THE CONNECTICUT LIGHT AND POWER COMPANY

THE UNITED ILLUMINATING COMPANY

Guidelines for Certified Inverter Based

Generating Facilities, 10 kW and Less

May 12, 2010

Certified Inverter-Based Generating Facility

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SECTION 1
INTRODUCTION AND GENERAL CONSIDERATIONS

The Electric Distribution Companies (EDCs) of Connecticut have a responsibility to the public and to EDC customers to ensure that all generator interconnections to the Electric Power System (EPS) are safe and reliable.

These Guidelines include the application form, procedure, terms and conditions and technical requirements to ensure an expedited and successful interconnection process.

1.0 General Considerations

1.1 All Interconnection Customers ("Customers") will be treated fairly and uniformly, on a first come first serve basis, without preferential treatment and in a non-discriminatory manner.

1.2 The EDC cannot recommend manufacturers, vendors or technical experts to assist Customers.

1.3 All interconnections to the grid require Municipal Electrical Inspector approval and an EDC witness of the Commissioning Test (unless waived) for authorization to energize and to interconnect.

1.4 The Customers should secure electrical engineering expertise to help with the design of the electrical interface. If the Customer has questions or needs clarification about the process or technical requirements, the Customer should consult the appropriate EDC contacts, posted on the EDC generator interconnection websites.

1.5 Definitions and acronyms can be found in the "Definitions" section, in Attachment 6.

1.6 If the EDC determines that the proposed generator will be interconnected to an Area Network, then the customer will be required to file an application under the Fast Track process.

SECTION 2
PROCEDURE

The following steps will assist the Customer in completing an Interconnection Application

2.0 Procedure

2.1 The Customer completes the Interconnection Request ("Application"), and submits it to the EDC (Section 5) (please also refer to Section 3.4 and Attachment 1).

2.2 The EDC acknowledges to the Customer, receipt of the Application within three (3) Business Days of receipt of the Application (Attachment 1).

2.3 The EDC evaluates the Application for completeness and notifies the Customer within ten (10) Business Days of receipt that the Application is or is not complete and, if not, advises what material is missing (Attachment 2). At the time that a request for missing application information is sent, the EDC will place the subject project on hold in the interconnection queue, until the information request has been satisfied.

2.4 After receipt of a completed application, the EDC verifies if the Certified Inverter-Based Generating Facility can be interconnected safely and reliably. The EDC facilitator will return the "Contingent Approval to interconnect the Certified Inverter based Generating Facility" (Attachment 3) if the Generating Facility can be interconnected safely and reliably. The EDC will make a good faith effort within 15 Business Days to either return "Contingent Approval to interconnect the Certified Inverter based Generating Facility" to the Customer or notify the Customer that the Generating Facility cannot be safely interconnected.

2.5 After installation, the Customer shall return the "Certificate of Completion" (Attachment 4) to the EDC within ten (10) Business Days from the date of installation, which shall include a copy of the Municipal Electric Inspector's documented approval. The Customer cannot operate in parallel until the EDC witnesses the Commissioning Test, or notice has been provided, in writing, by the EDC that the witnessing of the Commissioning Test by the EDC was waived.

2.6 Prior to Parallel Operation, the EDC may inspect the Certified Inverter-Based Generating Facility for compliance with standards which may include

witnessing the Commissioning Test, and, if necessary, may schedule appropriate metering replacement.

2.6.1 There will be no charge for EDC personnel to witness the Commissioning Test of Certified Inverter Based Generating Facility, provided that the testing is completed in one visit. If the testing cannot be completed or must be repeated, because of a problem on the first visit, the EDC will charge the Customer for EDC personnel to witness the Testing on a subsequent visit.

2.6.2 The EDC will not perform, aid in performance of, or provide equipment for the Commissioning Test.

2.6.3 The EDC may inspect the Generating Facility to ensure that all equipment has been appropriately installed. All inspections must be conducted by the EDC, at its own expense for the first visit only, within ten (10) Business Days after receipt of the Certificate of Completion, with documentation of electrical inspector's approval, and shall take place at a time agreeable to the Parties. Any further inspections deemed necessary by the EDC shall be paid for by the Customer in advance of the inspection.

2.6.4 The EDC shall provide a written statement that the Generating Facility has passed inspection or shall notify the Customer of what steps it must take to pass inspection as soon as practicable after the inspection takes place.

2.6.5 If the EDC does not schedule an inspection of the Generating Facility within ten (10) Business Days after receiving the Certificate of Completion, the witnessing of the Commissioning Test is deemed waived (unless the Parties agree otherwise).

2.6.6 Upon waiver or completion of a successful Commissioning Test, the EDC shall notify the Customer, in writing, that interconnection is authorized via the "Approval to Energize the Certified Inverter Based Generating Facility" (Attachment 5).

2.7 The Customer will be responsible for ensuring ongoing compliance with these Guidelines.

2.8 *Contact Information*: In its Application (see Section 5) the Customer must provide the contact information for the legal applicant (i.e., the Customer).

If another entity is responsible for interfacing with the EDC, that contact information must also be provided on the Application.

2.9 *Information*: In its Application the Customer must enter the legal names of the owner(s) of the Generating Facility Include the percentage ownership (if any) by any utility or public utility holding Company, or by any entity owned by either.

