

Public Service Company of New Hampshire

**Interconnection Standards
for Inverters Sized Up to 100 KVA**

August 2009



**Public Service
of New Hampshire**

The Northeast Utilities System

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PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
INTERCONNECTION STANDARDS FOR INVERTERS
SIZED UP TO 100 KVA (Continued)

1.0 Introduction

1.1 Applicability

This document (“Interconnection Standard”) describes the process and requirements for an Interconnecting Customer to connect a Listed inverter based Facility sized up to 100 kVA to the Company’s Electric Power System (“Company EPS”), including discussion of technical and operating requirements, and other matters. Non-inverter based Facilities will need to follow the standard interconnection procedures.

If the Facility will always be isolated from the Company’s EPS, (i.e., it will never operate in parallel to the Company’s EPS), then this Interconnection Standard does not apply.

1.2 Definitions

The following words and terms shall be understood to have the following meanings when used in this Interconnection Standard:

Affiliate: A person or entity controlling, controlled by or under common control with a Party.

Anti-Islanding: Describes the ability of a Facility to avoid unintentional islanding through some form of active control technique.

Application: The notice provided by the Interconnecting Customer to the Company in the form shown in Exhibit A, which initiates the interconnection process.

Area Network Distribution System: Electrical service from an EPS consisting of one or more primary circuits from one or more substations or transmission supply points arranged such that they collectively feed secondary circuits serving more than one Interconnecting Customer.

Commission: The New Hampshire Public Utilities Commission.

Company: Granite State Electric Company, Unitil Energy Systems, Inc, Public Service Company of New Hampshire.

Customer: Company’s retail customer; host site or premises, may be the same as Interconnecting Customer.

EPS: The electric power system owned, controlled or operated by the Company used to provide distribution service to its Customers.

Facility: A source of electricity that is located on the Customer’s side of the point of common coupling, and all facilities ancillary and appurtenant thereto, including interconnection equipment, which the Interconnecting Customer requests to interconnect to the Company EPS.

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In-Service Date: The date on which the Facility and System Modifications (if applicable) are complete and ready for service, even if the Facility is not placed in service on or by that date.

Interconnecting Customer: Entity that takes electric service from the Company who has or will obtain legal authority to enter into agreements regarding the interconnection of the Facility to the Company EPS.

Interconnection Service Agreement: An agreement for interconnection service, the form of which is provided in Exhibit A, between the Interconnecting Customer and the Company.

Islanding: A situation where electrical power remains in a portion of an electrical power system when the Company's transmission or distribution system has ceased providing power for whatever reason (emergency conditions, maintenance, etc.). Unintentional Islanding, especially past the PCC, is to be strictly avoided.

Isolated: The state of operating the Facility when electrically disconnected from the Company EPS on the Interconnecting Customer's side of the PCC.

Listed: A Facility that has been tested and certified by a nationally recognized testing laboratory to comply with all requirements in UL Standard 1741.1 dated May, 2007 or later.

Net Metering: A customer of the Company with a renewable on-site Facility of 100 kilovolt-amperes ("kVA") or less in size exercising the option to run the meter backward and thus choosing to receive a credit from the Company where in any month during which there was a positive net difference between kilowatt hours generated and consumed, the credit will equal the positive net difference. This credit is then used by the Customer in subsequent billing periods, until exhausted before purchasing energy from the Company.

Non-Islanding: Describes the ability of a Facility to avoid unintentional islanding through the operation of its interconnection equipment.

Parallel: The state of operating the Facility when electrically connected to the Company EPS (sometimes known as grid-parallel).

Parties: The Company and the Interconnecting Customer.

Point of Common Coupling (PCC): The point where the Interconnecting Customer's local electric power system connects to the Company EPS, such as the electric power revenue meter or premises service transformer. See the Company for the location at a particular Interconnecting Customer site.

Radial Distribution Circuit: Electrical service from an EPS consisting of one primary circuit extending from a single substation or transmission supply point arranged such that the primary circuit serves Interconnecting Customers in a particular local area.

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Screen(s): Criteria by which the Company will determine if a proposed Facility's installation will adversely impact the Company EPS in the Simplified Processes as set forth in Section 3.0.

Simplified Process: As described in Section 3.1, process steps from initial application to final written authorization for certain Listed inverter-based Facilities of limited scale and minimal apparent grid impact.

Spot Network Distribution System: Electrical service from an EPS consisting of one or more primary circuits from one or more substations or transmission supply points arranged such that they collectively feed secondary circuits serving only one Interconnecting Customer.

Supplemental Review: Additional engineering study to evaluate the potential impact of Facilities over 10 kVA on the Company EPS so as to determine any requirements for processing the application, or Facilities of 10 kVA or smaller that fail one of the Simplified Process screens. This review is charged at a cost of \$125.00 per hour up to a limit of 10 hours. If Company services are needed to install temporary metering to complete the Supplemental Review, then these charges will also be included as part of the overall review.

System Modification: Modifications or additions to distribution-related Company facilities that are integrated with the Company EPS for the benefit of the Interconnecting Customer and paid for by the Interconnecting Customer.

Unintentional Islanding: A situation where the electrical power from the Facility continues to supply a portion of the Company EPS past the PCC when the Company's transmission or distribution system has ceased providing power for whatever reason (emergency conditions, maintenance, etc.).

Witness Test: The Company's right to witness the commissioning testing. Commissioning testing is defined in IEEE Standard 1547-2003.

1.3 Forms and Agreements

The following documents for the interconnection process are included as Exhibits:

1. Application forms:
 - a. Simplified Process (Facilities meeting the requirements of Section 3.1) application form and service agreement (Exhibit A)
 - b. Certificate of Completion (Exhibit B)
2. Supplemental Review Agreement for those projects which have failed one or more screens in the Simplified Process (Exhibit C).

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2.0 Basic Understanding

Interconnecting Customer intends to install a Listed inverter based Facility on the Customer's side of the PCC that will be connected electrically to the Company EPS and operate in parallel, synchronized with the voltage and frequency maintained by the Company during all operating conditions. It is the responsibility of the Interconnecting Customer to design, procure, install, operate, and maintain all necessary equipment on its property for connection to the Company EPS. The Interconnecting Customer and the Company shall enter into a Simplified Process Application and Interconnection Service Agreement to provide for parallel operation of an Interconnecting Customer's Facility with Company EPS. A form of this agreement is attached as Exhibit A to this Interconnection Standard.

