



APPROVED BY THE FTC JUNE 19, 2015

BARBADOS LIGHT & POWER COMPANY LTD RENEWABLE ENERGY RIDER AGREEMENT

This Renewable Energy Rider Agreement (this "Agreement") is made this ____ day of _____, (the "Effective Date") BETWEEN the party described at Item 1 of Schedule A to this Agreement (the "Customer-Generator") and **THE BARBADOS LIGHT & POWER COMPANY LIMITED**, a company incorporated under the Companies Act, Cap. 308 of the Laws of Barbados and having its registered office situate at Garrison Hill, St Michael, Barbados ("BL&P").

WITNESSETH THAT:

WHEREAS:

- A. BL&P carries on the business of producing and distributing electrical energy pursuant to the Electric Light and Power Act, (ELPA) Cap. 278 of the Laws of Barbados.
- B. BL&P is currently engaged in a Renewable Energy Rider Programme (the "Rider Programme") whereby it will interconnect with a Customer-Generator who operates wind and/or solar generating systems approved by BL&P and purchase electrical energy generated by those customers at the approved tariff rate in the "Renewable Energy Rider", a copy of which is attached at Schedule C to this Agreement.
- C. The Customer-Generator is a customer of BL&P who desires to participate in the Rider Programme by operating a solar and/or wind Renewable Generation System ("RGS") with combined **Nameplate Gross Power Rating** of the kilowatts specified at Item 3 of Schedule A to this Agreement to be operated at the location specified at Item 2 of Schedule A to this Agreement and to make available and sell electrical energy generated by the RGS to BL&P.
- D. The Customer-Generator qualifies for the Renewable Energy Rider and his RGS meets the eligibility requirements in BL&P's "Requirements for Grid Interconnection of Renewable Generation Systems" a copy of which is attached at Schedule B to this Agreement.
- E. BL&P wishes to purchase electrical energy generated by the RGS pursuant to the terms and conditions of this Agreement and the Schedules attached hereto.



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- F. The Customer-Generator agrees to submit to BL&P prior to commencing operations, all required approvals for the RGS installation from the Government Electrical Engineering Department and other governmental authorities having jurisdiction over the Customer-Generator or the RGS.
- G. The BL&P shall administer the RER Agreement in accordance with the applicable provisions of the ELPA and any other relevant laws of Barbados.

NOW THEREFORE, in consideration of the mutual benefits to be derived and the representations, warranties, conditions and promises contained in this Agreement, the Customer-Generator and BL&P agrees to the Terms and Conditions as detailed in Appendix 1:

IN WITNESS WHEREOF the undersigned have executed this Agreement on the year and date hereinbefore mentioned.

SIGNED by **THE BARBADOS LIGHT & POWER**)
COMPANY LIMITED)
in the presence of:) Duly Authorized Officer

Witness:

Name:

Abode:

Calling or Description:

SIGNED by **CUSTOMER-GENERATOR**)
In the presence of)

Witness:

Name:

Abode:

Calling or Description:

RENEWABLE ENERGY RIDER AGREEMENT APPENDIX 1

1. INTERPRETATION

1.1 Definitions

Capitalized terms used in this Agreement shall have the meanings set forth below:

“Agreement” means this Renewable Energy Rider Agreement and the Schedules hereto attached.

“Buy All Sell All” means where the customer is billed by the BLPC (at the normal electricity rate) for all the energy he/she consumes, regardless of the source under the RER, and will receive a credit on the bill for all the electricity generated from the RGS at the RER credit rate.

“Customer-Generator” means the person or entity who is a customer of BL&P and who accepts responsibility for the electricity account associated with the RGS.

“Effective Date” means the date on which the RER Agreement is signed by the parties.

“Energy Credit” means the amount BL&P will credit the Customer Generator’s account for the kWh delivered to the Grid, as determined in accordance with the Renewable Energy Rider.

“Force Majeure Event” means:

- (i) hurricane, earthquake, flood, tidal wave, or other act of God;
- (ii) fire, strike, malicious damage, labour disturbances;
- (iii) war, terrorism, civil war, rebellion, riot;
- (iv) Any other cause beyond the control of a Party which was not reasonably foreseeable or if foreseeable could not have been prevented.

“Grid” means the systems by which electric energy is generated, transmitted and distributed to customers of BL&P and includes:

- (i) the equipment used to generate the electric energy,
- (ii) the network used to transmit the electric energy produced, and
- (iii) the poles, wires, transformers, substations and other equipment used to deliver electric energy to consumers (the distribution system).

A connection that in anyway links the supply from the RGS to BL&P’s supply, whether the connection is before or after the meter (that is, internal or external to the Customer’s installation) is considered to be interconnected with BL&P’s Grid.

“Interconnection Facilities” means all equipment and electrical hardware between the RGS and the Point of Delivery required to interconnect the RGS with the Grid.

“Metering System” means all meters and metering devices or equipment owned by BL&P and used to measure the delivery and receipt of electricity.

“Nameplate Gross Power Rating” means the RGS manufacturer’s alternating current (a.c). nameplate capacity.

“Net Billing”: means an arrangement that permits BL&P (using two meters or one meter that separately measures inflows and outflows of electricity) to sell power delivered to the Customer-Generator at the prevailing tariff, and buy power from the Customer-Generator’s RGS at a different rate to offset the Customer-Generator’s electricity bill.

“Operations Date” means the date on which the RGS is installed.

“Owner of the RGS” means the legal and/or equitable owner of the RGS.

“Parties” means BL&P and the Customer-Generator together and “Party” means either one of them.

“Point of Delivery” means the interconnection point or physical point where the RGS and the Grid are electrically connected for metering purposes.

“Renewable Energy Rider Agreement” means the agreement between the Customer-Generator and BL&P which sets forth the terms and conditions under which the RGS is interconnected with the Grid. The agreement also contains the terms and conditions under which the purchase and sale of electrical energy occur between the two Parties.

“Renewable Generation System” means the total components and facilities that, in combination, convert renewable energy into electrical energy suitable for connection to utilization loads to offset part or all of the customer’s electricity requirements and/or to provide electricity to the Grid.

“Sale of Excess” means where an RER customer is billed by BL&P (at the normal electricity rate) for only what he uses from the grid and will receive a credit for the excess electricity that he/she exports to the grid (i.e. the electricity generated from his/her RGS that he did not use).

“Standard Electricity Tariff” means the tariff under which the Customer-Generator is served by BL&P and to which the Renewable Energy Rider will apply.

“Term” means the duration of the RER Agreement, that is the period between the Effective Date and the termination of the Agreement.

1.2 Entire Agreement

This Agreement and the accompanying Schedules together with the other documents to be delivered under this Agreement represent the entire understanding between the Parties with respect to the subject matter of this Agreement and supersedes all previous agreements, arrangements, understandings, negotiations and discussions, whether oral or written, between the Parties in connection with the sale and purchase of electrical energy generated by the RGS and the interconnection of the Customer-Generator's RGS with BL&P's Grid.

1.3 Headings

Clause headings contained in this Agreement are included solely for convenience and are not intended to be a full or accurate description of the content of any clause and shall not be considered to be part of this Agreement.

1.4 Schedules

This Agreement includes the following schedules which are specifically incorporated herein and made a part of this Agreement by reference:

Schedule A - Particulars for the Agreement

Schedule B - Requirements for Grid Interconnection of Renewable Generation Systems

Schedule C - Renewable Energy Rider

Schedule D - Standard Electricity Tariffs

1.5 Statutory Instruments

Any reference in this Agreement to any law, regulation, order, act or statute of any governmental body or other regulatory body shall be construed as a reference to those as amended or re-enacted from time to time or as a reference to any successor to those.

1.6 Words

Unless the context otherwise requires, words denoting the singular shall include the plural and vice versa.

1.7 Highlight

Certain paragraphs of the Agreement have been highlighted solely for the purposes of emphasis.

2. TERM

2.1 This Agreement shall commence on the Effective Date and continue for the period specified at Item 8 of Schedule A, in this Agreement unless terminated earlier in accordance with the provisions of Clause 17 of this Agreement (“Early Termination”) or extended by BL&P in accordance with the provisions of Clause 19 of this Agreement. Any Early Termination of this Agreement shall be without prejudice to the rights and obligations accruing to the Parties prior to the Early Termination.

2.2 Throughout the term of this Agreement the value of the RER credit shall be determined by the latest Order of the Fair Trading Commission and is subject to review as determined by the Fair Trading Commission.

3. RGS INTERCONNECTION REQUIREMENTS

3.1 The Customer-Generator shall design, install, operate and maintain the RGS, and all ancillary facilities on the Customer-Generator’s side of the Point of Delivery, specified at Item 5 of Schedule A to this Agreement, in accordance with the “Requirements for Grid Interconnection of Renewable Generation Systems” and all governmental laws and regulations which may be applicable from time to time.

3.2 The Customer-Generator shall obtain and maintain all required insurance coverage, governmental authorizations, permits, licenses and approvals from all governmental authorities, local agencies, commissions and authorities required for the installation and operation of the RGS.

- 3.3 The RGS shall meet all applicable safety and performance standards, including the codes and standards described in the “Requirements for Grid Interconnection of Renewable Generation Systems”. BL&P may, from time to time, reasonably prescribe additional requirements, to be implemented at the Customer-Generator’s expense, which in BL&P’s judgment are necessary for ensuring the safety of the Grid. BL&P shall provide the Customer-Generator with written notice of any additional requirements to be implemented pursuant to this clause and the Customer-Generator shall have fourteen [14] days from the date of the notice to implement the change to the satisfaction of BL&P.
- 3.4 “No RGS shall be connected to BL&P’s Grid without permission from BL&P. This permission will be via the execution of the RER Agreement. Within six (6) weeks of receiving notification from ***the customer that the installation has been completed***, BL&P will carry out inspections and tests in accordance with Appendix 6 and will advise the applicant whether or not the proposed interconnection of the RGS qualifies for interconnection to BL&P’s Grid.

4. CUSTOMER-GENERATOR’S OBLIGATIONS

- 4.1 The Customer-Generator shall:
- (i) upon receipt of written approval from BL&P to interconnect the RGS described at Items 3 and 4 of Schedule A to this Agreement and installed at the address specified at the said Item 2 of Schedule A (the “Service Address”) immediately connect the RGS to BL&P’s Grid, unless the Customer-Generator obtains BL&P’s written approval to postpone the interconnection;
 - (ii) **at all times operate and maintain the RGS in accordance with all applicable governmental standards and requirements and the instructions of the manufacturers of the equipment used to construct the various components of the RGS;**

- (iii) at all times comply with BL&P standards and requirements relating to the parallel operation of the RGS which may be in effect from time to time;
- (iv) promptly notify BL&P of any malfunction or breakdown of any component of the RGS that could constitute a foreseeable safety hazard or reasonably be expected to cause disturbance or damage to the Grid;
- (v) not operate the RGS so as to generate electricity at a rate greater than 110% of the RGS's Nameplate Gross Power Rating specified at Item 3 of Schedule A to this Agreement;
- (vi) not add to or modify the RGS without the prior written consent of BL&P;
- (vii) not alter, modify or tamper with the RGS connection to BL&P's Grid without BL&P's prior written consent;
- (viii) not relocate or interconnect the RGS to BL&P's Grid at any location other than the Service Address without BL&P's prior written consent;
- (ix) not tamper with or alter the Metering System;
- (x) promptly comply with all requests from BL&P to interrupt the service of the RGS, reduce the output from the RGS and disconnect the RGS from BL&P's Grid;
- (xi) at all times allow BL&P reasonable access to the RGS; and
- (xii) make all payments required to be made by it to BL&P on or before the due date for the payment.

5. BL&P'S OBLIGATIONS

- 5.1 Subject to the terms and conditions of this Agreement BL&P will interconnect with the RGS located at the Service Address and supply electricity to and accept delivery of electricity from the Customer-Generator (if applicable) at the Point of Delivery specified at Item 5 of Schedule A to this Agreement.
- 5.2 BL&P will act with reasonable promptness to perform any inspections and give any approvals that it is authorized or required to give under this Agreement.

BL&P will not unreasonably withhold or delay the giving of its consent in any case where its consent is required.

- 5.3 Subject to BL&P's approval of the RGS and the Customer-Generator compliance with all matters set out in the "Requirements for Grid Interconnection of Renewable Generation Systems" BL&P shall take all necessary steps and perform all acts necessary to facilitate interconnection of the RGS with BL&P's Grid.

6. BL&P'S RIGHTS

- 6.1 BL&P shall have the right to require the Customer-Generator to interrupt (including, if so specified by BL&P, by means of physical disconnection or lockout) or reduce the output of the RGS whenever:

- (i) BL&P in its sole judgment deems such action necessary to permit BL&P to construct, install, maintain, repair, replace, remove, investigate, or inspect any of its equipment or any part of the Grid; or
- (ii) BL&P in its sole judgment determines that curtailment, interruption, or reduction of the Customer-Generator's electrical generation is otherwise necessary due to emergencies, forced outages, a Force Majeure Event, safety hazards, possible damage to or disturbance of the Grid, or compliance with prudent electrical practices.

