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**ELECTRICITY AND SECURITY**

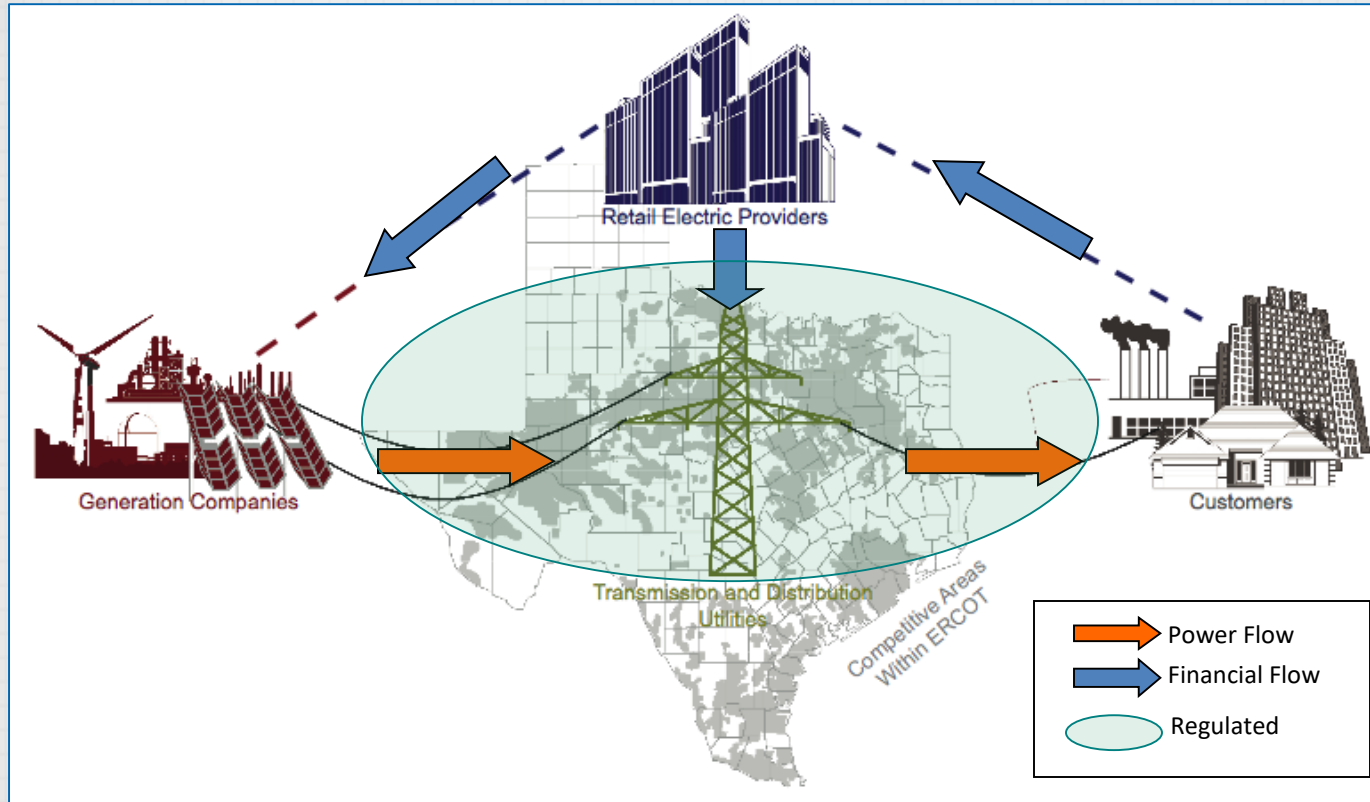
**2019**



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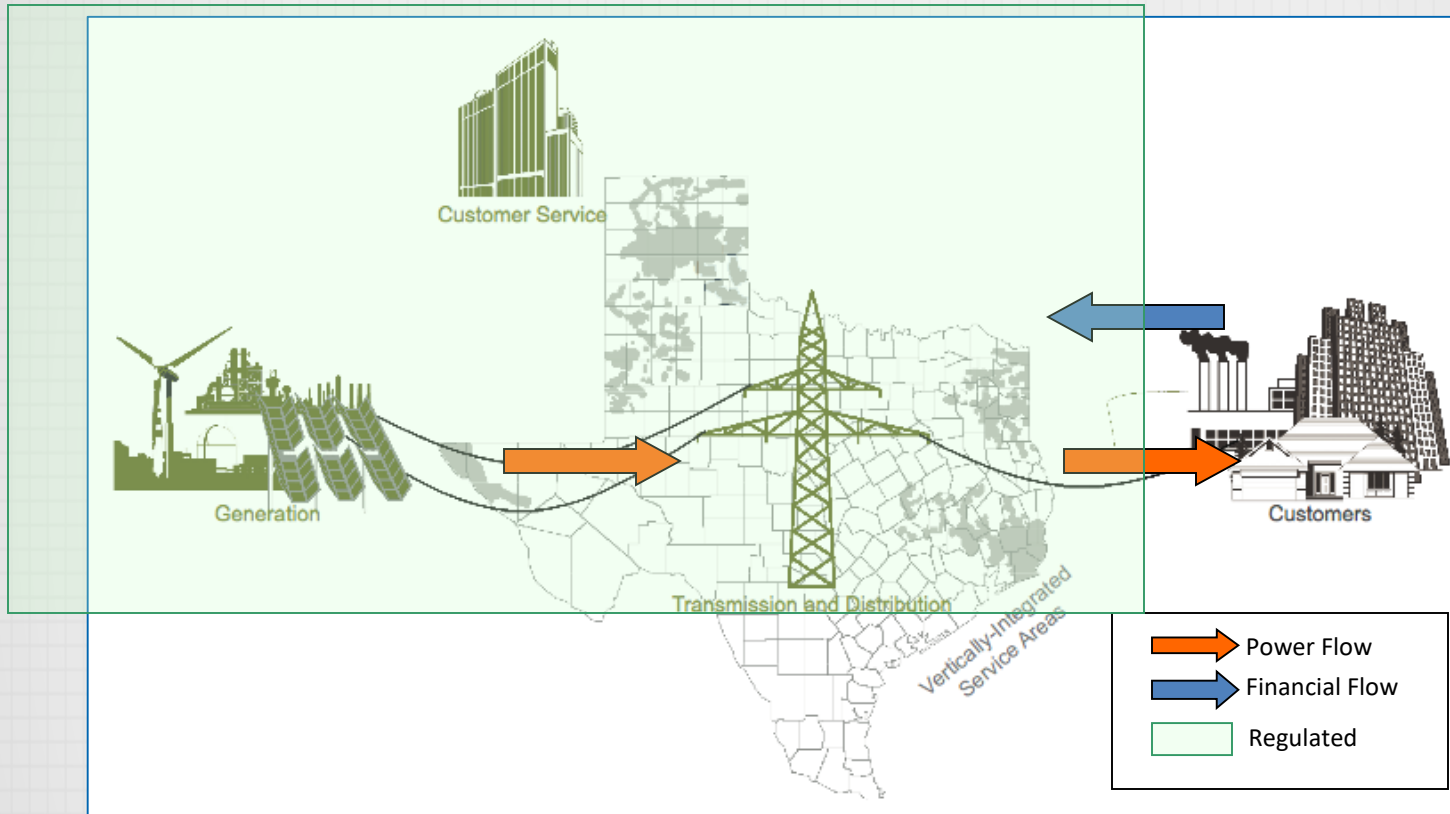
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# ERCOT: SEPARATE COMPANIES PROVIDE RETAIL, TRANSMISSION & DISTRIBUTION AND GENERATION SERVICES



- In competitive markets, consumers have multiple retail electric providers (REPs) and service plans to choose from.
- Wholesale and retail prices are set by competitive market forces, while the PUC sets transmission and distribution rates.

