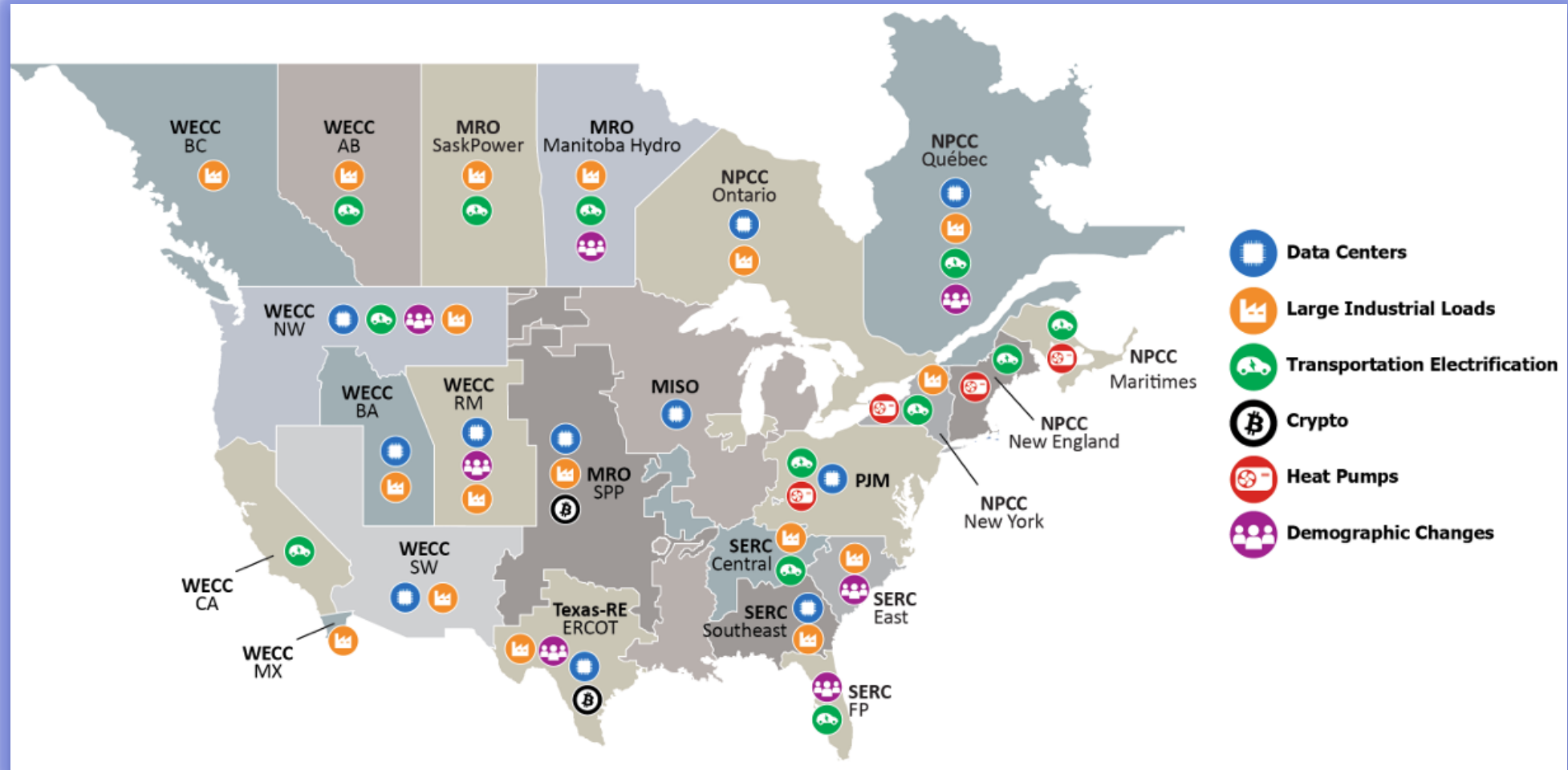


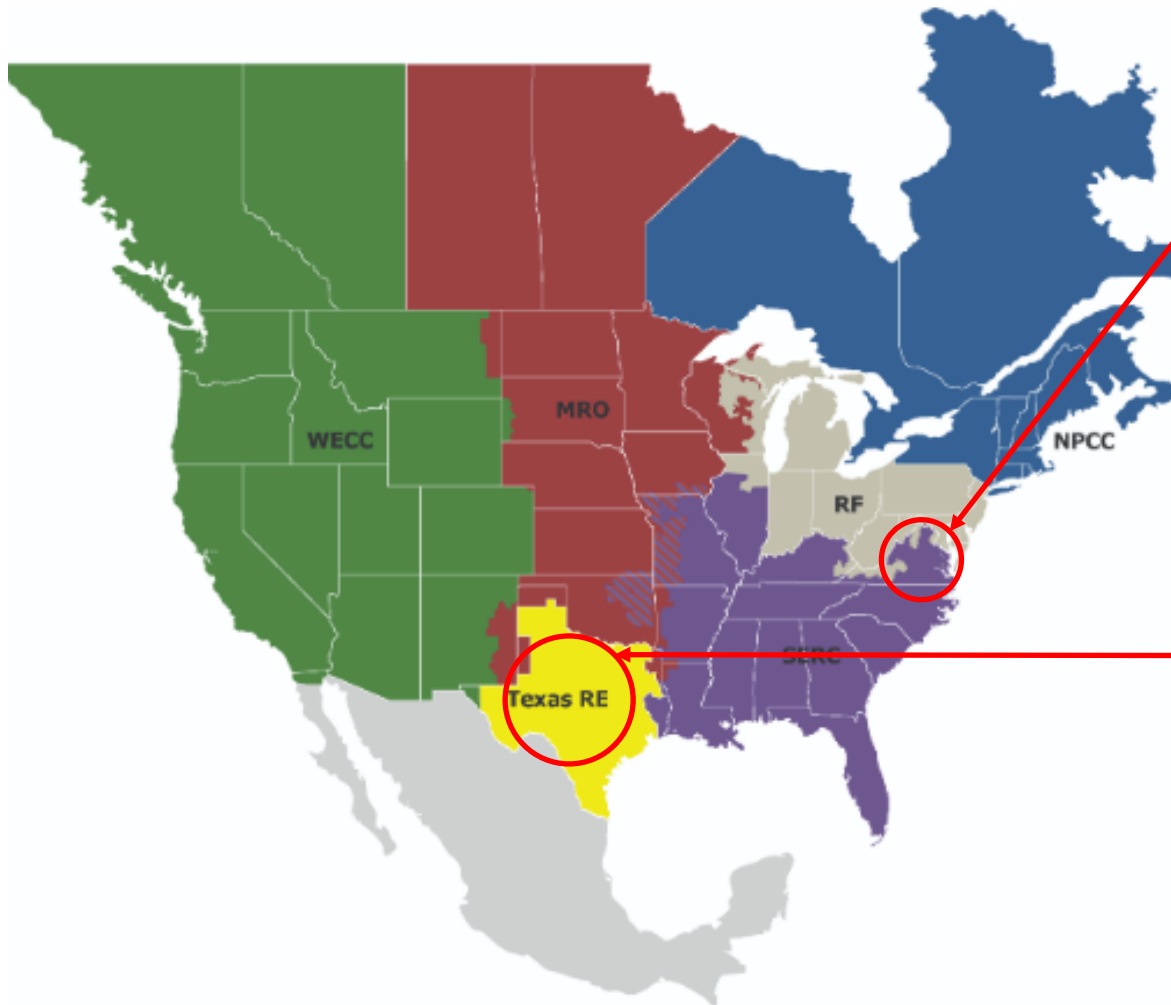
Reliability Impacts Risks with Large Load Integration

