

## Connection Impact Assessment (CIA) Application

This Application Form is for Generators applying for Connection Impact Assessment (“CIA”) and for Generators with a project size >10 kW.

This Application Form is required for:

- **New** Generators applying for Connection Impact Assessment (“CIA”)
- **New** Generators applying for revision to their original Connection Impact Assessment (“CIA”)
- **Existing** Generators to verify information related to current connection to the SYNERGY NORTH system.

For generation size  $\leq$  10 kW, please fill out “Micro-Generation Connection Request Form”.

**IMPORTANT:** All fields below are mandatory, except where noted. Incomplete applications may be returned by SYNERGY NORTH CORPORATION (“SYNERGY NORTH”).

If you have any questions please e-mail SYNERGY NORTH at [generator.connections@synergynorth.ca](mailto:generator.connections@synergynorth.ca) or call 807-343-1037.

**Completed CIA Application and other required documents may be returned:**

**By mail to:**

SYNERGY NORTH CORPORATION  
Attn: Asset Management and Engineering  
Generation Connection Application  
37 Front Street  
Thunder Bay, Ontario P7A 8B2

**or by email to:**

[generator.connections@synergynorth.ca](mailto:generator.connections@synergynorth.ca)

**Connection Impact Assessment deposit must be submitted by mail to the address above.**

**NOTE 1:** Applicants are cautioned NOT to incur major expenses until SYNERGY NORTH approves the connection of the proposed generation facility.

**NOTE 2:** All technical submissions (Connection Impact Assessment Application, single line diagrams, etc.) must be signed and sealed by a licensed Ontario Professional Engineer (P.Eng.).

## **CHECKLIST**

Please ensure that the following items are completed prior to submission. Your application will not be processed if any part is omitted or incomplete:

- Completed CIA Application Form**, must be stamped by a Professional Engineer
- Payment in full including applicable taxes** by cheque or money order payable to “SYNERGY NORTH CORPORATION.” The deposit for your application may be found in Appendix B – Study Agreement under Section 5 - Deposit.
- Signed Study Agreement (Appendix B)**
- Single-line Diagram (SLD)**, must be stamped by a Professional Engineer

DATE: \_\_\_\_\_ (dd / mm / yyyy)

PROJECT NAME: \_\_\_\_\_

**APPLICATION TYPE:**

CIA Revision/Rework

New CIA Application

ONTARIO POWER AUTHORITY (OPA) FEED-IN TARIFF (FIT) CONTRACT NUMBER (IF APPLICABLE): \_\_\_\_\_

PROPOSED IN-SERVICE DATE: \_\_\_\_\_ (dd / mm / yyyy)

**PROJECT SIZE:**

Number of Units: \_\_\_\_\_

Nameplate Rating of Each Unit: \_\_\_\_\_ kW

Generator Connecting on:  single phase  three phase

Existing Total Nameplate Capacity: \_\_\_\_\_ kW

Proposed Total Nameplate Capacity: \_\_\_\_\_ kW

**PROJECT LOCATION:**

Address: \_\_\_\_\_

City / Town / Township: \_\_\_\_\_

Lot Number(s): \_\_\_\_\_

Concession Number(s): \_\_\_\_\_

**CONTACT INFORMATION:**

Choose a Single Point of Contact: Owner  Consultant

	Generator (Mandatory)	Owner (Mandatory)	Consultant (Optional)
Company/Person			
Contact Person			
Mailing Address Line 1			
Mailing Address Line 2			
Telephone			
Cell			
Fax			
E-mail			

Preferred method of communication with SYNERGY NORTH:

- E-mail
- Telephone
- Mail
- Fax



**PROGRAM TYPE:**

- Net Metering
- FIT to Net Metering Conversion
- Load Displacement

**FUEL TYPE:**

- |                     |                          |                                           |                          |
|---------------------|--------------------------|-------------------------------------------|--------------------------|
| Wind Turbine        | <input type="checkbox"/> | Fuel Cell                                 | <input type="checkbox"/> |
| Hydraulic Turbine   | <input type="checkbox"/> | Biomass                                   | <input type="checkbox"/> |
| Steam Turbine       | <input type="checkbox"/> | Co-generation/CHP (Combined Heat & Power) | <input type="checkbox"/> |
| Solar/ Photovoltaic | <input type="checkbox"/> | Bio-diesel                                | <input type="checkbox"/> |
| Diesel Engine       | <input type="checkbox"/> | Anaerobic Digester                        | <input type="checkbox"/> |
| Gas Turbine         | <input type="checkbox"/> | Battery/Energy Storage                    | <input type="checkbox"/> |
|                     |                          | Other (Please Specify) _____              | <input type="checkbox"/> |

