NERC NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Agenda

Board of Trustees Informational Session

November 13, 2024 1:15-2:00 p.m. Eastern Virtual

Webinar: Join Link Webinar Password: BoardNov13ATT Audio Only: +1-415-655-0002 | Access Code: 2318 686 0169

Introduction and Opening Remarks

NERC Antitrust Compliance Guidelines

Agenda Items

- 1. 2024-2025 Winter Reliability Assessment Overview* Review
- 2. 2024 Long-Term Reliability Assessment Overview* Update
- 3. Interregional Transfer Capability Study* Update
- 4. Closing Remarks and Conclude Session

*Background materials included.

2024-2025 Winter Reliability Assessment Preview

Action

Review

Summary

The NERC 2024-2025 Winter Reliability Assessment (WRA) identifies, assesses, and reports on areas of concern regarding the reliability of the North American bulk power system (BPS) for the upcoming winter season. In addition, the WRA presents peak electricity supply and demand changes, as well as highlights regional challenges and expected conditions that might impact the BPS. The reliability assessment process is a coordinated reliability evaluation between the Reliability Assessment Subcommittee (RAS), the Regional Entities, and NERC staff.

The final report reflects NERC's independent assessment and is aimed at informing industry leaders, planners and operators, as well as regulatory bodies so that they can be better prepared to take necessary actions to ensure BPS reliability. The report also provides an opportunity for the industry to discuss their plans and preparations for ensuring reliability throughout the upcoming winter period.

Pursuant to delegated authority from the NERC Board of Trustees (Board), NERC management will approve the 2024-2025 Winter Reliability Assessment prior to its release on November 14, 2024. NERC Board will receive an embargoed copy of the report by November 12, 2024. NERC management will provide an overview of the report at the November 13 Board Informational Session.

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Reliability Assessments

2024-2025 Winter Reliability Assessment

Mark Olson, Manager, Reliability Assessments Board of Trustees Informational Session November 13, 2024





Winter Reliability Assessment

2024–2025 Winter Reliability Assessment

November 2024



Release November 14, 2024



2024-2025 Winter Reliability Assessment Highlights

 All areas expected to have sufficient resources for normal peak conditions 2

- Regulatory and industry initiatives have improved readiness for winter
- Load growth is shrinking reserves and adding to dispatchable resource needs
- Natural gas fuel supplies remain at risk in extreme cold weather



2024-2025 Winter Reliability Risk Map

Seasonal Risk Assessment Summary						
High	Potential for insufficient operating reserves in normal peak conditions					
Elevated	Potential for insufficient operating reserves in extreme conditions					
Low	Sufficient operating reserves expected					

Assessment based on reserve margins, operational risk scenarios, and probabilistic energy analysis

Extreme conditions include 90/10 demand scenarios, historical high generator outage rates, and low variable energy resource scenarios



- Cold Weather Preparations Operators should review seasonal operating plans, communications protocols, and lessons-learned
- Generator Readiness Generator Owners should complete winter readiness preparations, deploy weatherization packages in advance of winter storms, and frequently check cold-weather mitigations
- **Fuel** Balancing Authorities (BA) should implement generator fuel surveys to monitor the adequacy of fuel supplies
- Load Forecasting BA should anticipate load forecasts uncertainty and be prepared to take early action to manage potential reserve deficiencies
- State regulators and policy makers support environmental and transportation waivers when requested to manage potential emergencies







NERC Staff is preparing for NERC approval and distribution to the NERC Board of Trustees on November 12



NERC Board of Trustees Presentation: November 13, 2024



Publication date: November 14, 2024



Questions and Answers



2024 Long-Term Reliability Assessment Preview

Action

Update

Background

The Long-Term Reliability Assessment (LTRA) is developed annually by NERC in accordance with the Electric Reliability Organization's (ERO) Rules of Procedure and Section 215 of the Federal Power Act, which instructs NERC to conduct periodic assessments of the North American bulk power system (BPS). The reliability assessment process is a coordinated reliability evaluation between the Reliability Assessment Subcommittee (RAS), the Regional Entities, and NERC staff. The scope of the LTRA includes the following:

