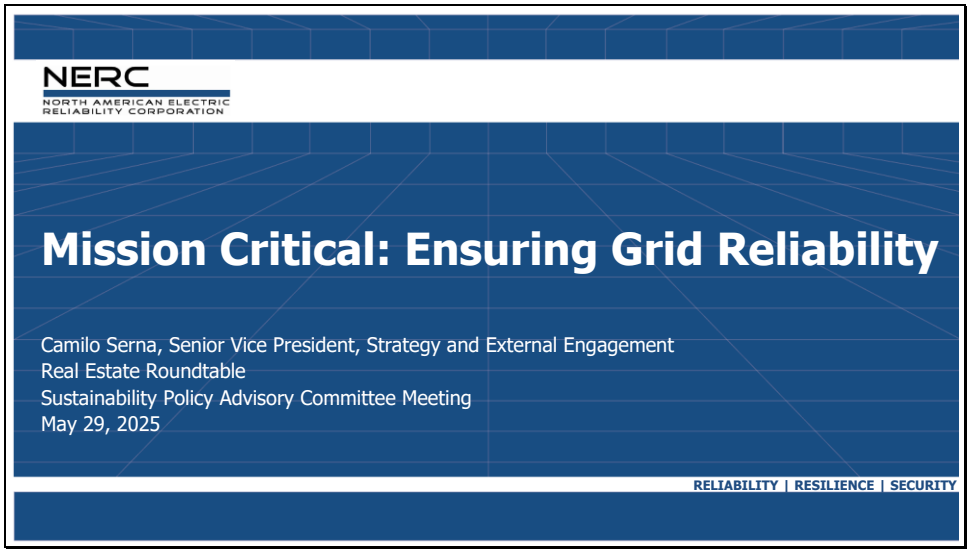
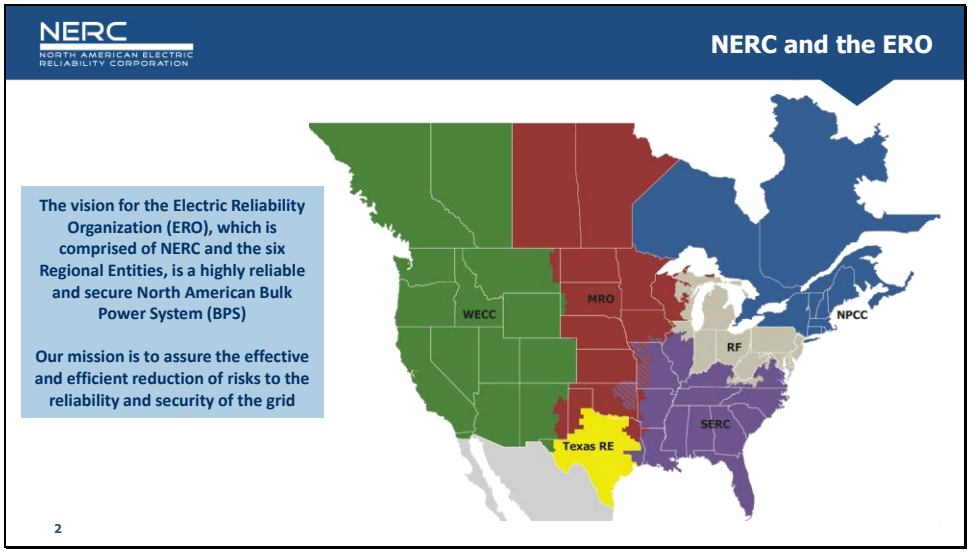
Slide 1


NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION
Mission Critical: Ensuring Grid Reliability
Camilo Serna, Senior Vice President, Strategy and External Engagement
Real Estate Roundtable
Sustainability Policy Advisory Committee Meeting
May 29, 2025
RELIABILITY | RESILIENCE | SECURITY