The equipment, controls and other facilities that together constitute the interconnection of the Facility with the Company EPS must be reviewed for potential impact on the Company EPS under the process described in Section 3.0.

The Interconnecting Customer should consult the Company before designing, purchasing and installing any generation equipment, in order to verify the nominal utilization voltages, frequency, and phase characteristics of the service to be supplied, the capacity available, and the suitability of the proposed equipment for operation at the intended location. Attempting to operate a Facility at other than its nameplate characteristics may result in unsatisfactory performance or, in certain instances, injury to personnel and/or damage to equipment. The Interconnecting Customer will be responsible for ascertaining from the Company, and the Company will cooperate in providing, the service characteristics of the Company EPS at the proposed PCC. The Company will in no way be responsible for damages sustained as a result of the Interconnecting Customer's failure to ascertain the service characteristics at the proposed PCC.

The Facility should operate in such a manner that does not compromise, or conflict with, the safety or reliability of the Company EPS. The Interconnecting Customer should design its equipment in such a manner that faults or other disturbances on the Company EPS do not cause damage to the Interconnecting Customer's equipment.

Authorization to interconnect will be provided once the Interconnecting Customer has met all terms of the interconnection process as outlined below.

This Interconnection Standard does not cover general distribution service needed to serve the Interconnecting Customer. Please refer to the Company's Terms and Conditions for Distribution Service. This Interconnection Standard does not cover the use of the distribution system to export power, or the purchase of excess power.

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3.0 Process Overview

This application process is for Listed inverter-based Facilities with a power rating of 100 kVA or less depending on the service configuration, and located on a radial EPS under certain conditions. A Listed inverter-based Facility with a power rating of 10 kVA or less single-phase located on a spot network EPS under certain conditions would also be eligible.

Listed inverter based interconnections are intended to be reviewed promptly under a Simplified Process. A set of review screens have been developed to determine if the application fits the Simplified Process and are described below and detailed in Figures 1 and 2 with their accompanying notes. Table 1 describes the timelines for these paths. Unless otherwise noted, all times in the Interconnection Standard reference Company business days under normal work conditions.

A project that fails to meet the Simplified review screens will be addressed using the Company's standard interconnection review practices. In cases where the Facility is larger than 10 kVA, a Supplemental Review will be conducted. In addition a Supplemental Review may be required which may allow an interconnection of 10 kVA or smaller to be accommodated at a particular site even though it did not pass the Simplified review screens. In these instances, the Company will provide an estimated cost to do a Supplemental Review to the Interconnecting Customer. If the Interconnecting Customer funds the Supplemental Review, the Company will undertake the review to determine which of the following apply:

- No system modifications are required and the simplified process can be used.
- System modifications are required at the Customer's expense before the simplified process can be used. A statement will be sent to the Customer describing the required modification and a bill for the estimated amount.
- The simplified process cannot be used and the Customer must reapply using the Company's standard interconnection process.

All proposed new sources of electric power that plan to operate in parallel with the Company EPS must submit a completed application to the Company within the Company's franchise territory where the Facility will be located. The Interconnecting Customer will be notified of the application's completeness. Interconnecting Customers proposing to interconnect on area networks require a detailed review of the planned interconnection and do not qualify for the Simplified Process. All applications from other Interconnecting Customers must proceed through a series of screens to determine if they meet the requirements for the Simplified Process interconnection path.

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3.1 Simplified Process

Interconnecting Customers using Listed single-phase inverter-based Facilities with power ratings of 100 kVA or less at locations receiving single-phase service from a single-phase transformer, or using Listed three-phase inverter-based Facilities with power ratings of 100 kVA or less at locations receiving three-phase service from a three-phase transformer configuration, and requesting an interconnection on radial EPSs where the aggregate Facility capacity on the circuit is less than 7.5% of circuit annual peak load qualify for Simplified interconnection.

The Simplified Process is as follows:

- a. Application process:
 - i. Interconnecting Customer submits a Simplified Process application filled out properly and completely (Exhibit A).
 - ii. Company evaluates the application for completeness and notifies the Interconnecting Customer within 10 business days of receipt that the application is or is not complete and, if not, advises what is missing.
- b. Company verifies Facility equipment passes screens 1, 2, and 3 in Figure 1 if a radial EPS, or the screens in Figure 2 if a spot network EPS.
- c. If approved, the Company signs the application approval line and returns the approved application to the Interconnecting Customer. In certain circumstances, the Company may require the Interconnecting Customer to pay for System Modifications before the application is approved. If so, a description of work and an estimate of the cost will be sent back to the Interconnecting Customer for approval. The Interconnecting Customer would then approve via a signature and submit payment for any System Modifications. If the Interconnecting Customer approves, the Company performs the System Modifications. Then, the Company signs the application approval line and sends to the Interconnecting Customer.
- d. Upon receipt of application signed by the Company, the Interconnecting Customer installs the Facility. Then the Interconnecting Customer arranges for inspection of the completed installation by the local electrical wiring inspector, or other authority having jurisdiction, and this person signs the Certificate of Completion. If the Facility was installed by an electrical contractor, this person also fills out the Certificate of Completion.
- e. The Interconnecting Customer returns Certificate of Completion to the Company.

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- f. Following receipt of the Certificate of Completion, the Company may inspect the Facility for compliance with standards by arranging for a Witness Test. The Interconnecting Customer has no right to operate in parallel until a Witness Test has been performed or has been previously waived by the Company on the Application Form. If the Company elects to conduct a Witness Test, every attempt will be made to conduct it within 10 business days of the receipt of the Certificate of Completion. All projects larger than 10 kVA will need to be witness tested, unless waived by the Company.
- g. Assuming the wiring inspection and/or Witness Test is satisfactory, the Company notifies the Interconnecting Customer in writing that interconnection is authorized. If the Witness Test is not satisfactory, the Company has the right to disconnect the Facility, and will provide information to the Interconnecting Customer describing clearly what is required for approval.

If the Interconnecting Customer does not substantially complete construction within 12 months after receiving application approval from the Company, the Company will require the Interconnecting Customer to reapply for interconnection.