- Review, assess, and report on the overall electric generation and transmission reliability (adequacy and operating reliability) of the interconnected BPS, both existing and as planned.
- Assess and report on the key issues, risks, and uncertainties that affect or have the potential to affect the reliability of existing and future electric supply and transmission.
- Review, analyze, and report on self-assessments of electric supply and bulk power transmission reliability, including reliability issues of specific regional concern.
- Identify, analyze, and project trends in electric customer demand, supply, and transmission and their impacts on BPS reliability.
- Investigate, assess, and report on the potential impacts of new and evolving electricity market practices, new or proposed regulatory procedures, and new or proposed legislation (e.g. environmental requirements) on the adequacy and operating reliability of the BPS.

Summary

The electricity industry provided NERC with data and narrative information for the 10-year (2024-2034) assessment period so that the ERO can conduct its independent assessment of the long-term reliability of the North American BPS. NERC staff will provide an update on the development of the 2024 LTRA and discuss long-term trends, emerging issues, and potential reliability risks. The LTRA draft report will be provided to the NERC Board of Trustees (Board) in November, per the schedule below.

2024 Long-Term Reliability Assessment Review Schedule					
Date	Description				
October 9	Draft sent to NERC Reliability and Security Technical Committee (RSTC)				
November 21	Embargoed copy of the report sent to NERC Board				
December 12	Report release (Embargoed report sent to MRC prior to release)				

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Reliability Assessments

2024 Long-Term Reliability Assessment

Mark Olson, Manager, Reliability Assessments Board of Trustees Informational Session November 13, 2024





Long-Term Reliability Assessment



2024 Long-Term Reliability Assessment

December 2024

Release: December 12, 2024







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Resources are Needed for Rising Demand and Energy Risks



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Criteria for load-loss and unserved energy.



- Areas are projected to fall short of reserve margin requirements as generation retirements continue at rapid pace
- Fossil-fired retirements through 2034: 78 GW confirmed + 37 GW announced



Demand Growth is Accelerating



6 10-year BPS Peak Demand Growth

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Resources Projections Reflect Slower Rate of Additions

 Resources in the interconnection process continue to grow Project delays and cancellations are causing resource growth to fall short of projections



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

Solar On-Peak Capacity | prior-year projection v. current year actual



Transmission Development is Increasing

- More line-miles are in transmission project planning than in prior LTRAs
- Assessment areas report significant investment in transmission development including projects to increase transfer capability



Under Construction
Planned
Conceptual
2024 LTRA Cumulative Transmission
Projects >100 kV



2024 LTRA Transmission Project Primary Driver



Emerging Issues

Data Centers and Large Industrial Load	Growth in large load parcels like data centers and industrial facilities pose various challenges for system planners and operators.			
Battery Energy Storage Systems (BESSs)	Poor visibility of BESSs' state-of-charge poses risks for operators who expect energy available for dispatch.			
Electric Vehicles and Electric Load	With increased adoption of Electric Vehicles (EVs) which use batteries to store energy, there is a need to understand the impact of battery charging on system performance			
	impact of battery charging on system performance.			
	impact of battery charging on system performance.			



Recommendations

Resource Planners and Markets

- Use multi-metric resource adequacy approaches
- Assess extreme weather and fuel risks
- Have effective mechanisms to manage generator deactivations

Industry

- Develop standards and incorporate recommendations to address IBR performance issues and planning needs for DER growth
- Develop standards for mitigating energy risks
- Implement generator cold-weather performance requirements

NERC and the ERO Enterprise

- Improve the LTRA with wide-area energy assessments and consistent probabilistic assessment approaches and metrics
- Engage policymakers and natural gas trade organizations in developing frameworks for addressing urgent gas-electric coordination







NERC Staff is revising the LTRA and preparing for NERC approval



NERC Board of Trustees Presentation: November 13, 2024



Publication date: December 12, 2024



Questions and Answers

Interregional Transfer Capability Study (ITCS)

Action

Update

Summary

Congress passed the <u>Fiscal Responsibility Act of 2023</u>¹, which included a provision for NERC to conduct a study on the reliable transfer of electric power between neighboring transmission planning areas. NERC, in consultation with the Regional Entities and industry stakeholders, is conducting transfer capability studies for regional transmission areas in the United States and recommend prudent additions to transfer capability needed for reliability.

