

**SMALL GENERATOR INTERCONNECTION REQUEST
(Application Form)**

An Interconnection Request is considered complete when it provides all applicable and correct information required below. Per SGIP Section 1.4, documentation of Site Control must be submitted with the Interconnection Request, except where the Interconnection Request is for a modification to the Interconnection Customer's existing Small Generating Facility and the Interconnection Customer has certified in the Interconnection Request that it has Site Control and that the proposed modifications do not require additional real property.

_____ Site Control is not provided because the proposed modification is to the Interconnection Customer's existing Small Generating Facility and, by checking this option, the Interconnection Customer certifies that it has Site Control and that the proposed modification does not require additional real property.

Preamble and Instructions

An Interconnection Customer who requests a Federal Energy Regulatory Commission jurisdictional interconnection that is subject to this SGIP must submit this Interconnection Request to the System Operator via the Interconnection Request Tracking Tool or IRTT, a web-based application for submitting, tracking and viewing Interconnection Requests available on the ISO New England website.

Processing Fee or Deposit:

If the Interconnection Request is submitted under the Fast Track Process, the non-refundable processing fee is \$4.50/kW (minimum of \$300 and maximum of \$7,500). The kW are the maximum gross kW of the Small Generating Facility. The Fast Track Process is limited to a Small Generating Facility that meets the eligibility requirements of section 2.1 and certain codes, standards and certification requirements.

If the Interconnection Request is submitted under the Study Process, whether a new submission or an Interconnection Request that did not pass the Fast Track Process, the Interconnection Customer shall submit to the System Operator a non-refundable deposit of \$2,500 towards the cost of the scoping meeting, the development of the interconnection study agreements, interconnection studies, and

development of the SGIA. For Interconnection Requests that are identified for inclusion in a CRPS performed under Section 15 of Attachment K, Section II of the Tariff, the non-refundable deposit also shall be applied toward the costs incurred by the Interconnecting Transmission Owner in developing the cost estimates in support of the CRPS.

Interconnection Customer Information

Proposed Project Name: _____

Legal Name of the Interconnection Customer (or, if an individual, individual's name)

Name: _____

ISO Customer ID# (if available): _____

Contact Person: _____

Mailing Address: _____

City: _____ County: _____ State: _____ Zip: _____

Facility Location (if different from above): _____

Telephone (Day): _____ Telephone (Evening): _____

Fax: _____ E-Mail Address: _____

Alternative Contact Information (if different from the Interconnection Customer)

Contact Name: _____

Title: _____

Address: _____

Telephone (Day): _____ Telephone (Evening): _____

Fax: _____ E-Mail Address: _____

- Application is for: _____ New Small Generating Facility
 _____ Capacity addition to or modification of an existing Small Generating Facility
 _____ Commencement of participation in the wholesale markets by an existing Small Generating Facility
 _____ A change from Network Resource Interconnection Service to Capacity Network Resource Interconnection Service

If capacity addition to or modification of an existing facility, please describe: _____

If the capacity addition increases the maximum gross megawatt electrical output at an ambient temperature of 20 degrees F of the Generating Facility to more than 20 MW, the Interconnection Customer shall apply under Schedule 22.

Will the Small Generating Facility be used for any of the following?

Net Metering? Yes ___ No ___

To Supply Power to the Interconnection Customer? Yes ___ No ___

To Supply Power to Others? Yes ___ No ___

Is the Interconnection Request for:

Service Type (check one):

_____ Capacity Network Resource Interconnection Service (energy capability and capacity capability) or

_____Network Resource Interconnection Service (energy capability only)

A retail customer interconnecting a new Small Generating Facility that will produce electric energy to be consumed only on the retail customer's site? Yes _____No _____

A Qualifying Facility where 100% of the output will be sold to its host utility?

Yes _____No _____

An Interconnection Customer interconnecting a new Small Generating Facility that plans to participate in the wholesale markets? Yes _____No _____

An existing Small Generating Facility commencing participation in the wholesale markets?