3.2 Time Frames

Unless otherwise noted, all days in the Interconnection Standard reference Company business days under normal work conditions.

Table 1 lays out the maximum timeframes allowed under the Simplified Review process. The maximum time allowed for the Company to execute the entire Simplified Process is 20 days.

3.3 Fees

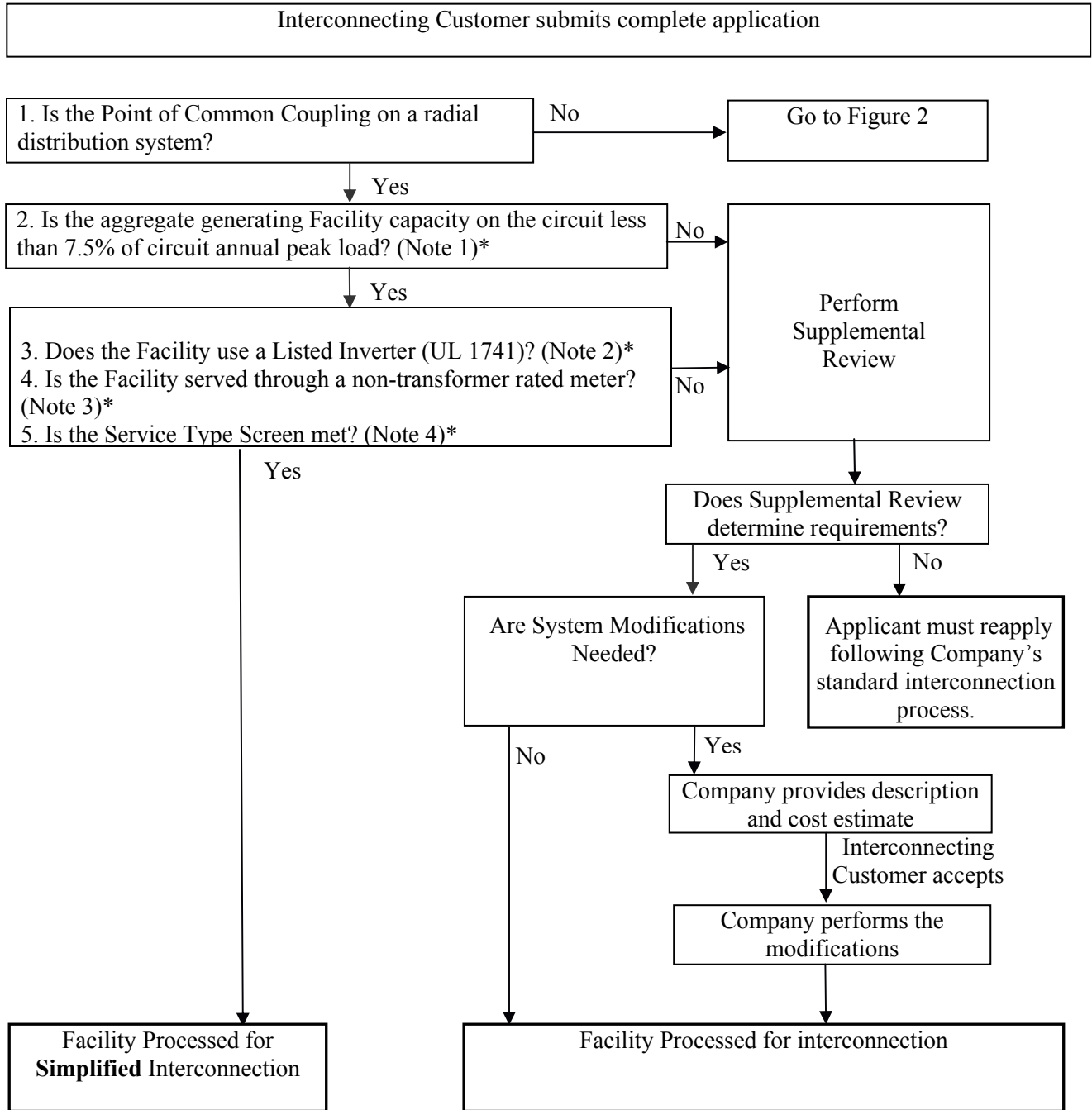
There are no fees for those Facilities that qualify for the Simplified Process on a radial EPS (except in certain cases where a System Modification would be needed for which the Interconnecting Customer would pay).

In cases where the Facility is larger than 10 kVA, or does not pass the other screens, a Supplemental Review will be conducted. In these instances, the Company will provide a cost estimate to do a Supplemental Review to the Interconnecting Customer.

This review is charged at a cost of \$125.00 per hour. If Company services are needed to install temporary metering to complete the Supplemental Review, then these charges will also be included as part of the overall review.

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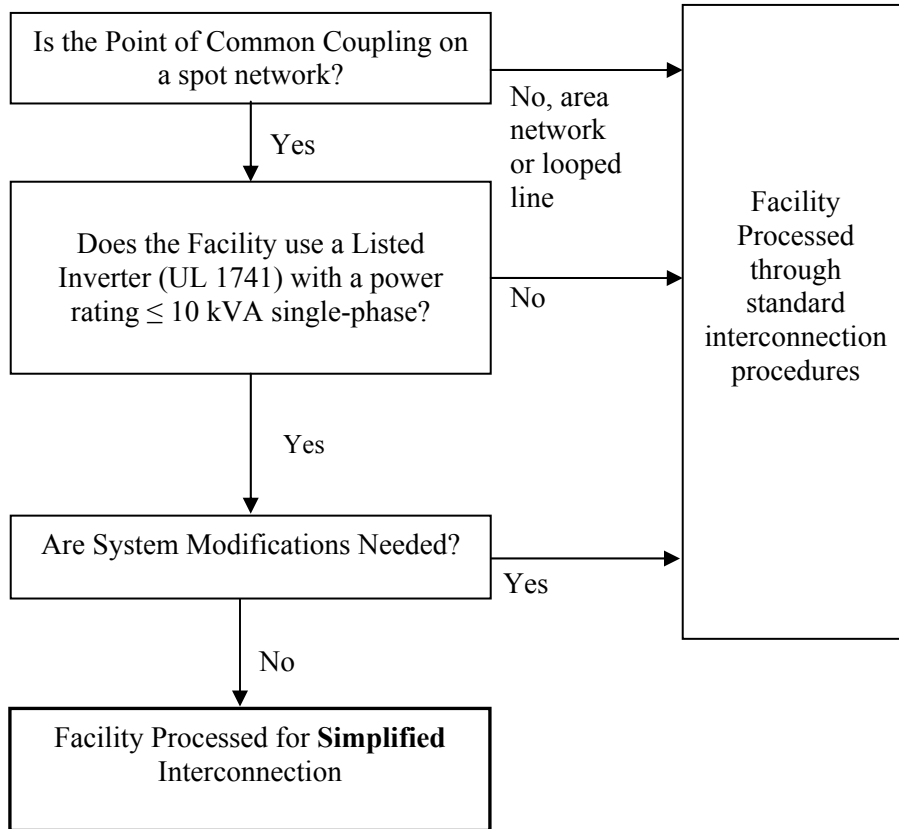
Figure 1 – Inverter Based Simplified Interconnection Process



