



# **URCA'S RESPONSE TO BPL'S SSRG SUBMISSION**

**ES: 02/2017**

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# **1 Introduction**

## **1.1 Background**

On 13 December 2016, the Utilities Regulation and Competition Authority (URCA) published an Initial Decision and Preliminary Determination in respect of URCA's Review and Proposed Revisions to Bahamas Power and Light Limited (BPL)'s Small-Scale Renewable Generation (SSRG) Plan<sup>1</sup>. In that document, URCA made certain decisions regarding the implementation of SSRG in The Bahamas, and required BPL to revise its SSRG Plan and present the revised Plan to URCA for approval.

URCA has now completed its review of revised documents which were submitted to URCA in February 2017. This document comprises URCA's decision in respect of those submissions. URCA assessed BPL's documents based on their compliance with URCA's Initial Decision and Preliminary Determination, their completeness, and their clarity.

## **1.2 Outline of BPL's Submission**

The SSRG Initial Decision required that BPL submit to URCA, by 6 January 2017, a revised SSRG Plan, based on URCA's proposals in Section 5 of the SSRG Initial Decision. Broadly, the revised plan was required to include:

- Revised Requirements Document
- Draft Interconnection Agreement
- Draft Standard Offer Contract that will be offered to all prospective small-scale renewable generators
- Application Forms
- Plan for migration of existing small-scale renewable generators onto the Small-Scale Renewable Generation Programme
- Public Education Plan detailing the steps that will be taken by BPL to educate members of the public about the programme.

BPL's submission to URCA comprised the following documents:

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<sup>1</sup> ES: 04/2016, issued 12 December 2016. Available here: <http://www.urbahamas.bs/download/091599000.pdf>

- BPL's revised SSRG Plan
- SSRG Interconnection Requirements Document
- Draft SSRG Interconnection Agreement
- Application form for SSRG systems.

URCA found that the submission went some way to address the issues outlined by URCA in the Initial SSRG Decision, however all the documents needed further revision to comply fully with URCA's decision, improve clarity, and increase legibility. URCA has therefore, in the interests of reducing the time that would be needed to finalise this process, revised the documents accordingly.

### **1.3 Outline of this Document**

The following sections of this document set out the main revisions which URCA has made to each of the documents submitted by BPL, and provide a brief explanation of why those changes were made:

- Section 2 provides URCA's revisions to the SSRG Plan document
- Section 3 provides URCA's revisions to the SSRG Interconnection Requirement Requirements document
- Section 4 provides URCA's revisions to the Draft SSRG Interconnection Agreement
- Section 5 provides URCA's revisions to the Applications for the SSRG Programme
- Section 6 lists the next steps BPL and URCA should take for URCA to authorize the SSRG Programme
- Appendix A provides the revised version of the Requirements for the Grid Interconnection of Small-Scale Renewable Energy Generators
- Appendix B provides the revised version of the Small-Scale Renewable Generation Application
- Appendix C provides the revised version of the Interconnection Agreement.

## **2 BPL's SSRG Plan**

### **2.1 General**

BPL's SSRG Plan document outlines the utility's plans for the initial implementation of the SSRG Programme and its development over the next three years. URCA has not sought to revise this document as it is fundamentally a statement of BPL's high-level strategy, however URCA has the following comments which should be considered by BPL and revisions made to the document as appropriate. URCA is of the view that BPL can commence the implementation of the SSRG Programme prior to publication of the Plan, however BPL is required to provide a revised document to URCA within 30 calendar days.

In general, URCA considers that SSRG Plan would benefit from a thorough edit to the writing and format to improve clarity. URCA has the following further specific comments:

### **2.2 Policy Statement**

BPL has included a proposed renewable energy policy statement in the SSRG Plan which states:

*"BPL being desirous of doing its part to help meet national renewable energy (RE) targets will give consideration to renewable energy sources when planning generation expansion within its service territory. Such renewable options would have to be able to meet the availability, reliability, capital & operating requirements of BPL for the specific installation as well as be the option that allows BPL to offer the desired dollars per kilowatt hour rate to its customers."*

URCA considers that this policy statement does not comply fully with the requirements of the Electricity Act 2015 (EA). Section 25(3)(b) of the EA requires BPL's Renewable Energy Plan to have a policy statement giving preference to renewable energy resources in all procurement processes, if there are no compelling reliability or cost considerations. This means the Act requires BPL to add renewable capacity if a renewable source is economically viable. That is, if the renewable energy source will reduce the overall cost of electricity, compared to existing generation sources and other

alternatives<sup>2</sup>. BPL’s policy statement does not clearly reflect the EA’s requirement to give preference to energy sources because the statement only mentions BPL “*will give consideration to renewable energy sources*”, which does not mean giving preference to renewable energy sources.

