Schedule A
Section 1.0

Generator Connection Assessment Review Form

10 kW to 10 MW
Appendix 5
Distributed Generation Connection Impact Assessment Review
To connect 10kW – 10MW to
Greater Sudbury Hydro’s Electrical Distribution System

Section 1: General Connection Information

Note: ALL of the information in "Section 1: General Connection Information" must be completed in full. Failure to provide complete information may delay the processing of the data.

All technical documents must be signed and sealed by a licensed Ontario Professional Engineer.

Date: (dd/mm/yyyy) Contact Person Name: ____________________________________________

______________________________
Signature: ______________________

1. Project Name: ________________________________________________________________

2. Project Dates:
   Proposed Start of Construction: __________________________
   Proposed In-Service: __________________________

   Proposed Start of Construction: (dd/mm/yyyy)
   Proposed In-Service: __________________________

3. Project Size:
   Number of Units
   Nameplate Rating of Each Unit (kW)
   Number of Phases (1 or 3)
   Proposed Total Capacity (kW)

4. Applicant Contact Information: (the party that will be contractually obligated for this generating facility)
   Company Name: _______________________________________________________________
   Street Address: _______________________________________________________________
   Mailing Address (if different): _________________________________________________
   Representative Name: _________________________________________________________
   Representative Title: ___________________________________________________________
   Phone Number (Main) ___________________________ Cell ___________________________
   Fax Number: ___________________________ Email ___________________________

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5. **Facility Contact Information:** (where the generating facility will be installed)

Company Name

Street Address

Mailing Address (if different)

Representative Name

Representative Title

Phone Number (Main)

Cell

Fax Number

Email

6. **Consultant:**

Company

Street Address

Mailing Address (if different)

Representative Name

Representative Title

Phone Number (Main)

Cell

Fax Number

Email

7. **Intent of Generation:**

☐ Sale of Power  ☐ Load Displacement

8. **Project Type:**

☐ Wind Turbine  ☐ Hydraulic Turbine  ☐ Steam Turbine  ☐ Solar

☐ Diesel Engine  ☐ Gas Turbine  ☐ Fuel Cell  ☐ Biomass

☐ Co-generation/CHP (Combined Heat & Power)

☐ Other (Please Specify)

9. **Generator Facility Type:**

Generation Facility Voltage (Volts):

☐ AC  ☐ DC

Type: Rotating generators:

☐ Synchronous  ☐ Induction  ☐ N/A

☐ Other (Please Specify)

Non-Rotating DC generation:

☐ Photovoltaic Arrays  ☐ Fuel Cells  ☐ Batteries

☐ Other (Please Specify)
10. Location and Site Plan:

Provide Site Plan with approximate line routings for connection to nearby Greater Sudbury Hydro’s facilities. The Site Plan should include roads, concession and lot numbers and nearby power lines.

Drawing / Sketch No.                     Rev.

11. Location and Site Plan:

Proposed connection voltage to the LDC’s distribution system (if known):  kV

_______________
Section 2: Impact Assessment Information

Note:
(a) It is important that the Generator provides ALL the information requested below, if applicable. All information is required to complete the first step of the process to move to the new Queue structure. Indicate "Not Applicable" where appropriate.
(b) In certain circumstances the LDC may require additional information to conduct the Impact Assessment. Should this be the case the Generator will be duly advised.

Date: (dd/mm/yyyy) Contact Person Name: ______________________________

Signature: _____________________________________________________________

1. Single Line Diagram (SLD):

Provide a SLD of the Generating Facility including the Interface Point/Point of Common Coupling ("PCC") to Greater Sudbury Hydro’s distribution system.

Drawing / Sketch No. Rev. ______________________________ ______

☐ Attached
☐ Mailed Separately

2. Generator Facility Fault Contributions for Faults at the Interface Point/PCC

All values to be at the nominal connection voltage to Greater Sudbury Hydro’s distribution system, i.e. the high voltage side of the Facility interface (step-up) transformer.