*See Page 10 for Notes

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Figure 2 – Simplified Interconnection to Networks



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Explanatory Notes to Accompany Figure 1

Note 1. On a typical radial distribution EPS circuit (“feeder”) the annual peak load is measured at the substation circuit breaker, which corresponds to the supply point of the circuit. A circuit may also be supplied from a tap on a higher-voltage line, sometimes called a subtransmission line. On more complex radial EPSs, where bidirectional power flow is possible due to alternative circuit supply options (“loop service”), the normal supply point is the loop tap.

Note 2. New Hampshire has adopted UL1741 (Inverters, Converters and Charge Controllers for Use in Independent Power Systems) as an acceptable standard for power systems to comply with IEEE Std 1547 and 1547.1. Equipment listed to UL1741 by a nationally recognized testing laboratory will be considered in compliance with IEEE Std 1547 and 1547.1. An Interconnecting Customer should contact the Facility supplier(s) to determine if its equipment has been listed to either of these standards.

Note 3. Facilities connected to the utility through a transformer rated meter will be required to install a fully rated, lockable disconnect switch. The disconnect switch will be located near the service entrance for use by utility personnel.

Note 4. This screen includes a review of the type of electrical service provided to the Interconnection Customer, including the service transformer configuration and service type to limit the potential for creating unacceptable voltage imbalance, over-voltage or under-voltage conditions, or service equipment overloads on the Company EPS due to a mismatch between the size and phasing of the energy source, the service loads fed from the service transformer(s), and the service equipment ratings.

To be eligible for the Simplified Process, a Listed inverter-based Facility must be either (1) a single-phase unit on a customer’s local EPS receiving single-phase secondary service at the PCC from a single-phase service transformer, or (2) a three-phase unit on a customer’s local EPS receiving three-phase secondary service at the PCC from a three-phase transformer configuration.

If the proposed Facility is single-phase and is to be interconnected on a center tap neutral of a 240 volt service, its addition will not create an imbalance between the two sides of the 240 volt service of more than 20% of nameplate rating of the service transformer.

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Table 1 – Time Frames

Review Process	Simplified	Simplified Spot Network
Eligible Facilities	Listed Small Inverter	Listed Inverter ≤ 10 kVA single-phase
Review Application for completeness	10 days	10 days
Complete Review of all screens	10 days	Site review 30 days if load is known or can be estimated 90 days if load has to be metered
Complete Supplemental Review (if needed) – Note 1		
Total Maximum Days	20 days	100 days
Notice/ Witness Test	< 1 day with 10 day notice or by mutual agreement	1 day with 10 day notice or by mutual agreement
Send Approval to Interconnector		

NOTE 1: When a Supplemental Review is involved, the timelines for a Simplified Process no longer apply, however, the Company will complete the Supplemental Review within 40 days.

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Exhibit A – Simplified Process Interconnection Application

Instructions *(please do not submit this page)*

General Information: If you, the Interconnecting Customer, wish to submit an application to interconnect your generating Facility using the Simplified Process (reference Section 3.1 of the Interconnection Standard for eligibility) please fill out the attached application form completely (not including this page of instructions), including your signature in the space provided. Interconnections that may be eligible for this Simplified Process include UL 1741-Listed inverter-based Facilities that are either (1) connecting to radial electric power systems with power ratings of ≤ 100 kVA, or (2) connecting to spot network electric power systems with power ratings of ≤ 10 kVA single-phase. Please attach any documentation provided by the inverter manufacturer concerning the UL 1741. Facilities larger than 10 kVA will be required to install a fully rated lockable switch near the service entrance for use by utility personnel.

E-Mail all material to: NHDG@eversource.com

The Simplified Process is as follows:

1. Application process:
 - a. Interconnecting Customer submits a Simplified Application filled out properly and completely.
 - b. Company evaluates the application for completeness and notifies the Interconnecting Customer within 10 business days of receipt that the application is or is not complete and, if not, advises what is missing.
2. Company verifies Facility equipment can be interconnected safely and reliably.
3. If approved, the Company signs the application and returns a copy to the Interconnecting Customer.
4. Upon receipt of the signed application, the Interconnecting Customer installs the Facility. Then the Interconnecting Customer arranges for inspection of the completed installation by the local electrical wiring inspector, or other authority having jurisdiction, and this person signs the Certificate of Completion. If the Facility was installed by an electrical contractor, this person also fills out the Certificate of Completion.
5. In certain circumstances, the Company will require the Interconnecting Customer to pay for System Modifications. If so, a description of work and an estimate will be sent back to the Interconnecting Customer for approval. The Interconnecting Customer would then approve via a signature and payment for the System Modifications. If the Interconnecting Customer approves, the Company performs the System Modifications. Then, the Company signs the application and sends the approved application back to the Interconnecting Customer.
6. The Interconnecting Customer returns the Certificate of Completion to the Company.
7. Following receipt of the Certificate of Completion, the Company may inspect the Facility for compliance with standards by arranging for a Witness Test. Except for a short test by the installer to confirm the system works properly, the Interconnecting Customer has no right to operate in parallel (interconnect) until a Witness Test has been performed or has been previously waived by the Company on the Application Form. The Company will make every attempt to complete this Witness Test within 10 business days of its receipt of the Certificate of Completion. All projects larger than 10 kVA will need to be witness tested, unless waived by the Company.
8. Assuming the wiring inspection and/or Witness Test is satisfactory, the Company notifies the Interconnecting Customer in writing that interconnection is authorized. If the Witness Test is not satisfactory, the Company has the right to disconnect the Facility, and will provide information to the Interconnecting Customer describing clearly what is required for approval.

