ENERGY+ INC.

GENERAL REQUIREMENTS FOR DISTRIBUTED GENERATION

EFFECTIVE: September 1, 2017

Energy+ Inc.
GENERAL REQUIREMENTS
FOR DISTRIBUTED GENERATION

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ENERGY+ INC. GENERAL REQUIREMENTS FOR DISTRIBUTED GENERATION

1 INTRODUCTION

Energy+ Inc. is a corporation incorporated under the laws of the Province of Ontario and a Distributor of electricity.

This document describes the general requirements for connecting a distributed generator (DG) to the Energy+ distribution system. These requirements are regulated by the Ontario Energy Board (OEB) (www.oeb.gov.on.ca) and are partially detailed in the OEB's Distribution System Code (DSC). The DSC sets the minimum obligations that a licensed electricity distributor must meet in carrying out its obligations to distribute electricity within its Service Area under its license and the *Energy Competition Act.*

This document is in addition to the requirements of Energy+'s Conditions of Service and all other requirements of Energy+. The Generator agrees to comply with all requirements as amended by Energy+ from time to time.

For inquiries relating to the connection of distributed generation facilities, please contact:

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If at any time the Generator feels that Energy+ is not being fair and reasonable, the Generator may request a review by Energy+ using the dispute resolution process outlined in Energy+'s Conditions of Service (section 1.8).

2 GENERAL REQUIREMENTS

The following general requirements must be met by the Generator:

1. The health and safety of the general public, utility personnel (or its agents) and the Generator's personnel must not be compromised or adversely affected in any way.

2. The Generator must not adversely affect or compromise equipment owned or operated by Energy+ (and Hydro One who is our transmitter, where applicable) nor the security, reliability and the quality of electrical supply of other customers connected to the Energy+ distribution system.

3. The Generator must meet all of Energy+'s requirements (and any Hydro One and/or IESO (www.ieso.ca) requirements (if applicable)) and comply with the Electrical Safety Code (as administered by the Electrical Safety Authority (ESA)).

Under no circumstances will the Generator be allowed to connect to the Energy+ distribution system unless Energy+'s requirements are met. If at any time these requirements are not met, Energy+ will have the right to refuse connection or to immediately disconnect the Generator from the Energy+ distribution system.

The Generator shall be responsible for ensuring that:

1. Appropriately certified and rated equipment is correctly installed;

2. Personnel involved in operating and maintaining the DG are qualified (i.e. knowledgeable and properly trained in operation and safe working procedures);

3. Maintenance is carried out on a regular basis by qualified personnel;

4. All necessary and required care is taken to protect the public, utility personnel (or its agents) and the Generator's personnel from hazards associated with the generation system of the DG;

5. The Generator's Facilities are inspected and approved by the ESA;

6. The installations, connections and operations meet all the requirements of Hydro One (our transmitter), the IESO, (if applicable), federal, provincial, and municipal statutes, regulations, bylaws, and codes, that pertain to the DG; and

7. It obtains the necessary licences and permits to install and operate the DG.

3 CONNECTION PROCESS

Subject to all applicable laws, regulations and codes, Energy+ will make all reasonable efforts to promptly connect a generation facility to its distribution system.

3.1 MICRO-DISTRIBUTED GENERATION (<=10kW)

The connection process for Micro-Distributed Generation (<= 10kW) is as follows:

3.1.1 Request for Information

The Generator proposing the installation of a Micro-Distributed generation facility contacts Energy+ and the ESA for information.

3.1.2 Provision of Information

Energy+ provides a copy of this document to the Generator to outline the connection process, required approvals, technical requirements (including metering), application form and contractual requirements.

The ESA is responsible for provision of information on electrical safety requirements. The ESA can be contacted at 1-877-ESA- SAFE (1-877-372-7233). The ESA's web site is www.esainspection.net. The ESA has published a booklet entitled "Electrical Guidelines for Inverter-Based Micro-Generating Facility (10kW and Smaller)" which is a useful guide.

3.1.3 Development of Generation Plan

The Generator reviews the relevant information from Energy+ and the ESA and puts together an installation plan.

3.1.4 Application Process

The Generator submits an application, Appendix 1 and Appendix 4, to Energy+ for an Offer to Connect. Energy+ will make an Offer to Connect or provide reasons for refusing to connect the proposed generation facility within 15 calendar days. The Offer to Connect is good for 6 months.

3.1.5 ESA Electrical Inspection Application

The Generator submits plans and specific information to the ESA for inspection. Step 3.1.5 runs in parallel with Step 3.1.6.

3.1.6 Energy+ Review of Application

3.1.6.1 For Generator at Existing Customer Connection

- Typical requirement is a new meter.
- Energy+ will check if a service upgrade is required based on Generator supplied information.
- Energy+ will check if there are any issues associated with a significant amount of generation already on the supply feeder.
- Energy+ will inform the Generator of any requirements specific to the connection (typically requirements for metering), costs and timing to implement.
- Energy+ will not charge for preparation of the Offer to Connect.

3.1.6.2 For Generator Not at Existing Customer Connection

A Customer Connection must first be established before an agreement can be made for connection of generation to Energy+'s system. This new connection process can be done at the same time as the proposed generation connection process, but the time lines will likely be extended since more work may be required.

3.1.7 Decision to Proceed

If the Generator decides to proceed, the Generator will:

- Commit to paying Energy+ for connection assets (including metering);
- Complete, sign and return the Micro-Distributed Generation Facility Connection Agreement (Appendix 2) to Energy+;
- Complete, sign and return the New Generation Account Application Form (Appendix 3) to Energy+;
- Complete, sign and return the Sales Tax (GST/HST) Form (Appendix 6), if applicable, to Energy+;
- Begin to install the generation;
- Work closely with Energy+ and the ESAand any other organizations from which work, inspections, approvals or licences are required to prevent delays;
- Plan activities in coordination with project milestones and initiate actions at required times; and
- Apply for electrical inspection with the ESA.
- For Net Metering projects, install a disconnect switch with a viewing window between generator and the service panel.

3.1.8 Final Connection

The Generator will contact Energy+ after completing the ESA inspection process and receiving an Authorization to Connect. Energy+ will respond within 5 business days to make any necessary metering changes and connect the Generator's Micro-Distributed generation facility to Energy+'s distribution system. Energy+ will check to ensure that all Generator commitments have been satisfied (i.e. ESA Authorization to Connect, Signed Connection Agreement, receipt of any required payment, etc.) prior to final connection.

3.2 GENERATION > 10kW

Generation greater than 10kW is classified into three categories as follows:

Small: <= 500kW connected on distribution system voltage < 15kV
<= 1MW connected on distribution system voltage >=15kV

Mid-Sized: <= 10MW but > 500kW connected on distribution system voltage < 15kV
> 1MW but <= 10MW connected on distribution system voltage >= 15kV

Large: > 10MW

The connection process is as follows:

3.2.1 Initial Contact

The Generator proposing the installation of a generation facility contacts Energy+ and the ESA. The transmitter (Hydro One) may need to become involved. The Generator must contact the OEB regarding licence applications. For all projects over 10MW, the IESO must be involved.

3.2.2 Provision of Information

Energy+ provides a copy of this document to the Generator to outline the connection process, required approvals, technical requirements (including metering), contractual requirements (Connection Agreement), application form and the potential involvement of the transmitter (Hydro One), the IESO and the OEB.

The ESA is responsible for provision of information on electrical safety requirements and its plan approval process.

3.2.3 Development of Generation Plan

The Generator reviews the relevant information from Energy+ and the ESA and puts together an installation plan. The Generator should follow Section 5 for Net Metering Program. Net Metering project over 10 kW require Connection Impact Assessment.

3.2.4 Initial Consultation (No Charge)

The Generator requests a preliminary meeting and submits the Preliminary Meeting Application Form (Appendix 4), including the following information:

- The name-plate rated capacity of each unit of the proposed generation facility and the total name-plate rated capacity of the proposed generation facility at the connection point;
- The fuel type of the proposed generation facility;
- The type of technology to be used; and
- The location(s) of the proposed generation facility including address and account number with Energy+ where available.

Within 15 business days of receipt of the Preliminary Meeting Application Form, Energy+ will set up a meeting (via phone/email/in person) with the Generator to review the plans at a basic level including:

- Location of existing distribution facilities in reference to proposed generation facility;

- The Energy+ distribution system technical information required to be provided by sections 6.2.9.1 and 6.2.9.3 of the Distribution System code, if this has been requested by the Generator
- Rough estimate on time and costs which could be associated with the project; and
- Basic feasibility of the project.

3.2.5 Application for Connection Impact Assessment

The Generator applies for a CIA by completing and submitting the Connection Impact Assessment Application Form (Appendix 5) and makes payment with the application. A CIA will also be required from Hydro One if the Generator is connected to a part of Energy+'s distribution system that is fed from a Hydro One Transformer Station. Projects greater than 10MW will require a System Impact Assessment (SIA) by the IESO. Energy+ will collect payment from the Generator and forward all necessary payments and applicable information on behalf of the Generator to Hydro One and the IESO as required.

Please note that all technical submissions associated with the CIA Application Form, including the form itself, must be signed and sealed by a licensed Ontario Professional Engineer (P.Eng).

3.2.6 Connection Impact Assessment

Energy+ performs an impact assessment of the proposed generation on the distribution system and customers considering:

- Voltage impacts;
- Current loading;
- Fault currents; and
- Connection feasibility and identification of lines/equipment upgrades required, distribution or transmission system protection modifications, and metering requirements.

Where necessary, Energy+ receives an impact assessment from Hydro One and the IESO.

For Small generation, an Offer to Connect will be made at the end of the impact assessment. For Mid-Sized generation, an overview of cost implications will be made at the end of the impact assessment. For Large generation, all costing will be addressed at a later step.

3.2.6.1 Timing

The time to review and inform the Generator about the results of the impact assessment is as follows from the date of receipt of payment and application:

- Small: up to 60 calendar days where no distribution system reinforcement or expansion is required to facilitate generator connection, up to 90 calendar days where a distribution system reinforcement or expansion is required to facilitate generator connection
- Mid-Sized: up to 60 calendar days
- Large: up to 90 calendar days

3.2.7 Decision to Proceed

If the Generator decides to revise the original plans based on results of the impact assessment, the plans must be re-submitted for another review by going back to Step 3.2.5. Any change in design, equipment or plans requires notification to the ESA.

3.2.7.1 Small

If the Generator is satisfied and decides to proceed:

- Both parties sign a CCA;
- Generator commits to payments;
- Both parties commit to schedules, information exchange, scope of work of the Generator and of Energy+;
- Energy+ initiates the work to be done to facilitate the connection;
- Generator initiates the required activities; and
- Generator must work closely with Energy+, the ESA, the IESO (if applicable) and any other organizations from which work, inspections, approvals or licences are required to prevent delays.

3.2.7.2 Mid-Sized and Large

If the Generator feels that the results of the CIA are manageable, the Generator will request a meeting to develop a scope so that Energy+ can prepare an estimate and an Offer to Connect.

If the Generator decides to proceed:

- both parties agree to, and sign, scope of project; and
- Generator pays for preparation of estimate by Energy+, Hydro One (if applicable), and IESO (if applicable).

Energy+ will notify Hydro One and the IESO as required within 10 business days of receiving payment and notification that the Generator has decided to proceed and that an estimate is to be prepared.

Energy+ will prepare a detailed estimate of the project based on the agreed upon scope.

Energy+ will prepare its Offer to Connect within 90 calendar days of receipt of payment from the Generator. In any event, Energy+ has up to 30 calendar days from date of receipt of comments from Hydro One and/or the IESO to incorporate them into the estimate.

If the Generator decides to proceed after reviewing the Offer to Connect:

- All parties agree to, and sign, a CCA
- Generator agrees to payment schedule for work required by Energy+ and/or Hydro One and/ or the IESO;
- All parties commit to schedules, information exchange, scope of work; and
- The generator must work closely with Energy+, the ESA, the IESO (if applicable) and any other organizations from which work, inspections, approvals or licences are required to prevent delays.