2.10 *Underwriters Laboratories Standard #1741 ("UL1741")* This standard addresses the electrical interconnection design of various forms of generating equipment. Manufacturers must submit their equipment to a Nationally Recognized Testing Laboratory ("NRTL"), recognized by OSHA, that verifies compliance with UL1741. This "listing" is then marked on the equipment and supporting documentation. The Customer is responsible for ensuring compliance with all additional inverter base requirements per the UL1741, and with IEEE C62.41 and C62.45.

2.11 Codes and Standards applicable to the Application can be found in Attachment 7.

SECTION 3
TECHNICAL REQUIREMENTS

3.0 Overview

When interconnecting facilities to the EDC distribution system, it is important to minimize the potential hazard to life and property. A basic safety rule requires automatic detection and isolation of an abnormal condition within a reasonable time. The interconnection of a new facility to the EDC distribution system must not degrade any of the existing EDC protection and control schemes nor lower the existing levels of safety and reliability to other customers. Neither EDC nor the Customer should depend on the other for the protection of their respective equipment. The EDC minimum protection requirements are designed and intended to protect the EDC power systems alone. The Customer is responsible for the costs of the EDC installation of any protective equipment necessary to ensure safe and reliable operation of both EDC and the Customer's facilities. The need for protective equipment will vary, depending on the Generating Facility's location within an EDC circuit.

3.1 *General Technical Requirements*

3.1.1 All interconnections must comply with all applicable local, state, federal, and EDC safety rules, including IEEE 1547. The Customer is responsible for obtaining any and all permits required for the construction and operation of the Generating Facility, including any permits required by the Department of Environmental Protection.

3.1.2 The Customer is responsible for providing an accessible, visible, and lockable AC Isolation Device for the Generating Facility which must be approved by the EDC. The device and its cabinet must conform to the National Electrical Manufactures Association (NEMA), the National Electrical Safety Code (NESC) and the National Electrical Code (NEC). The isolation device will normally be operated by Customer personnel and will only be operated by EDC personnel during emergency conditions. The AC Isolation Device must be appropriately labeled "Generator Isolation Device."

3.1.3 All Interconnections must provide a scheme which ensures protection against Islanding. All exporting entities, including inadvertent export and all net metering projects, interconnecting to the EDC system with existing

synchronous generators, on the same Distribution Feeder, will be reviewed on a case-by-case basis to ensure there is adequate protection against islanding. If screening criteria are not met, the project will be reviewed using the Fast Track/Study Process.

3.1.4 All steady-state and transient operating limits for voltage, flicker voltage, frequency, harmonic contents, etc. must comply with the newest versions of IEEE 519, the NEC and other relevant IEEE standards and all other applicable local, state, or federal regulations. The inverter must stop conduction within six (6) cycles when the EDCs line voltage is:

3.1.4.1 less than or equal to 50% of nominal voltage, or,

3.1.4.2 when the EDC line voltage is equal to or more than 120% of nominal voltage.

In cases of voltage grid disturbances, the inverter must cease to energize the EDC system in accordance with IEEE1547 and the latest revision of UL1741. Subsequent to the occurrence, the inverter must stop conducting within two (2) seconds when the EDC line voltage is outside the following ranges:

3.1.4.3 less than 88% and more than 50% of nominal voltage, or;

3.1.4.4 greater than or equal to 110% to 120% of nominal voltage.

3.1.5 Subsequent to the occurrence of events which causes the inverter to cease to energize the utility line, the utility line voltage must remain stable in voltage and frequency for five (5) minutes prior to permitting the Inverter to conduct again.

3.1.6 If the proposed Generating Facility is to be interconnected on single-phase shared secondary, the aggregate generation capacity on the shared secondary, including the proposed generator, will not exceed 20 kVA.

3.1.7 If the proposed Generating Facility is single-phase and is to be interconnected on a center tap neutral of a 240 volt service, its addition will not create imbalance between the two sides of the 240 volt service of more than 30% of nameplate rating of the service transformer.

SECTION 3
TECHNICAL REQUIREMENTS

3.1.8 These technical requirements refer to all projects that have an inverter interface at the Interconnection point including high frequency micro-turbines.

3.1.9 In general, a standard Net Metering application is approved for Interconnection to the EDC's distribution system if the following three conditions are met:

3.1.9.1 the Inverter is approved by the EDC;

3.1.9.2 the Isolation Device is approved by the EDC; and,

3.1.9.3 the aggregate Generating Facility capacity on the line section less than 15% of the line section peak load or 30% of the nameplate rating of the service transformer.

3.2 *Approved inverter(s)*

An Inverter is considered approved if it is certified to the UL 1741 testing procedure and passed the required tests without failure to comply with IEEE C62.41 and C62.45. Proof of certification under UL1741 and compliance with IEEE C62.41, and C62.45 shall be required.

3.3 *Isolation device*

3.3.1 An Isolation Device shall be located between the EDC EPS and the Generating Facility.

3.3.2 A manual Isolation Device located outside and accessible to the EDC is required for all Generation Facilities larger than 1 kW. The Customer must provide an Isolation Device to electrically isolate the EDC system from the Customer's Generating Facility. The Customer is solely responsible for obtaining any and all permits and easements necessary to allow EDC to gain access to the Isolation Device.