BPL should revise its Policy Statement to comply with the requirements of the EA and resubmit for URCA’s approval.

### **2.3 International Comparisons and Analysis**

In the Background section, BPL has included a comparison to the United States which URCA considers to be misplaced and possibly misleading. It’s not clear to URCA why a comparison with another market is needed in this section.

Further, The Bahamas is a very different electricity market from the US— if BPL is seeking to include comparison for reference purposes, a more comparable market would be a Caribbean or small-island market. URCA is particularly concerned at the apparently unsubstantiated statement that efforts in the US to increase use of renewables “*contributed to the explosive growth of renewable generation, particularly solar, with the pace of development pace often exceeding the ability of utilities to manage integration from a technical and administrative prospective. The result brings inefficiencies, higher costs, grid stability problems, and customer dissatisfaction.*” BPL’s statement counters the National Energy Policy, which aims to increase renewable energy uptake. This makes BPL’s unsubstantiated statement particularly concerning.

URCA notes that a few places (most notably Hawaii, which is very different from the rest of the US market) have had some problems with grid stability and unsustainable subsidies, but URCA is not aware of any large-scale cost increases or grid problems from increases in the amount of renewable energy installed in the US. If BPL proposes to include these statements, sources and references should be added. URCA is aware that such challenges have materialised in some countries (including places such as Spain and Germany, as well as Hawaii) but URCA’s research suggests that this has largely been due to unsustainable subsidies on renewable energy installations, through approaches such

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<sup>2</sup> In some cases, BPL should add renewable sources even if those sources would raise costs to consumers—if the premium compared to non-renewable sources is acceptable to consumers.

as net-metering or direct subsidy of installation costs. URCA's approved approach neither includes nor proposes subsidies for SSRG installations in The Bahamas.

## **2.4 Renewable Energy Zones**

URCA has previously noted BPL's references to "Renewable Energy Zones" which seems potentially confusing, considering how the term is used internationally, as URCA noted in its initial comments on the original BPL SSRG proposals. As URCA has advised previously, the term comes from large transmission corridors to accommodate large utility-scale projects in the United States and Europe. For a small-scale programme, URCA considers that it is likely to be technically feasible to interconnect SSRG on just about any part of the grid, so promoting small-scale renewable generation in any area should not detract from the principle that all residents may connect small-scale renewable facilities who wish to do so-. Rather, anyone should be allowed to generate at small-scale who would like to, subject to overall limits and except in exceptional circumstances where the grid isn't capable of taking on small-scale generation.

With this in mind, if BPL would like to use the term Renewable Energy Zones, the meaning should be clearly defined. URCA would then review the concept for compliance with the National Energy Policy and the Act.

## **2.5 National RE Targets**

In Phase 3, BPL mentions linking small-scale RE targets to national targets for renewables. This does not seem appropriate, since utility-scale renewables are cheaper and can be rolled out more quickly than small-scale renewables. While small-scale renewables are a key part of the energy ecosystem, URCA considers that BPL should focus its efforts to meet the overall national RE targets through predominantly utility-scale renewables.

## **2.6 Level 1 and Level 2**

URCA does not consider it helpful to distinguish between a "Level 1" and "Level 2" program. The distinction, though not clearly described by BPL, appears to be that Level 2 will have higher limits. This distinction might be clearer if the description of the phases gave the proposed higher limits, at least as far as they are currently known, however in light of the decisions made by URCA to date URCA considers it would be more useful to simply indicate that limits will be expanded as the phases of the SSRG progress, rather than adding different levels as well. That said, URCA does not propose to insist on this change, provided that BPL ensures that differential treatment of customers in each "Level" is not implemented without URCA's prior approval.



## **2.7 Feed-in Tariffs**

On page 10, BPL's description of the feed-in tariff seems to be incomplete. BPL states that *'Under the BPL SSRG Level 1 plan, it is proposed to have a feed-in tariff equal to the prevailing fuel charge for the billed month.'* BPL is reminded that URCA's decision on the feed-in tariff is that the fuel charge will be used as an interim rate only until URCA has completed its net billing tariff study this year, at which time URCA will approve and BPL will be required to implement, a new net billing rate based on the results of that study.

BPL should ensure that the Plan clearly describes the nature of the feed-in tariff and the fact that it will be amended from time to time as determined by URCA.

## **3 BPL's SSRG Interconnection Requirements**

### **3.1 Document Overview**

The Interconnection Requirements Document sets out the detailed requirements which a customer must meet, and the processes which must be followed, in order to lawfully install an SSRG system on BPL's grid.

URCA has provided at Appendix A an amended Interconnection Requirements document based on its review. The main revisions and changes to the Interconnection Requirement document are discussed in the following subsections of this document, and were made to:

- Adjust the capacity limit values for SSRG systems to comply with the limits set by URCA (Section 3.2)
- Modify the application and approval process for residential and commercial customers (Section 3.3)
- Require grid-tied systems to be insured (Section 3.4)
- Complete the Indemnification section (Section 3.5)
- Replace the Metering configuration figure (Section 3.6)
- Edit and format of the entire document (Section 3.7).