Yes _____No _____

For installations at locations with existing electric service to which the proposed Small Generating Facility will interconnect, provide:

(Local Electric Service Provider)

(Existing Account Number)

Contact Name: _____

Title: _____

Address: _____

Telephone (Day): _____ Telephone (Evening): _____

Fax: _____ E-Mail Address: _____

Small Generating Facility Information

Interconnection Customer's Requested Initial Synchronization Date:

Interconnection Customer's Requested In-Service Date: _____

Interconnection Customer's Requested Commercial Operation Date: _____

Proposed Point of Interconnection: _____

Data apply only to the Small Generating Facility, not the Interconnection Facilities.

Energy Source: Solar Wind Hydro Hydro Type (e.g. Run-of-River): _____
 Diesel Natural Gas Fuel Oil Other (state type) _____

Prime Mover: Fuel Cell Recip Engine Gas Turb Steam Turb
 Microturbine PV Other

Type of Generator: Synchronous Induction Inverter

Generator Nameplate Rating: _____ kW (Typical) Generator Nameplate kVAR: _____

Interconnection Customer or Customer-Site Load: _____ kW (if none, so state)

Typical Reactive Load (if known): _____

Maximum Physical Export Capability Requested: _____ kW

Will the generator have energy storage capacity? Yes No

If Yes, describe the energy storage device and specifications:

Provide the maximum output of each generator including each energy storage device: __

Primary frequency response operating range for electric storage resources:

Minimum State of Charge: _____

Maximum State of Charge: _____

Generating Facility Capacity (MW):

	Maximum Net MW Electrical Output	Maximum Gross MW Electrical Output
At 90 degrees F or higher		
At 50 degrees F or higher		
At 20 degrees F or higher		
At zero degrees F or higher		

List components of the Small Generating Facility equipment package that are currently certified:

Equipment Type	Certifying Entity
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

Is the prime mover compatible with the certified protective relay package? ___Yes ___No

Generator (or solar collector)

Manufacturer, Model Name & Number: _____

Version Number: _____

Nameplate Output Power Rating in kW: (Summer) _____ (Winter) _____

Nameplate Output Power Rating in kVA: (Summer) _____ (Winter) _____

Individual Generator Power Factor

Rated Power Factor: Leading: _____ Lagging: _____

Total Number of Generators in wind farm to be interconnected pursuant to this

Interconnection Request: _____ Elevation: _____ ___Single phase ___Three phase

Inverter Manufacturer, Model Name & Number (if used): _____

List of adjustable set points for the protective equipment or software: _____

Model Requirements

For all generation types: A completed, fully functioning, public (*i.e.*, non-proprietary or non-confidential) Siemens PTI's ("PSSE") power flow model or other compatible formats, such as IEEE and General Electric Company Power Systems Load Flow ("PSLF") data sheet, must be supplied with this Interconnection Request. If additional public data sheets are more appropriate to the proposed device then they shall be provided and discussed at the Scoping Meeting. For all Interconnection Studies commencing after January 1, 2017, all power flow models must be standard library models in PSS/E or applicable applications. After January 1, 2017, user-models will not be accepted.

A PSCAD model for all wind and inverter-based Small Generating Facilities must be supplied with this Interconnection Request. If a PSCAD model is deemed required for other Generating Facility types at the Scoping Meeting, such PSCAD model must be provided to the System Operator within ninety (90) Calendar Days of the executed Interconnection System Impact Study Agreement. A benchmarking analysis consistent with the requirements in the ISO New England Planning Procedures, confirming acceptable performance of the PSS/E model in comparison to the PSCAD model, shall be provided at the time the PSCAD model is submitted.

Small Generating Facility Characteristic Data (for inverter-based machines)

Max design fault contribution current: _____ Instantaneous ___ or RMS? _____

Harmonics Characteristics: _____

Start-up requirements: _____

Small Generating Facility Characteristic Data (for rotating machines)

RPM Frequency: _____

Neutral Grounding Resistor (If Applicable): _____

Synchronous Generators:

Generator AC resistance R_a : _____

Direct Axis Synchronous Reactance, X_d : _____ P.U.

Direct Axis Transient Reactance, X'_d : _____ P.U.

Direct Axis Subtransient Reactance, X''_d : _____ P.U.