Who: NERC, in consultation with each regional entity and each transmitting utility² in a neighboring transmission planning region.

What: A study of total transfer capability between transmission planning regions.³ In accomplishing this work, the study should include:

- 1. "Current total transfer capability, between each pair of neighboring transmission planning regions."^{4 5}
- 2. "A recommendation of prudent additions to total transfer capability between each pair of neighboring transmission planning regions that would demonstrably strengthen reliability within and among such neighboring transmission planning regions"; and
- 3. "Recommendations to meet and maintain total transfer capability together with such recommended prudent additions to total transfer capability between each pair of neighboring transmission planning regions."

When: NERC must file the report with FERC within 18 months of enactment of the bill. Public comment period will occur when FERC publishes the study in the Federal Register. After submittal, FERC must post for public comments and provide a report to Congress within 12 months of closure of the public comment period with recommendations (if any) for statutory changes.

ERO study filing deadline: On or before December 2, 2024

¹ H.R.3746 - 118th Congress (2023-2024): Fiscal Responsibility Act of 2023 | Congress.gov | Library of Congress

² "means an entity (including an entity described in section 201(f)) that owns, operates, or controls facilities used for the transmission of electric energy—(A) in interstate commerce; (B) for the sale of electric energy at wholesale." [FPA, Section 3(23)] ³ (a) IN GENERAL.—The Electric Reliability Organization (as that term is defined in section 215(a)(2) of the Federal Power Act), in consultation with each regional entity (as that term is defined in section 215(a)(7) of such Act) and each transmitting utility (as that term is defined in section 3(23) of such Act) that has facilities interconnected with a transmitting utility in a neighboring transmission planning region, shall conduct a study of total transfer capability as defined in section 37.6(b)(1)(vi) of title 18, Code of Federal Regulations, between transmission planning regions that contains the following:" [1-3 bullets quoted above]

⁴ **Total transfer capability** means the amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission systems by way of all transmission lines (or paths) between those areas under specified system conditions, or such definition as contained in Commission-approved Reliability Standards. [18 C.F.R. Section 37.6(b)(1)(vi)] ⁵ **Neighboring transmission planning region**: implicitly means facilities connecting two adjacent systems or control areas.

Key Activities

• Study Analysis

Analysis work for Part I 'Transfer Capability Analysis' and Part II 'Prudent Addition Recommendations' have been completed and draft reports have been published. The study results have been reviewed with Regional Entities and the ITCS Advisory Group (group of industry experts formed to provide input). A generic set of recommendations to meet and maintain transfer capability have also been finalized and published.

• Study Reports

The following Study Report drafts have been released:

- 1. ITCS Overview: This report provides a high-level overview of the study, the background, the approach and form foundational information for subsequent reports. The draft was published on June 27, 2024.
- 2. Part I Transfer Capability: This report covers the results from the transfer capability analysis. The report was released in August 2024.
- 3. Parts II and III Prudent Additions: This report includes recommendations of prudent additions to transfer capability as well as recommendations to meet and maintain prudent additions. The draft was released on November 4, 2024.

The final submission to FERC will include reports 1-3 above and expected to be officially filed with FERC in November 2024.

Analysis work has started on Canadian Analysis which will cover the US to Canada exports analysis and inter-provincial analysis; expected to be released in Q1 of 2025.

• Stakeholder Outreach

The ERO Enterprise (NERC and the Regional Entities) has executed a comprehensive stakeholder outreach plan to ensure that all North American transmitting utilities and all stakeholders can provide input into the ITCS. Regional Entities worked with their technical committees, which continued throughout 2024. The study directive in Fiscal Responsibility Act requires that NERC perform the ITCS in consultation with all transmitting utilities that have facilities interconnected with a transmitting utility in a neighboring transmission planning region.

NERC has been publishing quarterly project updates which have been posted to the NERC <u>ITCS website</u>.

NERC has issued three letters to all Transmission Owners, Transmission Operators, Transmission Planners and Planning Coordinators, inviting them to participate in the ITCS and provide input.