- 6.2 Notwithstanding the provisions in Clause 6.1 of this Agreement or any other provision of this Agreement, BL&P shall have the right:

- (i) to require the Customer-Generator to immediately disconnect the RGS from BL&P's Grid; and
- (ii) to itself immediately effect the disconnection of the RGS from BL&P's Grid if the Customer-Generator is apparently not available to make the disconnection or if the Customer-Generator is available but refuses to act and the disconnection is deemed necessary by BL&P.

- 6.3 Whenever feasible BL&P will give the Customer-Generator reasonable advance notice that interruption or reduction in output from the RGS may be required or that disconnection of the RGS from BL&P's Grid may be required. However, the failure of BL&P to give such notice shall not invalidate any action taken by BL&P under Clauses 6.1 or 6.2 of this Agreement.
- 6.4 If BL&P in its discretion deems it necessary to require the Customer-Generator to interrupt or disconnect the RGS from BL&P's Grid or for BL&P to itself effect the interruption or disconnection of the RGS from its Grid, as provided in Clause 6.1 and 6.2 respectively of this Agreement, or such interruption occurs as a result of suspension or termination of service to the Customer-Generator in accordance with the provisions of the "Renewable Energy Rider", then except to the extent caused by the misconduct or negligent actions of BL&P, its servants or agents, BL&P and its servants or agents shall not be liable to the Customer-Generator for any loss or damage whatsoever resulting from the exercise of such rights by BL&P.
- 6.5 BL&P shall have the right to enter the Customer-Generator's premises at the Service Address at all reasonable hours, without notice to the Customer-Generator, to inspect the protection devices installed at the RGS and to read, inspect and test meters, or to effect disconnection of the RGS as provided in section 6.2 of this Agreement. Nothing in this Agreement shall limit or otherwise affect any rights of entry to the Customer-Generator's premises that BL&P may have under its Standard Electricity Tariff or any other agreement with the Customer-Generator.
- 6.6 BL&P reserves the right to disconnect the electricity supply to the Service Address without notice if the Customer-Generator fails to comply with the requirements of this Agreement or for any other reason relating to safety and reliability of the Grid. In so doing, the BL&P will not incur any liability whatsoever provided that BL&P use reasonable care in the exercise of its functions.

6.7 BL&P shall have the right to demand, promptly obtain, review and copy the RGS operations and maintenance records, logs, or any information considered necessary by BL&P such as unit availability, maintenance outages, circuit breaker operation requiring manual reset, relay settings and any unusual events pertaining to the RGS or its interconnection with BL&P's Grid. In keeping with this stipulation, the BL&P therefore requires that the Customer-Generator retain and keep in good order adequate supporting records on the RGS.

6.8 All equipment owned by BL&P which is affixed to the Customer-Generator's premises for the purpose of facilitating the interconnection of the Customer-Generator's RGS with BL&P's Grid, including all equipment installed by BL&P which is required for the purpose of metering and billing, shall remain the property of BL&P.

7. METERING AND BILLING

All metering requirements and billing procedures shall be in accordance with this Agreement, the "Renewable Energy Rider" and any other rate schedules under which the Customer-Generator is receiving electric service.

8. SALE AND PURCHASE OF ENERGY

8.1 Sale to BL&P

Commencing on the Operations Date, specified at Item 7 of Schedule A to this Agreement, the Customer-Generator may sell to BL&P, electricity delivered to BL&P's Grid and produced by the RGS at the rate specified in the "Renewable Energy Rider".

8.2 Sale to Customer-Generator

BL&P shall make available and sell electricity to the Customer-Generator at the applicable prevailing tariff for electricity sold to customers.

8.3 Energy Credit to Customer-Generators

The amount credited by BL&P to the Customer-Generator's account for the purchase of energy from the RGS shall be calculated in accordance with the terms and conditions of the Renewable Energy Rider. Payments due to the Customer-Generator shall be made in accordance with Clause 9.1 of this Agreement.

9. BILLING AND PAYMENT

9.1 Net billing

9.1.1 At the end of each billing period, if the Customer-Generator's account for the RGS is in debit after the Energy Credits have been applied, the balance due will be billed and become payable. If the same Customer-Generator's account is in credit, the credit will be carried forward (rolled over) to the next billing period.

9.1.2 If at the end of each quarter, an Energy Credit of \$100.00 or greater exists on the Customer-Generator's account, the Customer-Generator will receive a refund of the Energy Credit by cheque unless otherwise requested by the Customer-Generator and agreed by BL&P.

9.2 Calculation of Payments.

BL&P's bill to the Customer-Generator ("RGS Bill") shall include calculations in reasonable detail of the amounts owed to BL&P with specific reference to the applicable tariffs and riders.

9.3 Bill Query

9.3.1 The Customer-Generator shall notify BL&P of the nature and basis of any query that it has with a RGS Bill within three (3) months of the receipt of the bill.

9.3.2 No query that the Customer-Generator has in connection with a RGS Bill shall authorize the Customer-Generator to refuse making payments due to BL&P on or before the due date for the payment.

9.3.3 BL&P shall investigate all queries reported to it by the Customer-Generator and shall provide the Customer-Generator with a statement of its findings on the matters forming the basis of the dispute.

9.3.4 The failure of the Customer-Generator to pay any portion of the RGS Bill which may be disputed shall constitute a breach of this Agreement.

10. INTERCONNECTION

The Customer-Generator shall design, construct, install, commission, own, operate and maintain the RGS and all auxiliary and interconnecting equipment on the Customer-Generator's side of the Point of Delivery, in accordance with the terms of this Agreement and the "Requirements for Grid Interconnection of Renewable Generation Systems".

11. METERING

11.1 Ownership of Metering System

11.1.1 BL&P shall own, operate and maintain the revenue and production Metering System used to acquire the measurements from which bills to the Customer-Generator are calculated pursuant to this Agreement. BL&P shall also own, operate and maintain production metering for statistical and analytical purposes where required under the terms of the Renewable Energy Rider.

11.1.2 The Customer-Generator shall, where required by BL&P, design, finance, construct, install, own, operate and maintain metering devices for non-revenue purposes which shall measure and record the total energy produced by the RGS on at least an hourly basis.

11.2 Location of Meters

All meters shall be installed in a location which is readily accessible at all times to BL&P's personnel.

11.3 Meter Reading

BL&P shall read revenue meters monthly for energy from the RGS supplied to the Grid by the Customer-Generator and for energy delivered from the Grid to the Customer-Generator. BL&P shall also read production meters for energy produced by the RGS both in configurations where BL&P purchases all of the energy produced by the RGS and otherwise for statistical and analytical purposes.

12. COVENANTS

12.1 Customer-Generator's Covenants

12.1.1 The Customer-Generator covenants that:

- (i) it has complied and will continue to comply with the terms, conditions and obligations under this Agreement, the Requirements for Grid Interconnection of Renewable Generation Systems and the Renewable Energy Rider, as provided for in this Agreement;
- (ii) it is the owner of the RGS and it is duly authorized to enter into this Agreement and to operate the RGS;
- (iii) the RGS shall not be used to supply electric energy to a third party;
- (iv) it shall not tamper with or alter the Metering System; and
- (v) it shall make all payments required to be made by it to BL&P on or before the due date for the payment.

12.2 BL&P's Covenants

BL&P covenants that it shall credit payments to the Customer-Generator's account as required under this Agreement and pursuant to the terms of the Renewable Energy Rider.

13. DEFAULTS

13.1 Customer-Generator Defaults

BL&P may give a notice of default under this Agreement (a "BL&P Notice of Default") upon the occurrence of any of the following events ("Events of Default"), unless caused by a breach by BL&P of this Agreement:

- (i) Abandonment of the operation of the RGS by the Customer-Generator after the commencement of operation, without the prior written consent of BL&P;
- (ii) Failure by the Customer-Generator to make any payment required to be made by it on the due date for the payment in accordance with the terms of this Agreement.
- (iii) Any material breach of Clause 12.1

13.2 BL&P Defaults

Customer-Generator may give a notice of default under this Agreement (a "Customer-Generator Notice of Default") upon the occurrence of any of the following events ("Events of Default"), unless caused by a breach by the Customer-Generator of this Agreement:

- (i) Any material breach by BL&P of any representation, warranty or covenant in this Agreement; and
- (ii) On cessation of operations of BL&P.

14. WAIVER OF DEFAULT

14.1 Effect of waiver

No waiver by either Party of any default by the other Party in the performance of any of the provisions of this Agreement shall:

- (i) operate or be construed as a waiver of any other or subsequent default whether similar or not; or
- (ii) be effective unless in writing and duly executed by an authorized representative of the non-defaulting Party.

14.2 Indulgences

Neither the failure by the BL&P to insist on any occasion upon the performance of the terms, conditions or provisions of this Agreement nor the granting of time or other indulgence by BL&P to the Customer-Generator shall thereby act as a waiver of any breach or the acceptance of any variation of this Agreement.

15. REPRESENTATIONS AND WARRANTIES

15.1 The Customer-Generator represents and warrants that:

- (i) it has complied and will continue to comply with the terms, conditions and obligations under this Agreement;
- (ii) it has obtained and will maintain all required insurance policies and those policies have been duly endorsed in accordance with the requirements of this Agreement;
- (iii) it has obtained all required permits, licences and approvals required by all government authorities, local agencies, commissions and authorities with jurisdiction over the Customer-Generator and the RGS to allow it to enter into this Agreement;
- (iv) the RGS meets and will continue to meet all applicable safety and performance standards that now exists and that BL&P may from time to time prescribe;
- (v) it is the owner of or rents the premises located at the Service Address; and
- (vi) it is the owner of the RGS and it is duly authorized to enter into this Agreement and to operate the RGS.

16. INDEMNITY

The Customer-Generator shall indemnify and hold harmless the BL&P, its affiliates, directors, officers, agents and employees from and against any and all losses, liabilities, costs, claims, charges, actions, proceedings or investigations which BL&P may incur or which may be made against it in connection with the interconnection of the renewable energy generating systems with BL&P's grid or by any breach of any of the warranties of this Agreement by the Customer-Generator or in respect of the BL&P exercising its rights, discretions, authorities and obligations under this Agreement. In no event shall the maximum liability hereunder exceed the value of the insurance policy purchased by

the Customer-Generator or \$100,000 for systems up to 10 kW or \$500,000 for systems larger than 10 kW, whichever is greater.

17. TERMINATION

17.1 This Agreement will terminate automatically at the end of the term, specified at Item 8 of Schedule A to this Agreement, unless

- (i) otherwise terminated in accordance with the provisions of Clauses 17.2 or 17.3 of this Agreement; or
- (ii) otherwise extended by BL&P pursuant to Clause 19 of this Agreement.

17.2 Termination by the Customer-Generator

The Customer-Generator may terminate this Agreement by giving BL&P thirty (30) days prior written notice of its intention to terminate this Agreement;

17.3 Termination by BL&P

BL&P shall have the right to terminate this Agreement:

- (i) where the Customer-Generator is in default of any of its obligations under this Agreement and the default is not remedied within thirty (30) days after written notice of the default has been given by BL&P to the Customer-Generator. BL&P shall exercise its right to terminate this Agreement for such default by giving ten (10) days written notice of termination to the Customer-Generator. BL&P's right to terminate this Agreement shall not be affected by any rights of suspension, interruption or disconnection that BL&P may otherwise have under this Agreement;
- (ii) immediately with the termination of the supply of electric service to the Customer-Generator under any of the rate schedules identified under the first paragraph of the "Renewable Energy Rider" in Schedule C;
- (iii) immediately and concurrently on termination of this Agreement".

18. RESOLUTION OF DISPUTES

18.1 Mutual Discussions

Subject to paragraph 9.3 of this Agreement, if any dispute or difference of any kind whatsoever arises between the Parties in connection with this Agreement the Parties shall within three (3) months after the date that the dispute arose

attempt to settle such dispute in the first instance by mutual discussions between the Parties.

18.2 Dispute Resolution

In the event that a dispute between the Parties is not settled within thirty (30) days as provided for in Clause 18.1 of this Agreement the Parties shall attempt to settle the dispute by alternative means of dispute resolution. Notwithstanding any provision in this Agreement, BL&P acknowledges that the Customer Generator is not restricted from seeking relief from the Fair Trading Commission or from the courts of Barbados.

19. EXTENSION OF TERM

19.1 The Customer-Generator may apply to BL&P in writing for an extension of the term at least three (3) months before the Ending Date.

19.2 BL&P may in its sole discretion extend the term of this Agreement under the same terms and conditions outlined in this Agreement or as modified by BL&P and for such period as BL&P deems fit.

20. MISCELLANEOUS PROVISIONS

20.1 No Third Party Beneficiaries.

This Agreement is intended solely for the benefit of the Parties. Nothing in this Agreement shall be construed to create any duty to, standard of care with reference to, any liability to, or any right of suit or action in, any person who is not a Party to this Agreement.

20.2 Variations in Writing

Save and except for an extension of the term provided for under Clause 19 of this Agreement, any additions, amendments or variations to this Agreement shall be binding only if they are in writing and signed by a duly authorized representative of the Parties.