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Contact Information: You must provide the contact information for the legal applicant (i.e. the Interconnecting Customer). If other parties are responsible for interfacing with the Company, you should provide their contact information as well.

Ownership Information: Please enter the legal names of the owner or owners of the Facility.

Generating Facility Information: Please consult an actual electric bill from the Electric Service Company and enter the correct Account Number and meter number on this application. If the facility is to be installed in a new location, a temporary number may be assigned by the Electric Company.

Confidentiality: Information on this form will be shared with the Commission and other State Agencies as required.

UL 1741 Listed: The standard UL 1741.1 dated May, 2007 or later, “Inverters, Converters, and Controllers for Use in Independent Power Systems,” addresses the electrical interconnection design of various forms of generating equipment. Many manufacturers choose to submit their equipment to a Nationally Recognized Testing Laboratory (NRTL) that verifies compliance with UL 1741.1. This term “Listed” is then marked on the equipment and supporting documentation.

EVERSOURCE – NEW HAMPSHIRE
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Simplified Process Interconnection Application and Service Agreement
[submit form via email to: NHDG@eversource.com]

Eversource Application Project ID#: _____

Contact Information:

Legal Name and Address of Interconnecting Customer (or, Company name, if appropriate)

Customer or Company Name (print): _____

Contact Person, if Company: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone (Daytime): _____ (Evening): _____

Facsimile Number: _____ E-Mail Address: _____

Alternative Contact Information (e.g., System installation contractor or coordinating company, if appropriate):

Name: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone (Daytime): _____ (Evening): _____

Facsimile Number: _____ E-Mail Address: _____

Electrical Contractor Contact Information (if appropriate):

Name: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone (Daytime): _____ (Evening): _____

Facsimile Number: _____ E-Mail Address: _____

Facility Site Information:

Facility (Site) Address: _____

City: _____ State: _____ NH _____ Zip Code: _____

Electric

Service Company: Eversource Account Number: _____ Meter Number: _____

Account and Meter Number: Please consult an actual Eversource electric bill and enter the correct Account Number and Meter Number on this application. If the facility is to be installed in a new location, please provide the Eversource Work Request number.

Eversource Work Request # _____

Non-Default' Service Customers Only:

Competitive Electric

Energy Supply Company: _____ Account Number: _____

(Customer's with a Competitive Energy Supply Company should verify the Terms & Conditions of their contract with their Energy Supply Company.)

EVERSOURCE – NEW HAMPSHIRE
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Simplified Process Interconnection Application and Service Agreement

Facility Machine Information:

Generator/ _____ Model Name & _____
Inverter Manufacturer: _____ Number: _____ Quantity: _____

Nameplate Rating: _____ (kW) _____ (kVA) _____ (AC Volts) Phase: Single Three

Nameplate Rating: *The Max AC Nameplate rating of the individual inverter.*

**If 'Yes' Please complete the
'Battery Storage/Backup
Supplemental Form' page 6.**

System Design Capacity: _____ (kW) _____ (kVA) Battery: Yes No

System Design Capacity: *The system total of the inverter AC ratings. If there are multiple inverters installed in the system, this is the sum of the AC nameplate ratings of all inverters.*

Net Metering: If Renewably Fueled, will the account be Net Metered? Yes No

Prime Mover: Photovoltaic Reciprocating Engine Fuel Cell Turbine Other _____

Energy Source: Solar Wind Hydro Diesel Natural Gas Fuel Oil Other _____

Inverter-based Generating Facilities:

UL 1741 / IEEE 1547.1 Compliant (Refer To Part Puc 906 Compliance Path For Inverter Units, Part Puc 906.01 Inverter Requirements)

Yes No

Certified per UL 1741 SA and compliant with ISO-NE Inverter Source Requirement Document?

Yes No

Please include documentation provided by the inverter manufacturer describing the inverter's UL 1741/IEEE 1547.1 listing.

External Manual Disconnect Switch:

An External Manual Disconnect Switch shall be installed in accordance with 'Part Puc 905 Technical Requirements For Interconnections For Facilities, Puc 905.01 Requirements For Disconnect Switches and 905.02 Disconnect Switch.'

Yes No

Location of External Manual Disconnect Switch: _____

Project Estimated Install Date: _____ Project Estimated In-Service Date: _____

Interconnecting Customer Signature:

I hereby certify that, to the best of my knowledge, all of the information provided in this application is true and I agree to the **Terms and Conditions for Simplified Process Interconnections** attached hereto:

Customer Signature: _____ Title: _____

Print Name: _____ Date: _____

Please include a one-line and/or three-line diagram of proposed installation. Diagram must indicate the generator connection point in relation to the customer service panel and the Eversource meter socket. Applications without such a diagram may be returned.

For Eversource Use Only

Approval to Install Facility:

Installation of the Facility is approved contingent upon the Terms and Conditions For Simplified Process Interconnections of this Agreement, and agreement to any system modifications, if required.

Are system modifications required? Yes No To be Determined

Company Signature: _____ Title: _____ Date: _____

EVERSOURCE – NEW HAMPSHIRE
INTERCONNECTION STANDARDS FOR INVERTERS
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Terms and Conditions for Simplified Process Interconnections

