DISTRIBUTED RENEWABLE ENERGY GENERATION POLICY

Dominica Electricity Services 2016 Version 2.00

DOCUMENT TITLE AND APPROVAL PAGE

DOCUMENT NUMBER: **2016/002/D**

DOCUMENT TITLE: **DISTRIBUTED RENEWABLE ENERGY GENERATION POLICY**

PURPOSE OF DOCUMENT

This document covers the guiding principles, operating procedures and technical standards governing the interconnection of distributed renewable energy sources. The policy seeks to facilitate the economic, safe and reliable operation and expansion renewable energy into the National Grid. The provisions of the policy are enforceable under the Electricity Supply ACT #10 of 2006.

RECORD OF DOCUMENT ON ISSUE

Document Number	Description	Date
2016/002/D	**Distributed Renewable Energy Generation Policy**	**May 11, 2016**

APPROVAL

This document is approved by the Independent Regulatory Commission (IRC) and the provisions therein become effective on the 11th day of May 2016.

On behalf of the Commission:

GLENN KHAN
EXECUTIVE DIRECTOR

Table of Contents

PURPOSE

The objective of this policy is to allow consumers of electricity who are customers of DOMLEC to be able to supply some or all their energy needs through the use of renewable energy while connected to the grid. This policy is not intended for individuals interconnecting for the sole purpose of exporting energy to the grid, such interconnections are covered under PPA made with DOMLEC.

RESOLUTION OF CONFLICT BETWEEN ENGINEERING STANDARDS

"In the event that there is conflict, contradiction or confusion between the required engineering standards stated in this policy and any other documents pertaining to the interconnection of renewable energy sources to DOMLEC's transmission or distribution system the prevailing standards as interpreted by DOMLEC shall apply."

Executive Summary

This "Interconnection Policy" describes the process and requirements of Dominica Electricity Services Limited (DOMLEC) for any Customer who desire to connect a Distributed Generating (DG) Facility through the customer interface (meter) to DOMLEC's Distribution System. Significant damage to the customer and / or DOMLEC's facilities as well as risk of physical injury to personnel may occur if a DG facility is interconnected in a manner that does not comply with DOMLEC's requirements contained herein.

The Interconnection Policy has been drafted to address requests from customers to install embedded generation on to the Dominica Electricity Services Limited (DOMLEC) distribution network. This policy details the process and requirements (DOMLEC) for Customers who desire to connect a Distributed Generating (DG) Facility to DOMLEC's Distribution System through the customer interface. Hence, any customer who plans to install any form of DG Facility and remain connected to DOMLEC's Distribution System must comply with DOMLEC's requirements.

The Policy addresses DG Facilities that will be connected electrically to DOMLEC's Distribution System and operate in harmony with the voltage and frequency maintained by DOMLEC during normal operating conditions. The policy does not apply to Standby Plant nor does it allow the interconnection of conventional plant, but strictly applies to Plants using renewable energy. Under such circumstances, the interconnection of the power source with DOMLEC's Distribution System must meet the technical requirements of the Interconnection Policy. In addition, the Interconnection Policy does not impact or supersede provisions of the 2006 Electricity Supply Act or Regulator rules.

The document focuses on the steps and requirements necessary for interconnection to DOMLEC Distribution System with a Distributed Generation Facility through the customer interface.

The interconnection may require an upgrade or other modifications to the Distribution System in order to meet such requirements. Any costs incurred by DOMLEC in facilitating such modifications or upgrades shall be paid in advance by the Customer. Once the requirements contained in this Interconnection Policy are met, DOMLEC shall interconnect the Customer to the Distributing System subject to the terms of an Interconnection Service Agreement. This Interconnection Policy is published for the convenience of the Customer in order to provide guidance as to DOMLEC requirements. The procedures and requirements herein are based on DOMLEC's current distribution system. As future changes occur to the distribution

system, DOMLEC reserves the right to modify the processes and requirements contained herein and in some cases may decline interconnection requests. Future changes or special circumstances may cause re-evaluations of the size of DG facilities that can be interconnected to the Distribution System. DOMLEC holds sole rights in declining any interconnection requests if the interconnection is found to be inconsistent with its system plan.

NOTE: This Interconnection Policy uses special capitalized terms throughout the text. For the convenience of the reader, a Glossary is provided in Appendix F.

For the purpose of ascribing varying levels of engineering and administrative effort based on the nature of the DG facility, the DG facilities have been classified as follows:

Table 1-1. Generation Category

Category	Maximum Output	Voltage Level
1	≤ 3kW	230V
2	3 ≤ 75kW	230/400 or 11kV
3	75 ≤ 150kW	230/400 or 11kV
This policy does not apply to proposed systems greater than 150 kW.		

Table 1-2. Technology Type

Type	Technology Type
A-1	Inverter-based, 1 phase
A-3	Inverter-based, 3 phase
B-1	Induction generator, 1-phase
B-3	Induction generator, 3-phase
C-3	Synchronous generator, 3-phase

1. SUMMARY OF APPLICATION AND INTERCONNECTION PROCESS

a) Persons desirous of installing the DG are required to be familiar with these requirements for interconnection BEFORE acquiring the DG.

b) The Customer may obtain application forms, Distributed Renewable Energy Generation Interconnection Policy, and information on DG requirements from DOMLEC offices. This information is also available on DOMLEC's website at http://www.domlec.dm

c) In order for an interconnection to DOMLEC's Grid to be approved, the Customer is required to do the following:

I. Understand DOMLEC's interconnection requirements before starting the project;

II. Submit to DOMLEC:

i. A Notice of Intent to which shall include:

a) Application to interconnect

b) Two single line diagrams of proposed Renewable Energy (RE) System

c) Relevant proof of ownership of property on which RE system is to be installed and documented Right of Way (ROW) where applicable

ii. Certificate of Fitness of the RE system from the Electrical Division

iii. A manufacturer specification sheet of the inverter showing the product technical details.

III. Ensure provision of a visible lockable outdoor rated (NEMA 3R) AC disconnect is in an accessible location at or near DOMLEC's meter.

1.1 Application process

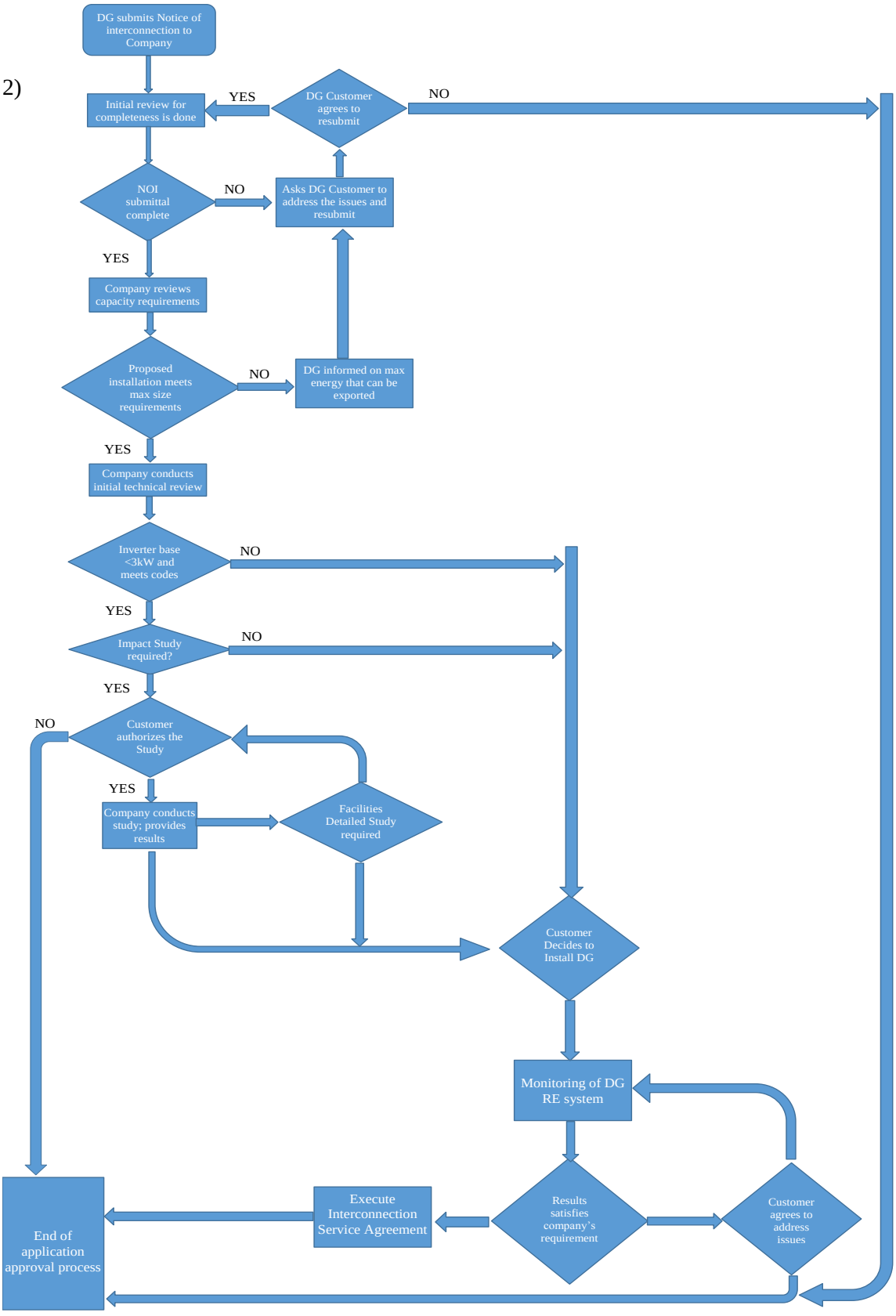
Application Fee

Applicants will be charged a non-refundable application fee at the time of submitting the Application to DOMLEC.

The process of interconnecting a DG Facility with DOMLEC's Distribution System is described and summarized below:

1) The Customer submits an Application and Notice of Intent to Interconnect ("Notice of Intent") to DOMLEC. The form of the Application and Notice of Intent is provided in Appendix A. The application should be sent to DOMLEC's designee at the address specified by DOMLEC (See flow chart Figure 1-1).

Figure 1-1. Flow Chart of Interconnection Approval Process



2) After

receiving the Application and Notice of Intent, DOMLEC's designee will work with the Customer and serve as the point of contact for all future activities until directed otherwise. The Notice of Intent will be reviewed and verified for completeness. If any of the requirements specified in the Interconnection Policy are not met, DOMLEC will inform the Customer in writing and the application process will be delayed until the Customer has addressed the deficiencies in writing.

3) If the Application is for an Inverter-based DG Facility, DOMLEC will determine if the DG Facility complies with UL Standard 1741 or equivalent.

4) Fast Track Interconnection for Small inverter based DG Facilities: For systems that are under 3kW, DOMLEC provides a faster interconnection process. This facilitates and simplifies the interconnection process for smaller DG Facilities by eliminating the Detailed Study as long as the DG Facilities meet the codes and standards stated by DOMLEC, and provided that DOMLEC has reviewed the design and monitored the proposed inverter based DG facility and is satisfied that the installation is safe for operation. Note that the system is "monitored" after the Customer and DOMLEC execute the DG Interconnection Monitoring Agreement.

5) Upon reviewing the Application and Notice of Intent, DOMLEC will determine if the proposed installation meets the capacity limits specific to the Customer's consumption as stated in Clause 4.1.6. An evaluation of whether a Distribution Facilities Impact Study (Impact Study) is required will be subsequently conducted. This evaluation will be conducted by DOMLEC.

6) If an Impact Study is required, DOMLEC will prepare a cost estimate to perform the study and will submit such estimate to the Customer.

7) If the Customer elects to proceed with the Impact Study, the Customer and DOMLEC will execute a Distribution Facilities Impact Study Agreement, a sample short form of which is provided in Appendix D. However, note that DOMLEC reserves its right to include additional provisions and use a longer form of agreement to the extent necessary to address any specific circumstances of the project. The Customer will be required to pay DOMLEC for the costs incurred in performing the study.