Mark Lauby, NERC Fellow and Chief Engineer
FERC/NRC Joint Commissions Meeting

October 22, 2026

Primary Demand Drivers by Assessment Area





- El Data Center Load Loss Events
 - Impacts the state of Virginia
 - July 2024 – 1,500 MW Load Loss in Loudoun County
 - February 2025 – 1,800 MW Load Loss in Loudoun & Fairfax Counties
 - July 2026 – 3,800 MW of Load Loss in Loudoun, Fairfax, Prince William, & Arlington Counties
- ERCOT Crypto-Mining Load Loss
 - 25 Load Loss Events (Nov 2023 – Jan 2025)
 - 100MW – 400MW Load loss

July 10, 2024 – Data Center Load Loss Event

NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Incident Review

Considering Simultaneous Voltage-Sensitive Load Reductions

Primary Takeaways

Operators and planners of the Bulk Electric System (BES) should be aware of the risks and challenges associated with voltage-sensitive large loads that are rapidly being connected to the power system. Specifically, when considering data centers and cryptocurrency mining facilities, entities should be aware of the potential for large amounts of voltage-sensitive load loss during normally cleared faults on the BES. Voltage-sensitive data center-type loads have increased on the system and are predicted to continue growing rapidly. The 2024 NERC *Long-Term Reliability Assessment* (LTRA) documents and discusses this potential growth of data center-type loads. This vignette highlights this load-loss potential based on analysis of a recent event in the Eastern Interconnection and offers some considerations for BES operators, planners, and regulators concerning identifying and mitigating the potential reliability effects and risks presented by these large voltage-sensitive load losses for future operations.