3.2.8 Implementation

Both parties commit to obtain required approvals:

- Generator prepares detailed engineering drawings;
- Generator submits all detailed plans to ESA for Plan Approval process (includes detailed single line diagram and interface protection); and
- Generator submits the following information to Energy+ for design review (three copies certified by a licensed Ontario Professional Engineer (P.Eng.)):
    - Project Summary containing:
        - site location
        - prime mover type (internal combustion engine, gas turbine etc.)
        - anticipated generator output (including any seasonal and daily variations)
        - proposed installation schedule
        - future expansion plans (if applicable)
    - Single line electrical diagrams containing:
        - generator connections
        - voltage levels
        - transformer connections
        - isolating devices
        - fusing
        - protective relaying
        - metering
    - Nameplate data on:
        - protective relays (including descriptive bulletins)
        - synchronizing devices (including descriptive bulletins)
        - load interrupter switches (including reactance levels)
        - generator(s) (including reactance levels)
        - transformer(s) (including reactance levels)
        - circuit breakers (including descriptive bulletins)

- Protection system design and operating procedures.
- AC and DC protection schematics.
- Fault calculations, protective relay settings, fuse selection and co-ordination study.
- Station service and battery system details.
- Grounding studies and results.
- Commissioning procedures and schedule.
- Operating procedures.
- Maintenance procedure and record keeping.

It is recommended that this information be provided within 30 days of signing the CCA to allow for a timely design review.

Energy+ performs design review to ensure that the detailed engineering is acceptable. It is recommended that this review be complete before equipment purchase by the Generator. Energy+ will not be held liable for any costs incurred for equipment or services ordered before the design review is complete.

The Generator receives the design review from Energy+. The Generator can then order equipment, begin construction, obtain ESA approvals, etc. Energy+ can begin connection work and complete any necessary line/equipment upgrades.

The Generator completes construction and applies for ESA electrical inspection for an Authorization to Connect (necessary for connection by Energy+).

3.2.9 New Account Application, Sales Tax Form, and Connection Agreement

If the Generator is not applying under the Net Metering Program then they must complete and submit a New Generation Account Application Form (Appendix 3) at least 30 days prior to the proposed date of connection.

If the Generator is a GST/HST registrant and will be collecting HST on the electricity commodity then the Sales Tax (GST/HST) Form (Appendix 6) must be completed and submitted.

The Generator and Energy+ agree to, and sign, the Connection Agreement. If necessary, Energy+ and Hydro One will review existing agreements for required revisions.

The form of the Connection Agreement is contained in Appendix E of the OEB Distribution System Code.

A temporary Connection Agreement for the purpose of connection for commissioning and verification may be signed at this point while negotiating the final Connection Agreement.

3.2.10 Commissioning and Verification

The Generator arranges for commissioning and testing of the facility. Energy+ witnesses and verifies the commissioning process. Hydro One witnesses and verifies the commissioning process as required. A final Connection Agreement is signed if a temporary one was used for commissioning and verification.

3.2.11 Completion

If everything is satisfactory, the generation facility is fully connected and operational. The Generator must ensure that all Energy+ obligations are met if participating in the Net Metering Program in order to ensure excess generation credits are accumulated in a correct manner.

4 GENERAL TECHNICAL REQUIREMENTS

The Generator shall ensure that the connection of its generation facility to the distribution system does not materially adversely affect the safety, reliability and efficiency of Energy+'s distribution system. Generation facilities must meet the technical requirements specified in the OEB's Distribution System Code, Appendix F.2 of the OEB's Distribution System Code and the requirements of Energy+.

Generation facilities will vary significantly in size, complexity and details. The following sections describe some general technical requirements that may or may not apply to a specific installation. Specific technical requirements will be provided to each applicant for new generation based on the specifics of the project.

4.1 CONNECTION POINT

4.1.1 Interconnection Switch

Three-phase, gang-operated, lockable, visible opening load interrupting switch(es) with provision for grounding shall be installed at the interface point between the Energy+ distribution system and the Generator's Facilities, including the metering. The use of the switch(es) will be to isolate the DG in case of emergency and for work protection. The switch(es) shall be provided, installed and maintained by the Generator unless other arrangements are made and approved by Energy+. Energy+ will have operating control of the interconnection switch(es).

4.1.2 Energy+ Access

Immediate access to the interconnection switch(es) as well as the rest of the Generator's Facilities where other operating devices, relays, control switches, metering equipment, etc. associated with the DG may be located must be provided on a 24 hour, 7 days a week basis for Energy+ personnel or its agents.

4.1.3 Fault Interrupting Devices

Suitable three-phase fault interrupting devices (circuit breakers acceptable to Energy+) shall be provided to immediately interrupt and isolate faults in the utility or faults in the Generator's Facilities and handle other abnormal conditions such as "islanding".

4.1.4 Generation Connection Point

A generating unit may be connected to the Generator's existing electrical system. The generation connection point is often not at the service entrance, but downstream at one of the Generator's switchboards. In the latter case, an alternate type of load break switch may be acceptable to Energy+. The generator connection switch must still meet functional requirements outlined above and pass ESA inspection. A mechanical interlock between the generator connection switch and the generator breaker will be required. The generator connection switch must have visible isolation.

4.1.5 Point Of Isolation

For the work protection of Energy+ crews, a point of isolation is *always* required to isolate the DG. A local disconnect must be installed between the generation meter and the generator and must be located within 2.0m of the load meter.

4.1.6 Supervisory Control

Supervisory control may be required for the control and monitoring of the load interrupting switches and circuit breakers, annunciation of the interface protection failure and telemetry of generator power outputs. If Energy+ determines supervisory control is required, the Generator will be required to cover all costs associated with the installation of a Generator owned RTU (Remote Terminal Unit) and associated hardware compatible with the Energy+ Control Centre SCADA system and initial and ongoing communication costs. If the capacity of a generator is less than or equal to 500 kW on Energy+, SCADA and PQ monitoring are not required.

4.2 VOLTAGE

4.2.1 Primary Distribution Voltage Level

Energy+ primary distribution voltages are 4.16 kV, 8.32kV and 27.6 kV depending on the geographical area. The distribution circuits are effectively grounded for 4-wire distribution (phase to neutral connected loads).

There are size limitations with respect to connecting DGs to 27.6kV underground residential distribution systems that primarily supply residential and low-density commercial areas.

No "Mid-Size" or "Large" generation connections may be made on the 4.16 kV or 8.32kV system since this system is being converted to 27.6 kV. "Small" connections to

the 4.16kV or 8.32kV system will be considered on an individual basis. "Micro" connections are acceptable on the 4.16kV, 8.32kV and 27.6kV systems.

4.2.2 Interface Transformer

An interface transformer will be required to transform the Generator's system voltage to a higher voltage suitable to connect to an Energy+ distribution 27.6 kV distribution circuit. The interface transformer shall be grounded wye primary and grounded wye secondary for connection to Energy+'s four wire distribution system if a DG size is less than 1 MW. However, an interface transformer with another configuration may be required for DG connection if a DG size is greater than 1 MW. The possible configurations are:

a) Wye-Ground : delta;
b) Wye-Ground : wye-Ground with a Delta tertiary;
c) Wye-Ground:wye-Ground (LV may be ungrounded) with a HV Grounding Transformer; or
d) Delta-wye with HV Grounding Transformer;

An interface transformer can be an existing transformer for load or a dedicated transformer. If a dedicated transformer is installed and the generation meter is on the secondary side of the transformer, 1% transformer losses will be deducted from the generated kWh.

The configuration of an interface transformer shall be determined in the CIA.

4.2.3 Voltage Regulation

Adequate voltage regulation shall be maintained under a variety of operating conditions. An off-load tapchanger is normally used for voltage matching. The loading/unloading rate of the generator, the starting current of induction generator and auxiliary motors should be regulated to protect the Energy+ distribution system from voltage swings. Where necessary, system power flow studies must be submitted to Energy+ to confirm voltage regulation requirements.

4.3 PROTECTION SYSTEM

4.3.1 Protection System Goals

Protective relaying must be designed to provide maximum safety and reliability. The Generator's protective relaying shall co-ordinate with the existing Energy+ protective devices (and Hydro One's, where applicable). The protective system shall be capable of automatically isolating the EG from the Energy+ distribution system in the following situations:

- Internal faults within the generator.
- Faults occurring in the Generator owned switchgear.

- External faults in the Energy+ distribution system.
- Certain abnormal system conditions (such as over/under voltage, over/under frequency) that could result in “islanding”.

To meet protection system goals, the Generator must provide adequate protective relaying for interface protection between the Energy+ distribution system and the Generator’s Facilities. Routine verification shall be required to ensure that the protections will respond to various fault conditions.

Protective equipment specified by Energy+ is for the protection of the Energy+ distribution system (and Hydro One equipment, if applicable) only. Additional protection will be required for the generation system.

The Generator should be aware that certain conditions in the utility system may affect the generator. It is the sole responsibility of the Generator to protect the equipment from conditions on the utility system.

Where modifications to existing distribution protection systems are required (and permitted), the Generator shall be responsible for all associated costs unless the Generator is a renewable energy generation facility, where some or all of these costs may be covered by Energy+.

4.3.2 Interface Protection Requirements

Interface protection shall be provided to detect any faults in the Energy+ distribution system and any abnormal conditions in the Generator’s system and to trip the generator/interface breaker to isolate the generator from the Energy+ distribution system.

The interface protection shall include:

4.3.2.1 Ground Fault Protection

Ground overcurrent relay (50N & 51N), or distance relay (21N) is required to detect ground faults.

4.3.2.2 Phase Fault Protection

To detect phase faults, one or more of the following protective relays must be installed by the Generator:

- Distance relay (21), phase to phase
- Phase directional overcurrent relay (67)
- Voltage-restrained overcurrent relay (51V)
- Overcurrent relay (51)

4.3.2.3 Protection for Islanding/Abnormal conditions

Voltage, frequency and reverse power protective relays are required to separate the DG from the Energy+ distribution system in an islanding condition. This is when the utility breaker is opened and the generator is still connected to the Energy+ distribution system.

- Overvoltage relay (59 or 59I)
- Undervoltage relay (27)
- Overfrequency (81O)
- Underfrequency (81U)
- Reverse power relay (32)

4.3.3 Relay Types and Settings

All the utility-generator interface protective relays shall be utility grade (not industrial grade). The types and settings of the protective relays shall be approved by Energy+. The relays shall be equipped with self-checking features. A dedicated locked cabinet, panel with locked cover or sealable relay covers shall be provided to ensure the relay settings are not tampered with or adjusted without Energy+'s approval. A backup protection scheme may be required. A separate DC supply to the protective relays is required.

4.3.4 Fault Levels and Protection Coordination

Energy+ will provide present three-phase fault levels which are always subject to change. Typical maximum available three-phase faults are 800 MVA for 27.6 kV systems. A protection co-ordination study will be required for all installations. All installations may be supplied from more than one Energy+ feeder (at various times). These feeders may have different fault levels and originate from different transformer stations or transformers within the same transformer station. The protection scheme and protection co-ordination will not account for these possibilities and thus the Generator will only be allowed to connect on feeders on which the study has been completed for.

The additional fault current contribution from the generator will result in an increase in fault level that may have an impact on the Energy+ distribution system. Energy+ may require the Generator to limit the generator fault current contribution to protect Energy+ equipment (i.e. breaker, switches) if the fault current is expected to be greater than design limits.

4.3.5 Generator/Interface Circuit Breaker

An automatic circuit interrupting device (usually a circuit breaker within switchgear) initiated by protective relays shall be provided by the Generator for generator/interface protection. The device must have adequate fault current interrupting capability.

4.3.6 Synchronizing

Synchronizing check shall be provided for the interface and generator breakers of the generation system that can produce electrical energy without being connected to the Energy+ distribution system. All breakers and devices (i.e. switches) between the generator and the Energy+ distribution system shall be interlocked with the synchronizing breakers.

4.3.7 Energy+ Breaker Reclosing Scheme

Most short circuits on overhead feeders are temporary. The Energy+ distribution system incorporates an automatic reclosing scheme to reclose the circuit breakers on such feeders typically within less than a half second after they have been automatically tripped by the feeder protections. This improves continuity of service to all customers.

The Generator must provide a reliable means of disconnecting the DG from the distribution system prior to the feeder breaker reclosing. Energy+ is not liable for the damage to the Generator's generation facility due to the reclosure of a feeder breaker.

The Generator must disconnect the DG from the Energy+ distribution system when system power is lost or when an electrical fault occurs, and remain disconnected.

4.3.8 Transfer Trip Protection Requirement

Depending on the generation system connected to the feeder and the minimum feeder load, a Transfer Trip (TT) facility between the transformer station and the Generator's Facilities will be considered. If the generation system can operate successfully in an islanded mode (i.e. maintain normal voltage and frequency) then the transfer trip must be provided to isolate the generation system of the Generator's Facilities.