Negative Sequence Reactance, X_2 : _____ P.U.

Zero Sequence Reactance, X_0 : _____ P.U.

KVA Base: _____

Field Volts: _____

Field Amperes: _____

Induction Generators:

Motoring Power (kW): _____

I_2^2t or K (Heating Time Constant): _____

Rotor Resistance, R_r : _____

Stator Resistance, R_s : _____

Stator Reactance, X_s : _____

Rotor Reactance, X_r : _____

Magnetizing Reactance, X_m : _____

Short Circuit Reactance, X_d'' : _____

Exciting Current: _____

Temperature Rise: _____

Frame Size: _____

Design Letter: _____

Reactive Power Required In Vars (No Load): _____

Reactive Power Required In Vars (Full Load): _____

Total Rotating Inertia, H: _____ Per Unit on kVA Base

Note: Please contact the System Operator prior to submitting the Interconnection Request to determine if the specified information above is required.

Excitation and Governor System Data for Synchronous Generators Only

Provide appropriate IEEE model block diagram of excitation system, governor system and power system stabilizer (PSS) in accordance with the regional reliability council criteria. A PSS may be determined to be required by applicable studies. A copy of the manufacturer's block diagram may not be substituted.

Interconnection Facilities Information

Will a transformer be used between the generator and the point of common coupling? ___Yes ___No

Will the transformer be provided by the Interconnection Customer? ___Yes ___No

Transformer Data (If Applicable, for Interconnection Customer-Owned Transformer):

Is the transformer: ___single phase ___three phase? Size: _____kVA

Transformer Impedance: _____% on _____kVA Base

If Three Phase:

Transformer Primary: ___ Volts ___ Delta ___ Wye ___ Wye Grounded

Transformer Secondary: ___ Volts ___ Delta ___ Wye ___ Wye Grounded

Transformer Tertiary: ___ Volts ___ Delta ___ Wye ___ Wye Grounded

Transformer Fuse Data (If Applicable, for Interconnection Customer-Owned Fuse):

(Attach copy of fuse manufacturer's Minimum Melt and Total Clearing Time-Current Curves)

Manufacturer: _____ Type: _____ Size: _____ Speed: _____

Interconnecting Circuit Breaker (if applicable):

Manufacturer: _____ Type: _____

Load Rating (Amps): _____ Interrupting Rating (Amps): _____ Trip Speed (Cycles): _____

Interconnection Protective Relays (If Applicable):

If Microprocessor-Controlled:

List of Functions and Adjustable Setpoints for the protective equipment or software:

	Setpoint Function	Minimum	Maximum
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____

If Discrete Components:

(Enclose Copy of any Proposed Time-Overcurrent Coordination Curves)

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting:

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting:

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting:

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting:

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting:

Current Transformer Data (If Applicable):

(Enclose Copy of Manufacturer's Excitation and Ratio Correction Curves)

Manufacturer: _____
Type: _____ Accuracy Class: ___ Proposed Ratio Connection: _____

Manufacturer: _____
Type: _____ Accuracy Class: ___ Proposed Ratio Connection: _____

Potential Transformer Data (If Applicable):

Manufacturer: _____
Type: _____ Accuracy Class: ___ Proposed Ratio Connection: _____

Manufacturer: _____
Type: _____ Accuracy Class: ___ Proposed Ratio Connection: _____

General Information

Enclose two copies of site electrical one-line diagram showing the configuration of all Small Generating Facility equipment, current and potential circuits, and protection and control schemes. This one-line diagram must be signed and stamped by a licensed Professional Engineer if the Small Generating Facility is larger than 50 kW. Are two copies of One-Line Diagram Enclosed? ___ Yes ___ No

Enclose copy of any site documentation that indicates the precise physical location of the proposed Small Generating Facility (e.g., USGS topographic map or other diagram or documentation).

Proposed location of protective interface equipment on property (include address if different from the Interconnection Customer's address) _____

Enclose copy of any site documentation that describes and details the operation of the protection and control schemes. Is Available Documentation Enclosed? ___Yes ___No

Enclose copies of schematic drawings for all protection and control circuits, relay current circuits, relay potential circuits, and alarm/monitoring circuits (if applicable).

