

**Testimony of**  
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**Submitted to the**  
**HOUSE SCIENCE, SPACE AND TECHNOLOGY COMMITTEE**  
**for the October 3, 2017, Hearing**  
**“Resiliency: The Electric Grid’s Only Hope”**

Chairman Smith, Ranking Member Bernice Johnson, and members of the Committee, thank you for inviting me to testify at the hearing today, “Resiliency: The Electric Grid’s Only Hope.”

My name is Walt Baum. I am the Executive Director of the Texas Public Power Association (TPPA). TPPA represents the 72 municipally owned electric utilities (MOUs) in Texas, along with other public electric providers such as river authorities, joint action agencies and some electric cooperatives. MOUs serve more than 5.1 million Texans. TPPA is also a proud member of the American Public Power Association (APPA), the voice for not-for-profit, community-owned utilities that serve 49 million people in 2,000 towns and cities nationwide.

**Hurricane Harvey Recovery Update**

I am here today to give a real world example of a resilient grid and how Texas electric utilities are recovering from Hurricane Harvey.

I don’t have to tell you about the devastation caused by Hurricane Harvey. Some of you have seen and experienced it firsthand. The combination of high winds, historic rainfall and torrential flooding led to over 1.5 million electric customers being temporarily affected by the storm. However, because it was such a slow storm that lasted several days the number of customers outages at any one given time was far less than 1.5 million, peaking at just over 300,000. Coastal utilities were primarily affected, but areas that were over 100 miles inland experienced 100 mph gusts leading to damage to electric distribution systems throughout the state.

Fortunately, restoration efforts are complete for all customers who can take power. Within 14 days after the storm hit there were less than 30,000 customers without power.

The investor owned utilities that serve the majority of the coastal areas of Texas were most affected. AEP Texas serves the Corpus Christi and Victoria areas, where the storm first came onshore on the evening of Friday August 25<sup>th</sup> as a category 4 hurricane. They had 220,000 customers affected at the peak and restored power to 96% of them within 14 days. AEP brought in over 5600 resources from across the state and country. Crews are concentrated the largest effort in the Aransas Pass, Rockport, Victoria and Refugio areas, which were most devastated by the storm. AEP service territory had 549 transmission structures and 5700 distribution poles downed or damaged.

CenterPoint serves Houston and surrounding area. CenterPoint restored service to 1.27 million customers in about 10 days. Some of those outages were controlled in order to protect equipment (or for safety reasons). They did not suffer significant wind damage, but lost several substations due to flooding. A temporary mobile substation was constructed near a severely flooded substation to serve area distribution load while the permanent substation was repaired. CenterPoint brought in 1500 crews from 7 states to assist in restoration efforts.

Entergy Texas serves the area east of Houston and the Beaumont/Port Arthur areas. They had 192,000 customers affected by the storm. On September 8<sup>th</sup> power has been restored to all other customers impacted by Hurricane Harvey except for customers served by flood damaged equipment and areas that are still flooded. Many customers experienced multiple outages as conditions changed from wind to rain to flooding. Temporary mobile substations were also brought in while severely damaged substations are rebuilt and repaired.

TNMP (which serves several communities up and down the coast) restored power to almost 80,000 customers, including 22,000 customers out during their peak. All customers were restored within 10 days. They suffered no outages to their transmission system or industrial customers. The imported about 400 additional crews to help restore power.

Electric cooperative members in Texas also worked tirelessly since September 25, when Hurricane Harvey made landfall. There were a total of 179,016 outages and they were down to less than 1,000 outages within 10 days. Some of the biggest obstacles in getting folks turned back quickly included limited access due to high water and issues in East Texas with Entergy transmission. Co-op employees from across Texas assisted other co-ops hardest hit by the storm.

Municipally owned systems did not suffer the worst impacts of the storm. Overall we had about 160,000 customers affected, and had service restored to nearly everyone within three days. Robstown, which is located close to Corpus Christi, suffered wind damage but had crews out working on their lines the day after the storm passed and restored power to 95 percent of their customers within two days. Some East Texas systems lost power due to transmission outages in the area, but did not suffer large distribution damage.

## **ERCOT**

ERCOT, the Electricity Reliability Council of Texas, is the grid operator for most of Texas affected by the storm. ERCOT's System Operations team worked 24/7 at ERCOT's System Control Center, which is built

to withstand hurricane-force winds, to monitor the situation and protect overall system reliability. Extra engineering staff supported their efforts throughout the storm. ERCOT sent out several operation notices to market participants before and during the storm and was in constant communication with transmission and generation owners regarding hurricane preparations.