8) Upon execution of the Distribution Facilities Impact Study Agreement and receipt of payment in full, DOMLEC will conduct the Impact Study and, upon completion of the work, issue a Distribution Facilities Impact Study Report to the Customer. The Report will also indicate whether a Detailed Study is required. If no Detailed Study is required the Customer may proceed to install said DG.

9) If the Customer elects to proceed with the installation, the Customer and DOMLEC will execute a DG Interconnection Monitoring Agreement. The form is provided in Appendix E.

10) If a Detailed Study is required and the Customer elects to proceed with the project, DOMLEC will prepare a cost estimate to perform the study and will submit such estimate to the Customer.

11) If the Customer elects to proceed with the Detailed Study, the Customer and DOMLEC will execute a Distribution Facilities Detailed Study Agreement, a form of which is provided in Appendix D. However, DOMLEC reserves its right to change the terms or include additional provisions to address the specific circumstances of the project. The Customer will be required to pay the costs incurred by DOMLEC in performing the study.

12) Upon execution of the Distribution Facilities Detailed Study Agreement and receipt of payment in full, DOMLEC will conduct the Detailed Study and, upon completion of the work, issue a Distribution Facilities Detailed Study Report to the Customer.

13) This report will contain a detailed cost estimate for any equipment and/or modifications to the Distribution System required to interconnect the DG facility.

14) After reviewing the Distribution Facilities Detailed Study Report, if the Customer elects to proceed with the interconnection of the DG Facility, DOMLEC will require the Customer to execute a DG Interconnection Monitoring Agreement.

15) Upon execution of the DG Interconnection Monitoring Agreement and payment in full for any equipment and/or modifications specified in the Detailed Study, Customer will proceed to construct the required facilities for monitoring.

16) Provided that the monitoring results are in compliance with DOMLEC's interconnection requirements, the Customer and DOMLEC shall proceed to execute the Interconnection Service Agreement. The terms of such Agreement will depend upon the size and location of the DG Facility, and other Customer-specific parameters particular to each individual interconnection request. A copy of the said Agreement to be lodged with the IRC.

#	ACTIVITY STEPS	PARTY RESPONSIBLE	TIME FRAME (working days)
1	Obtain Distributed Renewable Energy Generation Interconnection Policy	CUSTOMER	–
2	Read and get familiar with the Distributed Renewable Energy Generation Interconnection Policy	CUSTOMER	–
3	Get information on DG requirements	CUSTOMER	–
4	Obtain application form	CUSTOMER	–
5	Submit application along with Notice of Intent	CUSTOMER	–
6	Review Notice of Intent and give feedback	DOMLEC	3
7	Determine whether to conduct an Impact Study	DOMLEC	3
8	Execute Distribution Facilities Impact Study Agreement (if yes for # 7)	DOMLEC	5
9	Conduct Impact study	DOMLEC	5

10	Determine whether to conduct a Detailed Study	DOMLEC	3
11	Execute Distribution Facilities Detailed Study Agreement (if yes for # 10)	DOMLEC	1
12	Conduct Detailed Study	DOMLEC	TBD
13	Issue Distribution Facilities Detailed Study Report to the Customer.	DOMLEC	1
14	Execute DG Interconnection Monitoring Agreement	DOMLEC	1
15	Construct the facility for monitoring	CUSTOMER	–
16	Inspect upon Installation and provide feedback	DOMLEC	7
17	Execute the Interconnection Service Agreement	DOMLEC	1
18	Forward Copy of agreement to the IRC	DOMLEC	1

DISCLAIMER

Please note that the timeframe as shown above is contingent upon volumes being processed.

2. GENERAL CONDITIONS

Persons desirous of connecting a DG to DOMLEC's Grid must be customers of DOMLEC and the power source must be located at the customer's owned or rented premises. They must be current on their bill. The DG must operate in parallel with DOMLEC's Grid and offset some or all of the Customer's own energy usage; both real and reactive energy.

2.1 **Electrical Generation Systems**

2.1.1 Unless otherwise approved by DOMLEC, to be eligible to connect and operate in parallel with DOMLEC's Grid, the DG renewable must have a maximum aggregate capacity per facility of 1.5 times the Customer's current average usage up to a maximum of 150kW. The average usage is normally calculated based on the most recent twelve months that the Customer relied on the grid or the most recent months where the Customer does not have a twelve month history:

(i) For equivalent DG capacity- the average monthly consumption is divided by 150. A multiplier of 1.5 times provides the maximum allowed capacity up to 150kW. See Table 1.

Average monthly consumption over the last year (kWh)	Equivalent Capacity (kW)	Maximum system size (kW)
100	0.67	1
200	1.33	2
300	2.00	3
500	3.33	5
1000	6.67	10
3000	20	30

http://pvwatts.nrel.gov

2.2 Interconnection

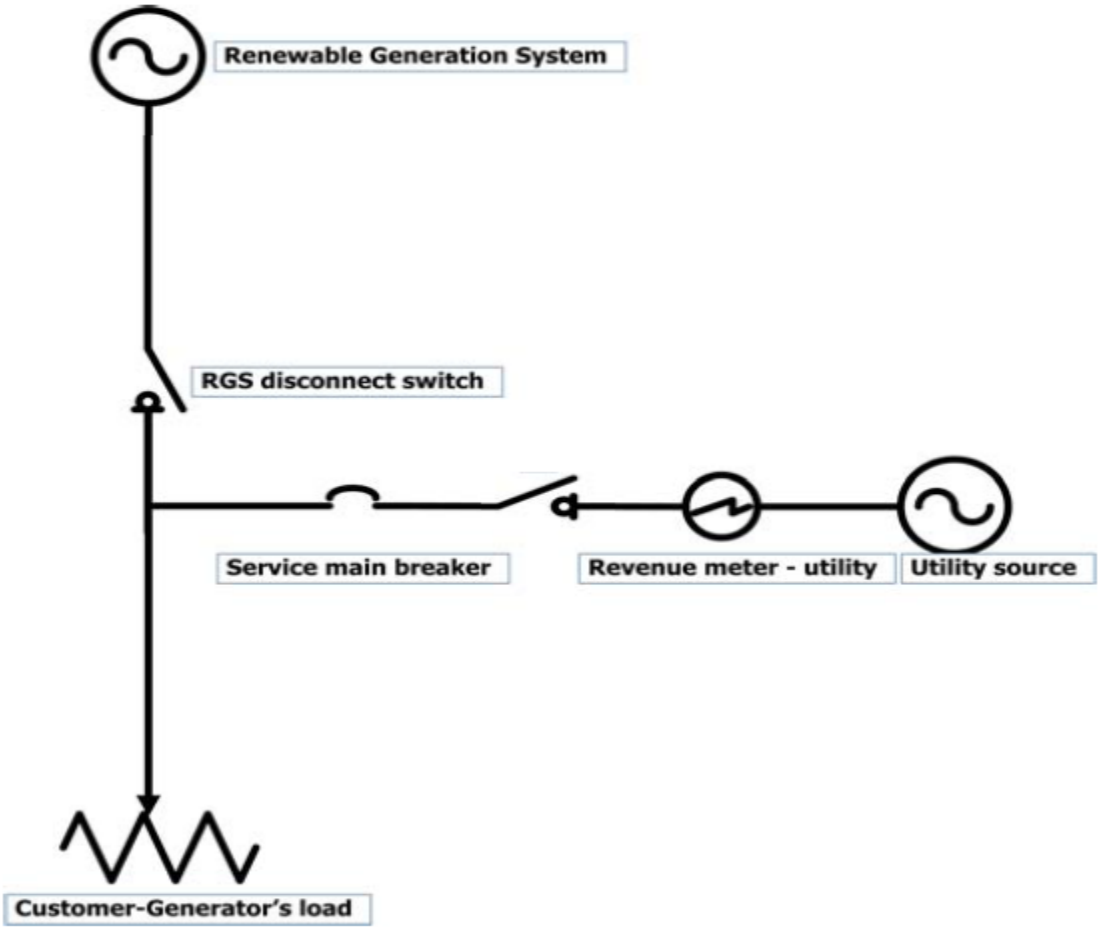
The Customer is required to sign an **Interconnection Service Agreement** with DOMLEC prior to **official** commencement of parallel operation. The **Interconnection Service Agreement** outlines the applicable interconnection standards and requirements

2.3 Unauthorized Connections

DOMLEC must grant approval in writing before any DG is connected to DOMLEC's Grid. For the purposes of public and utility personnel safety, DOMLEC reserves the right to disconnect and suspend, as required, the service to any Customer who connects a DG to the electrical installation without written authorisation from DOMLEC.

2.4 Metering

For each service interconnected, Customers must also make provision for fitting a meter socket base or other appropriate metering facilities to receive a meter to measure the total energy transactions between DOMLEC and the DG. This meter will be installed by DOMLEC. All metering locations must be readily accessible to DOMLEC personnel for the purposes of verifications and other related tasks. The metering configuration is as follows:



Future Modifications and Expansion

Prior to modifying, expanding or altering the DG, the Customer must obtain written permission from IRC to alter or extend an existing installation. Thereafter, the Customer must provide a new Application Form, revised One-line Diagram, Interconnection Service Agreement and to seek prior written approval from DOMLEC before interconnecting the modified DG to DOMLEC's Grid.

2.5 Renewable Capacity on the Natural Grid

For the overall safety and protection of the National Grid, the interconnection of all DG, is limited to a value approved by the IRC.

Customer-owned equipment protection

It is the Customer's sole responsibility to protect its facility loads and generation equipment and comply with the requirements of all appropriate and relevant standards, codes and local authorities.

2.6 Interconnection of Conventional Generators

I. The process and requirements contained in this Interconnection Policy are not applicable to fossil fuel emergency generators. Such generators must be installed in accordance with the requirements of the ***ELECTRICITY SUPPLY ACT 2006 and IEE standards or equivalent***. Guidelines in these publications require that adequate measures will be taken to ensure that the generator cannot be operated in parallel with DOMLEC's Distribution System. Attempting to interconnect a generator of this type with DOMLEC's Distribution System, except as specified in the Electricity Supply Act poses a significant risk of injury or death to personnel, and can potentially cause damage to DOMLEC's Distribution System and significant damage to the Customer's generator and premises and is specifically prohibited.

II. In an effort to encourage and promote renewable and clean generation sources DOMLEC will not consider interconnection of reciprocating (internal combustion) or large gas turbines fuelled by liquid fuels. DOMLEC considers the category of renewable, clean generation sources to include Photovoltaic, Hydro, Wind, Fuel Cells, or Micro-turbines and renewable fuels to include biogas and landfill-gas.

2.7 "Distributed DG Facility" Classification

The following sections discuss the approach that would accommodate Distributed Generation (DG) installations in DOMLEC's Distribution System to take advantage of the benefits of DG without affecting the operations of existing distribution system. The interconnection requirements depend on the capacity of DG and the type of technology used in producing power. For the purposes of developing the interconnection policy requirements for a DG facility to be interconnected to DOMLEC system, the following Categories and Types have been established listed in Table **1-1** and Table **1-2**. Based on the size of the DG facilities, a summary of technical requirements is provided in Table **1-3**:

Table 1-3. Summary of Requirements

		Requirements	Distribution Facilities Impact Study
Category I	Type A-1	Inverter must comply with UL 1741 or equivalent. Photo-voltaic inverters must comply with IEEE 929 or equivalent.	May not be required
	Type A-3	Inverter must comply with UL 1741 or equivalent... Photo-voltaic inverters must comply with IEEE 929 or equivalent.	May not be required
	Type B-1	Must meet protection requirements specified herein.	Required
	Type B-3	Must meet protection requirements specified herein.	Required
Category II	Type A-3	Inverter must comply with UL 1741 or equivalent. Photo-voltaic inverters must comply with IEEE 929 or equivalent.	Required
	Type B-3	Must meet protection requirements specified herein.	Required
	Type C-3	Must meet protection requirements specified herein.	Required
Category III	Type B-3	Must meet protection requirements specified herein.	Required
	Type C-3	Must meet protection requirements specified herein.	Required

2.8 Construction of the Distribution Facilities Upgrades

2.8.1 General Considerations

2.8.2 Land Interests

The Customer should recognize that the Interconnection requirements for the DG Facilities may require acquisition of land interests, including but not limited to rights of way, which may require individual agreements between DOMLEC and third party landowners. All concerns or issues as relates to land acquisition and or proof of ownership shall be the sole responsibility of the Customer. DOMLEC reserves the right to draft any and all documents creating land interests that it will receive to effectuate interconnection service under this Interconnection Policy. In the event the Customer acquires the land, the necessary permits, licenses, franchises or regulatory or other approvals required for the construction and operation of the Distribution Facilities Upgrades, DOMLEC has the right to approve or reject any terms and conditions related to such acquisition prior to the start of service. The Customer will submit adequate proof of availability of land for DG construction along with the Notice of Intent.