### **3.2 Capacity Limit Values for SSRG Systems**

URCA found that the capacity limit values in the Interconnection Requirements Document did not comply with the limit values set by URCA's Initial Decision and Preliminary Determination on BPL's Small-Scale Renewable Generation Plan<sup>3</sup>. URCA modified the limits on the Interconnection Requirements Document to comply with the Initial Decision and Preliminary Determination. URCA has also included the calculation and description for Average Customer Demand (ACD) to be more specific about the limits and avoid misinterpretations.

### **3.3 Application and Approval Process for Residential and Commercial SSRG Systems**

In its revision of the document, URCA identified three types of SSRG systems:

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<sup>3</sup> ES: 04/2016, issued 12 December 2016. Available here: <http://www.urbahamas.bs/download/091599000.pdf>

- Off-grid SSRG systems
- Grid-tied SSRG systems owned by Residential customers
- Grid-tied SSRG systems owned by Small Commercial customers.

For customers with off-grid SSRG systems, URCA found that BPL does not need to approve the installations of the systems because the system will not be connected to BPL's grid. URCA will be responsible for approving the installation of off-grid systems. The application process and guidelines will be available to customers on URCA's website. URCA removed any information regarding BPL's approval of off-grid systems in the revised versions of the Interconnection Requirements Document and the Application.

For grid-tied SSRG systems owned by Small Commercial customers, URCA is responsible for approving interconnection to the grid. The application information and guidelines will be available to customers on URCA's website. URCA will notify BPL and the commercial customer of the approval of customer's application. URCA removed any information regarding SSRG systems owned by Small Commercial customers in the revised versions of the Interconnection Requirements Document and the Application.

BPL will consider applications only for SSRG systems owned by Residential customers. The revised versions of the Interconnection Requirements Document and the Application refer only to these types of systems.

### **3.4 Insurance for Grid-Tied SSRG Systems**

BPL's Interconnection Requirements Document recommended customers with grid-tied SSRG system to obtain general liability insurance for their system. URCA has added a requirement that owners of SSRG systems obtain general liability insurance. Customer-generators could be held liable if the anti-islanding protections on their renewable energy systems fail to operate, harming BPL personnel or third parties.

### **3.5 Indemnifications for Grid-Tied SSRG Systems**

The language used in the indemnification section of the Interconnection Requirements document referred to an indemnity provision in a separate document, but did not name the document. URCA modified the section to offer more complete information about indemnity.

### **3.6 References to Commercial Systems**

URCA has removed references to commercial installations. URCA will administer the process for Small Commercial applicants to add grid-tied SSRG systems.

### **3.7 References to Off-Grid Systems**

URCA has removed references to off-grid systems. Generally, URCA is concerned that BPL's proposed role in relation to off-grid systems appears to be unclear and possibly unnecessary. URCA is seeking further clarity from BPL and will make its final decision together with its Final Determination on SSRG systems. However, URCA currently considers that it would be more appropriate for URCA to be responsible for approval of off-grid installations, which appears more consistent with the provisions of the Act.

### **3.8 Editing and Formatting**

In its revision, URCA sought to edit and re-format the Interconnection Requirements document to improve clarity and legibility. Some of the issues that made the document difficult to understand were its lack of precision and organization, its vague language, and the repetition of information in several sections. For example, the document referred to frequency and voltage deviations, when it should have referred to frequency and voltage ranges (system frequency and system voltage sections). URCA made revisions to improve the clarity and legibility of the document.

## **4 Draft SSRG Interconnection Agreement**

URCA has reviewed and proposed changes to BPL's Draft SSRG Interconnection Agreement, to address the following matters:

### **4.1 Term of the Agreement**

URCA notes that BPL's proposed draft suggests that the term of the interconnection agreement would be variable, depending either on the length of BPL's "pilot programme" or other factors, which are not clearly set out. URCA considers that in order to properly secure customer-generator investments in renewable generation systems, the agreement must be of fixed length which must be of sufficient duration to ensure recovery of the customer-generator's investment.

URCA has therefore inserted an amendment to fix the term of the agreement at 15 years, and to delete mention of the pilot program

### **4.2 Feed-in Tariffs**

URCA reminds BPL that the feed-in tariff is subject to URCA's regulatory jurisdiction and that URCA's current position is that it should be set at the fuel charge for the time being, but will be revised by URCA during 2017 based on a cost assessment to be conducted and will be revised from time to time thereafter. URCA has therefore amended the agreement to set the rate at which Customer-Generators will be remunerated at the approved tariff, as may be established and revised by URCA from time to time

### **4.3 Treatment of Customer-Generator Credit**

URCA notes that clause 6.5 of the agreement proposes for credits due to BPL to be payable by BPL monthly, however, credits due to Customer-Generators would be accumulated for up to one year but thereafter would be reset to 0, with the Customer-Generator receiving no credit or payment for the excess electricity which would have been generated by the Customer-Generator and transferred to BPL.