The ERCOT system experienced a number of transmission outages. Six 345 kV lines, ninety-one 139 kV lines and one hundred and thirty eight 69 kV lines were affected. Over 10,000 MWs of generation was also affected at some point, primarily due to floodwaters but also some due to transmission outages and some facilities that were impacted because they couldn't be reached by employees. ERCOT did instruct 2 generation facilities to run under their "Reliability Unit Commitments" program to provide voltage support and system reliability. ERCOT did have sufficient generation resources available throughout the storm and recovery and did not have to shed load or import power.

At the South Texas nuclear plant near Bay City, over 250 operators, engineers, maintenance and other support staff were stationed at the 2,700-megawatt plant throughout the storm. That plant continued to produce power safely at 100 percent capacity throughout the event.

### **Electric Grid Resiliency**

The electric utility industry strives to maintain a reliable and resilient grid. A reliable grid is one where you can count on the light coming on when you flip the switch. A resilient grid is one that can bounce back quickly from an adverse event. They are closely intertwined concepts: a reliable grid is one with built-in resiliency. Our goal is one hundred percent reliability. But because we cannot prevent Acts of God or all manmade emergencies, a reliable grid must have built-in resiliency to allow for as quick as of recovery as possible.

Every storm is different and Harvey was historic, but this is not the first storm to hit Texas. Electric utilities nationwide plan and coordinate to prepare, mitigate, and safely restore power in a wide variety of emergency events. Plans address how crews will be deployed, how information will be shared with customers, and when to call for additional help.

Grid resiliency is part of day-to-day operations in our industry. Tree-trimming and vegetation management are part of normal utility operations. Our utilities are designed with redundancy in mind. Grid operators and utilities with power plants plan for reserve margins annually to ensure ample power during weather events or other grid emergencies. Transmission and distribution systems are designed with redundancy in mind. ERCOT conducts annual "blackstart" training which simulates proper restoration of the ERCOT system in the event of a system wide black out.

Mutual aid is an important component of resiliency. Just as firefighters, police officers, and other emergency responders combine forces to help rebuild communities devastated by natural disasters, lineworkers and other electric utility personnel come together in an emergency to turn the lights back on. Crews from all across Texas and other areas of the country have shared in the restoration efforts. The utilities that were most affected called in crews from around the country. After dealing with their outages CPS Energy, Austin Energy, New Braunfels and others went to go help other MOUs, and helped

out coops and IOUs as well. CPS Energy sent crews to help AEP Texas in the Victoria and Bloomington areas and in addition to over 50 lineworkers they also sent IT professionals to help with network and infrastructure work. Over 1500 mutual assistance crews from other parts of Texas as well as Louisiana, Mississippi, Missouri, Florida, Kansas, Alabama and Tennessee assisted CenterPoint in their recovery efforts.

APPA has its own mutual aid network, which also coordinates with the Edison Electric Institute and the National Rural Electric Cooperative Association, the trade associations for investor-owned utilities and rural electric cooperatives, respectively. During Harvey, there were daily calls set up through APPA for MOUs in Texas and Louisiana to coordinate needs and recovery efforts. There were also daily calls run by the Department of Energy that APPA, EEI, NRECA, Nuclear Energy Institute the Department of Homeland Security, and others participated in to coordinate efforts between sectors and also CEO level calls hosted by Secretary Perry to discuss any specific needs. Similar coordination was in place for Hurricane Irma. Once restoration was complete in Texas, CPS Energy, Austin Energy, Denton, Garland and other Texas utilities sent crews to help Irma restoration efforts.

Texas also has a Texas Mutual Assistance Group made up of the larger utilities that coordinate mutual aid agreements and efforts. Texas Public Utility Commission staff worked with the State Emergency Operations Center during the storm to provide a contact point for utilities and their needs. The Public Utility Commission also issued emergency orders after the storm giving the Executive Director discretion over disconnect, reconnect, billing estimation and customer disconnection rules. They also Retail Electric Providers to offer deferred payment plans for customers in affected areas.

While the story is largely positive, each event is also a way for individual utilities to learn and be better prepared for the next round of emergency conditions. The new Public Utility Commission Chair held a meeting on September 28<sup>th</sup> and identified several issues for industry and government partners to review.

My members, public power utilities, and the entire electricity industry are committed to sharing information, technology, crews, and equipment to continue to keep the lights on. I especially want to thank all of the crews and personnel in our industry. The tireless work of the lineworkers and the support staff behind them is truly inspirational. But this is a serious and dangerous business; unfortunately the industry lost a young lineman last month when he was working to restore power near Victoria, TX.

Thank you for the opportunity to testify. I'm happy to answer any questions you may have.