

Distributed Generation Interconnection

Rhode Island Energy Reporting Requirements – Affected System Operator Studies

Paragraph 9 MONTHLY ASO STUDY UPDATE

May 15th, 2024

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9.d Estimated Timeline

The Western Rhode Island (WRI) Area ASO Study #3 commenced as of August 17, 2021, when Rhode Island Energy (RIE) officially received all PSCAD/PSSE models that aligned with Rhode Island Energy's Source Requirement Document (SRD). The timeline for the overall WRI ASO #3 System Impact Study was expected to take 6-12 months. Neco and NEP were initially targeting to have all study components completed by the end of October 2022. Due to the large amount of attrition from WRI ASO #1 and #2, the WRI ASO #3 study was put on hold in early 2022 to restudy ASO #1 and #2. This Attrition Study was completed and presented to NEPOOL RC Meeting on April 27, 2022. The analysis for WRI ASO #3 resumed soon after, and the first round of simulations was completed March 2023. The PSCAD analysis showed unacceptable response for several DER projects relating to voltage issues. Two solutions were to implement a Transmission Solution for a Synchronous Condenser or adjust the PSCAD and Stability model settings for the corresponding DER projects. The Company identified settings changes as the lowest cost solution, and RIE has been working with the developers to resolve the PSCAD and Stability model responses.

The affected developers have provided updated PSCAD and Stability models, and these models were rescreened to ensure they still met the SRD. The screening identified model deficiencies with regards to the SRD, so the Company requested the affected developers address these deficiencies. This effort required multiple revisions from the developers. The Company screened the updated models to determine if deficiencies were resolved, and it was determined that all deficiencies have been addressed and all models now in ASO#3 have been deemed functional.

The original Study Scope for WRI ASO #3 was approved by ISO in 2021, however, ISO-NE requested this be revised in December 2023 to incorporate project changes and updated assumptions to reflect new modeling practices. ISO-NE requested that RIE restart the study using new base cases and study assumptions. ISO reviewed the study scope and provided comments to RIE on March 26th. ISO-NE determined the ASO #3 study needs to respect an ongoing FERC QP study. The Stability and PSCAD models as well as the outputs from that study will need to be included in the WRI ASO #3 System Impact Study basecases. This FERC QP has not provided working stability and PSCAD models to ISO-NE as of this report. RIE is continuing to perform work on ASO #3 while waiting for ISO-NE to approve the FERC QP models. RIE is continuing with the Steady-State analysis and prepping the PSCAD cases for analysis. Stability analysis for ASO #3 is on hold until the approved FERC QP Stability models are received.

We are targeting to complete the next round of analysis for ASO #3 in Mid-July 2024, and the delivery date of the approved FERC QP models is being closely monitored. RIE will work towards reducing the study durations, but any other delays for inputs into these studies will prolong the completion date.

The Steady State and Stability analysis has an estimated timeline of 6 weeks per each round of simulation, to be followed by the PSCAD analysis that has a study timeline of approximately 8 weeks per each round of simulation. These results and the corresponding System Impact Study report will have to be reviewed and approved by ISO-NE. If the next round of PSCAD analysis shows similar voltage issues, there could be a potential need to move forward with the synchronous condenser solution. This result will introduce the need for a 3rd round of PSCAD analysis to incorporate the Synchronous Condenser if

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required. The estimated timeline for this potential 3rd round of simulation could be similar to the 14 weeks listed above.

ASO Study Name	No. of Applications	MW	Type of Study	Estimated Time to Complete
Western RI Area ASO Study #3	25	117.06	Comprehensive	6-12 Months

9.e Estimated System Modifications & Costs

Western RI Area ASO Study #3

These 25 applications have been grouped together and are being studied under one Comprehensive Study. NEP will not know if transmission upgrades will be required until the Study has been completed. The cost for a project to participate in this Study was based on a pro rata share of \$6,500/MW for each project.

9.f Prioritization System

If it is possible to advance any projects ahead of completion of an ASO study, NECo will prioritize projects based on the following:

1. Has customer paid its full construction advance for system modifications?
2. When did the NECo receive customer payment?
3. What is the date of the customer's anticipated authority to interconnect?
4. What stage is the project within the NECo's construction process?
5. How far along is the customer's construction? (Developers may need to self-certify the responses to these questions)
 - a. Does customer have all necessary local permits to construct?
 - b. Does customer have site control?
6. Has the necessary generator notification form been approved by the RC?
7. Application deemed complete date.

