NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Interregional Transfer Capability Study (ITCS)

Strengthening Reliability Through the Energy Transformation

Frequently Asked Questions

September 2024

Background

Congress passed the Fiscal Responsibility Act of 2023, which includes 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, will analyze the amount of 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 between the areas.

The study must be filed with the Federal Energy Regulatory Commission (FERC) within 18 months of enactment of the bill—**December 2, 2024**. A 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.

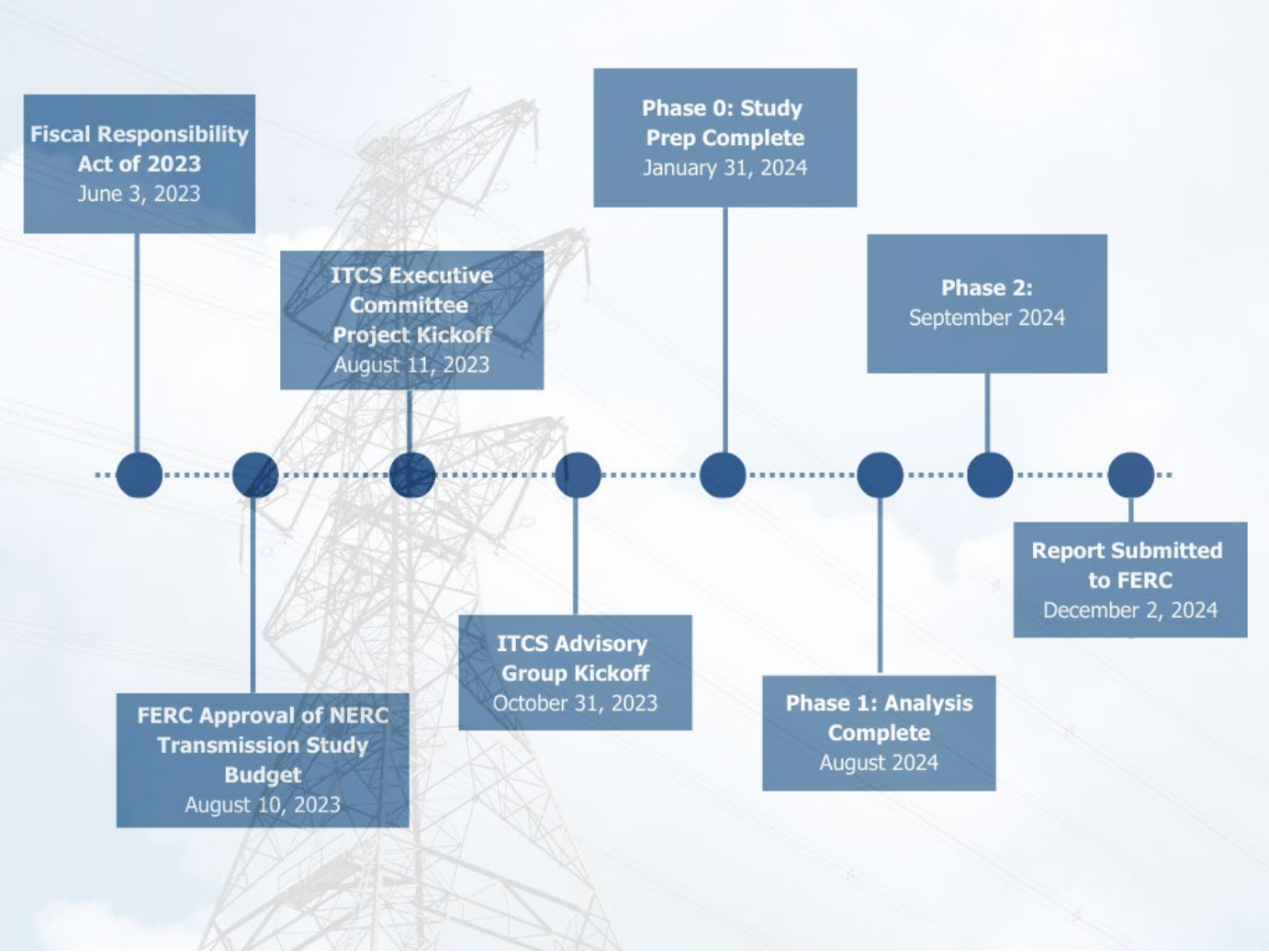
Critical Impact

- A strong, flexible transmission system that is capable of coping with a wide variety of system conditions is necessary for the reliable supply and delivery of electricity.
- Transmission adequacy is at the very core of the future of reliability.
- The rapidly changing resource mix requires greater access to, and deliverability of, resources to maintain reliability—particularly during extreme weather and environmental conditions. This challenge will continue to grow if not addressed in a timely, well-considered manner and in conjunction with work being done on extreme weather and environmental conditions.
- Transfer capability is a critical measure of the ability to address energy deficiencies from areas that have available energy. Measuring the transfer capability will be a key topic in future assessments toward understanding energy risks.
- The ability to support advanced studies like the congressionally mandated ITCS links to NERC's three-year plan and falls within the scope of our four focus areas—**Energy, Security, Agility, and Sustainability**.
- NERC has consistently stressed the need for more transmission to support the energy transformation in our reliability assessments. This study is not, and should not be a one-time effort. It is simply too important to our industry and will only become more so in the future.

Project Goals and Objectives

- Conduct a comprehensive study of interregional transfer capability across the United States and Canada to assess the need for additional transfer capacity.
- Provide reliable and data-driven recommendations for prudent additions to the amount of electric power that can be moved or transferred between neighboring areas.
- Recommend approaches to achieve and maintain the identified transfer capability and any recommended additional transfer capability.