Are Schematic Drawings Enclosed? ___Yes ___No

Applicant Signature

I hereby certify that, to the best of my knowledge, all the information provided in this Interconnection Request is true and correct.

For Interconnection Customer: _____ Date: _____

In order for a Small Generator Interconnection Request to be considered a valid request, it must:

- (a) Be accompanied by the applicable deposit that is provided electronically and which shall be non-refundable;
- (b) Include documentation of Site Control, if applicable;
- (c) Include a detailed map, such as a map of the quality produced by the U.S. Geological Survey, which clearly indicates the site of the new facility and pertinent surrounding structures;
- (d) Include two copies, signed and stamped by a licensed Professional Engineer, of the site electrical one-line diagram; and
- (e) Include all information and data required on the Interconnection Request form and any attachments thereto.

The Interconnection Request must be submitted to the System Operator via the Interconnection Request Tracking Tool or IRTT.

Attachment A to Interconnection Request Form

SUPPLEMENTARY WIND AND INVERTER-BASED GENERATING FACILITY DATA FORM

1. Attach a Geographic Map Demonstrating the Project Layout and its Interconnection to the Power Grid. *(Specify the name of the attachment here)*

2. Attach a Bus-Breaker Based One-line Diagram (The diagram should include each of the individual wind unit, generator number, rating and terminal voltage.) *(Specify the name of the attachment here)*

2.1 Collection system detail impedance sheet

If a collector system is used, attach a collector system data sheet in accordance with the one-line diagram attached above. The data sheet should include: the type, length Z_0 , Z_1 and Xc/B of each circuit (feeder and collector string).

Specify the name of the attachment here: _____

2.2 Collection system aggregate (equivalent) model data sheet

Attach an aggregate (equivalent) collection system data sheet. The data table should include: the type, length, Z_0 , Z_1 and Xc/B of the equivalent circuits (feeders and collector strings).

Specify the name of the attachment here: _____

3. Summary of the Unit Models in the wind or inverter-based generating facility *(List all different unit models in the facility)*

Manufacturer Model	Type of this WTG* (if applicable)	Generator Unit Numbers in the field	Number(s) of these Units	Maximum Output of this Unit (MW)	Total MW

- * Type 1 – Cage rotor induction generators
- Type 2 – Induction generators with variable rotor resistance
- Type 3 – Doubly-fed asynchronous generators with rotor-side converter
- Type 4 – Full-power converter interface

Repeat the following sections from 4 to 12 for each different unit model.

4. Unit Detail Information

Unit Manufacturer Model	
Terminal Voltage	
Rating of Each Unit (MVA)	
Maximum Gross Electrical Output (MW)	
Minimum Gross Electrical Output(MW)	
Lagging Reactive Power Limit at Rated Real Power Output (MVAR)	
Leading Reactive Power Limit at Rated Real Power Output (MVAR)	
Lagging Reactive Power Limit at Zero Real Power Output (MVAR)	
Leading Reactive Power Limit at Zero Real Power Output (MVAR)	
Station Service Load(MW, MVAR)	
Minimum short circuit ratio(SCR) requirement by manufacturer	
On which bus the minimum SCR is required by manufacturer	
What voltage level the minimum SCR is required by manufacturer	
Positive sequence Xsource	
Zero sequence Xsource	

5. Unit GSU – _____

Nameplate rating (MVA)	
Total number of the GSUs	
Voltages, generator side/system side	
Winding connections, low voltage/high voltage	
Available tap positions on high voltage side	
Available tap positions on low voltage side	
Will the GSU operate as an LTC?	
Desired voltage control range if LTC	
Tap adjustment time (Tap switching delay + switching time) if LTC	
Desired tap position if applicable	
Impedance, Z1, X/R ratio	
Impedance, Z0, X/R ratio	

6. Low Voltage Ride Through(LVRT) – _____(Specify the Manufacturer Model of this Unit)

Does each Unit have LVRT capability?