20.3 Prohibition against Assignment

The Customer-Generator shall not assign this Agreement or any of its rights or duties hereunder without the prior written consent of BL&P. Any such assignment or delegation made without BL&P's written consent shall be null and void.

SCHEDULES A – D

**SCHEDULE A
PARTICULARS FOR THE AGREEMENT**

1. **CUSTOMER-GENERATOR:** _____
ADDRESS OF CUSTOMER-GENERATOR : _____

2. **LOCATION OF THE RGS:** _____
3. **NAMEPLATE GROSS POWER RATING (kW):** _____
4. **RGS TECHNOLOGY:** _____
5. **POINT OF DELIVERY:** _____
6. **TYPE OF BILLING ARRANGEMENT:** _____
7. **OPERATIONS DATE:** _____
8. **TERM:** _____

SCHEDULE B

REQUIREMENTS FOR GRID INTERCONNECTION OF RENEWABLE GENERATION SYSTEM

1. PURPOSE

This document describes the general provisions and technical requirements for connecting Renewable Generation Systems (“RGS”) up to 150kW, or larger if approved in writing by the Barbados Light & Power Company Limited (“BL&P”), to BL&P’s electric distribution system (“BL&P’s Grid”). These requirements are aimed at, among other things:

- (i) ensuring the compatibility of the RGS with BL&P’s Grid;
- (ii) ensuring the safety of the RGS operating in parallel with BL&P’s Grid;
- (iii) facilitating the safety of BL&P’s employees, agents, customers and the general public; and
- (iv) maintaining a high standard of power quality.

2. SUMMARY OF APPLICATION AND INTERCONNECTION PROCESS

2.1 It is recommended that persons desirous of installing the RGS should become familiar with these requirements for interconnection **BEFORE** acquiring the RGS.

2.2 Customers may obtain application forms, the **Renewable Energy Rider (RER) Agreement** and information on RGS requirements from BL&P offices. This information is also available on BL&P’s website at http://www.blpc.com.bb/cus_servicerider.cfm.

2.3 Before finalising the investment in a Renewable Generation System (RGS) the Customer-Generator should obtain the appropriate approval for available capacity from BL&P, either directly or through the potential installer.

2.4 Before interconnection to BL&P's Grid can be completed, the Customer-Generator is required to do the following:

- (i) Understand BL&P's interconnection requirements before starting the project;
- (ii) Submit an "Application for Grid Interconnection for Renewable Energy Rider" form along with an Electrical One-Line Diagram;**
- (iii) Ensure a visible lockable AC disconnect is in an accessible location at or near BL&P's meter;
- (iv) Submit a GEED certificate for the RGS;
- (v) Submit a valid certificate of insurance evidencing general liability insurance coverage;
- (vi) Conform to BL&P's "Requirement for Grid Interconnection of Renewable Generation Systems" as evidenced by inspection and approval of the RGS by authorised BL&P personnel.
- (vii) Sign and submit a "Renewable Energy Rider Agreement" ("**RER** Agreement")
- (viii) Submit certification documentation from the inverter manufacturer prior to interconnection to verify that voltage and frequency ride through requirements have been satisfied.
- (ix) Submit a license issued in accordance with the *Electric Light & Power Act 2015* of the laws of Barbados, if warranted.

3. GENERAL CONDITIONS

Persons desirous of connecting a RGS to BL&P's Grid must be customers of BL&P and the power source must be located at the customer's owned or rented premises.

The RGS must operate in parallel with BL&P's Grid and offset some or all of the customer's own electricity usage.

3.1 Electrical Generation Systems

- 3.1.1** Unless otherwise approved by BL&P, to be eligible to connect and operate in parallel with BL&P's Grid, the RGS must be wind and/or solar

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powered with 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 months history:

- (i) For equivalent RGS 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.**

TABLE 1

Equivalent and Maximum PV system sizes at various monthly average consumption levels

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	3
500	3.33	5
1000	6.67	10
5000	33.33	50
10000	33.67	100
15000	100	150
>15000	>100	150

- (ii) Wind or hybrid – sized to produce 1.5 times the average monthly consumption, or 150kW, whichever is less.

3.1.2 The RGS may be single phase or three phase but its rated size is limited to 80% of the size of the main breaker servicing the installation.

3.2 ***Application***

Customers seeking to interconnect the RGS should submit the “**Application For Grid Interconnection for Renewable Energy Rider**” form (the “Application”) with an Electrical One-Line diagram (see Appendix 1 for sample) specifying all the components of the RGS to BL&P.

The customer shall also submit to BL&P the remaining documents, as follows, after acceptance into the RER Program has been permitted and the RGS installed:

- (i) A certificate for general liability insurance with a minimum coverage of \$100,000 for RGS up to 10kW and \$500,000 for RGS greater than 10kW; and
- (ii) A “GEED” certificate approving the RGS for interconnection to BL&P’s Grid.
- (iii) Signed Renewable Energy Rider Agreement

3.3 ***Application Fee***

Applicants will be charged a non-refundable application fee of \$58.75 (Vat inclusive).

3.4 ***Interconnection***

3.4.1 *Within six (6) weeks* of receiving notification from ***the customer that the installation has been completed***, BL&P will carry out inspections and tests in accordance with Appendix 6 and will advise the applicant in writing whether or not the proposed interconnection of the RGS qualifies for interconnection to BL&P’s Grid. The Customer-Generator is required to submit certification documentation from the inverter manufacturer prior to interconnection to verify that voltage and frequency ride through requirements have been satisfied.

3.4.2 The customer is required to sign the **RER Agreement** with BL&P prior to commencement of parallel operation. The **RER Agreement** outlines the applicable interconnection standards and requirements for on-going maintenance and operation and the terms of sale and billing, to allow the purchase and sale of energy between the customer generator and BL&P.

3.5 **Unauthorized Connections**

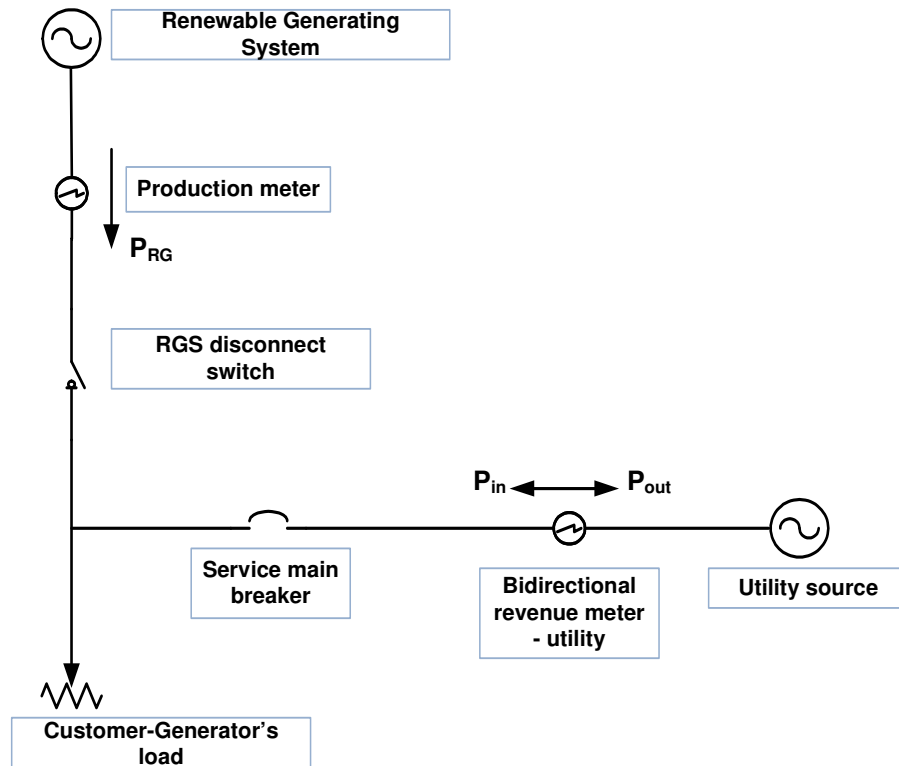
No RGS shall be connected to BL&P's Grid without permission from BL&P. This permission will be via the execution of the RER Agreement. For the purposes of public and utility personnel safety, BL&P reserves the right to disconnect the service to any customer who connects a RGS to the electrical installation without the appropriate authorisation from BL&P. Refer to the RER Agreement.

3.6 **Metering**

BL&P will furnish metering to measure separately the energy supplied from BL&P's Grid to the customer and the energy supplied to BL&P's Grid by the customer whose RGS has been approved by BL&P ("Customer-Generator"). For each service interconnected, Customer-Generators must also make provision for the appropriate meter socket base(s) or other appropriate metering facilities required to measure the total energy produced by the RGS and energy used by the Customer-Generator. The required meter(s) will be installed by BL&P. Please refer to the Metering and Meter Installations section of BL&P's Information and Requirements Booklet. All metering locations must be readily accessible to BL&P personnel for the purposes of maintenance and regular meter reading.

3.6.1 The two metering configurations for grid tied RGSs are as follows:

METERING CONFIGURATION – 1

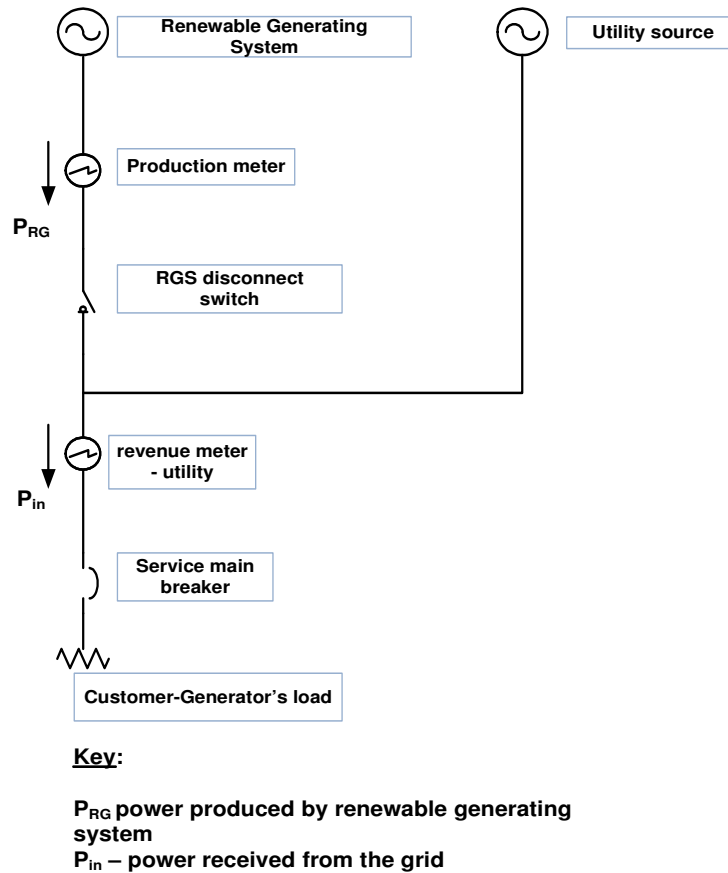


Key:

- P_{RG} - power produced by renewable generating system
- P_{in} – power received from the grid for all loads
- P_{out} – excess power from renewable generating system to grid

N.B this drawing is intended for illustration purposes only in the application for interconnection and does not represent a design or installation manual

METERING CONFIGURATION – 2



N.B this drawing is intended for illustration purposes only in the application for interconnection and does not represent a design or installation manual

For more detailed drawings, refer to Appendix 5, Figs 1 and 2

The “sale of excess” billing arrangement is not available for Customer-Generators interconnected using metering configuration 2.

- 3.6.2** A battery backed inverter system is configured such that the inverter falls directly in the path of the flow of alternating current passing through the electrical system and has the capability of supplying critical loads when there is no utility source.