URCA considers this proposal to be unfair and notes that BPL has advanced no justification for the proposal that Customer-Generators would not be fully compensated for the electricity which they generate and supply to BPL. URCA has amended the language to provide for payment by BPL to the Customer-Generator on an annual basis, where the customer's account holds a credit balance after offset of payment for power taken from BPL.

#### **4.4 Formatting and General Consistency**

URCA has generally sought to improve the formatting for the document, and has made amendments to address some vocabulary and other drafting points. For example, we eliminated the use of 'RGS' (Renewable Generation System) in favor of SSRG system, for consistency with other documents.

## **5 Application Forms**

### **5.1 Formatting and General Consistency**

URCA has generally sought to improve the formatting for the Application Form, and has made amendments to address some vocabulary and other drafting points and to ensure consistency with the other documents submitted, and URCA's changes made pursuant to this document.

## **6 Next Steps**

BPL should confirm the changes made to the SSRG documents by URCA and include URCA's comments on the final documents. URCA will review the comments received as part of the public consultation on the SSRG Programme and issue a Final Determination.

### **6.1 BPL Implementation**

BPL should revise the SSRG Plan, in accordance with URCA's comments in Section 2. That is, BPL should review the Policy Statement to comply with the Electricity Act, provide a definition of Renewable Energy Zone (if it is set on using the term in the Plan), indicate that limits will be expanded as the phases of the SSRG progress, and complete the section on feed-in tariffs. URCA requests that BPL include these changes and submit to URCA, by no later than 30 April 2017.

BPL can also immediately confirm its acceptance of URCA's revisions to the Interconnection Requirements document (Appendix A), the SSRG Interconnection Agreement (Appendix B), and the Application Forms (Appendix C). BPL should also include the Electrical One-Line diagram sample specifying all the components of the SSRG system as an appendix to the Interconnection Requirements document.

Upon acceptance of these documents, BPL can begin operationalising the residential SSRG Programme by accepting applications from residential customers to generate electricity from grid-tied renewable sources. BPL must confirm the acceptance of the revisions by no later than 30 April 2017.

### **6.2 Completion of URCA Consultation**

URCA will review comments received on the Preliminary Determination on BPL's SSRG Plan (ES 04/16), which was issued on 12 December 2016. URCA will then formulate a Final Determination on the matters under consultation. The Final Determination will guide BPL's implementation of the SSRG Programme. URCA will publish its Final Determination on its website 30 calendar days after the submission deadline (31 March 2017).

URCA will publish the application process to install and operate SSRG systems for Small Commercial and Governmental entities, in accordance with Section 28 of the Electricity Act. URCA will publish this information no later than 30 June 2017.



# Appendix A- Revised Version of The Requirements for Grid Interconnection of Small-Scale Renewable Energy Generation Systems Document



## Bahamas Power & Light

### REQUIREMENTS FOR GRID INTERCONNECTION OF SMALL-SCALE RENEWABLE ENERGY GENERATION SYSTEMS

#### **1 Purpose**

This document describes the general provisions and technical requirements for connecting Small-Scale Renewable Generation ("SSRG") systems to BPL's power system, inclusive of transmission and distribution, ('the Grid'). These requirements ensure:

1. The compatibility of the SSRG system with the Grid
2. The safety of the SSRG system operating in parallel with the Grid
3. The safety of BPL's employees, agents, customers and the public; and
4. High standards of power quality.

This document sets out the:

- Capacity limits for SSRG systems (Section 2)
- Application and interconnection process for Residential SSRG systems (Section 3)
- General conditions for connecting an SSRG system to the Grid (Section 4)
- Grid operating conditions (Section 5)
- Technical interconnection requirements (Section 6)
- Glossary (Appendix A).

## 2 Capacity Limits

For each island of The Bahamas, there are capacity limits for individual SSRG systems and for the total installed capacity of all SSRG systems. BPL or URCA may reject applications to install grid-tied SSRG systems that would exceed either limit. Interconnecting an SSRG system that exceeds the limits in this section requires written approval from BPL and URCA.

Capacity limits do not apply to off-grid SSRG systems.

