NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Agenda
NERC Quarterly Technical Session

August 16, 2023 | 12:30–3:00 p.m. Eastern

In-Person
Westin Ottawa Hotel
11 Colonel By Dr, Ottawa
ON K1N 9H4, Canada

Conference Room: CONF I/II

Virtual Attendees
Webinar Link

NERC Antitrust Compliance Guidelines

Agenda Items

1. **Interregional Transfer Capability Study*– Update**
2. **Bulk Power System Awareness*– Update**
3. **Long-Term Reliability Assessment*– Preview**
4. **Other Matters and Conclude Session**

*Background materials included.

Interregional Transfer Capability Study (ITCS)

Action
Update

Background
Congress passed the Fiscal Responsibility Act of 2023, 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, will conduct transfer capabilities studies for regional transmission areas in the United States and recommend transfer capability enhancements needed for reliability.

Who: NERC, in consultation with each Regional Entity and each transmitting utility[1] in a neighboring transmission planning region.

What: A study of total transfer capability between transmission planning regions.[2] In accomplishing this work, the study should include:

1. "Current total transfer capability, between each pair of neighboring transmission planning regions."[3] [4]
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 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 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] "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)]
[2] (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]
[3] **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)]
[4] **Neighboring transmission planning region**: implicitly means facilities connecting two adjacent systems or control areas.

Project Goals and Objectives

- Conduct a comprehensive study of existing interregional transfer capability across the United States (between each transmission planning region) to assess currently available transfer capability between neighboring areas and the future need for additional transfer capacity to ensure reliability under various system conditions including extreme weather
- Provide reliable and data-driven recommendations for "prudent" additions to the amount of electric power that can be moved or transferred between neighboring transmission planning regions
- Recommend approaches to achieve and maintain an adequate level transfer capability.
- Engage stakeholders and gather inputs, assumptions, and conditions from Regional Entities, industry, and the ITCS Stakeholder Advisory Group to ensure a comprehensive and inclusive study
- Identify expectations for next steps and continuing analysis to reinforce the Long-Term Reliability Assessment

General Approach

1. **Engage Executive Leadership Group:** For ERO-wide strategic leadership, concurrence on study design and approaches, and support for the project manager of this project. Form ERO project team that will be responsible for developing the overall project execution strategy, monitoring, and overseeing the project progress.
2. **Collaborate with Regional Entities and industry to collect necessary data and information:** Work closely with Regional Entities and industry stakeholders to gather relevant data, build system models, and reports required for the study. Develop input assumptions, including loads, resources, transmission topology, extreme weather conditions utilizing external consulting and industry expertise.
3. **Engage a Stakeholder Advisory Group composed of representation from all planning areas to gather inputs and ensure a comprehensive study:** Form a Stakeholder Advisory Group consisting of representatives from all planning areas to provide insights, expertise, and inputs to the study, study scope, and study results.
4. **Conduct comprehensive analysis and modeling of interregional transfer capability:** Perform detailed analysis and modeling of the transmission systems to assess the current and potential transfer capability between neighboring areas. Assumptions will need to be internally consistent and consider scenarios and conditions that impact long-distance power transfers. The study will also consider factors such as generation mix, load growth projections, various high-risk scenarios, and emerging environmental policy in the study.
5. **Evaluate existing transmission infrastructure, system constraints, and potential areas for improvement:** Assess the current transmission infrastructure, identifying system constraints, and identifying opportunities for improvement to enhance interregional transfer capability.
6. **Identify potential reliability challenges and propose solutions to enhance interregional transfer capability:** Identify existing transfer capability between transmission planning

areas, potential reliability challenges associated with interregional transfers and recommendations to address them.

7. **Develop a final report with actionable recommendations for enhancing interregional transfer capability:** Compile all study findings, analysis, and stakeholder inputs into a comprehensive final report that provides actionable recommendations for improving interregional transfer capability based on a quantifiable and objective metric and criteria.

Deliverables and Schedule

1. **Finalized Study Framework:** Describes the overall framework and governance of the project, general scoping, objectives, and roles and responsibilities.
2. **Interim Progress Reports:** Regular updates on project milestones, findings, and emerging recommendations. (September 2023, then quarterly)
3. **Draft Study Report:** A preliminary report shared with stakeholders for review and feedback. (June 2024)
4. **Final Study Report:** A comprehensive report outlining the study method, findings, recommendations, and supporting analysis. (November 2024)

NERC

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Interregional Transfer Capability Study

Study Framework and Plan

John Moura, Director, Reliability Assessment and Performance Analysis

NERC Quarterly Technical Session

August 16, 2023

RELIABILITY | RESILIENCE | SECURITY




Background

Who: NERC, in consultation with each Regional Entity and each transmitting utility in a neighboring transmission planning region registered entities

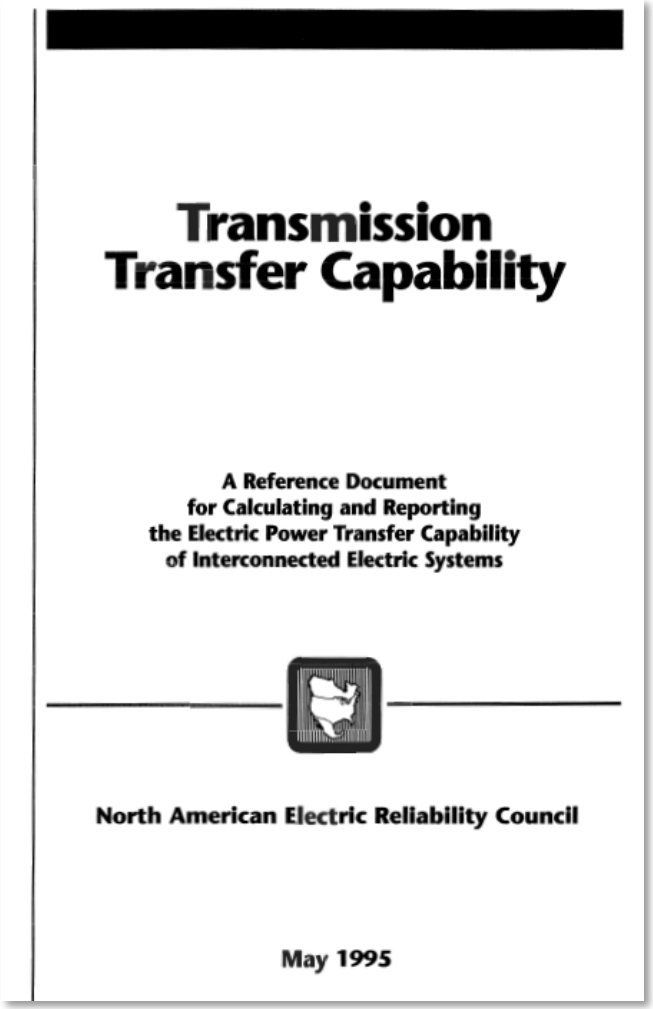
What: A study on the amount of electric power that can be moved or transferred reliably from one area to another area

1. Current total transfer capability, between each pair of neighboring transmission planning regions
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
3. Recommendation on how to meet and maintain the identified total transfer capability (from #1) and the recommended additional transfer capability (from #2)

When: NERC files with FERC within 18 months of enactment of the bill. Public comment period will occur when FERC publishes the study in the Federal Register

Study filing deadline: On or before December 2, 2024

Transfer Capability


Transmission Transfer Capability

A Reference Document for Calculating and Reporting the Electric Power Transfer Capability of Interconnected Electric Systems

North American Electric Reliability Council

May 1995

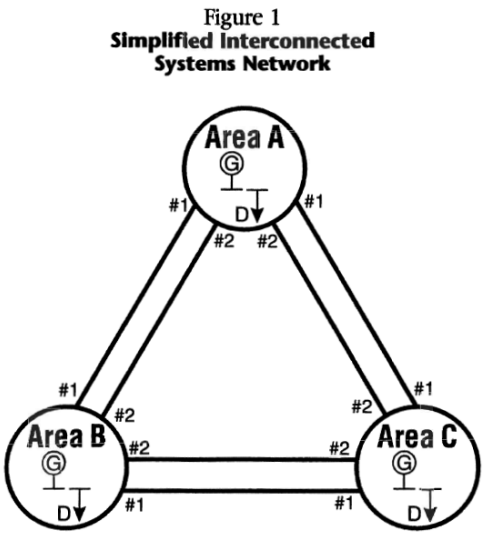
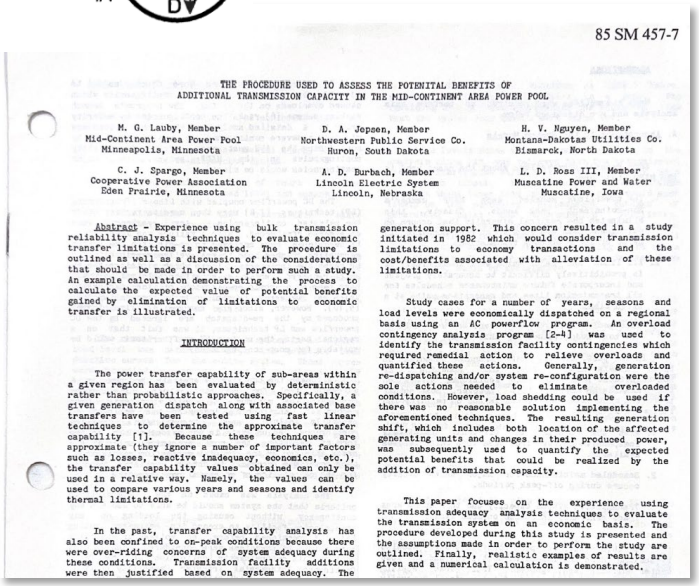


Figure 1
Simplified Interconnected Systems Network

Definition: *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.*


85 SM 457-7

THE PROCEDURE USED TO ASSESS THE POTENITAL BENEFITS OF ADDITIONAL TRANSMISSION CAPACITY IN THE MID-CONTINENT AREA POWER POOL

M. G. Lauby, Member
Mid-Continent Area Power Pool
Minneapolis, Minnesota

D. A. Jepsen, Member
Northwestern Public Service Co.
Huron, South Dakota

H. V. Nguyen, Member
Montana-Dakotas Utilities Co.
Bismarck, North Dakota

C. J. Spargo, Member
Cooperative Power Association
Eden Prairie, Minnesota

A. D. Burbach, Member
Lincoln Electric System
Lincoln, Nebraska

L. D. Ross III, Member
Muscatine Power and Water
Muscatine, Iowa

Abstract - Experience using bulk transmission reliability analysis techniques to evaluate economic transfer limitations is presented. The procedure is outlined as well as a discussion of the considerations that should be made in order to perform such a study. An example calculation demonstrating the process to calculate the expected value of potential benefits gained by elimination of limitations to economic transfer is illustrated.

