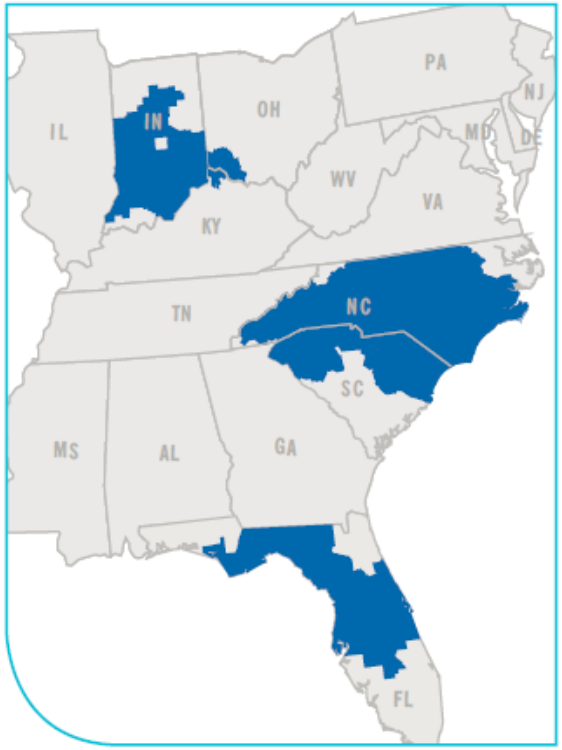
Presentation on Grid Security to the North Carolina Joint Legislative Emergency Management Oversight Committee – November 29, 2016