### 2.1 New Providence

1. Residential customers on New Providence may install Small-Scale Renewable Generation (“SSRG”) systems with capacity less than or equal to:

$$5kW + \text{Average Customer Demand}$$

Where Average Customer Demand (ACD) is the customer’s total consumption in kilowatt hours (kWh) during the preceding 12 months, divided by 8,760 (the number of hours in 1 year). The calculation for ACD will be rounded up to the nearest whole number. For example, a customer with ACD of 1.3kW would be allowed to install a system with a maximum size of 7kW. This is based on:

1.3kW ACD is rounded up to 2kW

$$5kW + 2kW = 7kW.$$

Regardless of a customer’s ACD, the maximum size for any SSRG system on New Providence is 100kW. BPL may further limit the allowable system size for technical reasons subject to URCA’s prior approval in writing.

2. Small Commercial customers on New Providence may install SSRG systems with capacity less than or equal to:

$$\text{Average Customer Demand} \times 2$$

Regardless of a customer’s ACD, the maximum size for any SSRG system on New Providence is 100kW. URCA may further limit the allowable system size for technical reasons, or permit system sizes above the standard limit of ACD x 2 (subject to the limit of 100kW) where special circumstances apply.

3. This program is available on a ‘first-come, first-served’ basis up to a maximum total of 10,000kW of installed SSRG capacity on New Providence.

### 2.2 Abaco, Eleuthera and Exuma

1. Residential customers on Abaco, Eleuthera, and Exuma may install SSRG systems with capacity less than or equal to:

$$3kW + \text{Average Customer Demand}$$

Where Average Customer Demand (ACD) is the customer's total consumption in kilowatt hours (kWh) during the preceding 12 months, divided by 8,760 (the number of hours in 1 year). The calculation for ACD will be rounded up to the nearest whole number. For example, a customer with ACD of 1.3kW would be allowed to install a system with a maximum size of 5kW. This is based on:

1.3kW ACD is rounded up to 2kW

3kW + 2kW = 5kW.

Regardless of a customer's ACD, the maximum size for any SSRG system on Abaco, Eleuthera, and Exuma is 50kW. BPL may further limit the allowable system size for technical reasons subject to URCA's prior approval in writing.

2. Small Commercial customers on Abaco, Eleuthera, and Exuma may install SSRG systems with capacity less than or equal to:

*Average Customer Demand x 2 (to a maximum of 50kW)*

Regardless of a customer's ACD, the maximum size for any SSRG system on Abaco, Eleuthera, and Exuma is 50kW. URCA may further limit the allowable system size for technical reasons, or permit system sizes above the standard limit of ACD x 2 (subject to the limit of 50kW) where special circumstances apply.

3. This program is available on a 'first-come, first-served' basis up to a maximum total of 500kW of installed SSRG capacity on each of Abaco, Eleuthera and Exuma.

### **2.3 Long Island, Bimini, San Salvador, North Andros, Central Andros, South Andros, Inagua, Cat Island, Great Harbour Cay, Black Point and Staniel Cay (Exuma)**

1. Residential customers on Long Island, Bimini, San Salvador, North Andros, Central Andros, South Andros, Inagua, Cat Island, Great Harbour Cay, Black Point, and Staniel Cay may install SSRG systems with capacity less than or equal to:

*2kW + Average Customer Demand (to a maximum of 30kW)*

Where Average Customer Demand (ACD) is the customer's total consumption in kilowatt hours (kWh) during the preceding 12 months, divided by 8,760 (the number of hours in 1 year). The calculation for ACD will be rounded up to the nearest whole number. For example, a customer with ACD of 1.3kW would be allowed to install a system with a maximum size of 4kW. This is based on:

1.3kW ACD is rounded up to 2kW

2kW + 2kW = 4kW.

Regardless of a customer's ACD, the maximum size for any SSRG system on Long Island, Bimini, San Salvador, North Andros, Central Andros, South Andros, Inagua, Cat Island, Great Harbour Cay, Black Point, and Staniel Cay is 30kW. BPL may further limit

the allowable system size for technical reasons subject to URCA's prior approval in writing.

2. Small Commercial customers on Long Island, Bimini, San Salvador, North Andros, Central Andros, South Andros, Inagua, Cat Island, Great Harbour Cay, Black Point and Staniel Cay may install SSRG systems with capacity less than or equal to:

$$\text{Average Customer Demand} \times 2$$

Regardless of a customer's ACD, the maximum size for any SSRG system on Long Island, Bimini, San Salvador, North Andros, Central Andros, South Andros, Inagua, Cat Island, Great Harbour Cay, Black Point and Staniel Cay is 30kW. URCA may further limit the allowable system size for technical reasons, or permit system sizes above the standard limit of  $ACD \times 2$  (subject to the limit of 30kW) where special circumstances apply.

3. This program is available on a 'first-come, first-served' basis up to a maximum total of 250kW of installed SSRG capacity on each of Long Island, Bimini, San Salvador, North Andros, Central Andros, South Andros, Inagua, Cat Island, Great Harbour Cay, Black Point and Staniel Cay.

