

Augmenting Resilient Energy Infrastructure

Initiative Summary Statement:

Work across sectors to improve the resilience and reliability of energy infrastructure to reduce power outages and operating costs.

Initiative Description:

Objective: Prioritizing resilient energy infrastructure projects and employing new technologies and mechanics is vital to supporting safe and reliable restoration and production of power following disruption. At the height of Hurricane Ian's landfall in Southwest Florida, approximately 2.7 million households were without power, primarily due to local distribution in neighborhood. Major high-tension and distribution lines sustained little damage and were available after initial inspections. One possible priority project is employing new technologies through infrastructure hardening – which proved successful in several locations following Ian's landfall¹⁸. Different communities require different approaches. The County will work to produce an updated, cross-jurisdictional view of energy resilience priorities, utilizing past disaster experiences and modeling. Additionally, stakeholders will work across sectors and continuously identify funding gaps and explore pathways to achieving priority work as recovery funding allows projects to be initiated.

Safeguarding can be achieved in some locations through burying power lines underground, where they are less vulnerable to high winds, strengthening poles with concrete, and implementing other inventive hardening solutions. Increasing local generation, such as hardened waste-to-energy facilities, increases local energy resiliency. County waste-to-energy facilities were operating within 48 hours. However, this option may not always be a solution where saltwater corrosion is a concern.

Additional projects and opportunities may include aligning planning and mitigation priorities at the local and regional levels, increasing coordination through permitting and easements, and mapping vulnerabilities and critical infrastructure. Using solar or other

¹⁸ Taylor, A. (2022, October 16). Most Floridians got power back quickly after Ian. but for some the wait has just begun. Retrieved April 7, 2023, from <https://www.washingtonpost.com/nation/2022/10/14/hurricane-ian-power-outages/>.

forms of renewable energy may also further build resilience in the energy grid which could improve and shorten restoration and recovery times.

Need: Resilient energy infrastructure supports the safe and reliable production of power for residents and businesses to use in their daily lives. Reliable power is also necessary for vital emergency service functions and life-safety operations. Though a full analysis is ongoing, early reports indicate the area's power grid benefitted from recent investments in resilience and performed better than when compared with past disasters. Both Florida Power and Light (FPL) and Lee County Electric Cooperative (LCEC) recognized the improved coordination for restoration staging areas and additional logistics, planning and response needs through the County Emergency Operations Center since Irma (2017). Additionally, both electric service companies have been prioritizing hardening projects and mitigation projects over the past few years. FPL has integrated pilot projects (most recently, the storm secure underground pilot program) and implemented smart grid technologies to be better equipped to respond and restore electricity. Continued challenges occur with the impacts of saltwater intrusion from coastal flooding, erosion and storm surge, and supply chain delays and disruptions. Substations in floodplains took on the most severe damage and require the greatest amount of money to restore. These substations would therefore benefit greatly from collaborative efforts to implement resilient solutions.

Funding grid resilience projects is not always straightforward and can lead to concerns of increased rates for those receiving power. Additionally, grant programs are often competitive and include a strategic ranking system that does not always lead to certain innovative projects ranking high. Electric service and power providers and regional, County and local officials should seek to collaborate on developing plans (e.g., mitigation plans and strategies, City and County Comprehensive Plans, and local planning/development plans) as well as mapping critical infrastructure to ensure maximum points can be obtained in grant project applications. Collaboration can also integrate grid sustainability and transmission and distribution resilience as part of broader development and recovery/resilience strategies.

FPL saw that all facilities that could receive power were restored in eight days, a notable improvement compared to Hurricane Andrew (1992) which took thirteen days and required significant reconstruction. Continued efforts to bolster the power grid, upgrade to renewable energy sources, and explore innovative solutions for hardening and manufacturing critical grid components is still needed to assist the County during emergencies. There are some small pockets of neighborhoods that have frequent outages, and often lag behind other areas in service restoration. Efforts should be made to identify

these areas and develop solutions. Clean and renewable energy options should be considered.

Regional Approach: The nature of the challenges to supply chain and the need for coordination in planning, mapping critical infrastructure, and assessing vulnerabilities will require a greater collaboration between power generators, distributors, partners, and stakeholders. FPL determined that underground power lines performed seven times better than overhead lines during Hurricane Ian. In some areas where power lines must stay overhead, other hardening measures can occur like using stronger poles. Undergrounding efforts must be comprehensive to promote the best outcomes. Implementing solutions will also require access to a variety of funding solutions, some of which include competitive grant programs and may be positioned to support regionally developed and supported projects related to critical infrastructure.

The region will work to bolster resilience and expedite the restoration of power to the community in the following ways:

- Hardening or retrofitting existing infrastructure and collaborating or supporting grant and loan applications for hardening and innovative mitigation solutions.
 - Focus areas for grants may include substation mitigation projects (e.g., raising the substation or implementing innovative manufacturing components) or developing new or expanding upon successful pilot projects.
- Upgrading and relocating service centers in service territories.
- Undergrounding lines where possible and feasible.
- Assistance with the permitting process including permitting for acquisitional land and restricted properties.
- Increased pre-storm planning coordination, including assistance with easement acquisitions (building easements into plan updates).
- Diversifying the production of energy and developing/expanding redundancies such as solar battery storage banking in strategic areas.
- Utilizing microgrid technologies for reliable production should be a high priority.

Impact: Prioritizing electric infrastructure mitigation and resilience projects around critical infrastructure and prioritizing areas for local and regional coordination will support both long-term resilience goals and short-term recovery goals. Strengthening and hardening the existing energy infrastructure through prioritizing strategies like undergrounding power lines, elevating substations, and funding innovative solutions will be an effective way to meet recovery and resilience goals. However, to make the most impact, it is vital to look at alternative ways to improve and secure the overall energy infrastructure by using

clean and renewable energy sources that can withstand catastrophic events such as hurricanes and flooding. This includes a diversity of strategies to meet this need.

Key Considerations:

- Compile a comprehensive list of current energy usage and maintenance of facilities.
- Assess energy needs and incorporating how improvements can be made to the current energy sources.
- Prioritize projects based on the most pressing needs found in the assessment.
- Utility redundancy for critical infrastructure such as the airports should be considered in future COOP.

Co-Sponsoring Branches:

Infrastructure, Health and Social Services, Natural Resources

Stakeholders:

- Utilities and power providers
- Municipal departmental experts on public safety
- County departmental experts on public safety
- Local port authority

Potential Funding Sources:

- United States Department of Energy
- United States Department of Agriculture
- United States Department of Housing and Urban Development
- Florida Department of Agriculture and Consumer Services
- Florida Public Utilities
- Enterprise Florida
- Duke Energy Foundation