2.8.3 Distribution Facilities Upgrades Charge

If Distribution Facilities Upgrades are required to accommodate interconnection of the DG Facility, the Customer will be required to pay a Distribution Facilities Upgrades Charge that reimburses DOMLEC for all reasonable costs incurred by DOMLEC in constructing a reliable and safe interconnection that has no adverse impacts on the Distribution System. Any such charges will be reflected in the terms of the Interconnection Service Agreement.

2 These costs typically include - Engineering design, construction costs, taxes and fees, and costs of ancillary facilities (such as, reactive power support).

2.8.4 Delivery and Measurement of Electricity

2.8.4.1 Voltage Level

All electricity across the Interconnection Point will be in the form of single-phase or three-phase, fifty-hertz alternating current at DOMLEC's legislated voltage levels.

2.8.4.2 Machine Reactive Capability

1. **Category 1 Facilities:**

Category 1 and smaller Category 2 Facilities shall be required to provide reactive capability.

2. **Category 2 and small Category 3 Facilities**

Category 2 and small Category 3 DG Facility interconnected with DOMLEC's Distribution System may be required to provide reactive capability.

3. **Large Category 3 Facilities**

Large Category 3 DG Facility interconnected with DOMLEC's Distribution System will be required to provide reactive capability to regulate and maintain system voltage at the Interconnection Point. DOMLEC will establish a scheduled range of voltages to be maintained by the DG Facility. The reactive capability requirements will be reviewed as part of the Distribution Facility Impact Study and Distribution Facility Detailed Study.

Metering, Related Equipment and Billing Options:

DOMLEC will provide all metering equipment, for which the Customer may be required to pay to DOMLEC a onetime charge to cover expenses associated with the meter. The Customer will provide suitable space within the DG Facility for installation of the metering, at no cost to DOMLEC.

All metering equipment installed pursuant to this Interconnection Policy and associated with the DG Facility will be routinely tested by DOMLEC as per (document name to be provided by George), in accordance with applicable metering criteria, rules and standards. Should the Customer require additional testing outside of this schedule, it shall be provided at a cos to the Customer. If, at any time, any metering equipment is found to be inaccurate by a margin greater than that allowed under applicable criteria, rules and standards, DOMLEC will cause such metering equipment to be made accurate or replaced.

The type of metering equipment to be installed at a DG Facility is dependent on the Category (size) of the facility.

Access and Control

Properly accredited representatives of DOMLEC or its Affiliate will at all reasonable times need access to the DG Facility to make reasonable inspections and obtain information required in connection with this Interconnection Policy. Representatives will be required to make themselves known to the Customer's personnel and state the object of their visit. DOMLEC or its Designated Agent will have control such that it may open or close the circuit breaker or disconnect and place safety grounds at the appropriate Interconnection point.

Insurance

For Category 2, Category 3 and Facilities, the Customer is required to provide and maintain relevant insurance coverage, with DOMLEC named as co-insured.

3. Technical Requirements

This section describes the technical requirements that the Customer must adhere to in order to interconnect a DG facility to DOMLEC's system. These requirements will serve as the interconnection technical guidelines and DOMLEC reserves the right to modify or revise these requirements from time to time or on a case by case basis.

3.1 DOMLEC OPERATING CONDITIONS

This section describes typical DOMLEC distribution operating and power quality conditions within which the DG should operate. These are the values within which the DG should be designed to withstand. It is the Customer's responsibility to ensure that all equipment operates correctly in this environment.

3.1.1 Voltage Level

All electricity across the interconnection point will be in the form of single phase or three phase alternating current at a voltage level determined by mutual agreement between DOMLEC and the Customer. In accordance with the ESA "Electricity Supply Act 2006". A voltage tolerance of +4% / -8 % is applicable to allow for varying load conditions as shown in below.

Phase	Minimum	Maximum	Nominal (+4/-8%)
1	211.6V	239.2V	230V
3	368V	416V	400V

3.1.2 System Frequency

DOMLEC's Grid operates at 50 Hz. Frequency deviations typically range from 48.5 to 51.5 Hz for all contingencies.

Nominal Frequency (+/- 3%)	Minimum Frequency	Maximum Frequency
50Hz	48.5Hz	51.5Hz

3.1.3 Harmonic Distortion

DOMLEC uses the IEEE Standard 519 "Recommended Practices and Requirements for Harmonic Control in Electric Power Systems" which sets out the quality of power that an electric utility is expected to deliver to the Customer at the Point of Common Coupling ("PCC") and describes the voltage and current waveforms that exist throughout the DOMLEC's Grid. Transient conditions exceeding the limits may be encountered. **IEEE Standard 519** Section 11.5 recommends that the voltage distortion limits, as a percentage of the nominal fundamental frequency voltage in the utility service, should not exceed 5% for the total voltage harmonic distortion and 3% for any individual harmonic.

Total harmonic current distortion shall be less than 5% of the fundamental frequency current at rated inverter output as referenced by IEEE 929.

3.1.4 Voltage Imbalance

When single phase RGS are connected in multiple units and three phase service is available, then approximately equal amounts of generation capacity should be applied to each phase of a three phase circuit.

3.1.5 Fault and Line Clearing

DOMLEC may use automatic reclosing to maintain the reliability of DOMLEC's Grid. The owner of the DG needs to be aware of line reclosing when designing or purchasing protection schemes to ensure that the DG ceases to energize before the automatic reclosing of DOMLEC substation breakers. Grid-tied inverters manufactured to the **UL 1741 Standard** are recommended for this purpose.

3.1.6 Machine Reactive Capability

The Customer may be required to install reactive power capabilities for system related issues or to maintain system voltage at interconnection points. This will also depend on the reactive power consumed by the facility. The specific requirement will be reviewed as a part of the Distribution Facility Impact study and Distribution Facility Detailed Study. The Customer will be required to follow the capacitor switching schedule established by DOMLEC. Large Category 3 interconnections involve additional requirements that will be specified by DOMLEC.

3.2 Study and Analysis

Without DG, the power flow in a radial system is unidirectional and decreasing with increasing distance from the power substation. Since DG can modify the power flow directions, difficulties in maintaining and adjusting voltage regulation may arise. Therefore, the DG interconnection policy requires that studies be performed to assess the impacts of power flows in the system. Two separate analyses that will be performed for an interconnection are:

a) Distribution Systems Impact Study, and

b) Distribution Facilities Detailed Study (if required)

These studies will evaluate generation interconnection feasibility, the impact of DG on DOMLEC's system along with the impact of the system on DG, and then evaluate options for system upgrade as necessary. The interconnection policy requires that power flow analysis be performed to assess the impact of the interconnecting DG resource on the local system and to identify any known violations in the area based on a contingency set. The contingency set will be established by DOMLEC and will be agreed upon with the Customer or entity making the request for interconnection. Similarly, stability analysis will be performed for resources where existing stability margins are limited. DOMLEC will ensure that operational issues such as availability of spinning reserve are appropriately considered while conducting these studies and while developing the findings and recommendations. DOMLEC reserves the complete rights to decline any interconnection request due to any system or operational constraints.

IPPs requesting interconnection of a Category 1 facility may generally not be required to do any of the studies except in exceptional circumstances that will be determined by DOMLEC. Interconnection of Category 2 facilities and smaller Category 3 facilities may require a Distribution Systems Impact Study but may not be required to conduct a Distribution Facilities Detailed Study. For larger facilities such as a large Category 3, a Distribution Facilities Detailed Study will be required in addition to Distribution Systems Impact Study in order to scope the required distribution facility system additions and/or upgrades necessary due to the addition of the distributed resource. DOMLEC may decide to include all the analyses performed under Generation Interconnection Feasibility, System Impact, and Generation Interconnection Facilities Studies under one study. Typically, power flow analysis will be performed to ensure that local contingency criteria are not violated.

Short circuit calculations will be performed to ensure that circuit breaker and protection equipment capabilities are not exceeded. DOMLEC or its designee acting on its behalf will also evaluate the engineering details of the physical attachment of the resource, as well as the relaying and metering associated with the resource to ensure a safe and reliable interconnection. This may entail more detailed evaluation in certain cases and configurations.

3.3 Protection Requirements

Any DG facility desiring to interconnect with DOMLEC's distribution system or to modify an existing interconnection must meet the technical specifications and requirements set forth in this section. Once interconnected, DOMLEC, in keeping with Good Utility Practice and in its sole discretion, may disconnect the DG Facility if the DG facility deviates from the technical specifications and requirements contained in this policy. If disconnected or declared non-conformant, the DG Facility must return to full compliance with this protection policy prior to reconnecting with DOMLEC's system. The specifications and requirements listed in this policy are intended solely to mitigate possible adverse impacts caused by the DG Facility on DOMLEC's equipment and on other IPPs of DOMLEC. These requirements are also necessary to ensure safety of personnel working on DOMLEC's system. These requirements are not intended to address protection of the DG Facility itself or the Customer's internal load. It is the responsibility of the DG Facility to comply with the requirements of all appropriate standards, codes, statutes and authorities to protect itself and its loads. DOMLEC will conduct periodic inspections on an annual basis or as agreed upon between DOMLEC and the DG facility. DOMLEC will have the right to disconnect if the interconnection standards are not being maintained.

3.3.1 Category 1: DG with capacity of 3 kW or less.

General Requirements:

The DG Facility will provide a disconnect switch at the interconnection point with DOMLEC that can be opened for isolation. The switch will be in a location accessible to DOMLEC's personnel at all times. DOMLEC will have the right to open this disconnect switch during emergency conditions and with reasonable notice to the Customer at other times. DOMLEC will exercise such right in accordance with Good Utility Practice. The switch will be gang operated, have a visible break when open, be rated to interrupt the maximum generator output and be capable of being locked open, tagged and grounded on DOMLEC side by Company personnel. The switch will be of a type approved by DOMLEC.

DOMLEC shall cap the total permitted nameplate installed capacity of Category I Renewable Energy Distributed Generation as set forth by the IRC.

Requirements for Inverter-based (Type A) installations:

1) The DG Facility is responsible for protecting its equipment from being re-connected out of synchronism with DOMLEC's system by an automatic line recloser operation. To meet these requirements, the DG facility's protection needs to be consistent with the auto-reclosing policies of DOMLEC.

2) The following information must be submitted by the Customer for review and acceptance by DOMLEC prior to DOMLEC's approving the Customer's request for interconnection:

   a) Electrical one-line diagram or sketch depicting how the inverter will be interconnected relative to the service entrance panel and the electric meter.

   b) Make, model and manufacturer's specification sheet for the inverter.

3) For Facilities that utilize photovoltaic technology, it is required that the system be installed in compliance with IEEE Standard 929-2000, "IEEE Recommended Practice for Utility Interface of Photovoltaic (PV) Systems" or equivalent. The inverter will meet the Underwriters Laboratories Inc. Standard UL 1741, "A Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems" or IEEE 1547 The Customer's request for interconnection will be accompanied with a request to conduct a Distribution Facilities Impact Study or a Distribution Facilities Detailed Study as deemed necessary by DOMLEC. In addition, due to the nature of PV impacts on interconnected distribution systems, DOMLEC reserves the right to request special studies depending on the control technology and the physical characteristics used for the PV converters.