#### **2.4 All other Family Islands**

1. Residential customers on all other Family Islands may install SSRG systems with capacity less than or equal to:

$$1kW + \text{Average Customer Demand}$$

Where Average Customer Demand (ACD) is the customer's total consumption in kilowatt hours (kWh) during the preceding 12 months, divided by 8,760 (the number of hours in 1 year). The calculation for ACD will be rounded up to the nearest whole number. For example, a customer with ACD of 1.3kW would be allowed to install a system with a maximum size of 3kW. This is based on:

1.3kW ACD is rounded up to 2kW

$$1kW + 2kW = 3kW.$$

Regardless of a customer's ACD, the maximum size for any SSRG system on all other Family Islands is 10kW. BPL may further limit the allowable system size for technical reasons subject to URCA's prior approval in writing.

2. Small Commercial customers on all other Family Islands may install SSRG systems with capacity less than or equal to:

$$\text{Average Customer Demand} \times 2 \text{ (to a maximum of 10kW)}$$

Regardless of a customer's ACD, the maximum size for any SSRG system on all other Family Islands is 10kW. URCA may further limit the allowable system size for

technical reasons, or permit system sizes above the standard limit of ACD x 2 (subject to the limit of 10kW) where special circumstances apply.

3. This program is available on a ‘first-come, first-served’ basis up to a maximum total of 25kW of installed SSRG capacity on each other Family Island.

## 2.5 Summary Table

The following table summarizes the capacity limits for Residential and Small Commercial SSRG systems, as well as the overarching limit that applies to all types of SSRG systems.

	Residential Maximum System Size	Commercial Maximum System Size	No System May Exceed This Size, Regardless of ACD
New Providence & Paradise Island	5kW + ACD	ACD x 2	100kW
Abaco, Eleuthera and Exuma	3kW + ACD	ACD x 2	50 kW
Long Island, Bimini, San Salvador, North Andros, Central Andros, South Andros, Inagua, Cat Island, Great Harbour Cay, Black Point and Staniel Cay (Exuma)	2kW + ACD	ACD x 2	30kW
All other Family Islands	1kW + ACD	ACD x 2	10kW

### **3 Application and Interconnection Process for Residential SSRG Systems**

This section describes the application and interconnection processes for Residential customers. **Commercial customers should apply to URCA in accordance with URCA's application process for SSRG systems, which will be available from URCA's website at [www.urbahamas.bs](http://www.urbahamas.bs) from 1 April 2017.**

Residential customers seeking to interconnect the SSRG system must apply for a Small-Scale Renewable Generation Permit from BPL. Customers should contact BPL to obtain information on interconnection requirements **BEFORE acquiring the SSRG system**. BPL is not obligated to approve or allow the connection to the Grid of any installation that is non-compliant, unsafe, or unfit for purpose.

Residential customers may obtain all relevant information on SSRG requirements, including the SSRG Application Form and the SSRG Interconnection Agreement, from BPL's offices or on BPL's website: [www.bahamaselectricity.com](http://www.bahamaselectricity.com).

To apply for Small-Scale Renewable Generation Permit, Residential customers must complete and submit the following to BPL:

1. The SSRG Application Form
2. An Electrical One-Line diagram (see Appendix 1 for sample) specifying all the components of the SSRG system
3. Copies of the operation and installation manuals for all system components
4. A non-refundable application fee of \$50.

Customers with existing SSRG systems who wish to connect to the grid must also apply for an SSRG Permit and submit the documents listed above to BPL.

BPL will review the application and provide its response, either approving or denying the application, within 21 days of receipt of a completed application.

After receiving written approval from BPL to acquire the specified system, the customer must apply to the Ministry of Works for the required electrical and building permits. In the application to the Ministry of Works, the customer must include a copy of its Small-Scale Renewable Generation Permit from BPL.

After receiving any required electrical and building permits from the Ministry of Works, the customer may install the approved SSRG system. The SSRG system must be installed according to the technical specifications in the customer's application to BPL and the Ministry of Works.

Once all approvals have been obtained and inspections passed, BPL may perform inspection and functionality tests to ensure the safety of the system. The tests must be performed no later than 21 calendar days after BPL receives written notice from the customer that the Ministry of Works has approved all relevant electrical and building permits. In the written notice, the customer must include copies of the relevant permits.