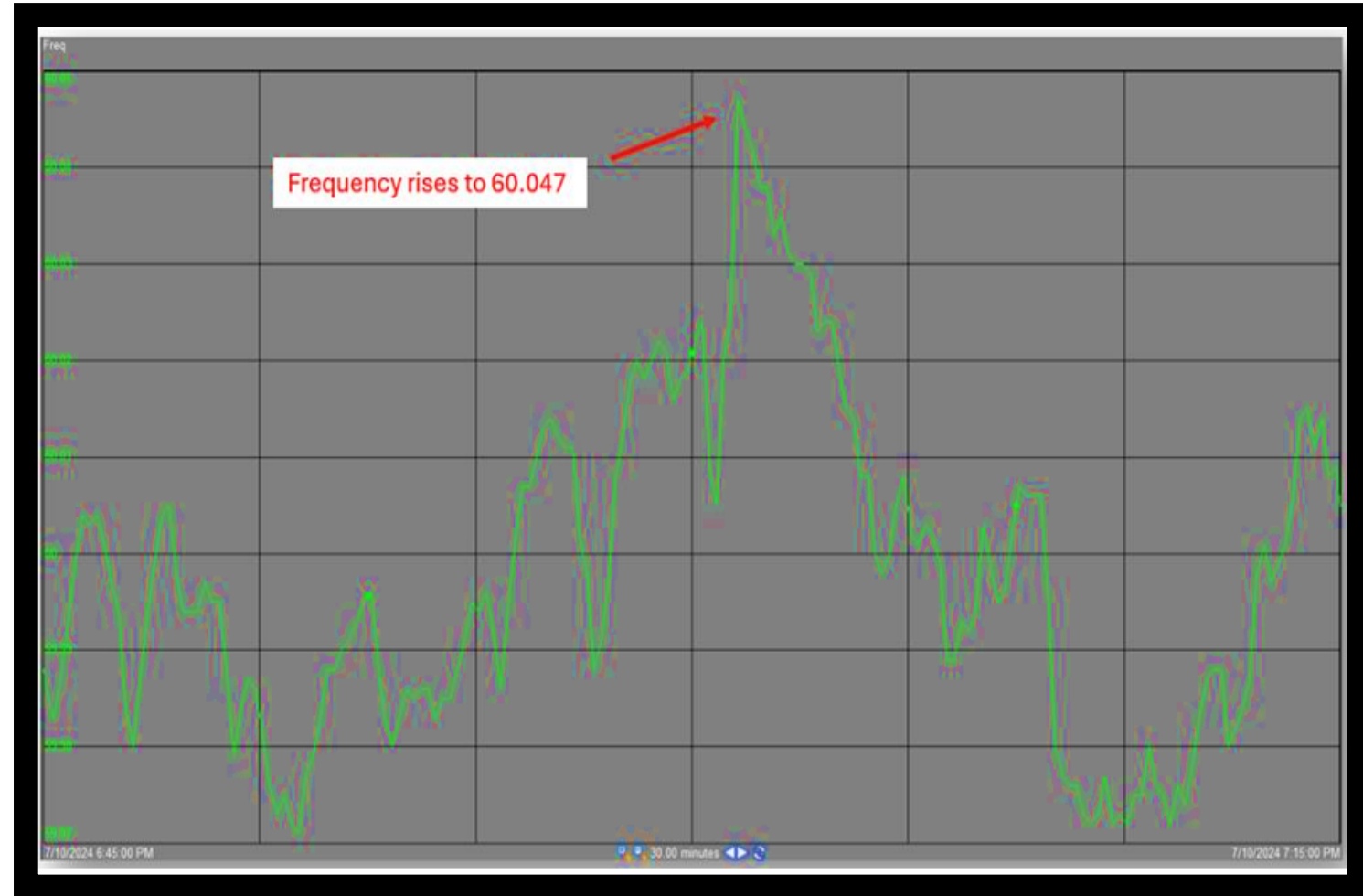
Summary of Incident

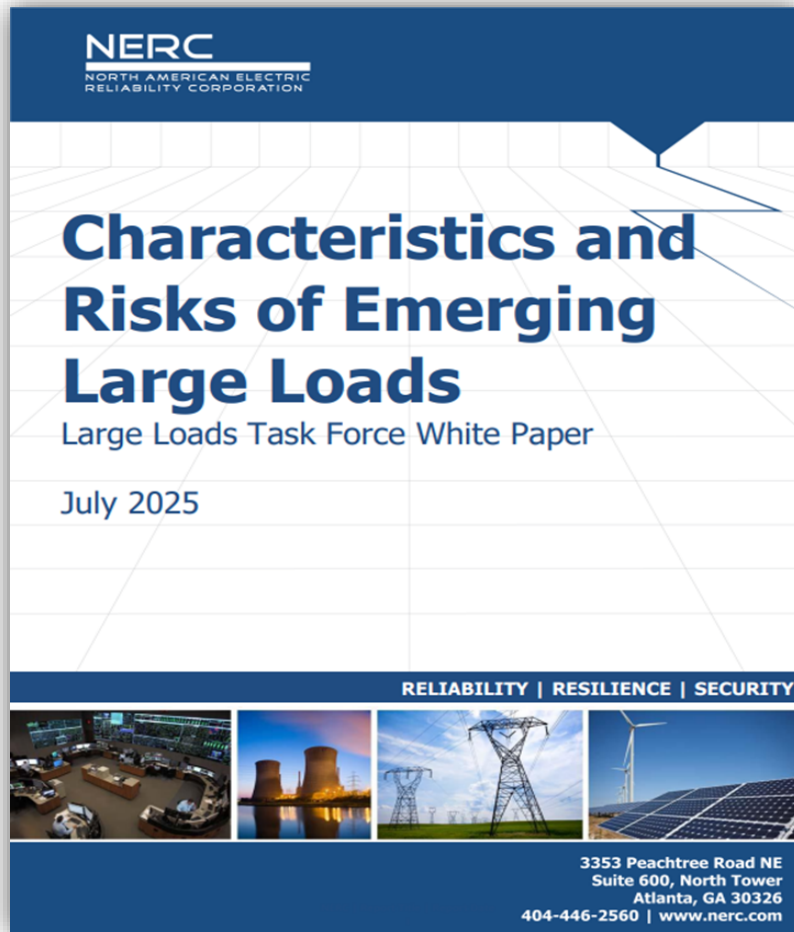
A 230 kV transmission line fault led to customer-initiated simultaneous loss of approximately 1,500 MW of voltage-sensitive load that was not anticipated by the BES operators. The electric grid has not historically experienced simultaneous load losses of this magnitude in response to a fault on the system, which has historically been planned for large generation losses but not for such significant simultaneous load losses. Simultaneous large load losses have two effects on the electric system: First, frequency rises on the system as a result of the imbalance between load and generation; second, voltage rises rapidly because less power is flowing through the system. In this incident, the frequency did not rise to a level high enough to cause concern. The voltage also did not rise to levels that posed a reliability risk, but operators did have to take action to reduce the voltage to within normal operating levels. However, as the potential for this type of load loss increases, the risk for frequency and voltage issues also increases. Operators and planners should be aware of this reliability risk and ensure that these load losses do not reach intolerable levels.

