Form B – Connection Impact Assessment (CIA) Application
For Connection of Generation Facilities of ≥ 10kW

About This Form
This application form is for generators applying for a Connection Impact Assessment (CIA) and for generators with a project size greater than 10 kW. This application form is required for:

- New generators applying for CIA
- Generators applying for revision to their original CIA
- Generators applying for CIA after rescinding a previous CIA. Note: Include your previous CIA Project ID# below.

Technical Requirements
Refer to Alectra Utilities Corporation's Conditions of Service on our website at www.alectrautilities.com for Technical Requirements for connection.

Submission Instructions
Return the completed form, fees and other required documents by email or mail to:

Alectra Utilities Corporation
Stations Design – Distributed Generation
161 Cityview Boulevard,
Vaughan, Ontario, L4H 0A9
Email: DER@alectrautilities.com

Important Notes
- Applications are cautioned NOT to incur major expenses until Alectra Utilities approves to connect the proposed generation facility.
- All technical documents (Form B, single line diagrams, etc.) must be signed and sealed by a licensed Ontario Professional Engineer (P.Eng.).
- If your project's size is greater than 10 kW, complete Form B – Connection Impact Assessment (CIA) Application available at: www.alectrautilities.com
- All fields below are mandatory, except where noted. Incomplete applications may be returned by Alectra Utilities.
- If you have any questions contact Alectra Utilities by email to DER@alectrautilities.com or telephone 1-877-963-6900 extension 25001.

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Application Information

1. **Date:** _____ (*dd/mm/yyyy*)

2. **Project Name:** _____

3. **Application Type:**

   ☐ New CIA Application

   ☐ CIA Revision / Rework Original CIA Project ID# (*if applicable*): _____

4. **IESO Reference Number: (*if applicable*):** _____

5. **Proposed In-Service Date:** _____ (*dd/mm/yyyy*)

Generator Information

6. **Project Location:**
   Address _____
   City / Town / Township _____
   Postal Code _____
   Lot Number(s) _____
   Concession number(s) _____

7. **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

8. **Project Intent:** ☐ Load Displacement ☐ Net Metering ☐ Emergency Backup ☐ Demand Response ☐ Other (*please specify*) _____

9. **Generator Type:** ☐ Synchronous ☐ Induction ☐ Inverter-type

10. **Project Type:**

    i. **Existing:** ☐ None ☐ Solar ☐ Energy Storage ☐ Biofuel ☐ Gas Turbine ☐ Hydraulic Turbine ☐ Steam Turbine ☐ Fuel Cell ☐ Wind Turbine ☐ Diesel Engine ☐ Other (*please specify*) _____ ☐ Co-gen/CHP (Combined Heat and Power)

    ii. **New:** ☐ Solar ☐ Energy Storage ☐ Wind Turbine ☐ Biofuel ☐ Gas Turbine ☐ Hydraulic Turbine ☐ Steam Turbine ☐ Fuel Cell ☐ Diesel Engine ☐ Co-gen/CHP (Combined Heat and Power) ☐ Other (*please specify*) _____

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Contact Information

	Generator Owner (*mandatory*)	Site Owner (*mandatory*)	Consultant (*optional*)
Company / Person			
Contact Person			
Mailing address line 1			
Mailing address line 2			
Telephone			
Email			

Choose a single point of contact: ☐ Generator Owner ☐ Consultant
Preferred method of contact with Alectra Utilities: ☐ Email ☐ Telephone ☐ Postal Mail

11. Customer Status:

Are you an existing Alectra Utilities customer? ☐ Yes ☐ No
If yes, Alectra Utilities account number: _____
Customer name registered on this account: _____
Are you an HST registrant? ☐ Yes ☐ No
If yes, provide your HST registration number: _____-_____RT_____