Slide 2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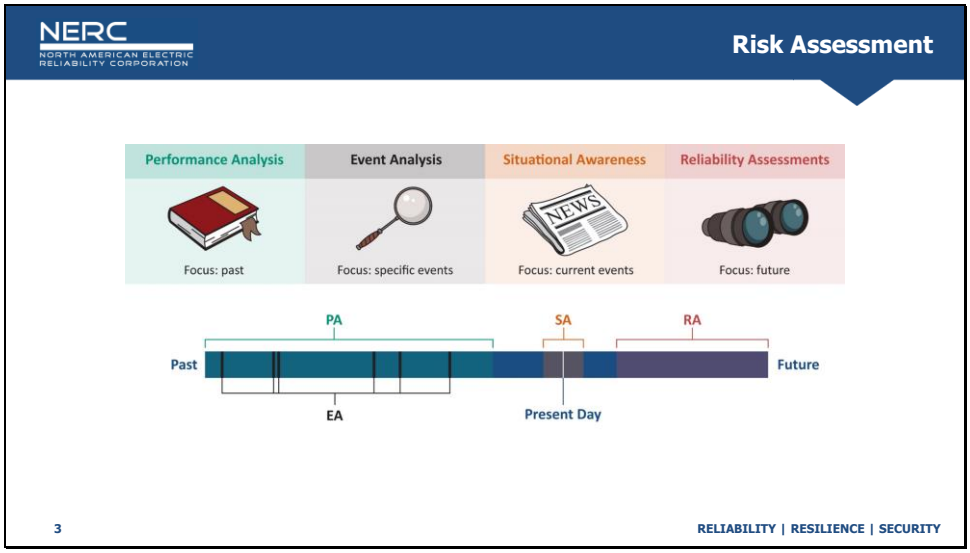
NERC and the ERO
The vision for the Electric Reliability Organization (ERO), which is comprised of NERC and the six Regional Entities, is a highly reliable and secure North American Bulk Power System (BPS)
Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid
WECC
MRO
NPCC
RF
SERC
Texas RE
2

Slide 3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Risk Assessment
Performance Analysis
Event Analysis
Situational Awareness
Reliability Assessments
Focus: past
Focus: specific events
Focus: current events
Focus: future
PA
SA
RA
Past
Future
EA
Present Day
3
RELIABILITY | RESILIENCE | SECURITY

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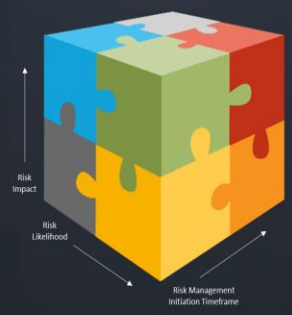
Risk Mitigation

Electric Reliability Organization: Reliability Risk Mitigation Toolkit



Reliability Guideline

Suggested approaches or behavior in a given technical area for the purpose of improving reliability. Guidelines are not enforceable, but may be adopted by a responsible entity in accordance with its own polices, practices, and conditions.

NERC Alert: Level 2-3

NERC alerts are divided into three distinct levels, 1) Industry Advisory, 2) Recommendation to Industry, and 3) Essential Action, which identifies actions to be taken and require the industry to respond to the ERO.

Technical Engagement

Technical Engagement is a catch-all for a variety of technical activity that is conducted between the ERO and entities. This includes, technical committee activities, technical reference documents, workshops and conferences, assist visits, joint and special studies, etc.

Reliability Standards

NERC Reliability Standards define the mandatory reliability requirements for planning and operating the North American BPS and are developed using a results-based approach focusing on performance, risk management, and entity capabilities.

Reliability Assessment

NERC independently assesses and reports on the overall reliability, adequacy, and associated risks that could impact BPS reliability. Long-term assessments identify emerging reliability issues that support public policy input, improved planning and operations, and general public awareness.

NERC Alert: Level 1

NERC Alerts are divided into three distinct levels, 1) Industry Advisory, 2) Recommendation to Industry, and 3) Essential Action, which identifies actions to be taken and require the industry to respond to the ERO.