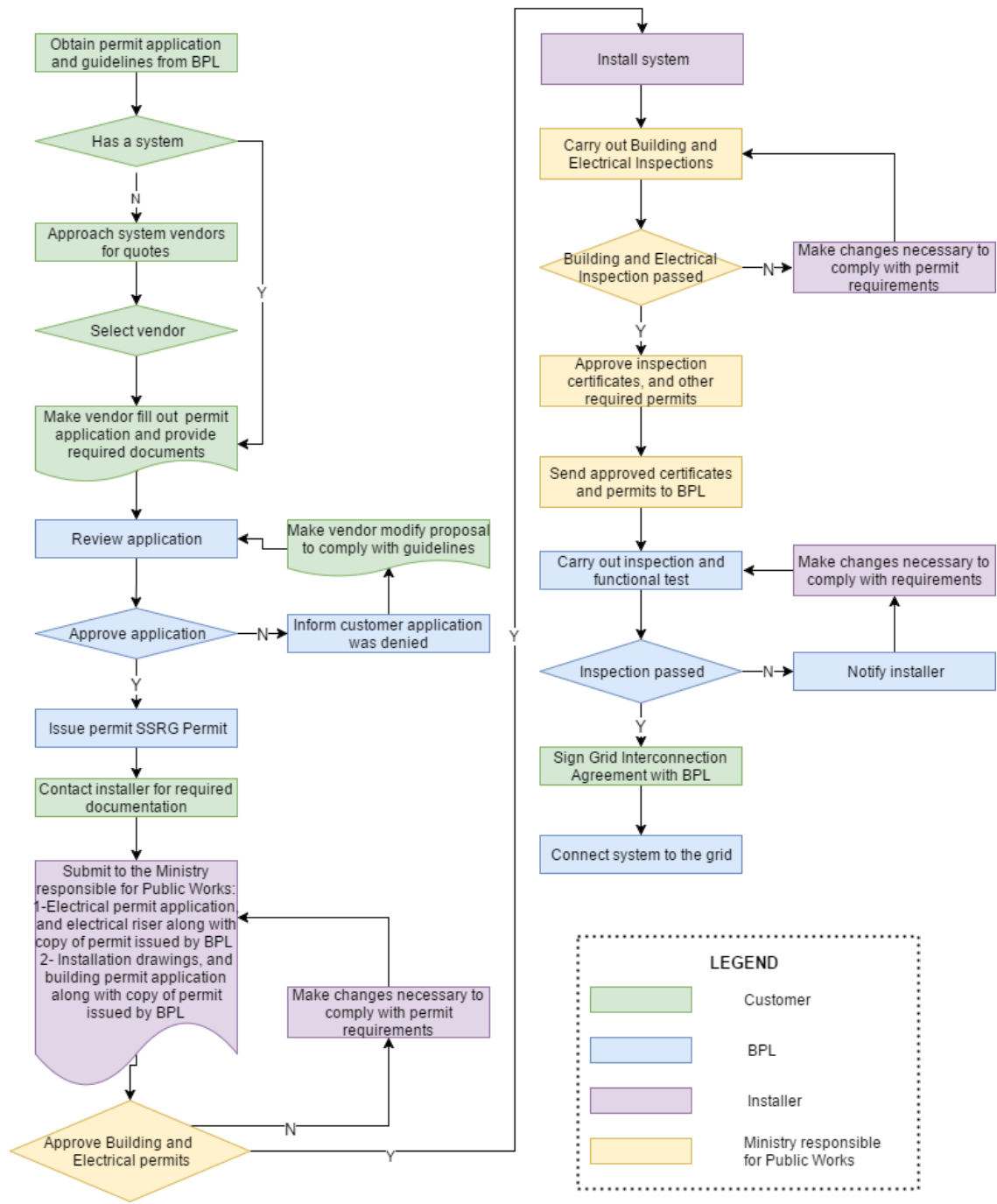
BPL will carry out inspections and tests in accordance with Section 6 of this document, and will advise the applicant in writing whether the SSRG system qualifies for interconnection to the Grid. BPL may, if deemed necessary, apply additional labelling and markers to identify the site as an approved SSRG system.

If BPL does not carry out these tests within 21 calendar days of receiving the approvals from the Ministry of Works, the SSRG system is considered approved, and the customer may interconnect the system to the Grid. BPL maintains the right to perform additional inspection and functionality testing for interconnected SSRG systems at any time, after providing the Customer-Generator with at least 48 hours' notice.

BPL may reject the request to connect an SSRG system to the Grid, or may disconnect an interconnected SSRG system, if the system is found to be unsafe during the inspection or the verification test results. The customer should take corrective measures to ensure its system complies with the requirements. BPL will perform a second inspection and functionality test to ensure the safety of the system no later than 21 calendar days after the customer requests a second inspection.

When BPL approves an SSRG system, the customer is required to execute an SSRG Interconnection Agreement with BPL to authorize the connection with the Grid and provide for the export of energy to the Grid under the terms defined in the SSRG Interconnection Agreement.

**Figure 3.1: Small-Scale Renewable Generation Application and Approval Process for Residential Customers**





## **4 General Conditions**

This section sets out the general conditions that apply to all customers with grid-tied SSRG systems.