Connection Information

12. Connection to Alectra Utilities' Distribution System:

a. Proposed or existing connection voltage to Alectra Utilities' distribution system: _____ kV
b. Station: _____
c. Feeder: _____
d. Distance between the connection point on the feeder (PCC) and the demarcation point between the utility and distributed generation 'owned' Electrical Safety Authority approved load break switch (located on source side of metering, breaker, interface transformer, etc.): _____ km
e. Size and Type of conductor between Alectra Utilities' supply transformer and the Buildings Main Disconnect Switch (*if known*):
Conductor size (e.g. 366): _____
Conductor type (e.g. AL): _____
Note: Alectra Utilities may request actual impedance for non-standard conductors at a later time.
f. If line tap required: Line tap between generating facility demarcation point (load break switch and metering) and connection point on Alectra Utilities's feeder (PCC) (*if known*):
Conductor size (e.g. 366): _____
Conductor type (e.g. AL): _____
Note: Alectra Utilities may request actual impedance for non-standard conductors at a later time.
g. PCC GPS coordinates: _____
h. Route distance from PCC (if distance from PCC to generator > 500m) to generation site: _____ km
i. Line tap to be built by: ☐ Alectra Utilities (see Note) OR ☐ other (*specify*):
j. Line tap to be owned by: ☐ Alectra Utilities (see Note) OR ☐ other (*specify*):
k. Total three phase, and line to ground fault current and the inverter system's output terminals.
Three phase fault: _____ amps
L-G fault: _____ amps
l. Total three phase, and line to ground fault current and the Building's Main Disconnect Switch.
Three phase fault: _____ amps

L-G fault: _____ amps

NOTE: Customers requiring line tap construction between their demarcation point and the connection point on the Alectra Utilities feeder should contact Alectra Utilities to discuss potential ownership options, construction and coordination logistics for these facilities. Also, those customers whom may require attaching collector lines to Alectra Utilities poles must also contact Alectra Utilities to discuss potential to engage in joint use of utility assets.

Alectra Utilities will consider owning and operating all new lines if they are designed and constructed to Alectra Utilities standards and are located on municipal roadway right-of-ways. This may change your PCC location. You must contact Alectra Utilities to discuss. For details email **DER@alectrautilities.com** or call 1-877-963-6900, extension 25001.

13. Location and Site Plan:

Provide Site Plan with approximate line routings for connection to nearby Alectra Utilities' facilities. The Site Plan should include roads, concession and lot numbers and nearby power lines. It should identify the Point of Common Coupling (PCC) location on the Alectra Utilities feeder and the location (i.e. on private property or municipal property) of all generator lines (collector lines and transmission / distribution lines).

Drawing / Sketch number: _____, Rev. _____

14. Single Line Diagram (SLD):

Provide a SLD of the generating facility including the Interface Point / PCC to Alectra Utilities' distribution system.

SLD drawing number: _____, Rev. _____

15. Protection Philosophy:

a. Provide a document describing the protection philosophy for detecting and clearing:

- internal faults within the embedded generation facility;
- external phase and ground faults (in Alectra Utilities' distribution system);
- certain abnormal system conditions such as over/under voltage , over/under frequency, open phase(s);
- islanding

Document Number: _____, Rev. _____

b. Include a tripping matrix or similar information in the document.

Note: Embedded 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.

16. Generator Characteristics

NOTE: Inverter-based generating units must not inject DC greater than 0.5% of the full rated output current at the point of connection of the generating units. The generated harmonic levels must not exceed those given in the CAN/CSA-C61000-3-6 Standards.

☐ No existing generators (*if chosen, part a. is optional*)

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a. Characteristics of Existing Generators (if applicable):

1. Number of generating unit(s): _____
2. Manufacturer / Type or Model No: _____ / _____
3. Rated capacity of each unit: _____ kW _____ kVA
   If unit outputs are different, fill in additional sheets to provide the information.
4. Rated frequency: _____Hz
5. Rotating machine type: ☐ Synchronous ☐ Induction ☐ Other (*specify*) _____
6. Generator connecting on: ☐ single phase ☐ three phase
7. Limits of range of reactive power at the machine output:
   Lagging (over-excited) _____ kVAR power factor _____
   Leading (under-excited) _____ kVAR power factor _____
8. Limits of range of reactive power at the PCC:
   Lagging (over-excited) _____ kVAR power factor _____
   Leading (under-excited) _____ kVAR power factor _____
9. Starting inrush current: _____ pu (*multiple of full load current*)