DUKE ENERGY®

About Duke Energy

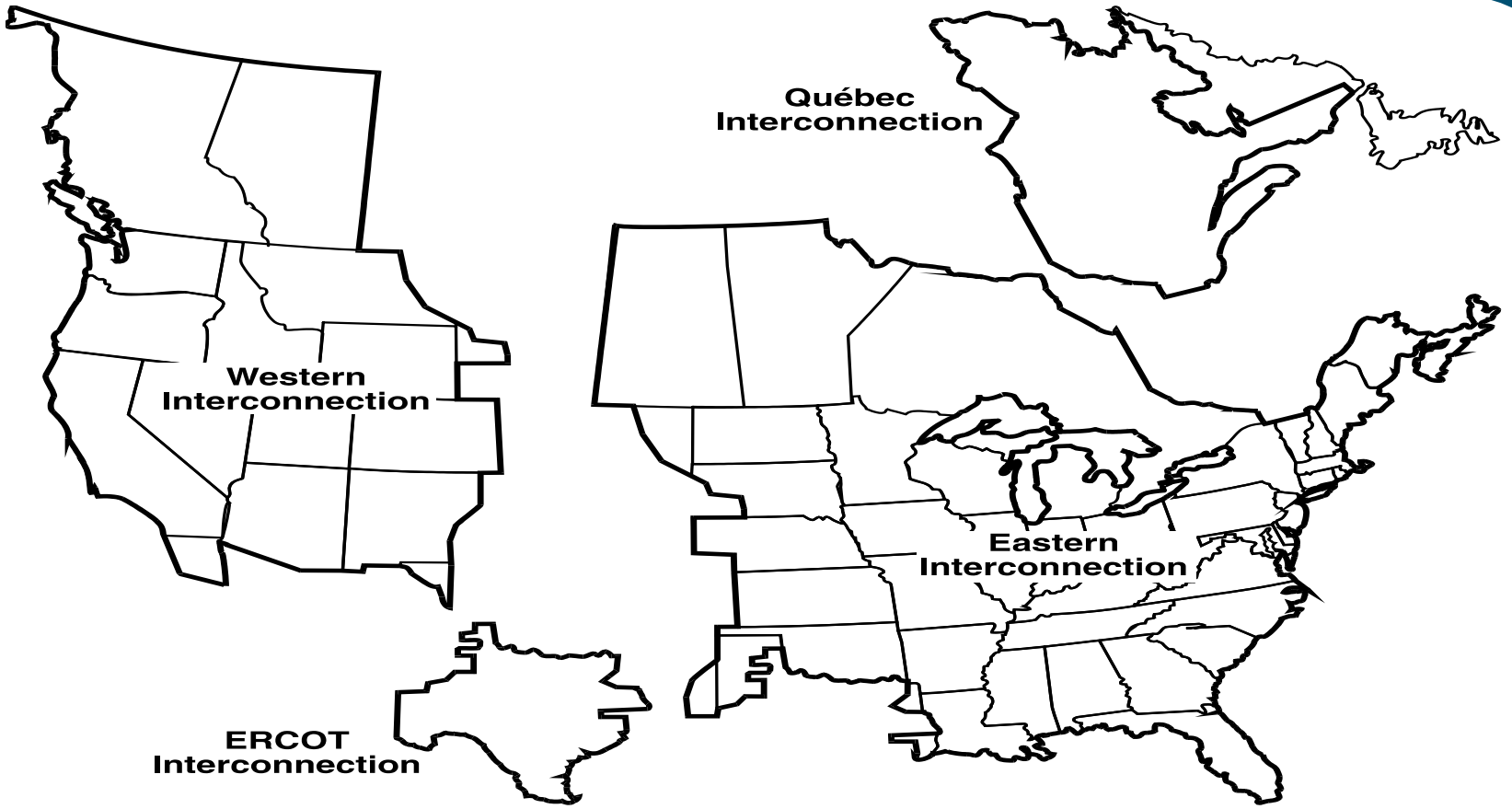


Duke Energy Service Territory

- 150+ years of service
- 7.3 million electric customers and 500,000 gas customers
- Fortune 250 company
- $100+ billion in assets
- 57,500 megawatts of generating capacity from a diverse mix of coal, nuclear, natural gas, oil and renewable resources
- Service area covering approximately 95,000 square miles in the Southeast and Midwest

(Source: http://www.duke-energy.com/pdfs/de-factsheet.pdf, retrieved 2/12/16)

The North American Electric Grid - Interconnections

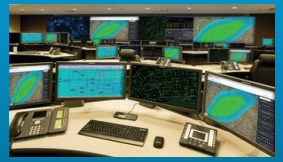


Protecting the Electric Grid

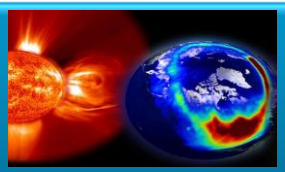
- Protecting the electric grid and maintaining system reliability – **Top Priorities**
- Have made, continue to make, significant investments to protect the grid from disruptions**. An efficient, reliable and safe electric system -- core to all we do.**
- Work with local, regional and national law enforcement and security agencies
- Coordinate with industry peers, research organizations and federal agencies to safeguard these important assets, and to monitor and develop solutions and responses.
- Collaborative relationship -- serves our customers well.
- Ability to share information and review research key to developing effective solutions **on a national level across the electric grid.**

Prepared For High Impact Low Frequency (HILF) Events

HILF Events occur infrequently, but can have significant effect. These types of events require the appropriate balance of detection, prevention and response mitigations.



Physical/Cyber Security



GMD/EMP

Hurricane/Ice Storms

Tornadoes

Straight -Line Winds

Floods

Seismic

Fires

Protecting the Electric Grid

- Duke Energy -- employs a multi-tiered approach to grid security based on resiliency.
  - **Includes elements of prevention and response to system threats.**
  - **Internal working teams specifically focused on geomagnetic disturbance and physical security threats to the grid.**
- No single solution can completely eliminate risk -- We ensure there are contingencies and redundancies in place.
- We must constantly balance threat mitigation with the cost impact to customers….

Grid Security Commitment:

We ensure that every dollar invested is prudent, and addresses all risks, in a common-sense, priority-based manner based on expert knowledge both inside the company and in coordination with industry and government experts.