INTRODUCTION

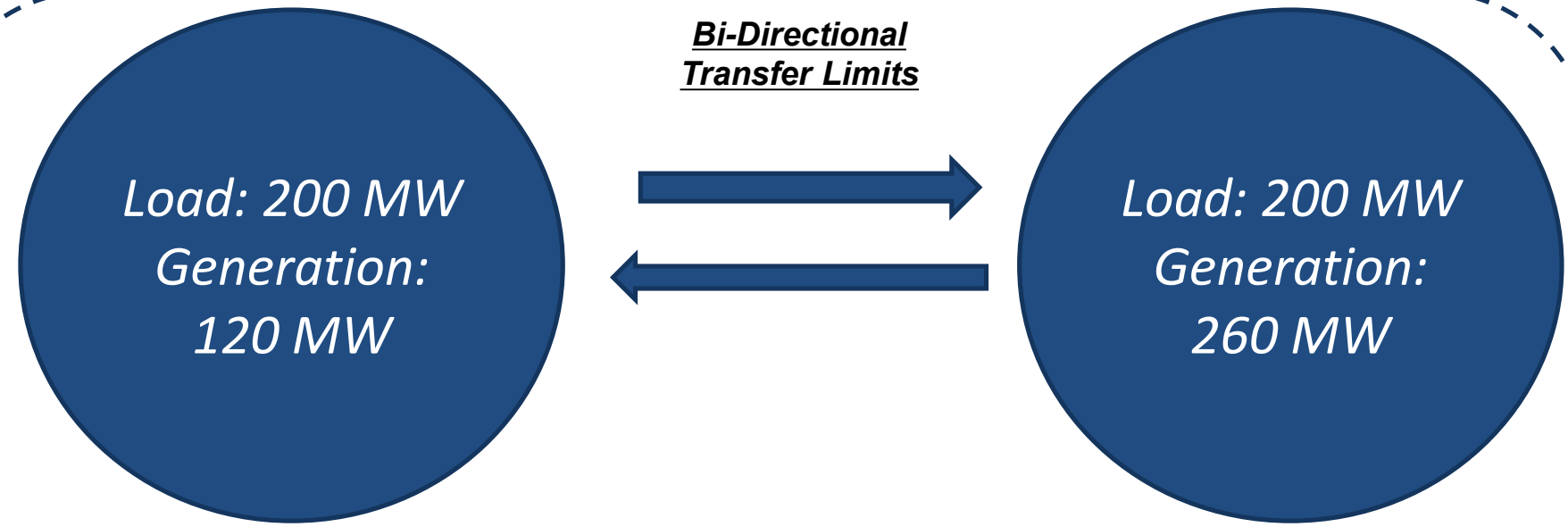
The power transfer capability of sub-areas within a given region has been evaluated by deterministic rather than probabilistic approaches. Specifically, a given generation dispatch along with associated base transfers have been tested using fast linear techniques to determine the approximate transfer capability [1]. Because these techniques are approximate (they ignore a number of important factors such as losses, reactive inadequacy, economics, etc.), the transfer capability values obtained can only be used in a relative way. Namely, the values can be used to compare various years and seasons and identify thermal limitations.

In the past, transfer capability analysis has also been confined to on-peak conditions because there were over-riding concerns of system adequacy during these conditions. Transmission facility additions were then justified based on system adequacy. The generation support. This concern resulted in a study initiated in 1982 which would consider transmission limitations to economy transactions and the cost/benefits associated with alleviation of these limitations.

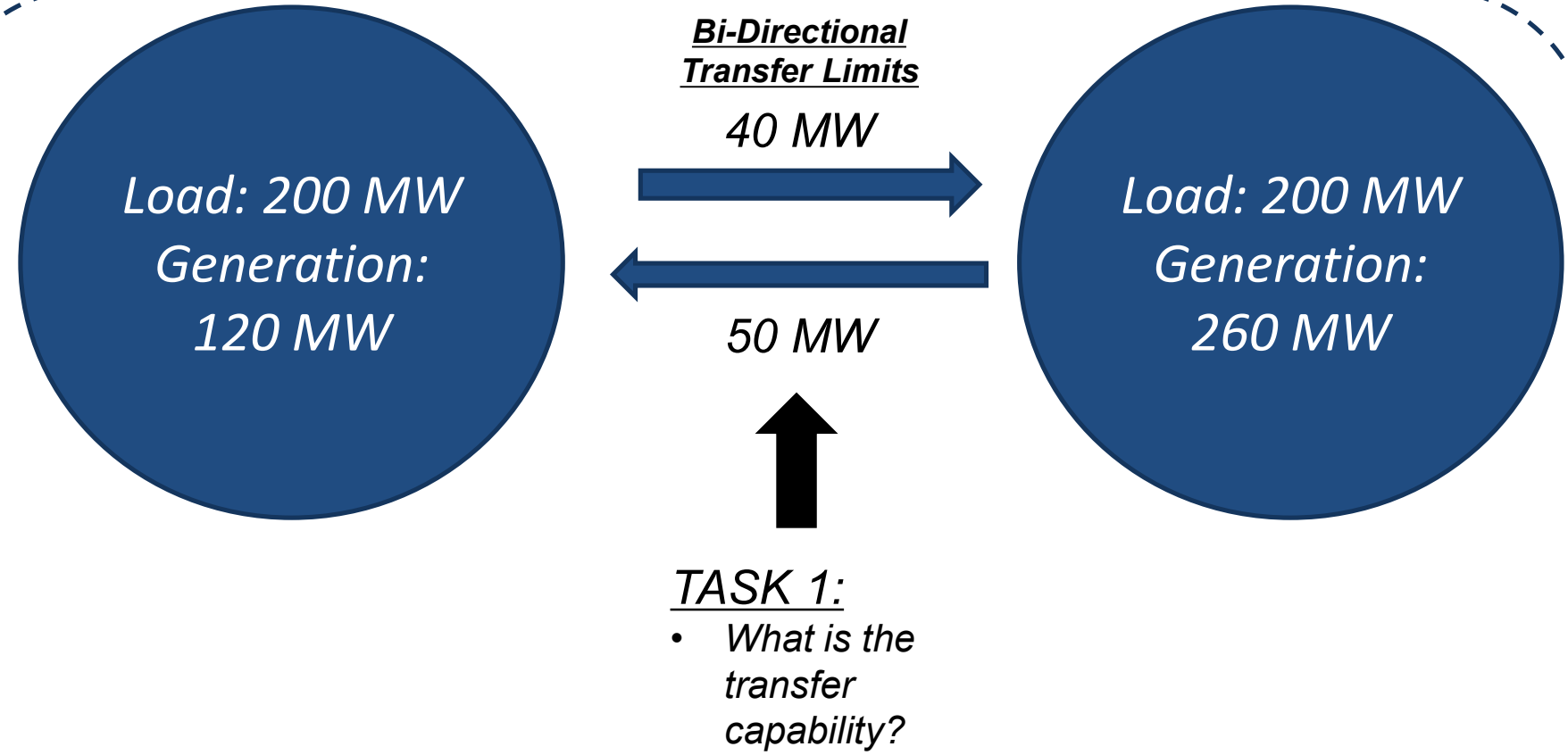
Study cases for a number of years, seasons and load levels were economically dispatched on a regional basis using an AC powerflow program. An overload contingency analysis program [2-4] was used to identify the transmission facility contingencies which required remedial action to relieve overloads and quantified these actions. Generally, generation re-dispatching and/or system re-configuration were the sole actions needed to eliminate overloaded conditions. However, load shedding could be used if there was no reasonable solution implementing the aforementioned techniques. The resulting generation shift, which includes both location of the affected generating units and changes in their produced power, was subsequently used to quantify the expected potential benefits that could be realized by the addition of transmission capacity.

This paper focuses on the experience using transmission adequacy analysis techniques to evaluate the transmission system on an economic basis. The procedure developed during this study is presented and the assumptions made in order to perform the study are outlined. Finally, realistic examples of results are given and a numerical calculation is demonstrated.