4) For Facilities that utilize wind technology or other direct current energy sources and employ inverters for production of alternating current, the inverter will meet the Underwriters Laboratories Inc. Standard UL 1741, "Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems" or equivalent. Based on the information supplied by the Customer, DOMLEC reserves the right to scope the Distribution Facilities Impact Study or a Distribution Facilities Detailed Study. In addition, DOMLEC reserves the right to request special studies depending on the control technology and the physical characteristics used for the converters that may have certain impacts on the system.

Requirements for Induction Generator (Type B) installations:

The following information must be submitted by the Customer for review and acceptance by DOMLEC prior to the Customer finalizing the DG Facility's protection design and DOMLEC's approving the Customer's request for interconnection:

1) Three copies of a DG Facility one-line drawing.

2) Three copies of a one-line drawing showing the relays, if required in this Interconnection Policy, and metering including current transformer ("CT") and voltage transformer ("VT") connections and ratios.

3) Three copies of a three-line drawing for three phase units or a two-line drawing for single phase units showing the AC connections to the relays, if required in this Interconnection Policy, and meters.

4) The generator nameplate information including rated voltage, rated current, power factor, HP/kW, rated speed and locked rotor current.

5) If the DG Facility owns the transformer between DOMLEC and the DG Facility, the generator step up transformer nameplate information including rated voltage, rated kVA, proposed winding connections, positive sequence impedance plus zero sequence impedance and zero sequence equivalent circuit.

6) A list of protective relay equipment proposed to be furnished to conform to this Protection Policy including relay types, styles, manufacturer's catalogue numbers, ranges and descriptive bulletins.

7) Three copies of applicable relay instruction manuals may also be required if DOMLEC does not already possess them.

8) Schematic drawings showing the control circuits for the interconnection breaker(s) or contactor(s).

9) Specifications for CTs and VTs relevant to the interconnection including their make, model, accuracy class, ratio, and available taps.

10) The proposed grounding method for the stator winding of the generator.

11) Other information that may be determined by DOMLEC as required for a specific interconnection.

12) Relay settings for all DG Facility protective relays that affect the interconnection with DOMLEC's system must be submitted at least four weeks prior to the scheduled date for setting the relays for review and acceptance by DOMLEC.

13) A DG Facility using induction generator(s) connected in the vicinity of capacitance sufficient to self-excite the generator(s) must meet the requirements for synchronous machines of the same Category. The capacitors that enable self-excitation may actually be external to the DG Facility and may belong to DOMLEC or to other IPPs of DOMLEC. DOMLEC will not restrict the existing or future application of capacitors on its lines nor restrict their use by other IPPs to accommodate a DG Facility with induction machines.

14) As changes occur in the location and size of capacitors, the DG Facility may be required in the future to upgrade its interface to meet the requirements for synchronous machines if self-excitation becomes possible even if not initially possible.

15) A circuit breaker or contactor will be installed to isolate the DG Facility from DOMLEC's system ("Interconnection Breaker" or "Interconnection Contactor").
If there is more than one Interconnection Breaker or Interconnection Contactor, the requirements of this Protection Policy will apply to each one individually.

16) DOMLEC will review the relay settings as submitted by the Customer to assure adequate protection for DOMLEC's facilities. DOMLEC will not be responsible for the protection of the DG Facility or Customer's other facilities. The DG Facility will be responsible for protection of its system against possible damage resulting from parallel operation with DOMLEC. If requested by the Customer, DOMLEC will provide system protection information for the line terminal(s) directly related to the interconnection. This protection information is provided exclusively for use by the Customer in evaluating protection of the DG Facility or Customer's other facilities during parallel operation.

17) DOMLEC reserves the right to specify the winding connections for the transformer between DOMLEC's voltage and the DG Facility's voltage ("Step Up Transformer") as well as whether it is to be grounded or ungrounded at the interface. DOMLEC also reserves the right to specify whether the generator stator is to be grounded or not grounded. The Customer will be responsible for procuring equipment with a level of insulation and fault withstand capability compatible with the specified grounding method.

18) In general, across the line starting of rotating machines is not permitted unless it can be demonstrated that the resultant voltage flicker is within DOMLEC's limits for starting of similar sized motors. If an Interconnection Breaker or latching type contactor is to be tripped by protective relays to satisfy the requirements of this Protection Policy, then the Interconnection Breaker or Interconnection Contactor control circuits will be DC powered from a station battery or DOMLEC approved equivalent.

19) A control interlock scheme that detects voltage on DOMLEC's line(s) will be used to prevent the DG Facility from energizing or attempting to energize DOMLEC's line(s). The logic for this scheme shall be

hardwired to prevent the Interconnection Breaker (or Interconnection Contactor where appropriate) from closing. No interposing computer or programmable logic controller or the like will be used in this logic.

20) The DG Facility will provide a disconnect switch at the interconnection point with DOMLEC that is accessible to Company personnel at all times that can be opened for isolation. DOMLEC shall have the sole right to open this disconnect switch during emergency conditions and with reasonable notice to the Customer at other times. DOMLEC will exercise such right in accordance with Good Utility Practice. The switch will be gang operated, have a visible break when open, be rated to interrupt the maximum generator output and be capable of being locked open, tagged and grounded on DOMLEC side by Company personnel. The switch will be of a manufacture and type approved for use by DOMLEC.

21) Where protective relays are required by this Protection Policy, their control circuits will be DC powered from a station battery. Solid-state relays will be self-powered or DC powered from a station battery. If the DG Facility uses a non-latching interconnection contactor, AC powered relaying satisfying the requirements of this Protection Policy may be allowed provided the relay and its method of application is fail safe, meaning that if the relay fails or if the voltage and/or frequency of its AC power source deviate from the relay's design requirements for power, the relay will immediately trip the generator by opening the coil circuit of the Interconnection Contactor.

22) CT ratios and accuracy classes will be chosen such that secondary current is less than 100 amperes and transformation errors are less than 10% under maximum fault conditions.

23) If the interconnection voltage requires, a voltage transformer will be provided by the DG Facility and will be connected to DOMLEC side of the interconnecting breaker or contactor. The voltage from this VT will be used in the interlock as specified above. For three phase applications, a VT for each phase is required.

24) All protective relays required by this Protection Policy will meet ANSI/IEEE Standard C37.90, C37.90.1 and C37.90.2 or equivalent, and be of a manufacturer and type approved for use by DOMLEC.

25) Voltage relays will be frequency compensated to provide a uniform response in the range of 30 to 60Hz.

a) Tripping by protective relays required to satisfy the requirements of this Protection Policy must be hardwired to the device they are tripping. No interposing computer or programmable logic controller or the like is permitted in the trip chain between the relay and the device being tripped.

b) On three phase installations where voltage relaying is required by this Protection Policy, all three phases must be sensed either by three individual relays or by one relay that contains three elements. If the voltage on any of the three phases is outside the bounds specified by DOMLEC, the unit will be tripped. The DG Facility will provide an under-voltage relay sensing voltage on DOMLEC's side of the interconnection breaker or contactor, which trips the interconnection breaker or contactor.

[**Inverter Response to Abnormal Voltage Levels**]

Voltage Condition (% of nominal voltage)	Maximum time to disconnect
V <50%	(6 cycles)
50% < V < 88%	(120 cycles)
88% < V < 110%	Normal Operation
110 % <V <137%	(120 cycles)

V > 137%	(2 cycles)

3.3.2 Category 2: DG with capacity greater than 3 kW and lower than 75 kW.

General Requirements:
The DG Facility will provide a disconnect switch at the interconnection point with DOMLEC that can be opened for isolation. The switch will be in a location accessible to DOMLEC's personnel at all times. DOMLEC will have the right to open this disconnect switch during emergency conditions and with reasonable notice to the Customer at other times. DOMLEC will exercise such right in accordance with Good Utility Practice. The switch will be gang operated, have a visible break when open, be rated to interrupt the maximum generator output and be capable of being locked open, tagged and grounded on DOMLEC side by DOMLEC personnel. The switch will be of a type generally accepted for use by DOMLEC.

Requirements for Inverter-based (Type A) installations:
1) DOMLEC's distribution circuits may operate with automatic reclosing following a trip with automatic reclosing times between 0.75 to 4 seconds. This auto-reclosing action will take place without regard to whether the DG Facility is keeping the circuit energized. The DG Facility is therefore, responsible for protecting its equipment from being re-connected out of synchronism with DOMLEC's system by an automatic line recloser operation.

2) The following information must be submitted by the Customer for review and acceptance by DOMLEC prior to DOMLEC's approving the Customer's request for interconnection:

a) Electrical one-line diagram or sketch depicting how the inverter will be interconnected relative to the service entrance panel and the electric meter.

b) Make, model and manufacturer's specification sheet for the inverter.

3) For Facilities that utilize photovoltaic technology, it is required that the system be installed in compliance with IEEE Standard 929-2000, "IEEE Recommended Practice for Utility Interface of Photovoltaic (PV) Systems" or equivalent. The inverter will meet the Underwriters Laboratories Inc. Standard UL 1741, "A Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems" or equivalent. The Customer's request for interconnection will be accompanied with a request to conduct a

Distribution Facilities Impact Study or a Distribution Facilities Detailed Study as deemed necessary by DOMLEC. In addition, due to the nature of PV impacts on interconnected distribution systems, DOMLEC reserves the right to request special studies depending on the control technology and the physical characteristics used for the PV converters. For instance, PV converters that use grid voltage and current as references for control may have undesirable output characteristics which may interfere with the grid power waveform to distort system characteristics. Such distortions may cause unwarranted zero-crossings and tripping of PV inverters. Also, the capacitances used to filter the output from the PV converters may interact with the grid impedance causing undesirable resonances.

4) For Facilities that utilize wind technology or other direct current energy sources and employ inverters for production of alternating current, the inverter will meet the Underwriters Laboratories Inc. Standard UL 1741, "Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems" or equivalent. Based on the information supplied by the Customer, DOMLEC reserves the right to scope the Distribution Facilities Impact Study or a Distribution Facilities Detailed Study. In addition, DOMLEC reserves the right to request special studies depending on the control technology and the physical characteristics used for the converters that may have certain impacts on the system.

3.3.3 CATEGORY 3 Facilities: DG with capacity greater than 75 kW and lower than or equal to 150kW

General Requirements and Submittals:
The following information must be submitted by the Customer for review and acceptance by DOMLEC prior to the Customer finalizing the DG Facility's protection design and DOMLEC's approving the Customer's request for interconnection:

1) Three copies of the DG one-line drawing.

2) Three copies of the DG one-line drawing showing the relays and metering including current transformer (CT) and voltage transformer (VT) connections and ratios.

3) Three copies of the DG three-line drawing showing the AC connections to the relays and meters.

4) If the DG Facility is a synchronous generator, the nameplate information including rated voltage, rated current, rated kVA and power factor plus transient, sub-transient and synchronous impedances and zero sequence impedance will be furnished by the Customer.

5) If the DG Facility is an induction generator, the nameplate information including rated voltage, rated current, power factor, HP/kW, rated speed, locked rotor current, stator reactance, stator resistance, rotor reactance, rotor resistance and magnetizing reactance will be furnished by the Customer.

6) If the DG Facility owns the transformer between DOMLEC and the DG Facility, the nameplate information including rated voltage, rated kVA, proposed winding connections, positive sequence impedance plus zero sequence impedance and zero sequence equivalent circuit will be furnished by the Customer.

7) A list of protective device equipment proposed to be furnished to conform to this Protection Policy including device types, styles, manufacturer's catalog numbers, ranges and descriptive bulletins. Other information above and beyond those listed may be DOMLEC required by DOMLEC for a specific interconnection.

