

State of Florida



Public Service Commission

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

DATE: February 20, 2006

TO: Mary Andrews Bane, Executive Director

FROM: Division of Economic Regulation (Bremman, Jopling, D.Lee, Lewis, Matlock, McRoy, Ballinger, Kummer, McNulty, Trapp) *KL summary*
Office of the General Counsel (Helton) *WBN RLT JB*

RE: *Florida's Electric Infrastructure – Storm Hardening*
Critical Information: Please place on the February 27, 2006, Internal Affairs. Commission approval is sought for recommended actions.

On January 23, 2006, the Commission held a staff workshop to discuss damage to electric utility facilities resulting from recent hurricanes, to explore ways of minimizing future storm damage, and reduce outages to customers. State and local government officials, independent technical experts, and Florida's electric utilities participated in the workshop. On January 30, 2006, post workshop comments were received from the participants.

The purpose of this memorandum is to recommend specific short-term and long-term actions to prepare Florida's electric infrastructure to better withstand severe storms. Staff also addresses areas where legislation may be helpful to address storm ready electric infrastructure.

Summary of RecommendationsI) Recommended Short-Term Actions for the Investor-Owned Electric Utilities

- (1) June 5, 2006 Internal Affairs – Provide a Briefing on Hurricane Preparedness
- (2) On or Before June 1, 2006 – File Implementation Plans for Ongoing Storm Preparedness Initiatives that include:
 - (a) A Three-year vegetation management cycle for all circuits,
 - (b) A Transmission and Distribution Geographic Information System,
 - (c) Replacement of Wooden Structures with Concrete and Steel,
 - (d) Post-Storm Data Collection and Forensic Analysis,
 - (e) Audit of Joint-Use Pole Attachment Agreements,
 - (f) A Six-Year Transmission Inspection Program,

- (g) Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems,
- (h) Increased Utility Coordination with Local Governments, and
- (i) Collaborative Research Through PURC.

II) Recommended Long-Term Actions for the Investor-Owned Electric Utilities

- (1) Open a Docket to Investigate Measures to Withstand a Category 3 Hurricane.
- (2) Open a Docket to Investigate How to Facilitate Undergrounding of Distribution Facilities.

III) Legislation

- (1) Commission Oversight of Electric Reliability.
Clarify and strengthen the Commission's authority to adopt, implement, and enforce construction standards and follow-up inspections for transmission and distribution facilities for reliability purposes.
- (2) Tree Trimming within Public Road Right-of-Ways and Easements.
Increase the ability of electric utilities to conduct vegetation management in all public road right-of-ways and easements.
- (3) Tree Trimming outside of Public Road Right-of-Ways and Easements.
Increase the ability of electric utilities to work with local communities and private land-owners to conduct vegetation management on private property.

Attachment A to this memorandum is staff's recommendation and analysis. Attachment B is a summary of the post-workshop comments.

CC: Dr. Mary Bane
Chuck Hill
Tim Devlin

Florida's Electric Infrastructure – Storm Hardening

Introduction

On January 23, 2006, the Commission held a staff workshop to discuss the damage to electric utility facilities resulting from recent hurricanes, to explore ways of minimizing future storm damage and reduce outages to customers. State and local government officials, independent technical experts, and Florida electric utilities participated in the workshop. On January 30, 2006, post-workshop comments were received from the following participants: Florida Power & Light Company (FPL), Progress Energy Florida, Inc. (PEF), Tampa Electric Company (TECO), Gulf Power Company (GULF), the Town of Jupiter Island, the Town of Palm Beach, Dr. Kurtis Gurley (University of Florida), and Dr. Alex Domijan (University of South Florida). A summary of the post-workshop comments is included in Attachment B.

Staff Recommendation

Staff's recommendations address various key points discussed at the workshop and in the post-workshop comments. Focus is placed on three areas: Short-Term Actions, Long-Term Actions, and Legislation.

D) Recommended Short-Term Actions for the Investor-Owned Electric Utilities

Staff proposes two broad short-term actions. First, in preparation for the 2006 hurricane season, each investor-owned electric utility should be required to report its hurricane preparedness at the June 5, 2006, Internal Affairs. Second, on or before June 1, 2006, each investor-owned electric utility should be required to prepare and file plans implementing certain ongoing storm preparedness initiatives.

(1) June 5, 2006 Internal Affairs – Provide a Briefing on Hurricane Preparedness

Each investor-owned electric utility should report its pre-hurricane season readiness status at the June 5, 2006, Internal Affairs. This reporting should occur annually thereafter.