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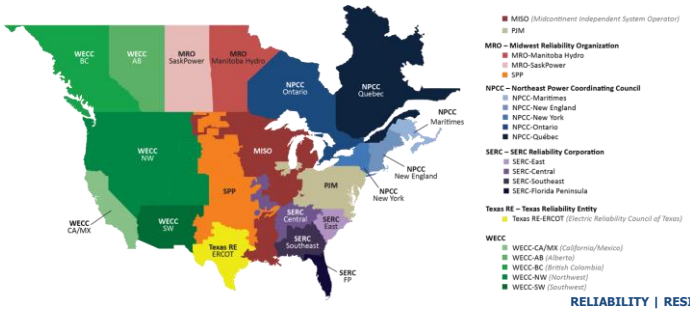
Long-Term Reliability Assessment (LTRA)

- 10-year assessment of resource capacity and energy risks
- Uses industry's demand and generation forecasts and transmission projections
- Coordination and review with Regional Entities and stakeholders
- Includes emerging issues that can impact future reliability



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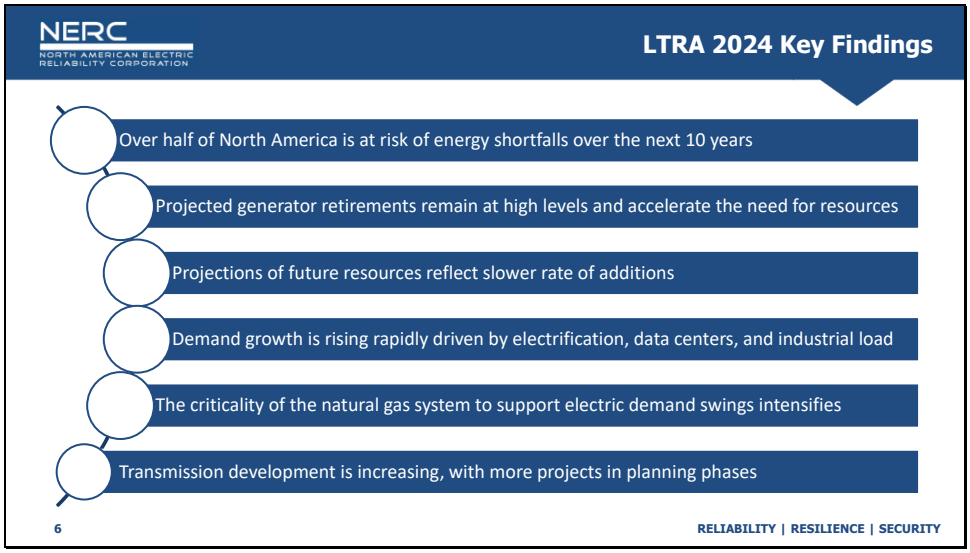
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LTRA 2024 Key Findings
Over half of North America is at risk of energy shortfalls over the next 10 years
Projected generator retirements remain at high levels and accelerate the need for resources
Projections of future resources reflect slower rate of additions
Demand growth is rising rapidly driven by electrification, data centers, and industrial load
The criticality of the natural gas system to support electric demand swings intensifies
Transmission development is increasing, with more projects in planning phases
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RELIABILITY | RESILIENCE | SECURITY

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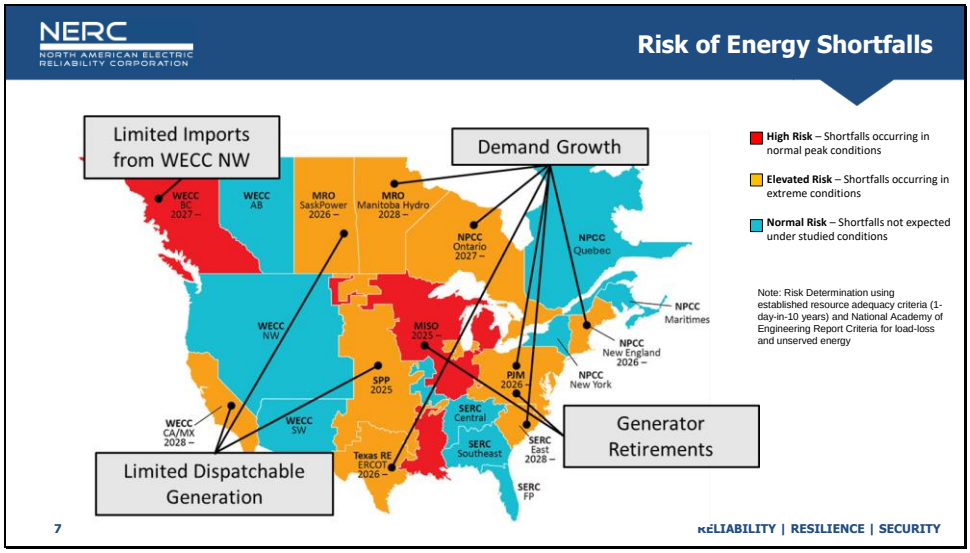