**CUSTOMER STATUS:**

- Existing SYNERGY NORTH Customer?  Yes  No
- If yes, SYNERGY NORTH Account Number: \_\_\_\_\_
- Customer name registered in this Account: \_\_\_\_\_
- Are you a GST registrant?  Yes  No
- If yes, provide your GST registration number: \_\_\_\_\_ - \_\_\_\_\_ RT \_\_\_\_\_

**CONNECTION TO SYNERGY NORTH DISTRIBUTION SYSTEM:**

**Point of Connection** means the point where the new Generator’s connection assets or new line expansion assets will be connected to the existing SYNERGY NORTH distribution system.

**Point of Common Coupling** or “PCC” or “Point of Supply” means the point where the Generator’s facilities are to connect to SYNERGY NORTH’s distribution system.

The Point of Connection and the PCC may be the same, especially if the Generator’s facilities lie along the existing SYNERGY NORTH distribution system; or the PCC may be located somewhere between the Point of Connection and the Generator’s facilities if new line will be owned by SYNERGY NORTH. For illustration of the Point of Connection and the PCC, refer to Appendix A attached.

**UTILITY INTERCONNECTION CHARACTERISTICS:**

- Voltage at Point of Connection \_\_\_\_\_ kV
- Point of Connection Feeder: \_\_\_\_\_
- Originating Station of Point of Connection Feeder: \_\_\_\_\_

GPS Coordinates (Lat, Long – Decimal Degrees Format)	Point of Connection:	Latitude	
		Longitude	
	PCC:	Latitude	
		Longitude	
	Generator’s Facilities:	Latitude	
		Longitude	

Distance from the Point of Connection to the PCC: \_\_\_\_\_ km

Fault contribution of Generator’s Facilities to a three phase fault at the PCC (use line to ground fault for single phase connections) \_\_\_\_\_ MVA

Length of Generator Owned Conductor from PCC to Generator’s Facilities (where applicable): \_\_\_\_\_ km

Size of Generator Owned Conductor from PCC to Generator’s Facilities (where applicable): \_\_\_\_\_

Does the project require establishment of joint use on SYNERGY NORTH’s poles? (i.e. Generator’s collector lines attached to SYNERGY NORTH poles on municipal right or way?  Yes  No

If “No” to above, will the Generator own poles and wires on a municipal right of way?  Yes  No

**Note:**

Generators requiring line construction between the Generator’s facilities and the Point of Connection should contact SYNERGY NORTH to discuss potential ownership options, construction and co-ordination logistics for these facilities. Also those Generators whom may require attaching collector lines to SYNERGY NORTH poles must also contact SYNERGY NORTH to discuss potential to engage in Joint Use of utility assets. SYNERGY NORTH will consider owning and operating new lines if they are designed and constructed to SYNERGY NORTH standard and are located on public road right-of-ways. This may change the PCC location. For details, please contact SYNERGY NORTH at [generator.connections@synergynorth.ca](mailto:generator.connections@synergynorth.ca) or call 807-343-1037.

**DRAWING REQUIREMENTS:**

On a cut-out from the SYNERGY NORTH distribution operating map\* provide location of Generator’s facilities with proposed line routings for connection to SYNERGY NORTH distribution system. It should identify the Point of Connection, the PCC, and the location (i.e. on private property or public road right-of-ways) of new lines between the Generator’s facilities and the Point of Connection.

\*distribution operating map is available from SYNERGY NORTH upon request.

Proposed Line Routing Drawing Drawing / Sketch No. \_\_\_\_\_ Rev. \_\_\_\_\_

Provide a Single-line Diagram of the Generator’s Facilities including the PCC

Single-line Diagram Drawing / Sketch No. \_\_\_\_\_ Rev. \_\_\_\_\_



**PROTECTION PHILOSOPHY:**

Provide a protection philosophy document describing the philosophy for the detection and clearing of:

- Internal faults within the EG facility;
- External phase and ground faults (in SYNERGY NORTH’s distribution system);
- Certain abnormal system conditions such as over / under voltage, over / under frequency, open phase(s);
- Islanding
- Control strategy for any energy storage system within the project (if applicable)

Protection philosophy document shall also include a tripping matrix or similar information.