If the generation system connected to the feeder is less than 50% of the minimum feeder loading and aggregate capacity is less than 1 MW, a TT trip is generally not required. However, the Generator is required to provide redundant islanding protection timed to ensure that the interface breaker is tripped prior to the feeder breaker reclosing. The TT protection may be required if the auto reclose time on the feeder breaker is less than the anticipated generator protection system fault clearing time. TT communications shall meet the timing requirements in Table 1. The maximum TT time shall depend on the operational speed of the DG Facilities interrupting device.

Table 1: TT Timing Requirements

Maximum TT Communication Time (ms)	Speed of DG Facility`s Interrupting Device (cycles)
83	3
67	4
50	5
33	6
17	7

The DG protection must be designed by considering the following conditions

- The DG Facility shall remain disconnected from Energy+'s Distribution System if the TT channel is unavailable.
- The TT teleprotection system shall be failsafe.
- Upon loss of the TT communication channel, the DG and HV ground sources shall disconnect within 5 seconds of the channel failing. A controlled shutdown may be allowed and must be submitted to Energy+ for approval.
- The DG Facility shall remain disconnected until the TT channel is repaired and the controlling authority has been advised that all DG Facility interconnection protections have been restored to service.

A ground potential rise study may be required at the Generator's Facilities for the installation of telephone wires as the communication channel(s) between the transformer station and the Generator's Facilities. The study is to ensure the new electrical facilities do not present a safety hazard or adversely affect telecom and protection facilities. The Generator shall assure that the need for ground potential rise study is reviewed.

4.3.9 Protection System Failure

If at any time the protection system, including transfer trip protection when installed, is not functioning or out of service or the DC supply is lost, the generator/interface breaker must be opened to isolate the generator from the Energy+ distribution system. This breaker must remain open until the protection system is returned to service.

4.4 TYPE OF GENERATION

Depending upon the type of generation, the following additional design criteria will be required.

4.4.1 Induction Generator

The induction generator requires a source of external excitation before the machine can produce any power. As a result, the chance of external islanding is remote. The protection and control systems for this type of machine can be somewhat simpler than those required for a synchronous machine. It is, however, essential to have a reverse-power relay to ensure that the machine cannot operate as a motor.

Induction generators, by the nature of their design, run at lagging power factor. Energy+ requires the overall power factor to be equal to or greater than 0.9 lagging. As a result, suitable power-factor correction capacitor banks are recommended, and will likely be required on generation over 200kVA capacity. If capacitors are used, they must automatically be isolated whenever the generator breaker is open and must be sized carefully to avoid the risk of self-excitation of the generator. The self-excited induction generator can produce abnormally high voltages that can cause damage to the equipment of other Energy+ Generators.

The Generator shall furnish generator starting data to Energy+ for review. System power flow studies may be required to evaluate the impact of generator starting to voltage regulation.

4.4.2 Synchronous Generator

Since the synchronous generator can produce electrical energy without being connected to the Energy+ distribution system, a more advanced protection and control system is required. The control system shall be provided with equipment necessary to establish a synchronous condition. In the event of a utility outage of even momentary duration, an automatic synchronization device shall prevent reconnection of the generator to the utility system until synchronism is re-established.

Synchronous generators can produce power at both leading and lagging power factors. The production of power at an excessive leading power factor can cause over-voltages in the distribution system. The generator can be run at leading power factor to offset lagging loads in the Generator's Facilities, however, overall plant power factor must remain between 0.9 lagging and unity.

4.4.3 Inverter Type Generator

Utility-interactive inverters do not require separate synchronizing equipment. Non-utility-interactive or stand-alone inverters shall not be used for distributed generation with the Energy+ distribution system.

An inverter type generator connected to the Energy+ distribution system shall operate with the power factor between 0.9 lagging and unity.

The utility-interactive inverters must include filters to minimize the harmonic output (see section 4.5) so as not to disturb the Energy+ distribution system or other customers in any way.

Generators with less than 100kW total capacity, such as micro-turbine generators without black start capability, may automatically restart following automatic reclosing of the feeder breaker. Generators that automatically restart must have an adjustable time delay on restart up to 5 minutes. Energy+ will co-ordinate the settings of generator restart time-delays such that generators on any feeders do not restart all at once to avoid voltage flicker.

4.5 POWER QUALITY

4.5.1 Design Goals

Negative effects on power quality must be prevented. These include: objectionable harmonics, voltage distortion, voltage flicker or poor power factor on the Energy+ distribution system or on other customers' electrical and communication systems.

4.5.2 Power Quality Requirements

The Generator's Facilities shall meet the guidelines set out in the CSA C22.3 No.9-08 (latest edition) titled "Interconnection of distributed resources and electricity supply systems".

The current Total Demand Distortion (TDD) shall not exceed 5% of the fundamental frequency (60Hz) when measured on the distribution system side of the interconnection switch. The individual harmonic limitation is shown in Table 1 of C22.3 No.9-08.

4.5.3 Future Requirements

If at any time before or after the in-service date, additional filters, other equipment, or modifications are needed to meet these specifications or future specifications, the Generator shall take the necessary steps to meet Energy+'s requirements. The Generator shall pay all costs associated with modifications deemed necessary by Energy+ to achieve acceptable power quality or the generator must be disconnected from the Energy+ distribution system.

4.5.4 Phase Unbalance

Unbalances in phase current and phase voltage can occur on Energy+'s four wire distribution system. Specific unbalancing varies by feeder. The DG connected to the distribution system must be capable of operating under these conditions and shall not make worse the existing unbalanced conditions.

4.5.5 Frequency

The generator shall be operated within the range 59.3Hz to 60.5Hz. 60 hertz is the normal electrical system frequency.

4.5.6 Voltage Flicker

Voltage flicker is described as an increase or decrease in voltage over a short period of time, normally associated with fluctuating load. The characteristics of a particular flicker will depend on the characteristics of the corresponding load (percentage voltage dip, frequency of occurrence). This type of problem may arise during the start-up of an induction generator as the large starting current may cause the voltage to dip considerably. The Generator must take steps to minimize flicker problems to the acceptable level.

4.5.7 Power Factor

When the actual Generator load approaches the output level of the generator, the net power factor may be adversely affected. The Generator shall ensure that the net generator/load power factor remains between 0.9 lagging and unity.

4.6 METERING

4.6.1 Metering Requirements

Metering requirements are to be determined by Energy+ and dependent on the type and size of generator and the total demand of the Generator's Facilities. The installation of these meters may require additional metering cabinets, metering cells, a dedicated 120 Volt AC supply to each meter cabinet and possibly a telephone connection. The Generator shall be required to cover the costs of additional equipment and monthly telephone charges, if applicable. Energy+ shall own, and have safe access to all metering equipment, including instrument transformers at all metering locations.

The Generator will also be required to comply with all the metering requirements specified in Energy+'s Conditions of Service and Energy+'s Metering Specifications (both as amended from time to time). Depending upon the size of the generator, the Generator may also be required to install IESO compliant metering equipment.

The generation meter must be located within sight and within 2.0m of the existing load meter. The only exception to this rule would be if placing the meter somewhere else would be technically or economically advantageous to Energy+ and will be determined on a case-by-case basis.

Where the Generator will be exporting power onto the distribution system, a bi-directional meter with four-quadrant interval measurement capability will be required.

Where export of power is not required, such as back-up capability or generation for load displacement, but not including Net Metering program, the metering requirement will be the same manner as other load customers. A reverse power relay shall also be installed to ensure blocking of any power exports.

Should the Generator receive pulses or data from regular Energy+ metering for monitoring or load management purposes, and the meter fails to deliver the data due to failure or breakdown, Energy+ will not be responsible for any damage to or additional operational requirements of the Generator's Facilities.

At some locations, additional metering required for the generator may introduce a need for multiple telephone circuits, or circuits in addition to those already present. It will be the Generator's obligation to provide, operate and maintain additional phone lines, or approved line sharing or call managing equipment.

4.6.2 Metering Instrument Transformers

The point of connecting metering instrument transformers is critical and must be approved by Energy+.

Energy+ will not share any metering instrument transformer circuits for non-revenue metering applications or any other purposes. All metering equipment that is part of the instrument transformer circuits must have Measurement Canada approval for billing and be inspected in accordance with Measurement Canada regulations.

For a customer owned 27.6kV substation, the Generator must include an Energy+ revenue metering cell.

4.7 SYSTEM CHANGE

If at any time the Generator proposes changes, modifications or additions to the Generator's Facilities or protection and control system including relay settings, the Generator must give Energy+ the opportunity to review and approve of these modifications before they are implemented. The Generator shall not arbitrarily or unilaterally implement any changes, modifications or additions to the Generator's Facilities. Where changes require re-testing or commissioning, Energy+ reserves the right to witness such testing. Reasonable notice shall be provided to Energy+.

4.8 SYSTEM DOCUMENTATION

Documentation on the Generator's Facilities, as built, shall be provided to Energy+ before the in-service date. This documentation shall include a detailed single line diagram, AC and DC elementary, relay types, protection co-ordination studies and setting sheets.

4.9 WARNING NOTICES AND DIAGRAMS

In addition to ESA requirements, the following notices shall be provided:

A warning notice indicating the presence of a distributed generation system shall be installed, prior to commissioning. The following sign shall be posted at the door of the switch room and the door of the generator room, one sign per door at the Generator's Facilities.

CAUTION
DISTRIBUTED GENERATION

A single line, permanent and legible diagram of the switching arrangement, shall also be placed at the Generator's control room and the switch room to indicate the position of the DG(s) and isolation points with their interlocking arrangements.

Operating designations will be assigned to the switching equipment of the generation system as required by Energy+. The Generator shall update single line electrical diagram and operating diagram to include the assigned operating designations, and the switching equipment shall be identified by the operating designations as well.

4.10 VERIFICATION OF PROTECTION SYSTEM

Routine verification of the utility-generator interface protective relays and protective devices shall be performed on a scheduled basis. Testing intervals for protection systems should not exceed four (4) years for microprocessor-based systems and two (2) years for electro-mechanical based systems.

Test switches shall be provided to isolate current and potential transformer input to the relays as well as a set of switches to isolate the relays tripping outputs from the generation system control circuitry.

The Generator shall make available to Energy+ records of relay calibration and protection verifications so that records of the interface protective relays can be maintained. The specific records shall be identified in the Connection Agreement.

4.11 INSPECTION REQUIREMENTS

The Generator shall allow Energy+ and/or its agent(s) free and unrestricted access to the Generator's Facilities for inspection and safety checks, given reasonable notice. The Generator shall demonstrate the correct operation of the generation system including the protection and control equipment as may be required by Energy+.

4.12 PERFORMANCE UNDER THIS SPECIFICATION

1. If at any time the Generator fails to perform any obligation under this Agreement or any other written requirements of Energy+, Energy+ may give notice to the Generator or the Generator's designate, as documented in the Operations Schedule, which notice may be given by telephone, to immediately remedy the failure. In all cases, Energy+ will attempt to give the Generator notice and ample time to remedy any problems and comply with this specification, however, Energy+ will always have the right to immediately disconnect the DG without any notice.

2. Energy+ may require the disconnection of the generation system, or discontinue the supply of electricity to the Generator for any good and substantial cause in the opinion of Energy+, acting reasonably, including but not limited to the following reasons:

    (a) for safety of persons, plant, or equipment;
    (b) to perform planned or unplanned maintenance on Energy+ equipment;
    (c) when work protection is required on the Energy+ distribution system or the Generator's Facilities;
    (d) when the Energy+ distribution system is in an abnormal or emergency operating condition;
    (e) when the Generator's Facilities are operating abnormally or are adversely affecting the Energy+ distribution system by way of frequency and voltage fluctuations; and

(f) when Hydro One load shedding is required.

Energy+ will give the Generator as much notice as possible before disconnecting the supply of electricity; however, Energy+ will always have the right to immediately disconnect the DG without any notice.

3. Neither party shall be held responsible or liable for any loss, damage, detention, delay, failure or inability to meet any of its obligations specified in this requirements or any documents referred to herein because of events beyond its reasonable control, including without limitation, acts of God, acts of a public enemy, war, hostilities, invasion, insurrection, riot, the order of any civil or military government, explosion, fire, strikes, lockouts, labour disputes, malicious acts, vandalism, failure of equipment, accident to the Generator's Facilities or the Energy+ distribution system (or the Hydro One system, if applicable), storms or other adverse weather conditions or other causes of a similar nature.

