STATEMENT OF BRIAN H. LLOYD

EXECUTIVE DIRECTOR, PUBLIC UTILITY COMMISSION OF TEXAS

BEFORE THE U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON ENERGY AND COMMERCE

SUBCOMMITTEE ON ENERGY

"STATES' PERSPECTIVES ON ENERGY SECURITY PLANNING, EMERGENCY PREPAREDNESS, AND STATE ENERGY PROGRAMS"

JUNE 14, 2017

Summary

Texas has a unique role in overseeing electricity markets in the United States due to our presence in all three electrical interconnections and our oversight of the Electric Reliability Council of Texas (ERCOT). Texas' planning for energy emergencies and power grid threats are encompassed in the *Texas Homeland Security Strategic Plan*, Texas' comprehensive homeland security plan directed by Governor Abbott. In conjunction with state leadership and other agencies, the Public Utility Commission of Texas (PUCT) treats Energy Assurance Planning, analysis of emerging threats, and emergency response and recovery as key functions of the agency. The PUCT works collaboratively with the ERCOT grid operator and Texas utilities to address the broad range of natural and manmade threats that can cause extended power outages across our state.

Texas recognizes the greatest threat that our utilities face today – cyber-attacks – is an area that in many respects does not fit into the traditional regulator/utility paradigm of prescriptive standards and enforcement. In recognition of the fact that cyber-threats are fast moving and increasingly sophisticated, we have recently launched new initiatives to identify and disseminate best practices for cyber and physical security defenses and corporate culture, as well as continue to explore improvements to information sharing structures among Texas utilities.

Addressing modern threats to the power grid involves critical partnerships between federal and state officials to ensure that the imminent threats to the power grid are timely disseminated so that utilities can properly prioritize the most significant threats to their systems. Continued development of these information sharing networks and utilization of unique federal assets related to the evaluation of high-impact, low probability threats should remain key efforts of our federal partners.

Introduction

Chairman Upton, Ranking Member Rush, and members of the Subcommittee,

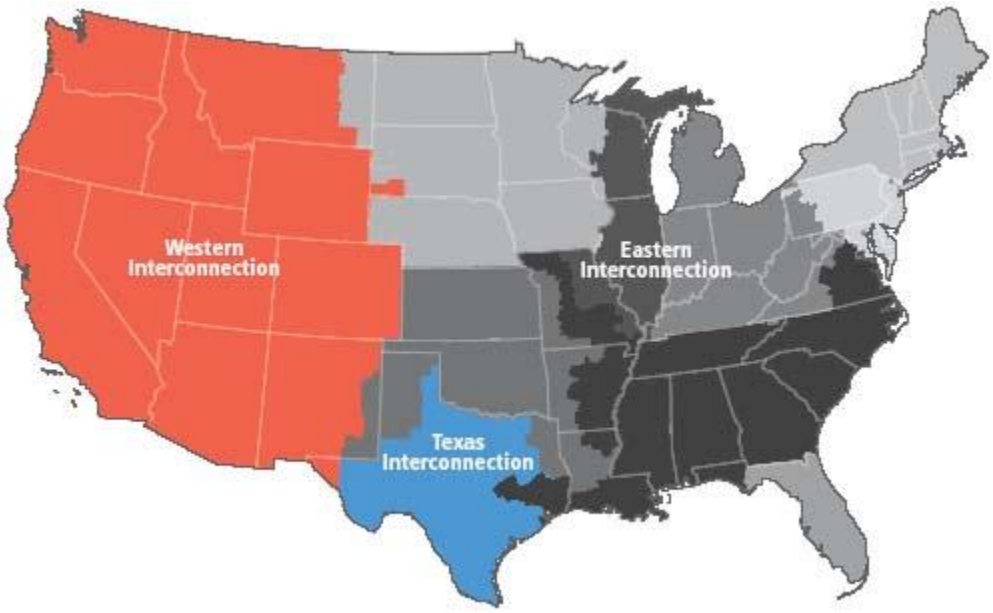
My name is Brian Lloyd, and I am the Executive Director of the Public Utility Commission of Texas (PUCT). The PUCT is Texas' regulator for electric, telecommunications, and water utilities, with the majority of work relating to the oversight of electric utilities that serve 27 million Texans, most of them through fully competitive wholesale and retail markets. On behalf of Commissioners Ken Anderson and Brandy Marquez, I thank you for the opportunity to testify today and provide you Texas' perspectives on energy emergency planning and preparedness.