Utilities routinely perform various types of inspections after severe storms. However, based on comments received at the workshop, the thoroughness of each inspection is unclear. [TR 165, 166, 238, 239, 240, 242, 261, 262] In preparation for the June 5, 2006, Internal Affairs, each investor-owned electric utility should be required to complete and report on the following pre-hurricane preparation activities:

- (a) Inspect all transmission lines, poles, and towers to ensure their structural integrity. Specific inspections should be required for all bolts, insulators, lines, and structures.

(b) Re-inspect and clear all transmission and primary distribution feeder right-of-ways for dead or dying vegetation, hanging branches, and any vegetation that does not meet minimum clearance requirements.

(c) Verify that all sweeps and backlogged storm repairs to transmission and distribution facilities, structurally compromised facilities, and leaning poles have been completed.

(2) File Implementation Plans for Ongoing Storm Preparedness Initiatives

At the workshop, numerous initiatives contributing to improved storm preparedness were discussed by the investor-owned electric utilities, other workshop participants, and staff. Staff believes each investor-owned electric utility should be required to prepare and file plans implementing each of the initiatives identified below on or before June 1, 2006.

(a) A Three-year vegetation management cycle for all circuits.

An inescapable observation is that trees significantly contribute to storm damages. Intuitively, it would seem that utilities would be aggressively engaged in vegetation management.

A July 2005 audit of PEF's vegetation management found that the miles trimmed had declined during a period when tree-caused outages had increased. During the same period, PEF's targeted 3-year trim cycle was not being met. Staff's July 2005 audit of FPL's vegetation management program revealed similar patterns. A June audit of TECO's vegetation management showed an increasing pattern in vegetation-caused outages for the five years prior to 2005. Yet TECO's 2005 vegetation management budget was lower than in prior years. Consequently, staff believes the utilities have not demonstrated aggressive implementation of vegetation management to adequately prepare for future storms.

In its post-workshop comments, FPL stated that it would ensure a three-year clearing cycle for all main lines (feeders). Staff notes that trees exist in the proximity of other circuits, not just the main lines. Storm damages and storm restoration can be abated by clearing all circuits, not just the main lines.

Staff recommends utilities should be required to establish a plan that achieves a three-year vegetation management cycle for all its facilities. Staff bases the three-year criteria based on efforts by FPL and PEF to target a three-year cycle.

(b) A Transmission and Distribution Geographic Information System

During the workshop it became apparent that utilities need to do a better job keeping track of the facilities in the field. Utilities capture and maintain varying degrees of inspection data, vintage data, and other performance related data. Lack of performance

data makes it difficult conduct forensic reviews and assess whether appropriate maintenance is being performed.

GULF is implementing a transmission and distribution geographic information system. The information system will include facility specific data and performance data. GULF found that the information system improves its storm restoration process. [TR 264]

Staff believes that other utilities should adopt a program similar to GULF's. Staff recommends each investor-owned utility should be required to prepare and file plans implementing a transmission and distribution geographic information system.

(c) Replacement of Wooden Structures with Concrete and Steel.

Utility transmission practices are gradually replacing wooden structures with steel and concrete transmission structures. Even though utilities are no longer installing new wooden transmission poles, there remain many existing wooden structures that are now sub-standard.

In 1993, after Hurricane Andrew, FPL stated it was reconsidering use of wooden transmission structures. At the workshop, FPL stated it is replacing the wooden structures on a maintenance basis and whenever relocations occur. [TR 165] In 2001, PEF decided to begin replacing all of its wooden transmission structures with either steel or concrete construction.

Staff recommends that each investor-owned utility should be required to prepare and file plans implementing a program that replaces existing wood transmission structures with steel and concrete construction by a date certain.

(d) Post-Storm Data Gathering, Data Retention, and Forensic Analysis.

Utilities need to increase data collection and forensic analysis. FPL hired a consultant, KEMA, to conduct a post-Hurricane Wilma forensic review. KEMA's review discusses a lack of inspection data retention and lack of facilities specific data. Some portions of KEMA's review relied on interviews with FPL staff rather than records because FPL did not have maintenance records and facility specific data.

In its post-workshop comments, GULF stated it is initiating a detailed post storm data collection process to provide improved storm damage analysis. The post-storm data collection will be in addition to any existing data collection. Such data is expected to provide information associated with the failure of facilities during storms that is not currently gathered. Thus, GULF will be better able to address hardening options.