For SPC/Inverter Type Units:

i. Terminal voltage: _____ V
ii. Line –interactive type (i.e. intended for parallel operation with electric utility) ☐ Yes ☐ No
iii. Power factor _____
iv. Battery backup provided ☐ Yes ☐ No
v. Maximum fault current for terminal faults _____ A
vi. Standards according to which built _____
vii. Provide Manufacturer's technical brochure and specification sheet _____

For Synchronous Units:

i. Nominal machine voltage: _____ kV
ii. Minimum power limit for stable operation _____ kW
iii. Unsaturated reactances on: _____ kVA base _____ kV base
Direct axis subtransient reactance, Xd" _____ pu
Direct axis transient reactance, Xd' _____ pu
Direct axis synchronous reactance, Xd _____ pu
Zero sequence reactance, X0 _____ pu
iv. Provide a plot of generator capability curve (MW output vs MVAR)
Document Number: _____, Rev. _____

For Induction Units:

i. Nominal machine voltage: _____ kV
ii. Unsaturated reactances on: _____ kVA base _____ kV base
Direct axis subtransient reactance, Xd" _____ pu
Direct axis transient reactance, Xd' _____ pu
iii. 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

b. Characteristics of New Generators:

10. Number of generating unit(s): _____
11. Manufacturer / Type or Model No: _____ / _____
12. Rated capacity of each unit: _____ kW _____ kVA
    If unit outputs are different, fill in additional sheet to provide the information.
13. Rated frequency: _____ Hz
14. Rotating machine type: ☐ Synchronous ☐ Induction ☐ Other (*specify*) _____
15. Generator connecting on: ☐ single phase ☐ three phase
16. Limits of range of reactive power at the machine output:
    Lagging (over-excited) _____ kVAR power factor _____
    Leading (under-excited) _____ kVAR power factor _____
17. Limits of range of reactive power at the PCC:
    Lagging (over-excited) _____ kVAR power factor _____
    Leading (under-excited) _____ kVAR power factor _____
18. Starting inrush current: _____ pu (*multiple of full load current*)

For SPC/Inverter Type Units:

viii. Terminal voltage: _____ V
ix. Line –interactive type (i.e. intended for parallel operation with electric utility) ☐ Yes ☐ No
x. Power factor _____
xi. Battery backup provided ☐ Yes ☐ No
xii. Maximum fault current for terminal faults _____ A
xiii. Standards according to which built _____
xiv. Provide Manufacturer's technical brochure and specification sheet _____

For Synchronous Units:

v. Nominal machine voltage: _____ kV
vi. Minimum power limit for stable operation: _____ kW
vii. Unsaturated reactances on: _____ kVA base _____ kV base
Direct axis subtransient reactance, Xd" _____ pu
Direct axis transient reactance, Xd' _____ pu
Direct axis synchronous reactance, Xd _____ pu
Zero sequence reactance, X0 _____ pu
viii. Provide a plot of generator capability curve (MW output vs MVAR)
Document Number: _____, Rev. _____

For Induction Units:

iv. Normal machine voltage: _____ kV
v. Unsaturated reactances on: _____ kVA base _____ kV base
Direct axis subtransient reactance, Xd" _____ pu
Direct axis transient reactance, Xd' _____ pu
vi. Total power factor correction installed: _____ kVAR
Direct axis subtransient reactance, Xd" _____ pu
Direct axis transient reactance, Xd' _____ pu
- 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

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17. Interface Step-Up Transformer Characteristics:

a. Transformer rating: _____ kVA
b. Nominal voltage of high voltage winding: _____ kV
c. Nominal voltage of low voltage winding: _____ kV
d. Transformer type: ☐ single phase ☐ three phase
e. Impedances on: _____ kVA base _____ kV base
R _____ pu, X_____ pu
f. High voltage winding connection: ☐ delta ☐ star
Grounding method of star connected high voltage winding neutral:
☐ solid ☐ ungrounded ☐ impedance: R _____ ohms X_____ ohms
g. Low voltage winding connection: : ☐ delta ☐ star
Grounding method of star connected high voltage winding neutral:
☐ solid ☐ ungrounded ☐ impedance: R _____ ohms X_____ ohms

NOTE: The term "high voltage" refers to the intermediate voltage that is input into the interface step-up transformer and "low voltage" refers to the generation or any other intermediate voltage.