Company waives inspection/Witness Test: Yes No

Date of inspection/Witness Test: _____

1. **Construction of the Facility.** The Interconnecting Customer may proceed to construct the Facility in compliance with the specifications of its Application once the Approval to Install the Facility has been signed by the Company. Such Approval relates only to the Eversource and Puc 900 electrical interconnection requirements, and does not convey any permissions or rights associated with permits, code enforcement, easements, rights of way, set back, or other physical construction issues.
2. **Interconnection and operation.** The Interconnecting Customer may operate Facility and interconnect with the Company's system once the all of the following has occurred:
 - 2.1. **Municipal Inspection.** Upon completing construction, the Interconnecting Customer will cause the Facility to be inspected or otherwise certified by the local electrical wiring inspector with jurisdiction.
 - 2.2. **Certificate of Completion.** The Interconnecting Customer returns the Certificate of Completion to the Agreement to the Company at address noted.
 - 2.3. **Company has completed or waived the right to inspection.**
3. **Company Right of Inspection.** The Company will make every attempt within ten (10) business days after receipt of the Certificate of Completion, and upon reasonable notice and at a mutually convenient time, conduct an inspection of the Facility to ensure that all equipment has been appropriately installed and that all electrical connections have been made in accordance with the Interconnection Standard. The Company has the right to disconnect the Facility in the event of improper installation or failure to return Certificate of Completion. All projects larger than 10 kVA will be witness tested, unless waived by the Company.
4. **Safe Operations and Maintenance.** The Interconnecting Customer shall be fully responsible to operate, maintain, and repair the Facility.
5. **Disconnection.** The Company may temporarily disconnect the Facility to facilitate planned or emergency Company work.
6. **Metering and Billing.** All renewable Facilities approved under this Agreement that qualify for net metering, as approved by the Commission from time to time, and the following is necessary to implement the net metering provisions:
 - 6.1. **Interconnecting Customer Provides:** The Interconnecting Customer shall furnish and install, if not already in place, the necessary meter socket and wiring in accordance with accepted electrical standards. In some cases the Interconnecting Customer may be required to install a separate telephone line.
 - 6.2. **Company Installs Meter.** The Company will make every attempt to furnish and install a meter capable of net metering within ten (10) business days after receipt of the Certificate of Completion if inspection is waived, or within 10 business days after the inspection is completed, if such meter is not already in place.
7. **Indemnification.** Interconnecting Customer and Company shall each indemnify, defend and hold the other, its directors, officers, employees and agents (including, but not limited to, Affiliates and contractors and their employees), harmless from and against all liabilities, damages, losses, penalties, claims, demands, suits and proceedings of any nature whatsoever for personal injury (including death) or property damages to unaffiliated third parties that arise out of, or are in any manner connected with, the performance of this Agreement by that party, except to the extent that such injury or damages to unaffiliated third parties may be attributable to the negligence or willful misconduct of the party seeking indemnification.
8. **Limitation of Liability.** Each party's liability to the other party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission in its performance of this Agreement, shall be limited to the amount of direct damage actually incurred. In no event shall either party be liable to the other party for any indirect, incidental, special, consequential, or punitive damages of any kind whatsoever.
9. **Termination.** This Agreement may be terminated under the following conditions:
 - 9.1. **By Mutual Agreement.** The Parties agree in writing to terminate the Agreement.
 - 9.2. **By Interconnecting Customer.** The Interconnecting Customer may terminate this Agreement by providing written notice to Company.
 - 9.3. **By Company.** The Company may terminate this Agreement (1) if the Facility fails to operate for any consecutive 12 month period, or (2) in the event that the Facility impairs or, in the good faith judgment of the Company, may imminently impair the operation of the electric distribution system or service to other customers or materially impairs the local circuit and the Interconnecting Customer does not cure the impairment.
10. **Assignment/Transfer of Ownership of the Facility.** This Agreement shall survive the transfer of ownership of the Facility to a new owner when the new owner agrees in writing to comply with the terms of this Agreement and so notifies the Company.
11. **Interconnection Standard.** These Terms and Conditions are pursuant to the Company's "Interconnection Standards for Inverters Sized Up to 100 kVA" for the Interconnection of Customer-Owned Generating Facilities, as approved by the Commission and as the same may be amended from time to time ("Interconnection Standard"). All defined terms set forth in these Terms and Conditions are as defined in the Interconnection Standard (see Company's website for the complete document).

EVERSOURCE – NEW HAMPSHIRE
 INTERCONNECTION STANDARDS FOR INVERTERS
 SIZED UP TO 100 KVA
Simplified Process Interconnection Application
Customer Requirements “Checklist”

Please provide the following information with your Application.

- Electrical Sketch / Site Plan
 - Does not need to be PE stamped.
 - Must show the existing/proposed service, including the Eversource revenue metering, and how the proposed generation will interconnect to it.
 - Can be hand drawn, but must be legible.
 - Include: Size of main breaker, external AC disconnect switch (when required or installed), kW rating, Inverter(s) and existing or back up generation (if applicable).
 - AC generator disconnects are required for systems over 10.0 kW. NOTE: Eversource may require a disconnect switch for smaller systems in accordance with Part PUC 905 Technical Requirements for Interconnections For Facilities, PUC 905.01 Requirements For Disconnect Switches and 905.02 Disconnect Switch.
 - Must show actual proposed equipment. Ex: Do NOT include “MIN 60A” for a disconnect size.

- Provide photograph of Eversource revenue meter that the generation will interconnect behind (meter number must be clearly readable). If property has multiple meters, it is important that the application documentation clearly identify which meter relates to the generation source.

- Inverter cut sheet. Provide UL 1741 / UL 1741 SA and IEEE 1547 certification (if not already on file).

- Provide inverter voltage and frequency set points (in compliance with ISO-NE ride-through requirements).

- Eversource Work Request number if; a new service or a service upgrade.

- For projects with Max AC inverter rating greater than 10.0 kW**, also submit a Supplemental Review Agreement and mail the required fee (see page 5 of this application). The required Supplemental Review fee is based on the table below and must be paid via paper check payable to “Eversource Energy” and mailed to the address below.

Project Size (Max AC rating of inverters)	Supplemental Review Fee
>10 kW to 30 kW	\$125
>30 kW to 50 kW	\$500
>50 kW to 100 kW	\$1000

Applications submitted without the appropriate documentation will be delayed in processing and/or returned.

Submit form and supporting information via email to: NHDG@eversource.com

Hard copies and checks may be mailed to: Eversource – Distributed Generation (NH)
 780 North Commercial Street
 Manchester, NH 03101-0330

**EVERSOURCE – NEW HAMPSHIRE
INTERCONNECTION STANDARDS FOR INVERTERS
SIZED UP TO 100 KVA**

Supplemental Review Agreement

This Agreement, dated _____, is entered into by and between...