Yes__ No__

If yes, please provide:

6.1 Unit LVRT mode activation and release condition:

When operating at maximum real power, what is the Unit terminal voltage for LVRT mode activation? _____

When operating at maximum real power, what is the Unit terminal voltage for releasing LVRT mode after it is activated? _____

If there is different LVRT activation and release logic, please state here _____

6.2 A wind or inverter-based generating facility technical manual from the manufacturer including description of LVRT functionality:

Attach the file and specify the name of the attachment here:

6.3 Does the wind or inverter-based generating facility technical manual attached above include a reactive power capability curve?

Yes__ No__

If no, attach the file and specify the name of the attachment here:

7. Low Voltage Protection (considering LVRT functionality)

(Specify the Manufacturer Model of this Unit)

Low Voltage Setting (pu)	Relay Pickup Time (Seconds)

*Add more rows in the table as needed

8. High Voltage Protection - _____(Specify the Manufacturer Model of this Unit)

High Voltage Setting (pu)	Relay Pickup Time (Seconds)

*Add more rows in the table as needed

9. Low Frequency Protection - _____(Specify the Manufacturer Model of this Unit)

Low Frequency Setting (Hz)	Relay Pickup Time (Seconds)

*Add more rows in the table as needed

10. High Frequency Protection - _____(Specify the Manufacturer Model of this Unit)

High Frequency Setting (Hz)	Relay Pickup Time (Seconds)

*Add more rows in the table as needed

Please make sure the settings in sections 7 through 10 comply with NERC and NPCC standards for generator protection relays.

11. Unit Reactive Power Control - ____ (Specify the Manufacturer Model of this Unit)

11.1 What are the options for the Unit reactive power control (check all available)?

- ____ Control the voltage at the Unit terminal
- ____ Control constant power factor at the Unit terminal
- ____ Control constant power factor at the low side of the station main transformer
- ____ Control constant power factor at the high side of the station main transformer
- ____ Control voltage at the low side of the station main transformer
- ____ Control voltage at the high side of the station main transformer
- ____ Other options. Please describe if select others

11.2 In all the control options selected above, please list the options in which the Unit is able to control its terminal voltage to prevent low/high voltage tripping.

11.3 What is the desired control mode from the selected options above? Specify the control plan in this mode. For example: control voltage at which bus to what schedule.

12. Wind or inverter-based generating facility Model

(All model files provided under this section 12 should be compatible with Siemens PTI's PSS/E version currently in use at ISO New England)

12.1 Power flow model

12.1.1 A *. RAW file including **aggregated/equivalent** wind or inverter-based generating facility power flow model with appropriate parameters and settings.

Attach the *.RAW file and specify the name of the attachment here:

- 12.1.2 A *. RAW file including **detailed** wind or inverter-based generating facility power flow model with appropriate parameters and settings. *(Optional)*

Attach the *.RAW file and specify the name of the attachment here:

- 12.2 Dynamic simulation model

(Please note that the dynamic model must match the aggregated/equivalent power flow model provided above. Attach the following information for each of the models.)

- 12.2.1 Wind or inverter-based generating facility Model _____(Please Specify the Manufacturer Model)

- 12.2.2 A compiled PSS/E dynamic model for the turbines (a *.LIB or *.OBJ file)

Attach the *.LIB or *.OBJ file and specify the name of the attachment here:

12.2.3 A dynamic data file with appropriate parameters and settings for the turbines (typically a *.DYZ file)

*Attach the *.DYZ file and specify the name of the attachment here:*

12.2.4 PSS/E wind or inverter-based generating facility model user manual for the WTG

Attach and specify the name of the attachment here:

Repeat the above sections from 6 to 12 for each different wind or inverter-based generating facility model.

13. Power Plant Controller

Will the wind or inverter-based generating facility be equipped with power plant controller, which has the ability to centrally control the output of the units?

