and distribution facilities.

TECO's Plan continues the company's practice of building to the NESC Grade B construction for all new major planned expansions, rebuild, or relocation of distribution facilities. All new transmission structures are constructed using the NESC EWL criteria, as well as rebuilds and relocations of existing facilities. TECO's Plan also includes projects to upgrade its Grade B construction to extreme wind on the circuits serving critical facilities in the City of

¹ National Electrical Safety Code rule 250 C prescribes extreme wind loads associated with historical wind speeds recorded over the state of Florida ranging from 100-150 miles per hour.

² The National Electrical Safety Code Grade B construction withstands wind loads up to 116 mph, while Grade C construction withstands wind loads up to 85 mph.

Tampa, an upgrade to the transmission circuit feeding Tampa International Airport to extreme wind standards, and upgrades to specific targeted areas in its service area.

In approving each of the Plans, the Commission noted that the cost/benefit estimates provided by the electric utilities were nonbinding and subject to change, and that it expected each utility to prudently manage its resources and assets for the benefit of the general body of ratepayers. The actual expenditures resulting from the Storm Hardening Plans will be reviewed when cost recovery is requested.

Adoption of Utility Tariffs Promoting Underground Electric Distribution Facilities

Rule 25-6.0342, F.A.C.

On February 1, 2007, Commission amendments to Rule 25-6.0342, F.A.C., became effective, requiring each IOU to include the costs and benefits of storm hardening on maintenance and reliability in the calculation of contribution-in-aid-of-construction (CIAC) charged for placing new facilities underground and for the conversion of existing overhead facilities to underground. Several other rules were affected by this change. In addition, amendments to Rule 25-6.064, F.A.C., address the CIAC calculations for customer-specific construction to accommodate individual customer preferences.

Amended tariffs incorporating the new rule language without elaboration were filed by FPL, TECO and Gulf Power and approved by the Commission. PEF's proposed tariff amendments included a more detailed application of the rule language and were addressed formally in Docket No. 070327-EI. PEF serves many large rural areas that are more likely to require an extension of facilities to serve new customers. Because CIAC proration results in additional costs to PEF to administer the collections and refunds, the Commission approved PEF's proposal to impose an eligibility threshold for proration. Only those end-use customers who pay at least \$1,500 in CIAC charges and are served from the initial facilities by a service drop and meter are eligible for CIAC proration. On July 30, 2007, the Commission approved PEF's proposed revisions to its CIAC tariff in Order PSC-07-0605-TRF-EI.

Rule 25-6.078, F.A.C.

Rule 25-6.078, F.A.C., defining an IOU's responsibilities for filing updated underground residential distribution tariffs, was amended as part of the Commission's efforts to strengthen Florida's electrical infrastructure system. On October 16, 2007, the Commission ruled on a petition filed by FPL for approval of revisions to its underground distribution tariff. Three main factors impacted FPL's 2007 differentials: (1) a design change for the overhead high-density and grouped meter subdivisions, (2) increased transformer and material costs, and (3) increased labor costs. Increases in material and labor costs were higher for underground service than for corresponding overhead service. The Commission's new requirement that utilities place distribution facilities to the front of the customer's lot when possible resulted in the need for more poles and larger transformers for overhead service, which narrowed the cost differential for overhead and underground installations. The cost differential between underground and overhead installations for low-density subdivisions increased 27 percent from 2005 levels.

However, there was a 63 percent decrease in the cost differential between underground and overhead installations in high-density subdivisions.³

The Commission also approved changes to Gulf Power's underground residential distribution tariffs on October 16, 2007. The cost differential between underground and overhead installations for a standard low-density subdivision increased 23 percent from 2004 levels. There was a 9 percent increase in the cost differential between underground and overhead installations in high-density subdivisions. Gulf Power attributed the overall increase in the underground residential distribution differentials to increases in material and labor costs.

Pilot Program

In order to encourage the installation of underground facilities, on May 22, 2007, the Commission approved a pilot program that would allow FPL to include a 25 percent discount in its CIAC calculations for applications for conversions received from a local government. This 25 percent adjustment factor for undergrounding projects from eligible local governments is designed to represent expected storm restoration savings. At present, at least one city appears to be poised to sign an agreement under the pilot program. The Commission will review the effectiveness of the pilot program in October 2008.

Collaborative University Research on the Costs and Benefits of Underground Electric Distribution Facilities

As part of its storm-hardening initiatives, the Commission directed all electric utilities to participate in collaborative university research to develop and test methodologies to identify and evaluate the cost and benefits of underground distribution facilities and to study the effects of hurricane winds. In response, the five investor-owned electric utilities, the Florida Municipal Electric Association, and the Florida Electric Cooperatives Association (collectively, the Project Sponsors) established a non-profit, member-financed organization to coordinate all research efforts. The Public Utility Research Center (PURC), located at the University of Florida, facilitates this effort and coordinated the solicitation of competitive bids from consulting firms for the underground research program. The project was awarded to InfraSource Technologies (now Quanta Technology). The underground research program is structured in three phases. Upon completion of each phase, a summary report is filed with the Commission for its review. Collectively, these work-products will assist the Commission in developing a comprehensive planning tool to address the needs of utilities as well as local communities in promoting the undergrounding of electric distribution facilities.

Phase 1: Meta-Analysis

Phase 1 is an analysis of all previous quantitative research currently available. The results from the Phase 1 meta-analysis were provided to the Commission on May 7, 2007.