ITCS Summary



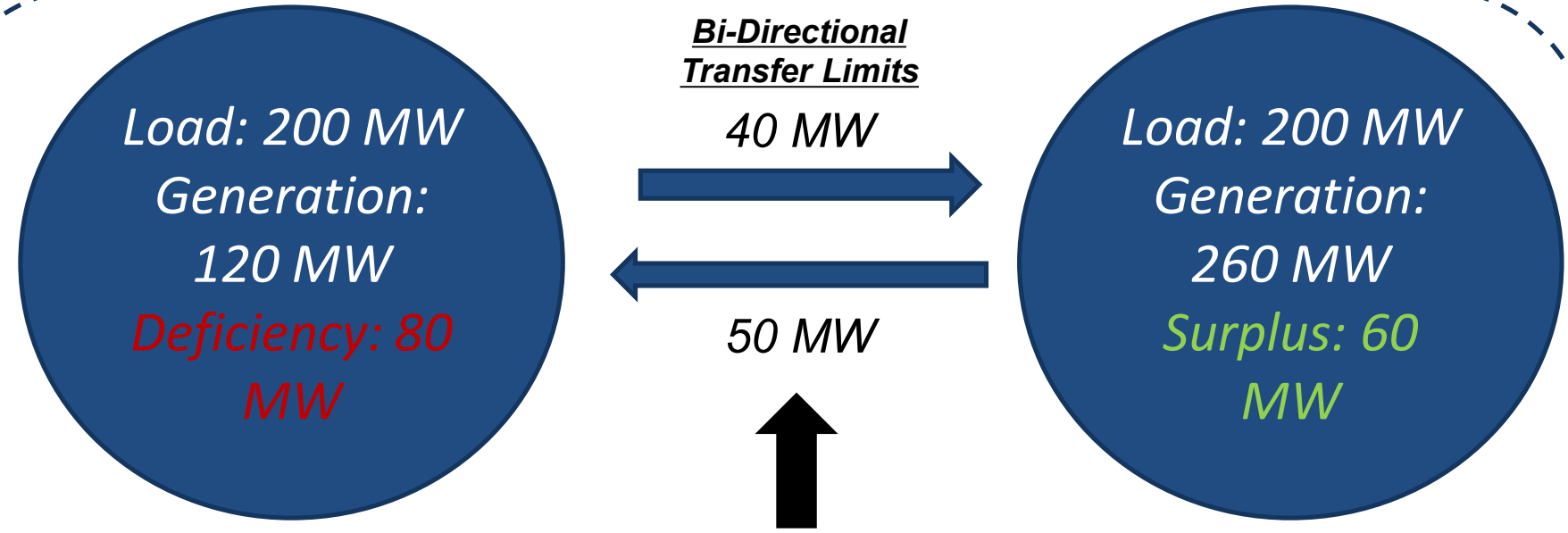
ITCS Summary



TASK 1:

- *What is the transfer capability?*

ITCS Summary



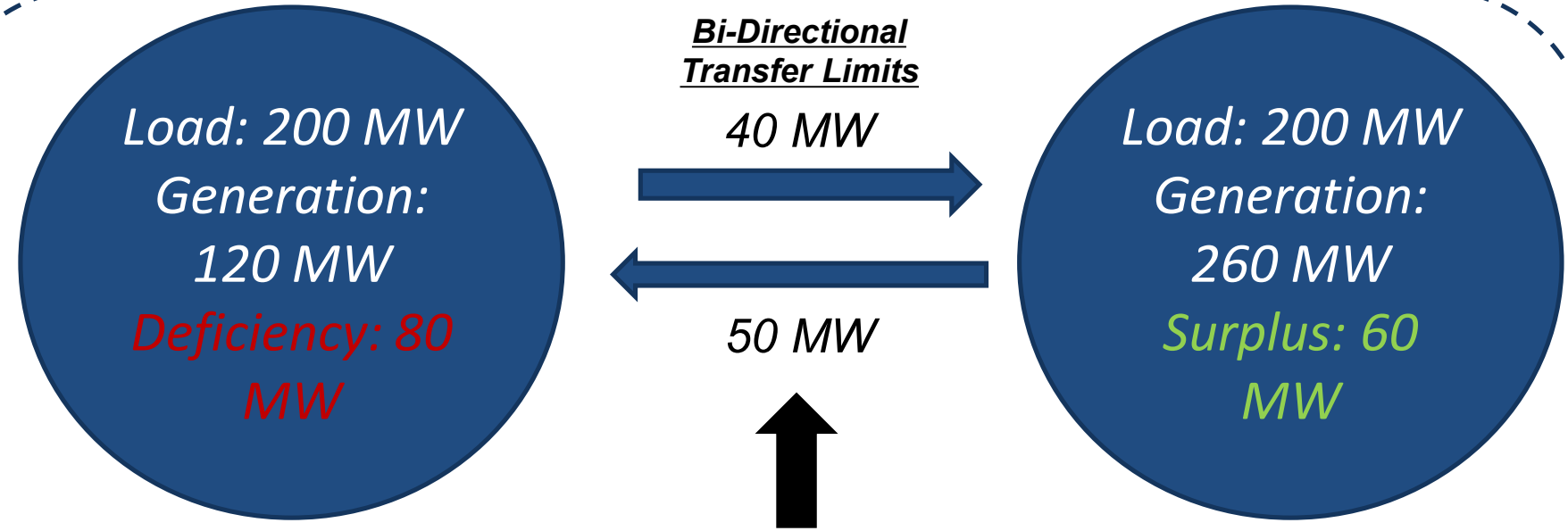
TASK 1:

- *What is the transfer capability?*

TASK 2:

- *What is the deficiency?*
- *Is there sufficient capability?*
- *If not, how much is needed to maintain reliability?*

ITCS Summary



TASK 1:

- What is the transfer capability?

TASK 2:

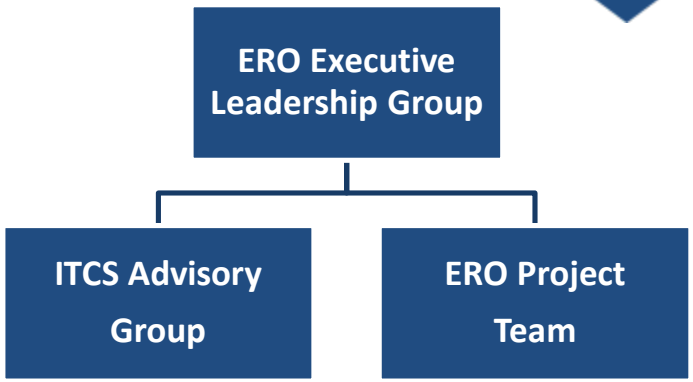
- What is the deficiency?
- Is there sufficient capability?
- If not, how much is needed to maintain reliability?

TASK 3:

- What is needed to meet and maintain these transfer limits
- Does the increase require other reliability reinforcements or considerations?

Study Group and Project Management

- **ERO Executive Leadership Group:** Serves as the executive project sponsor
- **ERO Project Team:** ERO Staff Team (NERC and Regional Entity Staff) will oversee, coordinate, and conduct the required studies
- **ITCS Advisory Group:** Stakeholder advisory group provides advice and input on the study scope, approach, results, and recommendations



NERC Staff	Regional Entity Staff	Industry
• Study design and oversight • Identify common assumptions, scenarios, and case creation parameters • Compile study results for cross-interconnection wide study	• Leverage technical study groups and data collection processes • Run power flow simulations	• Support scenario development • Support capacity and transmission expansion assumptions • Coordinate with study groups and Regional Entity staff

Phased Approach

Phase 0: Study Prep

- Define study scope, assumptions, scenarios
- Stakeholder engagement
- Data requests
- Build study cases & scenarios for transfer capability analysis

Phase 1 : Analysis

- Leverage LTRA to identify generation deficient and surplus areas
- Perform transfer capability analysis
- Identify thermal, voltage & stability limits (Total Transfer Capability)

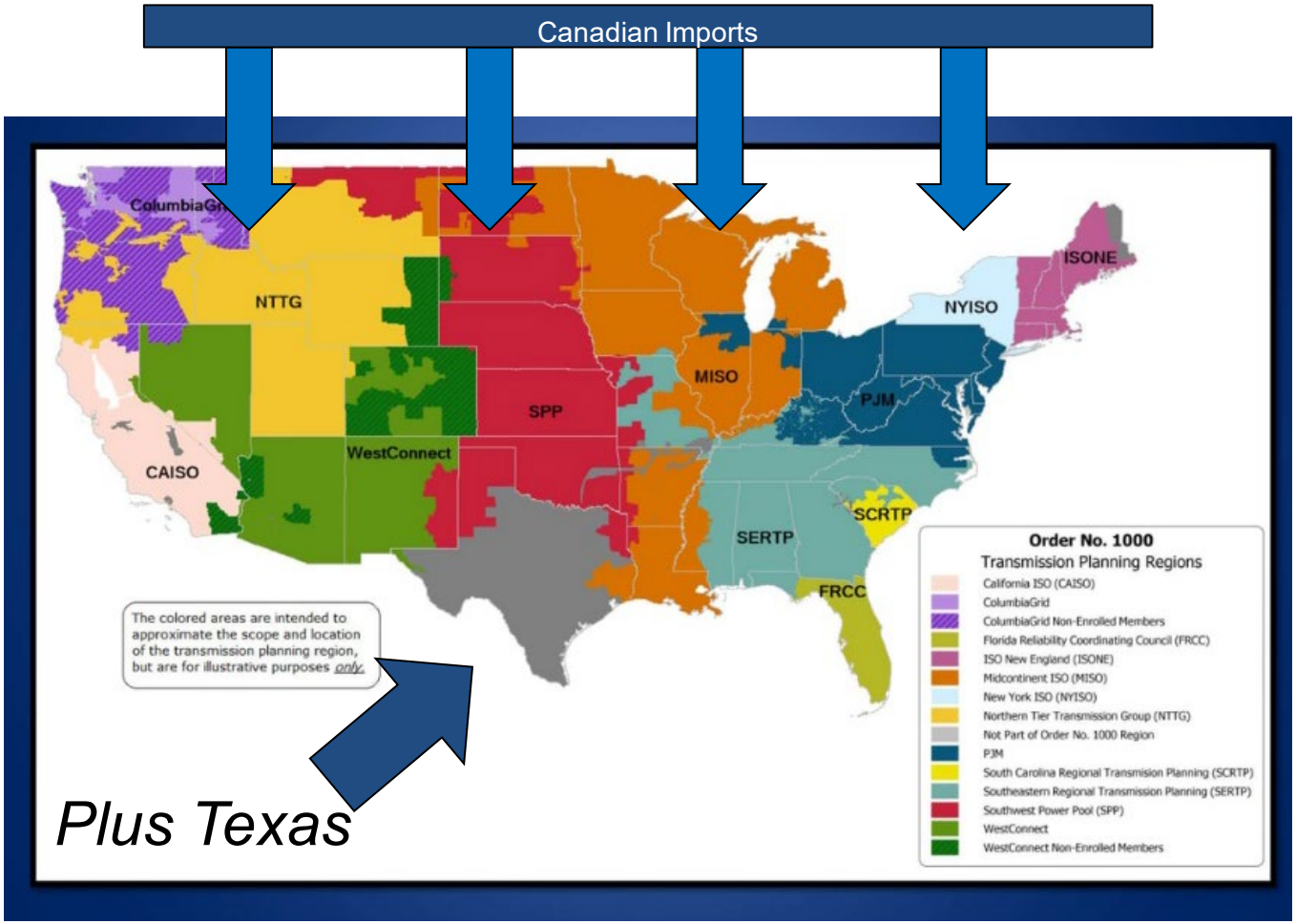
Phase 2 : Recommendations

- Define metrics for identification of “prudent transmission additions” based on reliability
- Draft final recommendations