**Note:**

**The Generator shall install utility grade relays for the interface protection. The protection design shall incorporate facilities for testing and calibrating the relays by secondary injection.**

Protection Philosophy Document Title/Number: \_\_\_\_\_

**GENERATOR CHARACTERISTICS**

**CHARACTERISTICS OF EXISTING GENERATORS**

If Generator’s facilities include existing generators, provide details as an attached document.

**Characteristics of New Generators:**

**GENERAL:**

Number of generating unit(s)\*: \_\_\_\_\_

Manufacturer/Type or Model No: \_\_\_\_\_

Rated capacity of each generating unit: \_\_\_\_\_ kW \_\_\_\_\_ kVA

Rated frequency: \_\_\_\_\_ Hz

Power Conversion Technology: \_\_\_\_\_  Other (specify) \_\_\_\_\_

Generator connecting on:  Single-phase  Three-phase

Starting inrush current: \_\_\_\_\_ pu (multiple of full load current)

Limits of range of reactive power at the machine output:

Lagging (over-excited)	_____ kVAR	_____ power factor
Leading (under-excited)	_____ kVAR	_____ power factor

Limits of range of reactive power at the PCC:

Lagging (over-excited)	_____ kVAR	_____ power factor
Leading (under-excited)	_____ kVAR	_____ power factor

Generator terminal connection:  Delta  Wye

Neutral grounding method of wye connected generator:  Solid  Ungrounded  Impedance: R \_\_\_\_\_ ohms  
X \_\_\_\_\_ ohms

***\*If photovoltaic, generating unit(s) = inverter(s)***



**ENERGY STORAGE:**

Does the project include any energy storage?  Yes  No

Number of Units: \_\_\_\_\_ Energy Storage Unit Size: \_\_\_\_\_ kWh

Total Energy Storage Size: \_\_\_\_\_ kWh Inverter Size\*: \_\_\_\_\_ kW

*\*Enter zero for inverter size if inverter is shared with generation unit(s)*

**FOR SYNCHRONOUS UNITS:**

Nominal machine voltage: \_\_\_\_\_ kV

Minimum power limit for stable operation: \_\_\_\_\_ kW

Unsaturated reactance on: \_\_\_\_\_ kVA base \_\_\_\_\_ kV base

Direct axis subtransient reactance,  $X_{d''}$  \_\_\_\_\_ pu

Direct axis transient reactance,  $X_{d'}$  \_\_\_\_\_ pu

Direct axis synchronous reactance,  $X_d$  \_\_\_\_\_ pu

Zero sequence reactance,  $X_0$  \_\_\_\_\_ pu

Provide a plot of generator capability curve (MW output vs MVAR): \_\_\_\_\_

Document Number: \_\_\_\_\_

Rev. \_\_\_\_\_

**FOR INDUCTION UNITS:**

Nominal machine voltage: \_\_\_\_\_ kV

Unsaturated reactances on: \_\_\_\_\_ kVA base \_\_\_\_\_ kV base

Direct axis subtransient reactance,  $X_{d''}$  \_\_\_\_\_ pu

Direct axis transient reactance,  $X_{d'}$  \_\_\_\_\_ pu

Total power factor correction installed: \_\_\_\_\_ kVAR

Number of regulating steps: \_\_\_\_\_

Power factor correction switched per step \_\_\_\_\_ kVAR

Power factor correction capacitors are automatically switched off when generator breaker opens:  Yes  No

**INTERFACE STEP-UP TRANSFORMER CHARACTERISTICS:**

Transformer rating: \_\_\_\_\_ kVA

Nominal voltage of high (distribution) voltage winding: \_\_\_\_\_ kV

Nominal voltage of low (generator) voltage winding: \_\_\_\_\_ kV

Transformer type:  Single-phase  Three-phase

Transformer Impedances on: \_\_\_\_\_ kVA base \_\_\_\_\_ kV base R \_\_\_\_\_ pu  
X \_\_\_\_\_ pu