A literature review examined 61 documents such as consultant reports, state regulatory reports, municipal and international reports, system reliability monitoring, and property value

³ On November 6, 2007, the Municipal Underground Utilities Consortium and the City of Coconut Creek filed a protest and requested a formal hearing addressing FPL's residential and commercial underground distribution tariffs. A formal hearing has been scheduled for June 11-12, 2008 (Docket No. 070231).

studies. Costs, benefits, disadvantages, and funding were among the issues analyzed. Analysis of the research led to the following general observations:

- Undergrounding is not justified based on quantifiable benefits
- No state requires undergrounding of existing facilities
- Few studies address negative impacts
- Few studies consider strengthening existing overhead systems
- *Ex post* analyses on actual undergrounding projects have not been done
- Current storm system and equipment reliability models are not sufficient for developing a cost/benefit methodology

Phase 2: Case Studies

Actual case studies of overhead-to-underground conversions in Florida were examined during Phase 2. Four conversion projects were examined:

- Pensacola Beach (Gulf Power Company)
- Sand Key (Progress Energy Florida, Inc.)
- Allison Island (Florida Power & Light Company)
- County Road 30A (Choctawhatchee Electric Cooperative, Inc.)

The results from the Phase 2 case studies were provided to the Commission on August 6, 2007.⁴ A review of the projects substantiated the conclusions reached in the Phase 1 literature review. The initial cost to convert overhead distribution to underground is high, and there is insufficient data to show that this high initial cost is offset by quantifiable benefits such as reduced operating and maintenance cost savings and reduced hurricane damage. Increased data collection can potentially increase knowledge about the amount of quantifiable benefits, but these benefits will unlikely fully justify the high initial cost, except potentially in a situation where an underground system is struck by multiple severe hurricanes. Based on these case studies, by far the strongest reason for undergrounding is to improve the aesthetics of the area.

Phase 3: Development and Testing of a Cost/Benefit Methodology

The purpose of Phase 3 is to develop and test a cost/benefit methodology for use by both electric companies and local communities to identify and evaluate the costs and benefits of undergrounding specific facilities in Florida. The expected outcome is a detailed manual and a prototype computer model for estimating costs and benefits that can be used by any interested party. The methodology will account for, but will not be limited to, location-specific conditions, known properties of materials and methods used in undergrounding applications, lifecycle costs, public (social) and private costs of outages, reliability improvements, and conditions in Florida. Other considerations include diversity with respect to funding sources, such as grants and economic development initiatives. The Phase 3 final report is scheduled for completion by March 30, 2008. The Commission will include a complete evaluation of the undergrounding cost/benefit methodology in the July 1, 2008, report to the Governor and Legislature.

⁴ Undergrounding Assessment Phase 2 Report: Undergrounding Case Studies, prepared by InfraSource Technology, August 6, 2007.

Wind Research Project

In addition to the research into the cost-effectiveness of underground distribution, the Commission also directed Florida's electric utilities to participate in collaborative university research on hurricane wind effects. The wind research project is a long-term effort to collect data on hurricane force wind impacts on electric utility infrastructure (power distribution, housing, emergency facilities, etc.). The University of Florida and the Project Sponsors partnered with WeatherFlow to install equipment in key areas of the state to measure actual wind speeds during tropical storms and hurricanes. The wind network currently has 21 fixed weather stations that report data to an online database in real-time, 24 hours a day, 365 days a year. An interim report on the wind research project filed with the Commission on December 11, 2007, indicates there should be 50 functional stations in place throughout the state by the 2008 hurricane season.

Assessment of Annual Distribution Service Reliability Reports Filed by Investor-Owned Electric Utilities

Annually, by March 1, all investor-owned utilities are required to file a Distribution Service Reliability Report pursuant to Rule 25-6.0455, F.A.C. On July 31, 2006, the Commission adopted rules that changed the existing reporting requirements to include reliability data for extreme weather events such as hurricanes. The Commission determined that the most cost-effective method to monitor each utility's ongoing storm hardening initiatives is in conjunction with the Commission's annual review of distribution reliability performance. Prior reporting requirements allowed for the exclusion of reliability data that is typically related to power outage events that were outside the utility's ability to prevent. The expanded reporting requirements will now give insight into storm-related impacts on reliable electric service in Florida.

Review of the IOUs' reports for calendar year 2006 did not provide substantive insight at this time regarding the performance impacts of storm hardening because of the relative newness of utility storm-hardening programs and the negligible hurricane impact to Florida in 2006. Review of the data did reveal, however, some ongoing areas for reliability improvements, especially for Florida Power & Light Company and Gulf Power Company, resulting from stress to their distribution facilities from 2004 and 2005 hurricane events. These ongoing difficulties resulted in a slight decline in distribution reliability performance during 2006. However, these utilities continue to have the lowest number of reliability related complaints compared to other utilities.

Conclusion

Many of the storm hardening activities described in the Commission's July 2007 Report and the above addendum to that report are ongoing and will require continuing activity and review. The Commission will provide a complete update to the July 2007 Report, including recommendations for any needed legislative action, by July 1, 2008.

TERMS AND ACRONYMS

CIAC	Contribution-in-aid-of-construction
EWL	Extreme wind loading
F.A.C.	Florida Administrative Code
FCTA	Florida Cable Telecommunication Association, Inc.
FPL	Florida Power & Light Company
IOU	Investor-owned electric utility
MUUC	Municipal Underground Utilities Consortium
NESC	National Electrical Safety Code
PCB	The town of Palm Beach, the town of Jupiter Island, the city of Panama City Beach and the Panama City Beach Community Redevelopment Agency
PEF	Progress Energy Florida, Inc.
PURC	Public Utility Research Center located in the Warrington College of Business at the University of Florida.
TECO	Tampa Electric Company
URD	Underground Residential Distribution