- Engage stakeholders and gather inputs from the Regional Entities, industry, and a special stakeholder Advisory Group to ensure a comprehensive and inclusive study.

Project Schedule



Frequently Asked Questions

Study Timeline and Scoping

When will the study results be published?

- An Overview of Study Need and Approach was published in June of 2024 and provides background, context, and study details.
- The ITCS Part 1, *transfer capability*, will detail the total transfer capability between neighboring transmission planning regions, published in August 2024.
- The ITCS Part 2 *prudent additions*, will provide recommendations to transfer capability between neighboring areas to resolve reliability issues in the future. Part 3, *meet and maintain recommendations*, is scheduled to be published jointly with Part 2 in November 2024.
- A final report to FERC will be filed on or before December 2, 2024.
- The Canadian Analysis will identify and make recommendations to transfer capabilities from the United States to Canada and/or between Canadian provinces and is intended for publication in Q1 2025.

Will work on related transmission initiatives be slowed down by the ITCS timeline?

NERC has no knowledge of any impact on ongoing projects and will work closely with FERC and the Department of Energy (DOE) on the ITCS while maintaining our independence. Conversely, an independent study could help clear transmission projects experiencing siting gridlock.

How does the ITCS compare to other transmission studies being performed?

NERC is aware of other studies, such as the DOE Transmission Needs Study and the Energy Systems Integration Group (ESIG) Transmission Resilience Project. There are several key distinctions between the ITCS and these studies, including data sources, areas of study, and scope.

Are natural disasters or weather events within the scope of the extreme scenarios portion of the study?

Because NERC is using 12 years of historical data, it will naturally capture extreme weather scenarios during that time frame. However, NERC is not studying natural disasters, such as hurricanes, as part of the ITCS.

Will the study get into the "how" of increasing transfer capability?

This study will recommend prudent additions to transfer capability; however, assessing how to increase transfer capability is outside the scope of the ITCS. Examples of potential projects to increase transfer capability are new ac or dc transmission facilities, upgrades to allow higher ratings, flow control devices, grid-enhancing technologies, or a combination of these.

What is the anticipated outcome of the study?

