

Florida Case Study on Hardening of the Grid And Additional Factors to Consider

By Cindy Miller and Brian Treby

In this article, we take a look at the steps Florida took to harden the grid after some intense hurricanes. We believe these steps may be useful to other states facing issues with major storms. In addition, we explore some climate change impacts and some economic justice issues.

In July 2018, the Florida Public Service Commission issued a report, “Review of Florida’s Electric Utility Hurricane Preparedness and Restoration Actions,” which tells the story of how Florida took steps to improve the adequacy and reliability of the state’s electric transmission and distribution grids. To promote strengthening of Florida’s electric infrastructure and to reduce the frequency and length of outages following the intense 2004 and 2005 hurricane seasons, the Commission adopted extensive storm hardening initiatives, such as wooden pole inspection and replacement. The Commission ordered investor-owned electric utilities (IOUs) to file updated storm hardening plans for Commission review every three years.

These initiatives and the utilities’ hardening plans have been the roadmap for aggressively improving resilience during the past decade or so. There were four hurricanes of 2016-2017, making those storm seasons the an opportunity to gather performance data.

The utilities suggested improvements such as targeted undergrounding projects for certain lateral circuits and additional coordination and communication regarding vegetation outside of the utilities’ rights of way. Non-utility stakeholders, including local governments, suggested increase coordination and more utility staffing at local Emergency Operations Centers (EOCs).

Key findings

- Florida's aggressive storm hardening programs are working.
- The length of outages was reduced markedly.
- Hardened overhead distribution facilities performed better than non-hardened facilities'
- Very few transmission structure failures were reported.
- Underground facilities performed much better compared to overhead facilities.
- Rising customer expectations are that resilience and restoration will have to continually improve.
- The primary causes of power outages came from outside the utilities' rights of way, including falling trees, displaced vegetation and other debris.
- Vegetation management outside the utilities' rights of way is typically not performed by utilities due to lack of legal access.
- In some instances, following Hurricane Irma, estimates of restoration time proved inaccurate, and consumer communication systems were overwhelmed.
- Some local governments see a need for better coordination and communication with utilities during and after storms.

Commission Actions:

- In 2018, the Commission directed staff to do the following:

--- Open storm hardening plan review dockets for all 5 investor-owned utilities (IOUs) and begin collecting additional details related to:

Meetings with local governments regarding vegetation management and the identification of critical facilities;

Review of utility staffing practices at local emergency operations centers;

Planned responses to roadway congestion, motor fuel availability and lodging accommodation issues.

Alternatives considered before selecting a particular storm hardening project;

The collection of more uniform performance data for hardened versus nonhardened and underground facilities, including sampling data where appropriate;

The impact of non-electric utility poles on storm recovery;

Begin collecting data related to the targeted undergrounding projects of FPL and Duke Energy Florida as part of the staff's annual distribution reliability review.

Initiate a management audit to examine the procedures and processes used by the IOUs to estimate and disseminate outage restoration times following a major storm; Initiate a management audit to examine the procedures/processes used by the IOUs to inspect and schedule maintenance on transmission structures.

The Commission also identified several issues that the Legislature may consider, such as a revision of management policies to improve the ability of electric utilities to conduct vegetation management outside of rights of way to reduce outages and restoration costs; possible legislation to require inspection and hardening of non-electric utility poles; enhanced statewide public education regarding tree trimming; implantation of emergency procedures regarding roadway congestion, motor fuel availability, and lodging accommodations for mutual aid personnel.

The 2006 Order. The Commission ordered IOUs to inspect wooden poles every eight years to assure weakened ones are replaced, and to implement 10 storm preparedness initiatives:

- Three year vegetation management cycle for distribution circuits;
- Audit of Joint Use Attachment Agreements (shared use of poles with telecom)
- 6 year Transmission Structure Inspection Program;
- Hardening of Existing Transmission Structures;
- Development of Transmission and Distribution Geographic Information System;

- -Collection of Post-Storm Data and Forensic Analysis;
- Collection of Detailed Outage Data Differentiating Between the Reliability Performance of Overhead and Underground Systems.
- Increased Utility Coordination with Local Governments
- Collaborative Research on Effects of Hurricane Winds and Storm Surge
- Development of Natural Disaster Preparedness and Recovery Program Plans

Storm Hardening Cost Recovery

While an IOU'

A storm hardening plan must be approved by the Commission, this does not guarantee an IOU the recovery of all incurred costs for the implementation of the plan. Storm hardening costs are addressed during an IOU's general rate case proceeding, and those costs are covered in base rates since they are considered a part of providing electric service in Florida. During a general rate case, the costs for storm hardening are taken into consideration and the Commission makes a ruling on whether the costs were prudently incurred.

Review of Outage Restoration Activities

Restoration Process

This is a year-round activity. Many utilities across Florida engage in exercises that simulate storms in order to better prepare for an actual hurricane or other significant weather event.

Before a storm makes landfall, an assessment of potential damage is completed by utilities based on the forecasted path of the storm. This information can be used to determine if mutual aid and additional material resources should be requested.