18. Intermediate Transformer Characteristics (if applicable):

☐ No intermediate transformer (if chosen, parts a. to h. are optional)

a. Transformer rating: _____ kVA
b. Nominal voltage of high voltage winding: _____ kV
c. Nominal voltage of low voltage winding: _____ kV
d. Transformer type: ☐ single phase ☐ three phase
e. Impedances on: _____ kVA base _____ kV base
R _____ pu, X _____ pu
f. High voltage winding connection: ☐ delta ☐ star
Grounding method of star connected high voltage winding neutral:
☐ solid ☐ ungrounded ☐ impedance: R _____ ohms X _____ ohms
g. Low voltage winding connection: ☐ delta ☐ star
Grounding method of star connected high voltage winding neutral:
☐ solid ☐ ungrounded ☐ impedance: R _____ ohms X _____ ohms

NOTE: The term "high voltage" refers to the intermediate voltage that is input into the interface step-up transformer and the "low voltage" refers to the generation voltage.

19. Load Information (optional):

a. Maximum load of the facility: _____ kVA _____ kW
b. Maximum load current (*referred to the nominal voltage at the connection point to Alectra Utilities' system*): _____ A
c. Maximum inrush current (*referred to the nominal voltage at the connection point to Alectra Utilities' system*): _____ A

Attached Documents:

Item #	Description	Reference Number	Number of pages
1.			
2.			
3.			
4.			
5.			

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Attached Drawings:

Item #	Description	Reference Number	Number of pages
1.			
2.			
3.			
4.			
5.			

Checklist:

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

☐ Form B – Connection Impact Assessment Application, stamped by a Professional Engineer (P. Eng.)
- (a) ☐ Protection Philosophy
- (b) ☐ Site Plan

☐ Single Line Diagram, stamped by a Professional Engineer (P. Eng.)
☐ Minimum information for Load Displacement or Energy Storage facilities (Appendix A or C), if applicable.

Appendix A: Load Displacement Generation Facilities

Operation Mode: ☐ Parallel ☐ Non-Parallel
Transition Type: ☐ Closed (*"make before break"*) ☐ Open (*"break before make"*)
Transition Time (ms): _____ *(length of time generator remains parallel to grid)*

Minimum Generation Output Information

	Load of Facility (kW)	Load of Facility (kVAR, lead or lag)	Generation Output (kW)	Generation Output (kVAR, lead or lag)
Maximum Load				
Minimum Load				

Appendix B: Emergency Backup Generators

Transition Type: ☐ Closed (*"make before break"*) ☐ Open (*"break before make"*)
Transition Time (ms): _____ *(length of time generator remains parallel to grid)*

Appendix C: Energy Storage Facilities

Energy Storage Control Strategy ☐ Peak Shaving ☐ Dynamic VAR Support
☐ Frequency Support ☐ Other (*please specify*) _____

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Peak Shaving

Description of Control Strategy	

When operating as a load:

Switch In Time	Switch Out Time	Load kW (peak)	Load kVAR (peak, leading/lagging)

When operating as a generator:

Switch In Time	Switch Out Time	Generation kW (peak)	Generation kVAR (peak, leading/lagging)

Dynamic VAR Support or Frequency Support

Description of Control Strategy			
Switch In Condition	**Switch Out Condition**	**Generation kW (peak)**	**Generation kVAR (peak, leading/lagging)**

Other

Description of Control Strategy and relevant operating parameters	