9.g Opportunities to Progress Applications

Western RI Area ASO Study #3:

We have reached a point where we can progress the Distribution System Impact Studies (DSIS) and we are currently coordinating to deliver the drafts in conjunction with ISO NE approval. There are no distribution study updates at this time.

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9.h Study Results

Western RI Area ASO Study #3:

This Study commenced August 17, 2021 when Rhode Island Energy officially received all working PSCAD/PSSE models that align with Rhode Island Energy’s Source Requirement Document (SRD). Accordingly, there are no study results at this time.

10.a Contact Information

All Rhode Island

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10.b Stakeholder Meetings

The last ASO/RI Interconnection Update meeting was held on February 15th, 2024, by Webinar. The last ASO webinar was held on January 16th, 2024, and was specifically presented to the developer community. RIE will be holding an in-person DG Seminar on March 6th 2024.

Appendix

9.a Scope & Process

At an overall level, when the interconnection of distributed generation (DG) to The Narragansett Electric Company’s (NECo) electric power system (EPS) has the potential to impact a neighboring EPS (distribution or transmission), further analysis and/or study will be required. Examples of potential impacts on a neighboring EPS include reverse power flow onto the bulk transmission system and the establishment of new retail delivery points (for example, new/upgraded substations, transformers) to provide the distribution capacity necessary to accommodate greater amounts of large-scale DG projects interconnecting to NECo’s EPS. The purpose of this Paragraph 9 Monthly Report (Paragraph 9 Report) is to provide updates for ongoing affected system operator (ASO) studies that implicate three or more DG applications or more than 15MW of DG capacity in accordance with the Reporting Requirements.

The Western RI Area ASO Study #3 commenced on August 17, 2021 and is a Level 3 Comprehensive Transmission System Impact Study. It consists of 25 projects within the Western Rhode Island Power Supply Area and is expected to complete in Q2 2024.

Process

ISO New England (ISO-NE) Tariff Process Applicable to DG Interconnections

There are two primary ISO-NE tariff processes that are potentially applicable to the interconnection review of new DG resources:

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1. ISO-NE’s interconnection processes, pursuant to Schedules 22 and 23 of the ISO New England Open Access Transmission Tariff (OATT)¹, and
2. ISO-NE’s Proposed Plan Application (PPA) process, pursuant to Section I.3.9 of the ISO New England Transmission, Markets, and Services Tariff.²

Jurisdiction for Interconnection

DG projects fall under one of two jurisdictions for interconnection: state or federal. A customer proposing to interconnect a DG resource to a state-jurisdictional distribution facility must follow the associated state interconnection process. A customer proposing to interconnect a DG resource to a Federal Energy Regulatory Commission (FERC)-jurisdictional distribution facility must follow the ISO-NE’s interconnection process under Schedule 22 or 23 of the Open Access Transmission Tariff (OATT) (unless it falls under one of the exemptions identified in Schedule 23).³

Most of the DG being installed in New England is interconnecting to the lower-voltage distribution system through state interconnection processes, which are administered by the states’ electric distribution companies. In these cases, the customer is an interconnection customer of the electric distribution company, not of ISO-NE. A customer should contact NECO and/or ISO-NE to determine whether the specific distribution feeder to which the DG facility plans to interconnect is subject to the OATT.

Overview of Section I.3.9 Proposed Plan Application Process

Regardless of the jurisdiction for interconnection, DG resources of 1 MW or greater will require review by ISO-NE pursuant to Section I.3.9 of the ISO Tariff to ensure the proposed system change does not have a significant adverse impact on the regional power system. This is true even in cases where the project is interconnecting under the state process.

The Section I.3.9 PPA process has been part of the region’s planning processes for decades. ISO-NE, as the Regional Transmission Organization for New England, is responsible for reviewing and approving proposed system changes because these changes may impact the stability, reliability, or operating characteristics of the New England power system.

Commencement of the Transmission Study of PPA (ISO-NE Planning Procedures)

NEP commences a transmission study when it has sufficient information about firm MW values for the proposed generator(s) and has determined how and where the generator(s) will interconnect to NECO’s EPS (e.g., NECO distribution system modifications and transmission system injection points). NECO gathers this information from Interconnecting Customers and coordinates with NEP to facilitate a transmission study.

