Distributed Generation Handbook

CornerstonE
Hydro Electric Concepts

Guidelines For Applicants Connecting
Distributed Generation to Member LDCs of
Cornerstone Hydro Electric Concepts Association Inc.

Cornerstone Hydro Electric Concepts (CHEC)

The CHEC Group is an association of twelve electricity distribution utilities modeled after a cooperative to share resources and proficiencies as the Ontario electricity industry continues its transformation. Previously known as the Organized Power Group, the CHEC group remains a collective alliance focused on maximizing value for investment by combining resources and competencies while simultaneously maintaining the high standards of locally supplied service our customers have come to expect.

The mission of the CHEC Group is, "to be recognized as the premier LDC Cooperative in the province, by meeting or exceeding member expectations through the sharing of services, opportunities, knowledge and resources."

The values of the CHEC Group include the sharing of resources, both intellectual and technical, enabling members to deliver value to their customers and shareholders ensuring competitiveness in the marketplace.

The current member Utilities of the CHEC group are:

Centre Wellington Hydro Ltd.	**Collus Power Corp**	**Innisfil Hydro Distribution Systems Ltd.**
Lakefront Utilities Inc.	**Lakeland Power Distribution Ltd.**	**Midland Power Utility Corporation**
Orangeville Hydro Ltd.	**Parry Sound Power Corporation**	**Rideau St. Lawrence Distribution Inc.**
Wasaga Distribution Inc.	**Wellington North Power Inc.**	**West Coast Huron Energy Inc.**

The non-CHEC participant(s) in this guide are:

Brant County Power Inc.

This document was prepared for the CHEC group by Rodan Energy and Metering Solutions Inc. For additional information about this document, please contact:

Rodan Energy Solutions Inc.
165 Matheson Blvd. East, Suite 6
Mississauga, ON, Canada L4Z 3K2

Tel: (905) 625-9900
Fax: (905) 625-4307
Email: info@rodanpower.com
www.rodanenergy.com

Welcome Message

Welcome to the 2010 Edition of the CHEC Guidelines for Applicants Connecting Distributed Generation.

This is the second edition of the CHEC Generation Guideline for Connecting Distributed Generation to LDC systems. Much of the information in the first Guideline has been maintained in this the second version. With the advent of feed in tariffs and the higher awareness of distributed generation, an update to the Guideline was deemed appropriate to re-establish the information in the new context.

The main body of the Guideline contains information which will remain consistent over time, information such as the technical requirements. The information which is more likely to change has been included in appendices, which will facilitate timely up-dates as required. Such items as special rates for feed in tariff programs, processes and document flow have been included in the appendices, along with the most recent versions of the application forms.

The Guideline has proven useful to distributed generation proponents in the past. The new format will help to ensure continued relevance of the Guideline moving forward. For potential applicants we trust the Guideline will provide you with basic information to assist you with your project and completing applications to CHEC LDCs for connection.

CHEC members look forward to your involvement in distributed generation and encourage you to make early contact with the LDCs where you are planning to connect your project. In addition to the Guideline the LDC contacts listed in this Guideline (see Appendix) are available to assist you.

Respectfully
Gord Eamer, P.Eng.
CHEC Chief Operating Officer

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Introduction

The mission of CHEC Local Distribution Companies (LDCs) is to provide safe, reliable, efficient delivery of electricity within their LDC's service area while being accountable to their shareholder, usually the Council and citizens of the municipality.

CHEC LDCs are committed to providing information, advice and direction to Generators who wish to connect to the LDC's electricity distribution system.

This guide contains an overview of the Ontario electricity transmission system, typical LDC Hydro distribution systems and safety, power quality, protection and other technical issues related to new generation.

This guide has two goals:

1. To provide the technical requirements of connecting distributed generation to an LDC's distribution system

2. To outline the necessary administrative procedures.

Distributed generation is any type of electrical generator or static inverter producing alternating current that has the capability of Parallel Operation with the LDC distribution system, or is designed to operate separately from the LDC system and can supply a load that can also be fed by the LDC system.

The Ontario government's policy on purchase of electricity through Feed-in-Tarrifs (FIT) and microFIT (formerly Standard Offer Program (SOP)) contracts creates an opportunity for a significant increase in the interest and presence of distributed generation throughout the province.

Although some distributed generation is intended to provide electricity solely for a customer's own use, such as stand-by or load displacement generation, this guide also covers the emerging role of distributed generation in supplying Ontario's generation needs through the sale of some or all of the electricity generated by exporting it through the LDC's electricity distribution system.

Distributed generation also varies in design and fuels from diesel or natural gas standby generators to natural gas co-generation to wind turbines, photo voltaic cells, bio gas and hydro electric generation. A further variable is size, from very small (micro) wind and photo voltaic units in the under 10 kilowatt (kW) range to generation in the multi megawatt (MW) range.

Due to the variability, size and complexity of each generation project, this guide provides only general information on connecting to an LDC's distribution system.

In this introductory guide we have kept the content at a fairly high level providing references to enable access to more specific details. We have used plain language and simple examples to illustrate the points.

The Ontario Electricity Transmission & Distribution System

In general, Ontario's electricity system consists of large centrally located generating stations linked by high voltage transmission lines over long distances at 500 kV, 230 kV and 115 kV. As the electricity is moved around the province the voltage is reduced as the electricity gets closer to the point of end use. Transformer stations reduce the voltage to 44 kV and 27.6 kV lines which transfer the electricity to distribution stations that reduce voltage again down to as low as 4 kV for routing electricity around streets.

It is likely that the location for distributed generation will be at the lower voltage levels and the ability of the distribution network to accommodate the distributed generation will depend on the "Maximum Fault Level" of the network at that point and the normal loads that it supplies. The maximum fault level must be maintained within the limits set by the Transmission System Code (TSC) and the interconnection of Distributed Generation (DG) Facilities shall not cause these limits to be exceeded. In Transmission System Code, the level of fault current is defined as "fault level".

The fault current is how much current that will flow when there is a fault on a network. The fault level at the end of a long electricity circuit is much lower than when it is closer to the upstream supply. At a low fault level site, the impact of the distributed generation can be great enough to disturb other local consumers. For this reason, it is sometimes necessary to reinforce the network, or connect the distributed generation to a higher voltage or stronger part of the network.

LDC distribution systems operate at 44 kV, 27.6 kV, 12.5 kV, 8 kV and 4 kV. The voltages for CHEC LDCs are listed in Appendix 11. As a general rule the voltage levels may have capacity for the maximum following amounts of distributed generation.

- 44 kV possibly between 15 MW and 30 MW
- 27.6 kV possibly between 6 MW and 15 MW
- 12.5 kV possibly between 3 MW to 5 MW
- 8 kV possibly between 1 MW and 3 MW
- 4 kV possibly between 500 kW and 1 MW

The above examples assume the presence of three-phase lines with adequate conductor size and common load levels. LDCs also have many single-phase lines which would only be suitable for the smallest distributed generation without upgrade. The actual capacity of LDC lines to accept distributed generation can only be determined by an engineering review.

The necessary protection systems to protect an LDC's distribution system from events that can occur with distributed generation connected will also vary by generation size and type of generation as well as distribution line characteristics. Therefore, similar units connected at

different locations could have different protection requirements based on varying load conditions, as well as on the LDC's Hydro One feeder supply and transformer characteristics.

Depending on the size, type, fuel, and location of generation facilities, the Ministry of the Environment (MOE) may require that the customer carry out an environmental assessment. The MOE should be contacted for specific information on this requirement.

Basic maps of the LDC distribution system are available upon request to assist a potential Generator to determine the approximate capacity of an LDC line in the area of interest for generation location. Once a proponent has identified a suitable host or property for a potential generation facility the local Utility should be contacted for a high level discussion relating to the ability of the infrastructure to support a DG connection of the type and size anticipated.

The local utility's Conditions of Service also contains specific information with respect to requirements with respect to connection of distributed generation and should be referred to. The link to the Conditions of Service can be found in the addendum of Useful Links.

Distinctions between Types of Distributed Generation

There are a number of distinct types of generators as far as the distribution system is concerned. These types include: (a) solid-state or static inverters, (b) induction machines, and (c) synchronous machines.

Many smaller renewable energy systems produce grid quality AC power through an inverter and are therefore typically grouped together.

Induction and synchronous generators, on the other hand, are generally grouped together as “rotating machines,” but their different configurations do give them different start-up and operational characteristics. For example, induction machines cannot operate in standalone mode and generally require the presence of the grid for rotor excitation and normally have a lagging power factor. Synchronous machines on the other hand can operate without the grid and can have a zero or leading power factor.

As a practical matter, it is much more difficult for inverter-based generators to power an electrically isolated portion of the utility system (islanding) and inverters can feed far less current into a fault. This means that inverter-based and rotating generators are treated differently in the codes and standards, with very small inverter-based devices requiring little – if any – additional protection equipment. However, considering the worst case scenario, the LDCs will disconnect the generator in order to prevent equipment damage and eliminate safety hazards when an island is formed. An accessible and visible disconnect device is necessary to minimize trouble for both the LDCs and Distributed Generators.

The equipment purchased may be subject to approval or require significant protection systems to be installed to limit any impact on the distribution system. The requirements of the LDC should be confirmed prior to purchasing equipment. For instance, there are two distinct types of Inverters available on the market. One type of inverter is generally referred to as a "Grid Dependant" Inverter, while the other is a basic Inverter system that merely converts DC to AC power for local use like a Cottage or Off-Grid. The operation modes, protection devices and control schemes of these two inverters are significantly different. For a long term operation, over decades, consulting with LDCs before purchasing new or replacement equipment is suggested.

Safety, Power Quality & Protection

As part of the interconnection process, safety, power quality, and system reliability are the primary utility concerns and responsibilities. Reference materials that determine the requirements for these interconnections have been prepared by a number of bodies and agencies including the Ontario Energy Board (OEB), Institute of Electrical and Electronics Engineers (IEEE), Canadian Standards Association (CSA) and the Electrical Safety Authority (ESA). This section therefore addresses safety and technical issues in general terms and how to streamline the interconnection process. The purpose of this section is to provide background and rationale, without going into great technical detail.

The OEB's Distribution System Code (DSC) Appendix F outlines the technical requirements for connecting a generator to an electricity distributor's system. We have identified specific sections of Appendix F as they relate to safety, power quality and protection.

Refer to the OEB website for more details on the Distribution System Code (DSC) [See Appendix "Useful Links"].

Safety

Like any source of electricity, distributed generation systems have the potential to be dangerous to both people and property, and require protection devices to protect the distribution system, utility workers, utility customers and the general public. Large industrial customers have been generating power on-site for many years, but interconnecting photo voltaic, wind turbines, co-generation, micro-turbines, and other relatively small generation systems to operate in parallel with the grid at residential and commercial locations is an increasing recent trend. Utilities are concerned with generators supplying energy to one of their lines that is otherwise thought to be de-energized. This is known as islanding.

Islanding

One of the most important issues for distributed generation is to avoid a condition known as islanding. Islanding is a situation where a portion of the utility system that contains both loads and a distributed generation source becomes separated from the remainder of the utility system but remains energized.

The primary concern is a situation where a fault occurs on the distribution system and automatic isolation of a utility protective device occurs. Since automatic reclosing is normally used on distribution systems to clear temporary faults it is essential that the distributed generation disconnects from the distribution system before the first automatic reclose occurs. The concern is that if the distributed generation does not disconnect fast enough: a) the distributed generation may feed the fault; and b) when the utility protective device(s) tries to reclose, it will be closing back in on a line that is being supplied by distributed generation resulting in possible equipment damage, overloading or power quality issues.

Historically with central generation and transmission, an LDC could be sure that if an electrical circuit was isolated "upstream", and was not being fed from an alternative source, that it was de-energized.

The LDC may want to isolate the section of line for maintenance purposes and would normally accomplish this by opening switches. While a utility can be sure that all of its own electricity sources are either shut down or isolated from the area that needs work, they must now factor in distributed generation to ensure that it too is isolated and not supplying the line section.

Distributed generation creates a source of energy inputs to the utility system that the LDC does not control. If the distributed generation is potentially capable of islanding it can backfeed electricity to the LDC's distribution system. Protection schemes will be required to avoid these situations.

Grounding

Distributed generators must be grounded in accordance with equipment manufacturers, the Ontario Electrical Safety Code (OESC) and LDC requirements.

The distributed generation must not disrupt any coordination of ground fault protection or cause over-voltages that exceed the rating of equipment connected to the LDC distribution system.

Power Quality

Power quality is another significant technical concern for utilities and customer-generators. Utility power is consistently supplied at a standard voltage and frequency. In North America, residences receive single-phase alternating current (AC) power at 120/240 Volts at 60 cycles per second (60 Hz), and commercial buildings typically receive either 120/240 Volts single phase or three-phase power depending on the size of the building and the types of loads in the building.

Power quality is important because electronic devices and appliances have been designed to receive power at or near rated voltage and frequency standards. Deviations may cause equipment and appliance malfunction or damage. Additional power quality considerations include harmonics, power factor, Direct Current (DC) injection, and voltage flicker.

Each type of distributed generation device has its own output characteristics based on its technology therefore some will have more power quality issues than others.

Ref: OEB DSC, Appendix F, Section 10

Short Circuit and Capacity to Connect Generation

A short circuit analysis is utilized to determine the system response to faults. The transformer station (TS) source has a short circuit fault capacity, and it is necessary to determine whether the TS can accept generation.

LDCs are to post the capacity to connect generation on their websites as part of the reporting requirements. They also are to note information with respect to projects which have received contracts to connect on their system. A generation proponent can review the web sites of Hydro One and LDCs for information on the amount of generation capacity that can be connected to a specific Transformer Station. A generation proponent should also contact the Local Utility for additional information on available capacity on the specific feeder lines that would be servicing the proposed site. Note that the actual capacity can only be determined by completing a Connection Impact Assessment.

Voltage Fluctuations and Voltage Regulation

Voltage fluctuations can result from a distributed generator connecting to or disconnecting from the utility system or because of its generation operating characteristics. The standards set certain limits which must be achieved for events that occur within the distributed generation's operating cycle. Whether the utility actively or passively regulates their voltages to maintain an acceptable range, the presence of a distributed generation should have no detrimental impact on that regulation. The distributed generation must not try to regulate the voltage and frequency on the utility line but instead must follow the utility voltage and frequency and disconnect for any abnormality.

Ref: OEB DSC, Appendix F, Section 3

Voltage Unbalance

Utilities try to operate their three phase lines with voltages in the three phases balanced as closely as possible. The presence of a distributed generator should not contribute to additional voltage unbalance.

Ref: OEB DSC, Appendix F, Section 3.2

Frequency

As with voltage fluctuations frequency variations are a reliability and power quality issue. Distributed generation shall operate within the range of 59.3 to 60.5 Hz.

Ref: OEB DSC, Appendix F, Section 6.5

Harmonics

Harmonics generically refer to distortions in the voltage and current waveforms caused by the overlapping of the standard sinusoidal waveforms at 60 hertz (Hz) with waves at other frequencies that are other multiples of 60 Hz. Harmonics can be caused by the electronic equipment used in some distributed generators such as soft start units and inverters.

Harmonics can cause equipment to fail or overheat and to degrade the service of other customers. Distributed generators must not impose harmonic distortions on the LDC's distribution system in excess of applicable standards.

Ref: OEB DSC, Appendix F, Section 10.2

Power Factor

Power factor is a measure of apparent power delivered when the voltage and current waveforms are out of synch. Power factor is the ratio of true electric power, as measured in kilowatts (kW), to the apparent power, as measured in kilovolt-amperes (kVA). The power factor can range from a worst case of zero when the current and voltage are completely out of synch to the optimal value of 100% when the current and voltage are entirely in synch. The terms "leading" and "lagging" refer to whether the current wave is ahead of or behind the voltage wave and are a contributor to the efficiency or inefficiency of the utility's electrical system. Distributed generators connected to the distribution system must operate in the range 0.9 lagging to 0.95 leading power factor.

Ref: OEB DSC, Appendix F, Section 4

DC Injection

DC Injection is a potential issue for inverters where an inverter passes unwanted DC current into the AC or output side. This can be prevented by the incorporation of equipment and design to prevent or limit the effect.

Ref: OEB DSC, Appendix F, Section 10.3

Voltage Flicker

Somewhat like voltage fluctuations, voltage flicker refers to short-lived spikes or dips in the line voltage that are noticeable to the eye and annoying. It can occur when the outputs from a distributed generator vary for example with some wind turbines if the wind is gusting or turbulent.

Ref: OEB DSC, Appendix F, Section 10.1

Protection of Distributed Generation Facility

The distributed generation developer will be responsible for protecting its distributed generation facility equipment in such a manner that distribution system faults - such as outages, short circuits, automatic reclosing of distribution circuits, or other disturbances - do not damage the distributed generation facility equipment. The equipment protection shall also prevent the distributed generation facility from adversely affecting the distribution system's capability of providing reliable service to other customers.

Ref: OEB DSC, Appendix F, Section 10.4

Monitoring

For distributed generation greater than 250 kW the LDC will require remote monitoring of the distributed generation connection status, real power output, reactive power output and voltage at the point of generator connection. For distributed generation greater than 10 MW the monitoring must be in real time.

Ref: OEB DSC, Appendix F, Section 9

Standardized or Certified Equipment

The design for a distributed generation installation is required to be approved by a Professional Engineer (P.Eng.) if the generation capacity is greater than 10 kW. All equipment should be CSA approved and inspected by the ESA regardless of generation capacity. However, if the interface equipment used is a standard package or certified for use (by UL or CSA† or some other recognized approving body), as is the case with some inverters, this will expedite and simplify the interconnection process. This is especially applicable at the lower distributed generation output levels and will reduce the amount of technical information required.

The safety, power quality and reliability of interconnected distributed generations is ensured through design, standards, inspection, testing and the provision of switches, breakers and protective relaying incorporated into the distributed generation or as auxiliary equipment. A brief summary is as follows:

- Isolation at the Point of Connection. Ref OEB DSC Appendix F, Section 1
- Interconnection Grounding. Ref OEB DSC Appendix F, Section 2
- A generator disconnect device. Ref OEB DSC Appendix F, Section 1
- Anti islanding protection. Ref OEB DSC Appendix F, Section 6.1.2
- A protective relay that will operate the load interruption device with the following features
- Over-voltage trip. Ref OEB DSC Appendix F, Section 6.5
- Under-voltage trip. Ref OEB DSC Appendix F, Section 6.5
- Over/underfrequency trip. Ref OEB DSC Appendix F, Section 6.5
- Over current protection. Ref OEB DSC Appendix F, Section 6.4
- Ground fault protection. Ref OEB DSC Appendix F, Section 2
- Reclosing co-ordination to ensure that the distributed generation ceases to energize prior to the reclosure of an upstream LDC device. Ref DSC F.2, Section 6
- Power Factor correction (if required). Ref DSC F.2, Section 4
- Synchronizing equipment that will limit voltage fluctuation, frequency variation and phase angle when the distributed generation parallels with the distribution system. Ref DSC F.2, Section 3.2

† After, January 1st, 2011 inverters are required to be certified to CSA standard C22.2 #107.1 and bear a certification mark recognized in Ontario.