_____ (“Interconnecting Customer”) and Eversource (“Company”), for the purpose of setting forth the terms, conditions and costs for conducting a Supplemental Review relative to the Interconnection Process as defined in Section 1.0 and outlined in Section 3.0 of the Interconnection Standard. This Supplemental Review pertains to the interconnection application the Interconnecting Customer has filed with the Company for interconnecting a _____kW Facility (Max AC rating) at _____(Facility address). If the Supplemental Review determines the requirements for processing the application including any System Modifications, then the modification requirements and costs for those modifications will be identified and included in a billing statement sent by the Company to the Interconnecting Customer for authorization and payment. If the Supplemental Review does not determine the requirements, it will include a proposed Impact Study Agreement as part of the Company’s standard interconnection process which will include an estimate of the cost of the study.

The Interconnecting Customer agrees to provide, in a timely and complete manner, all additional information and technical data necessary for the Company to conduct the Supplemental Review not already provided in the Interconnecting Customer’s application.

All work pertaining to the Supplemental Review that is the subject of this Agreement will be approved and coordinated only through designated and authorized representatives of the Company and the Interconnecting Customer. Each party shall inform the other in writing of its designated and authorized representative, if different than what is in the application.

The fee for this Supplemental Review is shown in the table below:

Project Size (Max AC rating of inverters)	Supplemental Review Fee
>10 kW to 30 kW	\$125
>30 kW to 50 kW	\$500
>50 kW to 100 kW	\$1000

No work will be performed until payment is received. Make check payable to “Eversource Energy”. Send to:

Eversource – Distributed Generation (NH)
780 North Commercial Street
Manchester, NH 03101-0330

Please indicate your acceptance of this Agreement by signing below.

Interconnecting Customer

_____/_____/_____
Date

EVERSOURCE – NEW HAMPSHIRE
INTERCONNECTION STANDARDS FOR INVERTERS
SIZED UP TO 100 KVA
Battery Storage/Backup Supplemental Form

This form is supplemental to the Simplified Process Interconnection Application and Service Agreement. If you are installing batteries in conjunction with your solar project or independently, Eversource requires you to submit the 'Battery Storage/Backup Supplemental Form' with your Simplified Process Interconnection Application and Service Agreement.

Is this Battery an add-on to an existing customer-generator facility? Yes No Eversource Project ID#: _____

Is this Battery: Battery (DC Coupled - No Export) + Solar Yes No Battery (AC Coupled - Export) + Solar Yes No
Battery Only (AC Coupled - Export) Yes No

Does the battery share an inverter with a Renewable Energy system? Yes No

If Yes, can the battery be charged from the Eversource electric distribution grid? Yes No

If No, how is the battery Energy Storage System prevented from being charged by the electric distribution system?

Shared Inverter Information (DC coupled inverters with multiple sources)

Quantity: _____

Battery System Manufacturer: _____ Model: _____ Battery Type: _____

Battery Charge/Discharge Rating: _____ kW (AC) Battery Energy Capacity (kWh): _____ PF Setting: _____

Inverter UL1547 Listed: Yes No DC Source/Prime Mover: _____

Please include, any documentation provided by the inverter manufacturer describing the inverter's UL 1741/IEEE 1547.1 listing.

Dedicated Inverter Information (inverters with only batteries for DC source)

Quantity: _____

Battery System Manufacturer: _____ Model: _____ Battery Type: _____

Battery Charge/Discharge Rating: _____ kW (AC) Battery Energy Capacity (kWh): _____ PF Setting: _____

Inverter UL1547 Listed: Yes No DC Source/Prime Mover: _____

Please include, any documentation provided by the inverter manufacturer describing the inverter's UL 1741/IEEE 1547.1 listing. Intended Use and Operation:

Intended Use and Operation

Please provide a sequence of operations explaining how the system will operate under normal and off-grid conditions (explain how the battery will disconnect and reconnect to the grid). Please provide the type of switching and indicate if it is self-contained or utilizes separate components. An example would be self-contained device with DC to AC inverter, battery charger, and integrated AC transfer switch. On your on-line diagram please label the various equipment (inverter(s), charge controllers, switches, etc.) so that your written operational equipment discussion matches the one-line diagram. If your system rated kW out flow to the grid is restricted by control logic (outflow kW is less than inverter total capacity), then indicate the worst case out-flow capacity.

Signature

I hereby certify that, to the best of my knowledge, all of the information provided in this form is complete and true. I consent to permit representatives to exchange information regarding the Energy Storage system to which this form applies.

Customer Signature: _____ Date: _____

EVERSOURCE – NEW HAMPSHIRE
INTERCONNECTION STANDARDS FOR INVERTERS SIZED UP TO 100 KVA

Exhibit B - Certificate of Completion for Simplified Process Interconnections

Installation Information: Check if owner-installed

Customer or Company Name (print): _____

Contact Person, if Company: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone (Daytime): _____ (Evening): _____

Facsimile Number: _____ E-Mail Address: _____

Facility Information: → Eversource Meter # _____

Address of Facility (if different from above): _____

City: _____ State: _____ Zip Code: _____

Electrical Contractor Contact Information:

Electrical Contractor's Name (if appropriate): _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone (Daytime): _____ (Evening): _____

Facsimile Number: _____ E-Mail Address: _____

License number: _____

Date of approval to install Facility granted by the Company: _____

Eversource Application ID number: _____

Inspection:

The system has been installed and inspected in compliance with the local Building/Electrical Code of:

City: _____ County: _____

Signed (Local Electrical Wiring Inspector, or attach signed electrical inspection):

Signature: _____

Name (printed): _____ Date: _____

Customer Certification:

I hereby certify that, to the best of my knowledge, all information contained in this Exhibit B – Certification of Completion is true and correct. This system has been installed and shall be operated in compliance with applicable standards. Also, the initial start-up test required by Puc. 905.04 has been successfully completed.

Please remember to complete the “Customer Requirements Checklist” (page 2), including the “ISO New England Ride Through Requirements Self-Certification” (pages 3, 4 and 5).

Customer Signature: _____

As a condition of interconnection, you are required to email or mail all pages of this form and related documents to:

NHDG@eversource.com
Eversource - Distributed Generation (NH)
780 North Commercial Street
P. O. Box 330, Manchester, NH 03105-0330

EVERSOURCE NH
INTERCONNECTION STANDARDS FOR INVERTERS
SIZED UP TO 100 KVA

Exhibit B – Certificate of Completion

Customer Requirements Checklist
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Please provide the following Post-Installation documentation with your Certificate of Completion.