4.13 LIABILITY

As part of installing and operating the Generator's Facilities, the Generator shall:

1. Assume all risk, liability or obligation in respect to all loss, damage or injury to:

   (a) property of the Generator, property of Energy+ and Hydro One, if applicable, or property of any third party on the lands and premises on the Generator's side of the Delivery Point. The Delivery Point is defined as Energy+'s disconnection device on the distribution line connecting the Generator's Facilities to Energy+'s distribution system as identified in the Operations Schedule.

   (b) any person or persons (including loss of life) on the said lands and premises on the Generator's side of the Delivery Point, which loss, damage or injury was due to power supplied by Energy+ to the Generator to the extent used to supply power to the Generator, except to the degree that such loss, damage injury was due to the negligence of Energy+, its servants or agents. Without limiting the generality of the foregoing, the Generator shall be responsible, except to the degree that such is caused by the negligence of Energy+, for the cost of any damage to the Generator's equipment and transformers or any damage to equipment of a third party that may occur due to the operation of the Generator's Facilities or of Energy+'s distribution system.

   (c) all actions, causes of action, suits, proceedings, claims, demands, losses, damages, penalties, fines, costs, expenses, obligations and liabilities arising out of a discharge of any contaminant into the natural environment on the Generator's lands and premises and any fines or

orders of any kind that may be levied or made pursuant to the Environmental Protection Act (Ontario), the Ontario Water Resources Act, or the Dangerous Goods Transportation Act (Ontario), or other legislation or legal requirements whether federal, provincial or municipal, except to the degree that such discharge was due to the negligence of Energy+, its servants or agents.

2. Indemnify Energy+, and Hydro One, and save each harmless from all risk, liability, and obligation assumed by the Generator and all claims and demands in connection therewith, save and except such loss, damage or injury due to the negligence of Energy+, Hydro One, or their respective servants or agents.

3. Assume all risk for the existence of all distribution lines, plant, meters and equipment of Energy+ on or in the lands and premises on the Generator's side of the Delivery Point. If any of this equipment is destroyed or damaged other than by ordinary wear and tear or due to the fault of Energy+ or defect to the equipment, the Generator shall pay to Energy+ the cost of repairing or replacing this equipment as determined by Energy+.

4. The Generator shall add Energy+ onto their liability insurance policy as an additional insured. A Certificate of Insurance shall be provided to Energy+ by the Generator evidencing this fact prior to the in-service date of the generator and this Certificate of Insurance shall be appropriately filed with Energy+ and renewed each year thereafter. The Generator's liability policy shall have a minimum limit of insurance of $10 million per occurrence.

5 NET METERING

As a way to encourage conservation, Energy+ welcomes eligible customers wishing to participate in the Ontario Ministry of Energy's Net Metering program.

5.1 What is Net Metering?

Ontario's net metering regulation allows you to send electricity generated from renewable sources to the electrical grid for a credit toward your energy costs. Energy+ will subtract the value of electricity you supply to the grid from the value of what you take from the grid. What you'll see on your bill is the "net" difference between those two amounts. If you supply power that is worth more than what you take from the grid over the billing period, you'll receive a credit that can help lower future energy bills. The more electricity you produce, the greater your savings.

5.2 How will your hydro bill be calculated?

Energy+ will continue to read your meter just as we do now. The bill you see will reflect the value of the energy you exported to the grid at time-of-use (TOU) rates and the

value of the energy you needed to take from the grid at TOU rates. All of the regulated charges apply only to your net consumption - if that portion of your bill is zero, or a credit, your bill will include only Energy+'s fixed monthly access charge. If you have more credit than you can apply to one bill you can carry the balance forward for up to one year to offset future costs. To cancel a net metering agreement, all you need to do is provide Energy+ with 90 days written notice.

5.3 Who is eligible?

Net metering is available from Energy+ to any customer who generates electricity primarily for their own use from a renewable source (wind, water, solar or agricultural biomass) and meet Energy+ technical, safety and inspection requirements.

5.4 How do you get started?

In order to participate, you must meet all the requirements for distributed generation as outlined in this document for the proposed size of generation. You may also want to contact the ESA at 1-877-ESA- SAFE (1-877--372-7233) or on-line at www.esainspection.net. The ESA must inspect and approve your system. The Ontario Ministry of Energy has published a booklet entitled "Net Metering in Ontario" which is a useful guide. The Ministry of Energy can be reached at 1-888-668-4636 or on-line at www.energy.gov.on.ca.

6 IESO FEED IN TARIFF PROGRAMS

The IESO's Feed in Tariff and micro Feed in Tariff programs have been discontinued and are no longer available. Any projects that had a contract with the IESO under these programs will still be under contract with the IESO as per the FIT/microFIT rules.

Micro-Distributed Generation Application Form (DG≤10 kW)

Part 1

Applicant Information

Company/Owner Name: _____

Contact Name: _____

Mailing Address: _____

Phone Number: _____ Fax Number: _____

E-Mail Address: _____ Request Date: _____

Existing Energy+ Inc. Customer: ☐ Yes ☐ No

If yes, Account Number: _____

Proposed Generation Location Information

Site Address: _____

City/Town/Township: _____

Lot Number: _____

Concession Number: _____

Program Type

☐ Net Metering

☐ MicroFIT, Reference Number: _____

☐ Other: _____

Project Information

Proposed In-Service Date (dd/mm/yy): _____

Incremental Project: ☐ Yes ☐ No

If yes, Existing Generation Nameplate Capacity (kW): _____

Proposed Total Generation Nameplate Capacity (kW): _____

Proposed Service or Sub-Service Size (A): _____

Part 2

Generation Connection Type: ☐ Single Phase ☐ Three Phase **Date:** _____

Fuel Type:

☐ Wind ☐ Water ☐ Biomass ☐ Bio-gas ☐ Landfill Gas

☐ Solar (Rooftop) ☐ Solar (Ground Mounted) ☐ Other: _____

Manufacturer (PV panel): _____

Model Number (PV panel): _____

Number of PV panels: _____

Generator/Inverter Information

Number of Phases: ☐ Single Phase ☐ Three Phase

Type: ☐ Synchronous ☐ Induction ☐ Inverter

Inverter Certification: ☐ C22.2 #107.1 ☐ UL 1741 ☐ Site Certified by the ESA

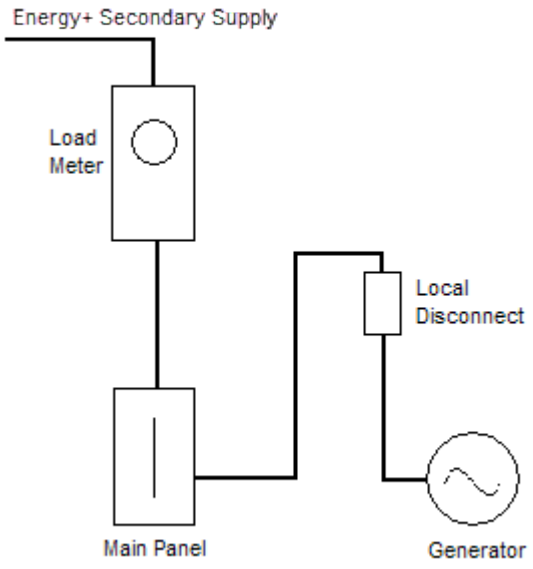
Nameplate Rating (kW): _____ Output Voltage (V): _____

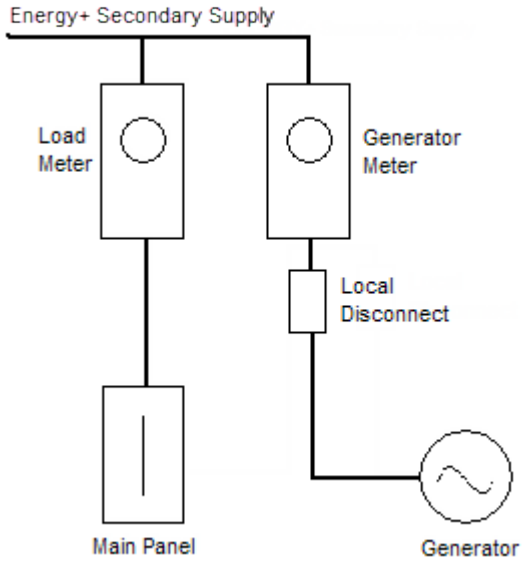
Manufacturer: _____

Model Number: _____

Metering Connection Setup

☐ Net Metering/Load Displacement ☐ Indirect Parallel Connection





Renewable Generation Contact Information:

Energy+ Inc.
Attn: Gurdeep Bansal, P.Eng.
Supervisor, Metering & Distributed Energy Resources
1500 Bishop Street
P.O. Box 1060
Cambridge, ON
N1R 5X6

(519) 621-3530 x 2414
generation@energyplus.ca

Notice of Collection

Personal information is collected on this form by Energy+ Inc. under the authority of the Electricity Act, S.O. 1998, Chapter 15, Schedule A. The principal purpose for the information we are collecting is to accurately deliver our services to you, billing and collection, and ensuring that we are dealing with only you or individuals you have authorized. Personal information will be used only for the purposes set out in Energy+'s Privacy Policy. Learn more **www.energyplus.ca/privacy**

If you have any questions about this collection, the ways in which your personal information may be used by Energy+, or would like further information about Energy+'s privacy policies, please contact: Energy+'s Chief Privacy Officer, 1500 Bishop Street, Cambridge, ON by phone 519-621-3530, or by e-mail at: **privacy@energyplus.ca**.

Micro-Distributed Generation Facility Connection Agreement

In consideration of Energy+ Inc. agreeing to allow you to connect your 10kW name-plate rated capacity or smaller generation facility to Energy+'s distribution system, you hereby agree to the following terms and conditions.

1.0 Eligibility

1.1 You agree that your generation connection shall be subject to all applicable laws and bound by the terms and conditions of Energy+'s Conditions of Service, which have been filed with the OEB and are available on request.

2.0 Technical Requirements

2.1 You represent and warrant that you have installed or will install prior to the connection of your generation facility to Energy+'s distribution system, an isolation device satisfying Section 84 of the Ontario Electrical Safety Code and agree to Energy+'s staff operation of this as required for the maintenance and repair of the distribution system.

2.2 You agree to perform regular scheduled maintenance to your generation facility as outlined by the manufacturer in order to assure that connection devices, protection systems, and control systems are maintained in good working order and in compliance with all applicable laws.

2.3 You agree that during a power outage on the Energy+ system your generation facility will shut down, unless you have installed special transfer and isolating capabilities on your generation facility. You agree to the automatic disconnection of your generation facility from Energy+'s distribution system, as per the generator protective relay settings set out in this Agreement, in the event of a power outage on Energy+'s distribution system or any abnormal operation of Energy+'s distribution system.

2.4 You covenant and agree that the design, installation, maintenance, and operation of your generation facility are conducted in a manner that ensures the safety and security of both the generation facility and Energy+'s distribution system.

2.5 Due to Energy+'s obligation to maintain the safety and reliability of its distribution system, you acknowledge and agree that in the event Energy+ determines that your generation facility (i) causes damage to; and/or (ii) is producing adverse effects affecting other distribution system customers or Energy+'s assets, you will disconnect your generation facility immediately from the distribution system upon direction from Energy+ and correct the problem at your own expense prior to reconnection.

3.0 Liabilities

3.1 You and Energy+ will indemnify and save each other harmless for all damages and/or adverse effects resulting from either party's negligence or willful misconduct in the connection and operation of your generation facility or Energy+'s distribution system.

3.2 Energy+ and you shall not be liable to each other under any circumstances whatsoever for any loss of profits or revenues, business interruptions losses, loss of contract or loss of goodwill, or for any indirect, consequential, incidental or special damages, including but not limited to punitive or exemplary damages, whether any of the said liability, loss or damages arise in contract, tort or otherwise.

4.0 Compensation and Billing

4.1 If you are not an embedded retail generator, you agree that, subject to any applicable law:

a) Energy+ will not pay you for any excess generation that results in a net delivery to Energy+ between meter reads; and
b) there will be no carryover of excess generation from one billing period to the next unless you are, at the relevant time, a net metered generator (as defined in section 6.7.1 of the Distribution System Code).

4.2 If you are an embedded retail generator selling output from the distributed generation facility to the IESO under contract, you agree that Energy+ will pay you for generation in accordance with the Retail Settlement Code.

4.3 If you are an embedded retail generator delivering and selling output to Energy+, you agree that Energy+ will pay you for generation in accordance with the Retail Settlement Code.

5.0 Termination

5.1 You understand that you have the right to terminate this agreement at any time, and that by doing so you are required to disconnect your generation facility and notify Energy+ of such action.