- Transfer Trip may be required depending on the loading of the distribution feeder and the output rating of the distributed generation relative to the feeder loading.
- Feeder Relay Directioning to prevent inadvertent tripping of a protective device for faults not associated with the protection zone of the device.

The LDC will provide three phase fault levels at the Connection Impact Assessment (CIA) stage. A protection co-ordination study will be required which may involve alternate supplies from different sources. Protection design and ratings should account for these variables.

ESA Electrical Guidelines

Any system that produces even small amounts of electricity can be potentially dangerous, creating the possibility of electrocution and fire hazards. Improperly installed systems will create serious safety hazards to property owners, their friends, family, employees and local electrical distribution company workers.

Before installing any type of distributed generation, whether it is stand-alone or connected to the grid, it is important to understand the safety requirements. The safety regulations, codes and the associated safety technical standards can be confusing and difficult to understand. The guidelines provided are intended to simplify and provide basic advice to home, farm and business owners who are considering the installation of distributed generation systems.

Notice: Inverters Approval

In the previous edition of the guideline for inverter-based micro-generating facility 10 kW and smaller (ESA SPEC-004), inverters certified to Underwriters Laboratories (UL) standard, UL1741, were accepted because of the limited availability of inverters certified to the CSA standard. As inverters certified to CSA standard are now widely available, inverters certified only to UL standard, UL1741 will not be accepted as of January 1st 2011. **After, January 1st, 2011 inverters are required to be certified to CSA standard C22.2 #107.1 and bear a certification mark recognized in Ontario.** Field Evaluation shall not be accepted for utility-interconnected inverters. Inverters marked as "UTILITY-INTERCONNECTED" or equivalent shall only bear a certification mark, not a field evaluation mark.

Applying for an Electrical Inspection

Before your solar, wind or other renewable energy generator can be connected to the electrical system it must be inspected and approved by the Electrical Safety Authority (ESA). The OESC requires an application for Inspection to be submitted by the contractor doing the work. ESA recommends that all electrical work be done by a qualified electrical contractor/electrician. Installing an alternative generation system is beyond the ability of most do-it-yourself projects.

Once the installation is complete and meets the requirements of the OESC a connection authorization will be sent by the ESA to the Local Distribution Company.

Further information on the ESA can be found in the Appendix “Electrical Guidelines for Inverter-Based Micro-Generating Facility” (April 2010).

How to Arrange for an Electrical Inspection

According to the ESA website, an electrical inspection is required for any new electrical installation. Homeowners should not take out an application on behalf of a contractor.

Homeowners who are doing their own electrical installations should contact the Electrical Safety Authority at **1-877-372-7233** to arrange for an electrical inspection. These arrangements should be made up to 48 hours after the commencement of work.

Preliminary Review, Technical Review, Impact Assessment

Preliminary Review

In the very early stages where a Generator may be considering site selection, the LDC will provide a preliminary review and high level advice and guidance based on limited parameters such as:

- Potential sites
- Output capacity of distributed generation
- Fuel type
- Generator generic description and design type

Technical Review

The technical review will establish the LDCs' requirements for the distributed generation at the specific location and determine the need for a Connection Impact Assessment. For generation projects greater than 10 kW, the technical review will require the distributed generation developer to provide the following details of the project certified by a licensed professional engineer:

Distributed Generation Description

- Site
- Type of distributed generation
- Output including seasonal and daily variations
- Number of units initially and ultimately, if future expansion is applicable
- Time line for construction and commissioning

Single Line Electrical Diagrams (with ratings or sizes detailing)

- Point of connection to the distribution system
- Generator
- Generator disconnect device
- Protective relaying and functions
- Transformer
- Protective isolating device
- Generator breaker
- Manual interconnection disconnection device
- Voltage levels

- Fusing

Nameplate data or manufacturers specs on:

- Protective relays
- Synchronizing device
- Fault calculations, protective relay settings, fuse specification
- Short circuit and voltage drop studies
- Station service and battery system
- Grounding studies
- Load interrupter switch or circuit breaker
- Dedicated interconnection transformer
- Isolating device for interconnection
- Protection system and operating procedures including schematics

LDC Impact Assessment

Where required, the LDC will perform an impact assessment and advise the Generator of compliance and permission to proceed or of problems that need to be addressed. The Generator should not order any equipment or make commitments to the project until the impact assessment has been satisfactorily completed and a Distribution Connection Agreement has been executed.

Hydro One Impact Assessment

Distributed generation greater than 10 kW connected to an LDC's distribution system may have an impact on Hydro One's electrical supply system and will require their separate impact assessment. The generator is to make application and pay the appropriate fees to the LDC and the LDC will request the impact assessment from Hydro One.

Costs

The Generator will be required to pay the LDC for processing and reviewing any application, technical review and impact assessment. The cost may vary from a fixed fee approved by the OEB to actual costs for time required. Check with your LDC for details.

In addition your LDC will add any costs incurred for reviews or assessments required by Hydro One.

The LDC will charge actual costs for labour and materials for any distribution system upgrades or line extensions required including but not limited to increased transformer capacity

requirement, primary or secondary conductor, line extensions, switches and associated distribution hardware.

Where the distributed generation is used for load displacement of existing load, a standby charge may be applicable as approved by the OEB.

Production and Commissioning Tests

The Generator will be required to pay the costs related to production and commissioning tests if these tests are required.

Generation Connection Matrices

The various permutations and combinations have been summarized in the Appendices. The data is believed to be accurate however reader are cautioned that the information contained in these matrices are the CHEC LDC's interpretation of rules and regulations that are in existence. Distributed generators should confirm applicability and eligibility in their own circumstances.

Metering

Metering requirements such as metering arrangement and instrument transformer requirements will be determined by the LDC. The determination by the LDC will depend on the type and size of generation and the load, if any, where the distributed generator is also a customer, at the distributed generation location. The LDC may or may not supply the instrument transformers. However, the instrument transforms will be at the cost of the generator. The LDC will supply the meter at the cost of the generator except for wholesale market participants where the generator supplies the metering.

Where the distributed generator is exporting power, a bi-directional meter capable of measuring electricity received from and sent to the distribution system is required. All metering cabinets, instrument transformers, meters and if necessary a means of telecommunication will be supplied by the Generator and owned by the LDC. The LDC will specify the method of communication to the meters.

The metering shall be installed at the Demarcation Point of connection of the Distributed Generation Facility to the Distribution System. The point of demarcation for a Distributed Generation Facility is the primary live line clamp or lines switch that is installed on or at the LDC's Distribution line. If this is not practical, the LDC shall apply loss factors to the generation output in accordance with the loss factors applied for Retail Settlements and billing. Appendix 9 shows the metering location and configuration options under the microFIT program.

Larger Generators have the right to participate in the Independent Electricity System Operator (IESO)-controlled wholesale market for settlements. Participants in the wholesale market must meet the requirements as specified in Chapter 6 Wholesale Metering of the IESO Market Rules. In general, the metering requirements for wholesale market participants are more stringent that those required for LDC retail revenue purposes. In both wholesale and retail markets, all meters and instrument transformers must be Measurement Canada approved and connected in accordance with Measurement Canada and OEB policies and procedures. However, in the wholesale market, the IESO requires that market participants engage the services of a Meter Service Provider (MSP) to install and maintain the metering system. In addition, the IESO specifies the number and types of meters that must be used for revenue purposes and requires the submission of an emergency instrument transformer restoration plan.

In 2005, the IESO revised the Market Rules to include relaxed polices for embedded generation facilities under 2 MVA or injecting less than 17 GWh per annum. These relaxed rules allow for the installation of a single meter only and no requirement to submit an emergency instrument transformer restoration plan.

To qualify under the FIT program, the generator is to be metered separately from the load customer. This requires the installation of an additional meter at the site. Metering configuration also needs to ensure that load cannot be added on the generator service that would not be properly metered. As such bi-directional metering will be required to capture any potential load consumption.

The location of the generator meter should follow existing meter installation requirements. The meter should be accessible to the LDC staff, and an external lockable disconnect switch at the metering location should be provided by the customer for use by the LDC. The disconnect switch is required to allow the LDC to remove a potential source of energy from the distribution system for system and worker safety. No battery systems are allowed on the "upstream" of the generator meter.

Refer to Appendix 9 for the different metering configurations.

Note: Measurement Canada stated that it "will not recognize or support" the in-series metering configuration. This is primarily because there could be an unacceptable level of error that results when two meters are used to measure electricity consumed by a load customer.

The OPA is working with the Ontario Energy Board and several local distribution companies to develop a rationale for the significance of the planned Measurement Canada prohibition on series connections.

Until a resolution has been reached, local distribution companies may choose not to connect projects in series. Project developers are encouraged to connect projects in parallel wherever possible.

Approvals

Before any distributed generation can be connected to the LDC's distribution system it must have received as a minimum the following approvals plus any additional approvals identified by the LDC and Hydro One:

- LDC Distribution Connection Agreement
- CSA or UL (**as of January 1, 2011** – UL only will not be accepted or recognized) certification of all equipment installed
- ESA approval

Appendices

Appendix 1: (a) Definitions

Appendix 1: (b) Who's Who in Ontario Electricity

Appendix 2: FIT and MicroFIT

Appendix 3: (a) Interconnection Matrices (Summary Load Displacement Generation)

Appendix 3: (b) Interconnection Matrices (Summary Feed-in Tariff Program)

Appendix 4: MicroFIT Application to Connect

Appendix 5: FIT Initial Feasibility Assessment Application (Form A)

Appendix 6: FIT Connection Impact Assessment Application (Form B)

Appendix 7: ESA Electrical Guidelines for Inverter-Based Micro-Generating Facility

Appendix 8: OEB Application for an Electricity Generation Licence

Appendix 9: FIT and MicroFIT Metering Options

Appendix 10: Hydroelectric Contract Initiative (HCI)

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Appendix 13: Useful Links

Appendix 1

(a) Definitions

(b) Who’s Who in Ontario Electricity

APPENDIX 1 (a)

Definitions

Applicant — The legally responsible person applying to an LDC to interconnect a distributed generation facility to the LDC's distribution system

Application Review — A review by the LDC of the completed standard interconnection application form for interconnection, to determine if an engineering review or distribution system study is needed

Back-up Power — Electric energy or capacity supplied by an LDC to replace energy ordinarily generated by distributed generation facility equipment during an unscheduled outage of the distribution system

Certified Equipment — A generating, control or protective system that has been certified by a nationally recognized testing laboratory (NRTL) as meeting acceptable safety and reliability standards

Commissioning Test — The initial process of documenting and verifying the performance of a distributed generation facility so that it operates in conformity with the design specifications

Customer — Any person who is receiving electric service from an LDC's distribution system

Designated Point of Contact — Each LDC shall designate one point of contact for all customer inquiries related to distributed generation facilities and from which interested parties can obtain a copy of interconnection guidelines - which include the appropriate application forms and interconnection agreements

Distributed Generation (DG) Facility — A facility for the generation of electricity with a capacity of no more than 15 megawatts that is located near the point where the electricity will be used or is in a location that will support the functioning of the electric power distribution grid

Distributed Generation Developer — same as Applicant

Distribution Feeder/Line — An electric line from an LDC substation or other supply point to customers that is operated at 50 kV or less, or as determined by the LDC

Distribution Substation — A facility that reduces the voltage of the electricity supply from sub transmission voltages less than 50 kV to even lower distribution voltages less than 50 kV

Distribution System — All electrical wires, equipment, and other facilities owned or provided by an LDC that are normally operated at 50 kV or less

Distribution System Code — A code issued by the Ontario Energy Board that prescribes the requirements for local distribution companies and customers who are served by the distribution system.

Distribution System Study — A study to determine if a distribution system upgrade is needed to accommodate the proposed distributed generation facility and to determine the cost of any such upgrade

Engineering Review — A study that may be undertaken by an LDC, in response to its receipt of a completed standard application form for interconnection, to determine the suitability of the installation

ESA – Electrical Safety Authority

ESC – Electrical Safety Code

Fault — An equipment failure, conductor failure, short circuit, or other condition resulting from abnormally high amounts of current from the power source

FIT Program – Feed-in Tariff Program, which was enabled by the Green Energy Act, 2009 and implemented by the Ontario Power Authority

FIT and microFIT – FIT Program is divided into two streams: FIT and microFIT. Renewable energy projects generating more than 10 kW of electricity should refer to FIT rules. Small renewable energy projects generating 10 kW or less of electricity should refer to microFIT rules.

Gross Nameplate Capacity – maximum power that generators can produce (Installed Capacity). Effective capacity refers to the expected contribution from generators. In case of renewable energy, the difference between nameplate capacity and effective capacity can be substantial.

HOEP — The Hourly Ontario Energy Price is an average of the market price set at each five-minute interval within that hour

IEEE — Institute of Electrical and Electronics Engineers

Impact Assessments — if warranted by the size, type location or other factors impact assessments may be required by an LDC and in some cases Hydro One where the distribution lines connect to Hydro One transformer stations

Independent Electricity System Operator (IESO) — An entity supervising the collective transmission facilities of a power region; the IESO is charged with nondiscriminatory coordination of market transactions, system-wide transmission operation, and network reliability

Interconnection — The physical connection of a distributed generation facility to the distribution system so that parallel operation can occur

Interconnection Agreement — a written set of operating procedures to specify how the distributed generator facility will interact with an LDC's distribution system and the responsibilities and accountabilities of the parties

Interconnection Disconnect Switch — A mechanical device used to disconnect a distributed generation facility from a distribution system. Also known as an isolation device

Inverter — A machine, device or system that converts direct current power to alternating current power

Islanding — A condition on the distribution system in which a distributed generation facility delivers power to customers using a portion of the distribution system that is electrically isolated from the remainder of the distribution system

kV – kilovolt (1000 volts)

kW – kilowatt (1000 watts)

Local Distribution Company — A local distribution company or LDC manages and operates the electricity distribution system and currently bills for electricity services at the retail level in Ontario.

MW – megawatt (1000 kW)

Material Modification – Any modification that changes the maximum electrical output of a distributed generation facility or changes the interconnection equipment, including:
a) Changing from certified to non-certified devices.
b) Replacing a component with a component of different functionality or Underwriters Laboratories listing.
c) Changes to the Interconnection Point

Nationally Recognized Testing Laboratory — Any testing laboratory recognized by the ESA, or CSA as having an approved equipment accreditation program

Net metering — An arrangement where distributed generation facilities can offset their associated load consumption and are compensated for any extra energy delivered to the electricity system. In Ontario, legislation permits distributed generation facilities using renewable resources with a capacity of 500 kW or less to be eligible for net metering

OEB — Ontario Energy Board

OPA – Ontario Power Authority

Parallel Operation — The operation, for a finite time, of a distributed generation facility while the facility is connected to the energized distribution system

Paralleling Equipment — The generating and protective equipment system that interfaces and synchronizes a distributed generation facility with the distribution system

Point of Common Coupling — The point where the electrical conductors of the distribution system are connected to the customer's conductors and where any transfer of electric power between the customer and the distribution system takes place

Point of Interconnection — The point where the distributed generation facility is electrically connected to the customer's electrical system

Preliminary Review — A review at the feasibility stage to determine the suitability of a distributed generation site and the LDC's facilities available for connection

Protective Function — A function of a distributed generation facility, carried out using hardware and software, designed to prevent unsafe operating conditions from occurring before, during, and after the interconnection to a distribution system

Short Circuit – a fault condition on transmission or distribution lines, which is normally caused by lightning. The high voltage between lines and ground establishes a fault current from lines to ground and, then, to the grounded neutral of a transformer or generator, thus completing the short circuit.

Supervisory Control and Data Acquisition (SCADA) — A system of remote control and telemetry used to monitor and control the electric system

Switchgear — Components for switching, protecting, monitoring and controlling electric power systems

Synchronize — The process of connecting two previously separated alternating current apparatuses after matching frequency, voltage, phase angles, etc. (e.g., paralleling a generator to the electric system)

Technical Review — a more comprehensive evaluation of the distributed generation proposal than the preliminary review to establish that the proposal and the equipment meet the technical guidelines for safety, power quality and reliability

Telemetry — The transmission of distributed generation operating data using telecommunications techniques

Transfer Switch — A switch designed so that it will disconnect the load from one power source and reconnect it to another source

Transformer Station — A facility that reduces the voltage of the electricity supply from transmission voltages greater than 50 kV to distribution voltages less than 50 kV.

Transfer Trip – A signal sent over communication channels from upstream devices commanding the Distribution Generator to disconnect for the Distribution System

APPENDIX 1 (b)

Who's Who in Ontario Electricity

Sometimes it's difficult to figure out who's who and what they do in Ontario's electricity system. Here's a brief overview:

The Ontario Government and the Ontario Ministry of Energy	• Establish public policy, pass legislation and regulations relating to electricity • Create other agencies IESO, OPA, OEB, etc., and establish raison d'etre for Hydro One, OPG and LDCs • Significant legislation: Electricity Act, 1998 and Regulations, Ontario Energy Board Act 1998, Electricity Restructuring Act 2004 • Shareholder of Hydro One and OPG
Ontario Ministry of Environment (MOE)	• The Ontario Ministry of Environment (MOE) sets environmental standards for electricity projects in Ontario and ensures that generators, distributors and transmitters follow rules and standards when constructing and operating facilities.
Ontario Energy Board (OEB)	• The Ontario Energy Board (OEB) is the province's electricity regulator and is responsible for protecting the interests of consumers with respect to prices, reliability, adequacy and quality of electricity service and to promote economic efficiency of generation, transmission and distribution. The OEB approves the rates charged by transmitters (greater than 50 kV) and distributors (less than 50 kV) and creates codes and regulations for certain aspects of how transmitters and distributors conduct their business. • The OEB issues licenses for generators, transmitters, distributors, and retailers. • The OEB does not set rates for generation; that is a competitive process either through the Hourly Ontario Energy Price or third party contracts, but it has set prices for small consumers.
Ontario Power Generation (OPG)	• Ontario Power Generation (OPG) owns and operates most of Ontario's generating capacity. It is owned by the Province of Ontario.

Hydro One Networks (HONI)	• Hydro One is the province's largest transmission company and owns the provincial transmission grid. Hydro One also distributes electricity outside of the major urban centres. It supplies LDCs from TSs at 27.6 kV and 44 kV or DSs at lower voltages. Some distributed generation connected to Hydro One TSs or DSs will require co-ordination with Hydro One. Hydro One is owned by the Province of Ontario.
Independent Electricity System Operator (IESO)	• The Independent Electricity System Operator (IESO) operates and manages Ontario's electricity system at the generation and transmission level. It does not design, build or own the system; it coordinates how the system interacts and performs and it monitors the performance, reliability and future adequacy of the system to provide electricity to Ontarians. The IESO creates electricity market rules, matches generation with load 24/7, establishes the Hourly Ontario Energy Price (HOEP) and settles wholesale electricity payments.
Ontario Power Authority (OPA)	• The Ontario Power Authority (OPA) is an agency of the government of Ontario. The OPA forecasts, plans and is responsible for bringing new resources onto the system in the medium and long term so that the IESO has adequate resources to manage. It can also be involved in demand management, conservation and renewable energy activities as directed by its mandate and government.
Electrical Safety Authority (ESA)	• The Electrical Safety Authority (ESA) is an agency of the Ministry of Consumer Services. The ESA is responsible for ensuring that electrical equipment is installed safely and meets required standards in accordance with the Ontario Electrical Safety Code.
Measurement Canada (MC)	• Measurement Canada (MC) is a federal agency of Industry Canada with the mandate of regulating meters and metering throughout the country. MC administers the Electricity and Gas Inspection Act. R.S. 1985, C.E-4.
Local Distribution Company (LDC)	• Your Local Distribution Company (LDC) maintains the local distribution system, provides a reliable source of electricity, connects local generation to grid and offers billing and customer service directly to you.