Big risks and trends from the LTRA's energy and capacity assessment

Slide 8

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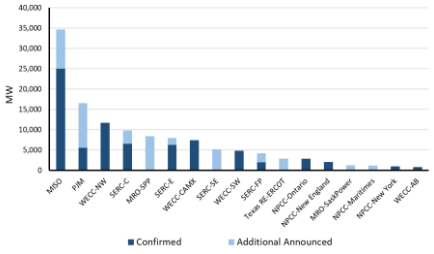
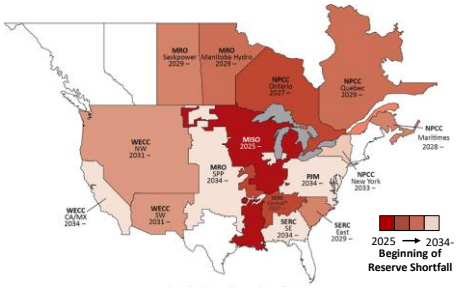
Projected Generator Retirements

Fossil-fired and Nuclear Generator Retirements by 2034 by Region



Reserve Margin Shortfall Projections Over the 10-Year Period



115 GW of expected thermal generator retirements through 2034 (78 GW confirmed; 37 GW announced)

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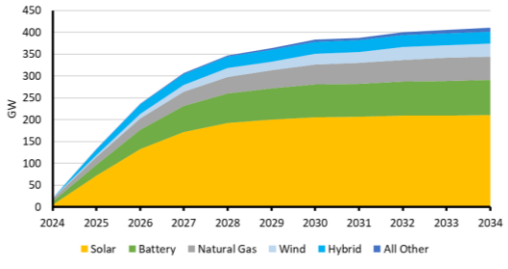
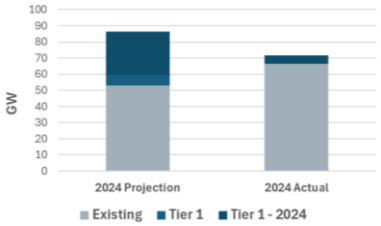
Slower Rate of Additions

Resources in Interconnection Process
Includes Tier 1 (Signed Agreements) and Tier 2 (Processing)



Solar On-Peak Capacity
Prior-Year Projection vs. Actual



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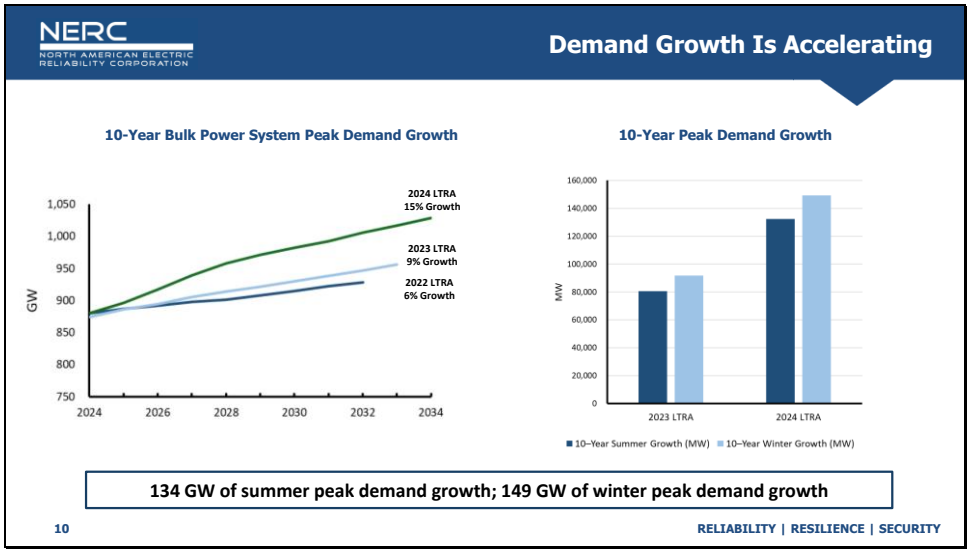