Note: The EDC requires that the Isolation Device be visible and in close proximity (10 feet or less) to the main utility meter panel, unless otherwise approved in writing by the EDC. The switch shall be gang operated, have a visible break when open, be rated to interrupt the maximum generator output and be capable of being locked open by EDC personnel in

accordance with EDC safety rules and practices, the device must be used to establish a visually open, working clearance boundary when performing maintenance and repair work. The Isolation Device also must be accessible and lockable in the open position. The Customer is solely responsible for the maintenance of all fuses in fused, blade-type isolation switches.

3.4 *Interconnection Documentation*

The Customer must provide a drawing of the actual installation, showing all of the following items:

3.4.1 Customer account number and meter number;

3.4.2 drawing title block containing the name of the generator project, the revision level and the date;

3.4.3 single line drawing or schematic indicating the location of the Isolation Device, the circuit connectivity from the main switch, including sub mains (if applicable), metering, the main switch and the rating of all breakers;

3.4.4 the manufacturer's name, the model number, and the ampere rating of the isolation switch;

3.4.5 number and location of inverters with manufacturers' and Model numbers; and,

3.4.6 a site plan showing the location of the Generating Facility with respect to the building metering and transformer must be provided.

3.5. *Metering Requirements*

Net Metering installations are designed to operate in parallel with the EDC system. The isolation requirements are specified by the EDC. Generating Facilities participating in an EDC Net Metering program may deliver minimum power only with a rated Inverter that is approved in writing from the EDC. In accordance with the DPUC-approved requirements, Customers that meet the following conditions may use a meter without a detent to net the usage (net kilowatt hours [kWh] = kWh usage – kWh generation):

3.5.1 the Generating Facility has an inverter rating of 10 kW and less;

3.5.2 the system connects to the EDC secondary-service voltage;

3.5.3 the system meets the EDC Net Metering rate schedule. Only electromechanical or solid-state programmable revenue meters are used for Net Metering. (A bidirectional meter measures and records the inadvertent generation of excess power from a Net Metering customer). In the event that the installation of a dual meter-socket adapter is necessary, the Customer is required to provide a safe and adequate Meter Working (MW) Space, as is determined by the EDC.

3.6 *Operation Requirements*

For the EDC operating requirements, the Customer must ensure that the EDC approved Isolation Device is accessible at all time to EDC employees. For some EDC work procedures, such as scheduled maintenance and outages, EDC employees may require that this Isolation Device be opened and locked for the employees' safety. The isolation device will normally be operated by Customer personnel and will only be operated by EDC personnel during emergency conditions.

3.7 *Other Technical Requirements*

If the Generating Facility exceeds the operating capabilities of distribution lines, the EDC may need to conduct a more extensive evaluation of the proposed Facility and the application before providing its written approval to operate a Generating Facility. Any and all required modifications necessary for safe Parallel Operation will be paid for by the Customer.

3.8 *Parallel Operation of Pre-certified Inverters*

Certification for any equipment is generally done for a particular mode of operation (usually for independent operation of units). Primary to secondary configurations of controllers for paralleled inverters or any additional wiring changes between the controllers will invalidate certification and thus new certification or testing performed by an NRTL will be required, or the units will be treated as non-Certified.

SECTION 3
TECHNICAL REQUIREMENTS

Inverters with capability to function in grid independent operation, including those inverters which use battery backup, should be certified to UL1741 including the anti islanding tests as described in IEEE 1547-1.

SECTION 4
PROVISIONS FOR ALL INTERCONNECTIONS

4.0 *Reasonable Efforts*

The applicable EDC shall make reasonable efforts to meet all time frames provided in these procedures unless the EDC and the Interconnection Customer agree to a different schedule. If the Interconnecting EDC fails to meet a deadline provided herein, it shall (a) notify the Generator, (b) explain the reason for the failure to meet the deadline, and (c) provide an estimated date by which it will complete the applicable Interconnection procedure in the process.

4.1 *Disputes*

4.1.1 The Parties shall agree to attempt to resolve all disputes promptly, equitably and in a good faith manner. If Parties are unable to informally resolve their dispute, the following formal three step dispute resolution process must be followed:

4.1.1.1 Negotiation: Upon receipt of written request for formal dispute resolution, the Parties shall negotiate in good faith for eight (8) Business Days in an attempt to resolve the disputed issues. The negotiation will take place between appropriate representatives of each Party. An appropriate representative is a vice-president or a member of senior management with sufficient authority to resolve the dispute.

4.1.1.2 Mediation: If the Parties have not resolved the dispute through negotiation, the Parties agree to attempt to resolve their dispute through non-binding mediation. The Parties shall agree to a mutually agreeable mediation process and mediator. Each party will select a mediator within five (5) Business Days and the two selected mediators will attempt to, within five (5) Business Days, select a third, mutually agreeable, mediator. The Parties shall share the cost of mediation equally. Once the three mediators are selected and the mediation commences, the Parties agree to engage in mediation in good faith for a period of not less than 30 days.

4.1.1.3 Department of Public Utility Control Dispute Resolution

If the Parties cannot resolve their dispute through dispute resolution

or mediation within 30 days, either Party may commence an action at the Department of Public Utility Control for resolution of the dispute.

All timeframes in this process and the Dispute Resolution Process itself may be modified by mutual agreement of the Parties.

4.2 *Interconnection Metering*

Any metering necessitated by the use of the Generating Facility shall be installed at the Interconnection Customer's expense in accordance with Applicable Reliability Standards or successor documents.