Appendix 2

FIT and MicroFIT

FIT and MicroFIT

Background

Ontario's Green Energy Act, which became law in May 2009, places a priority on expanding clean and renewable sources of energy. The Act's primary focus is the creation and integration of much more renewable energy into Ontario's provincial power mix.

The provincial standards administered by the Ministry of the Environment (MOE) for renewable projects are now outlined in a new approvals process, the Renewable Energy Approval (REA). REA combines previous requirements under the Environmental Assessment Act with clear provincial rules and standards in a new regulation under the Environmental Protection Act. The regulation became law on September 24, 2009. REA offers benefits to project applicants and local communities while continuing to ensure rigorous protection of the natural environment, cultural heritage and public health and safety.

Ontario's Feed-In Tariff or FIT Program was enabled by the Green Energy and Green Economy Act, 2009. The Ontario Power Authority (OPA) is responsible for implementing the program.

The FIT Program is divided into two streams – FIT and microFIT. Renewable energy projects generating more than 10 kW of electricity should refer to FIT rules. Small renewable energy projects generating 10 kW or less of electricity should refer to microFIT rules.

For more details on the FIT program, refer to the website of Ontario Power Authority (see Appendix "Useful Links").

Eligibility Requirements

MicroFIT

To be eligible for the MicroFIT Program, your project must:

- Be located in Ontario, at a location over which you have control
- Use one of the eligible renewable energy sources, which are biogas, biomass, landfill gas, on-shore or off-shore wind, solar PV and waterpower
- Be 10 kW or less in size
- Be connected, directly or indirectly, to the distribution system
- Be separately metered for data collection and settlement purposes
- Not be the subject of an existing OPA contract. For example, a project must not have a contract through the OPA's Renewable Energy Standard Offer Program (RESOP). There are options to allow certain projects with a RESOP contract to transition to the microFIT Program. These are outlined in the Transition Options on the OPA website.

FIT

To be eligible for the FIT Program, your project must:

- Be located in Ontario, at a location over which you have control
- Use one of the eligible renewable energy sources, which are biogas, biomass, landfill gas, on-shore or off-shore wind, solar PV and waterpower
- Be less than 50 megawatts (MW) if it is a waterpower project
- Be less than 10 MW if it is a solar PV ground-mounted project
- Be separately metered for data collection and settlement purposes
- Connect to an eligible local distribution system, host facility or the IESO-controlled grid
- Comply with the agricultural land restrictions, in the case of ground-mounted solar PV projects greater than 100 kW.
- Not be the subject of an existing OPA contract. For example, a project must not have a contract through the OPA's Renewable Energy Standard Offer Program (RESOP). There are options to allow certain projects with a RESOP contract to transition to the FIT Program. These are outlined in the Transition Options on the OPA website.

Domestic Content

The FIT contract requires wind projects greater than 10 kilowatts (kW) and all solar PV projects to include a minimum amount of goods and services that come from Ontario. You will be required to develop a plan that demonstrates how you intend to meet these domestic content requirements.

The minimum required amount of Ontario-based content will increase over time and is determined by the milestone date for commercial operation of your project, **not** the date that your project reaches commercial operation. Once you have declared commercial operation, you will be required to submit a domestic content report outlining how the requirements have been met.

MicroFIT†

Solar Projects 10 kW or less	
Minimum Domestic Content Level	Year of Commercial Operation
40 percent	Before December 31, 2010
60 percent	After January 1, 2011

†Refer to the OPA website for the latest updates on domestic content requirements.

FIT†

Wind Projects Over 10 kW	
Minimum Domestic Content Level	Year of Commercial Operation
25 percent	2009 to 2011
50 percent	2012 and later
Solar Projects Over 10 kW	
Minimum Domestic Content Level	Year of Commercial Operation
50 percent	2009 to 2010
60 percent	2011 and later

†Refer to the OPA website for the latest updates on domestic content requirements.

Capacity Allocation Exempt (CAE) Projects

Capacity Allocation Exempt (CAE) projects are generally small FIT projects connected to the distribution system. The Distribution System Code (DSC) defines these projects as:

⇒ Projects with no more than 250 kilowatts of rated generating capacity where the facility is connected to a less than 15 kV line

⇒ Projects of 500 kW or less of rated generating capacity where the facility is connected to a 15 kV or greater line.

It is important to note that Capacity Allocation Exempt status only provides a proponent a higher status in the queue for allocation of space on the grid. A Capacity Allocation Exempt facility must still apply and pay for a Connection Impact Assessment (CIA), a Connection Cost Assessment (CCA) as well as pay for the costs related to the connection. If the connection of a CAE facility were to displace a facility which has already been granted Capacity on the line, the LDC has the responsibility to contact the Ontario Energy Board before granting a connection offer.

The FIT Rules include provisions to ensure that CAE projects have a streamlined application and contract process:

- Application security is not required. However, completion and performance security is required;
- They proceed directly to a FIT contract after the application is complete. They are therefore not subject to the transmission and distribution availability tests, the economic connection test, the FIT production line or the FIT reserve;

- They are not subject to program launch criteria or commercial operation date acceleration days. These projects must meet the normal commercial operation deadlines of three years for solar, on-shore wind and bioenergy, four years for off-shore wind and five years for water;
- They must specify their connection point upon application so that they can proceed directly to contract;
- They are not required to rescind any impact assessment before submitting a FIT application. However, to qualify for the new Ontario Energy Board connection cost allocation rules - which allocate a greater share of connection costs to the local distribution company - they must rescind any impact assessments.

Hydro One Technical Requirements

Hydro One Networks Inc. (HONI) has developed a set of standard interface design requirements for Distributed Generation developments connecting to the Hydro One Networks distribution system. This document titled **"Distributed Generation Technical Interconnection Requirements Interconnections at Voltages 50kV and Below**", (referred to as "Technical Requirements"), provides both requirements and guidelines for an expeditious interconnection to Hydro One's distribution system that is both safe and reliable.

These requirements will apply to all generator installations on the Hydro One distribution system. Any DG facility larger than 250 kW shall be equipped with an isolation device, which provides a means of electrically isolating the DG facility for HONI's Distribution System, shall be motorized, and shall be monitored for Power Quality and so on (refer to "Technical Requirements" 2.1.7, 2.1.19, 2.5.4, 2.6.2, 2.6.3,2.6.4).

For more information on these "Technical Requirements", refer to the Hydro One website:

http://www.hydroone.com/ and search for "Distributed Generation Technical Interconnection Requirements".

Connection Process Overview

MicroFIT

Register for the microFIT Program and make an application to the OPA. Each application will be assigned a reference number. If your application meets the program eligibility requirements, the OPA will send you a "Conditional Offer of microFIT Contract" within 30 days. Once your application has been approved, contact your local distribution company to find out how to connect your project and be sure to provide them with your microFIT project reference number.

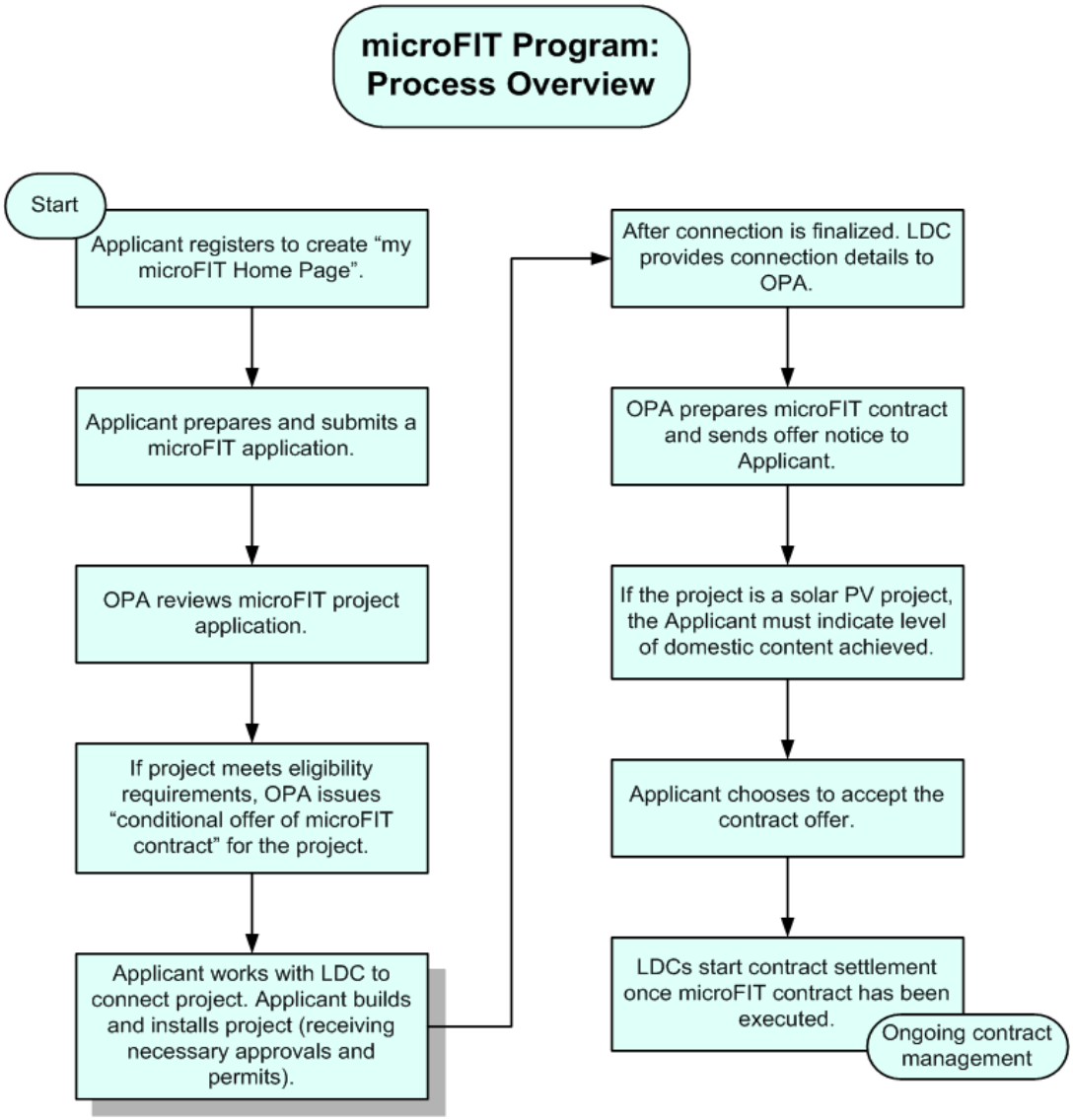
Your local distribution company will work with you to determine the best connection configuration for your project. It will also provide you with information about the costs

associated with connecting and metering your project and ongoing account charges. You can proceed to build your project.

The Electrical Safety Authority (ESA) will have to inspect your installation to ensure compliance to the Ontario Electrical Safety Code. Once you have completed your connection to the grid, your local distribution company will contact the OPA. The local distribution company will provide the OPA with information about your project so that the OPA can prepare and offer you a contract.

For more information on connecting your MicroFIT project, refer to the OPA website: http://www.powerauthority.on.ca/ and click on the Feed-in-Tariff link.

MicroFIT Process Flowchart



Typical Costs to Connect

The cost values below may vary according to each LDC.

	Cost	Notes
Item		
Load Meter		No charge as already there
Meter Credit		
Generator Meter	$150.00	Bi-directional 240 V meter
Meter Seals	$5.00	
Meter Labour	$150.00	Meter Tech time and overheads
Meter Vehicle	$50.00	
Layout/Eng.	$200.00	Site confirmation and transformer capacity
Acc. Setup	$30.00	Consistent with existing service requirements
Disc. & Reconnect at pole	$ 200.00	
Other		
Total	$790.25	Monthly Service Fee = $5.25/month

Note: For information purpose only. The local Utility should be contacted for information specific to their application in the form of an "Offer to Connect".

Estimate based on using 240 V meters

Other Information:

1. An external lockable disconnect located beside the generation meter will be required
2. Meter and disconnect is to be located in easy to access location for utility staff. A proponent should always contact the local Utility to find out if there are any restrictions or specific requirements related the location of the meter and disconnect
3. Generator payments will be made by means consistent with LDCs' polices
4. Monthly service fees will apply to the generator account and is subject to change
5. Generator responsible for all approvals and contract with OPA
6. Costing is based on 2010 rates – If not updated for a year or two it indicates that costs may have changed

FIT

Step 1: Pre-FIT Consultation

Through the Pre-FIT Consultation process, LDC will assist applicants to identify the details of connecting a project to the grid such as: station capacity, station names, feeder designation, voltage, and potential point of connection. Also, the LDC will indicate the connection requirements, costs and approvals.

Step 2: Submit an application to the OPA

There are three steps to submit a FIT Program application:

1. Register for the FIT Program.

2. Submit your application online - the OPA will send you a confirmation email and a reference number specific to your application.

3. Submit your application package to the OPA within five business days.

The application package must include:

- Two paper copies: one original prominently marked "Original" and one additional copy
- One electronic version provided on a searchable CD-ROM
- Application fee
- Application security (if applicable)
- Authorization letter (Exhibit A)
- Evidence of land access rights
- Evidence that the agricultural land restrictions have been met (applicable to ground-mounted solar PV projects greater than 100 kW).

Step 3: Contract Offer & Acceptance

- If the proposed project is Cost Allocation Exempt (CAE), you will receive a FIT contract offer notification from the OPA.
- If the proposed project is non-CAE, the OPA will perform Transmission Availability Test (TAT)
- Upon passing the TAT, your LDC will conduct a Distribution Availability Test (DAT)
- Upon passing the DAT, you will receive a FIT contract offer notification from the OPA

Step 4: Complete a Connection Impact Assessment (CIA)

Make an application for a Connection Impact Assessment (CIA) with your LDC for a formal assessment of the impact to connect. The application is to be signed by a P.Eng. Please be advised that a certain amount of payment is required for completing CIA. If the applicant requires a detailed Cost Connection Estimate (CCE), the applicant can alse make an application for CCE. Sign Connection Cost Agreement with your LDC

Step 5: Commercial Operation

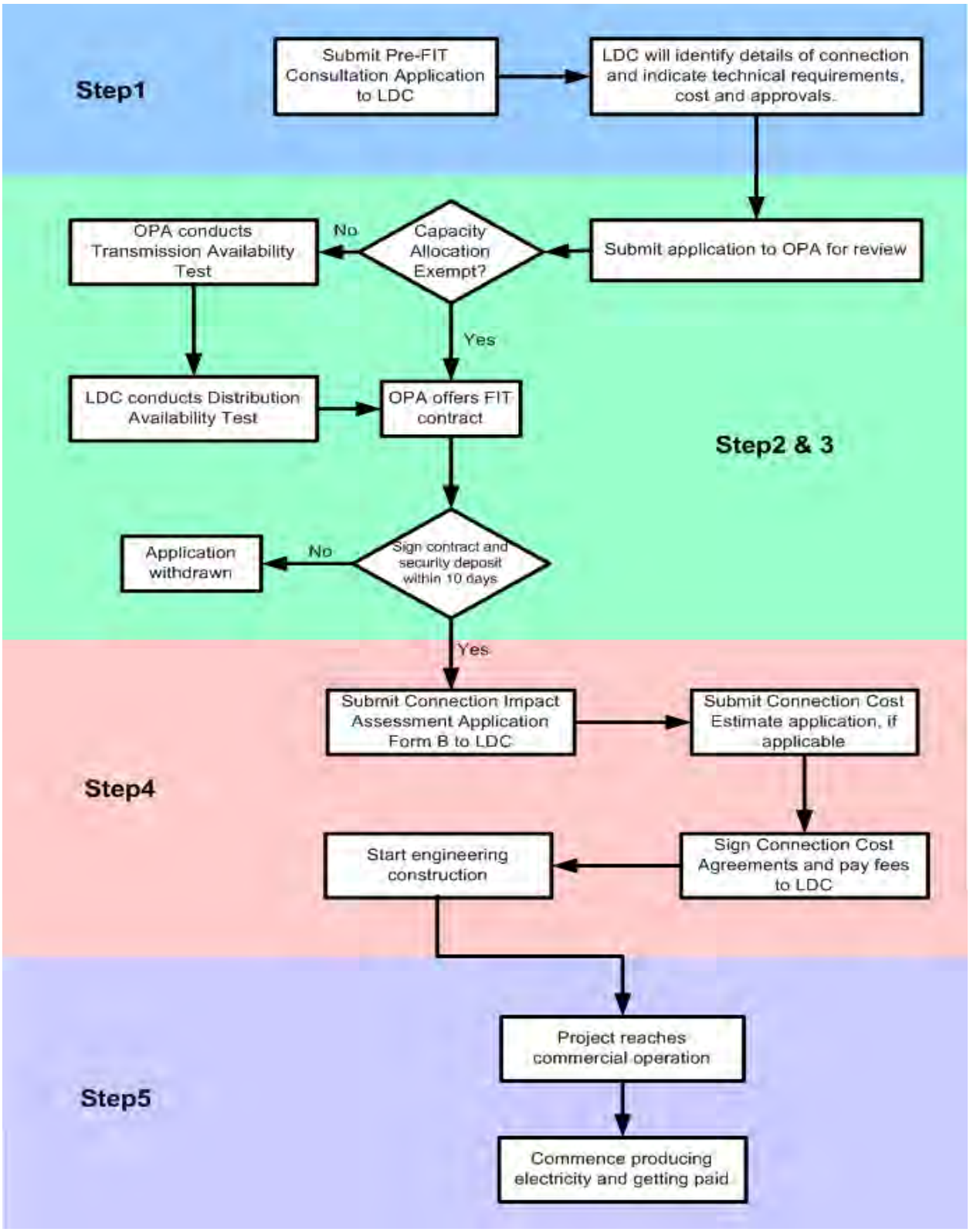
To reach commercial operation, your project must satisfy the following requirements:

- At least 90 percent of the FIT contract capacity must be generating power
- A metering plan has been approved by the OPA
- Single-line electrical drawing that identifies the connection point, the transmission and distribution facilities, including the transformer station(s), that are close to the project has been submitted to the OPA
- The OPA has received an Independent Engineer Certificate in the prescribed form with the required information from an independent engineer a declaration of commercial operation must be submitted in the prescribed form to the OPA.

For more information on connecting your FIT project, refer to the OPA website:

http://www.powerauthority.on.ca/ and click on the Feed-in-Tariff link.