July 2023 – August 2024

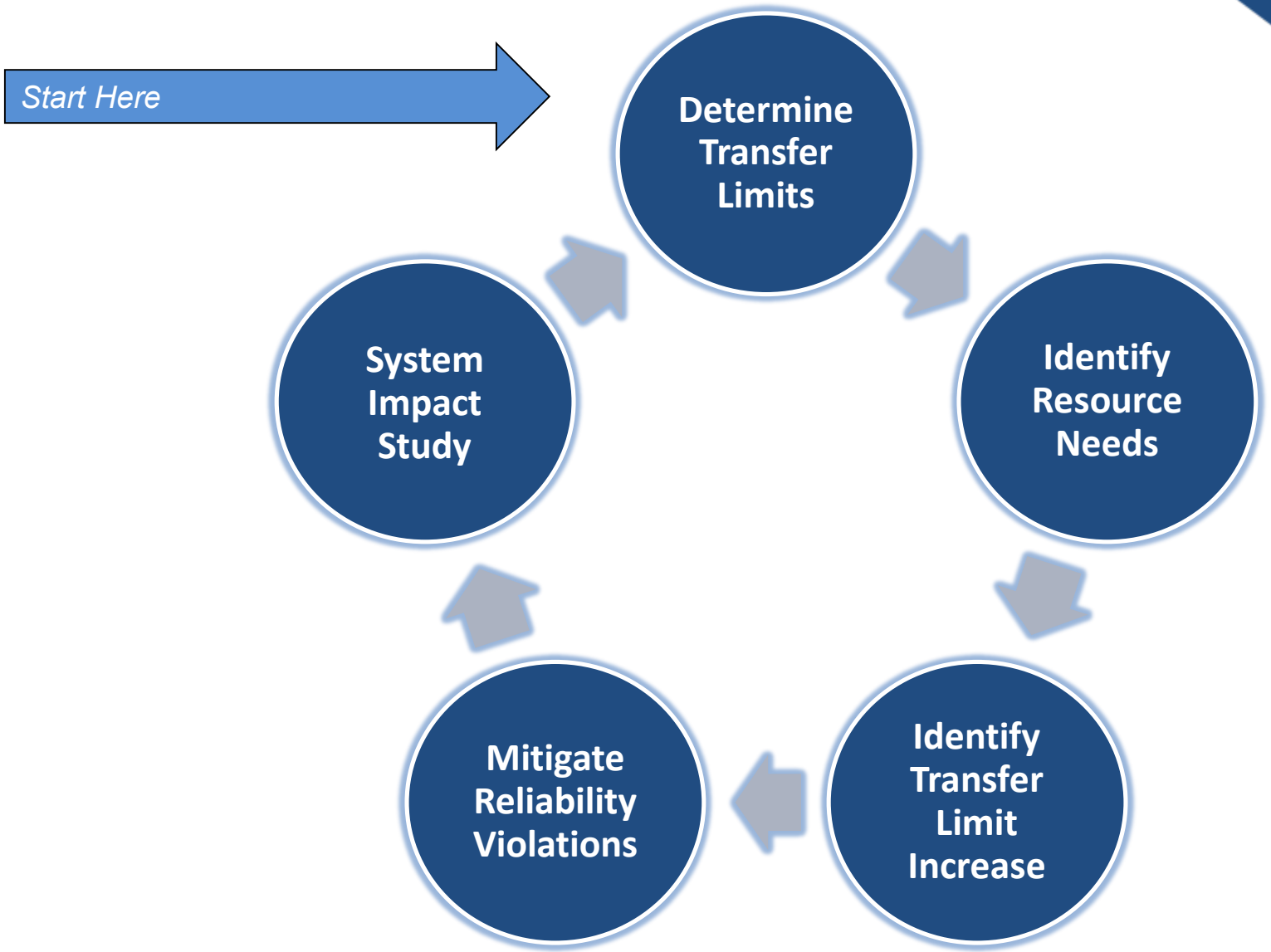
Stakeholder Engagement | Data Collection | Technical Coordination | Stakeholder Comment

ITCS - Areas of Study



- Legislation identified "Transmission Planning Regions" as identified in FERC Order 1000
- Texas Interconnection DC Ties included
- Canadian import capability and possible increases also assessed

General Approach



Study Approach: Part 1

- Study Case and Scenario Development
- Extreme Case Assumptions / Development
- Energy and Capacity Expansion Analysis
- Finalize Cases: Steady State and Stability
- Transfer Capability Analysis; AC Load Flow, Contingency Analysis

Objective: *Determine the total transfer capability between neighboring transmission planning regions*

Difficulty Rating: 

Study Approach: Part 2

- Metric Development
- Determine Needs Based on Resource Deficiencies
- System Expansion “Prudency” Analysis and Options for Prudent Additions
- Inter-Interconnection Analysis
- Transfer Capability Analysis
- Interconnection Stability

Objective: *Identify “prudent” additional transfer capability between neighboring areas to resolve reliability issues in the future*

Difficulty Rating: 

Study Approach: Part 3

- Review of existing studies and policy recommendations
- Identify generation and transmission needs and risks
- Identify actions needed to meet and maintain transfer capability (e.g., policy, market, NERC Reliability Standards)

Objective: *Identify mechanisms to achieve and sustain the identified transfer capability and any recommended enhancements.*

Difficulty Rating:

Final Report, Recommendations, and Outreach

- **Final Report Preparation Phase (Months 13-14):** Compile study results, develop a comprehensive final report, review and validate the report with stakeholders, and address any feedback received
- **Stakeholder Comment Phase (Months 14-17)**
- **Submit to FERC (Month 18): December 2, 2024**
- **FERC Review (Beyond 18 Months):** Provide support to FERC, as needed

Benefits Beyond ITCS

Significantly improves reliability risk assessments going forward by incorporating more transmission considerations

- Enables assessment of the uncertainty risks from energy-constrained resources
- Better representation of the transfer capability and resilience of the BPS under extreme conditions
- Supports the assessment of impacts from generating unit retirements and the need for addition of essential reliability services
- Requires ongoing independent assessment as retiring generation is replaced by energy-constrained resources resulting in the need for prudent amounts of transfer capability to address energy uncertainty

ITCS Resources

ITCS Resources (2023 and 2024)

- Five FTEs to be hired in 2023
  - Project manager
  - Engineering manager
  - Engineers (2)
  - Communications support
- Consultants
  - Executive leadership support
  - Technical study support
  - Public affairs support
- Regional Entity
  - Varies. Regional Entities will need to collect data, validate models, run and supply study results, etc. Any financial impacts run through their own budget processes.

Future Resources

- We have not included any additional resources to further enhance transmission transfer capacity analytics in the 2025 and 2026 projections in the 2024 BP&B. The value proposition and resource needs beyond 2024 will be evaluated with the Board at our next strategic planning session.

Reprioritizing Work

Eliminate a 2023 WPP

- Will not conduct the special assessment on new and evolving electricity market practices
  - Will partially address in this year's Long-Term Reliability Assessment as well as in the ITCS

Defer 2023 Personnel

- Defer hiring of four (4) open positions in the technical areas until 2024 to offset the four new hires in 2023
  - Changes are neutral for personnel expense in 2023

Repurpose Contractor and Consultant funds in 2023 and 2024

- GMD/EMP research
- Emerging technology/cyber risk studies
- Environmental policy analysis

Onward!

- NERC's role as the independent voice for reliability
- Critical assignment supporting the ERO's Reliability Assessment mandate
- Strong transmission system is crucial to a reliable supply and the delivery of electricity
- Rapidly changing resource mix requires greater access and deliverability of resources
- On-going assessment critical to maintaining BPS reliability

Questions and Answers

Bulk Power System Awareness

Action
Update

Background
NERC's Bulk Power System Awareness (BPSA) group acquires and disseminates timely, accurate, and complete information regarding the current status of the bulk power system (BPS) and threats to its reliable operation, to enable the Electric Reliability Organization (ERO) Enterprise to effectively assure the reliability of the BPS. During major system disturbances, extreme weather, fires, hurricanes, physical events, and geomagnetic disturbances, etc. the BPSA facilitates effective communications between the ERO Enterprise, industry, and government stakeholders.