The ITCS will provide recommendations on prudent additions to transfer capability based on the study analysis. Findings will be submitted to FERC on or before December 2, 2024.

Will stability be part of the transfer capability study?

The team completed thermal and voltage analyses and accounted for known stability limits; however, the team does not plan on conducting new stability analyses.

Does the study consider economics?

This study does not consider factors other than reliability; however, NERC acknowledges that entities must weigh other considerations when making decisions, including those related to economics or public policy. NERC's mission is to ensure the reliability and security of the grid, and transmission adequacy is at the core

of the future of reliability. As such, this highly complex engineering study focuses on analyzing the amount of power that can be moved or transferred reliably from one area to another area of the interconnected transmission systems.

Why does the ITCS divide large Balancing Authorities (BAs) and Transmission Owner/Operator into smaller, adjacent study areas instead of using FERC Order 1000 or other broader regions?

The ITCS fulfills a congressional mandate to identify prudent additions to transfer capability between neighboring transmission planning regions. Very large BAs often have zones that may experience energy deliverability issues due to transmission constraints, even though the BA as a whole may have sufficient energy to serve the demand.

Additionally, the ITCS intends to provide more granular information to stakeholders for the locations where increasing transfer capability will benefit reliability. Past weather events on the system, such as Winter Storm Uri, demonstrated that constraints within one BA affect its ability to share energy with its neighboring BAs or facilitate interregional energy transfers across its area. It is, therefore, appropriate to approach this study through a more granular lens to identify transmission constraints that could significantly limit wide-area energy transfers. Nevertheless, transfer capability limits were published in the Part I report for the larger FERC Order 1000 regions.

Study Assumptions

Is NERC developing resource portfolios?

NERC has developed a forecast for 2033 resources, informed by the NERC Long-Term Reliability Assessment (LTRA), taking into consideration planned retirements and entity queues.

How are reliability and resilience defined within the study?

"Reliability" is defined as meeting all NERC Reliability Standards; "resilience" is defined as serving as much load as possible under extreme conditions.

How will the study determine weather-outage projections?

The ITCS will incorporate correlated data from historical events. For 2019–2023, the study team will use historical measured data for load, wind, and solar resources to model future conditions. This option was chosen because the data is recent and strongly reflects current system performance. For 2007–2013, the study team will use synthetic datasets from the National Renewable Energy Laboratory (NREL) and historical weather observations (temperature, wind speed, solar irradiance, etc.) to estimate load and resource availability.

How will storage be studied?

Storage resources will be optimized to provide energy during times of need, typically charging during off-peak hours and discharging during on-peak hours.

How is the energy margin defined?

"Hourly energy margin" is the available energy capacity based on hourly resource availability and load. NERC will calculate the energy margin every hour for each region.

What is the "valid limit" that will be used in Part 1 of the ITCS?

The limits will be vetted and verified by the Transmission Planners and Planning Coordinators. It should be noted that limits can vary depending on system conditions and underlying assumptions used to calculate the limit.

Will sensitivity scenarios be considered?

NERC will consider doing a sensitivity analysis if time permits.

Does the ITCS assess simultaneous transfers?

Yes. Under extreme weather, a planning region may be importing energy from multiple neighbors simultaneously. The ITCS calculated and considered both simultaneous and non-simultaneous transfer capabilities in the Part 1 Transfer Capability Analysis, both of which are factored into Part 2 Prudent Additions.

Transfer Capability

Why doesn't the ITCS use Path Ratings in the study?

The ITCS is unique among previous studies as it applies Total Transfer Capability consistently across North America. For more information about transfer capability, please refer to this white paper. Other studies may incorporate different methods used by different regions. For example, WECC and portions of NPCC use Path Ratings in their analyses while other parts of the country use the Total Transfer Capability method. Both methods are appropriate. The ITCS chose to use area interchange methodology instead of path limit methodology to calculate transfer capability, as a majority of North American planning areas use this methodology.

What does it mean to maintain total transfer capability?