Maximum Symmetrical (all generators online)
- Three phase fault (kA) ______________________________
- Phase-to-phase fault (kA) ______________________________
- Single Phase to ground fault (kA) ______________________________

3. Generator Facility Characteristics:

a. Number of generating unit(s):

b. Manufacturer / Type or Model No.: ______________________________

c. Rated capacity of each unit:
   Gross: _______ kW _______ kVA
   Net: _______ kW _______ kVA

If unit outputs are different, please fill in additional sheets to provide the information.

   d. Type of generating unit: ☐ Synchronous ☐ Induction ☐ Static Power Converters (SPC)
   ☐ Other (Please Specify) ______________________________
e. Rated frequency (Hz):

f. Number of phases: ☐ One  ☐ Three

g. For Synchronous Units:
   i) Generation facility voltage (kV):
   ________________________________________________________________
   ii) Rated current (A):
   ________________________________________________________________
   iii) Rated power factor of generating unit (s): ___________________ p.u.
   iv) Power factor operating range. (Specify lag or lead): from p.u. to p.u.
   v) Unsaturated reactances on: kVA base, p.u.  kV base
      Direct axis synchronous reactance, Xd  __________  p.u.
      Direct axis transient reactance, Xd'  __________  p.u.
      Direct axis subtransient reactance, Xd'' __________  p.u.
   vi) Time Constants:
      Direct axis open circuit transient, T'  ________ seconds
      Direct axis open circuit subtransient, T'' __________ seconds
   vii) Provide a plot of generator capability curve: (MW output vs MVAR)

Document Number: ____________________________  Rev. __________
☐ Attached  ☐ Separate Mailing

viii) Generator Inertia constant (on machine base), if available
       H =  ________ seconds (generator only)
       H =  __________________________  seconds (generator & turbine)

h. For Induction Units:
   i) Generation facility voltage (kV):
   ________________________________________________________________
   ii) Rated current (A):
   ________________________________________________________________
   iii) Rated power factor of generating unit (s): ___________________ p.u.
   iv) Power factor operating range. (Specify lag or lead): from p.u. to p.u.
   v) Unsaturated reactances on: kVA base, p.u.  kV base
      Direct axis synchronous reactance, Xd  __________  p.u.
vi) Time Constants:

Direct axis open circuit transient, \( T' \) seconds

Direct axis open circuit subtransient, \( T'' \) seconds

vii) Actual power factor at PCC (after p.f. correction):

Full output: \( \quad \text{p.u.} \)

No output: \( \quad \text{p.u.} \)

viii) Generator reactive power requirements:

Full output: \( \quad \text{kVAR} \)

No output: \( \quad \text{kVAR} \)

ix) Total power factor correction installed: \( \quad \text{kVAR} \)

Number of regulating steps: \\

Power factor correction switched per step: \( \quad \text{kVAR} \)

Power factor correction capacitors are automatically switched off when generator breaker open:

\( \square \text{Yes} \quad \square \text{No} \)

x) Maximum starting inrush current (multiple of full load current): \( \quad \text{p.u.} \)

xi) Generator Inertia constant (on machine base), if available

\( H = \quad \text{seconds (generator only)} \)

\( H = \quad \text{seconds (generator & turbine)} \)

i. For SPC / Inverter type units:

i. Manufacturer / Type or Model No.: \\

ii. Inverter AC output voltage: \( \quad \text{Volts} \)

iii. Inverter AC output current: \( \quad \text{Amps} \)

iv. Number of phases: \( \square \text{One} \quad \square \text{Three} \)

v. Inverter output frequency: \( \quad \text{Hz} \)

vi. Type of inverter: 

\( \square \text{Self-Commutated} \quad \square \text{Line Commutated} \)

\( \square \text{Other (Please Specify):} \)
vii. Inverter rated power factor: %

viii. Inverter power factor adjustment range, if applicable (specify lag or lead):

from p.u. to p.u.

ix. Are power factor correction capacitors used? Yes No

x. If yes, total power factor correction installed: kVAR

xi. Number of capacitor steps:

xii. Are power factor correction capacitors automatically switched off when inverter breaker opens? Yes No

xiii. Is the inverter paralleling equipment and / or design pre-certified? Yes No

xiv. If yes, to which standard(s), e.g. CSA C22.2 No. 107.1-01, UL 1741:


xvi. Modelling parameters recommended by SPC/Inverter/Converter Manufacturer.