NERC BPSA, in collaboration with the E-ISAC and the ERO Enterprise Situation Awareness teams, maintains a near real-time situation awareness of conditions on the BPS. Notifies the Industry of significant BPS events that have occurred in one area, and which have the potential to impact reliability in other areas. Maintains and strengthens high-level communications, coordination and cooperation with governments and government agencies regarding real-time conditions.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Bulk Power System Awareness

Situational Awareness Q2 2023

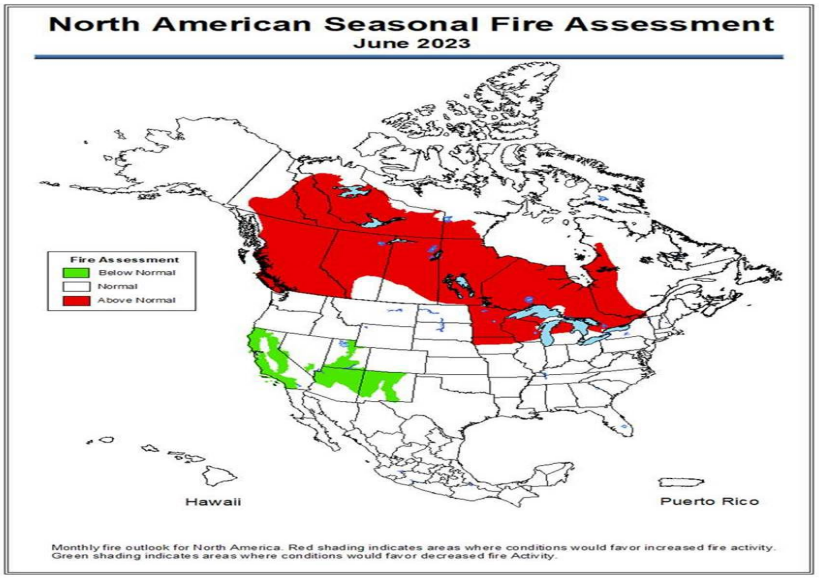
Darrell Moore, Director
Bulk Power System Awareness and Personnel Certification
NERC Quarterly Technical Session
August 16, 2023

RELIABILITY | RESILIENCE | SECURITY

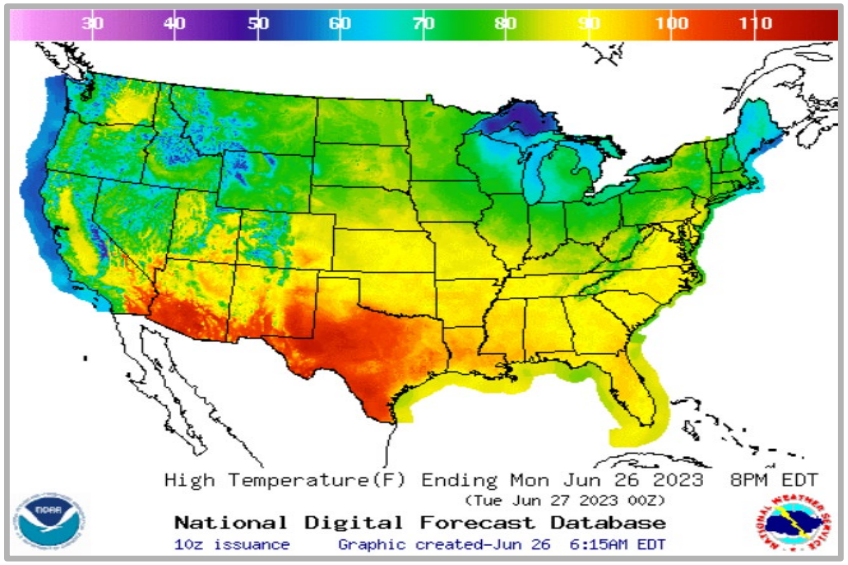



2023 Q2 Overview

For the second Quarter 2023, no widespread significant events were observed or reported on the North American bulk power system (BPS). The ERO System Awareness teams observed and monitored high temperatures and a number of wildfires across the BPS.



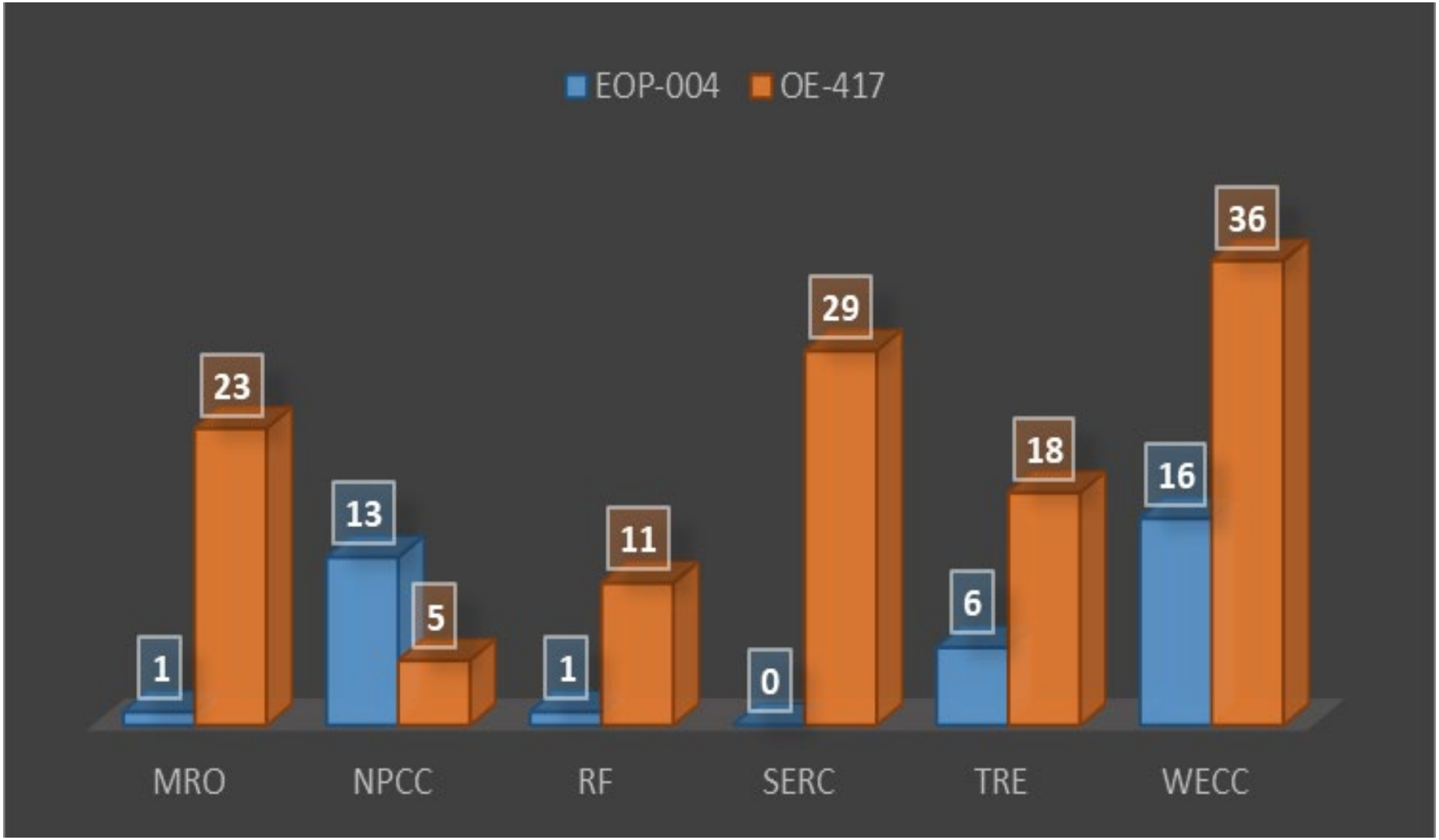
In June multiple wildfires and unfavorable fire weather conditions impacted a number of Canadian Provinces. Unfavorable fire weather conditions were present in Alberta, Quebec, and Nova Scotia for several weeks. This led to operational challenges in those provinces.



Higher than normal temperatures and storm systems caused several entities to declare conservative operations, hot weather alerts, and Energy Emergency Alerts.

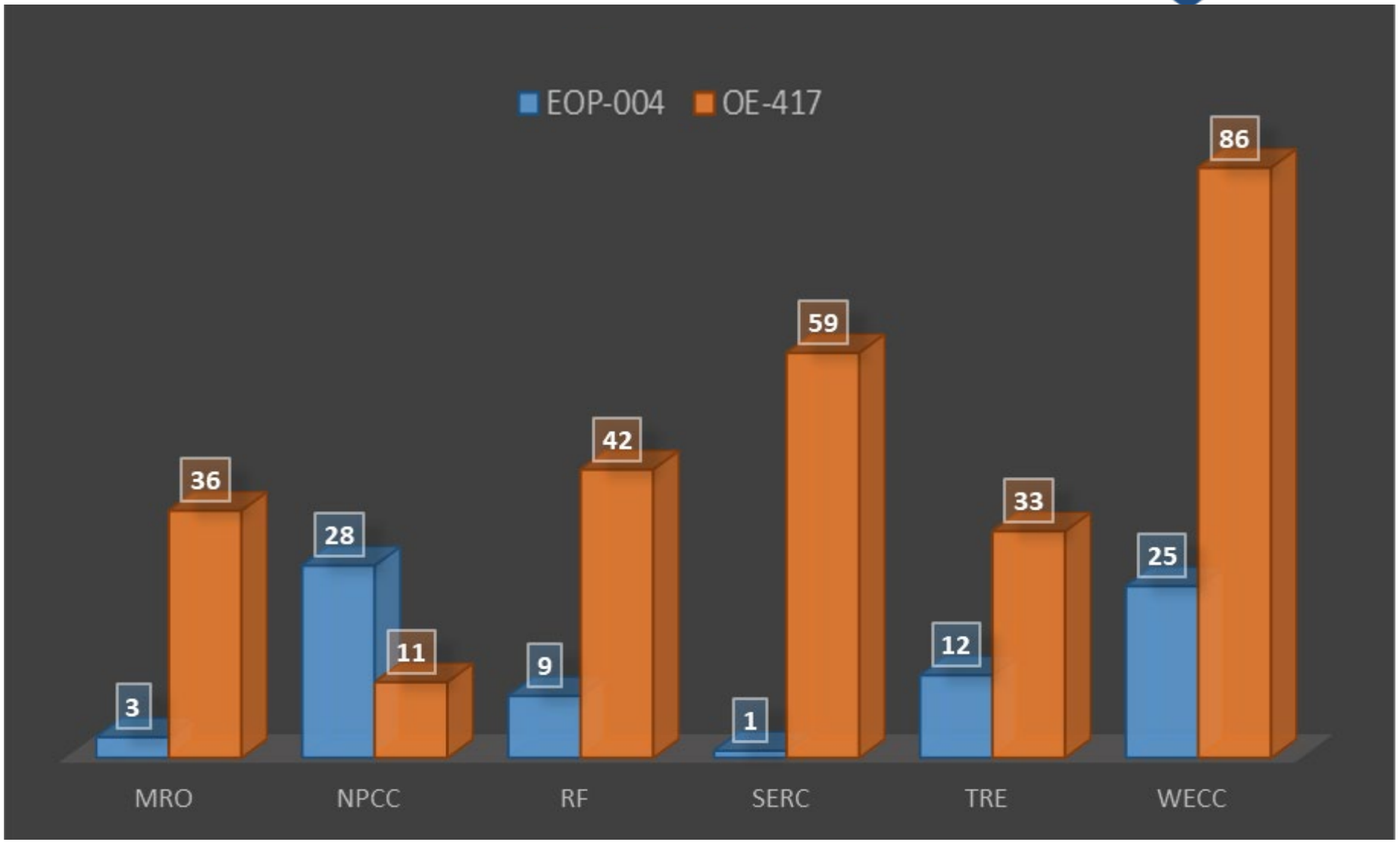
NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Q2 Mandatory Reports by Region

