

NERC

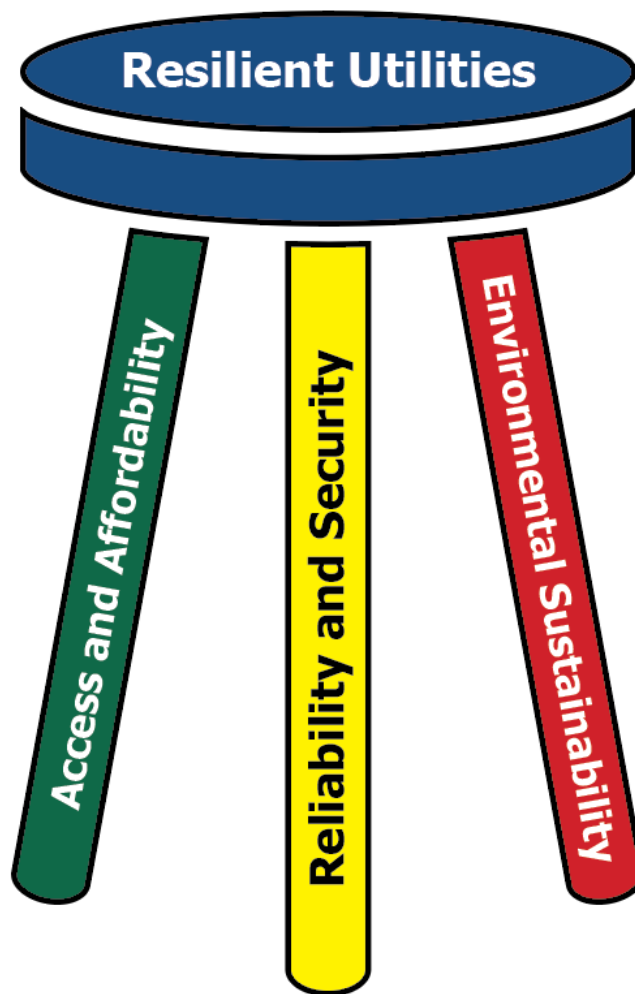
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Challenges in the Energy System

Jim Robb, President and CEO
November 7, 2023

RELIABILITY | RESILIENCE | SECURITY






Hyper Complex Risk Environment

- Rapidly changing resource mix
 - Retirements of traditional generation
 - Natural gas interdependencies
 - Inverter-Based Resource (IBR) integration
 - DER performance and visibility
- Extreme weather complexities
 - Extreme not infrequent
 - Broader deeper longer
- Energy & Environmental Policy
 - Electrification
 - Emissions
- Rapidly Evolving Threat Landscape
 - S/W vulnerabilities
 - Supply chain
 - Ransomware
 - Physical attacks

Hyper Complex Risk Environment

- Rapidly changing resource mix
 - Retirements of traditional generation
 - Natural gas interdependencies
 - Inverter-Based Resource (IBR) integration
 - DER performance and visibility
 - Extreme weather complexities
 - Extreme not infrequent
 - Broader deeper longer
 - Energy & Environmental Policy
 - Electrification
 - Emissions
 - Rapidly Evolving Threat Landscape
 - S/W vulnerabilities
 - Supply chain
 - Ransomware
 - Physical attacks
- 

Reliability/Resilience/Security Concerns

- Fuel assurance/uncertainties
 - Natural gas
 - Renewables
- Loss of key “essential reliability services” with retirements
 - Inertia/frequency response
 - Reactive Power/voltage support
- Appropriate level of investment in infrastructure for hardening & resilience
 - Extreme weather
 - Coordinated Physical attack
- Expanding cyber attack surface
 - Industry Control Systems (ICSs)
 - IBRs/DERs/EV Charging
- Sophistication of recent cyber attacks
 - SolarWinds (one to many)
 - Pipedream, Industroyer malware

Four Pillars of the Energy Transition

Growing loads and performance expectations as economy is electrified



No/Low Carbon Energy Resources

Ensure sufficient amounts of no/low carbon energy to achieve decarbonization goals



Transmission

Develop adequate transmission to integrate renewables and transmit/distribute energy



Balancing Resources

Maintain a robust fleet of balancing resources needed to serve energy along with integrated renewables



Energy Supply Chain

Ensure healthy energy supply chains for balancing resources, with sufficient access to stored energy to withstand long-duration, widespread extreme weather events

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION



Questions and Answers