8) Two copies of applicable relay instruction manuals may also be required if DOMLEC does not already possess them.

9) Schematic drawings showing the control circuits for the interconnection breaker(s) and synchronizing breaker(s).

10) Specifications for CTs and VTs relevant to the interconnection including their make, model, accuracy class, ratio, and available taps.

11) Interconnection breaker operating time if it is tripped by protective devices is required by this Protection Policy.

12) Specifications of proposed grounding method for the stator winding will be submitted by the Customer.

13) Relay settings for all DG Facility protective relays that affect the interconnection with DOMLEC's system must be submitted prior to the scheduled date for setting the relays for review and acceptance by DOMLEC.

14) If, due to the interconnection of the DG Facility to the line, the fault interrupting, continuous, momentary or other rating of any of DOMLEC's equipment or the equipment of other IPPs connected to DOMLEC's system is exceeded, DOMLEC will have the right to require the Customer to pay for the purchase, installation, replacement or modification of equipment to eliminate the condition. Likewise, when the proposed interconnection may result in reversed load flow through DOMLEC's transformer(s), line voltage regulator(s) or secondary network protector(s), control modifications necessary to mitigate the effects may be made to these devices by DOMLEC at the Customer's expense or the DG Facility may be required to limit its output so reverse load flow cannot occur or to provide reverse power relaying that trips the DG Facility. Where such action is deemed necessary by DOMLEC, DOMLEC will, where possible, permit the Customer to choose among two or more options for meeting DOMLEC's requirements as described in this Protection Policy.

15) A circuit breaker will be installed to isolate the DG Facility from DOMLEC's system ("Interconnection Breaker"). If there is more than one Interconnection Breaker, the requirements of this interconnection policy apply to each one individually.

16) The Customer will designate one or more breakers to be used to synchronize the DG Facility's generator to DOMLEC's system. This "synchronizing breaker" could be a breaker other than the Interconnection Breaker. In some induction generator applications a contactor may serve this function.

17) DOMLEC's lines may have automatic reclosing following a trip with reclosing times from 0.75 to 4 seconds without regard to whether the DG Facility is keeping the circuit energized. The Customer is responsible for protecting the DG Facility's equipment from being re-connected out of synchronism with DOMLEC's system by an automatic line recourse operation.

18) The Customer may choose to install additional equipment to ensure the DG Facility is off the line prior to the line reclosing

19) DOMLEC will review the relay settings as submitted by the Customer to assure adequate protection for DOMLEC's facilities.

20) DOMLEC will not be responsible for the protection of the DG Facility or Customer's other facilities. The Customer will be responsible for protection of the DG Facility's system against possible damage resulting from parallel operation with DOMLEC. If requested by the Customer, DOMLEC will provide system protection information for the line terminal(s) directly related to the interconnection. This protection information is provided exclusively for use by the Customer in evaluating protection of the DG Facility or the Customer's other facilities during parallel operation.

21) DOMLEC reserves the right to specify the winding connections for the transformer between DOMLEC's voltage and the DG Facility's voltage ("Step Up Transformer") as well as whether it is to be grounded or ungrounded at DOMLEC's voltage. DOMLEC also reserves the right to specify if and how the generator stator is to be grounded. The DG Facility will be responsible for procuring its equipment with a level of insulation and fault withstand capability compatible with the specified grounding method.

22) Across the line starting of rotating machines is not permitted unless it can be demonstrated that the resultant voltage flicker is within DOMLEC's limits for starting of similar sized motors.

Technical Requirements for Protection Equipment:

1) Where the Interconnection Breaker (or Interconnection Contactor as may be the case with some smaller induction machines) is to be tripped by protective relays required meeting the requirements of this Protection Policy then the Interconnection Breaker (or Interconnection Contactor) control circuits will be DC powered from a station battery.

2) The synchronizing breaker(s) must be capable of withstanding at least twice rated system voltage and must be capable of interrupting the current produced when the DG Facility is connected out of phase with DOMLEC's system.

3) A control interlock scheme that detects voltage on DOMLEC's line(s) will be used to prevent the DG Facility from energizing or attempting to energize DOMLEC's line(s). The logic for this scheme should be hardwired to prevent the synchronizing breaker, Interconnection Breaker (or Interconnection Contactor where appropriate) from closing. No interposing computer or programmable logic controller or the like is to be used in this logic.

4) The DG Facility will be equipped with a switch at the interconnection point with DOMLEC that can be opened for isolation. DOMLEC shall have the right to open the interconnection during emergency conditions and with reasonable notice to the Customer at other times. DOMLEC shall exercise such right in accordance with Good Utility Practice. 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, tagged and grounded on DOMLEC side by Company personnel. The switch will be of a manufacture and type approved
for use by DOMLEC.

5) Protective relaying control circuits (if used) will be DC powered from a station battery. Solid-state relays will be self-powered or DC powered from a station battery. CT ratios and accuracy classes will be chosen such that secondary current is less than 100 amperes and transformation errors are less than 10% under maximum fault conditions.

6) The DG Facility will be equipped with a voltage transformer, connected to DOMLEC side of the interconnecting breaker. The voltage from this VT will be used in the interlock as specified in this Protection Policy. If the DG Facility's step up transformer is ungrounded at DOMLEC voltage, this VT will be a single three-phase device or three single-phase devices connected from each phase to ground on DOMLEC's side of the DG Facility's step up transformer, rated for phase-to-phase voltage and provided with two secondary windings. One winding will be connected in open delta, have a loading resistor to prevent ferro-resonance, and be used for the relay specified in this Protection Policy.

7) All protective relays required by this Protection Policy will meet ANSI/IEEE Standard C37.90, C37.90.1 and C37.90.2 or equivalent IEC standards and will be obtained from a manufacturer and type generally accepted for use by DOMLEC.

8) Voltage relays will be frequency compensated to provide a uniform response in the range of 30 to 60Hz.

9) Protective relays utilized by the DG Facility as required per this interconnection policy will be sufficiently redundant and functionally separate so as to provide adequate protection, as determined by DOMLEC, upon the failure of any one component.

10) DOMLEC may require the DG Facility to be equipped with two independent, redundant relaying systems in accordance with typical practice for the protection if it is determined that delayed clearing of faults within the DG Facility adversely affects DOMLEC's system.

11) Tripping by protective relays required to satisfy the requirements of this Protection section must be hardwired to the device they are tripping. No interposing computer or programmable logic controller or the like is permitted in the trip chain between the relay and the device being tripped.

12) On three phase installations when voltage relaying is required by this Protection Policy, all three phases must be sensed either by three individual relays or by one relay that contains three elements. If the voltage on any of the three phases is outside the bounds specified by DOMLEC the unit will be tripped.

Requirements for Inverter-based (Type A) installations:
DOMLEC will approve inverter based RE devices subject to compliance of IEEE 519 THD specifications. Additional requirements as deemed necessary by DOMLEC may be also applied.

Requirements for Induction Generator (Type B) installations

1) A DG Facility using induction generators connected in the vicinity of capacitance sufficient area to self-excite the generator(s) will meet the requirements for synchronous machines in this Protection Policy. The capacitors that enable self-excitation may actually be external to the DG Facility. DOMLEC will not restrict its existing or future application of capacitors on its lines nor restrict their use by other IPPs of DOMLEC to accommodate a DG Facility with induction machines.

2) As changes occur in the location and size of capacitors, the DG Facility may be required in the future to upgrade its interface to meet the requirements for synchronous machines if self-excitation becomes possible, even if not initially possible. However, DOMLEC reserves the right to require the DG Facility to install capacitors to limit the adverse effects of drawing reactive power from the system for excitation of the generator. Capacitors for supply of reactive power at or near the induction generator with a kVAR rating greater than 30% of the generator's kW rating may cause the generator to become self-excited. (If self-excitation can occur, the DG Facility will be required to provide protection as specified in this Protection Policy for synchronous machines.)

3) The DG Facility will be equipped with the under-frequency, over-frequency, under-voltage, and overvoltage relays for island detection. The signals to these relays may be supplied from a voltage transformer connected to either the generator or DOMLEC voltage. The settings for these relays will be provided by DOMLEC.
[Inverter Frequency Operating Limits]

DOMLEC Voltage condition	Frequency	Maximum time to disconnect
Rated voltage	F <48.5 Hz	0.16 secs – (8 cycles)
Rated voltage	F > 51.5 Hz	0.16 secs – (8 cycles)

4) During system conditions where local area load exceeds system generation, the DG will respond in accordance with DOMLEC's automatic under frequency load shedding criteria to arrest

frequency decay and minimize the possibility of system collapse. Depending on the point of connection of the DG Facility to DOMLEC's system, the DG Facility may be required to remain connected to the system during the frequency decline to allow the objectives of the automatic load shedding program to be achieved, or to otherwise provide compensatory load reduction, equivalent to the DG Facility's generation lost to the system, if the Customer elects to disconnect the DG Facility at a higher under frequency set point.

Requirements for Synchronous Generator (Type C) installations

1) A synchronous generator is a source of current for faults occurring on DOMLEC's line(s). The DG Facility must be equipped with protective relays to detect any faults, whether phase-to-phase or phase-to-ground, on DOMLEC's line(s) or within DOMLEC's system. The following criteria should be met by the DG:

   - The existing sensitivity of fault detection is not substantially degraded.
   - The existing speed of fault clearing is not substantially degraded.
   - The coordination margin between relays is not substantially reduced.
   - The sustained un-faulted phase voltage during a line-to-ground fault is not increased beyond the design value for the existing system insulation levels and over-voltage protection.
   - Non-directional line relays will not operate for faults external to the line due to the DG Facility's contribution.
   - Proper settings for existing relays are achievable within their ranges.

2) DOMLEC may perform engineering studies to evaluate the DG Facility's protection compliance with respect to the above and may make recommendations to the Customer on methods to achieve compliance. If, due to the interconnection of the DG Facility to DOMLEC's system, any of the above criteria is violated for DOMLEC's facilities or for the facilities of others connected to DOMLEC's system, DOMLEC will have the right to require the Customer to pay for the purchase, installation, replacement or modification of protective equipment to eliminate the violation and restore the level of protection existing prior to the interconnection. This may include the addition of pilot relaying systems involving communications between all terminals. Where such action is deemed necessary by DOMLEC, DOMLEC will, where possible, permit the Customer to choose among two or more options for meeting DOMLEC's requirements as described in this interconnection policy.
3) The Customer is responsible for procuring any communications channels necessary between the DG Facility and DOMLEC's stations and for providing protection from transients and overvoltages at all ends of these communication channels.
4) If the DG Facility's step up transformer connection is ungrounded, the DG Facility will be equipped with a zero sequence overvoltage relay fed from the open delta of the three phase VT specified in this interconnection policy.
5) The DG Facility will be equipped to provide protection to limit sustained abnormal frequency and/or voltage conditions to DOMLEC's IPPs directly supplied from the interconnection circuit should the DG Facility and its interconnection circuit becomes isolated from DOMLEC's system. The protection can consist of overvoltage, under-voltage, under-frequency, and over-frequency

relays with signal supplied from a voltage transformer connected to either the generator or DOMLEC's voltage or other means. The settings for these relays will be provided by DOMLEC.

6) During system conditions where local area load exceeds system generation, the DG will respond in accordance with DOMLEC's automatic under-frequency load shedding criteria to arrest frequency decay and minimize the possibility of system collapse. Depending on the point of connection of the DG Facility to DOMLEC's system, the DG Facility may be required to remain connected to the system during the frequency decline to allow the objectives of the automatic load shedding program to be achieved, or to otherwise provide compensatory load reduction, equivalent to the DG Facility's generation lost to the system, if the Customer elects to disconnect the DG Facility at a higher under-frequency set point.
7) The DG Facility may be required to use high-speed protection if time-delayed protection would result in degradation in the existing sensitivity or speed of the protection systems on DOMLEC's lines.
8) The DG Facility may be required to be equipped to provide local breaker failure protection which may include direct transfer tripping to DOMLEC's line terminal(s) in order to detect and clear faults within the DG Facility that cannot be detected by DOMLEC's back-up protection
9) The DG Facility will be equipped to provide protective relaying to prevent the closing of the synchronizing breaker(s) while the DG Facility's generation is out-of-synchronization with DOMLEC's system.