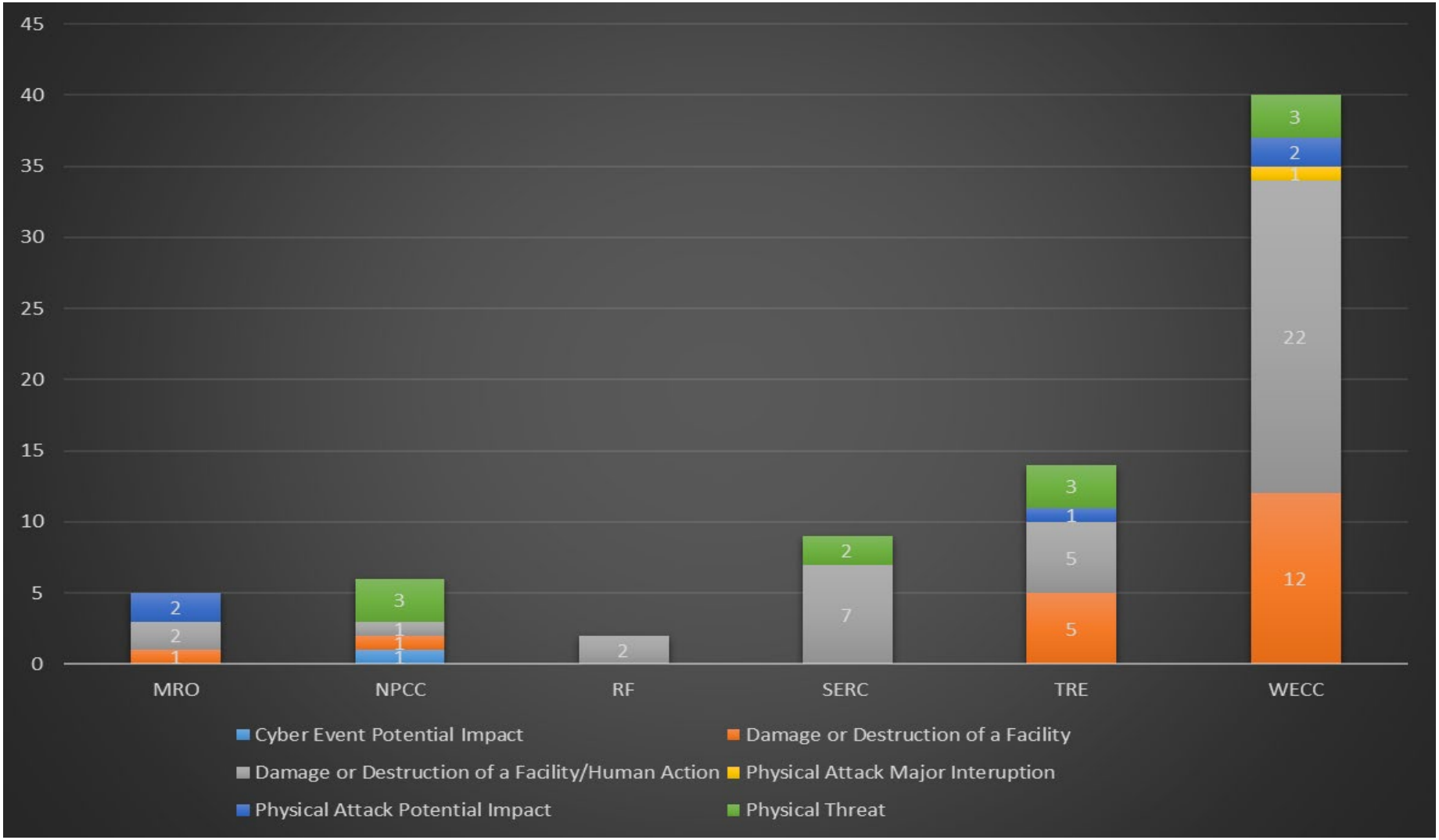


NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

2023 YTD Mandatory Reports by Region

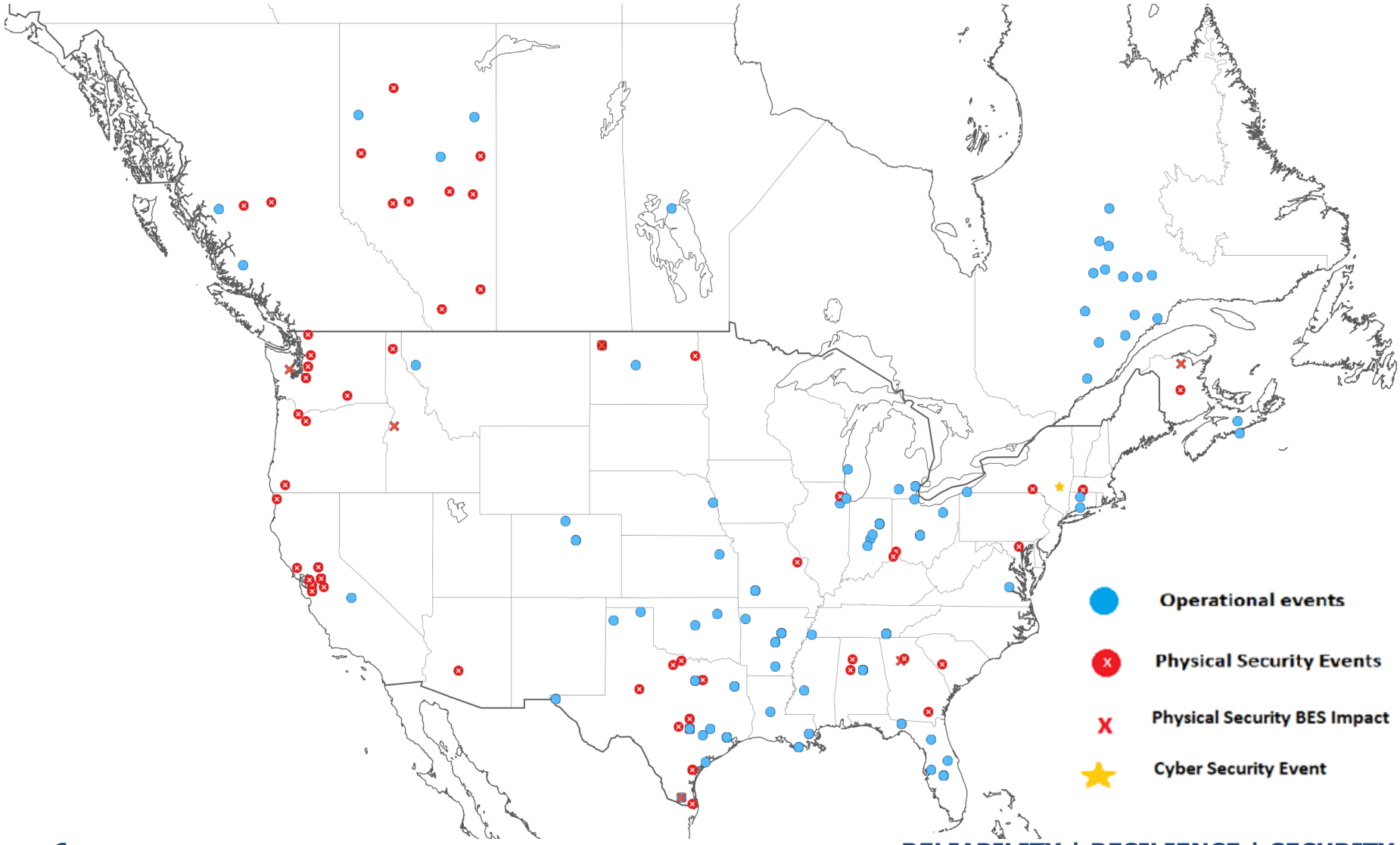


2023 Q2 Cyber & Physical Security Reports by Region

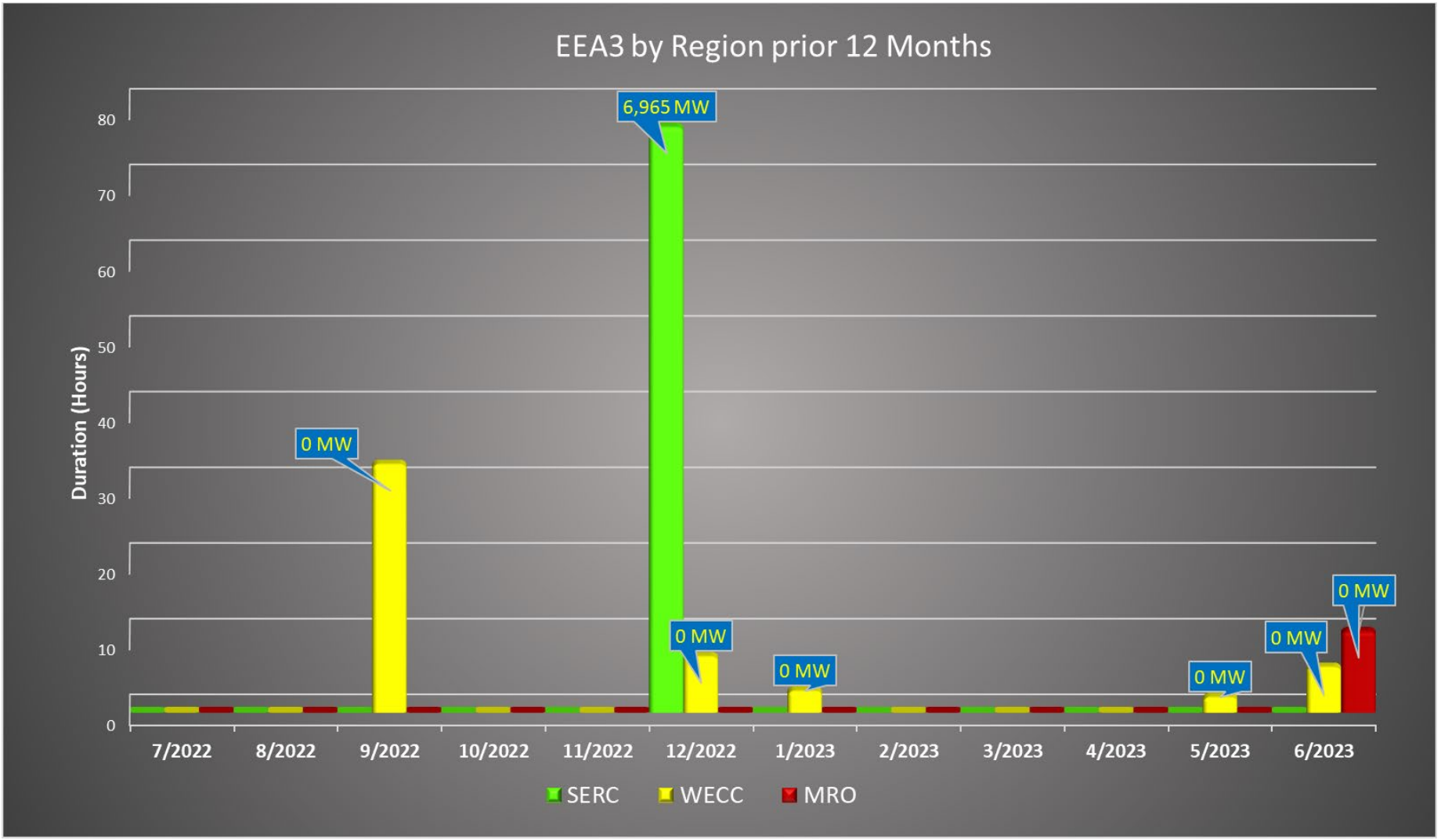


NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

2023 Q2 Events
United States & Canada



Energy Emergency Alert (EEA) Level 3 Reports 12 Month View



Questions and Answers

Long-Term Reliability Assessment

Action
Preview

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 (2023-2033) 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 2023 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:

2023 Long-Term Reliability Assessment Review Schedule	
Date	**Description**
September 26	Draft sent to NERC Reliability and Security Technical Committee (RSTC)
November 9	Report sent to NERC Board
Week of December 4	Report release (Embargoed report sent to MRC prior to release)

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

2023 Long-Term Reliability Assessment

Focus Areas and Emerging Issues

John Moura, Director Reliability Assessments and Performance Analysis

NERC Quarterly Technical Session

August 16, 2023

RELIABILITY | RESILIENCE | SECURITY



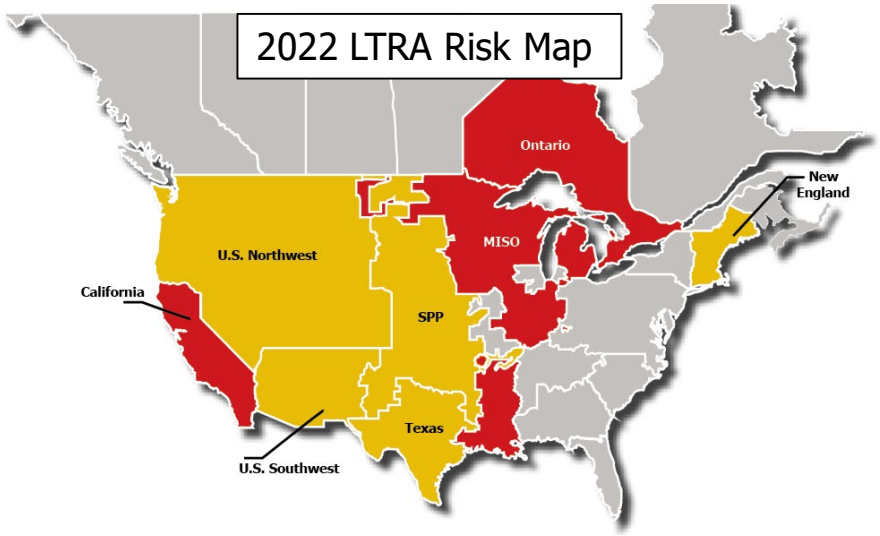

Recap: Key Takeaways from 2022 LTRA

- NERC's annual reliability assessments show increasing risk
- Grid and energy systems are undergoing unprecedented change. Drivers include:
  - Government policies
  - Comparative resource economics
  - Technology development
  - Customer preferences
- We believe that the energy transition that is occurring can work reliably but **the pace of change needs to be managed**

Report available at NERC.com here

- Findings cover five topics:
  - Energy Risk Assessment
  - Changing Resource Mix
  - Demand Trends
  - Transmission Trends
  - Emerging Risks

2022 LTRA: Risk Findings Summary



High Risk – Shortfalls occurring in normal peak conditions
Elevated Risk – Shortfalls occurring in extreme conditions