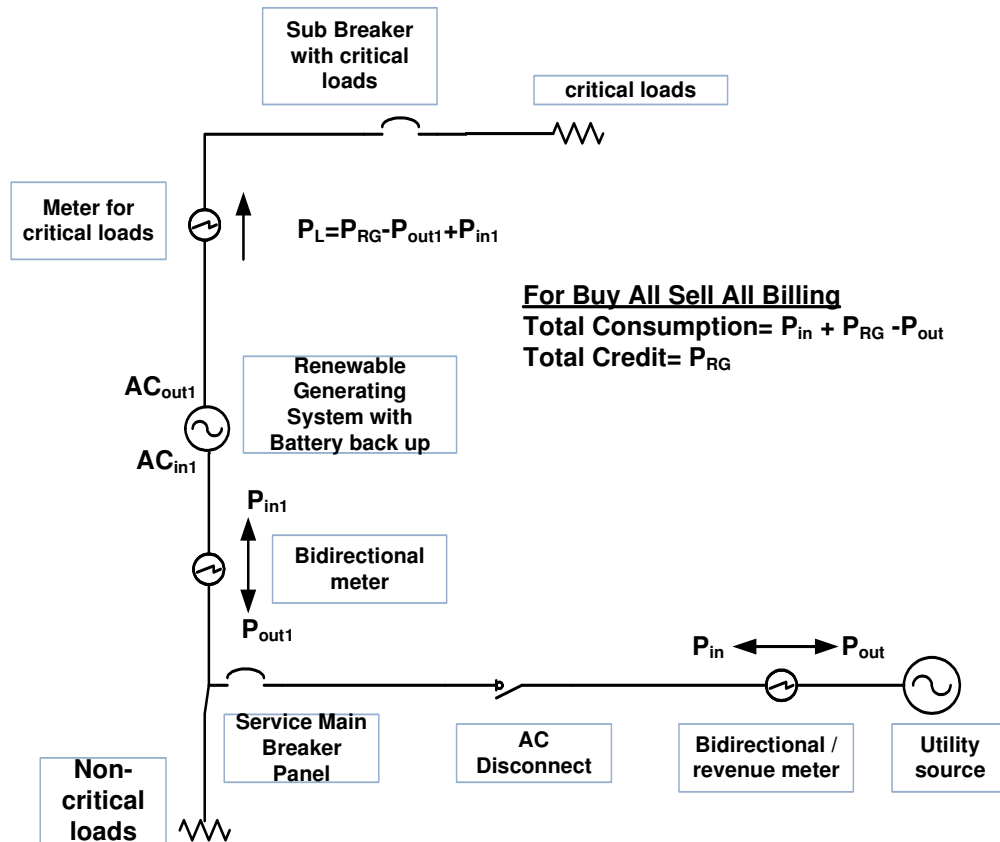
Three meters are required in this configuration to ensure that the total RGS production is captured from AC_{in1} and AC_{out1} . In situations where the RGS can support the supply of all loads when there is no utility source, a two meter configuration can be used since all loads will be supplied by AC_{out1} and any excess production not stored in batteries will flow directly to the grid. The two metering configurations for a single battery backed inverter are provided below respectively.

1. Three meter configuration for supply of critical loads in the absence of the grid supply.
2. Two meter configuration for supply of all loads in the absence of the grid supply

Note:

Other meter configurations for grid tied inverters with battery backup may be possible. However in the interest of safety and adequate metering such configurations must first be approved by the GEED and the BL&P prior to installation.

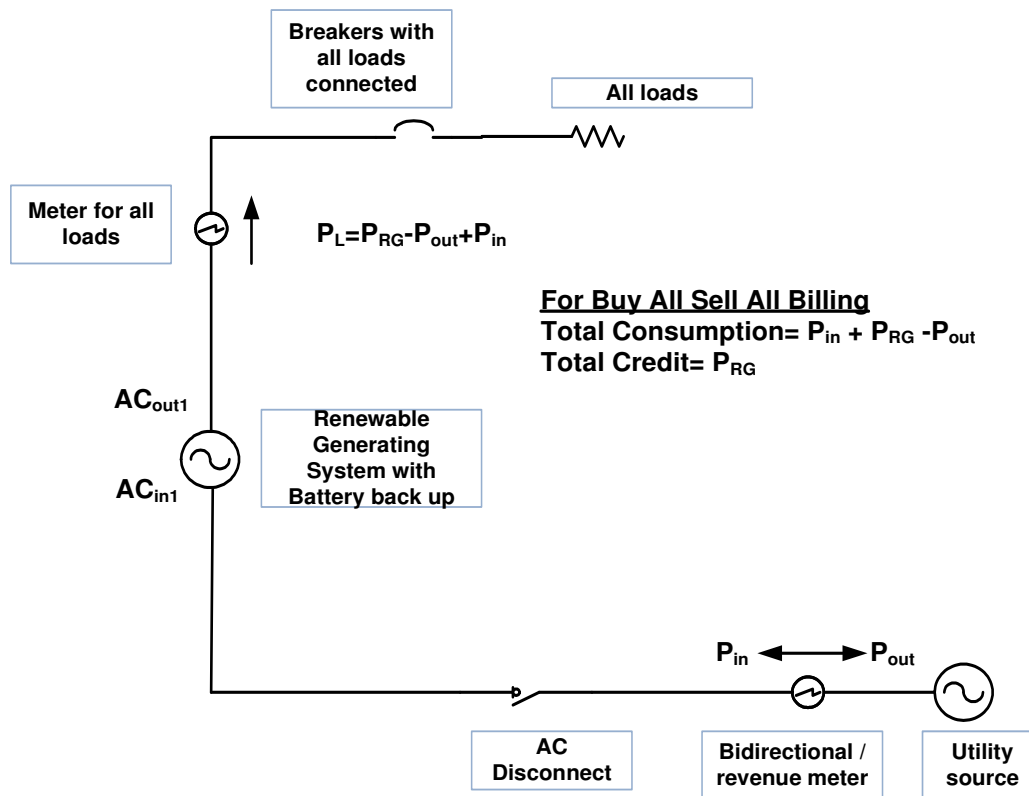
METERING CONFIGURATION FOR BATTERY BACKED INVERTER WITH CRITICAL LOADS CONNECTED TO THE INVERTER OUTPUT



Key:

- P_{RG} - power produced by renewable generating system
 $P_{RG} = P_L + P_{out1} - P_{in1}$
- P_{in} - power received from the grid for critical and non critical loads
- P_{out} - excess power from renewable generating system to grid
- P_{in1} - power received from the grid for critical loads
- P_{out1} - power from renewable generating system not used by critical loads
- P_L - power to critical loads from the grid and RGS
- AC_{in} - input terminal of inverter (can also be used for power export)
- AC_{out} - output terminal of inverter

METERING CONFIGURATION FOR BATTERY BACKED INVERTER WITH ALL LOADS CONNECTED TO THE INVERTER OUTPUT



Key:

- P_{RG} - power produced by renewable generating system
 $P_{RG} = P_L + P_{out} - P_{in}$
- P_{in} - power received from the grid for all loads
- P_{out} - excess power from renewable generating system to grid
- P_L - power to all loads from the grid and RGS
- AC_{in1} - input terminal of inverter (can also be used for power export)
- AC_{out1} - output terminal of inverter

3.7 Billing Configuration

Two billing configurations exist within the Renewable Energy Rider (RER) Program:

- (i) Sale of excess: the RER customer is billed by the BL&P (at the normal electricity rate) for only what he/she uses from the grid and will receive a credit for the excess electricity that he/she sells to the grid (i.e. the electricity generated from his/her RE system that he/she did not use).
- (ii) Buy all/sell all: the RER customer is billed by BL&P (at the normal electricity rate) for all the energy consumed, regardless of whether it is derived from solar PV, wind, and/or the utility, under the RER. The RER customer will receive a credit on the bill for all the electricity generated from the RE system at the RER credit rate.

3.7.1 The effective billing arrangement shall be determined by the latest order of the Fair Trading Commission and is subject to review.

3.8 Labelling

The Customer shall install labelling on or near the meter socket base or manual AC disconnect. Signs are required to be a minimum of 6 inches in height and 8 inches in width, Font shall be 1.25 inches in height, black in colour with a yellow background. In the event that the disconnect is in a remote location, an additional sign must be installed indicating the location of the disconnect. A sample is shown in Appendix 3. Other labelling may be required by the GEED.

3.9 Insurance

It is the Customer-Generator's sole responsibility to maintain in effect for the duration of the Rider Agreement general liability insurance in the amount of not less than **ONE HUNDRED THOUSAND DOLLARS (\$100,000.00)** for RGS up to 10kW, or not less than **FIVE HUNDRED THOUSAND DOLLARS (\$500,000.00)** for RGS greater than 10kW. An endorsement on a homeowner's policy providing the required amount of coverage is acceptable to meet this insurance

requirement. The Customer-Generator is required to submit a copy of a valid certificate of insurance for the RGS. The failure of the Customer-Generator to renew the insurance coverage will render the Rider Agreement null and void. BL&P does not accept responsibility for the failure of the Customer-Generator to renew its insurance policy.

3.10 Liability

The Customer-Generator shall hold harmless and indemnify BL&P and/or its agents or servants for all loss to third parties resulting from the operation of the RGS, except when the loss occurs due to the negligent actions of BL&P and/or its agents or servants. Any liability for loss to third parties resulting from the operation of the RGS shall not exceed the amount of the Customer-Generator's liability insurance or the value of \$100,000 for systems up to 10 kW or \$500,000 for systems larger than 10 kW, whichever is greater.

The BL&P and/or its agents or servants shall hold harmless and indemnify the Customer-Generator for all loss to third parties resulting from the operation of BL&P's Grid except where BL&P, and/or its agents or servants, has used reasonable care in the exercise of its functions and when the loss occurs due to the negligent actions of the Customer-Generator.

3.11 Future Modifications and Expansion

Prior to modifying, expanding or altering the RGS, the Customer-Generator must obtain written permission from GEED to alter or extend an existing installation. Thereafter, the Customer-Generator must provide a new Application Form, revised One-line Diagram, and **RER Agreement** to seek prior written approval from BL&P before interconnecting the modified RGS to BL&P's Grid.

3.12 Renewable Capacity on BL&P Grid

For the overall safety and protection of BL&P's Grid, the interconnection of all RGS is limited to a limit approved by the relevant government agency.

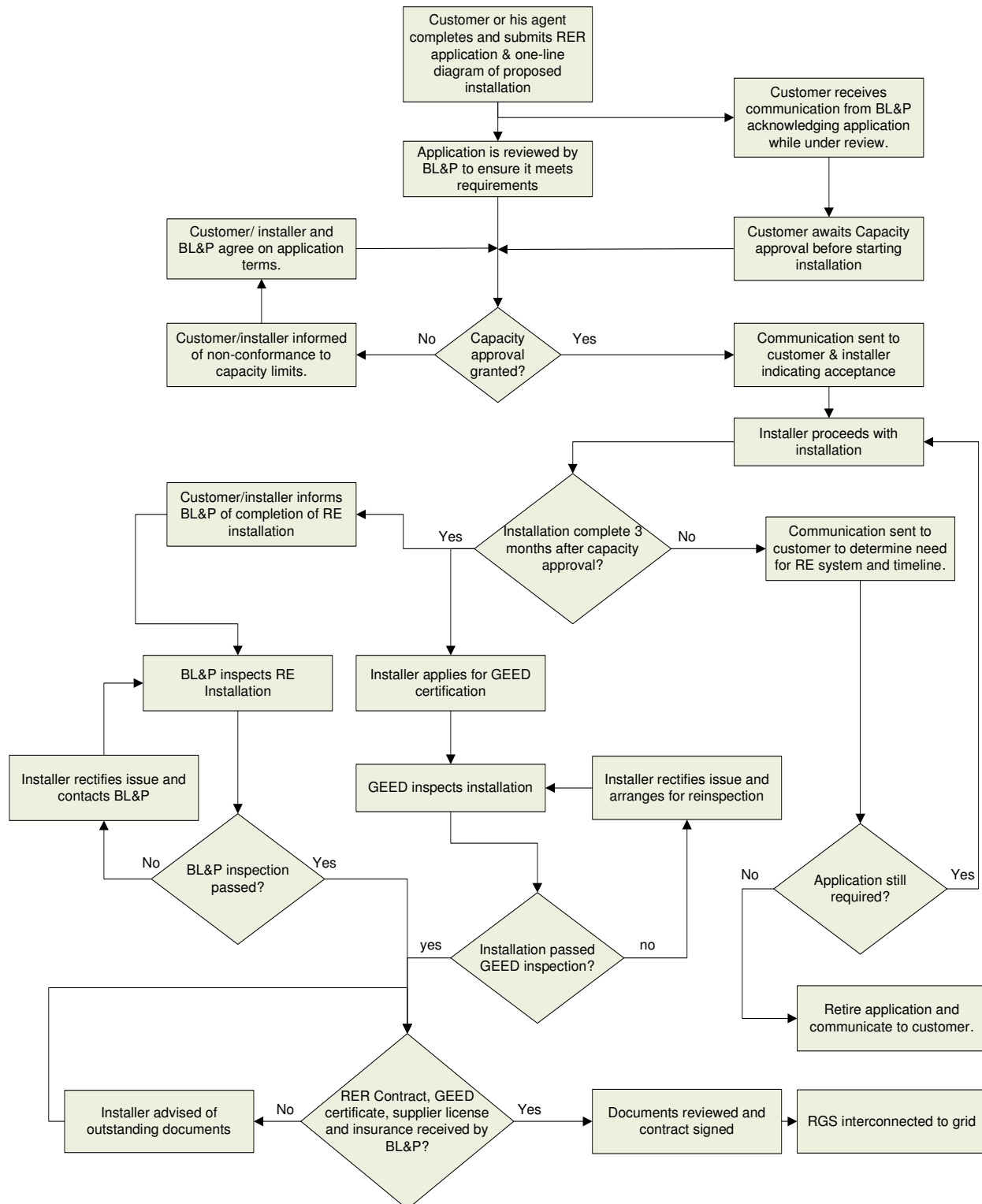
3.13 *Customer-owned equipment protection*

It is the Customer-Generator'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. **Please see Appendix 2.**

3.14 *Additional fees*

Customer-Generators may be required to pay BL&P additional fees for services related to the installation of the RGS. Additional costs payable by the Customer-Generator to BL&P above and beyond the Application fee, if any, will be cost-based.