FIT Process Flowchart



FIT Process Timelines

Milestone Phases	Purpose	Process Leader	Estimated Turnaround Time
Pre-FIT Consultation	Assist proponent to gather information necessary to apply for FIT, such as preliminary transmission and distribution testing, broad cost-estimates, etc.	LDC	15 days upon the receipt of a completed Pre-FIT Consultation application Form A
FIT Contract Application	A process that is managed by the OPA for assessing applications and issuing FIT contracts.	OPA	60 days upon completed OPA FIT application
Connection Impact Assessment (CIA)	After the FIT contract has been awarded, the applicant files a CIA application with LDC for a more formal assessment of the impact of connecting the generator to the system. A System Impact Assessment (SIA) must be completed by the IESO for projects> 10MW. A very high-level connect cost assessment will be provided as part of the CIA package back to the applicant.	LDC (and IESO if applicable)	60 days upon the receipt of a completed CIA application Form B. Longer than 60 days if projects involve other LDC(s).
Connection Cost Estimate (CCE)	If the Applicant requires a detailed connection cost assessment, the Applicant can complete a CCE.	LDC	90 days upon the receipt of a completed CCE study agreement by the generator. The

			CCE study agreement and cost are included as part of the CIA package.
Connection Cost Agreement (CCA)	Once agreement of the scope and cost are reached, the Generator is required to sign a Connection Cost Agreement to recover the costs. LDC will incur to connect the project to the distribution system.	LDC	6 months from the time CIA is completed. The generator is required to complete a CCA study agreement along with payment in order to initiate the CCA process. The CCA study agreement and payment information will be included as part of the CIA package.
Engineering, Procurement and Construction	After submitting the CCA and payment, detailed design and construction may begin. The project in-service date will be set. Once all of the required work and approvals are completed, the Distribution Connection Agreement, signed by LDC and the Generator, provides an outline of the connection as well as the roles and responsibilities of each party.	LDC	The project in-service date will be determined at the project kick-off meeting which will take place no later than 45 days after CCA execution

Appendix 3:

Interconnection Matrices

(a) Summary Load Displacement Generation

(b) Summary Feed-in Tariff Program

Appendix 3 (a) Interconnection Matrices

SUMMARY LOAD DISPLACEMENT GENERATION

Description >	Embedded Load Displacement primarily for own use*****	Micro Embedded Load Displacement	Small Embedded Load Displacement	Mid Size Embedded Load Displacement	Large Embedded Load Displacement	Embedded Load Displacement Generation that displaces New Load
Fuel >	**Fuel is solely from a renewable resource***	**Non renewable resource**	**Non renewable resource**	**Non renewable resource**	**Non renewable resource**	**Non renewable resource**
Size >	**Less than 500 kW****	**Less than 10 kW**	**10 kW to 500 kW connected at less than 15 kV**	**500 kW to 1 MW connected at less than 15 kV**	**Greater than 10 MW**	**Any size**
			Up to 1 MW connected at greater than 15 kV	**Greater than 1 MW to 10 MW connected at greater than 15 kV**		
Net metering allowed**	Yes	No	No	No	No	No
Connection Agreement with LDC or Supply Authority Required	Yes	Yes	Yes	Yes	Yes	Yes
All equipment must be CSA approved or have ESA special approval	Yes	Yes	Yes	Yes	Yes	Yes
ESA Inspection Required	Yes	Yes	Yes	Yes	Yes	Yes
OEB Generation Licence Required if exporting to distribution system	No	Yes	Yes	Yes	Yes	Yes
Relay Protection required	Yes - Disconnect	Yes - Disconnect	Yes - Disconnect	Yes - Disconnect or Transfer Trip	Yes - Disconnect or Transfer Trip	Yes - Disconnect or Transfer Trip
Monthly Distribution Fixed Charge	No reduction	No reduction	No reduction	No reduction	No reduction	No reduction
Distribution Variable Charge	Net	Net	Net	Net	Net	Net
Commodity (Electricity) Charge paid for electricity delivered	Net (where eligible)	Gross	Gross	Gross	Gross	Gross
Commodity (Electricity) Charge received for generation		HOEP	HOEP	HOEP	HOEP	HOEP
Payment for generation received from		LDC	LDC	LDC	LDC	LDC
Regulatory Charges	Net	Net	Net	Net	Net	Net
Debt Retirement Charge	Net	Gross	Gross	Gross	Gross	Net
				500 kW to 1 MW		
Transmission Charges - Network	Net	Net	Net	Net	Net	Net
				Over 1 MW		**Over 1 MW**
Transmission Charges - Connection	Net	Gross	Gross	Gross	Gross	Gross
			Over 50 kW	**Over 5 MW**		**Over 50 kW**
Fixed Standby Charge****	No	No	Yes	Yes	Yes	Yes
Variable Standby Charge****	No	No	Yes	Yes	Yes	Yes

Notes:
* Wind, drop in water elevation, solar radiation, agricultural bio mass or any combination
** The CHEC Group has a limit on its obligation to connect net metering on a first come, first served basis
**** If an OEB Rate Order exists
***** If distributed generator elects not to pursue standard offer contract.

Appendix 3 (b) Interconnection Matrices

SUMMARY Feed-in Tariff Program (FIT and microFIT)

Description >	Micro Embedded	Small Embedded	Mid Size
Fuel >	Fuel is solely from a renewable resource*	Fuel is solely from a renewable resource*	Fuel is solely from a renewable resource*
Size >	Less than 10 kW	10 kW to 500 kW connected at less than 15 kV	500 kW to 1 MW connected at less than 15 kV
		Up to 1 MW connected at greater than 15 kV	Greater than 1 MW to 10 MW connected at greater than 15 kV
Bi-directional Metering Required*****	Yes	Yes	Yes
Connection Agreement with LDC or Supply Authority Required	Yes	Yes	Yes
All equipment must be CSA approved or have ESA special approval	Yes	Yes	Yes
ESA Inspection Required	Yes	Yes	Yes
OEB Generation Licence Required**	No	Yes/No(See Note **)	Yes
Commodity (Electricity) Payment received for generation	microFIT	FIT	FIT
Payment for generation received from***	LDC	LDC	LDC
Relay Protection required	Yes - Disconnect	Yes - Disconnect or Transfer Trip	Yes - Disconnect or Transfer Trip
Monthly Service Charge****	Yes	Yes	Yes

Notes:

* Wind, drop in water elevation, solar radiation, agricultural bio mass or any combination

** Unless exempt by regulation, persons generating electricity in Ontario for sale require a generator licence from the OEB. Very small generators that have a capacity of 500 kilowatts or less are exempt from the need to obtain a generator licence. Generators that require a licence and that want to use the streamlined process that the OEB has established for generation facilities under a FIT contract with the OPA must have the FIT contract and must also have received a Notice to Proceed from the OPA before applying for the generation licence. Generally, generators that have a capacity of 500 kW or less is not required a generator licences; generators that have a capacity of more than 500 kW need to obtain a licence.

*** Projects connected directly to the high-voltage transmission system are settled directly by the OPA and the IESO

**** Monthly service charge will apply to the generator account; Refer to your local LDC for details

***** At the discretion of the LDC, bi-directional metering could also include two uni directional meters measuring power flow in and power flow out

Appendix 4

MicroFIT Application to Connect

APPLICATION TO CONNECT *micro*FIT PROJECT TO CHEC LDC DISTRIBUTION SYSTEM

***micro*FIT Information**	
Project Reference Number	
Applicant Legal Name	
Incremental Project	☐ Yes ☐ No

Primary Contact Information			
Name			
Billing Address	Street		
	City	Province	Postal Code
Existing Account Number (if applicable)			
Phone Number			
Email Address			
Fax Number			

Secondary Contact Information (e.g. Consultant, Contractor etc.)			
Name			
Address	Street		
	City	Province	Postal Code
Phone Number			
Email Address			
Fax Number			

***micro*FIT Project Description**			
Site Address	Street		
	City	Province	Postal Code
Facility GPS Co-ordinances: North		West	

Fuel Type	☐	Bio-gas	☐	Solar photovoltaic (Solar PV)
	☐	Landfill gas	☐	Wind
	☐	Renewable biomass	☐	Other (Please Specify): ----------

Nameplate Capacity	kW

Expected In Service Date	_____/_____/_____ DD / MM / YYYY

If the microFIT project is a Solar PV project:	
Total Nameplate Capacity of Solar PV Panels	kW
Total Nameplate Capacity of Inverter	kW
Inverter Certification	☐ C22.2 #107.1 (CSA Standard)
Location of Project	☐ Roof Top ☐ Ground Mounted
Location of Inverter	
Location of Generation Meter	
Location of Disconnection Point	
Size of Project in Square Meters	
Manufacturer's Technical Specifications of proposed equipment	☐ Attached ☐ Not Available Now

Type of Meter Required	☐ Single ☐ Poly ☐ Unknown
Service Upgrade Requirements	☐ Yes ☐ No ☐ Unknown
Engineering Single Line Diagram	Drawing / Sketch No. _____, Rev. _____
Expected Project Timeline (Dates): 1. Complete Installation 2. Electrical Safety Inspection	 1. 2.

Proposed Connection Method *(Refer to the Guide)*	☐ Directly Connected	☐ Indirectly Connected ☐ In-series, or ☐ In-parallel

If Incremental Project – Existing Generating Facility Description		
Fuel Type	☐ Bio-gas	☐ Solar photovoltaic
	☐ Landfill gas	☐ Wind
	☐ Renewable biomass	☐ Other (Please Specify): _____
Total Nameplate Capacity of Existing Generating Facility		kW
Combined Nameplate Capacity		kW
NOTE: Combined Nameplate Capacity (*micro*FIT Project plus Existing Generating Facility) cannot exceed 10kW.		

Signature : _____

Title : _____

Name : _____

Date : _____

Please return the completed form by email, mail or fax to the CHEC LDC Member.

For office use:

Date Received: _____

Date Approved: _____

Account Number: _____

Connection Date: _____

Appendix 5

FIT Initial Feasibility Assessment Application (Form A)

Form A
Initial Feasibility Assessment Application Form
Distribution System

This Application Form is for Generators applying for Initial Feasibility Assessment ("IFA").

It is important that the Generator provides all of the information requested below. Failure to do so could result in the non-acceptance of this application form by the CHEC LDC.

Date: _____ (dd / mm / yyyy)

1. **Project Name:** _____

2. **Project Size:** Number of Units _____
   Nameplate Rating of Each Unit _____ kW
   Generator connecting on ☐ single phase ☐ three phases
   Proposed Total Nameplate Capacity _____ kW

3. **Project Location:** Address _____
   OPA Reference # (if applicable) _____

4. **Project Information:**
   Generator Single Point of Contact Person _____
   Proposed Start of Construction _____
   Proposed Energization Date _____

	Generator	Owner	Consultant
Company/Person			
Contact Person			
Mailing Address			
Telephone			
Fax			
Email			

5. 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) _____

6. Machine Characteristics:

Machine Starting Inrush Current _____

Rotating Machine Type (if known): ☐ Synchronous ☐ Induction ☐ Other (Please Specify) _____

7. A completed single line diagram

Appendix 6

FIT Connection Impact Assessment Application (Form B)

Form B

Connection Impact Assessment Application Form

Distribution System

This Application Form is for Generators applying for Connection Impact Assessment ("CIA").
It is important that the Generator provides all of the information requested below. Failure to do so could result in the non-acceptance of this application form by the CHEC LDC.
All technical documents must be signed and sealed by a licensed Ontario Professional Engineer.

Date: _____ (dd / mm / yyyy)

1. **Project Name:** _____

2. **Project Size:** Number of Units _____
   Nameplate Rating of Each Unit _____ kW
   Generator connecting on ☐ single phase ☐ three phases
   Proposed Total Nameplate Capacity _____ kW

3. **Project Location:** Address _____
   OPA Reference # (if applicable) _____

4. **Project Information:**
   Generator Single Point of Contact Person _____
   Proposed Start of Construction _____
   Proposed Energization Date _____

	Generator	Owner	Consultant
Company/Person			
Contact Person			
Mailing Address			
Telephone			
Fax			
Email			

5. 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) _____

6. Machine Characteristics:

Machine Starting Inrush Current _____

Rotating Machine Type (if known): ☐ Synchronous ☐ Induction ☐ Other (Please Specify) _____

7. A completed single line diagram

Location and Site Plan:

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

Drawing / Sketch No. _____, Rev. _____

Connection to LDC's Distribution System (if known):

Proposed connection voltage to LDC's distribution system: _____ kV

Station: _____

Feeder: _____

Single Line Diagram ("SLD"):

Provide a SLD of the Generating Facility including the Interface Point/Point of Common Coupling ("PCC") to LDC's distribution system.

SLD Drawing Number: _____, Rev. _____

Generator Characteristics:

Number of generating unit(s): _____

Manufacturer / Type or Model No: _____ / _____

Rated capacity of each unit: _____ kW _____ kVA

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

Rated frequency: _____ Hz

Rotating Machine Type: ☐ Synchronous ☐ Induction ☐ Other (Please Specify) _____

Generator connecting on: ☐ single phase ☐ three phases

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 _____

Starting inrush current: _____ pu (multiple of full load current)

For Synchronous Units:

Nominal machine voltage: _____ kV

Minimum power limit for stable operation: _____ kW

Unsaturated reactances on: _____ kVA base _____ kV base

Direct axis sub transient reactance, Xd'' _____ pu

Direct axis transient reactance, Xd' _____ pu

Direct axis synchronous reactance, Xd _____ pu

Zero sequence reactance, X0 _____ 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 sub transient reactance, Xd'' _____ pu

Direct axis transient reactance, Xd' _____ 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 voltage winding: _____ kV

Nominal voltage of low voltage winding: _____ kV

Transformer type: ☐ single phase ☐ three phases

Impedances on: _____ kVA base _____ kV base

R _____ pu, X _____ pu

High voltage winding connection: ☐ delta ☐ star

Grounding method of star connected high voltage winding neutral:

☐ Solid ☐ Ungrounded ☐ Impedance: R _____ ohms X _____ ohms

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 connection voltage to LDC's distribution system and 'Low Voltage' refers to the generation or any other intermediate voltage.

Intermediate Transformer Characteristics (if applicable):

Transformer rating: _____ kVA

Nominal voltage of high voltage winding: _____ kV

Nominal voltage of low voltage winding: _____ kV

Transformer type: ☐ single phase ☐ three phases

Impedances on: _____ kVA base _____ kV base

R _____ pu X _____ pu

High voltage winding connection: ☐ delta ☐ star

Grounding method of star connected high voltage winding neutral:

☐ Solid ☐ Ungrounded ☐ Impedance: R _____ ohms X _____ ohms

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 to the interface step-up transformer and the 'Low Voltage' refers to the generation voltage.

Load information (if known):

Maximum load of the facility: _____ kVA _____ kW

Maximum load current (referred to the nominal voltage at the connection point to LDC's system): _____A

Maximum inrush current (referred to the nominal voltage at the connection point LDC's system): _____A

Attached Documents:

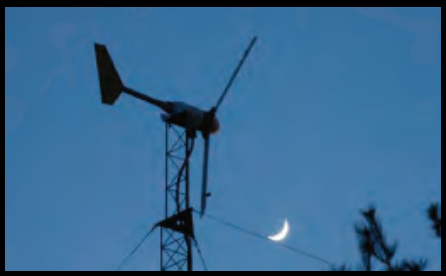
Item No.	Description	Reference No.	No. of Pages
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Attached Drawings:

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

Appendix 7

ESA Electrical Guidelines for Inverter-Based Micro-Generating Facility



Electrical Guidelines for Inverter-Based Micro-Generating Facility

(10 KW and Smaller)

Electrical Safety Authority

Contents

1 SCOPE

This guideline is intended to serve a very specific need for inverter based micro generation used for one of the following applications:

1. microFIT Program
2. Load displacement

The scope of the guideline deals only with the installation of inverter-based micro generation facilities, 10kW or smaller. For larger generator units, greater than 10kW refer to Spec-005-Process Guideline for the Installation of Parallel Generating Systems (Greater than10kW). For these larger installations, plans will have to be submitted to the Local Distribution Company and the Electrical Safety Authority for review and approval before any installation work begins.

This guideline is in no way intended to be used as a substitute for the Ontario Electrical Safety Code. Omission of any requirements in the OESC, from this guideline, does not in any way affect the OESC, and these omitted requirements shall not be considered irrelevant. The Ontario Electrical Safety Code is law in Ontario, and as such defines the legal requirements for safe electrical installations, products, and equipment in Ontario.

2 OVERVIEW

Today many home, farm and small business owners are considering the installation of alternative forms of electricity generation (distributed generation) and connecting them to run in parallel with the Local Distribution Company (utility) electrical system. This may include the installation of small wind turbines, photovoltaic (solar) systems, micro-hydro turbines or fuel cells. These systems are intended to reduce the amount of power purchased from the local electricity distribution company, or to participate in the FIT Program, and where they are powered from renewable sources such as wind, flowing water or sunlight they also provide environmental benefits.

The Ontario Power Authority has developed the Renewable Energy Feed-In Tariff (FIT) Program for the Province to encourage and promote greater use of renewable energy sources including wind, waterpower, renewable biomass, bio-gas, bio-fuel, landfill gas and solar for electricity generating projects that can be connected to a host facility, a distribution system or the IESO-Controlled Grid, in Ontario. The fundamental objective of the FIT Program, in conjunction with the Green Energy Act (Ontario), is to help facilitate the increased use in the Province of Renewable Generating Facilities of varying sizes, technologies and configurations via a standardized, open and fair process.

Any system that produces even small amounts of electricity can be potentially dangerous, creating the possibility of electrocution and fire hazards. Improperly installed systems will create serious safety hazards to property owners, their friends, family, employees and local electric distribution company workers.

Before installing any type of distributed generation, whether it is stand-alone or connected to the grid, it is important to understand the safety requirements. The safety regulations, the codes and the associated safety technical standards can be confusing and difficult to understand. This guideline is intended to simplify these and provide basic safety advice to home, farm and business owners who are considering the installation of Inverter-Based Micro generation systems.

This guideline is based on the requirements of the Electrical Safety Authority's Ontario Electrical Safety Code (OESC) and the Ontario Energy Board's Distribution System Code.

2.1 TYPES OF DISTRIBUTED GENERATION

The Distribution System Code describes four categories of distributed generation.

Generator Classification	Rating
Micro	**≤ 10 kW**
Small	(a) ≤ 500 kW connected on distribution system voltage < 15 kV (b) ≤ 1 MW connected on distribution system voltage ≥ 15 kV
Mid-Sized	(a) > 500 kW connected on distribution system voltage < 15 kV (b) > 1 MW < 10 MW connected on distribution system voltage > 15 kV
Large	> 10 MW

2.2 TYPICAL INVERTER-BASED MICRO GENERATION SYSTEM

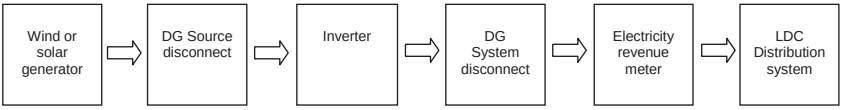


Diagram 1 - Block diagram of basic DG system

3 DEFINITIONS

Approved Electrical Equipment: Equipment that is approved in accordance with the OESC and bears product approval markings for use in Ontario. The presence of approval markings confirms to the user that the equipment is in compliance with the Ontario regulations (Refer to ESA website, www.esasafe.com/GeneralPublic/epa_002B.php?s=19, for recognized approval marks for products approved for use in Ontario).