4.3 *Commissioning Tests*

Commissioning tests of the Customer's installed equipment shall be performed pursuant to applicable codes, standards and equipment manufacturers. The Customer shall provide a written Commissioning Test procedure for EDC approval. The EDC will not perform, aid in performance of, or provide equipment for the Commissioning Test.

4.3.1 The EDC must be given at least ten (10) Business Days written notice, or as otherwise mutually agreed to by the Parties, of the tests and the EDC may be present to witness the Commissioning Tests.

4.3.2 The EDC will provide a Contingent Approval (Attachment 3). When the witnessed Commissioning Test has been successfully completed, the EDC will provide "An Approval to Energize Form" (similar to Attachment 5).

4.4 *Periodic Interconnection Tests*

During the application review, at the discretion of the EDC, a written Periodic Interconnection Test procedure shall be provided by the Customer to the EDC. Periodic Interconnection Test procedures are typically provided by the equipment manufacturer. The procedure shall describe a test process that will verify all interconnection-related protective functions and that associated batteries are functional, but need not replicate the Commissioning Test procedures. The interval between Periodic

SECTION 4
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Interconnection Tests shall be specified by the manufacturer, system integrator, or the authority having jurisdiction over the DR interconnection. Written test reports or a log for inspection shall be maintained. The Customer will be responsible to perform Periodic Interconnection Tests in accordance with manufacturer recommendations and IEEE 1547.

The EDC may audit records of Periodic Interconnection Tests at its discretion. If changes are made to functional software or firmware of the interconnection system or if a hardware component of the interconnection system has been modified in the field, replaced or repaired with parts different from the tested configuration and if such hardware, software or firmware have not been previously certified, then the applicable Commissioning Tests shall be performed. If such hardware, software or firmware has been previously certified or if settings have been changed, then the Commissioning Tests must be conducted applicable to the changes made. This requirement is in accordance with IEEE 1547.2.

4.5 *Confidentiality*

The EDC shall maintain confidentiality of all information so designated by the Customer if clearly marked and labeled "Confidential" except as otherwise required by system operators, applicable laws and regulations. In the event that the EDC is requested to produce confidential information, the EDC shall provide advance notice to the Customer, if possible, to give the Customer an opportunity to seek protective treatment of such information. If such information is requested or required by the Connecticut Department of Public Utility Control, the EDC will seek protective treatment of such information. Confidential information does not include information previously in the public domain, required to be public submitted or divulged by government authorities

4.6 *Comparability*

The EDC shall process and analyze all Interconnection Requests in a timely manner as set forth in this document. The EDC shall use the same reasonable efforts in processing and analyzing Interconnection Requests from all Customers.

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PROVISIONS FOR ALL INTERCONNECTIONS

4.7 *Record Retention*

The EDC shall maintain for three (3) years records, subject to audit, of all Interconnection Requests received under these procedures, the times required to complete Interconnection Request approvals and disapprovals, and justification for the actions taken on the Interconnection Requests.

4.8 *Acceptance of Guideline Requirements*

The Customer shall sign and return the Application which indicates the Customer's acceptance of the terms, conditions, and requirements included in the Guidelines. After the EDC receives the Application signed by the Customer acknowledging acceptance of all terms and conditions contained in the Guidelines, the Interconnection of the Generating Facility shall proceed under the provisions of the Guidelines.

4.9 *Capacity of Generating Facility*

The Capacity of a Generating Facility, for the purpose of analysis, shall be determined as follows:

4.9.1 if the Application pertains to an increase in capacity for an existing Generating Facility, the Application shall be evaluated on the basis of the new total capacity of the Generating Facility;

4.9.2 if the Application is for a Generating Facility that includes multiple energy production devices at a site for which the Customer seeks a single Point of Interconnection, the Interconnection Application shall be evaluated on the basis of the aggregate capacity of the multiple devices; and,

4.9.3 the Application shall be evaluated using the maximum nameplate rated capacity of the Generating Facility.

4.10 *Construction of the Facility*

It is recommended that the Customer construct the Generating Facility when the EDC approves the Application and returns it to the Customer.

SECTION 4
PROVISIONS FOR ALL INTERCONNECTIONS

4.11 *Interconnection and Operation*

The Customer may operate the Generating Facility and Interconnect with the EDC electric system in accordance with these Guidelines once all of the following have occurred:

4.11.1 upon completing construction, the Customer will cause the Generating Facility to be inspected or otherwise certified by the appropriate local electrical wiring inspector with jurisdiction;

4.11.2 the Customer returns the Certificate of Completion (see Attachment 4) to the EDC;

4.11.3 the EDC has either:

4.11.3.1 completed its inspection, and witnessed the Commissioning Test of the Generating Facility to ensure that all equipment has been appropriately installed and that all electrical connections have been made in accordance with applicable codes. All inspections must be conducted by the EDC at its own expense, within ten (10) Business Days after receipt of the Certificate of Completion and shall take place at a time agreeable to the Parties. The EDC shall provide a written "Approval to Energize" if the Commissioning Test was satisfactory. If it failed the Test, the EDC shall notify the Customer of what failed as soon as practicable after the inspection and/or the Commissioning Test takes place; or

4.11.3.2 if the EDC does not schedule an inspection of the Generating Facility within ten (10) Business Days after receiving the Certificate of Completion, the Commissioning Test is deemed waived (unless the Parties agree otherwise); or,

4.11.3.3 the EDC waives the right to inspect the Generating Facility by providing written notice of its waiver to the Customer;

4.11.4 the EDC has the right to disconnect the Generating Facility in the event that, in its sole discretion, it believes that the Generator is not installed properly or the Generator fails to return the Certificate of Completion; and,

4.11.5 revenue quality metering equipment must be installed and tested in accordance with applicable ANSI standards.