Diagram 1 – Flowchart of the Application and Interconnection Process



4. BL&P OPERATING CONDITIONS

This section describes typical BL&P distribution operating and power quality conditions within which the RGS should operate. These are representative values that BL&P attempts to maintain and include some abnormal conditions that the RGS should be designed to withstand. It is the Customer-Generator's responsibility to ensure that all equipment operates correctly in this environment.

4.1 System Voltage

BL&P supplies secondary voltages as stated in the latest revision of the "Information and Requirements Covering Installation of Electric Services and Meters". A voltage tolerance of $\pm 6\%$ is applicable to allow for varying load conditions as shown in **Table 2**. Contingencies may arise that cause the voltage to deviate outside of this tolerance and the RGS must be capable of operating satisfactorily beyond the extreme voltage level variation limits shown in **Table 2**. These extremes of voltage pertain to voltages that may occasionally occur on the grid during transient events. Table 3 in Section 5 describes the operating voltages limits for RGSs and expected inverters responses to various voltage conditions.

TABLE 2

Nominal system voltages	Voltage variation limits for secondary distribution voltages			
	Extreme	Operating		Conditions
		Normal Operating Conditions		
Single Phase 115/230V				
115V	104V	108V	122V	127V
230V	207V	216V	244V	253V
3 Ph 4 wire 115/200V or 230/400V Wye				
115	104V	108V	122V	127V
200	180V	188V	212V	220V
230	207V	216V	244V	253V
400	360V	376V	424V	440V
3 Phase 3 wire 115/230V				
115	104V	108V	122V	127V
230	207V	216V	244V	253V

4.2 System Frequency

BL&P's Grid operates at 50 Hz. Frequency deviations typically range from 49.8 to 50.2 Hz for small contingencies resulting in modest disturbances where the RGS is expected to remain connected to BL&P's Grid. For larger contingencies, broader frequency variations may occur such as when major generation or transmission is lost and load shedding occurs. The RGS' required response in these situations is specified in **Table 4**.

4.3 Configuration

Single phase 115/230V 50 Hz service is derived from a split-phase transformer with centre-tapped secondary windings to provide a 3-wire supply comprising two phase conductors and one grounded neutral conductor.

4.3.1 Interconnection of grid-synchronous inverters

For split single phase services, due to the configuration of the Grid, a split-phase transformer is strongly recommended for interconnection of European type 240V (L - N) 50 Hz single phase inverters. However, some manufacturers state that, based on their inverter design, the transformer may be excluded. In this event, BL&P requires that:

- (i) the inverter is equipped with ground fault protection

BL&P will not accept responsibility for any equipment malfunction or damage arising from the Customer-Generator's choice of configuration.

4.4 Harmonic Distortion

BL&P 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 BL&P'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.

4.5 Voltage Imbalance

The voltage imbalance on BL&P's Grid under normal operating conditions is typically under 3% but may reach 6%. This imbalance is included in the voltage variation shown in **Table 2**. Voltage imbalance is calculated using RMS voltage levels measured phase to phase at the service entrance under no load conditions.

$$\text{Voltage imbalance (\%)} = 100 \times \{(\text{Maximum deviation from average voltage}) \div (\text{average voltage})\}$$

4.6 Fault and Line Clearing

BL&P may use automatic reclosing to maintain the reliability of BL&P's Grid. The owner of the RGS needs to be aware of line reclosing when designing or purchasing protection schemes to ensure that the RGS responds according to Tables 3 and 4 before the automatic reclosing of BL&P's substation breakers. Grid-tied inverters manufactured to meet the German VDE-AR-N-4105 Standard "Power Generation Systems Connected to the Low Voltage Distribution Network" are recommended for this purpose.

5. TECHNICAL INTERCONNECTION REQUIREMENTS

This section provides the technical requirements to be met by the RGS in order to qualify for interconnection to BL&P's Grid and lists typical conditions and response to abnormal conditions that the RGS is required to meet. The RGS system must comply with the specific requirements as detailed in this document. RGS systems that conform to the German VDE-AR-N-4105 Standard - "Power Generation Systems Connected to the Low Voltage Distribution Network"- or other equivalent standards - with appropriate adjustments for frequency and voltage ride through as indicated in Tables 3 and 4, are appropriate for interconnection.

5.1 Point of delivery – Responsibilities

The Point of Delivery must be identified on the renewable system Electrical One-Line Diagram sent with the Application. BL&P will co-ordinate the design, construction, maintenance and operation of the facilities on the BL&P side of the Point of Common Coupling. The Customer-Generator is responsible for the design, construction, maintenance and operation of the facilities on the Customer-Generator side of the Point of Delivery.

5.2 Point of Disconnection – Safety

A lockable disconnecting device with visible break is required to provide a point of isolation between the RGS and BL&P's Grid for safe working purposes. It should be installed by the Customer-Generator in a visible and accessible

location near to BL&P's revenue meter or the Point of Delivery, whichever is acceptable to BL&P. A sample disconnect switch is shown in Appendix 4.

5.3 Interconnection Grounding

The RGS must be grounded as per the manufacturers' recommendations and according to the requirements of the GEED. BL&P provides a grounded neutral service conductor.

5.4 Interrupting Device Ratings

The design of the RGS must consider the fault current contributions from both generation sources to ensure that all circuit fault interrupters are adequately sized.

5.5 Over-current Protection

The RGS must detect and promptly cease to energize for over-current fault conditions within its system.

5.6 Under-Voltage and Over-Voltage Protection

Every grid-tied RGS shall have under/over-voltage protection and, on detection of such voltage, shall cease to energize within the timeframe indicated in **Table 3**. Three phase inverter systems shall detect the individual phase to neutral voltage on a grounded Wye system or any individual phase to phase voltage on an ungrounded Wye or delta system for the purposes of **Table 3**. Single phase inverter systems shall detect the phase to neutral voltage if connected to the neutral conductor. Single phase inverter systems connected phase to phase (not connected to the neutral conductor) shall detect the phase to phase voltage. The RGS shall not attempt to regulate the voltage or adversely affect the voltage at the Point of Delivery.

TABLE 3

Inverter Response to Abnormal Voltage Levels

Range (% of nom V)	Operating Mode	VRT Duration (s)		Reconnect Criteria (% of nom V)
		Ride Through	Trip	
$V > 120$	Trip	None	0.20	$88\% \leq V \leq 110\%$
$110 < V \leq 120$	Ride Through	0.92	1	$88\% \leq V \leq 110\%$
$90 < V \leq 110$	Normal Operation	Indefinite	Indefinite	-
$50 < V \leq 90$	Ride Through	10-20*	11-21*	$88\% \leq V \leq 110\%$
$V < 50$	Trip	None	0.20	$88\% \leq V \leq 110\%$

*May be adjusted within these ranges at manufacturer's discretion

5.7 Under Frequency and Over Frequency Protection

RGS shall cease to energize during over/under frequency conditions within the maximum delay times shown in **Table 4** and shall not reconnect until BL&P's Grid has stabilized.

TABLE 4

Inverter Frequency Operating Limits

Range (Hz)	Mode	FRT Duration (s)		Reconnect Criteria (Hz)
$f > 53.3$	Trip	None	0.20	$49.9 \leq f \leq 50.10$
$52.5 < f \leq 53.3$	Ride Through	20	21	-
$47.5 < f \leq 52.5$	Normal Operation	Indefinite	Indefinite	-
$46.7 \leq f \leq 47.5$	Ride Through	20	21	-
$f < 46.7$	Trip	None	0.20	$49.9 \leq f \leq 50.10$

5.8 Anti-Islanding

For an unintentional island condition, where the RGS energizes a portion of BL&P's Grid, the RGS shall detect the island condition and cease to energize BL&P's Grid within **a maximum of five seconds** after the formation of the island.

5.9 Voltage Flicker

Voltage Flicker is an increase or decrease in voltage over a short period of time and is normally associated with fluctuating loads or motor starting. A Flicker problem is site-specific and depends on the characteristics of the changes in load. A Flicker is considered objectionable when it either causes a modulation of lighting levels sufficient to be irritating to humans or it causes equipment to malfunction. The RGS shall not cause objectionable Flicker for other customers on BL&P's Grid. Refer to **IEC Standard EN61000-3-3 (2008)** or most recent version of **EN61000-3-3**.

5.10 Harmonic Distortion

RGS are expected to comply with **IEEE Standard 519** or **IEC 61000-3-2** or **61000-3-4** current distortion limits with regard to harmonic current injection into BL&P's Grid. The harmonic current injection arising from the RGS shall not exceed the values listed in **Table 5** – (excluding any harmonic currents associated with harmonic voltage distortion present on BL&P's Grid without the RGS connected). Total current harmonic distortion shall not exceed 5% of rated current.

TABLE 5

Limits of Maximum Harmonic Current Distortion

Total current harmonic distortion		5.0%
	Maximum distortion	
Harmonic Numbers	Even Harmonics	Odd Harmonics
$h < 11$	1.0%	4.0%
$10 < h < 17$	0.5%	2.0%
$18 < h < 23$	0.4%	1.5%
$24 < h < 35$	0.2%	0.6%
$h > 35$	0.1	0.3%

5.11 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. Voltage imbalance caused by the RGS at the point of common coupling is limited to 3 %.

5.12 DC Injection

The RGS shall not inject a DC current greater than 0.5% of the unit's rated output current at the Point of Delivery after a period of 6 cycles following connection to BL&P's Grid.

5.13 Synchronization

The RGS that can generate an AC Voltage Waveform independent of BL&P's Grid shall be connected in parallel only in combination with its synchronizing capabilities. The RGS shall synchronize to BL&P's Grid while meeting the Flicker requirements of Section 5.9. Synchronization may occur once BL&P's Grid is stabilized and in accordance with Tables 3 and 4.

5.13.1 Grid-tied inverters

Grid-tied inverters are required to produce a sine wave output of 50 Hz frequency, be synchronous with BL&P's Grid and comply with the requirements of this document. Note that systems comprising grid-tied inverters with battery backup are configured differently and are more complex than battery-less grid-tied systems. In the interest of safety, the designs of interconnection and meter configurations for battery back-up grid-tied systems must be approved by GEED and the BL&P prior to installation.

5.14 Interconnection Protection Function Requirements

5.14.1 The RGS shall incorporate the following protective functions:-

- (i) AC disconnecting;
- (ii) Anti-Islanding;
- (iii) Automatic synchronizing (inverters with stand-alone capability);
- (iv) Under-voltage trip (on each phase for 3-phase equipment);
- (v) Over-voltage trip (on each phase for 3-phase equipment);
- (vi) Instantaneous over-current trip (on each phase for 3-phase equipment);
- (vii) Timed over-current trip (on each phase for 3-phase equipment);
- (viii) Under-frequency trip; and
- (ix) Over-frequency trip.

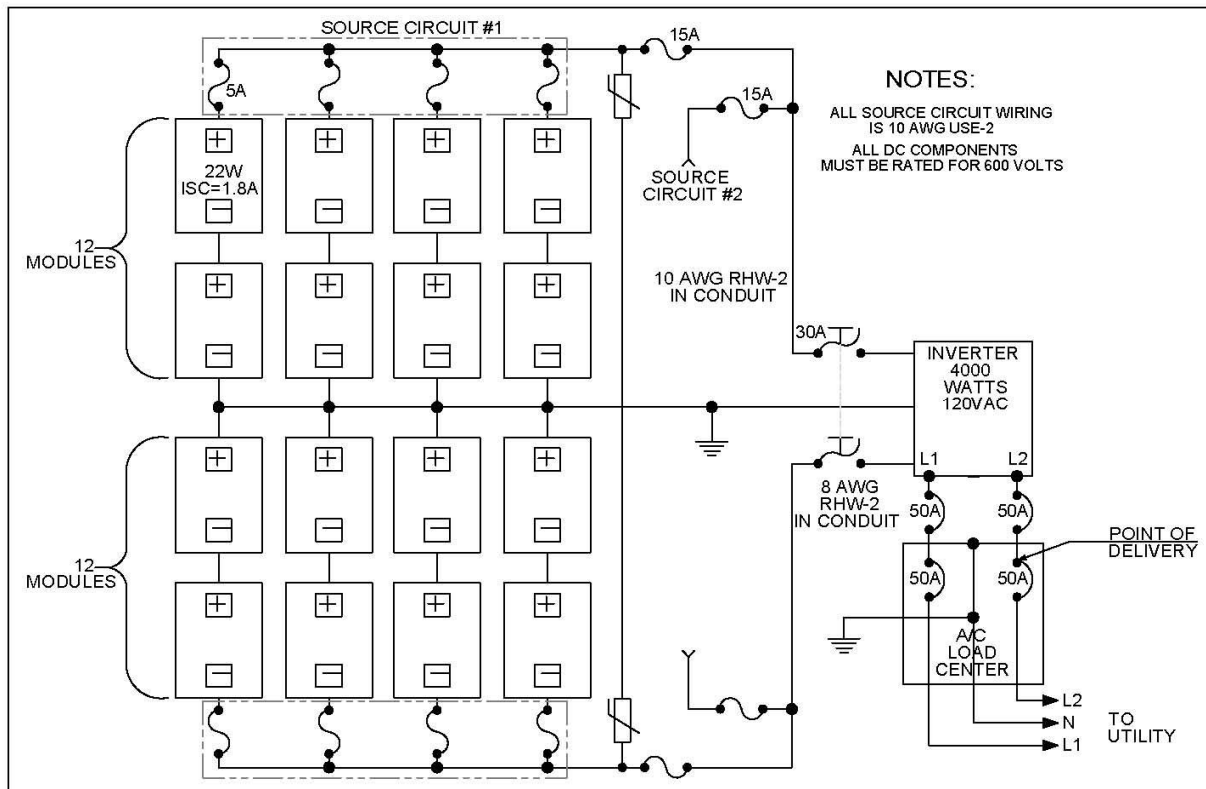
5.15 Voltage rise

During normal operation, the voltage rise caused by the RGS at the point of common coupling shall not exceed by 3% the magnitude of the voltage when the RGS is not connected.