6.0 Assignment

6.1 You may assign your rights and obligations under this Agreement with the consent of Energy+, which shall not withhold its consent unreasonably. Energy+ shall have the right to assign its rights and obligations under this Agreement without your consent.

I understand, accept and agree to comply with and be bound by the above terms and conditions governing the connection of my generation facility to Energy+'s distribution system.

Generator Signature: _____ Date: _____

Print name and LDC account number: _____

I confirm that the following information is true and accurate:

Nameplate rating of Generator: _____kW Total installed generation _____kW

Type: ☐ **Wind Turbine** ☐ **Photovoltaic (Solar)** ☐ **Hydraulic Turbine** ☐ **Fuel Cell**
☐ **Other** _____

Inverter Utilized: ☐ **Yes** ☐ **No**

Inverter Certification: ☐ **C22.2 #107.1** ☐ **UL 1741** ☐ **Site Certified by the ESA**

Generator Protective Relay Settings

Table 1: Inverter Based Generation
The following relay settings shall be used for inverters built to the CSA standard:
Source: CSA C22.2 No. 107.1-01 Table 16

System Voltage Vn = V nominal **V (Volts)**	Frequency **F (Hertz)**	Maximum number of cycles to disconnect	
		Seconds	Cycles
V < 0.5 Vn	60	0.1	6
0.5 Vn <= **V** < 0.88 Vn	60	2	120
1.10 Vn <= **V** <1.37 Vn	60	2	120
V > 1.37 Vn	60	0.033	2
Vn	**F** < 59.5*	0.1	6
Vn	**F** > 60.5	0.1	6

* The UL1741 & IEEE P1547 Standards use F < rated-0.7 i.e. 59.3 Hz. To update if CSA C22.2 No. 107.1-01 is changed.

Table 2: Non Inverter Generation
Energy+'s minimum requirements, for other generation are as follows:

System Voltage Vn = V nominal **V (Volts)**	Frequency **F (Hertz)**	Maximum clearing time*	
		Seconds	Cycles
V < 0.5 Vn	60	0.16	9.6
0.5 Vn <= **V** < 0.88 Vn	60	2	120
1.10 Vn <= **V** <1.20 Vn	60	1	120
V > 1.20 Vn	60	0.16	9.6
Vn	**F** < 59.3	0.16	9.6
Vn	**F** > 60.5	0.16	9.6

*Clearing time is the time between the start of the abnormal condition and the generation ceasing to energize Energy+'s distribution system.

- If you are uncertain about your generation equipment's protective relay settings, please check with your generating equipment supplier.
- Automatic reconnect setting time for your generator is after 5 minutes of normal voltage and frequency on Energy+'s distribution system.

New Generation Account Application Form

Applicant Information

Load Customer Account Number (if applicable): _____

For a residential customer

Title: ☐ Mr. ☐ Miss ☐ Mrs. ☐ Ms.

Applicant Legal Name (must be the same as that on your microFIT/FIT application)

_____

Applicant primary contact details

First Name: _____ Last Name: _____

Date of Birth (dd/mm/yyyy _____

Home Phone Number: _____ Work Phone Number: _____

Employer: _____

Email Address: _____

HST Registrant? ☐ No ☐ Yes (If yes, fill out Sales Tax (GST/HST) Form (Appendix 6))

Second Adult Living at Address Information (if applicable)

Title: ☐ Mr. ☐ Miss ☐ Mrs. ☐ Ms.

First Name: _____ Last Name: _____

Date of Birth (dd/mm/yyyy): _____ Work Phone Number: _____

Employer: _____

Email Address: _____

For a commercial or industrial customer

Applicant Legal Name (must be the same as that on your microFIT/FIT application)

_____

Company Name: _____

Contact Person

Title: ☐ Mr. ☐ Miss ☐ Mrs. ☐ Ms.

First Name: _____ Last Name: _____

Phone Number: _____ Fax Number: _____

Email Address: _____

Program Type

☐ FIT ☐ MicroFIT ☐ Net-Metering ☐ Load Displacement ☐ Other (specify)

HST Registrant?

☐ No ☐ Yes (If yes, fill out Sales Tax (GST/HST) Form (Appendix 6))

Service Information

Date Service Required (dd/mm/yyyy): _____

Street Address: _____

City: _____ Postal Code: _____

Billing Address (if different from service address)

Street Address: _____

City: _____ Postal Code: _____

_____
Owner's Signature

_____
Date (dd/mm/yyyy)

Notice of Collection

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Preliminary Meeting Application Form

Applicant Information

Company/Owner Name: _____

Contact Name: _____

Mailing Address: _____

Phone Number: _____ Fax Number: _____

E-Mail Address: _____

Proposed Generation Location Information

Site Address OR Closest Location Description: _____

Program Type

☐ Load Displacement ☐ Net-Metering ☐ Energy Storage

Project Information

Proposed Total Generation Nameplate Capacity (kW): _____

Proposed Service or Sub-Service Size (A): _____

Generation Connection Type: ☐ Single Phase ☐ Three Phase

Fuel Type:

☐ Wind ☐ Water ☐ Biomass ☐ Bio-gas ☐ Landfill Gas

☐ Solar (Rooftop) ☐ Solar (Ground Mounted) ☐ Other: _____

Please Return Completed Application to:

Energy+ Inc.
Attn: Gurdeep Bansal, P.Eng.
Supervisor, Metering & Distributed Energy Resources
1500 Bishop Street
P.O. Box 1060
Cambridge, ON
N1R 5X6

(519) 621-3530 x 2414
generation@energyplus.ca

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Connection Impact Assessment Application Form (DG > 10 kW)

Note: All technical submissions, including this form, must be signed and sealed by a licensed Ontario Professional Engineer (P.Eng.).

Date (dd/mm/yyyy): _____

Generation Account Number (if applicable): _____

Project Information

Project Name: _____

Proposed In-Service Date: _____

Project Size:

Number of Units: _____ Nameplate Rating of Each Unit (kW): _____

Generation Connection Type: ☐ Single Phase ☐ Three Phase

Proposed Total Generation Nameplate Capacity (kW): _____

Proposed Generation Location Information

Site Address: _____

City/Town/Township: _____

Lot Number: _____

Concession Number: _____

Project Information

Developer Information:

Company/Person: _____

Contact Person: _____

Mailing Address: _____

Telephone Number: _____ Fax Number: _____

Email Address: _____

Owner Information (if different from Developer):

Company/Person: _____

Contact Person: _____

Mailing Address: _____

Telephone Number: _____ Fax Number: _____

Email Address: _____

Engineering Consultant:

Company/Person: _____

Contact Person: _____

Mailing Address: _____

Telephone Number: _____ Fax Number: _____

Email Address: _____

Project Type

☐ Load Displacement ☐ Net Metering ☐ Energy Storage

Fuel Type

☐ Wind Turbine ☐ Hydraulic Turbine ☐ Steam Turbine ☐ Solar/Photovoltaic

☐ Diesel Engine ☐ Gas Turbine ☐ Fuel Cell ☐ Biomass

☐ Co-Generation/Combined Heat & Power ☐ Bio-Diesel ☐ Anaerobic Digester

☐ Other: _____

Location and Site Plan

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

Drawing/Sketch Number: _____ Rev: _____

Connection to Energy+'s Distribution System

Proposed Connection Voltage (kV): _____

Station: _____

Feeder: _____

Single Line Diagram

Provide a Single Line Diagram (SLD) of the Generating Facility including the PCC to Energy+'s distribution system.

SLD Drawing Number: _____ Rev: _____

Protection Philosophy

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

- Internal faults within the Generation Facility
- External phase and ground faults (within Energy+'s distribution system)
- Certain abnormal system conditions such as over/under voltage, over/under frequency, open phase(s)
- Islanding

Include a tripping matrix or similar information in the document

Drawing Number: _____ Rev: _____

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

Generator Characteristics

Number of Generating Unit(s): _____

Manufacturer: _____

Model Number: _____

Rated Capacity of Each Unit (kW/kVA): _____ / _____

Rated Frequency (Hz): _____

Generation Connection Type: ☐ Single Phase ☐ Three Phase

Type of Generating Unit: ☐ Synchronous ☐ Induction ☐ Inverter ☐ Other: _____

For Synchronous Unit(s):

Nominal Machine Voltage (kV): _____ Rated Current (A): _____

Rated Power Factor of Generating Unit(s) (p.u.): _____

Minimum Power Limit for Stable Operation (kW): _____

Unsaturated Reactances On: kVA Base: _____ kV Base: _____

- Direct Axis Subtransient Reactance, Xd" (p.u.): _____
- Direct Axis Transient Reactance, Xd' (p.u.): _____
- Direct Axis Synchronous Reactance, Xd (p.u.): _____
- Zero Sequence Reactance, X0 (p.u.): _____

Limits of Range of Reactive Power:

- Lagging (Over-excited) (kVAR): _____
- Leading (Under-excited) (kVAR): _____

Provide a plot of generator capability curve (MW vs. MVAR).

Drawing Number: _____ Rev: _____

For Induction Unit(s):

Nominal Machine Voltage (kV): _____ Rated Current (A): _____

Rated Power Factor of Generating Unit(s) (p.u.): _____

Unsaturated Reactances On: kVA Base: _____ kV Base: _____

- Direct Axis Subtransient Reactance, Xd" (p.u.): _____
- Direct Axis Transient Reactance, Xd' (p.u.): _____

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

For Inverter Unit(s):

Terminal Voltage (kV): _____ Power Factor (%): _____

Line-Interactive Type: ☐ Yes ☐ No

Battery Backup Provided: ☐ Yes ☐ No

Maximum Fault Current (kA): _____

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 Phase

Impedances On: kVA Base: _____ kV Base: _____

R (p.u.): _____ X (p.u.): _____

High Voltage Winding Connection: ☐ Delta ☐ Wye or Star

- Grounding Method of Wye Connected High Voltage Winding Neutral:

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

Low Voltage Winding Connection: ☐ Delta ☐ Wye or Star

- Grounding Method of Wye Connected Low Voltage Winding Neutral:

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

Note: The term “High Voltage” above refers to the connection voltage to Energy+’s distribution system and “Low Voltage” above 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 Phase

Impedances On: kVA Base: _____ kV Base: _____

R (p.u.): _____ X (p.u.): _____

High Voltage Winding Connection: ☐ Delta ☐ Wye or Star

- Grounding Method of Wye Connected High Voltage Winding Neutral:

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

Low Voltage Winding Connection: ☐ Delta ☐ Wye or Star

- Grounding Method of Wye Connected Low Voltage Winding Neutral:

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

Note: The term “High Voltage” above refers to the input voltage to the Interface Step-Up Transformer and “Low Voltage” above refers to the generation voltage

Appendix 5

Load Information

Maximum Load of the Facility (kW/kVA): _____/_____

Maximum Load Current (A): _____ Maximum Inrush Current (A): _____

Attached Documents

Item Number	Description	Reference Number	Number Of Pages
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Attached Drawings

Item Number	Description	Reference Number	Number Of Pages
1.			
2.			
3.			
4.			
5.			
6.			
7.			

8.			
9.			
10.			

Please Return Completed Application to:

Energy+ Inc.
Attn: Gurdeep Bansal, P.Eng.
Supervisor, Metering & Distributed Energy Resources
1500 Bishop Street
P.O. Box 1060
Cambridge, ON
N1R 5X6

(519) 621-3530 x 2414
generation@energyplus.ca

Sales Tax (GST/HST) Form

Any Generation payment issued to the applicant is consideration for a taxable supply, (i.e. purchase of electric power under the terms of a MicroFIT or FIT contract). Sales taxes will be calculated and paid on the Generation payment only if the applicant is a GST/HST registrant and provides a valid GST/HST registration number at the time an application for a MicroFIT or FIT contract is received by Energy+ Effective July 1, 2010, the Harmonized Sales Tax (HST) will be added to the payment as appropriate.

During the term of the MicroFIT or FIT contract any change with respect to the applicant's GST/HST registration status must be forwarded in writing to:

Energy+ Inc.
1500 Bishop Street
P.O. Box 1060
Cambridge, Ontario
N1R 5X6
Attention: Accounts Payable

Are you a GST/HST registrant? Yes ☐ No ☐

If your answer is yes, please fill out the rest of the form.

I declare that on [DATE] _____, [NAME] _____ is registered for GST/HST and the GST/HST registration number recorded below is the valid GST/HST registration number for [NAME] _____.