As the storm approaches, repair activities will continue until winds reach 35-40 miles per hour, at which time crews will be called back for a stand-down period. Once winds drop below 35-40 miles per hour and weather conditions are

considered to be safe following a storm, utility crews are re-deployed to continue the restoration process.

Once the storm has passed, a post-storm damage assessment is completed, where utilities can establish what facilities have been damaged, refine restoration time estimates, manage workloads, and allocate resources to where they are needed. Substations and feeders that provide critical infrastructure are prioritized first in order to get those necessary facilities back in service.

Feeders that serve the largest number of customers are restored next, and finally laterals that serve neighborhoods with fewer customers are repaired and restored. Overall, utilities strive to restore as many customers as possible in the shortest amount of time.

Outage Causes

Data collected from 39 utilities identified that the biggest source of outages was vegetation issues. Many utilities described that these issues were from fallen trees or branches that were outside of the utilities' rights of way where utilities typically do not have a legal access to perform vegetation management.

According to the Commission report, proactive tree trimming has been a key initiative of the Commission and the results of the review indicate that vegetation continues to be a primary cause of damage and outages.

Mutual Aid

Many mutual aid agreements among IOUs throughout the country are managed by seven Regional Mutual Assistance Groups (RMAGs). Florida's IOUs are members of the Southeastern Electric Exchange RMAG. RMAGs facilitate the process of identifying available restoration workers and help coordinate the logistics to help with restoration efforts.

IOUs that are in RMAGs follow guidelines established by the Edison Electric Institute (EEI) and also establish additional guidelines that aid in the

communication process and rapid mobilization and response efforts. EEI also communicates regularly with the associations that serve municipalities and cooperatives during major outage incidents.

The American Public Power Association (APPA) together with state and regional public power utilities and organizations, coordinate the mutual aid network for the nation's public power utilities.

Section 252.40, Fla. Statutes, Mutual Aid Arrangements, authorizes the governing body of each political subdivision of the state "to develop and enter into mutual aid agreements within the state for reciprocal emergency aid and assistance in case of emergencies too extensive to be dealt with unassisted." Mutual aid plays a key role in restoring the power quickly.

Storm Restoration Cost Recovery

Storm hardening costs incurred to make the system less vulnerable, are covered by the base rates the utility is authorized to charge. Storm restoration costs, incurred in response to a specific storm, are addressed differently and not covered by base rates.

Following Hurricane Andrew in 1992, the Commission took a three part approach:

- A storm damage reserve.
- An annual storm accrual
- A provision to seek recovery of costs that exceed the storm damage reserve balance.

Under the three-part system, cost recovery of storm related damage is typically addressed through a storm damage reserve, a surcharge, or a combination of the two.

In order to define what type of costs can be recovered, the Commission adopted Rule 25-6.0143, Fla. Admin. Code, which specifies that only incremental costs – those above the normal costs that are covered by rates – can be charged to the storm reserve or recovered in a storm cost recovery proceeding. The largest incremental storm cost categories typically include repair materials, added payroll/overtime, contracted crews, travel, housing and food.

In the event that the storm reserve is depleted from a major storm or multiple storms, or if a utility does not have a storm reserve, an IOU can request an interim storm surcharge added to the customer rates for a specific period based on an estimate, pending a thorough accounting. Upon request by the IOU, the Commission docket the matter for a formal process to determine actual eligible costs when they are available.

Revenues collected with the interim storm charge are compared to the total actual amount of storm restoration costs determined to be eligible. Expenses that exceed what the interim charge generated are recovered in rates, or excess interim charge revenues are flowed back to customers.

The utilities reported on their storm hardening performance. These were labelled forensic analysis reports.

Customer Communication

The Commission report states that communication issues were a notable source of customer dissatisfaction during Hurricane Irma. Customers particularly complained of inaccurate restoration projections and unavailability of overwhelmed utility websites and apps.

The Commission opened a customer portal on its website, allowing customers to submit comments regarding their reaction to utility restoration/communication efforts. The most prevalent topics discussed in customer comments were: support and encouragement of solar, cost responsibility for restoration, frustration with timely communications, tree trimming, and effectiveness of hardening.

The Commission also sought comments from non-utility stakeholders, which included Associated Industries of Florida, the Florida Chamber of Commerce, the Florida Association of Counties and the Florida League of Cities. The comments provided were on the topics of vegetation management, undergrounding, and coordination and communications.

Regarding vegetation management, the comments mainly focused on improving communication between stakeholders and utilities on where and when tree trimming occurs, as well as better educating the public on tree trimming. While the comments on undergrounding varied, many voiced a positive position on undergrounding, although there were differences in opinion on cost responsibility. Last, the comments on coordination and communication largely concentrated on more involvement from utilities at local Emergency Operations Centers, in addition to improving post-event information and power restoration time estimates.

Commission Actions

At the conclusion of the report, the Commission set out certain actions relating to review of utilities' vegetation management, identification of critical facilities and the staffing practices at the Emergency Operations Centers. Also, staff were advised to collect more data and seek more information on matters of underground facilities and more.

Conclusion

In conclusion, we believe the Florida Public Service Commission took actions that might be helpful to other regulators as major storms increase. In a future article, we will be exploring other steps that might be taken for ore resilience.