1 https://www.iso-ne.com/static-assets/documents/regulatory/tariff/sect_2/oatt/sect_ii.pdf

2 https://www.iso-ne.com/static-assets/documents/regulatory/tariff/sect_1/sect_i.pdf

3 Exemptions: The state interconnection process will apply if a DG resource is interconnecting to a FERC-jurisdictional distribution facility and the project will:

- a. Produce energy to be consumed only on the retail customer’s site,
- b. Not sell its output into the ISO markets, or
- c. Sell 100% of its output as a Qualifying Facility (QF) to the interconnecting utility under a Public Utility Regulatory Policies Act (PURPA) contract.

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For generation resources 5 MW and above, NECo works with NEP on the PPA requirement during NECo's detailed study phase of the interconnection process. For generation resources between 1 MW and 5 MW, NECo had been working with NEP to issue the Generator Notification Forms (GNFs) to ISO-NE during NECo's detailed design phase as well; ISO-NE was not requiring transmission impact analyses for these applications. Because of the significant number of proposed DG project interconnection applications between 1 MW and 5 MW received through the first half of 2018, ISO-NE is exercising its discretion to request impact analyses from NEP for applications between 1 MW and 5 MW. As a result, NECo has been submitting GNFs for applications between 1 MW and 5 MW to ISO-NE for review at or around 20 business days after the commencement of a distribution system impact study.

9.b Roles and Responsibilities

Below is a list of the various roles and responsibilities associated with transmission studies:

NECo – Interconnecting Company & Coordinator, includes the following functions:

- Customer Energy Integration (CEI) – Coordinate with developers from application to interconnection
- Distribution Planning – Analyze and develop interconnection solutions at distribution level; assist in coordination across NECo in development of most viable solution; coordinate engineering studies with ASOs (such as NEP and ISO-NE)
- Substation Engineering – Develop protection strategies to preserve safety and reliability given complex effects of high DG volume
- Design, Resource Planning, Operations – All downstream departments that implement the engineered solution required for safe and reliable interconnections

NEP – a Rhode Island Energy affiliate and also an ASO, includes the Transmission Planning and Asset Management (TPAM) function that is responsible to complete transmission-related analyses. NEP is the transmission provider in the area, including transfer analyses and transmission system impact studies.

ISO-NE – the Independent System Operator established in accordance with the NEPOOL Agreement and applicable FERC approvals, responsible for managing the bulk power generation and transmission systems in New England. Provides guidance and oversight to NEP analyses and responsible for ensuring compliance with ISO-NE Tariffs Schedule 22 and Schedule 23 as well as Section I.3.9. The ISO-NE will determine whether such interconnections will have a cumulative impact on facilities used for the provision of regional transmission service.

New England Power Pool (“NEPOOL”) Reliability Committee (“RC”) – The RC is a standing technical committee of NEPOOL, which is made up of Market Participants from across the region and serves as the ISO's principal advisory body. The RC provides advisory input to ISO-NE on the design and oversight of reliability standards for the New England power system. RC meetings are held monthly and consider matters such as PPAs for generation and transmission projects. After an advisory vote by the RC, the ISO will issue a determination approving or denying a PPA.

ASO - Any neighboring Electric Power System (EPS) not under control of NECo (i.e. municipal light company or other regulated utility).

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Governance Participant – a signatory to the NEPOOL agreement.

9.c Standards and Jurisdiction

In most cases, as is the case for the DG seeking to interconnect to Neco's EPS in Rhode Island, the need for a transmission impact study is defined by ISO-NE Planning Procedures. Specifically, pursuant to ISO-NE's tariff, Section I.3.9.1, and ISO-NE Planning Procedures PP5-1⁴ and PP5-3⁵ (collectively "ISO-NE Planning Procedures"), any proposed generation resource above 1 MW must be reviewed by ISO-NE and brought before the NEPOOL RC for approval. ISO-NE Planning Procedures PP5-1 and PP5-3 provide guidelines for the PPA application and review process.

Under the ISO-NE Planning Procedures, for each proposed generation resource 5 MW or greater, ISO-NE requires a formal transmission system impact study. Although proposed generation resources between 1 MW and 5 MW generally do not automatically trigger a transmission system impact study, ISO-NE has the discretion to request further analysis of the impact consistent with ISO-NE Planning Procedures, on an as-needed basis. Commencing around September 2018, ISO-NE started to exercise that discretion and has been requesting additional impact analyses from NEP on generation resources between 1 MW and 5 MW.