Staff recommends each investor-owned utility should be required to prepare and file plans implementing a detailed post storm data collection process to provide improved storm hardening options.

(e) Audit of Joint-Use Pole Attachment Agreements.

Representations were made by independent technical experts during the workshop that as much as 20 percent of pole attachments go undetected. It was also asserted that an estimated five percent of existing poles are overloaded and another 10 percent of existing poles are approaching overloading or are subject to failure in extreme weather. While these estimates were based on national data, they were not rebutted by the Florida electric utilities.

Staff recommends that the Florida utilities be required to establish a pole attachment audit plan to fully address the reliability of their joint-use facilities. These audits should include both poles owned by the electric utility to which other utility attachments are made (i.e., telecommunications and cable) and poles not owned by the electric utility to which the electric utility has attached its electrical equipment. 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. Utilities should verify that such attachments have been made pursuant to a current joint-use agreement. Stress calculations should be made to ensure that each joint-use pole is not overloaded or approaching overloading. Any disputes arising from the audit should be immediately filed with the Commission for expedited resolution.

(f) A Six-Year Transmission Inspection Program.

Based on information presented at the workshop and in recent Commission audits of utility programs, it is evident that transmission inspection practices vary widely among the investor-owned electric utilities. FPL practices a four-year cycle using a ten percent sample criteria for its 500 KV transmission system. KEMA, concluded that FPL's inspections were not sufficient to discover loose or missing bolts on transmission towers. In a July 2005 Commission audit of PEF's transmission pole inspection and maintenance programs, staff noted that PEF did not perform ground-line inspections on transmission poles from 1999 through 2004. A June 2005 audit of TECO's transmission inspection program noted that TECO performed few, if any, pole inspections from 2000 through 2003. While GULF completes at least one of the six types of transmission inspections within a six-year period, some types of inspections occur more frequently than others. Overall, the types of transmission inspections that GULF performs are scheduled such that, on a total basis, GULF completes all types of inspections on a 12-year cycle.

Based on this wide divergence of utility practices, staff is not convinced that current utility transmission facility inspections are adequate. Staff recommends the utilities be required to establish a plan that achieves a six-year transmission inspection program. Staff bases the six-year criteria in part on GULF's efforts to achieve at least one detailed inspection within a six-year period. Additionally, staff believes the critical nature of transmission facilities requires utilities to complete full inspections within a shorter period than the period established for distribution facilities. By Commission vote on February 7, 2006, in Docket No. 060078-EI, In Re: Proposal to Require Investor-Owned Electric Utilities to Implement a Ten-Year Wood Pole Inspection Program, the

Commission is requiring investor-owned electric utilities to establish an eight-year inspection cycle for wood distribution poles.

(g) Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems.

Utilities do not currently collect performance data that differentiates between overhead and underground facilities. Overhead and underground performance data is needed to adequately address options that reduce storm damage, storm restoration costs, and customer outages.

Staff recommends that each investor-owned utility be required to prepare and file plans implementing a program that specifically collects data on the performance of overhead and underground facilities such that informed review of hardening options can be performed.

(h) Increased Utility Coordination With Local Governments.

A key element in providing good service is knowing the needs and desires of your customers. While utilities have various public outreach programs, the workshop highlighted the need for better communication between the utilities and the cities and counties they serve. While utilities work with local governments prior to and immediately after a storm, staff believes that each utility should actively work with local communities year round to identify and address issues of common concern.

This point was raised by Mayor Anne Castro of the City of Dania Beach who suggested that a more integrated partnership between local governments and the utility could assist the utility in better serving its customers. Mayor Castro explained:

“We want to be the eyes and ears for FPL. We have offered ...[to]..train our public service people, our public safety people, especially after a hurricane or even on an ongoing basis during the year, as to what to look for in their infrastructure. If they could teach us what to look for as far as poles being bad or wires being bad or fuses hanging or loose ends hanging, our folks, as they routinely do this through code enforcement, through the fire department, through the police department, are happy to go out there and take a look. Even our citizens on patrol...turn in half of the code violations anyway...they can report all that, they can create a list...” [TR 20-21]

Staff agrees. The comments of Mayor Castro demonstrate the precise type of cooperative spirit that can help utilities target their resources to meet local needs and priorities.