4.12 *Safe Operations and Maintenance*

The Customer shall be fully responsible to operate, maintain, and repair the Generating Facility as required to ensure that it complies at all times with these Guidelines and the interconnection standards to which it has been certified.

4.13 *Access*

The EDC shall have access to the Isolation Device (if an Isolation Device is required by the EDC) and metering equipment of the Generating Facility at all times. The EDC shall provide reasonable notice to the Customer when possible prior to using its right of access.

4.14 *Disconnection*

4.14.1 The EDC may temporarily disconnect the Certified Inverter-Based Generating Facility upon the following conditions:

4.14.1.1 for scheduled outages upon reasonable notice;

4.14.1.2 for unscheduled outages or when the EDC believes that there is an emergency situation which includes the Generating Facility adversely affecting the EPS, any equipment owned or operated by the EDC, or other customers of the EDC; or,

4.14.1.3 if the Generating Facility does not operate in the manner consistent with these Guidelines.

4.14.2 The EDC shall inform the Customer in advance of any scheduled disconnection, or within a reasonable time after an unscheduled disconnection.

SECTION 4
PROVISIONS FOR ALL INTERCONNECTIONS

4.15 *Indemnification*

The Parties shall at all times indemnify, defend, and save the other Party harmless from, any and all damages, losses, claims, including claims and actions relating to injury to or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the other Party's action or inactions of its obligations under this agreement on behalf of the indemnifying Party, except in cases of gross negligence or intentional wrongdoing by the indemnified Party.

4.16 *Insurance*

Customers interconnecting a Generating Facility to the EPS of the EDC shall maintain liability insurance in the amount of $300,000.00, per Interconnection. If the site owner or the generator operator is a different party than the Generator, they shall also maintain liability insurance in this amount. The Customer shall provide a Certificate of Insurance to the EDC annually. If the insurance is discontinued, for any reason, including transferring of ownership of the Generating Facility, the Customer shall notify the EDC, in writing, within five (5) Business Days of said discontinuation.

4.17 *Limitation of Liability*

Each Party's liability to the other Party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission in its performance of its obligations pursuant to these Guidelines, shall be limited to the amount of direct damage actually incurred. In no event shall either party be liable to the other party for any indirect, incidental, special, consequential, or punitive damages of any kind whatsoever, except as allowed under paragraph 4.15.

4.18 *Termination*

4.18.1 The Interconnection may be terminated under the following conditions:

4.18.1.1by the Customer with 30 days advance written notice to the EDC;

4.18.1.2 by the EDC, if the Generating Facility fails to operate for any consecutive 12 month period; or,

4.17.1.3 by the EDC if the Customer fails to remedy a violation of these Guidelines within 30 days of receiving written notice of said violation by the EDC.

4.19 *Survival Rights*

The provisions within these Guidelines shall continue in effect after termination to the extent necessary to allow or require any Party to fulfill rights or obligations that arose under the Guidelines.

4.20 *Assignment/Transfer of Ownership of the Facility*

The Customer shall notify the EDC of its intent to transfer the Generating Facility no less than 30 days prior to the transfer, or, within five (5) Business Days of the formation of the intent to transfer if the intent forms less than 30 before transfer. These Guidelines shall survive the transfer of ownership of the Generating Facility to a new owner when the new owner agrees in writing to comply with the terms of the Guidelines and so notifies the EDC. Absent acceptance by the new owner, within 30 days of the transfer, the Interconnection is no longer authorized and the EDC reserves the right to terminate the Interconnection at its own discretion. The EDC will provide the new owner with notice of the its intent to terminate at least 30 days in advance of said termination.

SECTION 5
INTERCONNECTION APPLICATION

Complete Application

An application will be considered complete when the following items have been received by the EDC (in accordance with section 3.4):

1. Complete signed and dated application
2. Processing Fee
3. One line electrical schematic
4. Site plan
5. Original liability insurance accord form
6. Technical specification documents

Additional information to evaluate the Application may be required.

Processing Fee

A non-refundable processing fee of $100 must accompany this Application.

Insurance

Customers interconnecting a Generating Facility to the EPS of the EDC shall maintain liability insurance in the amount of $300,000.00, per interconnection. If the Site Owner or the generator operator is a different party than the Customer, they shall also maintain liability insurance in this amount.

Interconnection Customer

Name: _____

Contact Person: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone (Day): _____ (Evening): _____

Fax: _____ E-Mail Address: _____

SECTION 5
INTERCONNECTION APPLICATION

Contact (if different from Interconnection Customer i.e. Developer)

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone (Day): _____ (Evening): _____

Fax: _____ E-Mail Address: _____

Ownership Information (Owner of the facility, include percent ownership by any third party): _____

Certified Inverter-Based Generating Facility – Point of Interconnection

Location: _____

Electric Distribution Company (EDC): _____

Account Number: _____

Meter Number: _____

Is this a new service: Yes_____No_____

Is the Interconnection Request for:

A retail customer interconnecting a new Certified Inverter-Based Generating Facility that will produce electric energy to be consumed only on the retail customer's site? Yes_____No_____

A Generating facility where 100% of the excess output will be sold to its host utility?