- **Risk of insufficient future electricity supply:**
  - Energy and capacity risk assessment found areas face future risks in normal and extreme weather
  - Additional unanticipated generator retirements can increase risks

- **Unresolved engineering and technical issues**
  - Behavior of new types of resources and how they are installed affect reliability and must be planned
  - Natural gas system is increasingly important for electric reliability but interdependency issues exist

- **Lagging transmission system development**
  - New resources (wind and solar) are frequently not sited in the locations where generators are retiring
  - Siting and permitting is a challenge

2022 LTRA Recommendations

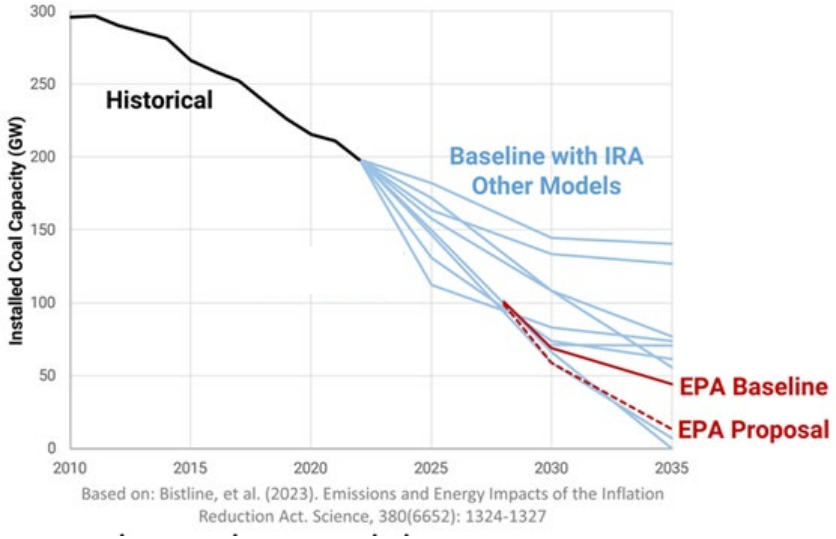
Objectives of the 2022 *LTRA's* specific recommendations to policymakers and industry:

- Manage the pace of generator retirements to ensure energy and essential reliability services needs are met
- Address performance and integration issues with solar and wind
- Expand resource adequacy evaluations beyond reserve margins to include energy risks for all hours and seasons
- Mitigate risks from interdependent natural gas infrastructure
- Promote use of extreme weather scenarios in resource planning
- Increase focus on operating with more distribution resources
- Consider the impact of electrification on future electricity demand and infrastructure

2023 LTRA Topics and Emerging Issues

Changing Resource Mix – Generator Retirements

- In 2022 LTRA: Generator retirements totaling over 110 GW were accounted for over the 10-year assessment period
- Since 2022 LTRA publication: New and proposed U.S. EPA regulations are expected to further accelerate retirements
- **2023 LTRA will consider updated retirement information and scenarios for assessing future resource adequacy and reliability risks**



U.S. Coal-Fired Gen Capacity Projections, Inflation Reduction Act and EPA Greenhouse Gas Proposal
Source EPRI Webcast, July 6 2023