Yes__ No__

If yes, please provide:

13.1 Manufacturer model of the power plant controller

13.2 What are the reactive power control strategy options of the power plant controller?

13.3 Which of the control option stated above is being used in current operation?

13.3 Is the power plant controller able to control the unit terminal voltages to prevent low/high voltage tripping?

Yes__ No__

Please provide the park controller technical manual from the manufacturer

Attach the file and specify the name of the attachment here:

14. Station Transformer

Transformer Name		
Nameplate ratings (MVA)		
Total number of the main transformer(s)		
Voltages, High/Low/Tertiary (kV)		
Winding connections, High/Low/Tertiary		
Available tap positions on high voltage side		
Available tap positions on low voltage side		
Will the transformer operate as a LTC?		
Desired voltage control range if LTC		
Tap adjustment time (Tap switching delay + switching time) if LTC		
Desired tap position if applicable		
Tap adjustment time (Tap switching delay + switching time)		
Impedance Z_1 , X/R ratio	Z_{1H-L}	X/R
	Z_{1H-T}	X/R
	Z_{1T-L}	X/R
Impedance Z_0 , X/R ratio	Z_{0H-L}	X/R
	Z_{0H-T}	X/R
	Z_{0T-L}	X/R

15. Dynamic Simulation Model for the Power Plant Controller(s) (if applicable)

(All model files provided under this section 15 should be compatible with Siemens PTI's PSS/E version currently in use at ISO New England)

15.1 A compiled PSS/E dynamic model for the power plant controller(s) (a *.LIB or *.OBJ file)

Attach the *.LIB or *.OBJ file and specify the name of the attachment here:

15.2 A dynamic data file with appropriate parameters and settings for the power plant controller(s) (typically a *.DYR file).

Please set the parameters in accordance with the currently used control mode.

*Attach the *.DYN file and specify the name of the attachment here:*

- 15.3 PSS/E model user manual for the power plant controller(s)

Attach the manual and specify the name of the attachment or specify the name of the attachment here:_____

16. Capacitors and Reactors

Please provide necessary modeling data for all the capacitors and reactors belong to the facility, including: size, basic electrical parameters, connecting bus, switched or fixed, etc.

17. Dynamic Device(s)

(All model files provided under this section 17 should be compatible with Siemens PTI's PSS/E version currently in use at ISO New England)

- 17.1 Provide necessary modeling data file for all the dynamic devices belong to the facility.

Attach the *.LIB or *.OBJ file and specify the name of the attachment here:

- 17.2 A dynamic data file containing the parameters for the units (typically a *.DYN file).

Set the parameters in accordance with the desired control mode.

Attach the *.DYN file and specify the name of the attachment here:

18. Collection System/Transformer Tap-Setting Design

Attach a collection system/transformer tap-setting design calculations, consistent with the requirements in the ISO New England Planning Procedures, that identify the calculations to support the proposed tap settings for the unit step-up transformers and the station step-up transformers.

Attach the design document and specify the name of the attachment here:

19. Additional Information

Are there any special features available to be implemented to the wind or inverter-based generating facility? Such as weak grid interconnection solutions, etc.

Specify the available features here:

Insert the technical manual for each of the features listed above as objects (display as icons) or specify the name of the attachment here: _____

20. Provide PSCAD Model and Documentation for the wind or inverter-based generating facility, the Power Plant Controller(s) and Other Dynamic Devices for the wind or inverter-based generating facility.

ISO will determine how much PSCAD work is needed from the wind or inverter-based generating facility based on its interconnection system conditions.

CLUSTER SYSTEM IMPACT STUDY APPLICATION FORM

The undersigned Interconnection Customer submits this form to request the inclusion of the Interconnection Request for its Small Generating Facility in a Cluster Interconnection System Impact Study pursuant to Section 1.5.3.3.2.2 of this SGIP.

To be included in a Cluster Interconnection System Impact Study, the following must be submitted together with this form to the System Operator by the Cluster Entry Deadline:

1. Project Information:
 - a. Project Name: _____
 - b. Queue Position: _____
 - c. Is the Interconnection Request contractually associated with another Interconnection Request for an Elective Transmission Upgrade? Yes ____ No ____
If yes, identify Queue Position of the associated Interconnection Request and provide evidence of the contractual commitment. Queue Position No.: _____
2. Initial Cluster Participation Deposit as specified in Section 1.5.3.3.2.2.

Applicant Signature

I hereby certify that, to the best of my knowledge, all the information provided in this form is true and accurate.

For Interconnection Customer: _____ Date: _____