"Maintain" is interpreted, for purposes of the ITCS, as the actions needed to maintain the current and prudent additions to transfer capability. These actions may include identification of resource deficiencies, other reliability considerations such as additional analysis, and/or regulatory requirements.

How are interregional transfers modeled in the study?

In Part 1 of the study, to calculate current transfer capability, transfers are modeled in the base cases representing typical summer and winter peak conditions. For Part 2 prudent additions analysis, interregional transfers will represent reliability-only transfers under stressed system conditions.

Will the limiting constraints be shared?

Limiting constraints will be shared with Planning Coordinators but will not be included in the report.

What year is NERC using for the study's base cases?

The study team will consider the current system (2024) base cases to perform the analysis in Part 1.

Why did the study team not include the 2033/34 Total Transfer Capability (TTC) analysis?

The 2033/34 TTCs were determined to be of limited value to the study. ITCS assessed the adequacy of the current (2024/2025) transfer capabilities into the 10-year out future and identified the need for additional transfer capability meeting the congressional mandate. As a reminder, the congressional mandate calls for a study of…."*Current total transfer capability between each pair of neighboring transmission planning regions.*" In making this decision, the study team sought input from the industry Advisory Group and the ITCS Executive Committee.

Where known, major projects that are expected to significantly increase transfer capability are listed in the Part 2 report.

Why not a one-size-fits-all recommendation for the amount of interregional transfer capability?

Each Transmission Planning Region (TPR) is unique, and a higher transfer capability does not necessarily correlate to increased reliability. Specifically, for some TPRs, a relatively low transfer capability may be

adequate for reliability, whereas in other TPRs, a relatively high transfer capability may be inadequate under certain extreme conditions. The adequacy of each region's transfer capability will be evaluated in Part 2, prudent additions.

What if industry has plans for more transfer capability in the next 10 years, will the report acknowledge it?

Entities with planned interregional transfer capability increases over the next ten-year horizon, per information provided to NERC during the Part 2 report review process, will be acknowledged in the final report submitted to FERC.

Per the congressional mandate, NERC will submit the study to FERC, after which there will be a formal comment period. The public comment period will give the industry time to thoroughly review the study and provide additional input, as well as inform FERC of planned interregional transfer capability increases.

Finally, NERC takes this opportunity to reiterate that any final solutions to address energy deficiencies or opportunities identified in the ITCS study will need to consider various options, including prudent additions to transfer capability, resource additions, economics, etc. The planning entities will also need to perform detailed, in-depth analysis before implementing any final solution. The completion of the ITCS report should, therefore, not be seen as the final study before solutions are implemented, but rather as the beginning of a long process that will involve further analysis, evaluation, and careful consideration of multiple important factors.

How many weather years were evaluated to assess prudent additions to transfer capability?

The ITCS evaluated 12 weather years of data, including the operational impacts (load, resource availability, etc.). In each of those weather years, at least one region experienced a demand shortfall, with the largest identified deficiency of 19 GW. Taking those same weather patterns and operational impacts and modeling them across the 12-year period clearly illustrates that some regions may not be unable to meet forecasted demand under extreme conditions with the projected resource mix.

Consequently, the ITCS has recommended 36 GW of additional transfer capability across 10 of the 23 transmission planning regions (TPR). However, it's important to note that while this additional transfer capability is a significant step, it will not fully solve all the energy deficiencies. A more comprehensive solution, one that incorporates resources and demand management in addition to transfer capability, is necessary to fully address the energy deficiencies.

Why not adopt a one-size fits all approach to import capability requirements?

A minimum capability requirement is a simplistic approach that would not serve all regions equally nor would it address the energy adequacy challenges identified in the study. In fact, it could cause some areas to overbuild and leave others with shortfalls. The amount of transfer capability each region requires is unique to each region and should include considerations like the entities' resource portfolios, impact of weather, and neighboring regions and their respective resource portfolios.