Background on Texas' Energy Markets

As the only state in the nation that has a physical presence within all three electrical interconnections, Texas is unique. In Texas, 90% of the electricity is consumed within the Electric Reliability Council of Texas (ERCOT), which is the only non-Federal Energy Regulatory Commission (FERC) jurisdictional power market in the continental United States. Because the ERCOT power grid is wholly within Texas, the PUCT uniquely oversees both the retail and wholesale markets, with federal jurisdiction limited to the monitoring and enforcement of federal reliability standards implemented under the Energy Policy Act of 2005 by the FERC and North American Electric Reliability Corporation (NERC). In Texas, enforcement of these standards is delegated to the Texas Reliability Entity (TRE) and the PUCT has also contracted with the TRE to assist in monitoring and enforcing the state reliability standards adopted by the PUCT. The remaining 10% of electricity consumption takes place in the areas outside of ERCOT – predominately areas of Southeast and Northeast Texas, El Paso, and the Texas Panhandle. All of our utilities in the Eastern Interconnection are members of either the Southwest

Power Pool or Midcontinent Independent System Operator, which are FERC jurisdictional power markets. El Paso Electric is on the southeastern end of the Western Interconnect.

Figure 1: Texas Power Grids Map



Texas is often called the Energy State, primarily for its production of energy, but also for its consumption. Texas leads the nation in crude oil production, accounts for more than 25% of total US refining capacity, produces 30% of the nation's natural gas, and leads the country in wind power production with over 20,000 megawatts of capacity installed in the state. Texas' economy would be the world's 10th largest if the state was its own country.

Because of our unique role in overseeing the ERCOT power grid, it is a core function of the PUCT to constantly evaluate the operation of our electric markets. This includes continually assessing power plant investment in the state, providing for a robust transmission grid, and daily considering how to respond to the major issues electric markets are facing, including the adoption of new technology, incorporation of renewable energy, impacts of environmental policy, and emerging threats to the grid.

Texas Energy Assurance Planning

In conjunction with state leadership and other state agencies, the PUCT considers Energy Assurance Planning and emergency response and recovery as a key function of the agency, particularly because of our unique role in overseeing the ERCOT power markets. Affordable and reliable electricity is the lifeblood of the Texas economy. We must continually assess and identify threats to the power grid, prevent or mitigate them where feasible, and have robust emergency response and recovery processes at the ready should natural or manmade attacks occur.

Texas faces a broad, complex array of critical infrastructure and homeland security threats. These include natural hazards such a hurricanes, tornados, wildfires, drought, floods, ice storms, and lightning. Weather related natural disasters are not uncommon in Texas, present threats to our energy infrastructure, and can cause extended disruptions of supply to energy users in the state. As the most extreme example, Hurricane Ike caused power outages for 2.1 million of CenterPoint Energy's 2.2 million Houston customers in 2008, and it took nearly three weeks to restore service to all of the customers.

Our threat assessment and emergency planning, however, does not stop with natural threats as we live in a world today where both domestic and international actors can seek to do damage to our electricity supply network. These have historically included persistent threats as vehicle accidents and copper theft from substations, transformers, and other equipment, to more malicious attacks by disgruntled employees, political activists, or others. Increasingly, of course, the threats of international criminal or terrorist organizations conducting coordinated cyber and/or physical attacks on energy infrastructure is a major concern of both the industry and regulators.

Texas law authorizes Governor Abbott to direct homeland security activities through the Texas Homeland Security Council, a Private Sector Advisory Council, and the Texas Fusion Center. These groups advise the Governor and work collaboratively to implement the *Texas Homeland Security Strategic Plan*. This plan is frequently updated, aligns with and encompasses the national preparedness priorities and policies established by the Department of Homeland Security, and is tailored to meet the unique homeland security needs of Texas, taking into account the state's size, location, lengthy land and sea borders, demographics, and economic diversity.