3.4 Protection System Testing and Maintenance

DOMLEC will have the right to witness the testing of selected protective relays and control circuits at the completion of construction and to receive a copy of all test data. The Customer will provide DOMLEC a notice prior to the final scheduling of these tests. Testing will consist of but not limited to:

- CT and CT circuit polarity, ratio, insulation, excitation, and continuity and burden tests.
- VT and VT circuit polarity, ratio, insulation and continuity tests.
- Relay pick-up and time delay tests.
- Functional breaker trip tests from protective relays.
- Relay in-service test to check for proper phase rotation and magnitudes of applied currents and voltages.
- Breaker closing interlocks tests.
- Paralleling and de-paralleling operation.
- Other relay commissioning tests typically performed for the relay types involved.
- An inverter with field adjustable settings for its internal protective elements will be tested to verify these settings if those internal elements are being used by the DG Facility to satisfy the requirements of this Protection Policy. The DG Facility will be equipped with whatever equipment is required to perform this test. If a simulated device is required to perform such

testing the DG will make necessary arrangements to make the equipment available to perform the test.

- The protective relays will be tested and maintained by the Customer on a periodic basis but not less than once every four years or as otherwise determined by DOMLEC. The results of these tests will be summarized by the Customer and reported in writing to DOMLEC.

- Inverters with field adjustable settings for their internal protective elements will be periodically tested if those internal elements are being used by the DG Facility to satisfy the requirements of this Protection Policy. If a simulated device is required to perform such testing the DG will make necessary arrangements to make the equipment available to perform the test.

Note that in its sole discretion, DOMLEC may waive all or some of these requirements.

3.5 Protection System Changes

1) The Customer must provide DOMLEC with 6 weeks written notice of any proposed changes to be made to the protective relay system, relay settings, operating procedures or equipment that affect the interconnection. The Customer must receive feedback from DOMLEC 2 weeks prior to effecting any changes

2) DOMLEC will determine if such proposed changes require re-acceptance of the interconnection per the requirements of this interconnection policy.

3) For future changes undertaken by DOMLEC to the system to which the DG Facility is interconnected, the Customer will be responsible at its own expense for identifying and incorporating any necessary changes to its protection system. These changes to the DG Facility's protection system are subject to review and approval by DOMLEC. In its sole discretion, DOMLEC may waive all or some of these requirements. In keeping with Good Utility Practices, DOMLEC shall inform the Customer within "three weeks" where possible of the intention to proceed with such changes.

3.6 Grounding Requirements:

1) The DG facility, whether connected directly or indirectly through a transformer should provide an effective ground to prevent unfaulted phases from over-voltages during a single line to ground fault.

2) The DG Facility must demonstrate that adequate protection is provided by the DG to detect a ground and limit any overvoltage to an acceptable level on DOMLEC system. This protection may require voltage monitoring on the high side of the DG transformer.

3 Effective ground is defined per IEEE 142, "IEEE Recommended Practice for grounding of industrial and commercial power systems," as "grounded through a sufficiently low impedance such that for all system conditions the ratio of zero sequence reactance to positive sequence reactance is positive and less than 3, and the ratio of zero sequence resistance to positive sequence reactance is positive and less than 1.

3) Depending on the needs of specific installation, DOMLEC may specify connection configurations for DG step-up transformer to be wye-grounded, delta, or ungrounded wye.

4) Requirements may be imposed under the sole discretion of DOMLEC to install a ground grid for safe isolation of the DG connected at 480 V or higher. This ground grid limits the ground potential rise should a fault occur during switching operations.

5) Operations on the isolation device will be restricted to DOMLEC personnel and properly trained personnel designated by the Customer

6) If the DG facility is connected to DOMLEC system without a transformer, the DG facility will be required to provide information on zero-sequence impedance design of the DG facility so that an effective grounding strategy can be formalized under all operating modes: when the DG facility is connected and disconnected from the grid source.

3.7 Monitoring Requirements:

Monitoring will be required for DG of all categories. The DG Interconnection Monitoring agreement can be found in Appendix E

4. Review Panel

4.1. Composition of Review Panel

The IRC shall establish and maintain the Distributed Renewable Energy Interconnection Review Panel which shall consist of the following five members with adequate knowledge of technical matters related to electricity supply by Licensees and Generators:

a) Chairperson nominated by the IRC
b) One member from each category (Domestic or Commercial) Licensee or Generator
c) One member from the Grid Operator
d) From (b) above the Member-Secretary will be nominated by the IRC from among the representatives of Distribution, and Generation Licensees. A Licensee whose representative is Member-Secretary shall provide the required administrative and other logistic support to the Review Panel. The Member-Secretary shall be fully responsible for rendering needed secretarial assistance to the Review panel.
e) One member to represent all the Consumers directly connected to the Licensee's Distribution System. On completion of tenure, the member shall be replaced by a person from other Consumers by rotation as decided by the IRC.

4.2. Tenure of Members

All the members of the Review Panel shall normally have tenure of three years. The new member in replacement shall be from the same category and for the unexpired period of term.

i. The Review Panel shall decide the procedures for transaction of its business.
ii. The Functions of the Review Panel:
(a) Review of the Interconnection Policy as and when necessary.
(b) Consideration of requests for review and making recommendations along with reasons to the IRC.
(c) Issue of guidelines on interpretation and implementation of the Interconnection Policy.
(d) Review of causes of electrical accidents and recommendations about required remedial measures in the light of any rules in force by the IRC under Section-43 of the ESA, 2006 to avoid recurrence of such accidents.

(e) Ensuring the consistency of the changes/modifications proposed to the Interconnection Policy with other Codes, Laws, Act, Rules and Regulations in force at that point of time.
(f) Undertaking detailed studies of matters concerning the Interconnection Policy and circulate findings and recommendations of such studies among the members of the Review Panel and other concerned entities.
(g) Holding of regular meetings as required and at least once in six months.
(h) Holding of meeting by any sub-committee of the Review Panel for discussing specific issues raised by any group of stakeholders

4.3. Review and Revisions

i. Persons/users seeking any amendment to the Interconnection Policy shall send written requests to the Secretary of the Review Panel with a copy to the IRC.
ii. If the request is sent to the IRC directly, it shall be forwarded to the Secretary of Review Panel who shall, in consultation with the concerned entities and such other persons as the IRC may direct, review the provisions of Interconnection Policy.
iii. The Secretary shall circulate the proposed changes/modifications to all the panel members for their written comments within a reasonable time.
iv. The Chairperson shall convene a meeting of the Panel for discussing the proposed amendments and shall forward its recommendations to IRC.
v. The Member - Secretary shall send the following reports to the IRC after each review meeting of the panel:
(a) Reports on the outcome of such review.
(b) Any proposed revision to the Interconnection Policy.
(c) All written representations and objections submitted by the users/persons at the time of review.
vi. The Member-secretary shall also forward a copy of agenda notes and proceedings of Review Panel meetings to the IRC.

4.4. Role of the IRC

i. The IRC shall convey to the Review Panel its decision on any proposed amendment to the Interconnection Policy.
ii. All amendments made to the Interconnection Policy shall be duly incorporated in a standard copy to be kept with the Secretary of the IRC. The standard copy shall also contain a sheet showing chronology of all the amendments.
iii. An updated version of the Interconnection Policy shall be placed on the IRC's website. The IRC may make it available for sale at a reasonable cost. All Licensees shall maintain updated copies of the T&D Code in their offices.

Appendix

Appendix A – Application and Notice of Intent to Interconnect Form – Less than 3 kW

Dominica Electricity Services Ltd		
DG Interconnection Application Form	**Version:**	V1.00
	Date Revised:	

The undersigned Interconnection Customer submits this request to interconnect a DG Facility to the distribution network of the Dominica Electricity Services Limited (DOMLEC).

This request form should be used for proposed DG facilities with total capacity of 3 kW or less. The Customer should submit its request to interconnect to:

General Manager

Dominica Electricity Services Ltd
18 Castle St., P.O. Box 1593
Roseau

For further information about this form or DOMLEC's DG policy please contact:

Engineer Transmission &Distribution Manager

Dominica Electricity Services Ltd
18 Castle St., P.O. Box 1593
Roseau

An Interconnection Request is considered complete when it provides all applicable and correct information required in this form. This information is intended to be used at the planning stage of a DG system.
This information must be provided to DOMLEC prior to the installation of the system in order that assessment and comments can be made on the proposed system.

DOMLEC DG INTERCONNECTION APPLICATION FORM

1 Customer INFORMATION

System Owner *(Last, First, M.I.)*:	
Contact Person *(Last, First, M.I.)*:	**Telephone No:**
Account Name:	**Account/Meter Number:**

2 PV SYSTEM TECHNICAL DATA

Site Address	**Street:**	**Village:**	**Parish:**	
DG Stats	**Capacity** *(kVA)*:	**Power Factor:**		
	Manufacturer:	**Module Type:**		
	Location:			
Inverter	**Capacity** *(kVA)*:			
	Manufacture:	**Model:**		
	Serial Numbers:	**Software Version** *(Where applicable)*:		
Battery	**Capacity** *(kVA)*:			
	Manufacturer:	**Module Type:**		
Connection	**Configuration:**	☐ **1 Phase**	☐ **Delta**	☐ **Wye Grounded** ☐ **Wye Ungrounded**
	Voltage *(V)*:			

3 INSTALLER DETAILS

Installer Name *(Last, First, M.I.)*:	
Address *(Street, Village, Parish)*:	
Telephone No:	**Fax Number:**

4 INFORMATION ENCLOSED

Electrical Required Schematic (2) :	☐ **Yes**	☐ **No**
Existing & Proposed Earthing Arrangement:	☐ **Yes**	☐ **No**
Inverter Test Certificate:	☐ **Yes**	☐ **No**
Proof Of Ownership	☐ **Yes**	☐ **No**
	☐	☐

5 DECLARATION – TO BE COMPLETED BY APPLICANT

I hereby certify that, to the best of my knowledge, all the information provided in this Interconnection Request is true and correct and I have reviewed and agreed to the terms and conditions of DOMLECs' Interconnection Policy.

Name:	**Signature:**	**Date:**

6 FOR INTERNAL USE ONLY

Date Application Received:			**Received By:**
Deposit Deficient:	☐ **Yes**	☐ **No**	**Date Resolved:**
Documentation Deficient:	☐ **Yes**	☐ **No**	**Date Resolved:**
Technical Data Deficient:	☐ **Yes**	☐ **No**	**Date Resolved:**
Miscellaneous Deficiency:			**Date Resolved:**
Date Application Validated:			**Validated By:**

Appendix B – Application and Notice of Intent to Interconnect Form – 3 kW and Higher.

DOMLEC INTERCONNECTION APPLICATION FORM

The undersigned Customer submits this request to interconnect its Distributed Generation (DG) Facility to the Dominica Electricity Services Ltd. (DOMLEC) distribution system.

The Customer should submit its request to interconnect a small DG facility to:

General Manager

Dominica Electricity Services Limited
18 Castle St., P.O. Box 1593
Roseau

For further information about this form or DOMLEC's DG policy, please contact:

Engineering Transmission and Distribution Manager

Dominica Electricity Services Limited
18 Castle St., P.O. Box 1593
Roseau

Tel: (767) 255 6100
Fax: (767) 440 5506
Email:

An Interconnection request is considered complete when it provides all applicable and correct information required below.