Combiner box: A box used in solar PV installations to combine multiple PV source circuits into one PV output circuit. A combiner box may also contain PV generator overcurrent devices.

Disconnecting means: A device, group of devices, or other means whereby the conductors of a circuit can be disconnected from their source of supply. Examples of disconnecting means are a switch or a circuit breaker.

Distributed Generator (DG): Electric generation facilities connected to a Distribution System through a point of common coupling (PCC).

Generator: Equipment that produces electric power. Examples of inverter-based micro generators are wind turbine and photovoltaic array, both of which produce Direct Current (DC) power.

DG Source Disconnect: Disconnecting means to disconnect the distributed generation source from the equipment that it supplies.

DG System Disconnect (Utility Disconnect): Disconnecting means to disconnect the distributed generator from the utility distribution system. This disconnect ensures the safety of electrical utility workers by allowing them to disconnect the generator from the utility system in case they have to service or repair the electrical supply to your home, farm or business. Also referred to as "utility disconnect".

Distribution Panel: The distribution panel contains overcurrent devices and distributes electricity to the various electrical circuits and equipment in your home, farm or business.

Distribution System Code (DSC): Sets out the minimum conditions that an electricity distributor must meet in carrying out its obligations, the DSC is established and approved by the Ontario Energy Board (OEB). All licensed electricity distributors in Ontario must comply with the provisions of the DSC as a condition of their license.

Electricity Revenue Meter: The Local Distribution Company supplies and installs the electricity revenue meter that measures consumption (Load Meter) or generation (Generation Meter) of electrical energy by the customer.

Inverter: A device that converts direct current (DC) electricity into alternating current (AC) electricity. Electrical equipment, appliances, tools, machines and lights connected to the wiring in your home, farm or business use AC power. Also, referred to as "Power conditioning unit" in OESC.

Stand-Alone Inverter: An inverter that operates only in stand-alone mode and thus contains no facility to synchronise its output energy to a Utility Distribution.

Utility-interconnected inverter: An inverter that is able to operate in grid parallel mode with the utility distribution facility. Thus contains provision for anti-islanding and for synchronizing distributed generation output voltage, phase and frequency to the utility distribution. Also known as "Grid Connected", or "Grid Tie Inverter". There are two types of utility-interconnected inverter; a Grid Dependant and a Grid Interactive.

Grid Dependent Inverter**:** An inverter that is able to operate in parallel to the distribution system and in order to operate there must be power available from the electric utility's electricity grid. Loss of power from the grid will initiate a shutdown of the inverter to prevent islanding. Distributed generation systems using a grid dependent inverter will not provide back-up power during a utility power outage.

Grid-interactive Inverter**:** An inverter that is able to operate in both stand-alone and grid-parallel modes according to the availability of the distribution system. It can be considered as an uninterruptible power supply that is also able to operate in grid-parallel mode. This type of inverter initiates grid-parallel operation.

Island: A condition in which a portion of the utility distribution system is energized by a Distributed Generator while that portion of the utility distribution system is electrically separated from the rest of the utility distribution system.

Anti-islanding: The distributed generator system shall cease to energize the utility distribution system after the formation of an unintentional island (i.e. for inverter based generations the inverter shall meet the anti-islanding requirements of CSA C22.2 No. 107.1).

Local Distribution Company (LDC): The distribution of electricity to end use customers is carried out by Ontario's local electrical utilities or LDCs. These utilities are responsible for maintaining their community's network of distribution wires. Also referred to as "Supply Authority".

Micro-embedded generation facility: A generation facility connected on the customer side of the electricity meter that produces 10kW of electricity or less.

microFIT Program: The FIT program developed for renewable energy projects that are 10kW or less in capacity.

Feed-in Tariff (FIT) Program: Is defined as the renewable Energy Feed-In Tariff Program established by the OPA pursuant to the FIT Rules and any prior or subsequent version of the FIT Rules.

microFIT Rules: The Rules governing the microFIT program as may be amended from time to time and is posted on the OPA website - **http://microfit.powerauthority.on.ca/pdf/microFIT-Rules.pdf**

Meter Connection: The meter connection configuration determines the application type for the project.

Series meter connection: The installation includes two revenue meters, connected in series. The Load meter and the Generation meter. The generation meter and the generator are connected beyond the load meter. *As of May 2010 this configuration is not permitted by OPA. Please refer to OPA website for more information www.powerauthority.on.ca.*

Parallel meter connection: The installation includes two revenue meters, connected in parallel; the Load meter and the Generation meter. The two meters could have one connection point (**Indirectly Connected microFIT project)** or two separate connection points (**Directly Connected microFIT project)**. Refer to Diagram A.

Net metering connection: The installation includes one revenue load meter. The generator is connected beyond the load meter, the generated power is used for load displacement; the project is a **Micro-embedded Load Displacement project**. Refer to Diagram B.

Ontario Electrical Safety Code (OESC): Provides the standards for the safe installation of all temporary and permanent electrical wiring and equipment. The OESC applies to all homes, businesses, farms and industry in Ontario. The Ontario Electrical Safety Code is law in Ontario, and as such defines the legal requirements for safe electrical installations and products/equipment in Ontario

Overcurrent Device: A device capable of automatically opening an electric circuit, under both predetermined overload and short-circuit conditions, either by fusing of metal or by electromechanical means (a fuse or circuit breaker). An approved fuse or circuit breaker is required to protect people and the electrical system from a short circuit or overload failures. This is an important safety device.

Service box: An approved assembly consisting of an enclosure that can be locked or sealed, containing either fuses and a switch, or a circuit breaker, and of such design that it is possible to operate either the switch or circuit breaker to the open position by manual means when the box is closed**.**

4 microFIT PROJECTS

4.1 PLANNING AND INSTALLATION

Before you begin any installation work or make any commitments to purchase equipment or have equipment installed, it is very important that you review all relevant documents, guidelines and available information.

A. Information to be gathered and reviewed:

1. **Review the Ontario Power Authority (OPA) website**
   Refer to the microFIT Rules, for project eligibility, application, contract terms, etc. specific to the microFIT program, as required and administered by the OPA at **http://microfit.powerauthority.on.ca**

2. **Review the Ontario Energy Board's Distribution System Code (Appendix F)**
   This document provides an outline for the micro-generation connection process. **www.oeb.gov.on.ca/documents/cases/EB-2005-0447/appendixf_201206.pdf**

3. **Review the OESC and these Electrical Safety Authority Guidelines**
   Be sure to review and understand the Electrical Safety Authority guidelines, including the requirements for electrical inspection and approval. An "Application for Inspection" is required.

4. **Some questions to consider are:**
   - Is a service upgrade required to accommodate the installation of an alternative generator?
   - Are there any other special technical requirements?
   - Discuss with your LDC the meter connection.
   - Will the revenue meter need replacing?
   - What are the charges for this connection?

5. **Check for any local bylaw or permit requirements.**
   In addition to ensuring that you understand the electrical safety requirements you should also check with you local municipality, township or county about any by-law or permit requirements that might apply depending on the type of installation.

B. Proceeding with the Installation:

1. **Apply through the Ontario Power Authority (OPA) website**

2. **Submit a connection request form to your LDC**

   Refer to your LDC website or contact them for information regarding their connection process for renewable energy and microFIT projects.

3. **Select Your Electrical Contractor**

   Prior to hiring an Electrical Contractor, confirm that they are licensed by the Electrical Contractor Registration Agency of the Electrical Safety Authority (ECRA/ESA)

It is also recommended that you ensure that:

- They can provide references
- They are prepared to take out the necessary “Application for Inspection”. If the person you are considering for the installation tells you that an electrical inspection is not required or suggests that you apply for the inspection on his or her behalf, find someone else to do the work.
- They will provide a written estimate of the cost of the work.
- You ask about the amount of experience the electrical contractor has installing alternative generation systems.
- If the electrical contractor is providing the electrical equipment as part of the installation ensure that they are providing and installing approved equipment.
- They will provide you with a copy of the “Certificate of Inspection”. The Local Distribution Company will require a copy of the “Certificate of Inspection” before they will finalize the connection agreement with you. You may wish to hold back final payment until you get this certificate.

4. File a Completed Application for Inspection with the Electrical Safety Authority

Before beginning the electrical work (or within 48 hours), your electrical contractor must file an Application for Inspection with the Electrical Safety Authority and pay the appropriate fees. For the installation of micro-generation systems the submission and approval of plans is not required. If you are the homeowner and you are doing the work (not recommended) you are responsible for filing the application for inspection.

1-877-ESA-SAFE (1-877-372-7233) || www.esasafe.com

An Electrical Inspector will inspect the installation to determine if it meets the requirements of the OESC.

If the installation meets the safety requirements of the OESC, then a “Connection Authorization” will be issued to the LDC and a “Certificate of Inspection” will be provided to the applicant (ie: owner/electrical contractor). These documents provide assurance that the installation was inspected by ESA, was found in compliance with the requirements of the OESC, and may be connected and used.

5. Finalize the connection agreement with the LDC and the microFIT contract with the OPA

4.2 ELECTRICAL INSPECTION PROCESS

Before the generator can be connected to the electrical system it must be inspected and approved by the Electrical Safety Authority. The OESC requires an Application for Inspection to be submitted by the contractor doing the electrical installation. The inspection provides assurance that the installation meets the safety requirements of the OESC. The electrical inspection process does not include the inspection of the structural integrity of the roof, the windmill installation or other non-electrical infrastructure for the installed generator equipment.

If the microFIT project is converting from an existing installation, e.g. a Net-metering/Load displacement installation, the entire distributed generator system installation shall be inspected by the ESA. Notwithstanding product approval requirements in Ontario (See Appendix A), for these retro-fitted existing installations, ESA will be accepting equipment that was approved to UL standards.

In addition to the standard inspection process, to verify that the electrical work meets the OESC, the ESA will be reporting the following to the LDC/OPA:

1. The type of the renewable energy of the project (ie: solar, wind etc.).
2. The generator total kW capacity and the inverter maximum output kW capacity
3. Verification if batteries are installed upstream of the generator meter.

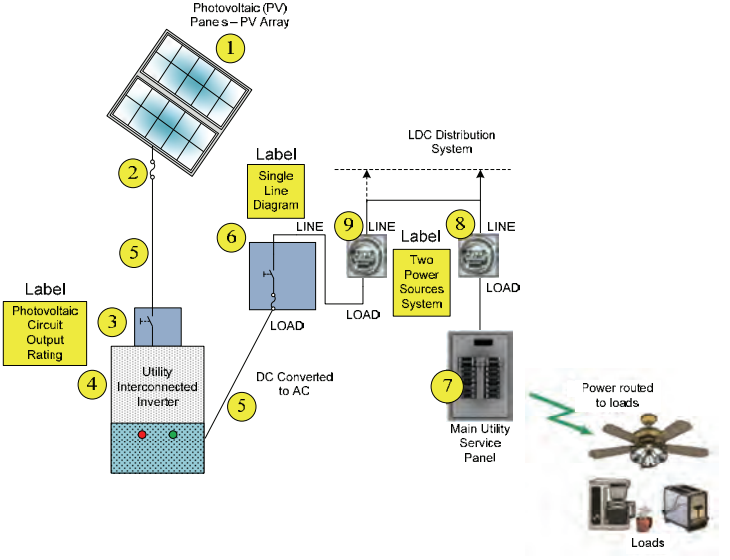


Diagram A: **Parallel Meter Connection – microFIT Project**

Note: The two revenue meters may have one connection point (Indirectly Connected project) or two separate connection points (Directly Connected project) to the LDC Distribution System; consult with the LDC on the connection of the meters]

All electrical devices and equipment shall be approved and bear accepted product approval markings for use in Ontario.

With reference to the Diagram A, the following is required according to the OESC:

1 **Generator type and characteristics**

The generator could be wind powered, photovoltaic, micro-hydro, etc. The Inspector will check the nameplate and note the generator electrical characteristics. Manufacturer specifications shall be made available to the inspector.

For Solar installations, flexible cords for extra-hard usage, conductors approved for exposed installations and PV cable approved to UL 4703 shall be permitted to interconnect modules within a photovoltaic array. If the combiner box is installed within the array, wiring method within the array shall be permitted to connect the array to the combiner box.

2 **Overcurrent Device(s)**

Where required by the OESC for protection of conductors and equipment from overcurrent (short circuit or overload). The rating and type shall be compliant with the OESC based on the generator nameplate ratings and the conductors and equipment**.**

For a Solar installation, the overcurrent devices may be located in the combiner box. The combiner box shall be permitted to be located on the roof.

3 **Disconnecting Means – Generator or Distributed Generation (DG) Source**

The disconnecting means shall be sized to safely disconnect the output of the generator unit. The OESC provides information on the sizing requirements The disconnecting means shall have a label marked “DG SOURCE DISCONNECT”.

For solar installations, a permanent marking shall be provided at an accessible location at the disconnecting means for the photovoltaic output circuit specifying; rated operating current and voltage; rated open-circuit voltage; and rated short-circuit current.

Some Inverters units might have the disconnecting means built into the inverter unit. In that case, the label “DG SOURCE DISCONNECT” will be on the inverter unit. If this is the case a separate disconnecting means is not required.

If the inverter is an integral part of the generator, and the combined unit is approved, there is no DG SOURCE DISCONNECT required. For Micro-inverters plugged into the modules, no DG SOURCE DISCONNECT is required

4 **Utility Interconnected Inverter**

An approved Utility Interconnected Inverter is required. The inverter shall bear a certification mark that indicates that the inverter meets the requirements of the Canadian Standards Association Standard CSA C22.2 #107.1. Field Evaluation shall not be accepted for “Utility Interconnected Inverter”. The Inspector will also check the nameplate and note the Inverter electrical characteristics.

The inverter shall be marked as “UTILITY-INTERCONNECTED” or equivalent indicating it meets the standard for utility interconnected inverters.

5 Wiring Methods

Wiring shall be installed in accordance with requirements set out in Section 12 of the OESC.

All exposed installations including cables, conduits, connector, attachment plugs, etc will be approved for outdoor installations and marked accordingly.

For Solar installations, refer also to Section 50 for additional requirements. Permanent wiring methods identified in Section 12 shall be used to interconnect the inverter to the array.

6 Disconnecting Means — Distributed Generation (DG) System (Utility disconnect)

The inspector will verify that a disconnecting means (intended to prevent back feed into the utility system) is installed. Recommended location of the disconnecting means is adjacent to the utility meter(s). The disconnecting means shall be properly sized to disconnect the electrical output from the inverter, have provision for being locked in the open position and will simultaneously disconnect all ungrounded conductors of the distributed generator from the distribution supply system.

NOTE: Verify if your LDC requires contact operation to be verified by direct visible means, and that the location of the utility disconnect meets the LDC's requirements.

The disconnecting means shall have a label marked "DG SYSTEM DISCONNECT – WARNING – TWO POWER SOURCES".

A single line diagram shall be posted at the disconnecting means. This single line diagram must be plainly and permanently marked, shows the switching arrangements, the location of the disconnecting means, the location and type of generator. The single line diagram should identify related components of the interconnected system, including switching arrangements, interlocks, isolation points, and their relative locations.

Where the utility disconnect is connected directly to the utility distribution system, the disconnecting means shall be an **approved service box** and grounded as per Section 10 of OESC requirements. This disconnect will serve as the service box and a Utility disconnect.

Where it is permitted to tap into a service disconnect or service equipment to connect the generator, the main circuit breaker or disconnecting means for the distribution panel shall be labelled "WARNING – TWO POWER SOURCES". A warning label shall also be posted at any distribution panel, load break switch, etc, were there exists the possibility of feedback.

7 Distribution Panel

There is no connection to the generator system from the customer's distribution panel for a parallel meter connection.

Load displacement systems shall be connected to a dedicated branch in the host distribution panel

8 Electricity Revenue Meter – Customer Load Meter

For Load displacement systems, a label marked "WARNING – TWO POWER SOURCES" shall be affixed in a location adjacent to the electricity revenue meter

9 Electricity Revenue Meter – Generation Meter

The electricity meter is the responsibility of the electrical utility. An approved meter mounting base shall be installed to meet the LDC requirements. The meterbase line side shall be connected to the LDC side and the load side shall be connected to the Generator Source wiring. The connections of the line side of the meter base shall satisfy the LDCs requirements.

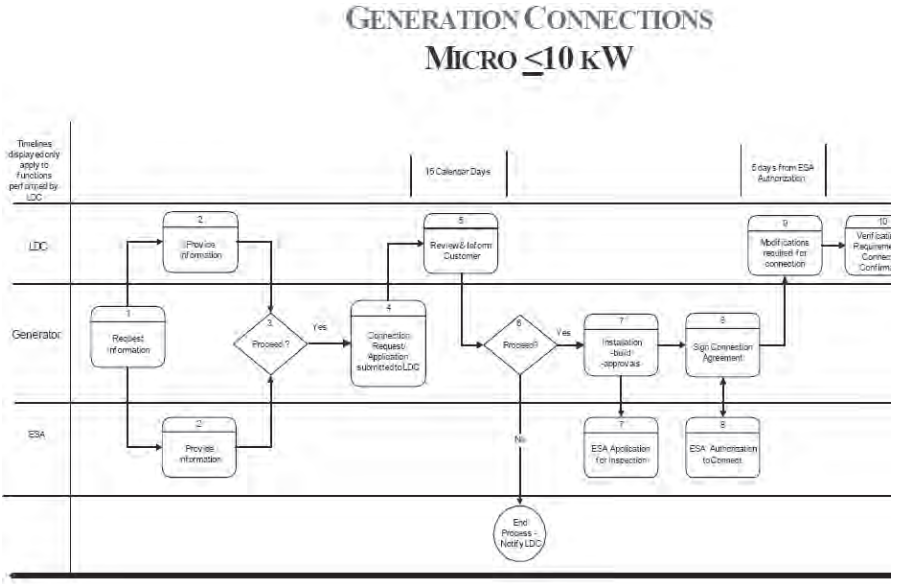
A label marked "WARNING – TWO POWER SOURCES" shall be affixed in a location adjacent to the electricity revenue meters. This label provides a warning to utility workers that your generator is capable of providing electricity into the utility system. It alerts them that they should disconnect the generator from the electrical supply system before beginning any work on the electrical system supplying your home, farm or business. Additionally, the label has to satisfy the local LDC requirements.

5 NET METERING CONNECTION (LOAD DISPLACEMENT PROJECT)

5.1 PLANNING AN INSTALLATION

Load displacement projects are not required to make application to the OPA

Net Metering is an agreement between the LDC and a customer who generates electricity from renewable resources. The customer produces and consumes electricity, and may send surplus energy to the grid.



(Source: OEB's Process and Technical Requirements for Connecting Embedded Generation Facilities)

5.2 ELECTRICAL INSPECTION PROCESS

Before the generator can be connected to the electrical system it must be inspected and approved by the Electrical Safety Authority. The OESC requires an Application for Inspection to be submitted by the contractor doing the electrical installation. The inspection provides assurance that the installation meets the safety requirements of the OESC.