# OUTSIDE ERCOT: A SINGLE UTILITY PROVIDES RETAIL, TRANSMISSION & DISTRIBUTION AND GENERATION SERVICES IN EACH AREA



- In fully regulated markets, the PUC sets retail rates charged to end-use customers.
- Each of service area is part of a multi-state electric grid, with differing regulations. In many cases, vertically integrated utilities purchase wholesale power from certain unregulated entities.

# KEEPING THE ELECTRIC GRID **RELIABLE**

**Electric utilities must balance electricity costs with reliability initiatives**

**The most effective way to reduce likelihood of a protracted outage: comprehensive emergency plans to restore the grid**

# PHYSICAL THREATS: STORMS, ANIMALS, FACILITY ATTACKS



## AVOIDANCE AND PREPARATION

- **Promote Awareness:** Utilities, national, state and local governments and agencies warn residents of impending storms, including hurricanes, tornadoes and major ice storms
- **Develop Mitigation Strategies:** Utilities implement protocols to reduce likelihood of electrocution from downed lines
- **Harden Facilities:** Utilities promote robust construction to allow for quick recovery and look for opportunities to cost-effectively harden systems, such as through undergrounding lines, animal guards and security drills
- **Maintain Backup Equipment:** Strategically position replacement parts and facilities to quickly rebuild where needed

## RESPONSE IN CASE OF MAJOR OUTAGE

- **Use the Advanced Grid:** Advanced systems allow utilities to pinpoint outages
- **Coordinate:** Utilities coordinate with DPS, DHS and other agencies to minimize recovery time and reduce injury from downed power lines
- **Restoration and Cooperation:** Utility work crews rebuild and restore, often with assistance from other utilities nationwide

# TECHNOLOGY THREATS: CYBER ATTACKS AND INFILTRATION

## AVOIDANCE AND PREPARATION

- **“Good Cyber Hygiene”**: Maintain best practices, share information with other utilities and hold regular briefings to avoid human error, such as clicking on a malicious email or installing Trojan horse software
- **Ongoing briefing and Communications**: Communicate with federal agencies regarding grid hacking activities
- **Investment**: Major hardware and software investment specifically aimed at identifying cyber attack activity, plus investment in cyber security divisions staffed with financial industry and military backgrounds

## RESPONSE IN CASE OF MAJOR OUTAGE

- **Mitigation**: Ensure systems can be segmented from one another to limit the impact of a cyber attack
- **Recovery**: Ensure critical facilities are primed for backup and quick recovery
- **Restoration, Cooperation and Recovery of Systems**: As with other types of outage, utilities are designed to be restored through robust systems, cooperation with government entities and able to be rebuilt



# MAGNETIC THREATS: SOLAR FLARES AND NUCLEAR DETONATION

## AVOIDANCE AND PREPARATION

- **Awareness:** Utilities communicate with NASA and NOAA regarding geomagnetic disturbances and DOD and DHS regarding the potential launch of a nuclear device by a terrorist state or agent
- **Mitigation:** Utilities review designs, processes and procedures to improve grid responsiveness in case of a magnetic disturbance
- **Drills:** As with preparing for other large-scale outage events, utilities hold regular drills to maximize response time

## RESPONSE IN CASE OF MAJOR OUTAGE

- **Preparation:** Continue work with utilities and associations nationwide to determine best practices for hardening against magnetic disturbances
- **Recovery:** Determine critical infrastructure that can be recovered quickly to rebuild the grid in case of a magnetic disturbance or attack
- **Putting the Grid Back Together:** continue focus on robust systems and inventories of assets to aid in recovery

# NERC PROTOCOLS AND GOVERNANCE

## NERC: Set cybersecurity protocols and standards for electric industry

- NERC Critical Infrastructure Protection (CIP) Standards
- Threat Prioritization – impact ratings (high, medium and low)
- Management Controls
- Personnel and Training
- Electronic Security Perimeter, Physical Security, and Systems Security
- Incident Reporting and Response
- Recovery Plans and Information Protection

## Electricity Subsector Coordinating Council

- NERC, DOE, DHS, FERC
- Electricity-Information Sharing and Analysis Center (E-ISAC)



# HOW TO REACH US



## AECT.NET

For background on electric markets, environmental data and Electricity 101



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