Yes_____No_____

An Interconnection Customer interconnecting a new Certified Inverter-Based Generating Facility that plans to participate in the wholesale markets?

Yes_____No_____

SECTION 5
INTERCONNECTION APPLICATION

Inverter Manufacturer:_____Model_____

Nameplate Rating:

_____ (kW)

_____ (kVA)

_____ (AC Volts)

Single Phase _____ Three Phase_____

System Design Capacity: _____ (kW) _____ (kVA)

Prime Mover:

☐ Photovoltaic

☐ Reciprocating Engine

☐ Fuel Cell

☐ Turbine

☐ Other _____

Energy Source:

☐ Solar

☐ Wind

☐ Hydro

☐ Diesel

☐ Natural Gas

☐ Fuel Oil

☐ Other (describe) _____

Is the equipment UL1741 Listed? Yes_ No __

If yes, attach manufacturer's document showing UL-1741 listing.

Estimated Installation Date: _____ Estimated In-Service Date: _____

The Inverter Process is available only for inverter-based Generating Facilities no larger than 10 kW that meet the codes, standards, and certification requirements to UL 1741 as outlined in these Guidelines.

SECTION 5
INTERCONNECTION APPLICATION

Interconnection Customer Signature

I hereby certify that, to the best of my knowledge, the information provided in this Application is true. I agree and accept all terms and conditions for Interconnection and agree to abide by the "Guidelines for Certified Inverter Based Generating Facility, 10 kW and less" to interconnect a Certified Inverter-Based Generating Facility and return the Certificate of Completion when the Certified Inverter-Based Generating Facility has been installed.

Signed: _____

Print Name:
_____

A T T A C H M E N T 1
RECEIPT OF APPLICATION (Sample)

Title: _____ Date: _____

Date Interconnection Request Received: _____

Received By: _____

Application Number # _____

Interconnection Customer Name

_____

ATTACHMENT 2
CHECKLIST OF MISSING INFORMATION
(Sample)

Interconnection Application: _____

Interconnection Customer Name: _____

Missing Elements

- ☐ Processing Fee Deficient — Date Cured: _____
- ☐ Signed Application — Date Cured: _____
- ☐ One Line Schematic — Date Cured: _____
- ☐ Site Plan — Date Cured: _____
- ☐ Technical Data — Date Cured: _____
- ☐ Insurance — Date Cured: _____

Date Deemed Valid Interconnection Request: _____

Deemed Valid By: _____

ATTACHMENT 3
CONTINGENT APPROVAL TO INTERCONNECT (Sample)

Interconnection of the Generating Facility is approved contingent upon compliance with the Terms and Conditions of the Interconnection Application (Section 5) and the Interconnection Customer's return of a completed Certificate of Completion (Attachment 4).

Electric Distribution Company Name:
_____

Electric Distribution Company Signature:
_____

Print Name:
_____

Title: _____ Date: _____

Application ID number: _____

Interconnection Customer Name_____

Electric Distribution Company waives witness test? Yes___No___

ATTACHMENT 4
CERTIFICATE OF COMPLETION

Is the Generating Facility owner-installed? Yes___ No ____

Interconnection Customer: _____
Contact:_____

Location of the Generating Facility (if different from above):

_____

City: _____ State: _____ Zip Code:_____

Telephone (Day):_____

(Evening):_____

Fax:_____

E-Mail Address: _____

Electrician:
Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____
Telephone (Day): _____
(Evening): _____

Fax:_____

E-Mail Address: _____
License number: _____

Date approval to install facility granted by the Electric Distribution Company : _____

Application ID number: _____

ATTACHMENT 4
CERTIFICATE OF COMPLETION

Electrical Inspection Signoff/ Copy of Inspection Sticker:
_____

The Generating Facility has been installed and inspected in compliance with the local building/electrical code of _____

Signed (Local electrical wiring inspector, or attach signed electrical inspection):
_____

Print Name: _____ Date: _____

As a condition of interconnection, you are required to send a signed copy of this form along with a copy of the approved and signed electrical permit to the EDC, including the information below:

Name: _____

Electric Distribution Company :
_____
Address:_____

_____
City, State

ZIP: _____Fax: _____

Email
ID_____

I have read and certify that to the information included in this Certificate of Completion is true and correct.

Sign and Date _____

ATTACHMENT 5
APPROVAL TO ENERGIZE
(Sample)

Energizing the Generating Facility is approved contingent upon ongoing compliance with the Guidelines for interconnecting an Inverter-Based Generating Facility.

Please provide the EDC Distributed Resources Group with the following on a regular basis:

1. **Annually**: Provide a certificate of insurance as described in the enclosed interconnection agreement. The next one will be due by _____.
   Please send it to the following address by that date:

   EDC:
   EDC Name: _____
   EDC Address: _____
   _____
   _____

2. **Every 60 months**: Customer is responsible for the periodic maintenance of the relays, interrupting devices, control schemes, and batteries that involve the protection of the EDC's system. The test cycle for protective relaying must occur every 60 calendar months or manufacturer's recommendation, whichever is less. Customer must provide copies of these test records to the EDC by _____.