The intent of such a liaison program is to establish an on-going dialogue on key issues with the goal of reaching some accommodation or agreement on how the utility and the governmental agency will work together to address concerns. One key role of the liaison

is to help local governments prioritize their needs, given the time and financial constraints associated with given actions.

There is already precedent for this level of cooperation with local governments. The Department of Community Affairs has developed a statewide local mitigation strategy which local governments adopt. Several of the proposals listed in the mitigation guidelines are easily adaptable and equally applicable to utility/government relationships. For example, the guidelines require local governments to provide a multi-hazard map of the community. This would identify flood zones and areas prone to wind damage, consistent with the discussions by Dr. Domijan, University of South Florida, and Dr. Gurley, University of Florida. The mitigation guidelines also cite the need for land use patterns and discussion on development trends provided by the Future Land Use and Coastal elements of the local comprehensive plans. The section on mitigation techniques notes the importance of identifying areas subject to repetitive damage from disasters. It cites the need to develop plans to protect critical functions and structures. In other words, electric utilities need to develop plans to provide service to critical functions and structures. All of these functions are best performed in conjunction with the local governments most familiar with local needs and tolerances. This type of information can only assist the utility in designing and operating its system in the most cost efficient manner. An example of improved dialogue with local communities is FPL's decision to use public right-of-way in its placement of underground facilities.

Staff recommends that utilities immediately begin discussions with the communities they serve. This would include discussing issues such as local flood areas or other specialized problems that might assist in determining whether undergrounding is a reasonable option for the locality. Using local knowledge of terrain and governmental restrictions such as tree trimming ordinances, the utility can better explain options for addressing vegetation management concerns.

(i) Collaborative Research Through PURC

During the workshop it appeared that the utilities were unaware of work being done by universities to study the effects of hurricane winds and storm surge within Florida. Each utility appeared engaged in independent efforts to gather their own data with little, if any, coordination of resources and information.

Staff believes Florida would be better served by consolidating utility resources through a centrally coordinated research and development effort. The purpose of such effort would be to further the development of storm resilient electric utility infrastructure and technologies that reduce storm restoration costs and outages to customers.

Staff believes that the Public Utility Research Center (PURC) in the Warrington College of Business Administration, at the University of Florida, is uniquely well-positioned to guide a coordinated research and development effort of this type. Staff recommends the Commission direct the utilities to meet with the appropriate PURC representatives to identify areas of collaborative research and required funding.

II) Recommended Long-Term Actions for the Investor-Owned Electric Utilities

The objective of the following long-term actions is to identify and establish a procedure for resolving key issues of fact and policy associated with hardening Florida's electric infrastructure.

(1) Open a Docket to Investigate Measures to Withstand a Category 3 Hurricane

Staff recommends the Commission establish a docket that focuses on hardening of overhead facilities. The docket will provide all stakeholders the opportunity to explore concerns and matters of policy such that the Commission can move forward with decisions are deemed appropriate related to hardening.

The docket should specifically investigate the effects on system robustness and cost of requiring electric transmission and distribution facilities to be constructed to withstand a Category 3 hurricane (wind speeds 111-130 miles per hour with a storm surge of 9-12 feet). Utilities should be required to provide individual analysis of system robustness and costs for each of the following cases:

1. Implementation of a Category 3 hurricane construction standard for all new overhead and underground construction,
2. Upgrade of all existing overhead and underground facilities,
3. Upgrade of existing overhead and underground facilities on a targeted basis such as geographic and critical needs, and
4. Upgrade of overhead and underground facilities through normal maintenance activities such as upgrades, relocations, during storm restoration, and end of life replacements.

The utilities should include the following in each of the above analyses:

1. The effect of hardening facilities on operation and maintenance costs,
2. The effect of hardening facilities on storm restoration costs, and
3. The effect of hardening on the cost differentials between overhead and underground construction. The cost differentials should include the differences in O&M costs between overhead and underground inclusive of hurricane restoration costs.

In addition to the above analyses, the utilities should be required to provide funding and billing alternatives. Funding and billing alternatives should address cost recovery for voluntary utility actions, recovery of costs incurred to address specific requests by local communities, and recovery of costs to harden transmission and distribution facilities.

(2) Open a Docket to Investigate How to Facilitate Undergrounding of Distribution Facilities

Staff recommends the Commission establish a second docket that focuses on underground facilities. The docket will provide all stakeholders the opportunity to

explore concerns and matters of policy such that the Commission can move forward with decisions deemed appropriate related to undergrounding.