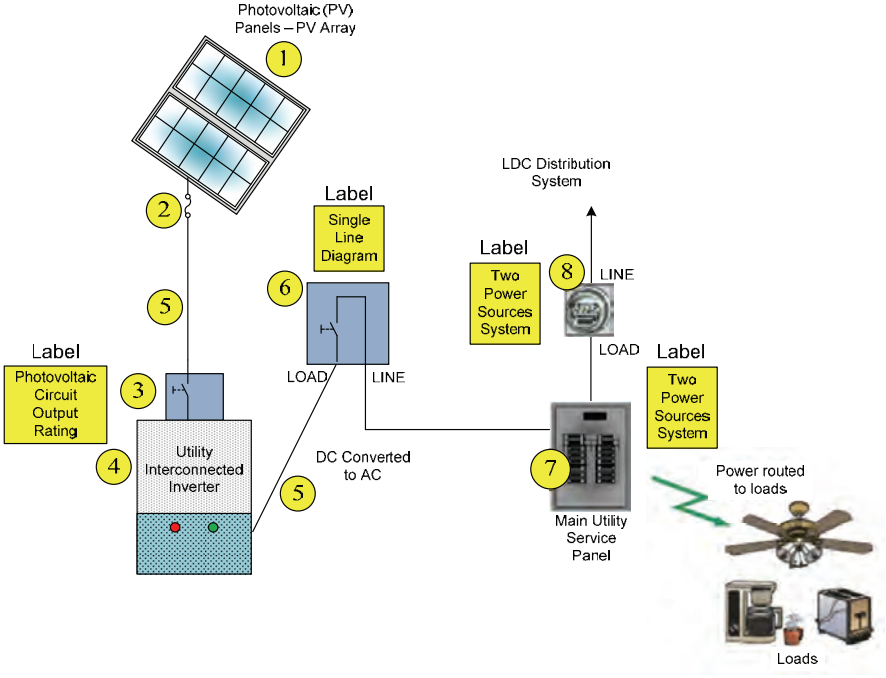


Diagram B: Net metering connection - Micro-embedded Load Displacement System

With reference to the above diagram, the Inspector will look for the applicable OESC requirements when inspecting the generation installation.

6 OTHER SOURCES OF INFORMATION

- Ontario Electrical Safety Code
- CSA C22.2 #107.1 General Use Power Supplies
- ULC/ORD-C1703-01 Flat Plate Photovoltaic Modules and Panels
- The Renewable Energy Handbook for Homeowners by William H. Kemp
- $mart Power; an urban guide to renewable energy and efficiency The Renewable Energy Handbook for Homeowners by William H. Kemp
- Distribution System Code published by OEB
- Standby Generators and Emergency Power Information By Ministry of Agriculture and Food
    - Generator Handbook
    - Generator fact sheets
    - http://www.omafra.gov.on.ca/english/engineer/energy.html
- Electricity Generation Using Small Wind Turbines at Your Home or Farm, by S. Clarke of the Ministry of Agriculture
- CAN/CSA-C22.2 No. 257-06 Interconnecting Inverter-Based Micro-Distributed Resources to Distribution Systems
- The Kortright Centre for Conservation - environmental and renewable energy education and demonstration centre.

To file for an Application for Inspection call:

1-877-ESA-SAFE (372-7233)

www.esasafe.com

Appendix A

Certification marks acceptable under the OESC of the Province of Ontario are:

Canadian Standards Association (CSA)			
Curtis Strauss		**Entela**	
FM Approvals			
Intertek Testing Services			
Labtest Certification (LC)			
Met Laboratories (MET)		**Nemko**	
NSF International		**OMNI Environmental Services Inc**	
Quality Auditing Institute		**QPS**	
TUV America		**TUV Rheinland**	
Underwriters' Laboratories of Canada (ULC)			
Underwriters' Laboratories Inc.			

Cover: Photos Courtesy of Balance Solutions for Today Inc

Appendix 8

OEB Application for an Electricity Generation Licence

Print Form

Ontario Energy Board
Commission de l'énergie de l'Ontario

Ontario

Application for an Electricity Retailer Licence
Application Instructions

1. Purpose of this Form

This form is to be used to apply for a licence that would enable the applicant

(a) to sell or offer to sell electricity to a consumer;
(b) to act as agent or broker for a retailer with respect to the sale of electricity; and/or
(c) to act or offer to act as an agent or broker for a consumer with respect to the sale or offering for sale of electricity.

2. Completion Instructions

This form is in a writeable PDF format. The applicant must either:

- type answers to all questions, print two copies and sign both copies; or
- print a copy of the form, clearly print answers to all questions, make a copy and sign both copies.

The applicant must also complete the checklist attached to the application form.

Please send both copies of the completed form, checklist, and two copies of any attachments to:

Board Secretary
Ontario Energy Board
P.O Box 2319
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

If you have any questions regarding the completion of this application, please contact the Market Operations Hotline by telephone at 416-440-7604 or 1-888-632-6273 or e-mail at market.operations@oeb.gov.on.ca.

Please note that the Board may require information that is additional or supplementary to the information filed in this application form and that filing of the form does not preclude the applicant from filing additional or supplementary information.

The Board's "Performance Standards for Processing Applications" are indicated on the "Corporate Information and Reports" section of the Board's website at www.oeb.gov.on.ca. Applicants are encouraged to consider the timelines required to process applications to avoid submitting applications too early or too late. Submitting applications too early without reasonable certainty of the proposed licensed activities will impede regulatory efficiency while submitting applications too late will leave the applicant to bear the risk of delayed commencement of licensed activities. If the submitted application is incomplete, it may be returned by the Board or there may be a delay in processing the application.

3. Application and Registration Fees

A non-refundable application fee is required to process your application. Please enclose a cheque or money order made payable to the **ONTARIO ENERGY BOARD**. The amount of the application fee is indicated on the "Apply for a Licence" page of the "Licences" section of the Board's website at www.oeb.gov.on.ca.

If a licence is issued, the licensee will be required to pay an annual registration fee. Annual registration fee information is indicated on the "Apply for a Licence" page of the "Licences" section of the Board's website at www.oeb.gov.on.ca.

4. Confidentiality

Sections 10 to 15 of this application will be treated as confidential. All other information filed as a part of or in support of this application will be placed on the public record. Where the applicant objects to public disclosure of information contained in sections other than sections 10 to 15, the applicant must follow the procedure set out in the Board's Practice Direction on Confidential Filings.

5. Important Information

The applicant must make a copy of the non-confidential sections of the application available to any person who requests a copy of the application.

This page is intentionally left blank

Ontario Energy Board
P.O. Box 2319
2300 Yonge Street
27th Floor
Toronto ON M4P 1E4
Telephone: 1-888-632-6273
Facsimile: (416) 440-7656

Commission de l'énergie l'Ontario
C.P. 2319
2300, rue Yonge
27e étage
Toronto ON M4P 1E4
Téléphone: 1-888-632-6273
Télécopieur: (416) 440-7656

Ontario

Application for an Electricity Retailer Licence

For Office Use Only	
Application Number	EB -
Date Received	

1. The Applicant

Legal Name of the Applicant : _____

Name to Appear on Licence: _____

☐ Indicate if the name to appear on the licence is the same as the legal name.

Please note that if the name to appear on the licence is not the same as the legal name, the name on the licence must include the legal name of the applicant and the legal name must appear first. The "Name to Appear on Licence" will appear on the notice of application and on the licence.

Business Classification:

- ○ Sole Proprietor
- ○ Partnership
- ○ Corporation
- ○ Other (describe) _____

Date of formation or incorporation: _____

Place of formation or incorporation: _____

Province/state _____

Country _____

If the applicant is an individual, the applicant must be at least 18 years old.
If the applicant is an individual, is he or she at least 18 years old?

- ○ Yes
- ○ No
- ○ Not applicable - not an individual

2. Licence Primary Contact

As a condition of licensing, the licensee shall designate a person who will act as primary contact with the Board on matters related to the licence.

Mr. ○ Mrs. ○
Miss ○ Ms. ○
Other ○ _____

Last Name | First Name | Initial

Title/Position

Company Name if different from Name to Appear on Licence

Licence Primary Contact Address:

City | Province/State | Country | Postal/Zip Code

Phone Number | Toll Free (if available) | Fax Number | E-mail Address

If the above address is not in Ontario, the applicant must also provide contact information for service purposes in the province of Ontario. Applicants whose offices are not located in Ontario may provide the address of an agent (an individual who is a resident of Ontario and is at least 18 years old, or a corporation that has its head office or registered office in Ontario) as the address of service.

Mr. ○ Mrs. ○
Miss ○ Ms. ○
Other ○ _____

Last Name | First Name | Initial

Title/Position

Company Name if different from Name to Appear on Licence

Address for Service in Ontario (if different than the Licence Primary Contact Address above)

City | Province ONTARIO | Postal Code

Phone Number | Toll Free (if available) | Fax Number | E-mail Address

3. Application Primary Contact

☐ Indicate if same as above. If yes, proceed to section 4.

The primary contact for the licence application may be a person within the applicant's organization other than the licence primary contact noted above. An applicant may also choose to designate a consultant, lawyer, etc. to be the primary contact for the licence application. The Board will communicate with this person during the course of the application but with the licence primary contact after a licence is issued.

Mr. ○ Mrs. ○
Miss ○ Ms. ○
Other ○ _____

Last Name | First Name | Initial

Title/Position

Company Name if different from Name to Appear on Licence

Application Primary Contact Address:

City | Province/State | Country | Postal/Zip Code

Phone Number | Toll Free (if available) | Fax Number | E-mail Address

4. Customer Complaint or Inquiries Primary Contact

Provide contact information of the person to whom correspondence or communication regarding customer complaints or inquiries should be addressed. The mailing address should be in Ontario and the telephone number should be listed in Ontario. If the applicant intends to retail electricity to low-volume consumers (annually consuming less than 150,000 kilowatt hours of electricity), the applicant should also provide a telephone number which may be reached by the general public without a charge.

Mr. ○ Mrs. ○
Miss ○ Ms. ○
Other ○ _____

Last Name | First Name | Initial

Title/Position

Company Name if different from Name to Appear on Licence

Customer Complaint or Inquiries Primary Contact Address:

City | Province: ONTARIO | Postal Code

Phone Number | Toll Free | Fax Number | E-mail Address

5. Type of Application

○ New licence

○ Renewal, please provide the licence number and expiry date of the existing licence

Licence Number: ER- _____ Expiry Date: _____

6. Trade Names

The electricity retailer licence authorizes the licensee to conduct business using the name under which the licence is held. It also provides for the use of trade names by the licensed electricity retailer.

Does the applicant intend to use trade names?

☐ Yes, provide a list of trade names the applicant intends to use in the space provided below.

☐ No, proceed to 7.

7. Applicant's Licensing Status and History

(a) Has the applicant, an affiliate of the applicant, or an associated entity (e.g., a partnership or limited partnership) ever been licensed by the Ontario Energy Board? (the *Business Corporations Act* definition for affiliate can be found at www.e-laws.gov.on.ca).

☐ Yes, provide details of current and expired licences in the table below.

☐ No, proceed to 7(b).

Licensee Name	Relation to the applicant (e.g., applicant itself, affiliate, partner...etc.)	Licence Number

(b) Does the applicant, an affiliate of the applicant, or an associated entity (e.g., a partnership or limited partnership) have any other application(s) before the Ontario Energy Board?

☐ Yes, provide details in the table below.

☐ No, proceed to 7(c).

Applicant Name	Type of Application	Ontario Energy Board File Number (if applicable)

(c) Has the applicant, an affiliate of the applicant, or an associated entity (e.g., a partnership or limited partnership) ever undertaken licensed energy sector activity in any other jurisdiction within North America?

☐ Yes, provide details of current and expired licences in the table below

☐ No

Company Name	Jurisdiction	Business Activity	Name of Licensing Body	Licence/Registration No.

8. Officers, Directors and Key Individuals

(a) If the applicant is a corporation, provide as a separate attachment a list of all officers and directors, including name and title.

(b) Provide a list of key individuals below. The individuals listed must be the individuals that are responsible for the following functions for the applicant: regulatory requirements and conduct, financial matters and technical matters. These key individuals may include the Chief Executive Officer, the Chief Financial Officer, other officers, directors and proprietors.

Note: Please list a minimum of three key individuals. If unable to provide a minimum of three, please explain. _____

Name of Key Individual	Title/position within applicant's business (or identify company if not the applicant's business)

9. Intended Services and Markets

(a) Intended Services: please identify which of the following services the applicant intends to offer. You may select as many as applicable.

☐ to sell or offer to sell electricity to low-volume consumers (annually consuming less than 150,000 kilowatt hours of electricity) in Ontario.

☐ to sell or offer to sell electricity to large-volume consumers (annually consuming more than 150,000 kilowatt hours of electricity) in Ontario.

☐ to act as an agent or broker for a retailer with respect to the sale or offering for sale of electricity to large-volume consumers, or as an agent or broker for large-volume consumers with respect to the sale or offering for sale of electricity in Ontario.

☐ to act as an agent or broker for a retailer with respect to the sale or offering for sale of electricity to low-volume consumers, or as an agent or broker for low-volume consumers with respect to the sale or offering for sale of electricity in Ontario.

Is the applicant currently providing any of the above listed services?

☐ Yes, provide a list of the services the applicant is currently providing.

_____

_____

☐ No, indicate when the applicant intends to provide these services.

_____

(b) Wholesale Market Participation: does the applicant intend to operate in the IESO-administered markets and settle bilateral contracts through the IESO?

☐ Yes

☐ No, please explain how the applicant intends to participate.

_____

_____

(c) Retail Market Participation: does the applicant intend to settle the wholesale market cost of electricity consumed by its customers through a distributor's settlement system?

☐ Yes

☐ No, please explain how the applicant intends to participate.

_____

_____

The following sections of information (10 to 15) will be maintained **in confidence.**

10. Intended Market Activity

(a) Does the applicant intend to market green or alternative power? _____

(b) How many low-volume consumers does the applicant expect to serve each year? _____

(c) How many large-volume consumers does the applicant expect to serve each month? _____

(d) What is the average number of kilowatt hours the applicant plans to sell each month? _____

11. Corporate Organization

(a) Please provide a corporate organization chart.

(b) Please provide a detailed description of the applicant's current business activities.
(Note: Your response may be continued on a separate sheet.)

(c) Please describe the applicant's corporate organization and the applicant's relationship with its affiliates and associated entities (e.g., partnerships and limited partnerships) including a brief description of each entity's type of business.
(Note: Your response may be continued on a separate sheet.)

12. Finance

Note - It is preferable to receive financial information for the applicant and not an affiliate of the applicant.

Please provide audited financial statements for the last two years. If audited financial statements are not available, please provide unaudited financial statements for the applicant for the last two years. Documents must be signed by one key individual.

If the applicant does not have financial statements for itself, the applicant may submit the financial statements of its parent company. If the applicant submits the financial statements of its parent company, the applicant must also provide a parental guarantee. Please note that the Board has developed a parental guarantee template which the applicant may use by entering the necessary information and submitting it with the application. Please contact the Market Operations Hotline for further information or if you wish to obtain a copy of the template. An applicant may wish to provide its own parental guarantee. However, this will be subject to review during the application review process to determine whether or not it is satisfactory.

If the applicant does not submit financial statements for itself or its parent company, along with a parental guarantee, the applicant must identify and attach to its application at least two of the following items:

☐ Most recent prospectus and quarterly report.

☐ If the applicant is a new entity, pro forma financial statements for five years along with detailed notes or business plan explaining the assumptions used in preparing the pro forma statements. Documents must be signed by one key individual.

☐ Letter of reference from the applicant's bank showing the following information:

(a) Details respecting any line of credit(s) available to the applicant including dollar limit amount, outstanding amounts as of current date, terms and conditions and whether the account is secured;

(b) Details respecting cash and cash equivalents (names of short-term investments, amounts and expiry dates if applicable; name of saving/chequing accounts, date accounts opened, accounts balances as of current date); and

(c) Details of any bank guarantee and/or letter of credit available to the applicant including amounts and the terms and conditions.

☐ Other, please specify (e.g. general liability insurance, credit reports or credit ratings regarding the applicant's payment and credit history) _____

_____

If the financial statements of either the applicant or its parent company demonstrate that the applicant or parent company (as applicable) is not in a healthy financial position, the applicant may be required to submit additional items from the list above in support of its application.

13. Technical Resources

Does the applicant employ technical resource staff or contractors with appropriate qualifications and experience in retailing electricity?

☐ Yes, briefly describe the technical qualifications of the applicant's key technical and operational personnel.

(Note: Your response may be continued on a separate sheet.)

☐ No, identify plans to acquire the necessary technical resource for technical matters related to the electricity retailing activities.

(Note: Your response may be continued on a separate sheet.)

14. Legal Proceedings

(a) Has the applicant, an affiliate of the applicant, or an associated entity (e.g., a partnership or limited partnership) ever been declared bankrupt, or is it presently party to a bankruptcy proceeding?

☐ Yes, provide a copy of the Assignment in Bankruptcy, a list of creditors, or proof of discharge

☐ No

(b) Does the applicant, an affiliate of the applicant, or an associated entity (e.g., a partnership or limited partnership) have any unpaid judgements against it?

☐ Yes, provide a copy of each judgement and state the amount outstanding and repayment arrangements

☐ No

(c) Has the applicant, an affiliate of the applicant, or an associated entity (e.g., a partnership or limited partnership) been found guilty or convicted of a criminal offence under any law in the past 5 years or are any charges now pending?

☐ Yes, provide full particulars (Note: Your response may be continued on a separate sheet.)

☐ No

(d) Has the applicant, an affiliate of the applicant, or an associated entity (e.g., a partnership or limited partnership) ever had a licence or registration of any kind in Ontario and/or any other jurisdiction within North America refused, suspended, revoked or cancelled?

☐ Yes, provide full particulars (Note: Your response may be continued on a separate sheet.)

☐ No

(e) Has the applicant, an affiliate of the applicant, or an associated entity (e.g., a partnership or limited partnership) been subject to penalties, fines, voluntary payments as a result of an investigation or any other disciplinary actions by a regulatory body in Ontario and/or any other jurisdiction within North America in the past 5 years?

☐ Yes, provide full particulars (Note: Your response may be continued on a separate sheet).

☐ No

(f) If the applicant has been previously licensed by the Board, are there any outstanding licensing fees, outstanding information requests or compliance orders?

☐ Yes, provide particulars (Note: Your response may be continued on a separate sheet).

☐ No

(g) If the applicant, an affiliate of the applicant, or an associated entity (e.g., a partnership or limited partnership) is currently licensed to sell electricity or natural gas in Ontario, are there any customer complaints filed against these entities with the Ontario Energy Board in relation to the licensed activity?

☐ Yes, provide number of customer complaints filed with the Ontario Energy Board within at least the last 2 years (list according to quarterly reporting period) in the table below.

☐ No

Licensee Name	Business Activity	No. of complaints within at least the last 2 years (List by quarterly reporting period)

Please provide appropriate context for the number of complaints received:
(Note: Your response may be continued on a separate sheet.)