High voltage winding connection:  Delta  Wye

Grounding method of wye connected high voltage winding neutral:  Solid  Ungrounded  Impedance: R \_\_\_\_\_ ohms  
X \_\_\_\_\_ ohms

Low voltage winding connection:  Delta  Wye

Grounding method of wye connected low voltage winding neutral:  Solid  Ungrounded  Impedance: R \_\_\_\_\_ ohms  
X \_\_\_\_\_ ohms

**INTERMEDIATE STEP-UP TRANSFORMER CHARACTERISTICS:**

Transformer rating: \_\_\_\_\_ kVA

Nominal voltage of high (distribution) voltage winding: \_\_\_\_\_ kV

Nominal voltage of low (generator) voltage winding: \_\_\_\_\_ kV

Transformer type:  Single-phase  Three-phase

Transformer Impedances on: \_\_\_\_\_ kVA base \_\_\_\_\_ kV base R \_\_\_\_\_ pu  
X \_\_\_\_\_ pu

High voltage winding connection:  Delta  Wye

Grounding method of wye connected high voltage winding neutral:  Solid  Ungrounded  Impedance: R \_\_\_\_\_ ohms  
X \_\_\_\_\_ ohms

Low voltage winding connection:  Delta  Wye

Grounding method of wye connected low voltage winding neutral:  Solid  Ungrounded  Impedance: R \_\_\_\_\_ ohms  
X \_\_\_\_\_ ohms

**LOAD INFORMATION:**

Maximum load of the facility: \_\_\_\_\_ kVA \_\_\_\_\_ kW

Maximum load current (referred to the distribution voltage at the PCC): \_\_\_\_\_ A

Maximum inrush current (referred to the distribution voltage at the PCC): \_\_\_\_\_ A



**ATTACHED DOCUMENTS:**

Item No.	Description	Reference No.	No. of Pages
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

I hereby declare that all statements made in this application are true, complete, and correct to the best of my knowledge and belief. Detailed calculations and/or supporting documentation are available upon request.

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Registered P.Eng (Print Name)

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Registered P.Eng (Signature)

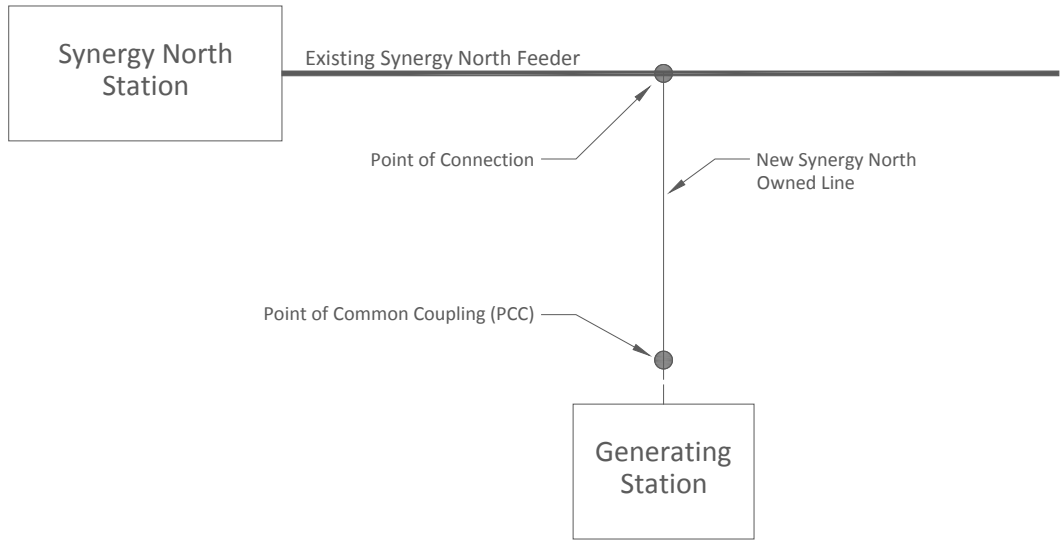
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Registered P.Eng (Stamp)