APPENDIX 1

SAMPLE ELECTRICAL ONE-LINE DIAGRAM

Centre-tapped PV grid-interconnected PV system



APPENDIX 2

SUMMARY OF PV AND INTERCONNECTION-RELATED TECHNICAL STANDARDS

IEEE Std 928	Recommended Criteria for Terrestrial PV Power Systems
IEEE Std 1547	Standard for Distributed Resources Interconnected with Electric Power Systems – <i>standard for technical interconnection requirements</i>
IEEE Std 519	Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems - <i>standard for allowable harmonic waveform distortions</i>
IEEE Std 1262	Recommended Practice for Qualification of Photovoltaic Modules
IEEE Std 1374	Guide for Terrestrial Photovoltaic Power System Safety
IEEE Std 1479	Recommended Practice for the Evaluation of Photovoltaic Module Energy Production
UL Std 1741	Static Inverters and Charge Controllers for use in PV Power Systems – <i>a testing protocol that certifies the safe operation of grid-connected inverters</i>
UL Std 1703	Flat-Plate Photovoltaic Modules and Panels
NFPA 70 Article 690 (NEC Code)	Solar Photovoltaic Systems – <i>standard for installation of PV systems</i>
NFPA 70 Article 705 (NEC Code)	Interconnected Electric Power Production Sources – <i>standard for installation of grid-connected systems</i>
VDE-AR-N-4105	German Standard “Power Generation Systems Connected to the Low Voltage Distribution Network
IEC 61000-3-2	Harmonic current emissions in case of load currents up to 16A
IEC 61000-3-4	Harmonic current emissions in case of load currents greater than 16A

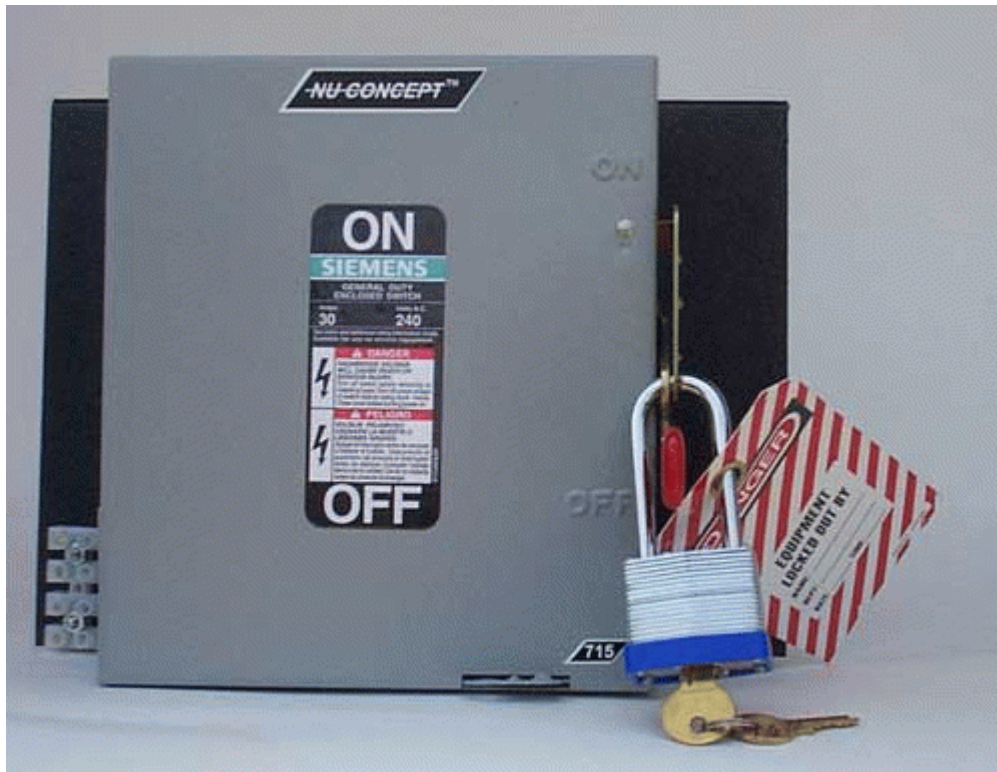
APPENDIX 3

SAMPLE OF UTILITY WARNING SIGN OF CUSTOMER GENERATION



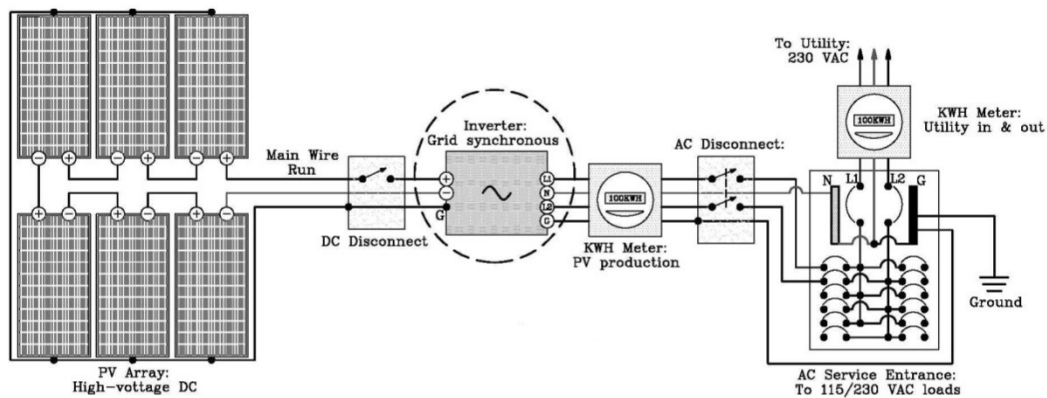
(Size not less than 8" x 6", Font shall be 1.25 inches in height, black in colour with a yellow background.)

APPENDIX 4
SAMPLE OF SAFETY DISCONNECT SWITCH



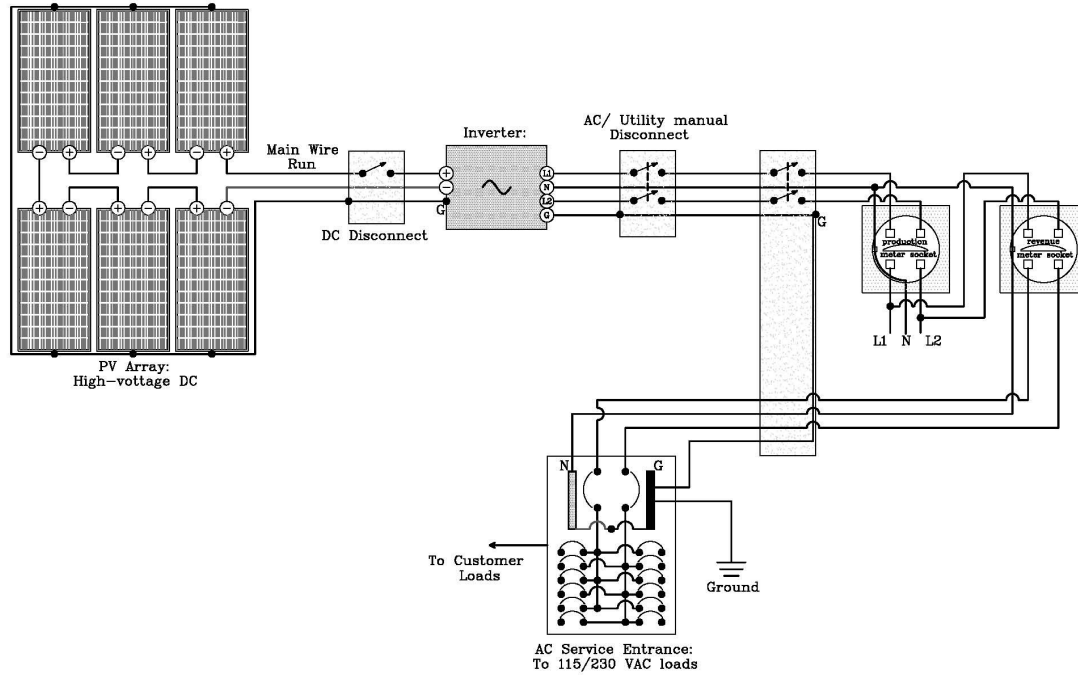


APPENDIX 5 **CONFIGURATIONS**



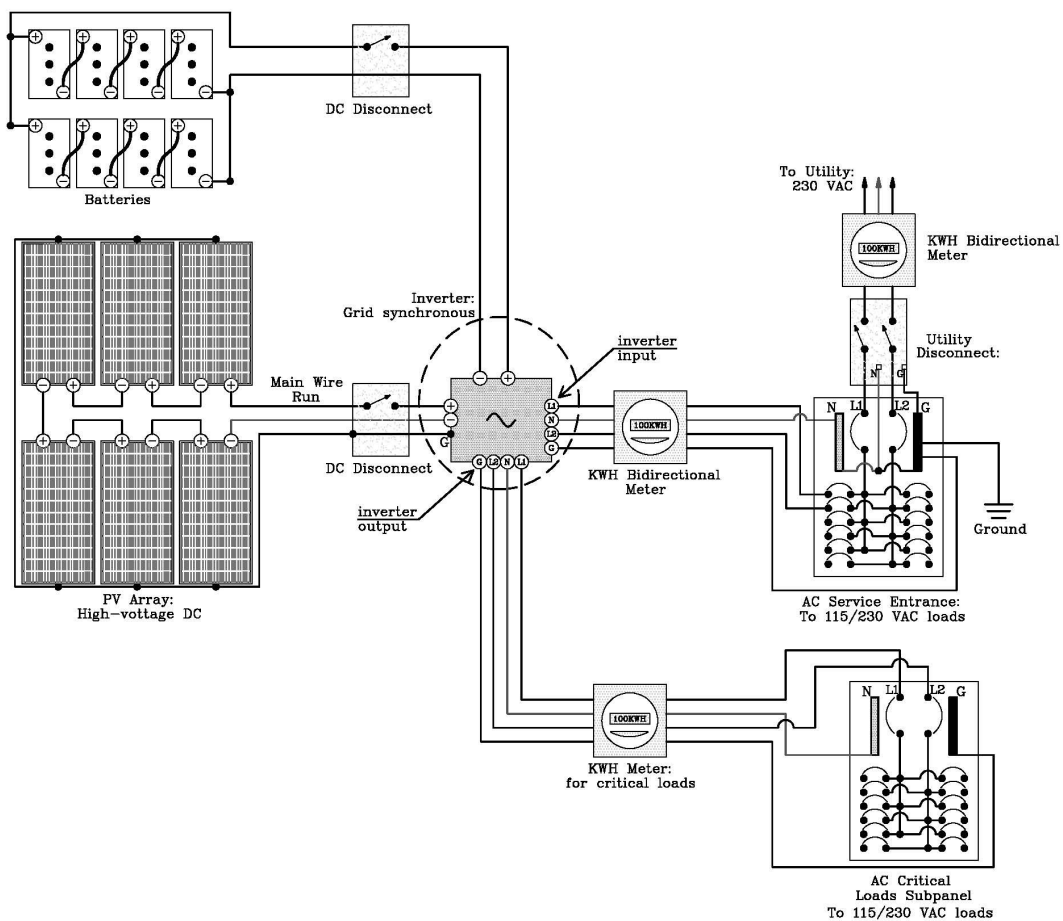
N.B this drawing is intended for illustration purposes only in the application for interconnection and does not represent a design or installation manual