(h) If the applicant, an affiliate of the applicant, or an associated entity (e.g., a partnership or limited partnership) is currently licensed to sell electricity or natural gas in Ontario and/or any other jurisdictions, are there any customer complaints filed against these entities with regulatory bodies other than the Ontario Energy Board in relation to the licensed activity?

☐ No

☐ Yes, provide number of customer complaints filed with each regulatory body other than the Ontario Energy Board within at least the last 2 years (list according to quarterly reporting period) in the table below.

Licensee Name	Jurisdiction	Business Activity	Name of Regulatory Body	No. of complaints within at least the last 2 years (List by quarterly reporting period)

Please provide appropriate context for the number of complaints received:
(Note: Your response may be continued on a separate sheet.)

15. Key Individual Information

Key Individual Information - Required for each key individual identified in section 8. If there are more than three key individuals, please make a copy of section 15.

Key Individual Information # 1

a) Personal Information

Mr. ○ Mrs. ○
Miss ○ Ms. ○
Other ○ _____

Last Name | First Name | Initial

Title/Position

Company Name

Key Individual's Home Address:

City | Province/State | Country | Postal/Zip Code

Birthdate (yyyy/mm/dd) _____

b) Personal Experience in the Energy Sector

i) Has this person been a proprietor, officer or director with an entity that was granted a licence under the *Ontario Energy Board Act, 1998*?

☐ Yes, provide licence number and name of licensee _____

☐ No

ii) Has this person been a proprietor, partner, officer or director of an entity that was registered or licensed under any other statute of Canada or the United States in relation to the energy sector?

☐ Yes, provide jurisdiction, name of business and business activity _____

☐ No

iii) Does this person have experience in the energy sector?

☐ Yes, provide details

☐ No

c) Legal Proceedings

i) Has this person ever been declared bankrupt or is presently party to a bankruptcy proceeding?

☐ Yes, provide a copy of the Assignment in Bankruptcy, a list of creditors, or proof of discharge (provide full particulars)

☐ No

ii) Has this person been a proprietor, partner, officer or director of any entity that has been declared bankrupt or is presently party to bankruptcy proceedings?

☐ Yes, provide a copy of the Assignment in Bankruptcy, a list of creditors, or proof of discharge (provide full particulars)

☐ No

iii) Are there any unpaid judgements against this person?

☐ Yes, provide a copy of each judgement and state the amount outstanding and repayment arrangements (provide full particulars)

☐ No

iv) Has this person been found guilty or convicted of a criminal offence under any law in the past 5 years or are any charges now pending?

☐ Yes, provide full particulars

☐ No

v) Has this person been a proprietor, officer or director of an entity that had a registration or licence of any kind in Ontario and/or any other jurisdiction within North America refused, suspended, revoked or cancelled?

☐ Yes, provide name of business, jurisdiction and describe situation

☐ No

vi) Has this person been a proprietor, officer or director of an entity that had been subject to penalties, fines, voluntary payments as a result of an investigation or any other disciplinary actions by a regulatory body in Ontario and/or any other jurisdiction within North America in the past 5 years?

☐ Yes, provide name of business, jurisdiction and describe situation

☐ No

Documents to Support Identity

Copies of at least two documents to support key individual's identity must be submitted with the application. One of these documents must include a photo. The documentation must be valid, must be issued by federal or provincial authority, and must include the individual's name and signature. Examples of acceptable identification include a driver's licence, health card and passport. Please submit clear readable photocopies of both sides of the documents.

Signature of Key Individual	Date

15. Key Individual Information

Key Individual Information - Required for each key individual identified in section 8. If there are more than three key individuals, please make a copy of section 15.

Key Individual Information # 2

a) Personal Information

Mr. ○ Mrs. ○
Miss ○ Ms. ○
Other ○ _____

Last Name | First Name | Initial

Title/Position

Company Name

Key Individual's Home Address:

City | Province/State | Country | Postal/Zip Code

Birthdate (yyyy/mm/dd) _____

b) Personal Experience in the Energy Sector

i) Has this person been a proprietor, officer or director with an entity that was granted a licence under the *Ontario Energy Board Act, 1998*?

☐ Yes, provide licence number and name of licensee _____

_____

☐ No

ii) Has this person been a proprietor, partner, officer or director of an entity that was registered or licensed under any other statute of Canada or the United States in relation to the energy sector?

☐ Yes, provide jurisdiction, name of business and business activity _____

_____

☐ No

iii) Does this person have experience in the energy sector?

☐ Yes, provide details

☐ No

c) Legal Proceedings

i) Has this person ever been declared bankrupt or is presently party to a bankruptcy proceeding?

☐ Yes, provide a copy of the Assignment in Bankruptcy, a list of creditors, or proof of discharge (provide full particulars)

☐ No

ii) Has this person been a proprietor, partner, officer or director of any entity that has been declared bankrupt or is presently party to bankruptcy proceedings?

☐ Yes, provide a copy of the Assignment in Bankruptcy, a list of creditors, or proof of discharge (provide full particulars)

☐ No

iii) Are there any unpaid judgements against this person?

☐ Yes, provide a copy of each judgement and state the amount outstanding and repayment arrangements (provide full particulars)

☐ No

iv) Has this person been found guilty or convicted of a criminal offence under any law in the past 5 years or are any charges now pending?

☐ Yes, provide full particulars

☐ No

v) Has this person been a proprietor, officer or director of an entity that had a registration or licence of any kind in Ontario and/or any other jurisdiction within North America refused, suspended, revoked or cancelled?

☐ Yes, provide name of business, jurisdiction and describe situation

☐ No

vi) Has this person been a proprietor, officer or director of an entity that had been subject to penalties, fines, voluntary payments as a result of an investigation or any other disciplinary actions by a regulatory body in Ontario and/or any other jurisdiction within North America in the past 5 years?

☐ Yes, provide name of business, jurisdiction and describe situation

☐ No

Documents to Support Identity

Copies of at least two documents to support key individual's identity must be submitted with the application. One of these documents must include a photo. The documentation must be valid, must be issued by federal or provincial authority, and must include the individual's name and signature. Examples of acceptable identification include a driver's licence, health card and passport. Please submit clear readable photocopies of both sides of the documents.

Signature of Key Individual	Date

15. Key Individual Information

Key Individual Information - Required for each key individual identified in section 8. If there are more than three key individuals, please make a copy of section 15.

Key Individual Information # 3

a) Personal Information

Mr. ○ Mrs. ○
Miss ○ Ms. ○
Other ○ _____

Last Name | First Name | Initial

Title/Position

Company Name

Key Individual's Home Address:

City | Province/State | Country | Postal/Zip Code

Birthdate (yyyy/mm/dd) _____

b) Personal Experience in the Energy Sector

i) Has this person been a proprietor, officer or director with an entity that was granted a licence under the *Ontario Energy Board Act, 1998*?

☐ Yes, provide licence number and name of licensee _____

☐ No

ii) Has this person been a proprietor, partner, officer or director of an entity that was registered or licensed under any other statute of Canada or the United States in relation to the energy sector?

☐ Yes, provide jurisdiction, name of business and business activity _____

☐ No

iii) Does this person have experience in the energy sector?

☐ Yes, provide details

☐ No

c) Legal Proceedings

i) Has this person ever been declared bankrupt or is presently party to a bankruptcy proceeding?

☐ Yes, provide a copy of the Assignment in Bankruptcy, a list of creditors, or proof of discharge (provide full particulars)

☐ No

ii) Has this person been a proprietor, partner, officer or director of any entity that has been declared bankrupt or is presently party to bankruptcy proceedings?

☐ Yes, provide a copy of the Assignment in Bankruptcy, a list of creditors, or proof of discharge (provide full particulars)

☐ No

iii) Are there any unpaid judgements against this person?

☐ Yes, provide a copy of each judgement and state the amount outstanding and repayment arrangements (provide full particulars)

☐ No

iv) Has this person been found guilty or convicted of a criminal offence under any law in the past 5 years or are any charges now pending?

☐ Yes, provide full particulars

☐ No

v) Has this person been a proprietor, officer or director of an entity that had a registration or licence of any kind in Ontario and/or any other jurisdiction within North America refused, suspended, revoked or cancelled?

☐ Yes, provide name of business, jurisdiction and describe situation

☐ No

vi) Has this person been a proprietor, officer or director of an entity that had been subject to penalties, fines, voluntary payments as a result of an investigation or any other disciplinary actions by a regulatory body in Ontario and/or any other jurisdiction within North America in the past 5 years?

☐ Yes, provide name of business, jurisdiction and describe situation

☐ No

Documents to Support Identity

Copies of at least two documents to support key individual's identity must be submitted with the application. One of these documents must include a photo. The documentation must be valid, must be issued by federal or provincial authority, and must include the individual's name and signature. Examples of acceptable identification include a driver's licence, health card and passport. Please submit clear readable photocopies of both sides of the documents.

Signature of Key Individual	Date

16. Notice

The Board is authorized, under section 4.14 of the *Ontario Energy Act, 1998*, to collect personal information for the purpose of carrying out its duties and exercising its powers under the *Ontario Energy Board Act, 1998* or any other Act.

The information provided both on this form and attached to this form is being collected by the Board for the purpose of determining whether the applicant is qualified to receive the licence for which it is applying.

In order to verify the information on this form and/or determine whether the applicant is qualified to receive the licence for which it is applying, it may be necessary for the Board to collect additional information from some or all of the following sources: federal, provincial/state, or municipal governments; licensing bodies; law enforcement agencies; credit bureaus; and banks. Only information relevant to the application or the Board's determination of the application will be collected by the Board.

The public official who can answer questions about the collection of the information is:

Board Secretary
Ontario Energy Board
P.O Box 2319
2300 Yonge Street, 27th Floor
Toronto, ON
M4P 1E4

Tel: 416-481-1967 or 1-888-632-6273

Applicants are reminded that the Board is subject to the *Freedom of Information and Protection of Privacy Act* ("FIPPA"). FIPPA addresses circumstances in which the Board may, upon request, be required to release information that is in its custody or under its control, and generally prohibits the Board from releasing personal information. "Personal Information" has the meaning given to it under FIPPA.

17. Certification and Acknowledgement

(a) I certify that the information contained in this application and in the documents provided are true and accurate.

(b) I understand and acknowledge that, as a licenced electricity retailer, I must provide information as the Board may require from time to time.

(c) I understand and acknowledge that, as a licenced electricity retailer, I may have to meet requirements to disclose information to consumers in accordance with any government regulation made or standard set by the Board.

(d) I understand and acknowledge that the issuance of an electricity retailer licence does not guarantee accreditation by the Independent Electricity System Operator (IESO) or distributors.

(e) I understand and acknowledge that, if I intend to operate in the IESO administered markets and settle bilateral contracts through the IESO, I may have to post security (i.e., financial guarantee bond, security deposit) with the IESO to meet its prudential requirements.

(f) I understand and acknowledge that, if I choose to settle the wholesale cost of electricity consumed by my customers through a distributor's settlement system, I may have to meet prudential requirements set out in the Retail Settlement Code.

(g) I understand and acknowledge that, as a licensed electricity retailer, I must enter into a service agreement with the distributor before registering customers in a distributor's service area.

Name	Signature	Date

Must be signed by:
(a) the proprietor or by at least one partner, officer or director of the organization; and
(b) each key individual identified in section 8(b)

Checklist (return with application form)

- ☐ Two copies of the application form have been included with original signature on both copies.
- ☐ A cheque or money order for the non-refundable application fee has been included.
- ☐ A list of all officers and directors, including name and title has been attached to the application form.
- ☐ A corporate organization chart has been attached to the application form.
- ☐ Section 12 has been completed and all relevant financial information has been included.
- ☐ Section 15 has been completed for all key individuals.
- ☐ Each key individual has provided copies of two documents to support their identity. One of the documents includes a photo.

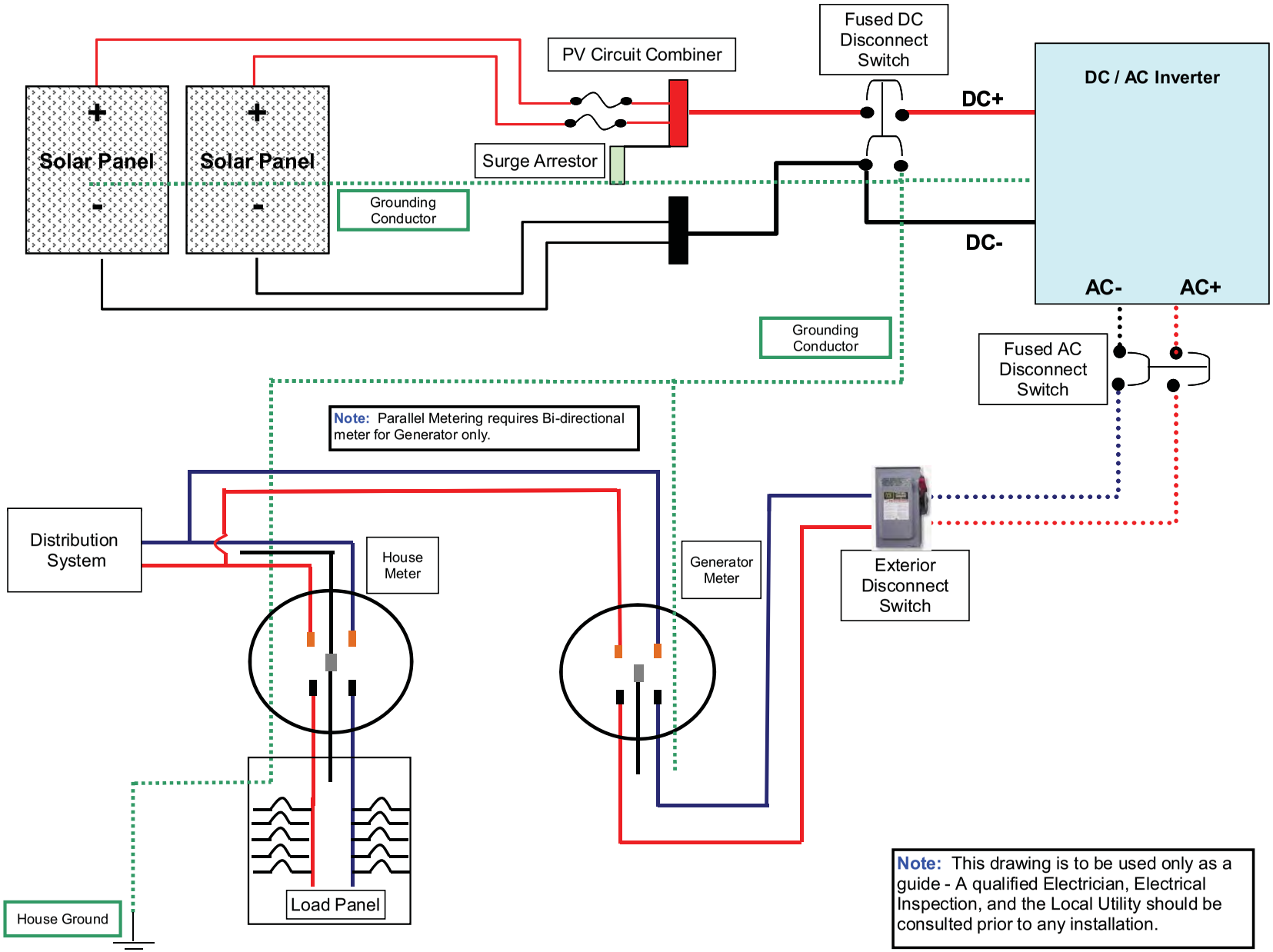
Appendix 9

MicroFIT Metering Options

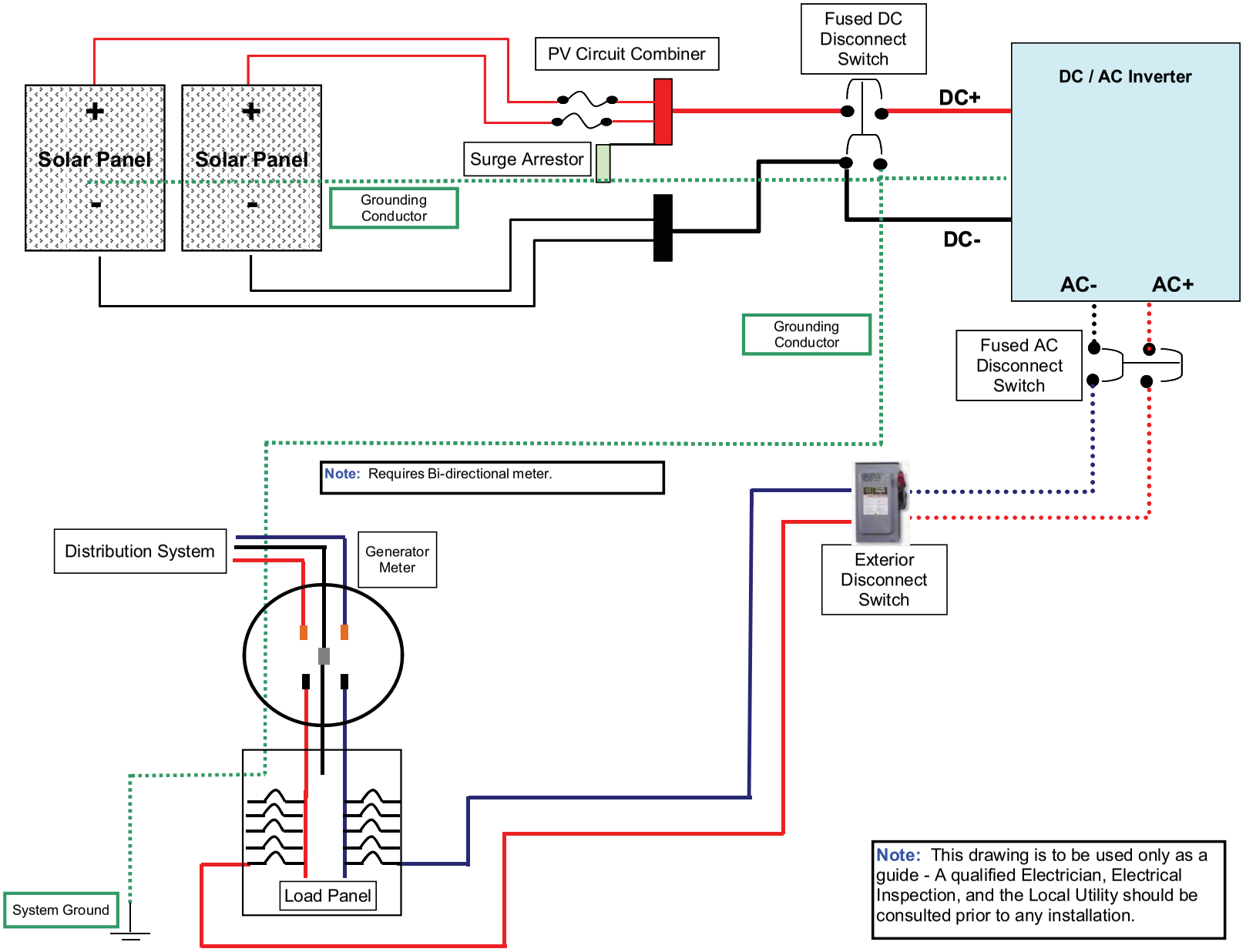
Note:

1. Metering is at the discretion of the LDC. Check with your LDC to confirm the metering arrangement to be utilized;
2. Drawings presented in Appendix 9 are only of illustrative purposes;
3. Generation type shown in drawing may vary;
4. A series connection would result in the generator not being eligible for payment under the FIT program.