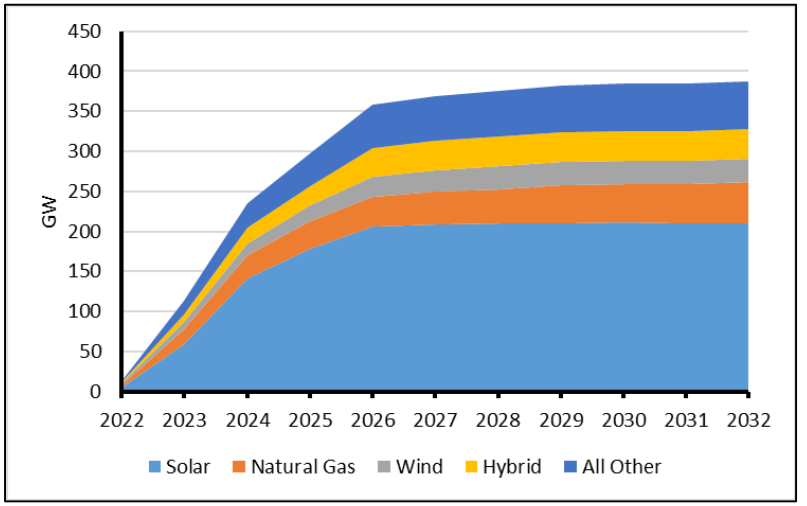
Changing Resource Mix – Resource Additions

- In 2022 LTRA: Wind, solar, and hybrid generation leads the continued energy transition as older thermal generators retire
- 2023 LTRA Preliminary Data: Solar growth, battery and hybrids are accelerating
- **Implications: Reliably integrating IBRs, addressing BPS energy, essential reliability services, and fuel risks remain key issues**

Table 1: 2022 Capacity at Peak Demand

Type	Capacity (GW)	Change since 2021 (GW)
Natural Gas	477	+14
Coal	202	-18
Nuclear	106	-2
Solar and Wind	70	+19
All others	189	+2

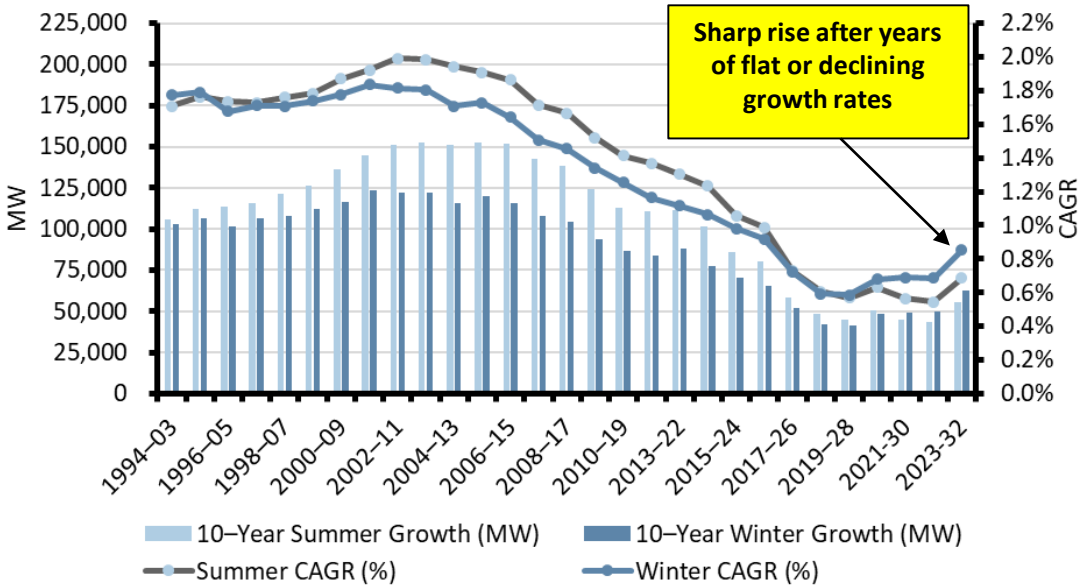
Contributions at hour of peak demand. VER (solar, wind, and some hydro) typically count less than installed nameplate capacity.



2022 LTRA: Resource Capacity in Pipeline to Connect

Peak Demand: Growth across the BPS

- 2022 LTRA: 10-year Peak Demand growth showed largest increases in years
  - Further increases from electrification and EV adoption are anticipated
- 2023 LTRA Preliminary Data: Peak demand growth is accelerating
- **Implications: Growth in some areas is affecting adequacy of reserves and seasonal energy risks**



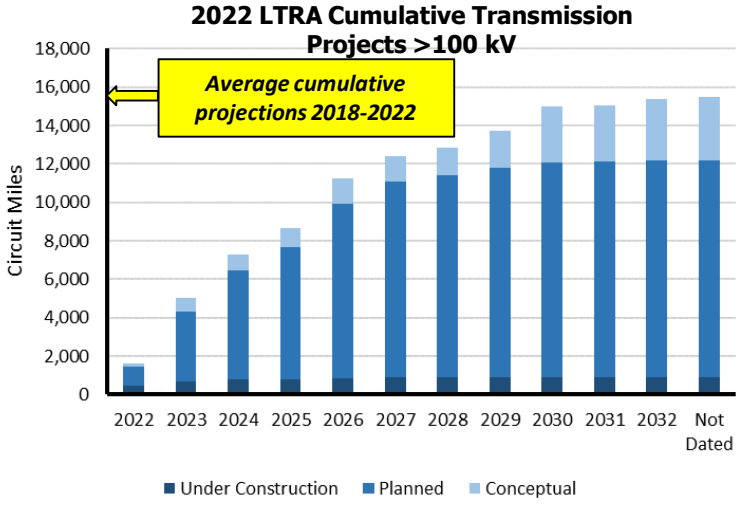
2022 LTRA 10-year Summer and Winter Peak Demand Growth

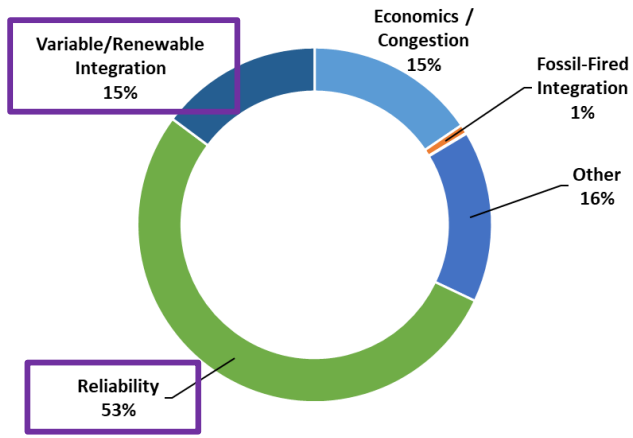
Largest 10-year Winter Peak Demand Growth	
Assessment Area	Demand Change
NPCC-New York	2.36%
WECC-SRSG	2.06%
NPCC-New England	1.95%
NPCC-Ontario	1.32%
Texas RE-ERCOT	1.30%

Largest 10-year Summer Peak Demand Growth	
Assessment Area	Demand Change
WECC-SRSG	1.69%
NPCC-Ontario	1.27%
WECC-CAMX	1.19%
MRO-SaskPower	1.05%
NPCC-Maritimes	1.03%

Projections of Transmission Development

- 2022 LTRA: Little change in transmission miles projections
- 2023 LTRA Preliminary Information: Indicators point to more investment and enhancements to regional planning processes to support expansion
- **Implications: Assessments should evolve to evaluate transfer capability and benefits to reliability**





2022 LTRA Transmission Project Primary Driver

2023 LTRA: Preliminary Topics

- **Standing key finding:** Capacity and Energy Risk Assessment highlighting progress and emerging concerns
  - Year 1 – 5 resource and energy adequacy assessment
  - Year 6 – 10 emerging trends in resource capacity and demand
- Assessment of potential for new and proposed environmental regulations to affect future generator retirements and resources
- Energy risk analysis of extreme wide-area weather events and their effect on peak demand, generation, and transfers
- Growth trends in summer and winter peak demand forecasts
- Trends in resource and transmission development and evolving regional planning and interconnection management processes
- Recent fuel assurance mechanisms and gas-electric coordination efforts

2023 LTRA Emerging Issues

- Electrification influence on the growth in peak demand, net energy projections, and changes to area peak-seasons
- Evolving application of energy risk management in electricity markets and resource planning
- Increasing trends in battery storage and hybrid resources and efforts to integrate and benefit from these resources
- Inverter-based resource growth trends and stepped-up efforts to address performance issues
- Distributed Energy Resource growth and implications
- Future opportunities for peak load management from growth in large flexible loads and demand-side mechanisms
- Supply chain issues and implications for generation and transmission development and asset management

2023 LTRA Milestones

2023 Long-Term Reliability Assessment Review Schedule	
Date	**Description**
February 24	NERC Data and Narrative Request Sent to Regional Entities
June 16	Preliminary Data and Narratives Provided to NERC
July 11 – 13	Reliability Assessments Subcommittee (RAS) Meeting | Assessment Area Peer Reviews
August 30 – 31	RAS Meeting / Preliminary Findings Discussion
September 26	Draft Report sent to NERC Reliability and Security Technical Committee (RSTC)
November 9	Report sent to NERC Board
Week of December 6	Report release

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

LTRA Topics Discussion

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Questions and Answers

2022 LTRA: Emerging Issues

- Anticipating EV adoption and impacts of energy transition programs on future demand, load shapes, and energy needs is a growing focus for planners and operators
- Cryptocurrency mining is raising policy, market, operational, and planning issues in areas experiencing growth
- Supply chain issues threaten completion timelines for generation and transmission projects in development
- Changes to U.S. communications regulations governing access to the 6 GHz band is raising concerns of harmful interference on circuits used by BPS owners and operators for grid monitoring and control