GST/HST Registration No.: _____

I acknowledge that the Generation payment issued (in accordance with a MicroFIT or FIT contract) to [NAME] _____ is consideration for a taxable supply and that [NAME] _____ will remit as tax collected the GST/HST paid by Energy+

Please Return Completed Application to:

Energy+ Inc.
Attn: Gurdeep Bansal, P.Eng.
Supervisor, Metering & Distributed Energy Resources
1500 Bishop Street
P.O. Box 1060
Cambridge, ON
N1R 5X6

(519) 621-3530 x 2414
generation@energyplus.ca

Direct Deposit
Sign Up Authorization Form and Instruction Sheet

Receive Your Generation Refund the faster and easy way with Direct Deposit!

1. Saves time – no trip to the bank to deposit your refund cheque.
2. Saves the environment – less paper.
3. You receive your refund faster.
4. Direct Deposit costs nothing.
5. You may change your banking information at any time.
6. Sign up is easy. Simply complete the authorization form.

Direct Deposit – Authorization Form

To sign up for Direct Deposit, complete this form. Attach a Void Cheque and fax or mail it to us!

Direct Deposit Authorization

☐ Yes – I would like to sign up for Direct Deposit with Energy+. I authorize Energy+ Inc. to credit my chequing account with my generation account refund. This authorization is valid for all regular refunds, as well as reconciliation refunds, credits due to me and final credits issued upon closure of my generation account.

Name: _____
Generation Account No.____ Energy+Use Only
Daytime Phone: _____
Evening Phone: _____
Email Address:_____
Signature: _____
Date: _____
Signature: _____
Date: _____
Financial Institution: _____
Branch No: _____
Location: _____
Chequing Account No._____
For joint accounts where more than one signature is required on cheques, please have all account holders sign.

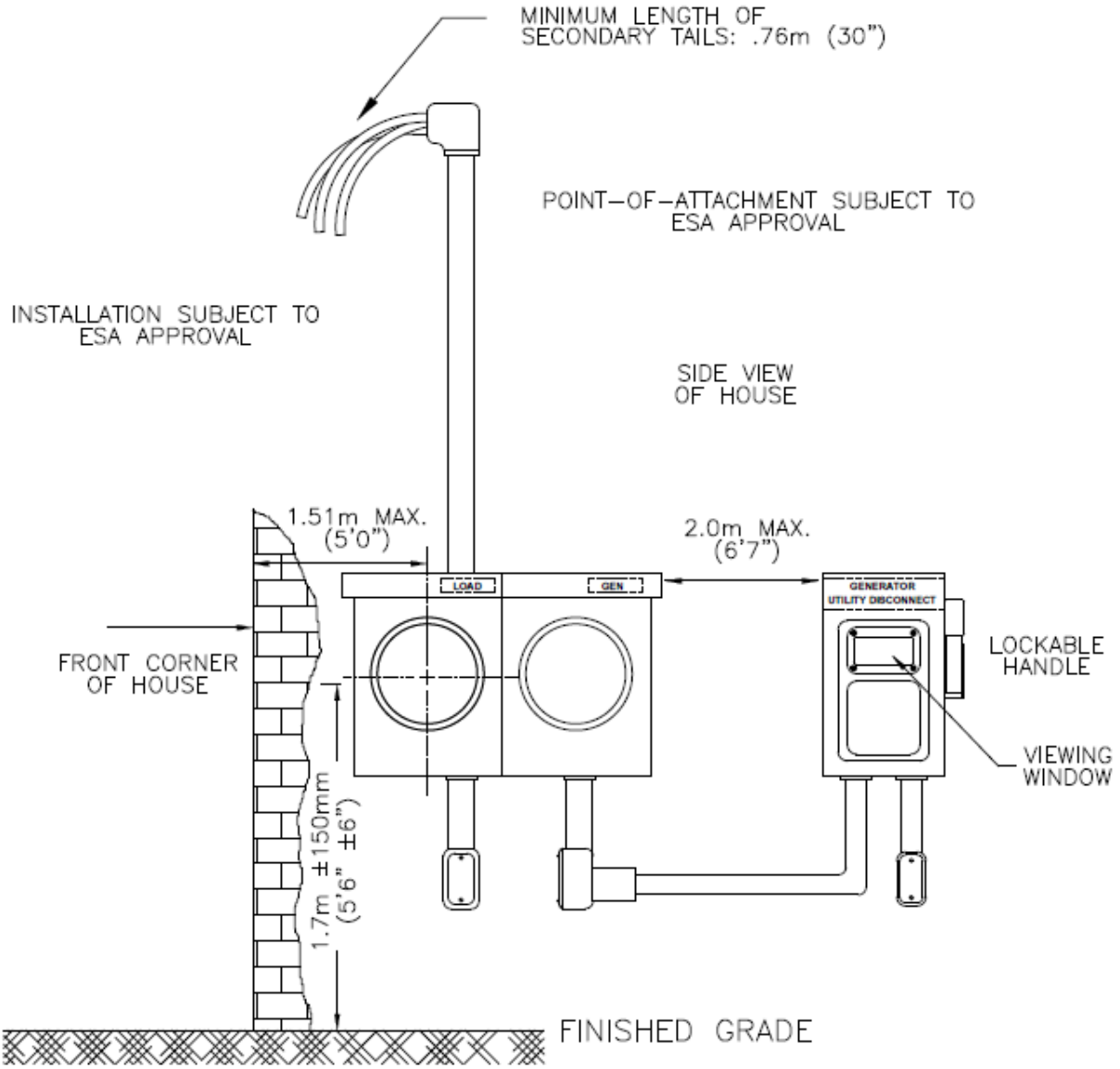
Account type: Personal_____Business_____

RETURN THIS COMPLETED FORM. PLEASE BE SURE TO ENCLOSE A VOID CHEQUE WITH YOUR GENERATION ACCOUNT NUMBER WRITTEN ON THE FRONT.

Mail to:
Energy+ Inc.
P. O. Box 1060, 1500 Bishop Street
Cambridge, Ontario N1R 5X6
Attention: Customer Care Department

Fax: 1-519-621-7420
Attention: Customer Care

Generation Metering Drawings

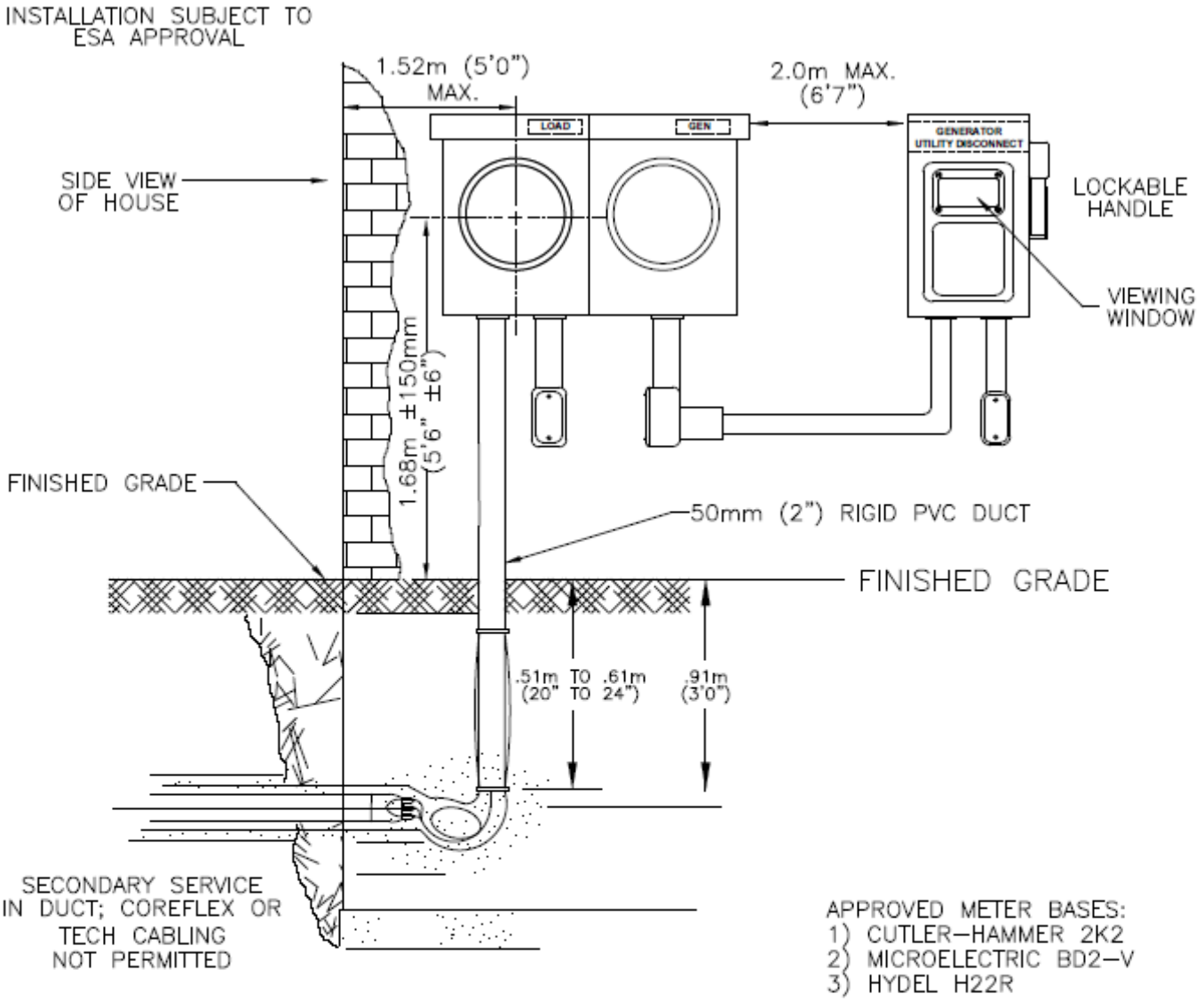


MAINTAIN A MINIMUM 1m (39") CLEARANCE IN FRONT OF METERS

Energy+

TITLE: GENERATOR METERING, UP TO AND INCLUDING 200 AMPS PER METERED SUB–SERVICE, 120/240V, GANGED METER BASES, OVERHEAD SERVICE – OUTDOOR EQUIPMENT LAYOUT

Date:	Drawn By:	DRAWING No.
DEC. 3, 2014.	Jon Jarosz	DG–001



***MAINTAIN A MINIMUM 1m (39") CLEARANCE IN FRONT OF METERS**

Energy+

TITLE: GENERATOR METERING, UP TO AND INCLUDING 200 AMPS PER METERED SUB–SERVICE, 120/240V, GANGED METER BASES, UNDERGROUND SERVICE – OUTDOOR EQUIPMENT LAYOUT

Date:	Drawn By:	DRAWING No.
DEC. 3, 2014	Jon Jarosz	DG–002

CUSTOMER–OWNED TRANSFORMER POLE MUST BE:
1) SUPPLIED & INSTALLED BY CUSTOMER/CONTRACTOR (LOCATION SUBJECT TO CNDHI APPROVAL).
2) MINIMUM 40' CLASS 3 WOOD, PRESSURE–TREATED BUTT (TREATED WITH AN APPROVED WOOD PRESERVATIVE) TO APPROXIMATELY 300mm (12") ABOVE GRADE. MINIMUM SETTING DEPTH OF POLE: 1.8m (6').
3) BACK–GUYED & ANCHORED AS PER ESA (1.37m (54") FIBREGLASS ROD SHALL BE USED ON ALL GUYS).
4) FRAMED & INSULATED FOR 46KV.
5) GROUNDED WITH 3 X ¾" X 10' COPPER GROUND RODS, "SHEAR–LOK" GROUND CONNECTORS, AND 1/0 STRANDED COPPER GROUND WIRE TO THE TOP OF THE POLE

INSTALLATION SUBJECT TO ESA APPROVAL

L1 N L2

CNDHI FORCES WILL SUPPLY & INSTALL THE METERING CT AND METERING WIRE

TOP OF ENTRANCE FITTING ABOVE NEUTRAL:
300mm (12")

N
L2
L1

200mm (8")

NEUTRAL (N)

METER BASE MOUNTING HEIGHT MUST BE: 1.68m (5'6") FROM FINISHED GRADE TO CENTRE OF METER FACE/GLASS

GEN LOAD

CUSTOMER/CONTRACTOR TO SUPPLY & INSTALL AN APPROVED 5–JAW METER BASE WITH AUTOMATIC BYPASS AT THE CURRENT CIRCUIT ON THE LEFT SIDE AND A 25mm (1") PVC CONDUIT UP THE POLE, COMPLETE WITH WEATHERHEAD AT SPECIFIED HEIGHT