Demand continues to be a big focus for the long-term. Looking at 2023, the 10-year peak demand was increasing at the highest rate in last three decades. Further growth was projected in part due to increases in electrification and EV adoption. Now in 2024's early look, we see Peak demand growth is increasing at an **even higher** rate than in 2023 and 2024 records the highest CAGR in the last 20 years. Lots of this increased growth in demand can be attributed to data centers, large commercial and industrial loads, vehicle electrification, and heat pumps showcasing as the predominant drivers. NERC is studying the impacts on some of these new demand drivers, such as large commercial and industrial loads. A new RSTC task force has been created to address this.

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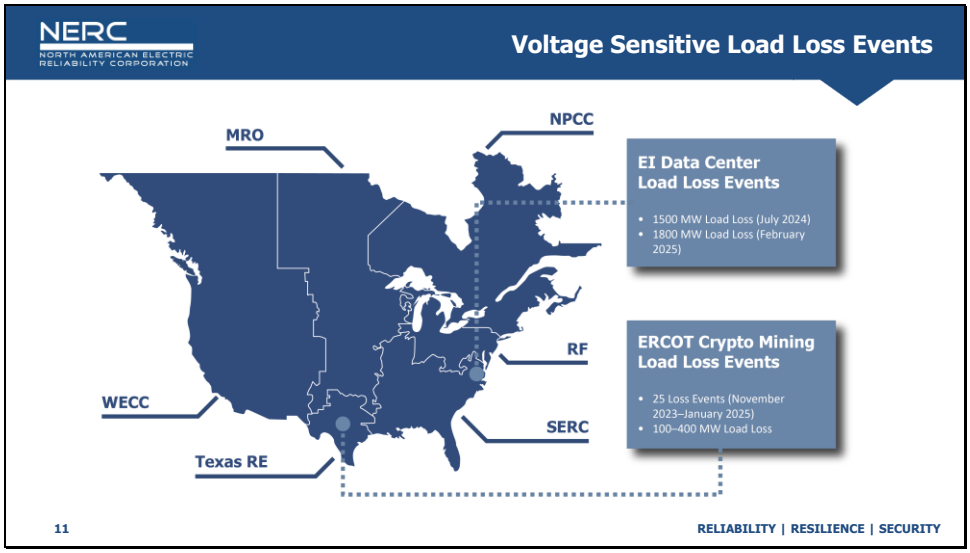
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Voltage Sensitive Load Loss Events
MRO
NPCC
RF
WECC
SERC
Texas RE
EI Data Center Load Loss Events
• 1500 MW Load Loss (July 2024)
• 1800 MW Load Loss (February 2025)
ERCOT Crypto Mining Load Loss Events
• 25 Loss Events (November 2023–January 2025)
• 100–400 MW Load Loss
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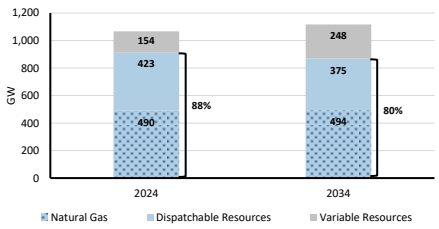
Criticality of Natural Gas Intensifies

2024 to 2034 Change in Natural Gas and Dispatchable Capacity



Natural Gas Generation Contribution to Winter Peak and Total Winter Resource Mix

	Peak Winter Capacity	Contribution to Total Winter Resource Mix
MISO	62.3 GW	45%
MRO-SaskPower	2.4 GW	43%
NPCC-New England	15.0 GW	51%
NPCC-New York	24.5 GW	66%
PJM	84.4 GW	47%
SERC-Central	22.0 GW	43%
SERC-Florida Peninsula	49.8 GW	80%
SERC-Southeast	31.9 GW	50%
SPP	29.9 GW	48%
Texas RE-ERCOT	55.3 GW	57%
WECC-AB	13.9 GW	83%
WECC-CA/MX	37.8 GW	65%
WECC-NW	33.6 GW	39%
WECC-SW	18.1 GW	58%