The undergrounding docket should follow the hardening docket. The docket should investigate the effect on system robustness and cost of placing electric distribution facilities underground. Such docket should require utilities to provide individual analysis of system robustness and costs for each of the following cases:

1. Placing all new distribution facilities underground,
2. Conversion of all existing overhead facilities to underground facilities,
3. Conversion of existing overhead facilities to underground facilities on a targeted basis such as geographic and critical needs,
4. Conversion of existing overhead facilities to underground facilities through normal maintenance activities such as upgrades, relocations, and end of life replacements, and
5. Conversion of overhead primary feeders to underground primary feeders.

The utilities should include the following in each of the above analyses:

1. The effect on operation and maintenance costs,
2. The effect on storm restoration costs, and
3. The effect on the cost differentials between overhead and underground construction. The cost differentials should include the differences in O&M costs between overhead and underground inclusive of hurricane restoration costs.

In addition to the above analyses, the utilities should be required to provide funding and billing alternatives. Funding and billing alternatives should address cost recovery for voluntary utility actions, recovery of costs incurred to address specific requests by local communities, and recovery of costs to underground distribution facilities.

FPL's Recent Voluntary Actions

FPL voluntarily decided to reduce by 25 percent the contribution in aid of construction (CIAC) normally required for local government sponsored overhead-to-underground conversion projects. FPL's voluntary actions do not provide substantive and competent evidence on which the Commission can implement changes in policy that affects all investor-owned electric utilities and their customers in terms of cost and reliability. The existing policies, rules, and tariffs remain in effect until the Commission changes them. Staff notes that FPL's voluntary actions may be in tension with Rule 25-6.064(11), Florida Administrative Code, which states in part "if the utility waives the CIAC, the Commission will reduce the utility's net plant in service by an equal amount for ratemaking purposes." The longstanding practice has been to avoid including such costs in future rate proceeding because including such costs will result in the general body of ratepayers paying for a portion of the costs of a specific undergrounding project. The prudence of FPL's actions and policy considerations should be addressed if and when FPL seeks recovery of incurred costs.

The two dockets previously discussed will help determine whether policies and rules need to be changed. The sequential process of both dockets will provide the appropriate basis to establish comprehensive policies and rule changes necessary to prepare Florida's electric infrastructure to better withstand severe storms.

III) Legislation

(1) Commission Oversight of Electric Reliability

For the purposes of reliability, the Commission should support legislation that clarifies, with express authority, the Commission's jurisdiction to adopt and enforce construction standards and subsequent inspections that meet or exceed the National Electric Safety Code (NESC) for investor-owned electric utility transmission and distribution facilities.

Currently, each utility develops its own construction guidelines using the NESC standards as the underlying guide. There is no evidence of a central coordinating body that sets or reviews Florida's electric utility construction standards. [TR 269, 270] In reference to the NESC, Section 366.04(6), Florida Statutes, states "compliance with the minimum requirements of that code shall constitute good engineering practice by the utilities." Nevertheless, staff notes apparent consensus that, in light of a more active hurricane cycle, Florida needs to review and possibly change the minimum acceptable construction standards of the investor-owned electric utility transmission and distribution facilities. [TR 102, 103, 109] Staff believes Section 366.04(5) and (6), Florida Statutes, provides the Commission with implicit authority to set construction standards for reliability purposes. Staff believes express legislative authority will clarify the existing implicit authority and facilitate setting public policies regarding minimum construction standards for Florida investor-owned electric utility infrastructure. For purposes of reliability, staff believes the Commission should support legislation that clarifies the Commission's jurisdiction to adopt and enforce construction standards that meet or exceed construction standards of the NESC for investor-owned electric utility transmission and distribution facilities.

(2) Tree Trimming within Public Road Right-of-Ways and Easements

The Commission should support legislation that would strengthen a utility's ability to trim trees along public road right-of-ways and easements where electric transmission and distribution facilities are located.

The investor-owned electric utilities unanimously advocated for greater authority for them to trim and remove trees. Staff agrees. During the workshop, vegetation management was identified as a primary cause of hurricane damage. [TR 107, 161] Dania Beach Mayor Castro indicated that people plant trees in the wrong place and sometimes the trees are not maintained. [TR 18] Utilities should have wide latitude and authority to perform tree trimming in public areas in order to decrease hurricane damages. Staff believes the Commission should support legislation that would strengthen

a utility's ability to trim trees along public road right-of-ways and easements where electric transmission and distribution facilities are located.