GENERATOR
UTILITY D/C
LOCKABLE HANDLE
VIEWING WINDOW

#6 BOND WIRE

MAINTAIN A MINIMUM 1m (39") CLEARANCE IN FRONT OF METER BASE

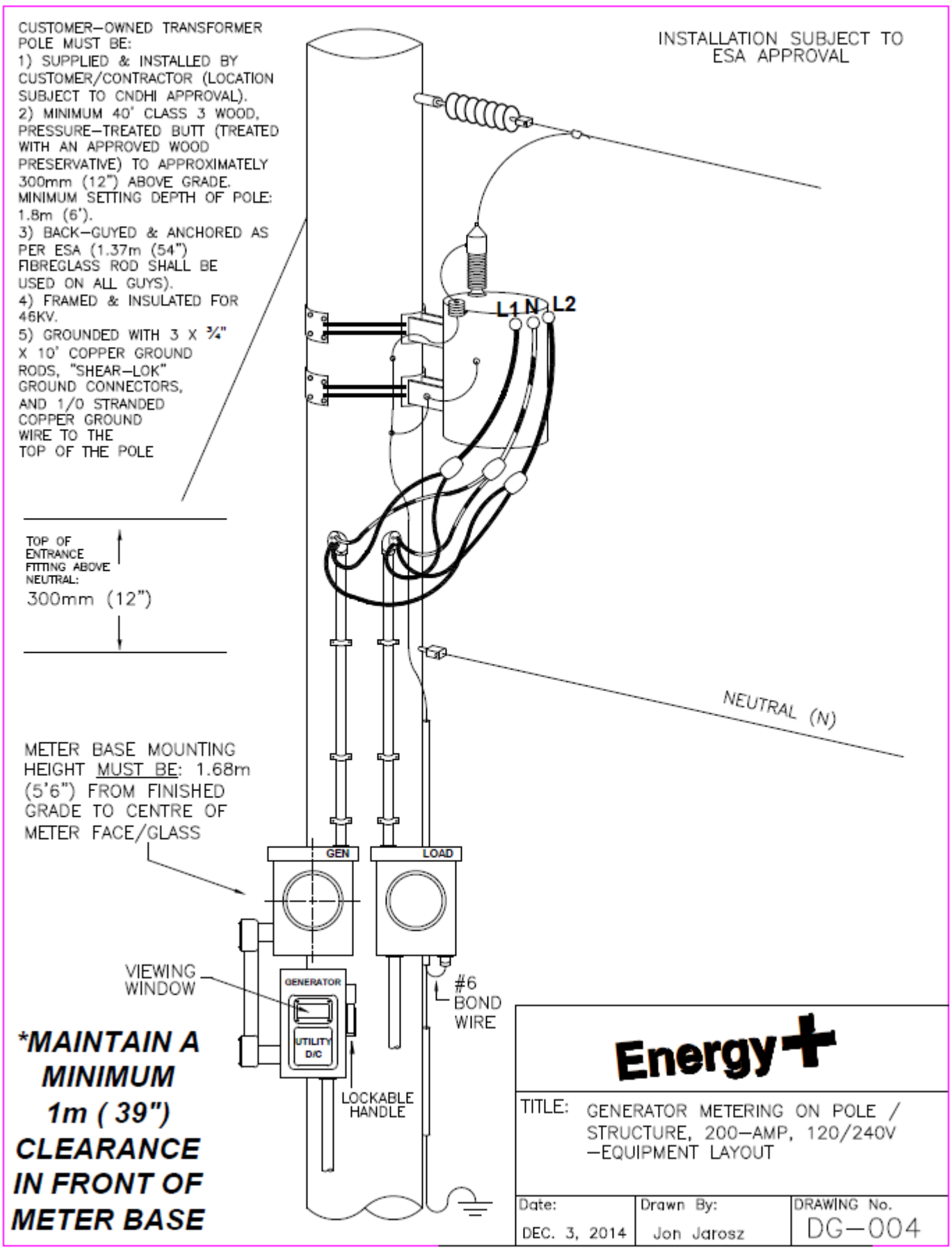
Energy+

TITLE: GENERATOR METERING AT CENTRAL–METERED SERVICE, 200 AMP OR 400 AMP, 120/240V – EQUIPMENT LAYOUT

Date:	Drawn By:	DRAWING No.
DEC. 3, 2014	Jon Jarosz	DG–003

CUSTOMER–OWNED TRANSFORMER POLE MUST BE:
1) SUPPLIED & INSTALLED BY CUSTOMER/CONTRACTOR (LOCATION SUBJECT TO CNDHI APPROVAL).
2) MINIMUM 40' CLASS 3 WOOD, PRESSURE–TREATED BUTT (TREATED WITH AN APPROVED WOOD PRESERVATIVE) TO APPROXIMATELY 300mm (12") ABOVE GRADE. MINIMUM SETTING DEPTH OF POLE: 1.8m (6').
3) BACK–GUYED & ANCHORED AS PER ESA (1.37m (54") FIBREGLASS ROD SHALL BE USED ON ALL GUYS).
4) FRAMED & INSULATED FOR 46KV.
5) GROUNDED WITH 3 X ¾" X 10' COPPER GROUND RODS, "SHEAR–LOK" GROUND CONNECTORS, AND 1/0 STRANDED COPPER GROUND WIRE TO THE TOP OF THE POLE

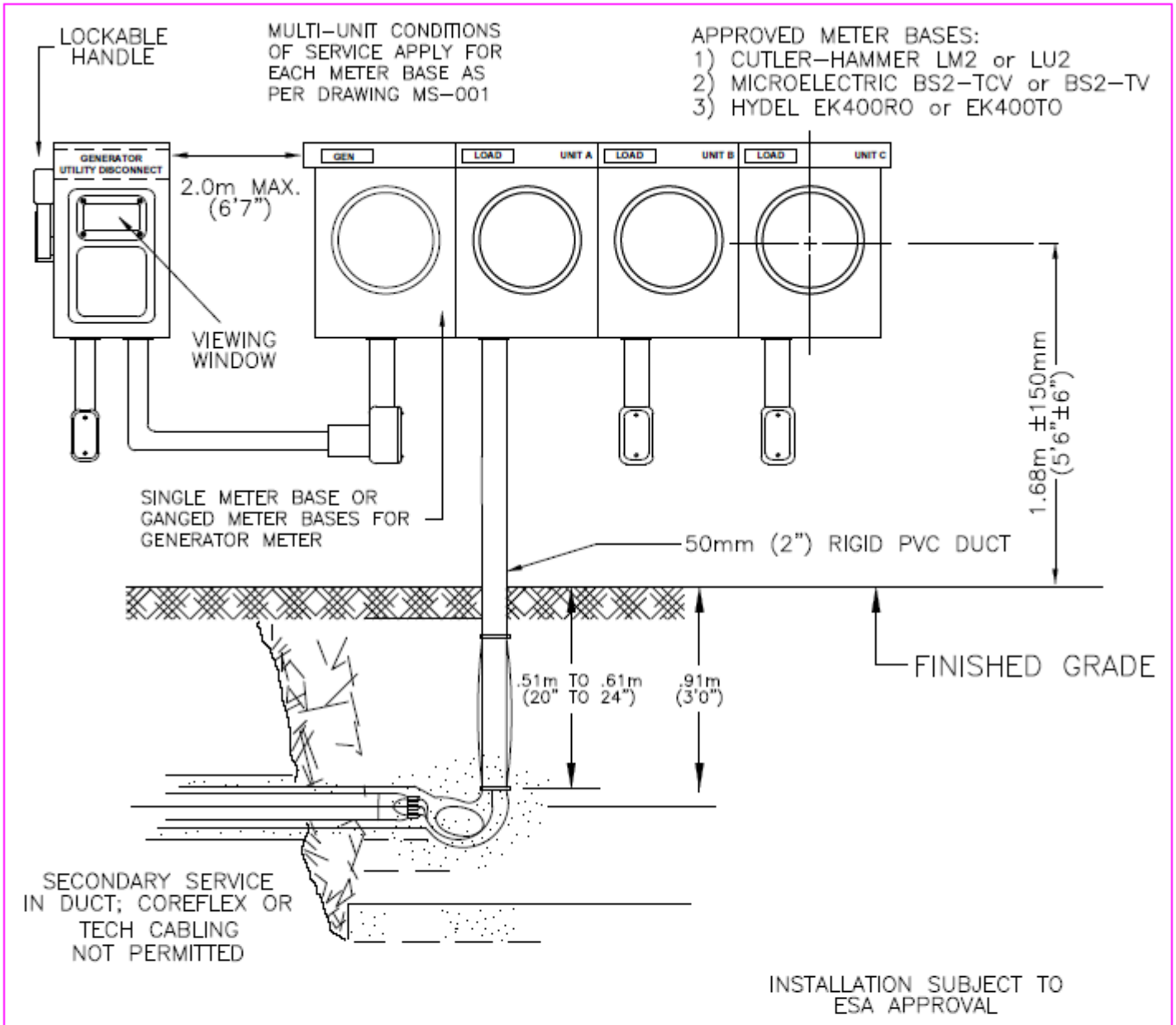
INSTALLATION SUBJECT TO ESA APPROVAL



Energy+

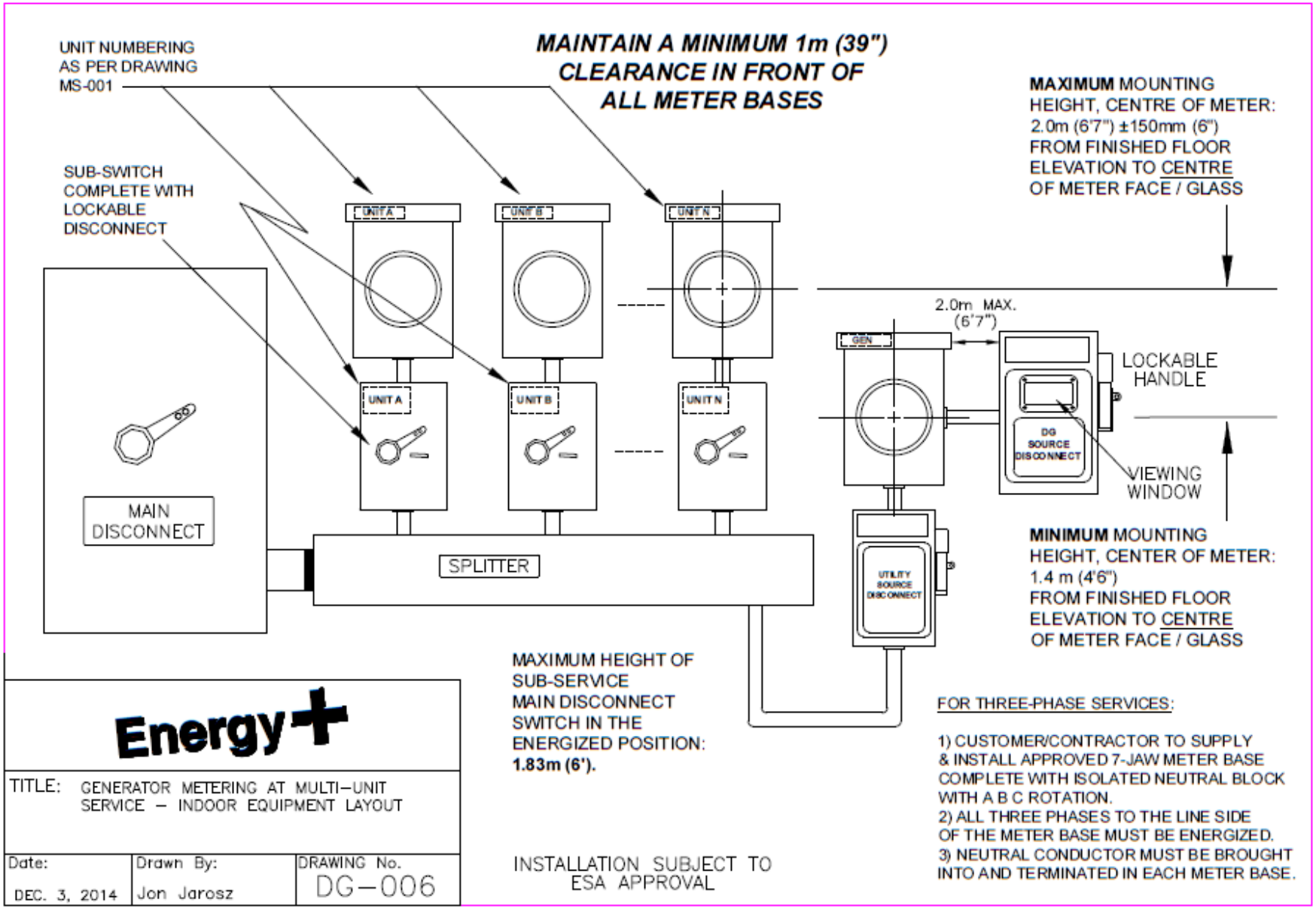
TITLE: GENERATOR METERING ON POLE / STRUCTURE, 200–AMP, 120/240V –EQUIPMENT LAYOUT