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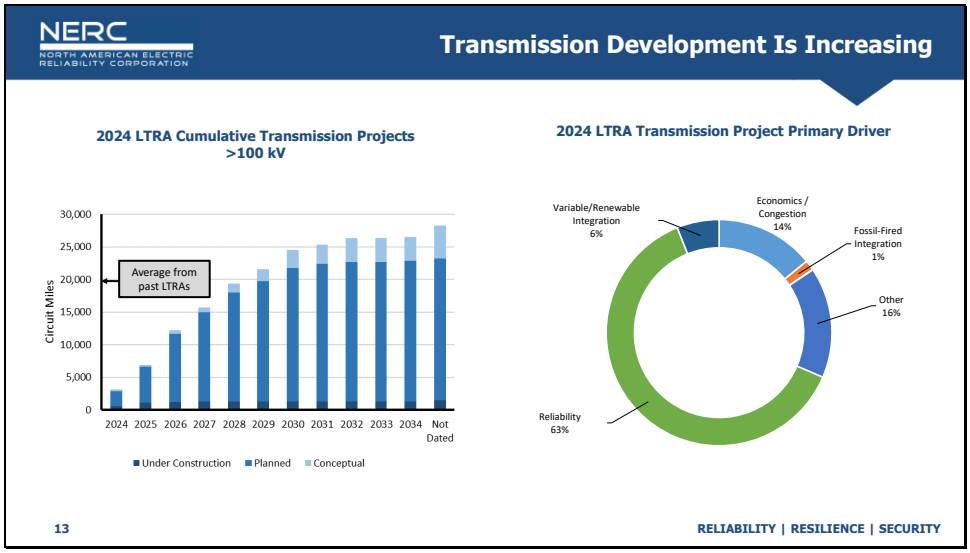

2023 LTRA: Little change in transmission miles projections over the course of the 10-year assessment period. 2024 LTRA Preliminary Information: Indicators point to more investment and enhancements to regional planning processes to support expansion. The amount of BPS transmission projects reported to NERC as under construction or in planning for construction over the next 10 years has increased, indicating an overall increase in transmission development. Siting and permitting challenges continue to inflict delays in transmission expansion planning. Regional transmission planning processes are adapting to manage energy transition, but impediments to transmission development remain.

Implications: Assessments should evolve to evaluate transfer capability and benefits to reliability. The Interregional Transfer Capability Study (ITCS) will create a foundation for transmission assessment that will shape the transmission assessment within the LTRA.

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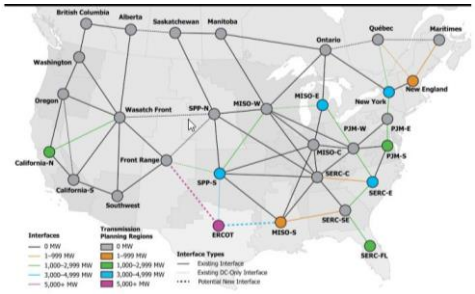
Increasing Transfer Capability Can Reduce Energy Shortfalls

ITCS Prudent Additions to Transfer Capability

- NERC Interregional Transfer Capability Study (ITCS) finding: **35 GW additional transfer capability in the U.S. would improve energy adequacy in extreme weather**
- Transmission alone will not resolve all identified shortfalls → supply resources are needed
- ITCS recommendations to planners include considering all options to address system needs:
  - Transmission and transfer capability
  - Local generation and storage
  - Demand-side management

ITCS Prudent Additions to Transfer Capability



NERC performed the ITCS to meet the requirements of the Fiscal Responsibility Act of 2023. Study information and results can be found on NERC's ITCS Webpage

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2024 LTRA Recommendations

- Resource planners, market operators, and regulators| **carefully manage generator deactivations**
- NERC and Regional Entities| **improve the LTRA with energy metrics, consistent methods, and wide-area energy analysis**
- Regulators and Policymakers| **streamline siting and permitting to remove barriers to resource and transmission development**
- Regulators, industry, and gas industry| **implement a framework for addressing reliability needs of the interconnected energy system**
- ISOs/RTOs, regulators| **continue steps to ensure sufficient Essential Reliability Services**