Fig. 1 **Configuration 1 (net production to grid)**

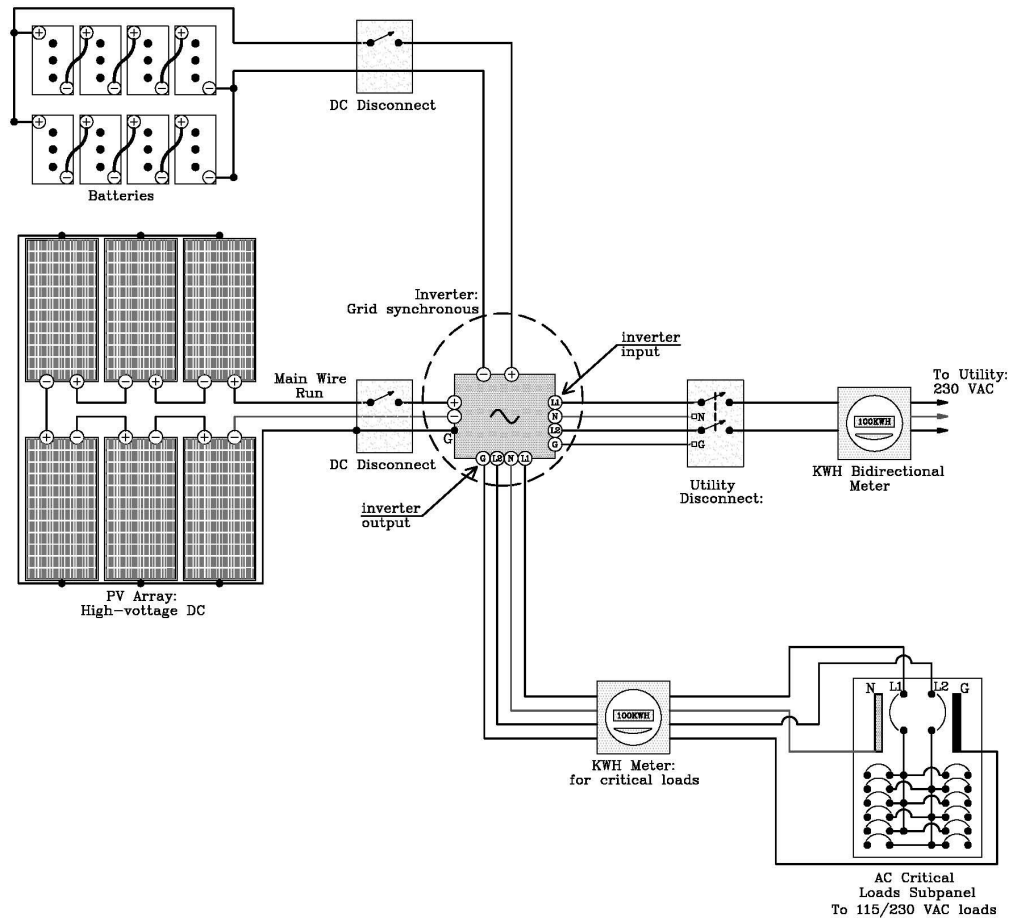


N.B this drawing is intended for illustration purposes only in the application for interconnection and does not represent a design or installation manual

Fig.2 Configuration 2 – total production to grid



Configuration of Battery Backed Inverter with Output to Critical Loads



Configuration of Battery Backed Inverter with All Loads Connected at the Inverter Output

APPENDIX 6

RGS INTERCONNECTION SITE INSPECTION

Verify size of inverters per application
Verify output frequency of inverter
Verify inverter disconnects in the event of an outage
Verify main breaker size per application
Check whether loads are being metered correctly
Verify bi-directional meter is in place
Check whether meter change is required
Verify a.c. disconnect switch is readily accessible to BL&P personnel
Verify label is in place near the utility disconnect switch
Check whether label is required on utility pole
Verify a.c. disconnect switch is grounded via equipment grounding conductor
Verify a.c. disconnect switch is visibly open
Verify a.c. disconnect switch is properly wired
Verify utility disconnect switch is not a raceway for wiring to other components
Verify a.c. disconnect switch handle can be locked in the OFF position with a BL&P lock
Verify BL&P lock has been placed on utility disconnect switch
Verify utility disconnect switch has not been modified to accommodate the BL&P lock
Verify configuration conforms with Electrical One-line drawing & application
Verify measurement of RGS output is in place via production meter or other means
Note any other discrepancies

GLOSSARY

Alternating Current (AC): An electric current that reverses its direction at regularly occurring intervals, known as the frequency which, in the case of Barbados, is 50 times per second.

Automatic Reclosing: This refers to the automatic restoration of power by devices following a fault. It may involve a sequence of short interruptions before permanent restoration or cessation of power.

Capacity (gross): The full-load continuous rating of the Renewable Generation System, under specified conditions, as designated by the manufacturer. It is usually indicated on the nameplate attached to the equipment.

Customer-Generator: The person or entity accepting responsibility for the electricity account associated with the Renewable Generation System.

Delta (Δ) connection: A method for connecting three phase supply where each phase is connected in series with the next, separated by a phase rotation of 120 degrees. Compare with Wye (Y) (star) connection.

Direct Current (DC): An electric current that flows in a constant direction. The magnitude of the current does not vary or has a very slight variation.

Distribution System:

The local poles, wires, transformers, substations and other equipment used to deliver electricity to consumers. (See Grid also)

Flicker: Flicker (voltage) is an unsteady visual sensation associated with changing lighting luminance caused by sudden and repetitive increases or decreases in voltage over a short period of time. It is normally associated with fluctuating loads or motor starting.

Frequency Protection (over/under): Use of relays or other devices to protect lines or equipment by causing circuits to open based on the degree by which the measured frequency varies from a set value.

Generation (Electricity): The process of producing electric energy from other forms of energy; also, the amount of electric energy produced, expressed in Watthours (Wh).

Grid: A network for the transmission of electricity throughout a region. The term is also used to refer to the layout of an electric distribution system.

Grounding: An electrical connection to the earth or a body that extends from an earth connection for the purposes of safety and voltage reference.

Harmonics: Distortions in the sinusoidal voltage and current waveforms caused by the overlapping of the fundamental waveform at 50 Hz with other waveforms of integral multiple frequencies of the fundamental waveform. Total harmonic distortion (THD) is summation of all the distortions at the various harmonic frequencies.

Hybrid System: A self-generation system that combines multiple power sources (such as solar and wind) and is located behind a single electric utility service meter. Energy storage systems such as batteries do not constitute a power source for the purpose of this definition.

Interrupting Device Rating: The highest current that a device is intended to interrupt safely at rated voltage.

Inverter: A device that converts dc electricity into ac electricity. Some types are used for stand-alone systems (not connected to the grid) and others are designed as utility-interactive (grid-tied) systems to operate in parallel with the utility to supply common loads and may deliver power to the utility.

Islanding: Islanding is a condition which occurs when an interconnected Renewable Generation System continues to energize the facility (and the grid) after a utility power interruption. Industry practice requires that the Renewable Generation System be disconnected promptly according to applicable standards to avoid equipment damage and safety hazards to personnel.

Overcurrent Protection: Use of a device or relay to protect the system by tripping it offline based on the degree by which the measured current varies from a set value. The trip may be instantaneous or after a preset time.

Kilowatt (kW): A measure of instantaneous power equal to one thousand Watts of electricity (See Watt).

Kilowatthour (kWh): A quantity of electricity usage equal to one thousand Watthours.

Manual Disconnect switch: A manual switch required for interconnection to disconnect the renewable generation source from the utility line.

Net Metering: An arrangement that permits a facility to offset its electrical consumption against energy delivered by the grid at the retail value and sell power in excess of its local consumption.

Net billing: Arrangement that permits the utility (using two meters or one meter that separately measures inflows and outflows of electricity) to sell power delivered to the customer at the prevailing tariff, and buy excess power from the customer's RGS at a rate contracted by the utility. The utility issues a net bill for each billing period.

Peak Watt: A manufacturer's unit indicating the amount of power a photovoltaic cell or module will produce at standard test conditions (normally 1,000 watts per square meter and 25 degrees Celsius).

Photovoltaic (PV) Cell: An electronic device capable of converting incident light directly into electricity (direct current)

Photovoltaic (PV) Module: An integrated assembly of interconnected photovoltaic cells designed to deliver a selected level of working voltage and current at its output terminals, packaged for protection against environment degradation, and suited for incorporation in photovoltaic power systems

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

Point of Delivery: The point where the Renewable Generation System is electrically connected to the electric utility for metering purposes.

Point of Disconnection: The point at an accessible location where the disconnect switch used to isolate the Renewable Generation System from the utility is located.

Renewable Energy: Energy flows that occur naturally and repeatedly in the environment (such as solar, wind, biomass) and can be harnessed for human benefit.

Renewable Generation System: The total components and subsystems that, in combination, convert renewable energy into electrical energy suitable for connection to utilisation loads.

Renewable Energy Rider Agreement: A legal document authorizing the flow of electricity between the facilities of two electric systems. Renewable energy systems must be permanently interconnected and operating in parallel to the electrical distribution grid of the utility serving the customer's electrical load. This agreement also authorises and describes the terms and conditions under which the purchase and sale of electrical energy between the customer generator and the BL&P occurs.

Root Mean Square (RMS): Used for AC voltage and current, this quantity equals the square root of the average of the squares of all the instantaneous values occurring during one cycle. It is considered as the effective value of AC because, for a fixed resistive load, the AC rms voltage will produce the same heating effect as a DC voltage of equivalent value.

Solar Energy: The radiant energy of the sun, which can be converted into other forms of energy, such as heat or electricity. Sunlight can be converted to electricity directly, as in the case of photovoltaic (PV) applications or indirectly as in the case of solar thermal applications.

Synchronization: The process of connecting two previously separated ac sources such as the customer's private generation system and the utility's grid, to allow them to operate in parallel (after matching frequency, voltage, phase angles etc.).

Total Harmonic Distortion (voltage and current): This is a single number representation of the amount of distortion of a voltage or current electrical waveform from a true sine wave.

Voltage protection (over/under): Use of relays or other devices to protect lines or equipment by causing circuits to open based on the degree by which the measured voltage varies from a set value.

Voltage (current) Waveform: The variation of voltage (current) over one cycle indicated by the pattern which results when the instantaneous value of voltage (current) is plotted with respect to time over a cycle. Ideally, AC waveforms are represented by sinusoids and DC waveforms are constant over time.

Watt (Electric): The electrical unit of power represented by the rate of energy transfer of 1 Ampere of electric current flowing under a pressure of 1 Volt at unity Power Factor.

Watthour (Wh): The electrical unit of energy represented by 1 Watt of power supplied to, or taken from, an electric circuit steadily for 1 hour.

Wind energy: Energy present in wind motion that can be converted to mechanical energy for driving pumps, mills, and electric power generators.

Wye (Y, star) Connection: A method for connecting three phase supply where each individual conductor is connected to a common point, which may be grounded or ungrounded. Compare with delta (Δ) connection.

SCHEDULE C

RENEWABLE ENERGY RIDER (RER)

APPLICATION

This rider is available to customers who qualify for the Domestic Service (DS), Employee (EMP), General Service (GS), Secondary Voltage Power (SVP), Large Power (LP) and Time-of-Use (TOU) pilot programme customers. All of the provisions of the applicable DS, EMP, GS, SVP, LP and TOU tariffs will apply except as amended by this rider. This rider is specific to customers with renewable generation system (hereinafter collectively referred to as “Customer-Generators” and each as a “Customer-Generator”) utilizing a wind turbine, solar photovoltaic or hybrid (wind/solar) power source located on the customer’s owned or rented premises.

The Customer-Generator shall have a capacity limit of 1.5 times the customer’s current average usage up to a maximum capacity of 150 kW. The average usage is 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 months history.

This rider is available on a first-come first-serve basis up to a maximum combined installed capacity as approved by the appropriate designated authority. The Company reserves the right to limit the number of services per individual or entity.

This rider is applicable only to the energy produced by the Customer-Generator to the Company’s electric grid. All other services supplied to the customer will be billed in accordance with the rates and charges under the customer’s applicable standard tariff. Service under this rider is conditional on the continuance of service to the customer under one of the applicable standard tariffs.

CONDITIONS OF SERVICE

The service under this rider will be provided to the entire premises through a single point of delivery at a single voltage in accordance with the terms of the standard tariff applicable to the customer. The Customer-Generator must be:

- (1) capable of providing single or three phase voltage at 50 Hz, with its rated output not exceeding 50% of the Ampere rating of the main breaker of the installation, and
- (2) manufactured, installed and operated to meet the Company's standards for interconnection as set out in the Company's "Renewable Energy Rider Agreement" and the "Requirements for Grid Interconnection of Renewable Generation Systems" and all applicable Government and industry safety and performance standards.

The Company reserves the right to disconnect the electricity supply to the entire premises to which the Customer-Generator is connected, without notice and without incurring any liability, for failure to comply with the requirements of the interconnection agreement or for other reasons relating to safety and reliability.

Provision must be made for the measurement of energy produced by the Customer-Generator through a meter provided by the Company.