This is critically important, and we take it very seriously.

Cybersecurity program

Identify – Identify key assets and related cyber security risks	• Critical assets identified • Risk Management Framework • Internal and third party penetration testing
Protect – Implement safeguards that protect critical infrastructure	• Perimeter protection • Network access control • Data loss prevention • Enhanced cybersecurity services (ECS)
Detect – Deploy solutions to identify the occurrence of a cybersecurity event	• Intrusion protection systems and monitoring • Cybersecurity Risk Information Sharing Program (DHS program) • Collaboration with FBI, DHS, and Electricity Sector Information Sharing and Analysis Center (E-ISAC)
Respond – Take appropriate action regarding a detected cybersecurity event	• Incident response process and communication plans • Kill chain methodology • Anti-distributed denial of service attack • Cyber incident drills: internal and external
Recover – Execute plans to restore all capabilities impaired by a cybersecurity event	• Cyber Incident Response process and communication plan • Backup and restore process • Disaster recovery exercise

Protecting the Grid – Physical Security

Current Duke Energy Actions

- Internal working team comprised of security and operations employees
- Meetings with FERC to discuss threats and mitigating actions
- Participation in industry groups – North American Transmission Forum, EEI, GridEx, etc.
- System studies and site reviews
- Emergency response plans, black start plans, system operator training
- Spare equipment plans and programs (EEI STEP, STEP Connect, Grid Assurance)
- Involvement in development and implementing provisions of FERC-approved NERC physical security standard (CIP-014-1)
- Participation in EPRI research efforts for Transmission Resiliency and Physical Security
- Coordination and information sharing with local, state and federal agencies
- NERC standards for Critical Infrastructure Protection (CIP) and Emergency Operations (EOP)

Protecting the Grid – Electromagnetic Pulse (EMP)

- **Current Duke Energy Actions:**
- Factoring EMP protection into the overall protection plan for some key facilities – design criteria for EMP is location and purpose specific
- Reviewing/refining existing response plans for modifications to incorporate response to widespread EMP impacts
- Working with the Law Enforcement Division of the North Carolina Department of Public Safety to develop a North Carolina EMP Readiness/Response plan
  - Scenario and plan basis built largely on NERC and Duke restoration and response plan criteria
  - Intended to include all critical infrastructure sectors
- Beginning a similar cross-sector response plan effort in South Carolina
- Working with industry organizations (EPRI, NATF, etc.) and academic consortiums (CAPER, CUEPRA, etc.) to research adequate levels of hardening/resiliency of grid elements, components, and facilities and determine best practices

Responding When the Grid Is Damaged

- **Plan, drill the plan, gain feedback/best practices to improve the plan**
  - Duke Energy continually reviews and revises its comprehensive response plan for major events affecting the grid
  - Duke Energy drills the plan to ensure understanding and to determine ways to improve our response
  - Duke Energy participates in industry and regulatory groups (Edison Electric Institute, Southeastern Electric Exchange, North American Transmission Forum, North American Electric Reliability Corporation, Federal Energy Regulatory Commission, etc.) to help us learn and share industry best practices related to response plans, technologies and practices
  - Duke Energy takes a leadership role in the National Response Event (NRE) - a coordinated response plan/structure to national events developed after Hurricane Sandy

Resiliency

Resiliency –The Big Picture:

"…..With finite resources, if we attempt to address all threats and vulnerabilities, we protect against none. Using a comprehensive, risk-based approach, grid security can be addressed in a manner that balances protection with the need to provide affordable energy to consumers." *Center for the Study of the Presidency & Congress on "Securing the U.S. Electrical Grid"*

"…….Recognizing the costs for ratepayers associated with these efforts requires prioritization, along with risk management, to ensure that we are focusing resources on the greatest risks to the reliability of the bulk power system." *Gerry Cauley, CEO NERC*


DUKE
ENERGY®