The first goal of the *Texas Homeland Security Strategic Plan* is prevention. The Texas Department of Public Safety (TxDPS) oversees the Texas Infrastructure Protection Communications Center (TIPCC), which is our primary entity for planning, coordinating and integrating government communications capabilities. The TIPCC includes two elements:

- The State Operations Center (SOC) operates around the clock to monitor and analyze the impacts of threats and ongoing emergency situations statewide, as well as coordinate state readiness activities and emergency response operations. At the SOC, the PUCT is the lead agency on issues related to electricity outages and restoration, and the Railroad Commission of Texas (RRCTx) resolves issues related to the delivery of oil, gasoline, natural gas, and other fuels. The two agencies work collaboratively where there are interdependency issues between the sectors, particularly as it relates the provision of natural gas to power plants, to form a response and recovery from natural or man-made disasters. Texas' utilities and grid operators are the first responders when it comes to restoring service during outages or a disruption of service, with the PUCT serving in a support role. In an emergency, the PUCT and RRCTx will staff the SOC and assist in obtaining damage assessments, estimated out-of-service times, and coordinate priority restoration to critical facilities, such as hospitals,

water treatment plants, and other critical facilities. The PUCT will also assist any coordination with the Department of Energy if needed for emergency interconnections between ERCOT and the Eastern Interconnection.

- The Texas Security Alert and Analysis Center, staffed by TxDPS Special Crimes personnel analyses suspicious incidents related to homeland security and shares information as needed with other governmental bodies.

In addition to these governmental efforts, electric utilities in Texas actively participate in other industry and cross-sector information sharing efforts. This includes a Critical Infrastructure Protection Working Group hosted by the ERCOT grid operator, the Electricity Information Sharing and Analysis Center (E-ISAC), which is a division of NERC, in collaboration with the Department of Energy and Electricity Subsector Coordinating Council, as well as information sharing between the TxDPS, the PUCT, and utilities.

The second goal of the plan is to protect our critical infrastructure where possible. When it comes to the electric grid, it is important to remember that electric grids and markets are – perhaps uniquely among industry segments – highly integrated, highly redundant, and highly regulated. Power grids are intentionally designed so that the loss of any one component of the power system does not cause outages. Power grids are also planned to have a cushion of supply above their peak demand needs in order to account for unforeseen events such as power plant outages, unexpected demand, or other supply and demand imbalances. The ERCOT grid operator, in conjunction with the PUCT, has a comprehensive set of emergency procedures and public notifications in the event there are system wide or local supply issues, including the use of procured back-up generation, utilization of demand response programs, and public appeals for conservation. Additionally, in the event of wide-scale disruption to the power grid, electric utilities have extensive plans to manage the outage and restoration of

customers to prevent an uncontrolled, cascading outage. Finally, all power grids also have comprehensive "black-start" procedures that provide for methods to restore the power grid even after such an uncontrolled outage. These procedures are tested and drilled frequently, and the PUCT has brought enforcement actions against entities that have been found unready or unable to provide for their contracted black-start services. PUCT regulations also require utilities to conduct or participate in one or more drills annually to test their emergency procedures, including large scale hurricane drills coordinated by ERCOT. The PUCT staff routinely observes these drills as well as NERC GridEx exercises.

The PUCT takes many additional steps to protect the electric grid. We monitor utility spending on vegetation management to ensure proper clearances are being maintained around the electric grid. We expect utilities to take appropriate security steps for important substations and other facilities. Advanced metering and other "smart-grid" technologies have been deployed across nearly all PUCT-regulated utilities as well as many municipally owned utilities and electric cooperatives not under PUCT-oversight. These technologies provide the ability to quickly identify and mitigate faults and outages on the power grid, and provide great potential for increased reliability and decreased outage restoration times. Additionally, we are in the midst of a new initiative to identify and disseminate best practices regarding cyber-security and physical protection of the power grid to utilities in Texas.

Texas electric utilities also participate in mutual assistance programs operated by utilities across the country. These programs allow for force-multiplying assistance between utilities to expedite the restoration process. In anticipation of major weather events, utilities and their mutual assistance partners can pre-position assets to be ready to respond when the storm has passed, or partners can bring in crews later if the extent of damage is greater than anticipated. As an example, utility crews from Texas assisted with the restoration of service after Hurricane Sandy, while crews from as far north as Canada assisted in CenterPoint Energy's restoration after Hurricane Ike. Utilities also utilize

equipment sharing networks to expedite facility replacement when major equipment is damaged beyond repair. The PUCT is tremendously supportive of the industry's efforts to expand the concept of mutual assistance to include cyber mutual assistance when companies need assistance restoring necessary computer systems following a regional or national cyber incident.