Describe how your equipment should be modeled for load flow, voltage study and short circuit analysis.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

4. Interface (Step-Up) Transformer Characteristics:

a. Transformer rating: kVA

b. Manufacturer (if known):

c. Number of phases: Yes No

d. Nominal voltage of high voltage winding: kV

e. Nominal voltage of low voltage winding: kV

f. High voltage winding connection:

g. Grounding method of star connected high voltage winding neutral; if applicable

   Solid   Ungrounded   Impedance:   R   X   ohms

h. Low voltage winding connection:
i. Grounding method of star connected low voltage winding neutral; if applicable

- Solid  - Ungrounded  - Impedance:  R  X  ohms

j. Impedances on:  kVA base  kV base


**Note:**
(a) The term “High Voltage”, used above, refers to the connection voltage to Greater Sudbury Hydro’s distribution system, and “Low Voltage”, used above, refers to the generation or any other intermediate voltage.
(b) Studies will be conducted at nominal voltages (i.e. tap changer at neutral position)

5. Intermediate Transformer Characteristics (if applicable):

a. Transformer rating:  kVA

b. Manufacturer (if known):

c. Number of phases:  Yes  No

d. Nominal voltage of high voltage winding:

e. Nominal voltage of low voltage winding:

f. High voltage winding connection:

g. Grounding method of star connected high voltage winding neutral; if applicable

- Solid  - Ungrounded  - Impedance:  R  X  ohms

h. Low voltage winding connection:

i. Grounding method of star connected low voltage winding neutral; if applicable

- Solid  - Ungrounded  - Impedance:  R  X  ohms

j. Impedances on:  kVA base  kV base


**Note:**
(a) The term “High Voltage”, used above, refers to the intermediate voltage that is input to the interface step-up transformer, and “Low Voltage”, used above, refers to the generation voltage.

6. Generating Facility Load Information

a. Maximum continuous load:

- Total:  kVA  kW

- Generator Auxiliary Load Only:  kVA  kW

b. Maximum start up load:

| Total: | kVA | kW |

| Generator Auxiliary Load Only: | kVA | kW |

| Largest motor size that would be started: | HP | kW |


e. For load displacement generators:

- Max. present load at Generator's facility: kVA kW

- Max. future load at Generator's facility (excluding Auxiliary Loads): kVA kW

- Indicate the means by which injection of power into Greater Sudbury Hydro's system will be prevented.

7. Operation Information:

- Mode of Operation: %

- Annual Capacity Factor: %

- Prospective number of annual scheduled starts / stops, and timing thereof:

8. Expected Monthly Generation, Consumption and Output From the Facility:

<table>
<thead>
<tr>
<th>Expected:</th>
<th>Total Generation (a)</th>
<th>Total Internal Consumption (b)</th>
<th>Total Output (To the LDC's Distribution System) (a-b)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kWh</td>
<td>Peak kW</td>
<td>kWh Peak kW</td>
</tr>
<tr>
<td>January</td>
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<td>December</td>
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</tbody>
</table>

* This value would be negative when the generators are not in operation or when the internal consumption exceeds generation.
9. **Protection Design, Philosophy and Logic**

Either at the CIA stage or the design review stage it will be necessary to determine the protection philosophy, co-ordination and trip logic. If it is available now please provide it. If it is not, it can be deferred and submitted if the project goes ahead. Please do not feel inhibited by the space provided here. Use as much space and as many additional sheets as are required to describe how the Generator protection will deal with faults, outages, disturbances or other events on the distribution system and for the generator itself.

<table>
<thead>
<tr>
<th>Protective Device</th>
<th>Range of Available Settings</th>
<th>Trip Time</th>
<th>Trip Set Point</th>
<th>Describe operation for disconnecting the generator or inverter in the event of a distribution system outage</th>
<th>Describe operation for disconnecting the generator or inverter in the event of a distribution system short circuit (three phase and single phase to ground)</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 Phase Undervoltage Instantaneous</td>
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<tr>
<td>27 Phase Undervoltage</td>
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<tr>
<td>50 Phase Instantaneous Overcurrent</td>
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<td>50Gground Instantaneous Overcurrent</td>
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<td>51 Phase Time Overcurrent</td>
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<td>51G Ground Time Overcurrent</td>
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<td>59 Phase Overvoltage Instantaneous</td>
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<td>59 Phase Overvoltage</td>
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<td>81 Under Frequency</td>
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<td>87 Transformer Differential</td>
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<td>Other</td>
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</table>
10. Other Comments, Specifications and Exceptions (attach additional sheets if needed)


11. Applicant and Project Design / Engineering Signature

To the best of my knowledge, all the information provided in this Application Form is complete and correct.

Applicant Signature Date

Project Design / Engineering Date

* Return this form to the LDC.