Prior to this, for the most part, for a project that was sized between 1 MW and 5 MW, a GNF would have been required, which did not include any study or analysis. This requested evaluation by ISO-NE for generation resources between 1 MW and 5 MW required a change in process for Neco with respect to the processing of Neco's interconnection applications, coordination with NEP, and the timing of these notifications to ISO-NE. The change in process also contributed to the inclusion of between 1 MW and 5 MW projects in the ASO studies.

The attached link offers additional information relative to the ISO-NE Planning Procedures I.3.9.:
<https://ngus.force.com/servlet/servlet.FileDownload?file=0150W0000FEqTu>

Typically, for Neco interconnected generation resources, NEP submits the PPA on the generator's behalf and performs the required transmission analysis and studies in coordination with the ISO-NE and any other ASO. While ISO-NE's Planning Procedures allow generators that are a Governance Participant under the ISO-NE Tariff to submit their own PPAs for their projects, if the project results in the need for transmission system upgrades, an affected transmission owner is required to submit its own PPA for the proposed transmission system upgrades. Importantly, regardless of whether the generating facility PPA is submitted by a Governance Participant or NEP, the same aforementioned transmission system impact studies and NEPOOL RC approval are required. The ISO-NE Planning Procedures do not specify the manner in which NEP should perform a transmission study where there is a high volume of proposed Neco interconnected generator resource applications and capacity coming into an area in a short time frame. Therefore, NEP considered the ongoing challenges in these areas, including the saturation and system constraints and best practices for system planning, to assure the safety and reliability of the

⁴ Entitled, "Procedure for Review of Governance Participant's Proposed Plans (Section I.3.9 Applications: Requirements, Procedures, and Forms)."

⁵ Entitled, "Guidelines for Conducting and Evaluating Proposed Plan Application Analyses."

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transmission system. In the context of these considerations, NEP developed its study methodology with the following goals in mind:

- **Speed:** Facilitate developer interconnection as quickly as possible.
- **Reliability:** Ensure that the interconnections do not compromise the reliability of the transmission system.
- **Coordination:** Ensure the distribution upgrades are appropriately represented in the study assumptions.
- **Process:** Abide by ISO-NE Planning Procedures and Tariff requirements.
- **Solutions:** Develop the appropriate set of upgrades for each Area ASO Study, as opposed to determining individual case-by-case upgrades, which more efficiently uses time, material and human resources, and avoids duplicative, out-of-date and/or unnecessary infrastructure (at the customer's cost).
- **Efficiency:** The study of individual projects in the same area would be performed sequentially, or, subject to ISO-NE's approval, in a group approach. By way of comparison, a single typical 5 MW transmission system impact study would take approximately 3 months. The goal of grouping the projects in an Area ASO Study, or in discrete substation analyses, is to gain significant efficiency over individual sequential project analysis by evaluating many MWs at one time.

With these goals considered, and consistent with NEP's obligation in Section 3.03(b) of the Transmission Operating Agreement ("TOA")⁶ to notify ISO-NE of situations where the interconnection of multiple DG resources may have cumulative impacts on the facilities used for the provision of regional transmission service⁷, NEP began communicating with ISO-NE to assess the preferred way to evaluate the impact of this volume of generation proposing to interconnect in the same area. ISO-NE elected to exercise its discretion under the Planning Procedures and requested that the studies include generation projects between 1 MW and 5 MW given the saturation in the area and the potential aggregate impacts to the transmission system. For Western RI Area ASO Study #3, NEP and ISO-NE determined that it would be more efficient to group the PPAs and the associated transmission system study, rather than submit individual applications and studies for each project. In addition, in the Western RI Area ASO Study #3, NEP and ISO-NE determined that discrete analyses at multiple substations would be more efficient.

⁶ The Transmission Operating Agreement was executed by ISO-NE and the region's Participating Transmission Owners (PTO) when ISO-NE became the Regional Transmission Organization for New England in 2005, and sets forth the roles and responsibilities of the PTOs and ISO-NE as it pertains to the operation and planning of the regional transmission system.

⁷ The failure of a PTO to appropriately implement the requirements of the TOA, Section I.3.9 of the ISO-NE Tariff, or ISO-NE's Planning Procedures, could subject a PTO to liability for breach of the TOA, ISO-NE's Tariff, and RC reliability requirements. In this event, FERC has the authority to pursue criminal liability and/or levy fines up to \$1 million per day for violations of the Federal Power Act, FERC regulations, orders or tariffs.