Next Steps

To enhance future Long-term Reliability Assessments, NERC has begun collaborating with Regional Entities and the Reliability Assessment Subcommittee to incorporate assessment of interregional transfer capability into future analyses.

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Strengthening Reliability through Energy Transformation NERC ITCS

Saad Malik, Manager Transmission Assessments - NERC Board of Trustees Informational Session November 13, 2024





North American system is vulnerable to extreme weather

One-size fit all transfer capability requirement may be ineffective

Increased interregional transmission could mitigate energy deficiencies

Resource assumptions are critical

Transmission upgrades alone will not address all risks



Prudent Addition Recommendations

RELIABILITY | RESILIENCE | SECURITY



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Prudent Addition Recommendations

		Table ES.1: Recommended Prudent Additions Detail								
		Transmission Planning Region	Weather Years (WY) / Events	Resource Deficiency Hours	Maximum Deficiency (MW)	Additional Transfer Capability (MW)	Interface Additions (MW)			
1	ſ	ERCOT	Winter Storm Uri (WY2021) and nine other events	135	18,926	14,100	Front Range (5,700) MISO-S (4,300) SPP-S (4,100)			
		MISO-E	WY2020 Heat Wave and two other events	58	5,715	3,000	MISO-W (2,000) PJM-W (1,000)			
creasing Energy Deficiency Hours	sur	New York	WY2023 Heat Wave and seven other events	52	3,729	3,700	PJM-E (1,800) Québec (1,900)			
	ency Hot	SPP-S	Winter Storm Uri (WY2021)	34	4,137	3,700	Front Range (1,200) ERCOT (800) MISO-W (1,700)			
	Defici	PJM-S	Winter Storm Elliott (WY2022)	20	4,147	2,800	РЈМ-Е (2,800)			
	Energy	California North	WY2022 Heat Wave	17	3,211	1,100	Wasatch Front (1,100)			
	creasing	SERC-E	Winter Storm Elliott (WY2022)	9	5,849	4,100	SERC-C (300) SERC-SE (2,200) PJM-W (1,600)			
	E	SERC-Florida	Summer WY2009 and Winter WY2010	6	1,152	1,200	SERC-SE (1,200)			
		New England	WY2012 Heat Wave and two other events	5	984	700	Québec (400) Maritimes (300)			
		MISO-S	WY2009 and WY2011 summer events	4	629	600	ERCOT (300) SERC-SE (300)			
		TOTAL				35,000				



Recommendations to Meet and Maintain Transfer Capability



- Upgrade transmission
- Resources
- Remedial Action Schemes (RAS)
- Dynamic Line Ratings (DLR)
- Advanced conductors
- Power flow control devices

Maintain Transfer Capability

- Planning studies
- Coordination with neighbors
- Regulatory/policy mechanisms or NERC standards

Grid Enhancing Technologies



Multiple Options to Address Prudent Addition Recommendations

- Internal resources
- Transmission enhancements to neighbors
 - Resource evaluations
 - Siting and permitting
 - Cost-allocation
- Demand-side management
 - Demand shifting
 - Energy efficiency
 - Demand response
 - Storage



How to Use the Report?

- Understand analysis limitations
- Identify existing projects
- Recommendations are directional
- Prioritize high-risk areas
- Consider implementation barriers
 - Lack of a process and forum to consider large multiregional transmission opportunities
 - Cost allocation and recovery
 - Seams issues
 - Siting and permitting
- Consider each Region's unique circumstances
- Consider a combination of multiple strategies







- Wide-area energy assessment and scenario development using consistent approach is important
- Study of extreme weather impacts is important
- Coordinated resource and transmission planning is vital
- Adaptive planning processes
- Data and metrics
 - Common datasets
 - Long-term weather forecasts
 - Resource projections uncertainty
 - U.S./Canada impacts







- Will post ITCS report for public comment
- Will submit report to Congress with recommendations on statutory changes if any (12 months after comment period ends)

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- Integrate transmission assessment into Long-term Reliability Assessments
- Enhancements to study data and models
- Canadian Analysis



Questions and Answers