(3) Tree Trimming outside of Public Road Right-of-Ways and Easements

The Commission should support legislation that would encourage local communities and private land-owners to work with utilities to increase a utility's ability to conduct vegetation management, including condemnation of "danger trees," outside the public road right-of-ways or easements.

Private property rights are important. There is a difference between trees in public road right-of-ways and trees on private property. Of specific concern to the utilities are tall trees, outside of the right-of-ways and easements, that are in proximity to overhead power lines. These tall trees are considered "danger trees" because storms can cause the tall trees to fall into or onto utility facilities. [TR 108, 223, 228] Increased dialogue between local communities, the private land-owners, and the utility may address many of these "danger trees." There may be a need for a specific legal process which provided for an objective ruling should dialogue not be effective. In such cases, a specific condemnation procedure can address "danger trees" where agreement cannot be reached.

Florida's Electric Infrastructure – Storm Hardening
Summary of Post-Workshop Comments

I) Short-Term Actions

FPL Complete post-hurricane repairs and targeted facility upgrades to rehabilitate and strengthen the electric infrastructure in order to prepare for the 2006 hurricane season.

Modify our existing pole inspection, treatment and replacement program to include a systematic ten-year inspection and treatment cycle for all distribution wood poles, including those poles owned by other utilities, in order to proactively address any identified pole deficiencies (consistent with recent FPSC staff recommendations) and work with other utilities to address joint use issues pertaining to loading.

Promote undergrounding by investing 25% of the cost of local-government sponsored overhead-to-underground conversion projects otherwise borne by the requesting locality and facilitating local undergrounding projects by allowing underground conduit and cable, and associated above-ground transformers and switch cabinets to be placed in road right-of-way under specific standards and agreements.

Enhance vegetation management initiatives by (a) accelerating main line (feeder) clearing to complete 75% of each year's planned line clearing work before the peak hurricane season, (b) completing line clearing for circuits serving top critical infrastructure facilities (CIFs) prior to hurricane season 2006 and prior to every hurricane season thereafter, (c) ensuring a 3-year line clearing cycle for all main lines (feeders), and (d) aggressively promoting our "Right Tree – Right Place" program to educate communities and improve shared responsibility with customers regarding the placement, removal, species and type of trees in proximity to power lines.

PEF The Commission should consider initiating and funding a pilot program under which utilities would study the feasibility of new technologies, including the limited installation of certain new technologies on utilities system.

The Commission and the Legislature should consider funding a study with the University of Florida and University of South Florida to identify potential T&D system "hot spots" that may warrant additional hardening or underground.

TECO Tampa Electric will initiate dialogue with each of the local governments in its service area to discuss the feasibility of developing an effective program for assistance in infrastructure review.

Tampa Electric will develop similar materials as GULF to assist its customer in making decisions with respect to undergrounding.

GULF Gulf Power Company is constructing an interim emergency operations center (EOC) to be used during the 2006 storm season. This interim EOC will be used in the event of a hurricane producing a storm surge the height of that seen during Katrina.

GULF's Transmission system restoration plan will be supported by Southern company's *Transmission Emergency response Plan* (TERP). The TERP will be developed and maintained to serve as restoration guidelines to consistently provide a quick response and proper coordination of emergency restoration efforts.

Prior to each storm season, patrol and correct problems on main circuits serving essential facilities.

GULF will install storm guying for new installations of regulator stations and transformer bank poles where practical.

Begin collaborating with independent weather services and universities to determine areas most vulnerable to storm surges. This effort will address the need for updated and more accurate "slosh" (Sea, Lake and Overland Surges from Hurricanes) models to show possible storm surge scenarios and the impacted transmission and distribution facilities.

GULF will continue its 10 year cycle on distribution pole inspection. In addition, through the Pole Manager software implemented in 2005, GULF will improve pole data collection and from such data begin development of accurate pole maps.

GULF will conduct a pilot program for stainless steel flush mounted switch gear; utilize existing land topography and buildings to help shield pad mounted equipment from storm surges; and modify pad designs to incorporate anchoring.

GULF will implement a pilot program incorporating the use of secondary spool racks. This pilot will evaluate how damage could be mitigated to overhead transformer stations when trees or other debris impact overhead service drops.

GULF will initiate a detailed post storm data collection process to provide improved storm damage analysis and data collection. This process would be in addition to GULF's current restoration process, which it finds to be very effective. It is essential that the new data collection process be conducted as a parallel process that would not hamper the existing restoration process.

