Distribution generator interconnections micro-generator project application

A distribution micro-generator project must have a combined total Nameplate Capacity over 100 kW up to and including 1 MW (1,000 kW). For a project with multiple generating units, the aggregate Nameplate Capacities of all of the generators must not exceed 1 MW. You can visit our **webpage** for an overview of the interconnection process and more details about interconnection requirements. If you have any questions, please contact your BC Hydro Interconnections Manager or email **Distribution.Generators@bchydro.com**.

Application submission date	

You may need to submit this application more than once as we make sure this application information is deemed complete. We prefer that you submit this application by email as one single pdf with all the required attachments. If you submit your application as multiple pdfs, please make sure each pdf is clearly titled. This will ensure there is no delay when we assess your application for completeness.

Micro-generator project interconnection process milestones	
What date was your Basic Distribution System Information Request completed?	
What date was your Screening Study completed?	

1. Interconnection customer information	
Project name	
Company name	
Mailing address	

Project contacts			
Role	Owner/developer	Consultant	Engineer
Name			
Phone			
Email			

2. Project Information

Generating station location			
Latitude (deg min sec)		Longitude (deg min sec)	

Proposed Point of Interconnection (POI)			
Latitude (deg min sec)		Longitude (deg min sec)	
Address (optional)			
Closest city, town or community			

Facility general information			
Does this facility currently have electric service from BC Hydro? If yes, answer below.			
BC Hydro Meter #		BC Hydro Account #	

Distribution generator interconnections micro-generator project application

PROJECT NAME: _____

Project milestones	
Will this project need construction power from BC Hydro? (Yes or No.)	☐ Yes ☐ No
If yes, please provide the date construction begins.	
Generator testing date	
Commercial operation date (COD)	

☐ Project information attachment 2.1 Proposed site map(s)

Please attach one or more maps of your proposed site. The map(s) should be at a scale of approximately 1:25,000 or better to clearly show the generating station and the proposed POI. The proposed distribution and transmission lines (if any) from the generating station to the POI should also be shown on your map(s).

☐ Project information attachment 2.2 Site plan

Drawing number	Revision number	Date

You need to include a Site Plan with this application. Your Site Plan should include:

- Your project title, date and revision number, site address, and the name of person and/or firm that prepared the drawing
- Plan view of the site, with nearby roads
- Location of POI, BC Hydro metering, electrical equipment, and generator/inverter
- Equipment names (which should match the single line diagram)
- Routing of the overheard or underground lines and proposed terminal pole or service manhole

☐ Project information attachment 2.3 Single line diagram (sld)

Drawing number	Revision number	Date

You need to include a single line diagram (SLD) of your proposed project with this application. Your SLD should include:

- Your project title, date and revision number, site address and the name of person and/or firm that prepared the drawing
- Differentiation between new and existing equipment (clouds or dividing lines)
- All switches, breakers, and relays must have distinct identifiers or names
- Service entrance equipment
- BC Hydro revenue meter and, if applicable, revenue metering instrument transformers
- All electrical equipment between the Service Entrance and the generator (switches, breakers, cables, etc.) with voltage levels and equipment ratings

☐ Project information attachment 2.4 Protection single line (metering and relaying) diagram

Drawing number	Revision number	Date

You need to include a Protection Single Line (Metering and Relaying) Diagram with your application. This diagram should show all the protective relaying, metering, major control and telecommunications interface to tie in the generator, transformer and plant protection. This diagram should also provide the CT & VT ratios and accuracy classes.

This information may be already included in your Single Line Diagram (SLD) or Attachment 2.3. If this information is already included in your SLD, please enter N/A in the drawing number, revision number and date fields.

Distribution generator interconnections micro-generator project application

PROJECT NAME: _____

3. Generator information

Basic generator information

What is your generator's energy source?	Select One		3.1
What is the total generation (MW) of all generators at your site? (Existing and new.)			3.2
What is the total number of generators at your site? (Existing and new.)			3.3

What is the peak load at the site (for the service with the proposed generator(s))?	kW		3.4
	kvar		3.5
What is the minimum load at your site when the generators are running?	kW		3.6
	kvar		3.7

3.8 Maximum power output of your generator(s)

Please provide the proposed maximum power output of your generator(s) month by month. Minimum and average monthly generation values are also preferred but not mandatory.

	Maximum (MW)	Minimum (MW)	Average (MW)
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

Specific generator type section instructions

This application has a different section for inverter, synchronous and induction type generators. You only need to fill out the appropriate section for your generator type.

If your proposed project has more than one generator, then you will need to fill out a multiple sections of the appropriate generator type, one for each generator.