Cybersecurity and Physical Security Threats

In recent years, protecting critical energy infrastructure has become more complex as regulators must increasingly account for threats from international actors and the power grid has become increasingly connected to the internet. Information technology, advanced energy infrastructure, and smart grid initiatives help make the power grid and other energy sectors more efficient and resilient. However, these technologies also come with the other edge of that sword – increased vulnerability.

From a regulatory perspective, cybersecurity for regulated utilities cannot simply be fit into the traditional utility/regulator paradigm whereby the regulator prescribes a set of standards that acceptably balance cost and benefit and then we simply monitor the performance of utilities against those standards using the threat of enforcement and penalties to gain compliance. Similarly, the traditional threats that have caused power outages to consumers have been events that we could all see coming – a heat wave, a drought, or a hurricane as the main examples. Instead, the greatest threat we face today – cyberattacks – is also the area that least lends itself to this traditional approach. Standards can be useful. But standards alone cannot completely mitigate the risk of cyberattacks given the speed at which information technology and the sophistication of bad actors increases daily. Nor should we pretend that regulators, with limited budgets and the constraints that come with governmental service (such as open records requirements and administrative due process requirements) can be expected to be nimble enough to attempt to micro-manage utility cybersecurity defenses and programs.

We have taken a different approach in Texas. Faced with a concern that some utilities may be managing to NERC standards as their primary cybersecurity strategy rather than take a broader approach to good corporate cyber-practices, we have launched a new initiative this year. The PUCT has retained an outside consultant to perform a review and make recommendations as to the best practices for cybersecurity and physical security defenses and culture. It is our goal that all utilities in Texas, including those that the PUCT does not have jurisdiction over, will join this exercise and look to adopt these best holistic approaches to this topic. Simply put, it does little to mandate that our utilities should spend tens of millions of dollars per year on cyber-defenses, if they have not trained their employees to not give a password to someone on the phone claiming to be from Human Resources. We will also be examining whether there are further information sharing structures that we should set up among the Texas utilities operating on the ERCOT power grid.

What the Federal Government Can Do to Help

Increasingly, the threats to the power grid come from potential international criminal and terroristic organizations or adverse nation states that may seek to launch a coordinated cyberattack. It is critical for local utilities, state homeland security officials, and utility regulators to know the threats as they become apparent. This is best accomplished with robust information sharing between federal and state law enforcement and intelligence agencies and the private sector. If state utility commissions and their utilities know what issues are of the biggest concern to the intelligence community, it will help commissions and the utilities know what threats to prioritize in their systems and in the field. Efforts such as the Electricity Subsector Coordinating Council, E-ISAC, Cybersecurity Risk Information Sharing Program, and similar programs provide these critical links between the federal government and the sector, both for information sharing and incident response and recovery.

As I indicated above, NERC and Department of Energy led multi-state drills and exercises are very useful efforts that help ensure proper readiness and chains of communication and response in times of emergencies among all levels of government and the industry. Additionally, continued support by both state and federal governments of mutual assistance programs and equipment sharing initiatives (along with facilitating the rapid transport of equipment to where it is needed) are also essential to cost-effectively prepare for the wide range of threats utilities face.

There is also a role for the federal government when it comes to certain high impact, low-probability threats such as geomagnetic or electromagnetic pulse events. Once again, in this area, the federal government has unique assets and information that can help utilities assess and prepare for these events. For example, the work done by the National Oceanic and Atmospheric Administration related to geomagnetic disturbances that can be used to more discretely forecast impacts to power grids is valuable work not easily replicated by states or the private sector. Similarly, the collaborative work being done by the Department of Energy, Department of Defense (DOD), and the Electric Power Research Institute related to electromagnetic pulse events is excellent work that can only be done utilizing classified information held by the DOD as outlined by the Department of Energy's "*Electromagnetic Pulse Resilience Action Plan.*" Timely dissemination of this unique knowledge and analysis held at the federal level can be critical information necessary for state regulators to determine where grid hardening investments can have the most beneficial and effective impact.

Conclusion

I would like to thank the Subcommittee for the opportunity to provide a Texas perspective on these issues. Ensuring the reliability of our nation's power grid is an exceptionally important and complex undertaking, and I applaud your focus on this subject.