3. A fully executed Interconnection Agreement for the Generating Facility will be sent under separate cover

Electric Distribution Company Name: _____

Electric Distribution Company Signature: _____

Print Name: _____

Title: _____ Date: _____

ATTACHMENT 6
INTERCONECTION DEFINITIONS

In this Guideline the following terms may be used:

Area Network: See Low Voltage Secondary Network Grid System

Business Day: Shall mean Monday through Friday, excluding Federal and State Holidays.

Calendar Day: Shall mean any day including Saturday, Sunday, Federal and State Holidays.

Capacity: The maximum output, commonly expressed in kilowatts (kW) or megawatts (MW), that generating equipment can supply to system load, adjusted for ambient conditions]

CL&P: The Connecticut Light and Power Company. CL&P provides service to all of Connecticut except the towns supplied by UI, and the towns of Wallingford, Norwich, Bozrah and parts of Groton, Norwalk, and Lebanon.

Certificate of Completion: the Customer shall return the "Certificate of Completion" (Attachment 4) to the EDC within ten (10) Business Days of from the date of installation, and which shall include a copy of the Municipal Electric Inspector's documented approval

Certified Inverter Based Generating Facility: Specific Generating Facility, 10kW and less and protective equipment system or systems that are documented as meeting applicable test requirements and standards relating to safety and reliability by a nationally recognized testing laboratory. An inverter is considered approved if it is certified to UL-1741 and passed the required tests without failure to comply with IEEE C62.41 and C62.45. Proof of certification under UL-1741 and IEEE C62.41, and C62.45 shall be required.

Commissioning Test: Commissioning tests shall be conducted after the interconnection system is installed and is ready for operation. An individual qualified in testing protective equipment (professional engineer, factory certified technician, or licensed electrician with experience in testing protective equipment) must perform or directly supervise Commissioning tests. The EDC has the right to witness the Commissioning tests as described below, or to require written certification, by the equipment owner describing which tests were performed and their results. All commissioning tests shall be performed based on written procedures. Commissioning procedures are typically

provided by equipment manufacturers or system integrators and approved by the equipment owner and the EDC. Once completed and accepted, the Commissioning tests will not have to be repeated unless set points are changed.

Company: CL&P or UI; the EDC

Company (EDC) Facilitator: The EDC's designated single point of contact for customer inquiries related to Facilities. Interested parties can obtain a copy of the Guidelines, interconnection applications and any forms that are needed to request an interconnection from the EDC Facilitator.

DPUC: Connecticut Department of Public Utility Control.

Department: Connecticut Department of Public Utility Control ("DPUC").

Disconnect: To isolate a circuit or equipment from a source of power.

Distribution Feeder An electric line operated at voltages below 69 kV, from an electric provider substation or other supply point to customers.

Electric Distribution Company or **"EDC"**: CL&P and/or UI, as appropriate.

Electric Power System (EPS): All electrical wires, equipment, and other facilities owned or provided by the EDC that are normally operated at voltages below 69kV to provide distribution service to customers.

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

Generator: The owner/operator of the Generating Facility.

Generating Facility: Any certified inverter-based device producing electrical energy, i.e. rotating generators, wind, steam turbines, internal combustion engines, hydraulic turbines, solar, fuel cells, etc., including energy storage technologies. A system for the Generation of electricity 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.

ATTACHMENT 6
INTERCONECTION DEFINITIONS

Guidelines: The "Guidelines for Certified Inverter Based Generating Facility, 10 kW or less" which includes 5 Sections and 7 Attachments. They describe the protocols and procedures for interconnecting to the Electric Power System.

IEEE: Institute of Electrical and Electronics Engineers.

In-Service Date: The date on which the Generating Facility and system modification (if applicable) are complete and ready for service, even if the Generating Facility is not placed in service on or by that date

Intentional Islanding: Intentional Islanding occurs when the Generating Facility has been isolated from the EPS by planned operation of disconnecting means consistent with the Technical Requirements and the Generating Facility as a result is serving segregated load(s) on the Generating Facility's side of the Point of Interconnection.

Interconnection: The physical connection of a Generating Facility to the Electric Power System so that Parallel Operation can occur.

Interconnection Application: The document to be filled out by the Customer and sent to the EDC prior to any Interconnection. The Interconnection Application is in Section 5 of the Guidelines. By signing the Interconnection Application, the Customer acknowledges acceptance of all terms and conditions of the Guidelines.

Interconnection Customer or Customer: The person, organization or entity applying to interconnect a Generating Facility to the Electric Power System.

Inverter: A machine, device or system that changes direct-current power to alternating-current power.

Islanding: A situation where electrical power remains in a portion of an EPS when the EPS has ceased providing power for whatever reason (emergency conditions, maintenance, etc.) to that portion of the EPS.

Isolation Device: A readily accessible, lockable, visible-break mechanical device used for isolating a circuit or equipment from a source of power.

ATTACHMENT 6
INTERCONECTION DEFINITIONS

Low Voltage Secondary Network Grid System (Area Network): A Network Secondary Distribution System typically with a nominal voltage of 208Y/120 volts in which the secondaries of distribution transformers are connected to a common network bus through Network Protectors. The distribution transformers, Network Protectors and network buses are located in multiple locations which are interconnected to form a grid.

Meter Working Space: An area in front, above and below the meter or the meter enclosure. Refer to Article 110.26 of NEC for specifications regarding access and working spaces about electrical equipment (600 V or less).