If your proposed project has a doubly fed induction generator or another type of generator not covered in this application form, please contact your project's BC Hydro Interconnections Manager for specific instructions.

Induction generator

Induction generator information			
Unit Designation (or name)			Ind 1
Manufacturer (optional)			Ind 2
Model (optional)			Ind 3
Rated apparent power (kVA)			Ind 4
Rated real power (kW)			Ind 5
Rated voltage (kV)			Ind 6
Rated continuous current (A)			Ind 7
Rated Power Factor (%)			Ind 8
Rated Efficiency (%)			Ind 9
Rated Speed (rpm)			Ind 10
Rated Frequency (Hz)			Ind 11
Subtransient Impedance X_d" (pu)			Ind 12
Inertia Constant of Generator H_G (MW-sec / MVA)			Ind 13
Generator Moment of Inertia J_G or WR^2_G (kg•m^2)			Ind 14
Inertia of all rotating mass	H (MW s / MVA)		Ind 16
	J (kg•m^2)		Ind 17
Power Factor Correction Capacitor Size (kvar) (if applicable)			Ind 18
Power Factor Correction Capacitor Voltage (V) (if applicable)			Ind 19

☐ Induction attachment ind1.1 Induction generator data sheet		
Document title and/or number	Revision number	Date

☐ Induction attachment ind1.2 Induction generator equivalent circuit diagram		
Drawing number	Revision number	Date

Distribution generator interconnections micro-generator project application

PROJECT NAME: _____

Inverter generator

Inverter information			
Unit Designation (or name)			Inv 1
Manufacturer (optional)			Inv 2
Model (optional)			Inv 3
Rated apparent power (kVA)			Inv 4
Rated real power (kW)			Inv 5
Rated voltage (kV)			Inv 6
Number of phases (1-phase or 3-phase)			Inv 7
Rated Current (Amps)			Inv 8
Rated Power Factor (%)			Inv 9
Rated Efficiency (%)			Inv 10
Rated Frequency (Hz)			Inv 11
Fault Contribution Amps	At 100% (rated) power generation by the inverter		Inv 12
	At a level of rated power below 50% (40%, 25%, etc.)		Inv 13
Is your Inverter Certified to CSA C22.2 No 107.1? (Yes or No)			Inv 14

Number of Inverters Total Inverter Capacity Calculation		
Number of inverters	Capacity	Total inverter capacity
x	kW	=

☐ **Inverter Information Attachment Inv1.1 Inverter embedded protection scheme**

Document title and/or number	Revision number	Date

☐ **Inverter Information Attachment Inv1.2 Harmonics current spectrum**

(Please include both rated power generation by the inverter and 50% power generation by the inverter in one file.)

Document title and/or number	Revision number	Date

☐ **Inverter Information Attachment Inv1.3 Inverter data sheet**

Document title and/or number	Revision number	Date

Distribution generator interconnections micro-generator project application

PROJECT NAME: _____

Energy storage		
Will this site be using energy storage?	☐ Yes ☐ No	
Storage technology (Battery type)		Inv 15
Power at peak charge (kW)		Inv 16
Power at peak discharge (kW)		Inv 17
Total stored energy (kWh)		Inv 18

Please include a brief description of your energy storage control scheme:

Synchronous generator

Synchronous generator information		
Unit Designation (or name)		S1
Manufacturer (optional)		S2
Model (optional)		S3
Rated apparent power (kVA)		S4
Rated real power (kW)		S5
Rated Power Factor (specify “lagging (over-excited) / leading (under-excited)” as “0.xx / 0.xx”)		S6
Rated voltage (kV)		S7
Rated Amperes		S8
Number of Phases		S9
Number of Poles		S10
Rated Speed (rpm)		S11
Rated Frequency (Hz)		S12
Amortisseur (damper) windings (connected, not connected or not installed)		S13
Connection (delta or wye)		S14
Type of Grounding (ungrounded, resistive, reactive or solidly grounded)		S15
Grounding Impedance (ohms)		S16
Inertia Constant of Generator H_G (MW-sec / MVA)		S17
Generator Moment of Inertia J_G or WR_2^G (kg•m²)		S18
Inertia constant of turbine + generator (provide proposed data) H_{GT} (MW-sec/MVA)		S19
Turbine + Generator Moment of Inertia J_G or WR^2_G (kg•m²)		S20