NERC and the Regions also rely on studies like the Long-term Reliability Assessment to provide a more holistic resource adequacy assessment. The recommended additions to transfer capability did not consider factors such as economics and policy.

Why did the ITCS not consider firm transfers?

NERC, as the Electric Reliability Organization (ERO), is singularly focused on reliability, resilience and security of the BPS, consequently the ITCS does not include economic or policy considerations. Specifically, energy transfers were only modeled when needed to maintain a desired margin within a TPR and only if the source

TPR had an energy surplus to share during the relevant time periods. If there was sufficient energy surplus, then energy transfers, whether firm or non-firm, were permitted up to the transfer capability of the interface. The ITCS does not attribute responsibility for building additional transfer capability to any entity. Relevant entities must consider all factors, such as economics and policy, before making a final determination on a solution to resolve energy deficiencies and should also consider solutions such as additional resources, demand response, and storage solutions before selecting final projects to implement. Such analysis should also include discussions and agreements about entities responsible for implementing the final projects and associated cost allocation.

Prudent Additions

How do you determine prudent additions?

The concept of prudency is not a clearly defined concept in technical system planning. However, a FERC precedent defines prudency as *"a determination of whether a reasonable entity would have made the same decision in good faith under the same circumstances, and at the relevant point in time."*

Since NERC's primary focus is reliability, the study results will be evaluated to analyze potential transfer capability deficits and then recommend additions to transfer capability that are technically prudent to strengthen reliability. Even though NERC's focus is reliability, in the backdrop of recent events such as winter storm Uri, it is evident that the interregional transfer capability's added value goes beyond just reliability to other areas of public importance, such as protection of life, public safety, and national security as safeguarded by a reliable grid.

How is the study treating dc-only interfaces?

In Part 2, dc-only interfaces were treated the same way as other interfaces. Energy transfers could occur in either direction up to the transfer capability calculated in Part 1, assuming that the source TPR had surplus energy when needed by the sink TPR.

Are there situations in which building transmission between regions would have no reliability value?

Yes. For example, when comparing New England and New York under extreme cold conditions, additional transfer capability between these two regions may not help as both areas may be affected by the same weather pattern simultaneously.

How will you manage transfers from Canada?

Transfer capabilities into or between areas in the United States will be included in the Part 1 report, including imports from Canada. Transfer capabilities from the United States to Canada or between Canadian provinces will be published in the Canadian Analysis in Q1 2025. Canadian provinces are also included in the Part 2 prudent additions analysis.

Stakeholder Engagement

Will stakeholders have the opportunity to make formal comments on the ITCS?

The Fiscal Responsibility Act of 2023, in which NERC was directed to conduct this study, requires NERC to consult with each transmitting utility with facilities interconnected with another transmitting utility in a neighboring transmission planning region. NERC has adopted a broader approach to consult with and inform all industry stakeholders (e.g., utilities; Transmission Planners; Planning Coordinators; Transmission Operators; Transmission Owners; state, provincial, and federal regulators; and industry trade groups).

NERC and the Regional Entities highly value the input of stakeholders, including transmitting utilities, and regularly engage with them through targeted meetings, presentations, and regular touchpoints. Regional

Entities are regularly engaging with stakeholders through their technical committees regarding the ITCS study progress. Additionally, all transmitting utilities were sent a letter on February 9, 2024, informing them of the study and emphasizing the importance of their input. NERC will send a follow-up letter in Q3 2024, providing all the transmitting utilities with another opportunity to contribute to the study. Other actions include the establishment of the ITCS Advisory Group comprised of industry experts. NERC hosts a monthly meeting with the Advisory Group to provide updates and seek input and feedback. For any additional questions and to provide input, please email the ITCS project team.

A formal comment period will take place once FERC files the report in the Federal Register.

Where can I learn more about the ITCS?

NERC developed an ITCS web page with the latest study scope and progress information, project timelines, and stakeholder engagement opportunities. Also helpful is the ITCS Quarterly Report, detailing the latest activities and progress.