Towns (Recommended changes to rules are not considered short term for purposes of this analysis.)

Universities (None recommended.)

II) Long Term Actions

FPL Harden the electrical infrastructure by (a) adopting NESC extreme wind velocity zone criteria as the standard for all new distribution construction and system upgrades (up to 150 mph in certain areas) using construction methods such as undergrounding, stronger poles (including concrete poles where appropriate), shorter spans, guying, etc., (b) upgrading existing overhead main lines (feeders) initially targeting those serving top critical infrastructure facilities and major thoroughfares within the first five years, with the objective of applying NESC extreme wind-loading criteria where feasible and practical, and (c) replacing targeted components of remaining transmission and substation facilities constructed under legacy standards -- all as part of a comprehensive, detailed ten-year hardening plan for distribution, transmission and substation infrastructure.

PEF The Commission should consider initiating and funding a pilot program under which utilities would study the feasibility of new technologies, including the limited installation of certain new technologies on utility's system.

The utilities, working with all stakeholders, should undertake a detailed study to identify specific T&D system hardening "toolboxes" and "roadmaps," which could include targeted underground conversion projects, wood transmission pole replacements, and other promising new technologies, as well as evaluation of specific tools most applicable to specific local conditions, the costs, and benefits to all stakeholders of implementing the roadmap, and the funding mechanisms for the roadmap.

TECO The Commission should include electric, cable and telephone companies in dialogue to consider the following: (1) the options for placement of telephone and cable infrastructure if electric facilities are relocated underground; and (2) the options for eliminating unauthorized and unnoticed attachments to electric poles.

During the workshop a presentation was made by the Homac Companies of new electric products which may prevent storm damage. Tampa Electric proposes to design an experimental program of installation of an appropriate sample of such devices and to test the effectiveness of damage mitigation and long term day-to-day reliability under normal operating conditions.

GULF Construct a new permanent Emergency Operating Center incorporating the best design features seen in other EOCs along with the latest technology. This facility will be located further inland than the current EOC. This relocation is based on the valuation of current facility locations against storm surges similar to those seen in the impact zone of Hurricane Katrina.

GULF will use the “slosh” maps developed under the short term solutions to evaluate hardening options for facilities located in the identified most vulnerable areas.

In an effort to capitalize on opportunities to apply solutions to “hardening” distribution facilities from storms, GULF will expand its current planning processes to facilitate cooperative efforts with local governments.

Where practical, GULF will install storm guying for regulator stations and transformer bank poles on existing installations.

Endeavor to develop infrastructure maps showing all utilities [overhead and underground] to facilitate joint “hardening” options where needed. This will have to be a collaborative effort among all utility companies in GULF Power’s service area.

Collaborate with fellow IOU’s to develop and evaluate a “hardening road map” for transmission and distribution facilities.

GULF is continuing the development of a Distribution Geographic Information System (DistGIS) which will replace its existing mapping system. The new application has the ability to hold and query more detailed data (i.e. pole and structure GIS locations) on the transmission and distribution system.

Seek the collaboration of universities on our research. GULF will establish a single point of contact to lead this effort with universities, with Georgia Tech’s National Electric Energy Testing Research and Applications Center (NEETRAC) and with the Southern Company Distribution Research Advisory Team (DRAT).

Towns The present situation where most distribution poles are apparently designed for between 60 MPH winds and 90 MPH is not adequate to avoid

unacceptable outages in Category 1-2 conditions, and is obviously not adequate for more powerful storms.

The Commission should amend its rules, and require Florida's public utilities to amend their tariffs, to require that the cost of "hardened" [overhead] OH facilities be used as the basis for determining the utility-funded amount in developing CIAC for underground (UG) conversion and new UG installation costs.

The Commission should also mandate that operating and maintenance cost savings, e.g., avoided tree-trimming costs, be reflected in the calculation of CIACs for new UG installations and for UG conversion projects.

The Commission should also require that appropriate values for avoided hurricane restoration costs be included in determining UG CIACs.

The Commission should evaluate and encourage the "hardening" of UG facilities, e.g., by the use of waterproof switches, switch cabinets, and other facilities.

The Commission should prohibit public utilities from including indirect and general costs, other than the normal hourly-rate costs for "reviewing and inspecting" UG construction work in progress to ensure compliance with codes and utility construction standards, in applicant costs where an applicant local government does the installation of the UG facilities itself.