Incident Details

At approximately 7:00 p.m. Eastern on July 10, 2024, a lightning arrester failed on a 230 kV transmission line in the Eastern Interconnection, resulting in a permanent fault that eventually “locked out” the transmission line. The auto-reclosing control on the transmission line was configured for three auto-reclose attempts staggered at each end of the line. This configuration resulted in 6 successive system faults in an 82-second period. The protection system detected these faults and cleared them properly. The shortest fault duration was the initial fault at 42 milliseconds, and the longest fault duration was 66 milliseconds. The voltage magnitudes during the fault ranged from .25 to .40 per unit in the load-loss area.

RELIABILITY | RESILIENCE | SECURITY





Emerging Large Loads exhibit BPS risk

Certain Loads (Data Centers) are of concern

**High Priority
Risks**

LONG-TERM PLANNING

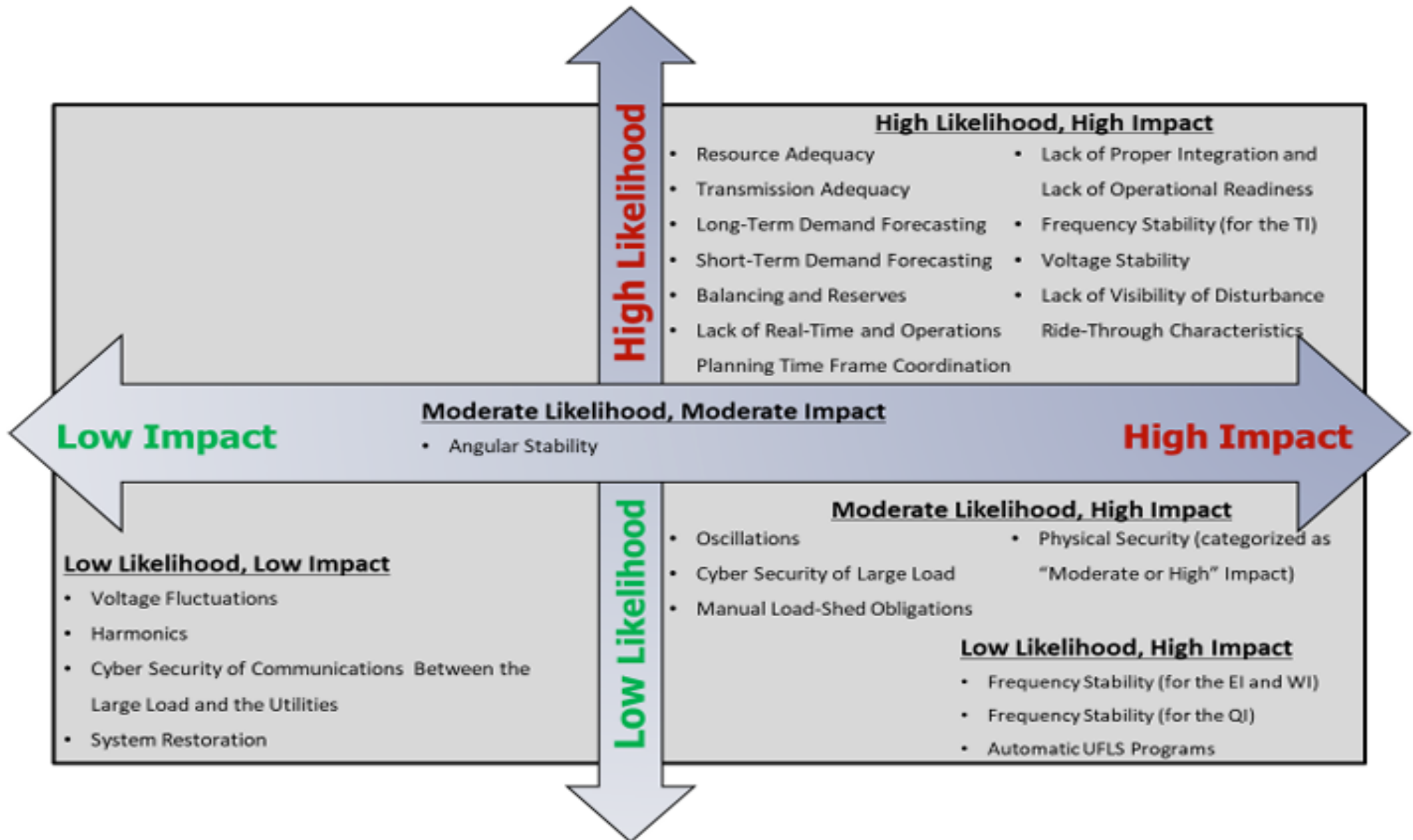
- Resource Adequacy

OPERATIONS/BALANCING

- Balancing and Reserves

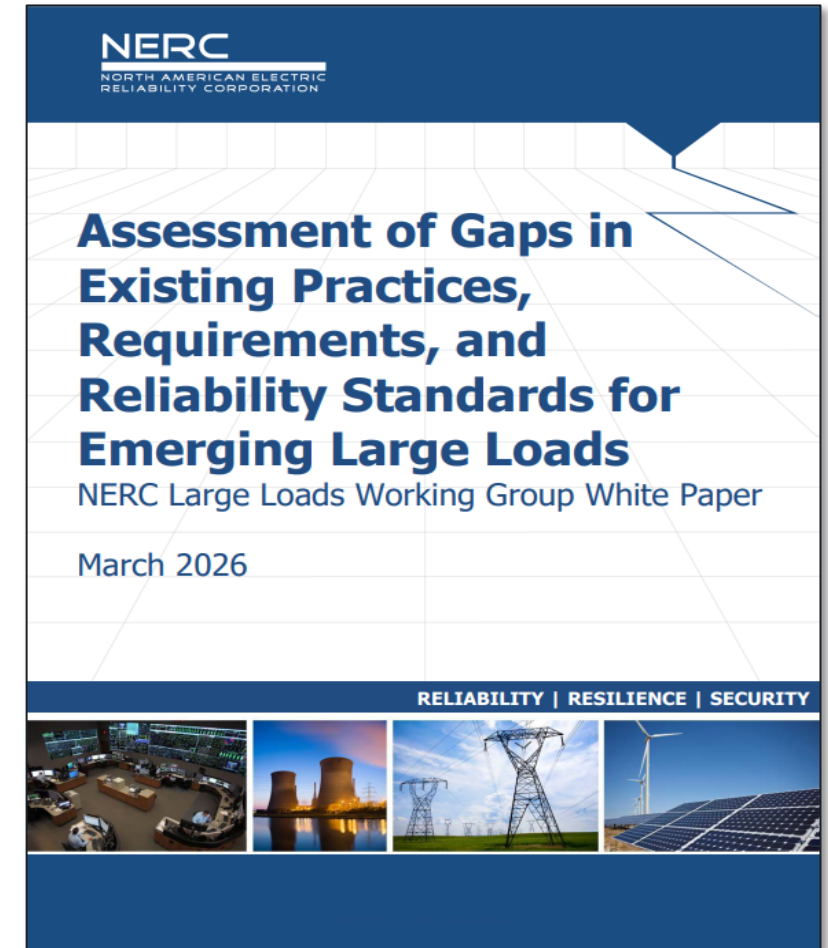
STABILITY

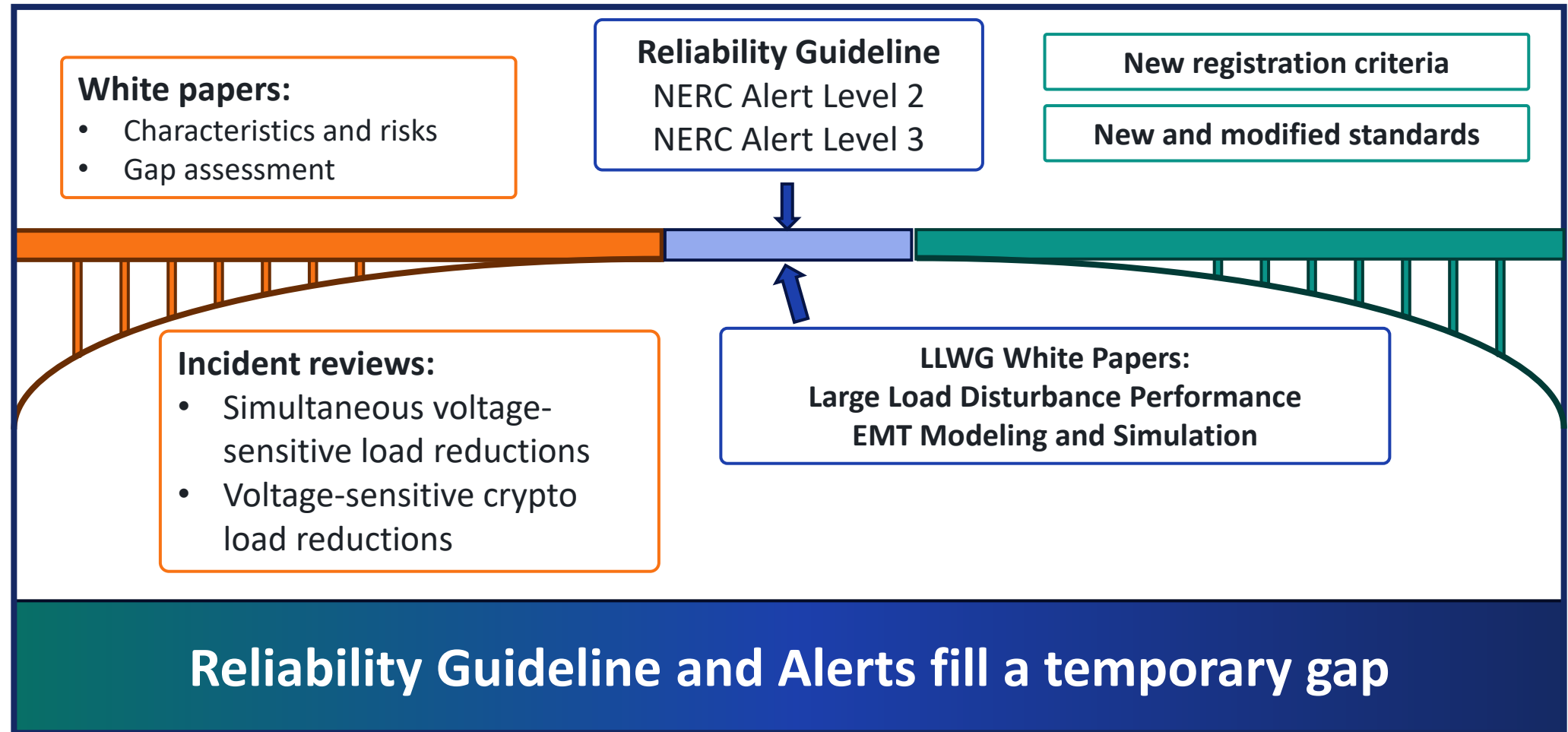
- Ride-through
- Voltage Stability
- Angular Stability
- Oscillations



Existing Reliability Standards, processes, and requirements for Transmission/Distribution planning, operations, security, and other areas are **inadequate** to address the risks posed by emerging large loads.

Updates are needed to registration criteria, Reliability Standards, processes/requirements, and other areas.





A light blue map of North America, including the United States, Canada, and Mexico, serves as the background. The map shows state and provincial boundaries. A vertical line is positioned between the text 'NERC' and 'Discussion'.

NERC

Discussion