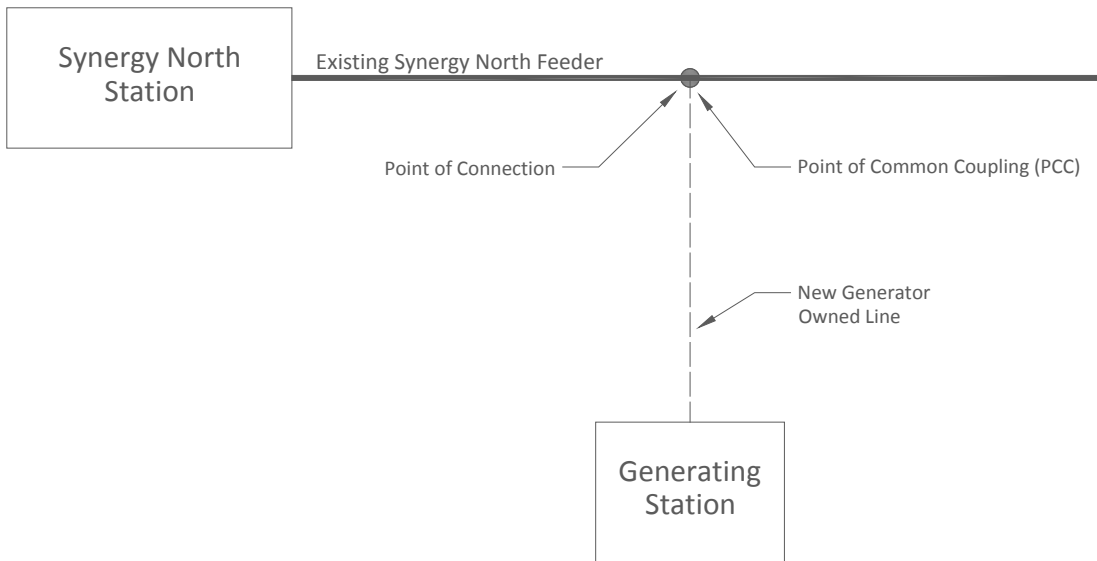
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Date (DD/MM/YYYY)

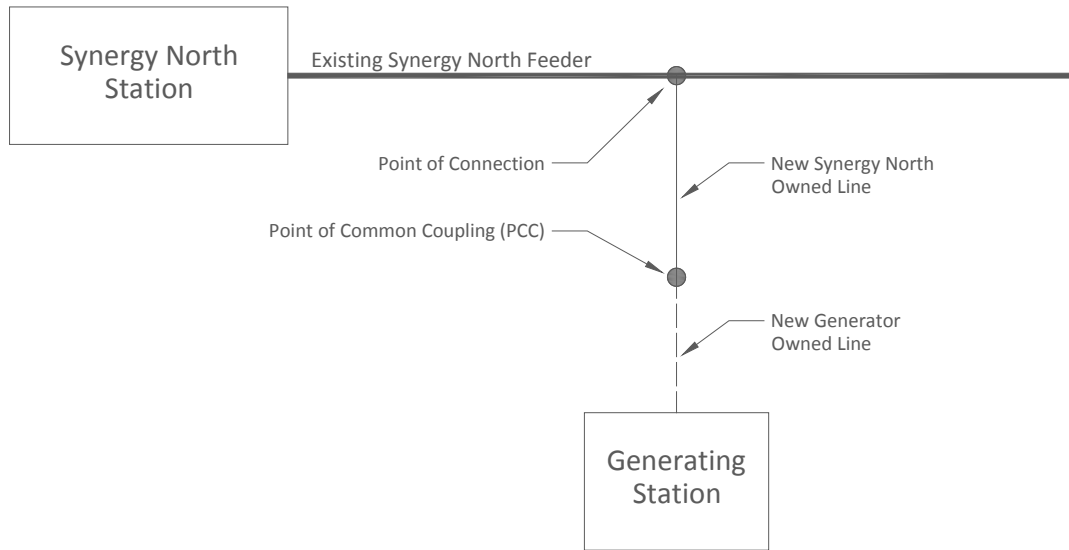
**Appendix A: Illustrations of PCC and Point of Connection**



**Figure 1 - SYNERGY NORTH Owns Entire Tap Line**



**Figure 2 - Generator Owns Entire Tap Line**



**Figure 3 - SYNERGY NORTH and Generator Each Own a Portion of the Tap Line**

## Appendix B: Study Agreement

\_\_\_\_\_ (the "Customer") has requested and SYNERGY NORTH CORPORATION ("SYNERGY NORTH") has agreed to perform the Work described below to determine the feasibility and impact of the Proposed Project defined below and to undertake the Work as defined in Section 4, forming a part hereof (the "Agreement") dated \_\_\_\_\_.