Impedances in per-unit (unless specified) on the machine base kV and base MVA		
Base kVA		S21
D-axis synchronous reactance (unsaturated) X_{di} (pu)		S22
D-axis transient reactance (unsaturated) X'_{di} (pu)		S23
D-axis sub-transient reactance (unsaturated) X''_{di} (pu)		S24
Q-axis synchronous reactance (unsaturated) X_{qi} (pu)		S25
Q-axis transient reactance (unsaturated) X'_{qi} (pu)		S26
Q-axis sub-transient reactance (unsaturated) X''_{qi} (pu)		S27
Negative sequence reactance (unsaturated) X_{2i} (pu)		S28
Zero sequence reactance (unsaturated) X_{Oi} (pu)		S29
Leakage reactance (unsaturated) X_{lm} (pu)		S30
Zero sequence resistance R_O (pu)		S31
Negative sequence resistance R_2 (pu)		S32

Distribution generator interconnections micro-generator project application

PROJECT NAME: _____

Time constants		
D-axis transient open circuit time constant T'_{do} (sec)		S33
D-axis sub-transient open circuit time constant T''_{do} (sec)		S34
Q-axis transient open circuit time constant T'_{qo} (sec)		S35
Q-axis sub-transient open circuit time constant T''_{qo} (sec)		S36

Other parameters		
Saturation Factor at E_t = 1.0pu $S_{G1.0}$		S37
Saturation Factor at E_t = 1.2pu $S_{G1.2}$		S38
Damping Coefficient (pu torque/pu speed dev) kD		S39

☐ **Synchronous attachment s1.1 Generator capability curve (kvars versus kw)**

Document title and/or number	Revision number	Date

☐ **Synchronous attachment s1.2 Characteristic curves** (Open circuit saturation curve and Short circuit curve on one graph)

Document title and/or number	Revision number	Date

☐ **Synchronous attachment s1.3 V-curves** (please include if available)

Document title and/or number	Revision number	Date

4. Transformer (Generator Step Up) information			
Step-up transformer capacity (kVA)			4.1
Step-up transformer base capacity (kVA) if different from the above capacity			4.2
Step-up transformer voltages (kV)	H.V.		4.3
	L.V.		4.4
Step-up transformer configuration (delta, wye grounded, etc.)	H.V. winding		4.5
	L.V. winding		4.6
Step-up transformer impedances (specified in % of transformer base)	Z%		4.7
	X/R		4.8
H.V. Neutral grounding impedance (ohms)[1]	R		4.9
	X		4.10
L.V. Neutral grounding impedance (ohms)	R		4.11
	X		4.12

Note 1: Typically BC Hydro chooses the H.V. neutral grounding impedance values. However please feel free to let us know your preference.

5. Service entrance circuit breaker information		
Unit Designation (Name)		5.1
Interrupting Media (oil, air, SF6, etc.)		5.2
Rated maximum voltage (kV)		5.3
Rated Frequency (Hz)		5.4
Basic impulse level (BIL) (kV)		5.5
Rated continuous current (A)		5.6
Momentary (1/2 cycle) current withstand capability (kA crest)		5.7
Rated symmetrical short circuit interrupting capability (kA RMS symmetrical)		5.8
Interrupting time (cycles)		5.9
Out-of-phase switching capability (kA RMS symmetrical)		5.10

Distribution generator interconnections micro-generator project application

PROJECT NAME: _____

6. Line information

	Line segment 1	Line segment 2	Line segment 3	
Line Length (km)				6.1
Number of conductors per phase (1, 2, 3, etc.)				6.2
Phase conductors: size and type				6.3
Neutral conductors: size and type				6.4

Conductor Impedances

Positive Sequence Resistance R1 (ohms)				6.5
Zero Sequence Resistance R0 (ohms)				6.6
Positive Sequence Reactance X1 (ohms)				6.7
Zero Sequence Reactance X0 (ohms)				6.8
Positive Sequence Charging Y1 (µMHO)				6.9
Zero Sequence Charging Y0 (µMHO)				6.10

Overhead line characteristics (not required for cables)

	Line segment 1	Line segment 2	Line segment 3	
Conductor name (for example waxwing, linnet, etc.)				6.11
Line Clearances to Ground (Maximum) meters				6.12
Line Clearances to Ground (Minimum) meters				6.13
Maximum Pole Height meters				6.14
Minimum Pole Height meters				6.15
Conductor Phase Spacing, A–B				6.16
Conductor Phase Spacing, B–C				6.17
Conductor Phase Spacing, C–A				6.18
Average conductor height above ground for the lowest conductor (meters)				6.19
Length of skywire (if any) (meters)				6.20
Geometric Mean Radius @ 60 Hz (GMR) (meters)				6.21

7.Engineer of Record declaration

The Engineer of Record declares that the data submitted herein is accurate and meets the requirements of this the latest *35 kV and Below Interconnection Requirements for Power Generators*.

Seal of Professional Engineer registered in British Columbia	Signature
	Print name
	Date