Any Certificate of Completion submitted without the appropriate documentation may be delayed in processing and/or returned.

- Page 1 must include the required signature to certify that the facility shall be inspected and certified by the local electrical wiring inspector having jurisdiction. In the event the municipality does not have an inspector, a New Hampshire licensed electrician can inspect and certify the facility in accordance with section **PUC 904.05 Installation and Interconnection of Facility**.

- Complete and submit the ISO New England Ride Through Requirements “Self-Certification” Form (see page 3, 4 & 5)

Submit ‘as-built’ digital photos to Eversource which clearly show the following:

- The existing Eversource revenue meter (meter number must be clearly readable).
- The inverter(s). If micro inverters are used, submit a photo of the entire array instead.
- The external manual disconnect switch (*if required*). Please refer to Part PUC 905 Technical Requirements For Interconnections For Facilities, PUC 904.01 Requirements For Disconnect Switches and 905.02 Disconnect Switch and/or your processed Application.
- The main distribution panel showing the point of interconnection (backfeed breaker). **Note:** If the point of interconnection is via a line side tap, the cover shall be off of the panel and or junction box. Under no circumstances shall the point of interconnection be made within the meter box, nor shall the meter box be used as a pass through for any other conductors.

Upon receipt of all required documentation Eversource will within ten (10) business days; 1) schedule a witness test unless otherwise waived (please review the attached Terms and Conditions for Simplified Process Interconnections to determine whether Eversource has waived the right to inspection), and 2) schedule the installation of a Net Meter.

Once all requirements and conditions have been met, Eversource will provide written notification, authorizing the interconnection of your project to the Eversource electric distribution system and confirming your status as a net metered customer in our customer billing system.

Note: Eversource shall not be responsible for improper billing that will result when a customer operates their generator prior to the installation of the appropriate Net Meter.

EVERSOURCE NH
INTERCONNECTION STANDARDS FOR INVERTERS

Exhibit B – Certificate of Completion

ISO New England Ride Through Requirements “Self-Certification” Form

Effective June 1, 2018, all inverter-based projects are subject to ISO-NE Ride through Requirements.

To comply with the ISO-NE Ride-through requirements, all inverters in distributed energy resource (DER) installations shall be certified per the requirements of UL 1741 SA as a grid support utility interactive inverter and have the voltage and frequency trip settings and ride-through capability described in the ISO-NE Inverter Source Requirements Document (SRD).

Link to the ISO-NE SRD:

https://www.eversource.com/content/docs/default-source/builders-contractors/iso-new-england-source-requirement-document-2018-02-02.pdf?sfvrsn=a4f1c362_2

Link to an ISO-NE presentation for more information:

https://www.eversource.com/content/docs/default-source/builders-contractors/a2-implementation-of-revised-ieee-standard-1547-presentation.pdf?sfvrsn=83f1c362_2

Please refer to this linked webpage for a list of UL 1741 SA inverters:

[https://www.gosolarcalifornia.ca.gov/equipment/documents/Grid_Support_Inverter_List_Simplified Data.xlsx](https://www.gosolarcalifornia.ca.gov/equipment/documents/Grid_Support_Inverter_List_Simplified_Data.xlsx)

The customer or their representative shall complete and submit the Self-Certification (pages 4 and 5)

EVERSOURCE NH
INTERCONNECTION STANDARDS FOR INVERTERS

Exhibit B – Certificate of Completion

ISO New England Inverter Ride Through Requirements “Self-Certification” Form

Customer Name: _____ ES Application ID Number: _____

Facility Address: _____

Inverter Make/Model: _____ Inverter Firmware Version: _____

Inverter Serial Number: _____

Verified by (Print): _____ (Signature): _____

Requirement 1: Inverter is certified per UL 1741 SA as a “grid support utility interactive inverter” and has been verified by a Nationally Recognized Testing Laboratory to meet the ISO-NE SRD requirements.

Nameplate Shows UL 1741 SA “Grid Support Interactive Inverter” or “Grid Support Utility Interactive Inverter” (Yes/No): _____.

Requirement 2: Inverter settings adhere to ISO-NE SRD Voltage and Frequency trip settings requirements. This information shall be documented in the trip settings table below.

DEVICE	PICKUP SETTING (DEFAULTS)	DEFAULT CLEARING TIME (seconds)	Pickup and Clearing Times Adhere to Required Defaults (Yes/No):
Under Frequency (81U)	56.5 Hz	0.16	
Under Frequency (81U)	58.5 Hz	300	
Over Frequency (81O)	61.2 Hz	300	
Over Frequency (81O)	62.0 Hz	0.16	
Under Voltage (27)	50% of Nominal	1.1	
Under Voltage (27)	88% of Nominal	2	
Over Voltage (59)	110% of Nominal	2	
Over Voltage (59)	120% of Nominal	0.16	

EVERSOURCE NH
INTERCONNECTION STANDARDS FOR INVERTERS

Exhibit B – Certificate of Completion

ISO New England Inverter Ride Through Requirements “Self-Certification” Form

Requirement 3: Inverter Grid Support Functions are set according to the Advanced Functions Activation Table below per ISO-NE SRD:

Verify that ISO-NE SRD group settings have been confirmed by the manufacturer AND that ISO-NE SRD group setting is ENABLED (if available), OR manually check the following states are applied in the inverter:

Function	Default Activation State	Set to Required Default State? Yes/No
SPF, Specified Power Factor	OFF ¹	
Q(V), Volt-Var Function with Watt or Var Priority	OFF Default value: 2% of maximum current output per second	
SS, Soft-Start Ramp Rate	ON	
FW, Freq-Watt Function	OFF	

Requirement 4: The Inverter Enters “Momentary Cessation” for high voltage range:

In the Permissive Operation region above 1.1 p. u. voltage, the inverter(s) will ride-through in Momentary Cessation mode as defined in the NE ISO SRD. (Yes/No) _____

Note: Inverters that have passed UL 1741 SA testing using the “Example Operating Parameters that Correspond to Rule 21 L/HVRT” given in UL 1741 SA Table SA9.1 are acceptable for meeting this requirement.

¹ OFF and operating at unity PF, Or set to ON with unity PF.