Interconnection Customer Information

Legal Name of the Interconnection Customer (or, if an individual, individual's name)

Name: _____

Contact Person: _____

Mailing Address:

Village: Parish:

Facility Location (if different from above):

Telephone (day): _____ Telephone (evening): _____

Fax: E-Mail Address:

Alternative Contact Information (if different from the Interconnection Customer)

Contact Name: ____

Title: _____

Address:

_____

Telephone (day): _____ Telephone (evening): _____

Fax: _____ E-Mail Address: _____

Project Information

Application is for (√): New Small DG Facility. Check for 1MW or less

Capacity addition to or Material Modification of an existing Small DG Facility

If capacity addition to or Material Modification of an existing facility, please describe.

_____

Will the Small DG Facility be used for any of the following?

New Metering: Yes_____ No _

Is the Interconnection Request for?

A Customer interconnecting a new Small DG Facility that will produce electric energy to be consumed only on the Customer's site:

Yes _ No _

A Generating Facility where 100% of the output will be sold to grid:

Yes _ No _

For installations at locations with existing electric service to which the proposed Small DG Facility will interconnect, provide:

Contact

Name: _____

Title: _____

Address:

_____

Telephone (day): _____ Telephone (evening): _____

Fax: _____ E-Mail Address: _____

Requested point of Interconnection: _____

Small DG Facility Information

Data apply only to the Small DG Facility, not the Interconnection Facilities. Energy Source: **Solar** □ **Wind** □ **Hydro** □ **Hydro Type** (e.g. Run-of-River) □

Diesel □ **Natural Gas** □ **Fuel Oil** □ **Other** (state type) □

Prime Mover: Fuel Cell____Recip Engine_____Gas Turb_____Steam Turb _____ Microturbine_PV_Other

Type of Generator: Synchronous _ Induction_____Inverter

Generator Nameplate Rating:_____kW(Typical) Generator Nameplate kVAR:

Interconnection Customer or Customer-Site Load:_____kW (if none, so state)

Typical Reactive Load (if known):

List components of the Small DG Facility equipment package that are certified:

Equipment Type

1.

2.

3.

4.

5.

Is the prime mover compatible with the certified protective relay package?

Yes _ No _

Generator (or solar collector)

Manufacturer, Model Name & Number: _____

Version Number:

Nameplate Output Power Rating in kW: _____

Nameplate Output Power Rating in kVA:

Individual Generator Power Factor

Rated Power Factor: Leading Lagging:

Total number of Generators in wind farm to be interconnected pursuant to this Interconnection Request: Elevation _ Single Phase Three Phase

Inverter Manufacturer, model name & Number (if used):

_____

List of adjustable set points for the protective equipment or software:

_____

Note: A completed Power Systems Load Flow data sheet must be supplied with the Interconnection Request.

Small DG Facility Characteristic Data (for inverter-based machines)

Max design fault contribution current:_____Instantaneous_____or RMS _____

Harmonics Characteristics: _____

Start-up requirements:

Small DG Facility Characteristic Data (for rotating machines)

RPM Frequency: _____

Neutral Grounding Resistor (If Applicable):

Synchronous Generators

Direct Axis Synchronous Reactance, Xd: _____P.U.

Direct Axis Transient Reactance, X'_d: ____P.U.

Direct Axis Subtransient Reactance, X''_d: _____P.U.

Negative Sequence Reactance, X_2: P.U.

Zero Sequence Reactance, X_0: _____P.U.

kVA Base: _____

kV Base: _____

Field Volts: _____

Field Amperes:

Induction Generators

Motoring Power (kW): _____

I_2^2t or K (Heating Time Constant): _____

Rotor Resistance, Rr: _____

Stator Resistance, Rs: _____

Stator Reactance, Xs: _____

Rotor Reactance, Xr: _____

Magnetizing Reactance, Xm: _____

Short Circuit Reactance, Xd": _____

Exciting Current: _____

Temperature Rise: _____

Frame Size: _____

Design Letter: _____

Reactive Power Required In Vars (No Load): _____

Reactive Power Required In Vars (Full Load): _____

Total Rotating Inertia, H:_____Per Unit on kVA Base

Excitation and Governor System Data for Synchronous Generators Only

Provide appropriate IEEE model block diagram of excitation system, governor system and power system stabilizer (PSS) in accordance with the regional reliability council criteria. A PSS may be determined to be required by applicable studies. A copy of the manufacturer's block diagram may not be substituted.

Interconnection Facilities Information

Will a transformer be used between the generator and the point of common coupling?

Yes No _

Will the transformer be provided by the Interconnection Customer?

Yes No _

Transformer Data (If Applicable, for Interconnection Customer-Owned Transformer)

Is the transformer: Single Phase Three Phase Size:_____kVA

Transformer Impedance:_____% on_____kVA Base

If Three Phase:

Transformer Primary: ____Volts_____Delta_____Wye_____Wye Grounded

Transformer Secondary:_____Volts_____Delta_____Wye_Wye Grounded Transformer

Tertiary: ____Volts_____Delta____Wye Wye Grounded

Transformer Fuse Data (If Applicable, for Interconnection Customer-Owned Fuse)

(Attach copy of fuse manufacturer's Minimum Melt and Total Clearing Time-Current Curves)

Manufacturer: Type: Size: Speed:

Interconnecting Circuit Breaker (if applicable)

Manufacturer: Type: Loading Rating (Amps):

Interrupting Rating Amps): Trip speed (Cycles)

Interconnection Protective Relays (If Applicable)

Manufacturer: Type: Loading Rating (Amps):

Interrupting Rating Amps): Trip speed (Cycles)

If Microprocessor-Controlled

List of Functions and Adjustable Setpoints for the protective equipment or software:

	Setpoint Function	
	Maximum	Minimum
1.		_____
2.		_____
3.		_____
4.		_____
5.		_____

If Discrete Components

(Enclose copy of any proposed Time-Overcurrent Coordination Curves)

Manufacturer:_____Type:_____Style/Catalog No.:_____Proposed Setting: _____

Manufacturer:_____Type:_____Style/Catalog No.:_____Proposed Setting:

Current Transformer Data (If Applicable)

(Enclose Copy of Manufacturer's Excitation and Ratio Correction Curves

Manufacturer:

Type:_____Accuracy Class: Proposed Ratio Connection:

Potential Transformer Data (If Applicable)

Manufacturer:

Type:_____Accuracy Class: Proposed Ratio Connection:

General Information

Enclose two copies of site electrical one-line diagram showing the configuration of all Small DG Facility equipment, current and potential circuits, and protection and control schemes. This one-line diagram must be signed and stamped by a licensed professional Engineer if the Small DG Facility is larger than 50kW.

Are two copies or One-Line Enclosed? Yes _ No _

Enclose copy of any site documentation that indicates the precise physical location of the proposed Small DG Facility (e.g. Topographic map or other diagram or documentation)

Proposed location of protective interface equipment on property (include address if different from the Interconnection Customer's address).

Enclose copy of any site documentation that describes and details the operation of the protection and control schemes.

Is Available Documentation Enclosed? Yes _ No _

Enclose copies of schematic drawings for all protection and control circuits, relay current circuits, relay potential circuits, and alarm/monitoring circuits (if applicable).

Are Schematic Drawings Enclosed? Yes _ No _

Applicant Signature

I hereby certify that, to the best of my knowledge, all the information provided in this Interconnection Request is true and correct.

For Interconnection Customer: Date:

Name (type or print):

Internal Use

Date Interconnection Request Received: Received By:

- ☐ Deposit Deficient Date Cured:
- ☐ Site Control Documentation Deficient Date Cured:
- ☐ Project Mapping Deficient Date Cured:
- ☐ Technical Data Deficient Date Cured:

Date Deemed Valid Interconnection Request: Deemed Valid By:

Appendix C - Distribution Facilities Impact Study Agreement

This Agreement dated _____, is entered into between _____ (the Customer) and **DOMLEC** (DOMLEC), for the purpose of setting forth the terms, conditions and costs for conducting a Distribution Facilities Impact Study relative to_____ _____.

1. The Customer agrees to provide, in a timely and complete manner, all required information and technical data necessary for DOMLEC to conduct the Distribution Facilities Impact Study. The Customer understands that it must provide all such information and data prior to DOMLEC's commencement of the Distribution Facilities Impact Study.

2. All work pertaining to the Distribution Facilities Impact Study that is the subject of this Agreement will be approved and coordinated only through designated and authorized representatives of DOMLEC and the Customer. Each party will inform the other in writing of its designated and authorized representative.

3. DOMLEC will advise the Customer of any additional studies, as it may in its sole discretion deem necessary, in accordance with Good Utility Practice. DOMLEC will not proceed with additional studies without the Customer's consent.

4. DOMLEC contemplates that it will require [specify time] to complete the Distribution Facilities Impact Study. Upon completion of the Distribution Facilities Impact Study by DOMLEC, DOMLEC will provide a Distribution Facilities Impact Study Report to the Customer based on the information provided and developed as a result of this effort. If, upon review of the Distribution Facilities Impact Study Report, the Customer decides to pursue its interconnection request, DOMLEC will, at the Customer's direction, tender a Distribution Facilities Detailed Study Agreement within [specify time] if deemed additionally necessary by DOMLEC. The Distribution Facilities Impact Study and Distribution Facilities Detailed Study, together with any additional studies contemplated in Paragraph 3, will form the basis for the Customer's proposed use of DOMLEC's Distribution System and will be furthermore utilized in obtaining necessary third-party approvals of any required facilities and requested distribution services. The Customer understands and acknowledges that any use of study results by the Customer or its agents, whether in preliminary or final form, prior to final approval, should such approval be required, is completely at the Customer's risk and that DOMLEC will not guarantee or warrant the completeness, validity or utility of study results prior to final approval.

5. The estimated costs contained within this Agreement are DOMLEC's good faith estimate of its costs to perform the Distribution Facilities Impact Study contemplated by this Agreement. The actual costs charged to the Customer by DOMLEC may change as set forth in this Agreement. Prepayment will be required for all study, analysis, and review work performed by DOMLEC or its Affiliate, all of which will be billed by DOMLEC to the Customer in accordance with Paragraph 6 of this Agreement.

6. The payment required is [specify fees] from the Customer to DOMLEC for the primary system analysis, coordination, and monitoring of the Distribution Facilities Impact Study. Such amount will be payable in full to DOMLEC prior to DOMLEC beginning the work. DOMLEC will, in writing, advise the Customer in advance of any cost increases for work to be performed if the total amount increases by 10% or more. Any such changes to DOMLEC's costs for the study work will be subject

to the Customer's consent. The Customer will, within **[specify time**] of DOMLEC's notice of increase, both authorize such increases

and make payment in the amount set forth in such notice, or DOMLEC will suspend the Distribution Facilities Impact Study and this Agreement will terminate. In the event this Agreement is terminated for any reason, DOMLEC will refund to the Customer the portion of the above credit or any subsequent payment to DOMLEC by the Customer that DOMLEC did not expend or commit in performing its obligations under this Agreement. Any additional billings under this Agreement will be subject to an interest charge equal to __% per year. Payments for work performed will not be subject to refunding except in accordance with Paragraph 7 below.

7. If the actual costs for the work exceed prepaid estimated costs, the Customer will make payment to DOMLEC for such actual costs within **[specify time]** of the date of DOMLEC's invoice for such costs. If the actual costs for the work are less than those prepaid, DOMLEC will credit such difference toward DOMLEC costs unbilled, or in the event there will be no additional billed expenses, the amount of the overpayment will be returned to the Customer with interest computed as stated in Paragraph 6 of this Agreement, from the date of reconciliation.

8. Nothing in this Agreement will be interpreted to give the Customer immediate rights or interconnect with DOMLEC's Distribution System.

9. The Customer agrees to indemnify and hold DOMLEC and its affiliated companies and directors, officers, employees, and agents of each of them (collectively "Affiliates") harmless from and against any and all damages, costs (including attorney's fees), fines, penalties and liabilities, in tort, contract, or otherwise (collectively "Liabilities") resulting from claims of third parties arising, or claimed to have arisen as a result of any acts or omissions by DOMLEC or its Affiliates under this Agreement. The Customer hereby waives recourse against DOMLEC and its Affiliates for, and releases DOMLEC and its Affiliates from, any and all Liabilities for or arising from damage to its property due to a performance under this Agreement by DOMLEC or its Affiliates.