The Commission should also consider at least the value of lost goods, food, and medicine, as well as lost economic productivity, to all Floridians in formulating its policies for improving and enhancing the reliability of Florida's electric distribution system.

Universities It is recommended to monitor common weather, severe weather and interruptions to locate areas of concern and determine correlations with the electrical grid. This should be done for both underground and overhead systems. Grid hot spots may first be determined in the short term by evaluating the effect of common weather (and for severe weather, such as hurricanes, as they pass over parts of Florida) with variations in interruptions due to temperature, rain, humidity, lightning, wind, and pressure. All weather factors must be considered as each one individually or in combination affect power system elements (substations, transformers, relays, communications, etc) to a different extent. Once this is accomplished it becomes feasible to provide advance warnings of problem areas and predictive tools to solve interruption issues in advance of adverse weather patterns, develop appropriate vegetation management strategies, and provide guidance on manpower and reserve equipment needs for fast restoration of electrical service to the citizens of Florida.

Develop the Protect Florida Now Electrical Grid Initiative to provide collaborative interactions via a public information sharing, monitoring and grid restoration. The Protect Florida Now Electrical Grid initiative may include regular outreach programs (educational workshops, courses, briefing papers, conferences), testing facilities (wind tunnel, field weather stations at utility locations, reliability evaluations, field monitoring of electrical conditions), and formation of a central database with on-going monitoring of weather patterns, interruptions, determination of electrical grid system hot spots, modeling and forecasting of potential problem areas and development and comparison of solutions.

The Power Center for Utility Explorations with the Florida Coastal Monitoring Program, coordinate and provide relevant testing, monitoring, reporting and modeling capabilities in collaboration with the Florida PSC and utilities, and other partners from the state university systems of Florida.

III) Legislation

FPL Legislation that would regulate and enforce the species, type, placement and removal of trees and vegetation in proximity to electric facilities, and enhance utility rights of access to property to clear lines through local code enforcement assistance.

Promote undergrounding by aggressively encouraging local ordinances and legislation requiring developers to provide underground electric service for all new subdivisions, developments and projects.

PEF Utilities need greater authority to trim and remove trees. Legislation should be introduced this year that would: (1) preempt local government tree-trimming ordinances that allow tree planting in conflict with utility infrastructure; (2) expressly authorize utilities to condemn for danger trees; and (3) allow tree-trimming to NESC standards and preempt inconsistent local ordinances. These relatively simple steps will allow for additional hardening of the system.

Changes to the Federal Communications Commission policies regarding attachments to utility poles without the prior authorization by the utility.

The Commission and the Legislature should consider implementing new incentives to foster underground conversions. These should include:

- State and/or local fees collected on utility customer bills that the utility sets aside to cover the cost of targeted undergrounding projects.
- Tax incentives to assist in funding underground projects.
- Promoting special purpose financing vehicles to privately finance undergrounding projects.

- Implementing a state tax to fund undergrounding projects in identified system “hot spots”.
- Establishing special taxing districts in which local governments within the district may join to raise funds for undergrounding projects.

TECO The Commission should support legislation which grants priority to cost-effective utility vegetation management programs over local tree ordinances and which prevents planting of vegetation which will likely interfere with electric infrastructure.

The Commission should support legislation providing funding for the production of more detailed flood zone maps with improved granularity and detail which will be very helpful in emergency management and utility infrastructure planning.

The Commission should support legislative action to provide funding to the Commission for the purpose of hiring experts and managing the employment contract to provide: (1) a detailed meteorological study, and (2) an electric utility transmission and distribution infrastructure study to identify available cost-effective options to harden electric infrastructure to withstand severe weather conditions. The objective of the study would be an assessment of current design standards from a durability standpoint and development of a road map for the cost-effective implementation of prospective design standards. The studies would be presented for review by the Commission, taking into account comments by all interested parties. The end result of this process would be a final report based on the experts’ findings and the interested parties’ comments submitted by the Commission to the Governor and Legislature.

The Commission should include electric, cable and telephone companies in dialogue to consider whether the Commission should seek jurisdiction from the Legislature to regulate pole attachments.

GULF Requests governmental assistance with the following: Increasing the ability of utilities to conduct vegetation management activities outside the road right-of-way or easement when necessary to eliminate vegetative conditions that pose a hazard to power lines and discouraging the planting of trees outside of the right-of-way or easement that, when mature, could grow into or fall into a power line.

Towns None recommended.

Universities None recommended.