Metering Point: The point at which the billing meter is connected (for meters that do not use instrument transformers). For meters that use instrument transformers, the point at which the instrument transformers are connected.

Municipal Electrical Inspector: Local town or city official in which the Interconnection is proposed to take place who is responsible for approving the Interconnection.

Nationally Recognized Testing Laboratory (NRTL): An OSHA approved laboratory which performs the certification testing required for Generating Facilities.

Net Metering: The process, in accordance with applicable EDC rates whereby the metered electrical energy production by a Generating Facility is subtracted from the metered EDC electrical energy sales to the customer at the Generating Facility.

Operator: Entity that operates the electric distribution system (also EDC)

OSHA Occupational Safety and Health Administration

Parallel Operation: A Generating Facility, connected electrically to the EDC EPS, in which the potential exists for electricity to flow back from the generating Facility to the EDC EPS. The EDC will grant operation to parallel (energize) only when the products of the interconnection review conclude that the Generating Facility is in compliance with all EDC requirements.

Parties: Those who are undertaking and agreeing to these Guidelines and the interconnection process, includes Customer and the EDC.

ATTACHMENT 6
INTERCONECTION DEFINITIONS

Periodic Interconnection Test: Customer shall maintain all equipment and perform periodic tests of such equipment.

Point of Interconnection: The point where the Generating Facility is electrically connected to the Generator's electrical system.

Primary – Secondary configurations (formerly Master/Slave)- In electrical engineering language , master/slave terminology was formerly used as a model for a communication protocol in which one device or process (known as the *master*) controlled one or more other devices or processes (known as *slave*). The guidelines will refer to this controller relationship instead as primary - secondary.

Site Owner: a person who as legal ownership of a property and has the right to use it and has full control over it unless prevented by some agreement.

UI: The United Illuminating Company. UI's service area includes the principal cities of Bridgeport and New Haven and their surrounding municipalities: Ansonia, Derby, East Haven, Easton, Fairfield, Hamden, Milford, North Branford, North Haven, Orange, Shelton, Stratford, Trumbull, West Haven and Woodbridge.

UL1741: Underwriters Laboratories Standard 1741 "Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources"

Utility Grade Relay: A relay that is constructed to comply with, as a minimum, the most current version of the following standards; ANSI/ IEEE C37.90, ANSI/ IEEE C37.90.1, ANSI/ IEEE C37.90.2, ANSI/ IEEE C37.90.3 and; IEEE C37.98 Seismic Testing (fragility) of Protective and Auxiliary Relays, ANSI C37.2 Electric Power System Device Function Numbers, IEC 255-21-1 Vibration, IEC 255-22-2 Electrostatic Discharge, and IEC 255-5 Insulation (Impulse Voltage Withstand).

ATTACHMENT 7
CODES AND STANDARDS

The EDCs recommends that the following existing codes and standards (in addition to any successor codes and standards) shall be applied as appropriate:

ANSI C12.1-2001 "American National Standard for Electric Meter Code for Electricity Metering"

ANSI C84.1-1995 Electric Power Systems and Equipment – Voltage Ratings (60 Hertz)

ANSI/IEEE C37.90-1989 IEEE Standard "Relays and Relay Systems Associated with Electric Power Apparatus"

ANSI/IEEE C37.90-1-1989 IEEE Standard "Surge Withstand Capability [SWC] Tests for Protective Relays and Relay Systems"

ANSI/IEEE Std C37.90.2 (1995), IEEE Standard "Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers"

ANSI/IEEE C62.41-1991 "Recommended Practice on Surge Voltages in Low Voltage AC Power Circuits"

ANSI/IEEE Std C62.41.2-2002, IEEE Recommended Practice on Characterization of Surges in Low Voltage (1000V and Less) AC Power Circuits

ANSI/IEEE Std C62.45-1992 (R2002), IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000V and Less) AC Power Circuits

IEC 1000-4-15 Flicker meter- Functional and Design Specifications

IEEE Std p1453 Draft, Recommended Practices for Measurement and Limits of Voltage Flicker on AC Power Systems

IEEE p 1547.1 2006 Std for Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems

ATTACHMENT 7
CODES AND STANDARDS

IEEE p 1547.2 Draft Application Guide for IEEE Standard 1547 for Interconnecting Distributed Resources with Electric Power Systems

IEEE p 1547.3 Draft Guide for Monitoring, Information Exchange and Control of DR Interconnection with Electric Power Systems

IEEE 1547-2003 IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems.

IEEE Std 100-2000, IEEE Standard Dictionary of Electrical and Electronic Terms

IEEE Std 519-1992, IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems

IEEE Std C37.108-1989 (R2002), IEEE Guide for the Protection of Network Transformers

IEEE Std C57.12.44-2000, IEEE Standard Requirements for Secondary Network Protectors

National Electrical Code, NFPA/ANSI 70 (Note: As adopted by State of CT)

NEMA MG 1-1998, Motors and Resources, Revision 3

UL (Underwriters Laboratories) Std 1741, 2006 Inverters, Converters and Charge Controllers for Use in Independent Power Systems

ANSI/ IEEE C37.90.3

IEEE C37.98 Seismic Testing (fragility) of Protective and Auxiliary Relays

ANSI C37.2 Electric Power System Device Function Numbers

IEC 255-21-1 Vibration

IEC 255-22-2 Electrostatic Discharge

IEC 255-5 Insulation (Impulse Voltage Withstand