### 1. **Proposed Project**

The Proposed Project is the connection of \_\_\_\_\_ (the "Generation Facility") to SYNERGY NORTH's distribution system.

### 2. **Completion Date:**

SYNERGY NORTH shall complete the Work, by no later than sixty (60) days after the latter of:

- a) the Customer executing this Agreement;
- b) the Customer paying SYNERGY NORTH the amount specified below in Section 5(a);
- c) the Customer providing the information described in Section 3.

### 3. **Impact of Subsequent Changes to the Information Provided by Customer**

Should the Customer make any changes to the information provided in the Connection Impact Application after SYNERGY NORTH has commenced the Work and those changes:

- a) result in costs to SYNERGY NORTH greater than the cost shown in Section 5(a), the Customer shall make such further payment as may be required by SYNERGY NORTH in the time specified by SYNERGY NORTH;
- b) otherwise affect any other provision of this Agreement, such as the time required for completion of the Work, the parties shall negotiate and agree upon the required amendments to this Agreement and SYNERGY NORTH shall be under no obligation to resume performance of the Work until such time as the parties agree on such amendments.

### 4. **Scope of Work**

- a) SYNERGY NORTH will perform and provide the Customer with a Connection Impact Assessment to determine the feasibility of the Proposed Project by reviewing the impact of the Proposed Project on SYNERGY NORTH's distribution system.
- b) SYNERGY NORTH will advise the Customer of specific requirements for each of the alternative connections that are identified by the Connection Impact Assessment.
- c) SYNERGY NORTH will describe the necessary modifications to SYNERGY NORTH's distribution system facilities based on SYNERGY NORTH's review of the Proposed Project in order to permit the connection of the Proposed Project.
- d) SYNERGY NORTH will apply for a Transmitter Connection Impact Assessment which will determine the impact of the Generation Facility on the transmitter's transmission system.



**5. Deposit:**

- a) The Customer shall submit a deposit of \$\_\_\_\_\_ towards SYNERGY NORTH’s Actual Cost of performing the Work. SYNERGY NORTH’s Actual Cost of performing the Work includes:
  - i. All engineering, administrative costs, and overheads associated with the Work described in Section 4 – Scope of Work;
  - ii. The Transmitter’s fee for the performance of the Transmitter’s Connection Impact Assessment.
- b) The Customer agrees to remit to SYNERGY NORTH the amount shown in Section 5(a) by no later than 15 days after the date first written above towards the Actual Cost of the Work.
- c) Within 90 days after the completion of the work, SYNERGY NORTH shall provide the Customer with a final invoice. Any difference between the final Invoice (including applicable taxes) and the amount deposited by the Customer shall be paid (refunded) within 30 days of the invoice.

**6. GST Registration Information**

The GST registration number for SYNERGY NORTH is 89209-0614 RT0001and the GST registration number for the Customer is \_\_\_\_\_RT\_\_\_\_\_.

**IN WITNESS WHEREOF**, the parties hereto have caused this Agreement to be executed by the signatures of their proper officers, as of the day and year first written above.

**SYNERGY NORTH CORPORATION**

\_\_\_\_\_ Daniel Dillon

Title: Distribution Engineer

**I have the authority to bind the corporation**

\_\_\_\_\_ *(company name)*

\_\_\_\_\_ (print and sign)

**Title:** \_\_\_\_\_

**I have the authority to bind the corporation**

SYNERGY NORTH Connection Impact Assessment (CIA) Deposit Schedule		
Proposed Generator Project Size	SYNERGY NORTH CIA Deposit	Hydro One CIA Fee
≤ 10kW	N/A	N/A
≤ 250kW Connected at < 15kV <b>OR</b> ≤ 500kW Connected at > 15kV	\$3,000	N/A
> 250kW ≤ 500kW Connected at < 15kV <b>OR</b> > 500kW ≤ 1MW Connected at < 15kV	\$5,000	\$5,895.15
> 500kW < 10 MW Connected at < 15kV <b>OR</b> > 1MW < 10 MW Connected at > 15kV	\$8,000	\$5,895.15
≥ 10MW	\$8,000	\$5,895.15