



Paragraph 9 MONTHLY ASO STUDY UPDATE

January 15, 2020
Distributed Generation Interconnection
National Grid Reporting Requirements – Affected System Operator Studies

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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.

Rhode Island ASO Study Scope

The Rhode Island ASO Transmission Study (RI ASO study) are groups of proposed DG interconnections to NECo's distribution system in Rhode Island being performed by the transmission provider, New England Power Company (NEP) with inputs from three Affected System Operators to determine the impacts of these interconnections on the transmission system in accordance with ISO-NE rules and planning procedures. The RI ASO study is a transmission study and is separate from and in addition to NECo's own distribution system impact study.

The ASO Study was broken into two types of study: Non-Comprehensive, and Comprehensive.

Category	No. of Applications	MW	Type of Study
Between 1MW & 5 MW			
Group 0	11	24	Non-Comprehensive
Group 1	5	16.75	Non-Comprehensive
Group 2*	6	19	Comprehensive
Group 3	4	14	Non-Comprehensive
Group 4*	10	35	Comprehensive
Over 5 MW			
Part 0	17	95	Comprehensive
Part 1*	14	108	Comprehensive
Part 2*	10	70	Comprehensive

Non-Comprehensive: This is a level of analysis required to demonstrate no adverse impacts. They can result in comprehensive studies.

Comprehensive: This is a full study and will be completed as per PP5-3 and PP5-6.

*Studies need to be coordinated with FERC studies

Coordinating with FERC Projects:

- A discontinued FERC project (352MW) in the area that has been represented in NEP's base cases has indicated it will not be progressing and will be removed from consideration in the RI ASO study.
- Another FERC project (180MW) has initiated its System Impact Study over the past month which NEP has been asked to represent in the RI ASO study in progress.
- Impacts:
 - The modeling data relating to the new FERC project to be assumed in the base case is required.
 - Assumptions are being made on the revised impacts of interconnecting Part 1.
 - The completion date of RI DG Area study is estimated to be March 31, 2020.
- All RI ASO studies

- Application of Changes to FERC projects
- Conservative assumptions included in study without yet having all the modelling data from the newly added FERC project.
- Completed Preliminary Steady State Analysis
- Results
 - Overloads have been observed on two 115kV transmission lines between Kent County and Drumrock, which include:
 - G-185N
 - K-189
- Proposed Mitigations
 - G-185N – reconductoring with 1590 ACSS
 - K-189 – tower equipment and insulator upgrades

Process

ISO New England 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:

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 developer proposing to interconnect a DG resource to a state-jurisdictional distribution facility must follow the associated state interconnection process. A developer 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 (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 DG developer is an interconnection customer of the electric distribution company, not the ISO. A DG developer should contact the owner of the distribution facilities and/or ISO-NE to determine whether the facilities involved in the interconnection are state- or FERC-jurisdictional.

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.

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 the ISO 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.

Figure 1 provides an illustration of the general process flow for DG projects that require review by the ISO pursuant to Section I.3.9 of the ISO Tariff.

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 system modifications and transmission system injection points). NECo gathers this information from Interconnecting Customers and coordinates with NEP to facilitate a transmission study.

Up until recently, NECo worked with NEP to issue the Generator Notification Forms (GNFs) to ISO-NE for generation resources between 1 MW and 5 MW during NECo's detailed design phase. The timing of this notification was influenced partly because the overwhelming majority of proposed DG project interconnection applications were under 5 MW and because until recently, ISO-NE was not requiring transmission impact analyses for projects between 1 MW and 5 MW. For generation resources 5 MW and above, NECo worked with NEP on the PPA requirement during NECo's detailed study phase of the interconnection process. As a result of ISO-NE increasingly exercising its discretion to request additional impact analyses from NEP on generation resources between 1 MW and 5 MW, NECo has begun to submit GNFs to ISO-NE for review at or around 20 business day 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:

The Narragansett Electric Company (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

New England Power Company (NEP) – a National Grid affiliate and also an ASO, includes the Transmission Planning and Asset Management (TPAM) function that is responsible to complete transmission-related analyses where they are 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.

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

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. In fact, over the past year (commencing around September 2018), ISO-NE has started to exercise that discretion and has requested additional impact analyses from NEP on generation resources between 1 MW and 5 MW.

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.*”

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 newly requested evaluation by ISO-NE for generation resources between 1 MW and 5 MW has 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 has 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=0150W00000FEqTu>

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 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, as is the case in the RI ASO study area. 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 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 the ASO study area, 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 the RI DG Area Study, or discrete substation analyses is to gain significant efficiency over individual sequential project analysis by evaluating many hundreds of 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

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

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 study 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 the RI ASO study area, 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 RI ASO study area, it was determined discrete analyses at multiple substations would be more efficient.

9.d Estimated Timeline

Estimated Timeline for Completion of the ASO Study						
Category	No. of Applications	MW	Type of Study	Current Status	Estimated Completion Date	System Modifications
Group 0	11	24	Non-Comprehensive	Complete	10/18/2019	No
Group 1	5	16.75	Non-Comprehensive	Complete	9/3/2019	No
Group 2	6	19	Comprehensive	On-Going	3/31/2020	N/A
Group 3	4	14	Non-Comprehensive	Complete	9/3/2019	No
Group 4	10	35	Comprehensive	On-Going	3/31/2020	N/A
Part 0	17	95	Comprehensive	15/17 Complete	1/31/2020	N/A
Part 1	14	108	Comprehensive	On-Going	3/31/2020	N/A
Part 2	10	70	Comprehensive	On-Going	3/31/2020	N/A

9.e Estimate System Modifications & Costs

Non-Comprehensive ASO Study

The transmission study for the non-comprehensive groups 1 & 3 resulted with NO system modifications necessary. Those applications progress to the NEPOOL Reliability Committee in September. The Non-Comprehensive Group 0 study resulted with NO system modifications necessary and will progress to the NEPOOL Reliability Committee in November.

Comprehensive ASO Study

The comprehensive RI ASO study has not yet progressed to a point where adverse impacts have been determined so system modifications have yet to be identified at this time.

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 NERC 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.

9.f Prioritization System

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 ISO's reliability committee?

9.g Opportunities to Progress Applications

Non-Comprehensive ASO Study

The Non-Comprehensive ASO studies pertaining to applications and associated projects that had been placed in Groups 0, 1 and 3 have been completed. Generator Notification Forms (GNF) associated with applications in Groups 0, 1 and 3 have been approved by the ISO-NE Reliability Committee and are progressing.

Comprehensive ASO Study: (Groups 2,4 Part 1,2)

The comprehensive ASO Study which pertains to applications and associated projects that had previously been placed in Group 2, Group 4, Part 1 and Part 2 is expected to be completed on March 31, 2020. There are no opportunities to progress these applications until the comprehensive ASO Study is completed.

9.h Study Results

Comprehensive ASO Study

The comprehensive ASO study results for projects that had previously been placed in Group 2, Group 4, Part 1 and Part 2 are expected to be completed on March 31, 2020.

10.a Contact Information

All Rhode Island

John C. Kennedy – 401-784-7221 email: John.Kennedy@Nationalgrid.com

Nick Neilsen – 401-784-4370 email: Nicholas.Neilsen@Nationalgrid.com

10.b Stakeholder Meetings

The last stakeholder meeting was held on October 21st. The next meeting is scheduled to be held on January 28, 2020 at the Warwick Country Club – 394 Narragansett Bay Ave, Warwick RI, 02889.