10. If either party materially breaches any of its covenants hereunder, the other party may terminate this Agreement by serving notice of same on the other party to this Agreement.

11. This agreement will be construed and governed in accordance with the laws of Dominica.

12. All amendments to this Agreement will be in written form executed by both parties.

13. The terms and conditions of this Agreement will be binding on the successors and assigns of either party. 14. This Agreement will remain in effect for a period of up to two years from its effective date and is subject to extension by mutual agreement. Either party may terminate this Agreement by [specify time] notice except as is otherwise provided herein.

Customer:
Name:
Title:
Date:
Signature:

DOMLEC:
Name:
Title:

Date:
Signature

Appendix D Distribution Facilities Detailed Study Agreement

This agreement dated_____ , is entered into between _____(the Customer) and **DOMLEC** (DOMLEC) for the purpose of setting forth the terms, conditions and costs for conducting a Distribution Facilities Detailed Study relative to
_____.

1. The Distribution Facilities Detailed Study will determine the detailed engineering, design and cost of the facilities necessary to satisfy the Customer's request for service interconnecting with DOMLEC's Distribution System.

2. The Customer agrees to provide, in a timely and complete manner, all required information and technical data necessary for DOMLEC to conduct the Distribution Facilities Detailed Study. Where such information and technical data was provided for the Distribution Facilities Impact Study, it should be reviewed and updated with current information, as required.

3. All work pertaining to the Distribution Facilities Detailed Study that is the subject of this Agreement will be approved and coordinated only through designated and authorized representatives of DOMLEC and the Customer. Each party will inform the other in writing of its designated and authorized representative.

4. DOMLEC will advise the Customer of additional studies, as in its sole discretion deem necessary, in accordance with Good Utility Practice. DOMLEC will not proceed with additional studies without the Customer's consent.

5. DOMLEC contemplates that it will require [specify time] to complete the Distribution Facilities Detailed Study. Upon completion of the Distribution Facilities Detailed Study, DOMLEC will provide a Distribution Facilities Detailed Study Report to the Customer based on the information provided and developed as a result of this effort. If, upon review of the Distribution Facilities Detailed Study Report, the Customer decides to pursue its interconnection service request, the Customer must sign an Interconnection Service Agreement with DOMLEC. The Distribution Facilities Impact Study and Distribution Facilities Detailed Study, together with any additional studies contemplated in Paragraph 3, will form the basis for the Customer's proposed use of DOMLEC's Distribution System and will be furthermore utilized in obtaining necessary third-party approvals of any facilities and requested services. The Customer understands and acknowledges that any use of the study results by the Customer or its agents, whether in preliminary or final form should such approval be required, prior to final approval, is completely at the Customer's risk and that DOMLEC will not guarantee or warrant the completeness, validity or utility of the study results prior to final approval.

6. The estimated costs contained within this Agreement are DOMLEC's good faith estimate of its costs to perform the Distribution Facilities Detailed Study contemplated by this Agreement. The actual costs charged to the Customer by DOMLEC may change as set forth in this Agreement. Prepayment will be required for all study, analysis, and review

work performed by DOMLEC or its Designated Agent's personnel, all of which will be billed by DOMLEC to the Customer in accordance with Paragraph 6 of this Agreement.

7. The payment required is [specify amount] from the Customer to DOMLEC for the primary system analysis, coordination, and monitoring of the Distribution Facilities Detailed Study to be performed by DOMLEC for the Customer's requested service. Such amount will be payable in full to DOMLEC prior to DOMLEC beginning the work. DOMLEC will, in writing, advise the Customer in advance of any cost increases for work to be performed if the total amount increases by 10% or more. Any such changes to DOMLEC's costs for the study work to be performed will be subject to the Customer's consent. The Customer will, within [specify time] of DOMLEC's notice of increase, both authorize such increases and make payment in the amount set forth in such notice, or DOMLEC will suspend the Distribution Facilities Detailed Study and this Agreement will terminate. In the event this Agreement is terminated for any reason, DOMLEC will refund to the Customer the portion of the above credit or any subsequent payment to DOMLEC by the Customer that DOMLEC did not expend or commit in performing its obligations under this Agreement. Any additional billings under this Agreement will be subject to an interest charge equal to [specify interest rate]% per year. Payments for work performed will not be subject to refunding except in accordance with Paragraph 7 below.

8. If the actual costs for the work exceed prepaid estimated costs, the Customer will make payment to DOMLEC for such actual costs within [specify time] of the date of DOMLEC's invoice for such costs. If the actual costs for the work are less than that prepaid, DOMLEC will credit such difference toward DOMLEC costs unbilled, or in the event there will be no additional billed expenses, the amount of the overpayment will be returned to the Customer with interest computed in accordance with the provisions of the Interconnection Policy.

9. Nothing in this Agreement will be interpreted to give the Customer immediate rights or interconnect with DOMLEC's Distribution System.

10. Within [specify time] following DOMLEC's issuance of a final bill under this Agreement, the Customer will have the right to audit DOMLEC's accounts and records at the offices where such accounts and records are maintained, during normal business hours; provided that appropriate notice will have been given prior to any audit and provided that the audit will be limited to those portions of such accounts and records that relate to service under this Agreement. DOMLEC reserves the right to assess a reasonable fee to compensate for the use of its personnel time in assisting any inspection or audit of its books, records or accounts by the Customer or its Designated Agent.

11. The Customer agrees to indemnify and hold DOMLEC and its affiliated companies and directors, officers, employees, and agents of each of them (collectively "Affiliates") harmless from and against any and all damages, costs (including attorney's fees), fines, penalties and liabilities, in tort, contract, or otherwise (collectively "Liabilities") resulting from claims of third parties arising, or claimed to have arisen as a result of any acts or omissions of DOMLEC or its Affiliates under this Agreement. The Customer hereby waives recourse against DOMLEC and its Affiliates for, and releases DOMLEC and its Affiliates from, any and all Liabilities for or arising from damage to its property due to a performance under this Agreement by DOMLEC or its Affiliates.

12. If either party materially breaches any of its covenants hereunder, the other party may terminate this Agreement by serving notice of same on the other party to this Agreement.

13. This agreement will be construed and governed in accordance with the laws of the Dominica.

14. All amendments to this Agreement will be in written form executed by both parties.

15. The terms and conditions of this Agreement will be binding on the successors and assigns of either party.

16. This Agreement will remain in effect for a period of up to [specify time] years from its effective date and is subject to extension by mutual agreement. Either party may terminate this Agreement by [specify time] notice except as is otherwise provided herein.

Customer:
Name:
Title:
Date:

Signature:

DOMLEC:
Name:
Title:
Date:

Signature:

Appendix E DG Interconnection Monitoring Agreement

This agreement dated_____, is entered into between _ (the Customer) and DOMLEC (DOMLEC) for the purpose of setting forth the terms, conditions and costs for conducting distributed generation interconnection monitoring relative to

_.

The Customer will be notified in writing three (3) days prior to commencement of the monitoring process. DOMLEC will then place monitors at the transformer supplying the Customer and at the point of common coupling (PCC) for simultaneous readings. Duration of such monitoring will be for no less than seventy two (72) hours and will be carried out as follows:

- First 24 hours the DG will remain offline
- RGS placed online for 48 hours
- RGS placed offline

Duration of monitoring is subjected to change at the sole discretion of DOMLEC with notification to the Customer. The Customer shall be responsible for turning off the system no later than eight (8) hours after having received notification from DOMLEC that the monitoring is complete, after which DOMLEC reserve the right to take the necessary actions required for having the DG isolated from DOMLEC's grid. DOMLEC reserves the right to request a second period of monitoring based on the findings from the first period as deemed adequate by DOMLEC based on data gathered.

Any abnormalities or issues arising from or affiliated to the interconnection during the period of monitoring resulting in damage to other IPPs' equipment shall be the responsibility of the DG/Customer.

DOMLEC shall provide a report to the Customer on findings of the Interconnection Monitoring no later than three (3) weeks subsequent to notification being given to the Customer to turn off their facility after the monitoring period. This report will provide details of findings as deemed necessary by DOMLEC for authorization for the DG system's interconnection to the grid. DOMLEC reserves the right to provide further information gathered from the monitoring upon request by the Customer based on DOMLEC's sole discretion of necessity.

Customer:
Name:
Title:
Date:

Signature:

DOMLEC:
Name:
Title:
Date:

Signature:

Appendix F - Glossary of Terms

The following words and terms have the following meanings when used in this Interconnection Policy:

Company: Dominica Electricity Services Limited (DOMLEC).

Designated Agent: Any entity that performs actions or functions on behalf of the Company or the Customer required under this Interconnection Policy and/or the Exhibits.

Detailed Engineering Study: See the definition of "Distribution Facilities Detailed Study".

Distribution Facilities Upgrades: Modifications or additions to distribution-related facilities that are integrated with and support the Company's Distribution System for the benefit of the Customer.

Distribution Facilities Impact Study: The first phase of engineering study conducted by the Company to determine the required modifications to its Distribution System, resulting in study grade cost estimates (+/- 25%) and an approximate estimate of the time required for such modifications that will be required to provide the requested interconnection service. The Distribution Facilities Impact Study is not suitable for finalizing agreements, contracts or commitments.

Distribution Facilities Detailed Study: The final phase of engineering study conducted by the Company to determine the required detailed modifications to its Distribution System, resulting in project grade cost estimates (+/- 10%) and an estimate of the time required for such modifications that will be required to provide the requested interconnection service.

Distribution Facilities Upgrades Charge: A charge to be paid by the Customer equal to all costs incurred by the Company that are associated with upgrading or modifying the Distribution System to assure a safe and reliable interconnection of the DG Facility with the Company's Distribution System that has no adverse impacts on the Distribution System.

Distribution System: The facilities owned, controlled or operated by the Company that are used to provide service to its customers.

DG Facility: A customer-owned source of electricity, which may be an Inverter or a rotating generator of the synchronous or induction type and all facilities ancillary and appurtenant thereto, which the Customer requests to interconnect to the Distribution System. This term excludes fossil generators.

Good Utility Practice: Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region.

Impact Study: See the definition of "Distribution Facilities Impact Study".

Customer: A customer desiring to install an independently-operated DG Facility, which is interconnected with the Company's Distribution System. Interconnection

Service Agreement: A legally binding agreement for interconnection service entered into between the Customer and the Company that sets forth the obligations and responsibilities of the Customer in operating its DG Facility while it is interconnected to the Company's Distribution System. The agreement also will require the Customer to pay for certain costs incurred by the Company in constructing and/or upgrading facilities.

Inverter: An electrical device that accepts direct current as input, and produces alternating current as output.

Metering Point: For meters that do not utilize instrumentation transformers, the point at which the billing meter is connected. For meters that utilize instrumentation transformers, the point at which the instrumentation transformers are connected.

Network Distribution System: Electrical service where two or more distribution transformers have their secondary windings connected in parallel to form a network of conductors supplying service voltage to customers. Primary voltage to the transformers may come from a number of independent circuits, so that loss of one primary circuit will not generally cause a loss of service voltage to customers.

Notice of Intent to Interconnect: A written notification provided by Customer to the Company, which initiates the interconnection process. The Company may require a Notification of the type found in Appendices A and B of this Interconnection Policy.

Point of Delivery: A point on the Company's Distribution System where the Customer's DG Facility delivers electricity into the Company's Distribution System when generation output exceeds the customer's total load. The point of Delivery will be specified in the Interconnection Service Agreement.

Point of Receipt: A point on the Company's Distribution System where the Company delivers electricity to the Customer when the customer's total load exceeds its generation output. The Point of Receipt will be specified in the Interconnection Service Agreement.

Radial Distribution System: Electrical service from a system consisting of one or more primary circuits extending from a single substation or transmission supply point arranged such that each primary circuit serves customers in a particular local area.