INTERCONNECTION

Before interconnection to BL&P's Grid can be completed, the Customer-Generator is required to do the following:

- (iv) Understand BL&P's interconnection requirements before starting the project;
- (v) ***Submit an "Application for Grid Interconnection for Renewable Energy Rider" form along with an Electrical One-Line Diagram;***
- (vi) Ensure a visible lockable AC disconnect is in an accessible location at or near BL&P's meter;
- (x) Submit an "Application for Grid Interconnection" form along with an Electrical One-Line Diagram;
- (xi) Submit a GEED certificate for the RGS;
- (xii) Submit a valid certificate of insurance evidencing general liability insurance coverage;
- (xiii) Submit a specification sheet of the inverter showing the product listing;

- (xiv) Sign and submit a “Renewable Energy Rider Agreement” (“**RER** Agreement”)
- (xv) Submit certification documentation from the inverter manufacturer prior to interconnection to verify that voltage and frequency ride through requirements have been satisfied.

MONTHLY RENEWABLE ENERGY RIDER (RER) CREDIT

All kWh supplied to the grid @ **1.6 times** the **Fuel Clause** Adjustment up to a maximum 1.5 times the customer’s average usage beyond which kWh supplied to the grid @ 1 times the Fuel Clause Adjustment.

The Fuel Clause Adjustment is calculated according to the Fuel Clause approved by the Fair Trading Commission and may vary from month to month.

Throughout the term of this Agreement the value of the RER credit shall be determined by the latest order of the Fair Trading Commission and is subject to review as determined by the Fair Trading Commission.

BILLING

The Company will utilize a Net Billing with Rolling Credit and Buyback methodology for billing purposes. At the end of each billing period, if the account is in debit after the renewable energy credits have been applied, the balance due will be billed and payable. If the account is in credit, the credit will be carried forward (rolled over) to the next billing period.

If at the end of each quarter, the customer has accumulated a credit greater than or equal to \$100.00, the customer shall be provided with a refund of the credit from the Company.

All new DS, GS, EMP, SVP and LP customers on the RER will be billed under the “buy all/sell all” billing arrangement with the exception of DS, GS, and EMP customer with a Customer-Generator capacity of 2 kW or less who will also have the option of the “sale of excess” billing arrangement. This billing arrangement will remain in place for the duration of the agreement.

Customer-Generators interconnected before September 1st, 2014 may remain on their current billing arrangement or exercise the option within 3 months of this date to change to the buy all/sell all billing arrangement.

METERING CONFIGURATION

The following metering configurations are permitted:

- (1) Metering configuration 1 – point of interconnection on the customer's side of the revenue meter
- (2) Metering configuration 2 – point of interconnection on the grid side of the revenue meter.

Schedule B provides details for the meter configuration for battery backed inverter systems.

The "sale of excess" billing arrangement is not available for Customer-Generators interconnected using metering configuration 2.

TERMS OF SERVICE

The duration of the agreement between BL&P and the Customer-generator for interconnection to the grid and purchase of energy shall be offered for a minimum of ten years. The value of the RER credit shall be subject to review every 3 years or as periodically determined by the Fair Trading Commission.

RULES & REGULATIONS

Service under this schedule is subject to the orders of the Fair Trading Commission and the latest publication of the "Information and Requirements Covering Installation of Electric Services and Meters". In case of a difference of interpretation between any provision of this schedule and the "Information and Requirements Covering Installation of Electric Services and Meters" booklet the provision of this schedule shall be deemed to apply.

**SCHEDULE D
STANDARD ELECTRICITY TARIFFS**

**THE BARBADOS LIGHT & POWER CO. LTD.
SUMMARY OF EXISTING AND NEW TARIFFS**

TARIFFS	COMPONENTS	EXISTING		NEW		
		Parameters	RATES Monthly Excl. VAT	Parameters	RATES Monthly Excl. VAT	RATES Monthly Incl. VAT
Domestic Service						
	Customer Charge	Each service	\$3	0-150kWh	\$6.00	\$6.90
				151-500kWh	\$10.00	\$11.50
				Over 500 kWh	\$14.00	\$16.10
	Demand Charge	Not applicable	-----	Not applicable	-----	-----
	Base Energy Charge	0-100 kWh, per kWh	\$0.176	0-150 kWh, per kWh	\$0.150	\$0.1725
		Next 900 kWh, per kWh	\$0.196	Next 350 kWh, per kWh	\$0.176	\$0.2024
		Over 1,000 kWh, per kWh	\$0.216	Next 1,000 kWh, per kWh	\$0.200	\$0.2300
				Over 1,500 kWh, per kWh.	\$0.224	\$0.2576
	Fuel Charge	All kWh, per kWh.	FCA	All kWh, per kWh.	FCA	FCA x 1.15
Employee						
	Customer Charge	Not applicable	-----	Not applicable	-----	-----
	Demand Charge	Not applicable	-----	Not applicable	-----	-----
	Base Energy Charge	All kWh, per kWh.	\$0.080	0-150 kWh, per kWh	\$0.1080	\$0.12420
				Next 350 kWh, per kWh	\$0.1270	\$0.14605
				Next 1,000 kWh, per kWh	\$0.1600	\$0.20700
				Over 1,500 kWh, per kWh	\$0.2020	\$0.23230
	Fuel Charge	All kWh, per kWh.	FCA		FCA	FCA x 1.15
General Service						
	Customer Charge	Each service	\$5	0-100kWh	\$8.00	\$9.20
				101-500kWh	\$11.00	\$12.65
				Over 500 kWh	\$14.00	\$16.10
	Demand Charge	Not applicable	-----	Not applicable	-----	-----
	Base Energy Charge	All kWh, per kWh.	\$0.226	0-100 kWh, per kWh	\$0.184	\$0.21160
				Next 400 kWh, per kWh	\$0.217	\$0.24955
				Next 1,000 kWh, per kWh	\$0.259	\$0.29785
				Over 1,500 kWh, per kWh	\$0.290	\$0.33350
	Fuel Charge	All kWh, per kWh.	FCA	All kWh, per kWh.	FCA	FCA x 1.15
Secondary Voltage Power						
	Customer Charge	Not applicable	-----	Each service	\$20.00	\$23.00
	Demand Charge	per kVA	\$4	per kVA	\$24.00	\$27.60
	Base Energy Charge	All kWh, per kWh.	\$0.206	All kWh, per kWh.	\$0.1380	\$0.1587
	Fuel Charge	All kWh, per kWh.	FCA	All kWh, per kWh.	FCA	FCA x 1.15
Large Power						
	Customer Charge	Not applicable	-----	Each service	\$300	\$345
	Demand Charge	per kVA	\$3	per kVA	\$22	\$25.30
	Base Energy Charge	All kWh, per kWh.	\$0.196	All kWh, per kWh.	\$0.1170	\$0.13455
	Fuel Charge	All kWh, per kWh.	FCA	All kWh, per kWh.	FCA	FCA x 1.15
Streetlights						
	Customer Charge	Each 50 Watt HPS light	\$5.82	Each 50 Watt HPS light	\$7.04	\$8.0960
		Each 70 Watt HPS light	\$5.82	Each 70 Watt HPS light	\$7.73	\$8.8895
		Each 100 Watt HPS light	\$14.80	Each 100 Watt HPS light	\$8.59	\$9.8785
	Demand Charge	Not applicable	-----	Not applicable	-----	-----
	Base Energy Charge	Not applicable	-----	Not applicable	-----	-----
	Fuel Charge	50 Watt HPS (27 kWh / month)	27°FCA	50 Watt HPS (25 kWh / month)	25°FCA	25°FCA x 1.15
		70 Watt HPS (27 kWh / month)	27°FCA	70 Watt HPS (33 kWh / month)	33°FCA	33°FCA x 1.15
		100 Watt HPS (73 kWh / month)	73°FCA	100 Watt HPS (43 kWh / month)	43°FCA	43°FCA x 1.15
NOTES:						
(1) FCA = Fuel Clause Adjustment, calculated monthly in accordance with the Fuel Clause.						
(2) Proposed Fuel Clause Adjustment is based on the total fuel cost. 2.64 cents/kWh has been shifted from the Base Energy rate to the FCA.						
(3) 10% discount on non-fuel components of Domestic Service bills is applied if full payment is made within 15 calendar days of bill issue date.						

APPENDIX 2

SUMMARY OF PV AND INTERCONNECTION-RELATED TECHNICAL STANDARDS

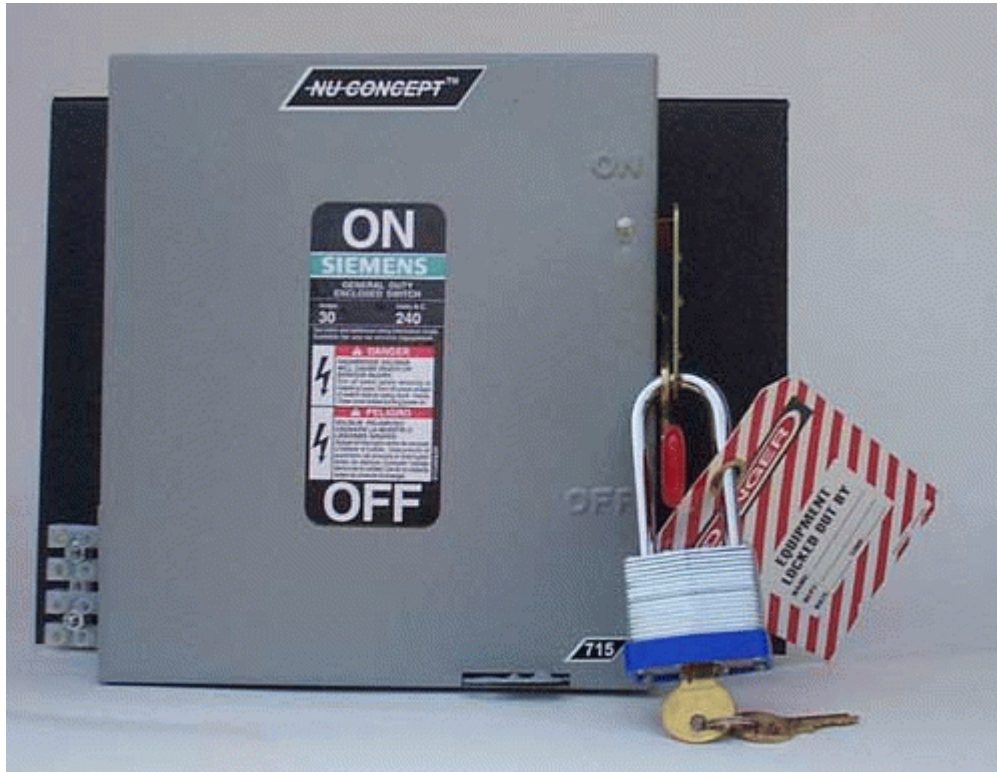
IEEE Std 928	Recommended Criteria for Terrestrial PV Power Systems
IEEE Std 1547	Standard for Distributed Resources Interconnected with Electric Power Systems – <i>standard for technical interconnection requirements</i>
IEEE Std 519	Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems - <i>standard for allowable harmonic waveform distortions</i>
IEEE Std 1262	Recommended Practice for Qualification of Photovoltaic Modules
IEEE Std 1374	Guide for Terrestrial Photovoltaic Power System Safety
IEEE Std 1479	Recommended Practice for the Evaluation of Photovoltaic Module Energy Production
UL Std 1741	Static Inverters and Charge Controllers for use in PV Power Systems – <i>a testing protocol that certifies the safe operation of grid-connected inverters</i>
UL Std 1703	Flat-Plate Photovoltaic Modules and Panels
NFPA 70 Article 690 (NEC Code)	Solar Photovoltaic Systems – <i>standard for installation of PV systems</i>
NFPA 70 Article 705 (NEC Code)	Interconnected Electric Power Production Sources – <i>standard for installation of grid-connected systems</i>
VDE-AR-N-4105	German Standard “Power Generation Systems Connected to the Low Voltage Distribution Network
IEC 61000-3-2	Harmonic current emissions in case of load currents up to 16A
IEC 61000-3-4	Harmonic current emissions in case of load currents greater than 16A

**APPENDIX 3
SAMPLE OF UTILITY WARNING SIGN OF CUSTOMER GENERATION**



(N. B. size not less than 8" x 6")

**APPENDIX 4
SAMPLE OF SAFETY DISCONNECT SWITCH**



APPENDIX 5 RGS INTERCONNECTION SITE INSPECTION

Verify size of inverters per application

Verify output frequency of inverter

Verify inverter disconnects in the event of an outage

Verify main breaker size per application

Check whether loads are being metered correctly

Verify bi-directional meter is in place

Check whether meter change is required

Verify a.c. disconnect switch is readily accessible to BL&P personnel

Verify label is in place near the utility disconnect switch

Check whether label is required on utility pole

Verify a.c. disconnect switch is grounded via equipment grounding conductor

Verify a.c. disconnect switch is visibly open

Verify a.c. disconnect switch is properly wired

Verify utility disconnect switch is not a raceway for wiring to other components

Verify a.c. disconnect switch handle can be locked in the OFF position with a BL&P lock

Verify BL&P lock has been placed on utility disconnect switch

Verify utility disconnect switch has not been modified to accommodate the BL&P lock

Verify configuration conforms with Electrical One-line drawing & application

Verify measurement of RGS output is in place via production meter or other means

Note any other discrepancies