Parallel Connection

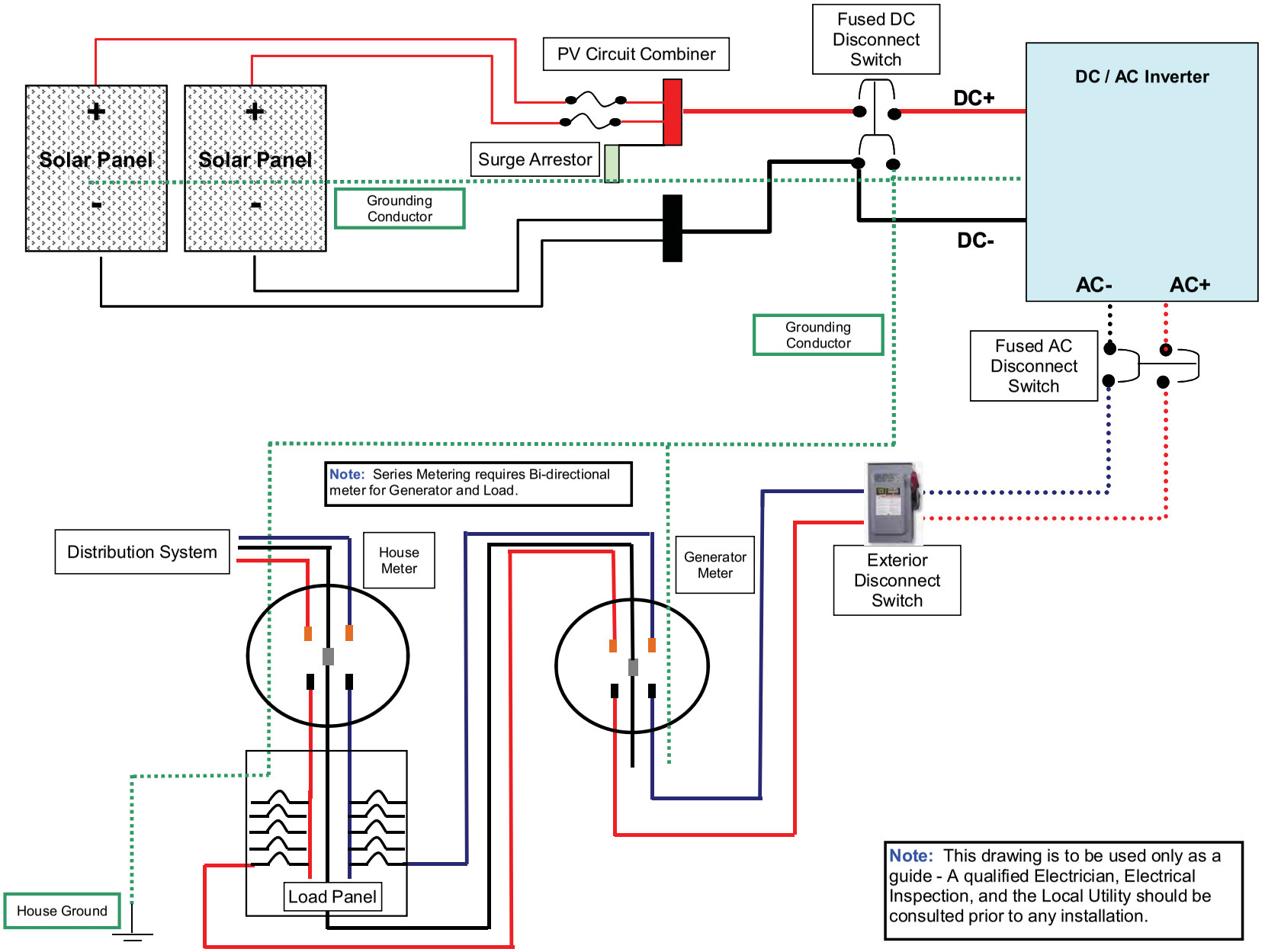


Stand-Alone or Net-Metering Generator Connection



Series Connection

This connection is not approval for the projects under FIT program.



Appendix 10

Hydroelectric Contract Initiative
(HCI)

Hydroelectric Contract Initiative (HCI)

As part of the province's commitment to increase Ontario's supply of clean, renewable generation, the OPA is developing a program to negotiate new contracts for qualified existing hydroelectric generation facilities in Ontario.

Background to the Hydroelectric Contract Initiative

In accordance with the direction from the Minister of Energy and Infrastructure, dated May 7, 2009, the OPA will enter into new contracts for hydroelectric facilities which are directly or indirectly connected to the IESO-Controlled Grid but not currently owned by Ontario Power Generation. The hydroelectric facility must not have been previously eligible for consideration under any renewable request for proposals issued by the Government of Ontario or the OPA, and may have either on contract, or a current contract with a provincial government body or agency, for any part of the generation output.

Facility Classification – "Large" or "Small" Facility

"Large" facilities are hydroelectric facilities that are generally capable of scheduling and dispatch in the IESO-Administered Markets, are connected directly or through a host load facility to the Transmission System, and are in most cases larger than 10 MW.

"Small" facilities are hydroelectric facilities that are generally not capable of, or do not warrant, scheduling and dispatch in the IESO-Administered Markets, are connected directly or through a host load facility to a Distribution System or, in some cases, to the Transmission System, and are in most cases less than 10 MW.

Basic Eligibility Requirements

To be eligible for a contract under the HCI, a hydroelectric generating facility must:

- constitute an existing hydroelectric generating facility on May 7, 2009;
- be located in the Province of Ontario;
- be connected to a Distribution System, the Transmission System or to a Host Facility;
- have metering suitable for HCI data collection and settlement purposes, as described in the HCI Contract;
- meet all relevant requirements of the IESO Market Rules, Distribution System Code, Transmission System Code, the Connection Agreement, in each case, as applicable, and all other Laws and Regulations;

- not have or have had a physical or financial power or capacity purchase contract with the OPA relating to the generation of Electricity by such hydroelectric facility (which, for greater certainty, includes a Standard Offer Contract), or other form of contract with the OPA relating to Electricity or Related Products relating to such hydroelectric facility (a "Prior OPA Contract"), unless such Prior OPA Contract was terminated (other than as a result of an event of default) or expired prior to May 7, 2009;
- not have been previously eligible for consideration under any renewables request for proposals issued by the Government of Ontario or the OPA;
- not have or have had a physical or financial power or capacity purchase contract with the OEFC or other agency of the Government of Ontario relating to the generation of Electricity by such hydroelectric facility, or other form of contract with the OEFC or other agency of the Government of Ontario relating to Electricity or Related Products relating to such hydroelectric facility (an "**Existing OEFC Contract**"), unless such Existing OEFC Contract was terminated before May 7, 2009 or the original contract term of such Existing OEFC Contract has expired or is expected to expire (other than through an event of default) within the next 18 months or within 36 months where the OPA determines that the Applicant plans an Upgrade of the hydroelectric facility immediately thereafter; and
- not be owned or controlled by Ontario Power Generation.

Upgrade Eligibility Requirements

An expansion or a redevelopment, or a combination may constitute an upgrade. Refurbishment of an existing hydroelectric facility in and of itself does not constitute an Upgrade. An Upgrade may be eligible for upgrade conditions under the HCI (the "Upgrade Provisions"). A hydroelectric facility must meet the following conditions to be eligible for the Upgrade Provisions:

- meet the basic eligibility requirements;
- comply with all applicable provisions specified the HCI Contract;
- demonstrate to the OPA that the material upgrade will result in the actual generating capacity of the hydroelectric facility being increased by more 5%;

To be eligible for Upgrade Provisions in respect of redevelopment, a hydroelectric facility must also, in the reasonable judgment of the OPA, be a redevelopment project which satisfies the following criteria:

- absent redevelopment, the existing hydroelectric facility must be near to the end of its useful life;
- the redeveloped hydroelectric facility must have an in service date after May 7, 2009;

- the powerhouse and the physical infrastructure for the conveyance and utilization of water must be substantially replaced; and
- following redevelopment, the expected life of the hydroelectric facility must be comparable with that of a new hydroelectric facility.

Contract Term

Every HCI Contract will be for a 20 year term unless special circumstances preclude an Applicant from entering into a HCI Contract for 20 years.

An Applicant in respect of a hydroelectric facility that includes an Upgrade may (but is not required to) defer the Term Commencement Date by up to 36 months pending commercial operation of the Upgrade. Upgrade Provisions shall not result in any extension to the Term of the HCI Contract.

Standard Price

The HCI Contract specifies the Contract Price and Contract Payment for Hourly Delivered Electricity from the Facility. The Contract Price is intended to reflect a reasonable cost to Ontario electricity customers and a reasonable balancing of risk and reward for the Supplier, taking into account the operating characteristics of these hydroelectric facilities and the value of their output.

The 2009 base year Contract Price is $69/MWh. 100% of the Contract Price will be subject to escalation from the 2009 base year in proportion to CPI.

Contract Price will be time differentiated The application of the Peak Performance Factor will result in higher payments during On-Peak Hours and lower payments during Off-Peak Hours to encourage a Facility to schedule their production during On-Peak Hours to the extent practicable.

Contract Price for an Upgrade

A differentiated contract price shall be available for an Upgrade. This is referred to as the Upgraded Contract Price. The Upgraded Contract Price is intended to reflect the economics which are generally equivalent to those that a Supplier would have obtained by contracting:

- under the HCI Contract for the original (pre-expansion) capacity including any special price established for redevelopment; and
- under the FIT program for the incremental (post-expansion) capacity, adjusted to reflect the 20 year permitted term of an HCI Contract.

The Upgraded Contract Price effective on commercial operation of the Upgrade and applicable to all output from the Facility. The calculation of the Upgraded Contract Price is complex. For details, please refer to the web site of OPA.

For more details of this initiative, refer to the website of Ontario Power Authority: http://www.powerauthority.on.ca/ and search for “Hydroeclectric Contract Initiative”.

Appendix 11

LDCs Contacts and System Voltages

LDC	Micro FIT Contact	FIT Contact	Address	Phone	Fax	e-mail	System Voltages
Centre Wellington	Pat Kelly	Pat Kelly	P.O. Box 217, 730 Gartshore St. Fergus ON N1M 2W8	(519) 843-2900 ex 222	(519) 843-4389	kelly@cwhydro.ca	Distribution: 4.16 kV Subtransmissioin: 44 kV
COLLUS Power	Jeff Hansen	Jeff Hansen	P.O. Box 189 43 Stewart Road Collingwood ON L9Y 3Z5	(705) 445-1800	(705) 445-0791	jhansen@collus.com	Distribution: 4.16 kV, 8.32 kV Subtransmissioin: 44 kV
Innisfil Hydro	Brenda Pinke	Brenda Pinke	2073 Commerce Park DR., Innisfil ON, L9S 4A2	(705) 431-4321	(705) 431-5901	brendap@innisfilhydro.com	Distribution: 8.32 kV, 27.6 kV Subtransmission: 44 kV
Lakefront Utilities	Carol Gutteridge	Dale Dingwall	207 Division Street, P.O. Box 577, Cobourg ON, K9A 4L3	(905) 372-2193	(905) 372-2581	CGutteridge@lusi.on.ca ddingwall@lusi.on.ca	Distribution: 27.6 kV, 4.16 kV Subtransmission: 44 kV
Lakeland Power	Vince Kulchycki	Vince Kulchycki	Operations 196 Taylor Road, Bracebridge ON P1L 1V7	(705) 645-2670	(705) 645-4667	vkulchycki@lakelandholding.com	Distribution: 27.6 kV, 12.5 kV, 4.16 kV Subtransmission 44 kV
Midland Power	Christine Bell	Christine Bell	16984 Highway 12, P. O. Box 820 Midland ON L4R 4P4	(705) 526-9361	(705) 526-7890	cbell@midlandpuc.on.ca	Distribution: 4.16 kV, 8.32 kV Subtransmissioin: 44 kV
Orangeville Hydro	Pietra Velinor	Pietra Velinor	400 C-Line P.O. Box 400, Orangeville ON L9W 2Z7	(519) 942-8000	(519) 941-6061	pietra.velinor@orangevillehydro.on.ca	Distribution: 4.16kV, 12.5kV, 27.6 kV Subtransmission: 44 kV
Parry Sound Power	Calvin Epps	Calvin Epps	125 William Street, Parry Sound ON, P2A 1V9	Ph: 705-746-5866	Fax: 705-746-7789	cepps@pspower.ca	Distribution: 12.5 kV, 4.16 kV Subransmission: 44 kV
Rideau St. Lawrence Dist.	John Walsh	John Walsh	985 Industrial Road, Prescott ON, K0E 1T0	Ph: (613) 925-3851	Fax: (613) 925-0303	jwalsh@rslu.ca	Distribution: 4.16 kV , 8.32 KV Subtransmissioin: 44 kV
Wasaga Distribution	Paul Trace	Paul Trace	950 River Road West, P.O. Box 20 Wasaga Beach ON L9Z 1A2	(705) 429-2517	(705) 429-2590	p.trace@wasagadist.ca	Distribution: 8 kV Subtransmission: 44 kV
Wellington North Power	Judy Rosebrugh Ryan Roopnaraine	Judy Rosebrugh Ryan Roopnaraine	290 Queen St. W. P.O. Box 359, Mount Forest, ON N0G 2L0	(519) 323-1710 (519) 323-1710	(519) 323-2425 (519) 323-2425	jrosebrugh@wellingtonnorthpower.com rroopnaraine@wellingtonnorthpower.com	Distribution: 4.16 kV, 8.32 kV Subtransmissioin: 44 kV
West Coast Huron Energy Inc.	Jennette Walker	Jennette Walker	57 West Street, Goderich ON N7A 2K4	(519)524-7371	(519) 524-7930	jwalker@goderich.ca	Distribution: 27.6 kV, 4.16 kV Subtransmission: 27.6 kV

Non CHEC Participant(s) in the Guide

Brant County Power Inc.	Wendy Robinson	Wendy Robinson	65 Dundas Street, E. Paris, Ont N3L 3H1	(519)442-2215 ext726	(519) 442-3701	wrobinson@brantcountypower.com	Distribution: 4.16 kV, 8,32 kV, 27.6 kV

Appendix 12

Exhibit A – Form of LDC Authorization Letter

EXHIBIT A – FORM OF LDC AUTHORIZATION LETTER

TO: _____ _____ **[Insert full legal name of Local Distribution Company]** (the "**LDC**")

AND TO: Ontario Power Authority (the "**OPA**")

RE: Disclosure of Information

_____ **[insert Applicant's full legal name]** (the "**Supplier**"), as the owner and operator of the embedded hydroelectric generation facility located at _____ _____ **[insert hydroelectric facility address]** and connected to the LDC's electricity distribution system at _____ **[insert description of connection point]** (the "**Facility**"), hereby irrevocably authorizes and consents to your releasing, disclosing, providing, delivering and otherwise making available to the OPA or to its agents, successors and assigns, any and all such information relating to the connections, meters, meter data, billing data and LDC account of the Supplier or the Facility as the OPA, its agents, successors or assigns may advise is required in connection with the evaluation, offer and administration of a contract under the OPA's Hydroelectric Contract Initiative.

And, if connecting to a Host Facility:

_____ **[insert Host Facility's full legal name]** (the "LDC Customer"), as a customer of the LDC with account number _____ **[insert Host Facility's LDC account number from most recent electricity bill]** relating to the property located at _____ **[insert Host Facility Address]** (the "**Account**") and connected to the LDC's electricity distribution system, hereby irrevocably authorizes and consents to your releasing, disclosing, providing, delivering and otherwise making available to the OPA or to its agents, successors and assigns, any and all such information relating to the connections, meters, meter data, billing data and LDC account of the LDC Customer or the Account as the OPA, its agents, successors and assigns may advise is required in connection with the evaluation, offer and administration of a contract under the OPA's Hydroelectric Contract Initiative.

DATED as of the ___ day of _____, 20___.

SUPPLIER: Per:_____

Name:
Title:
I have authority to bind the Supplier.

LDC CUSTOMER: Per:_____

Name:
Title:
I have authority to bind the LDC Customer.

Appendix 13

Useful Links

1. Web-Links Pertaining to Generation Guide:

OEB, Distribution System Code:
http://www.oeb.gov.on.ca/documents/cases/EB-2005-0447/appendixf_201206.pdf

OEB, Application for an Electricity Generation Licence – Feed-in Tariff Program:
http://www.oeb.gov.on.ca/OEB/_Documents/Licences/FIT_Generator_application.pdf

OEB, Application for an Electricity Generation Licence – Standard Offer Program:
http://www.oeb.gov.on.ca/OEB/_Documents/Licences/StandardOfferProgram_Generator_application.pdf

OEB, Application for an Electricity Generation Licence
http://www.oeb.gov.on.ca/OEB/_Documents/Licences/Electricity_Generator_application.pdf

Electrical Safety Authority:
http://www.esasafe.com/

Hydro One Network Inc. "Distributed Generation Technical Interconnection Requirements Interconnections at Voltages 50kV and Below":
http://www.hydroone.com/Generators/Documents/Distribution/Hydro%20One%20Networks%20Inc%20DG%20Technical%20Interconnection%20Requirements.pdf

Ontario Power Authority, FIT Program:
http://fit.powerauthority.on.ca/Page.asp?PageID=1115&SiteNodeID=1052

Ontario Power Authority, microFIT Program:
http://microfit.powerauthority.on.ca/

Ontario Power Authority, Hydroelectric Contract Initiative Program:
http://hci.powerauthority.on.ca/

Cornerstone Hydro Electric Concepts Association Inc., Conditions of Service:
http://www.collus.com/sites/default/files/Conditions_of_Service_Version_6_0_2008.pdf

2. Websites of Participants in Generation Guide:

Centre Wellington Hydro Ltd.:
http://www.cwhydro.ca/

Collus Power Corporation:
http://www.collus.com/

Innisfil Hydro Distribution System Ltd.:
http://www.innisfilhydro.com/

Lakefront Utilities Inc.:
http://www.lusi.on.ca/

Lakeland Power Distribution Ltd.:
http://www.lakelandpower.on.ca/

Midland Power Utility Corporation:
http://www.midlandpuc.on.ca/

Orangeville Hydro Ltd.:
http://orangevillehydro.on.ca/

Parry Sound Power Corporation:
http://www.pspower.ca/

Rideau St. Lawrence Distribution Inc.:
http://www.rslu.ca/

Wasaga Distribution Inc.:
http://www.wasagadist.ca/

Wellington North Power Inc.:
http://www.wellingtonnorthpower.com/

West Coast Huron Energy Inc.:
http://www.goderichhydro.ca/Home.aspx

Brant County Power Inc.:
http://www.brantcountypower.com/