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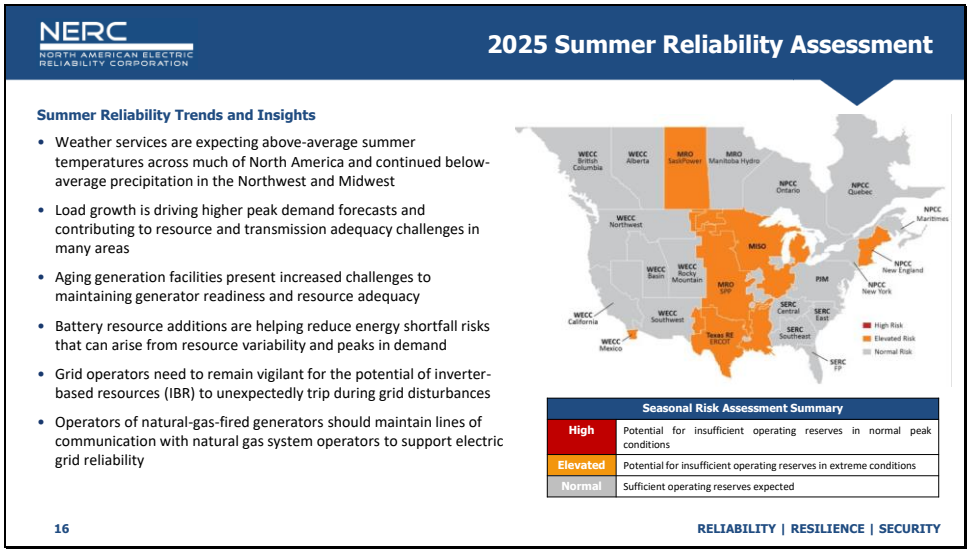

In Texas, California, and across the U.S. West, the influx of battery energy storage systems (BESS) in recent years has markedly improved the ability to manage energy risks during challenging summer periods

As solar, wind, and battery resources remain the predominant types of resources being added to the BPS, it is imperative for industry, vendors, and manufacturers to take the recommended steps for system modeling and study practices and IBR performance.

Across the U.S. portion of the Western Interconnection, over 6.5 GW of installed solar capacity has been added, along with nearly 7 GW in battery storage. The resources are expected to provide close to 14 GW in on-peak capacity. In British Columbia, new hydroelectric generators were commissioned, contributing to an additional 500 MW in capacity for the summer. The resource additions have alleviated capacity and energy shortfall risks identified in these assessment areas prior to Summer 2024 and provide supplies across the Western Interconnection.

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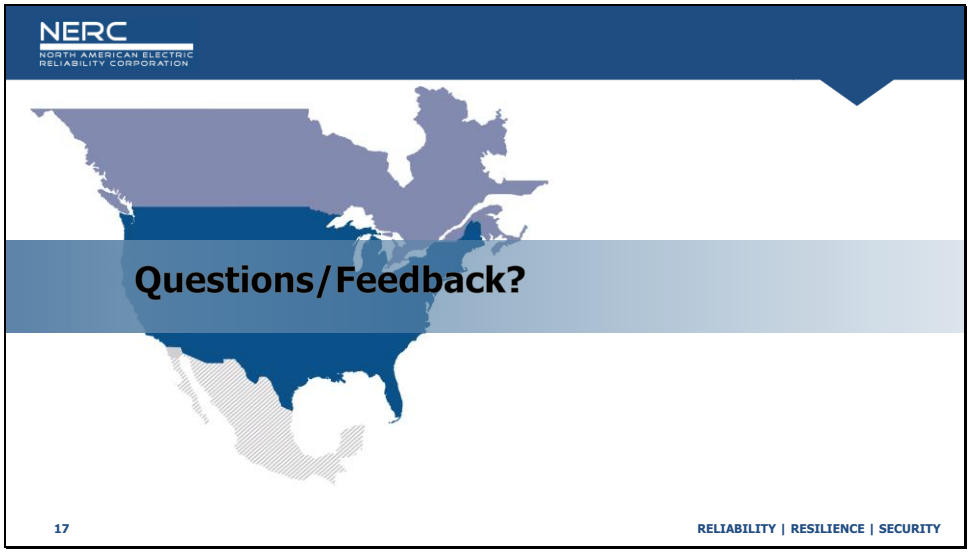
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Questions/Feedback?
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