Date:	Drawn By:	DRAWING No.
DEC. 3, 2014	Jon Jarosz	DG–004



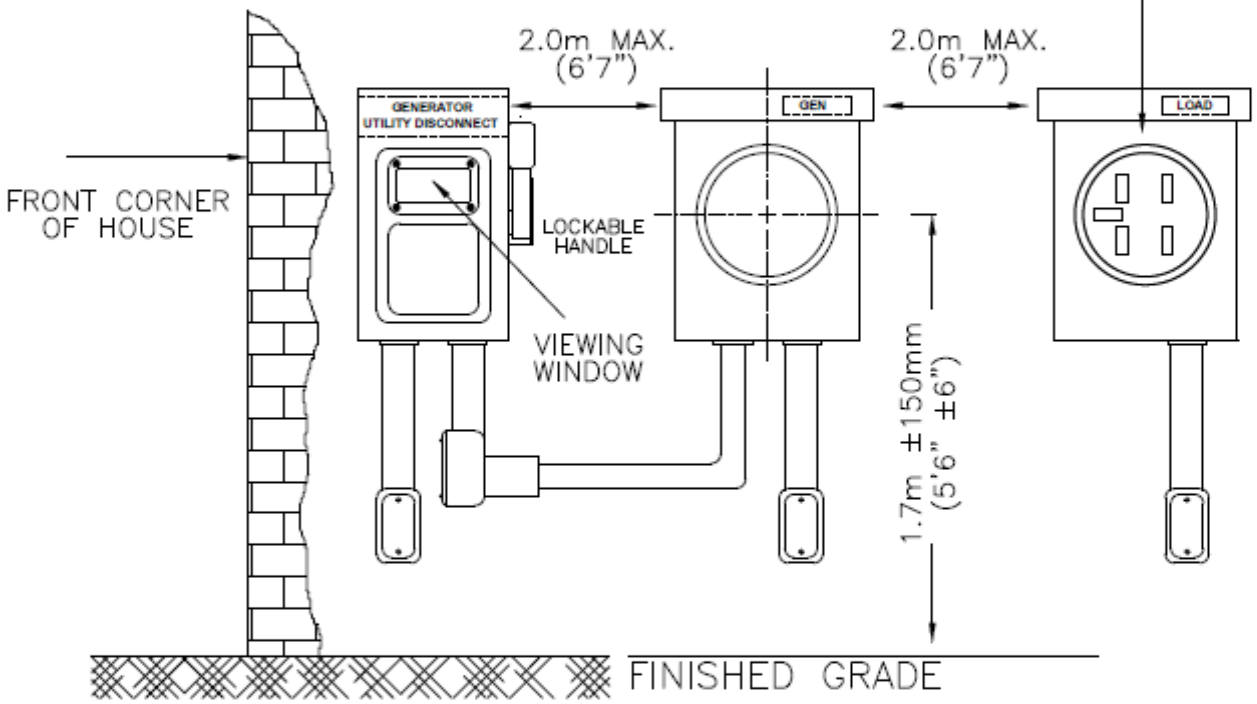
MAINTAIN A MINIMUM 1m (39") CLEARANCE IN FRONT OF METER BASE

TITLE: GENERATOR METERING AT MULTI–METERED SERVICE – OUTDOOR EQUIPMENT LAYOUT		
Date: DEC. 3, 2014	Drawn By: Jon Jarosz	DRAWING No. DG–005


MAINTAIN A MINIMUM 1m (39")
CLEARANCE IN FRONT OF
ALL METER BASES
UNIT NUMBERING
AS PER DRAWING
MS-001
SUB-SWITCH
COMPLETE WITH
LOCKABLE
DISCONNECT
MAIN
DISCONNECT
UNIT A
UNIT B
UNIT N
SPLITTER
MAXIMUM MOUNTING
HEIGHT, CENTRE OF METER:
2.0m (6'7") ±150mm (6")
FROM FINISHED FLOOR
ELEVATION TO CENTRE
OF METER FACE / GLASS
2.0m MAX.
(6'7")
GEN
LOCKABLE
HANDLE
DG
SOURCE
DISCONNECT
VIEWING
WINDOW
UTILITY
SOURCE
DISCONNECT
MINIMUM MOUNTING
HEIGHT, CENTER OF METER:
1.4 m (4'6")
FROM FINISHED FLOOR
ELEVATION TO CENTRE
OF METER FACE / GLASS
MAXIMUM HEIGHT OF
SUB-SERVICE
MAIN DISCONNECT
SWITCH IN THE
ENERGIZED POSITION:
1.83m (6').
FOR THREE-PHASE SERVICES:
1) CUSTOMER/CONTRACTOR TO SUPPLY
& INSTALL APPROVED 7-JAW METER BASE
COMPLETE WITH ISOLATED NEUTRAL BLOCK
WITH A B C ROTATION.
2) ALL THREE PHASES TO THE LINE SIDE
OF THE METER BASE MUST BE ENERGIZED.
3) NEUTRAL CONDUCTOR MUST BE BROUGHT
INTO AND TERMINATED IN EACH METER BASE.
Energy+
TITLE: GENERATOR METERING AT MULTI–UNIT
SERVICE – INDOOR EQUIPMENT LAYOUT
Date: DEC. 3, 2014
Drawn By: Jon Jarosz
DRAWING No. DG–006
INSTALLATION SUBJECT TO
ESA APPROVAL

5–JAW METER BASE MUST BE EQUIPPED WITH AN AUTOMATIC BYPASS FOR CURRENT CIRCUITS ON THE LEFT SIDE

*MAINTAIN A MINIMUM 1m (39") CLEARANCE IN FRONT OF METERS

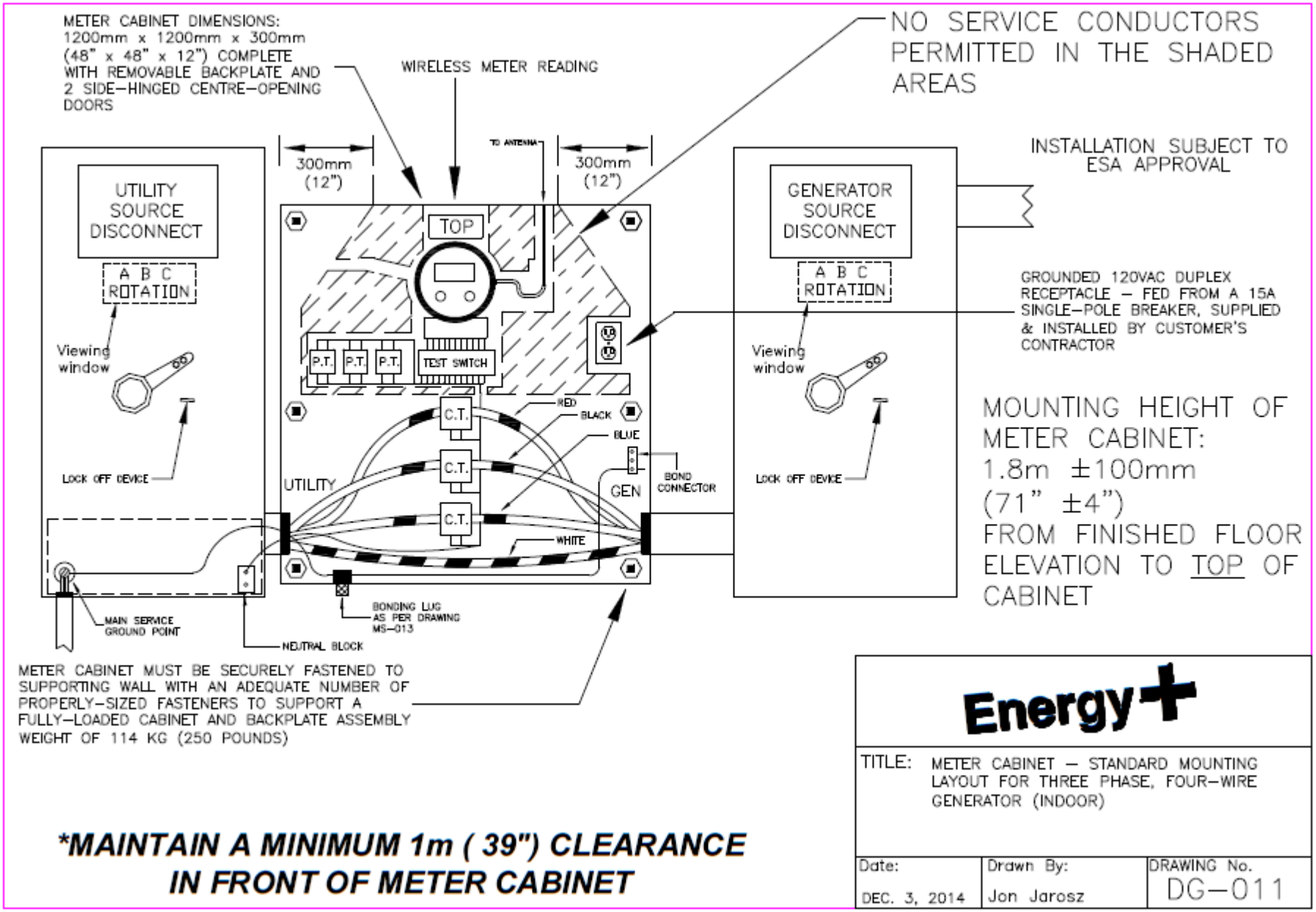


INSTALLATION SUBJECT TO ESA APPROVAL

Energy+

TITLE: GENERATOR METERING AT 400–AMP SINGLE PHASE, 120/240V WITH/WITHOUT TRANSFORMER – RATED COMBINATION METER BASE ENCLOSURE – OUTDOOR EQUIPMENT LAYOUT

Date:	Drawn By:	DRAWING No.
DEC. 3, 2014	Jon Jarosz	DG–007


METER CABINET DIMENSIONS:
1200mm x 1200mm x 300mm
(48" x 48" x 12") COMPLETE
WITH REMOVABLE BACKPLATE AND
2 SIDE–HINGED CENTRE–OPENING
DOORS
WIRELESS METER READING
NO SERVICE CONDUCTORS PERMITTED IN THE SHADED AREAS
INSTALLATION SUBJECT TO ESA APPROVAL
300mm (12")
300mm (12")
TO ANTENNA
UTILITY SOURCE DISCONNECT
A B C ROTATION
Viewing window
LOCK OFF DEVICE
TOP
P.T.
P.T.
P.T.
TEST SWITCH
C.T.
C.T.
C.T.
RED
BLACK
BLUE
WHITE
UTILITY
GEN
BOND CONNECTOR
BONDING LUG AS PER DRAWING MS–013
MAIN SERVICE GROUND POINT
NEUTRAL BLOCK
GENERATOR SOURCE DISCONNECT
A B C ROTATION
Viewing window
LOCK OFF DEVICE
GROUNDED 120VAC DUPLEX RECEPTACLE – FED FROM A 15A SINGLE–POLE BREAKER, SUPPLIED & INSTALLED BY CUSTOMER'S CONTRACTOR
MOUNTING HEIGHT OF METER CABINET:
1.8m ±100mm
(71" ±4")
FROM FINISHED FLOOR ELEVATION TO TOP OF CABINET
METER CABINET MUST BE SECURELY FASTENED TO SUPPORTING WALL WITH AN ADEQUATE NUMBER OF PROPERLY–SIZED FASTENERS TO SUPPORT A FULLY–LOADED CABINET AND BACKPLATE ASSEMBLY WEIGHT OF 114 KG (250 POUNDS)
*MAINTAIN A MINIMUM 1m (39") CLEARANCE IN FRONT OF METER CABINET
Energy+
TITLE: METER CABINET – STANDARD MOUNTING LAYOUT FOR THREE PHASE, FOUR–WIRE GENERATOR (INDOOR)
Date: DEC. 3, 2014
Drawn By: Jon Jarosz
DRAWING No. DG–011

ENERGY+ INC.