### **4.1 Customers Must Be in Good Standing**

Persons seeking to acquire and connect SSRG systems to the Grid must be BPL customers in good standing. The SSRG system must be located at the customer's owned or rented property. For rented properties, the applicant must obtain and provide to BPL written approval from the property owner authorizing the SSRG installation and fully indemnifying BPL with respect to damages from the installation, maintenance, operation, or removal of the SSRG installation.

Grid-tied SSRG systems must be capable of operating in parallel with the Grid (in accordance with the stipulated technical requirements) with the intent to offset some or all of the customer's own electricity usage.

### **4.2 Types of Grid-tied SSRG Systems Allowed**

Unless otherwise approved by BPL, to be eligible to connect and operate in parallel with the Grid, grid-tied SSRG systems must be wind and/or solar powered. Section 20 of this document describes the limits of the nameplate capacity of grid-tied SSRG systems.

The SSRG system may be single-phase or three-phase. In either case, its rated size is limited to 80 percent of the size of the main breaker servicing the system. Additionally, the phasing of the SSRG system must match that of the electrical service that is in place.

### **4.3 SSRG Interconnection Agreement**

Where the SSRG system has been approved, and passes all required inspections, the customer is required to execute a SSRG Interconnection Agreement with BPL prior to beginning operations. The SSRG Interconnection Agreement contains the terms and conditions for operating a grid-tied SSRG system, including the rate that BPL will pay for electricity sold to the Grid.

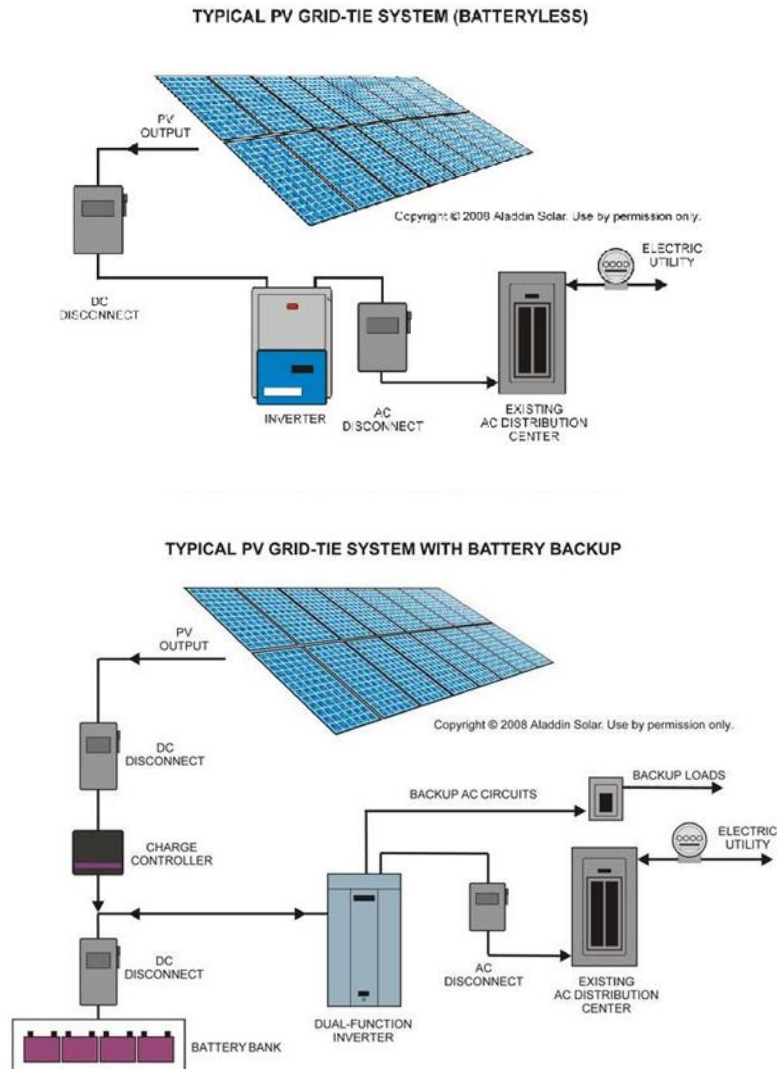
### **4.4 Unauthorised Connections**

BPL or URCA must grant approval in writing, and the customer must have executed a SSRG Interconnection Agreement with BPL, before any SSRG system is connected to the Grid. For the purposes of public and utility personal safety, BPL reserves the right to disconnect any customer who connects or has connected a SSRG system to the Grid without written authorisation from BPL. If BPL decides to disconnect a SSRG system from the Grid, it shall notify URCA within two (2) days of doing so, giving reasons for the disconnection. A customer whose system has been disconnected pursuant to this power may have the matter reviewed by URCA by making a written complaint to URCA.

## 4.5 Metering

BPL will furnish metering to measure the energy supplied from the Grid to the customer and the energy supplied to the Grid by the owner of a SSRG system. A sample diagram showing a metering configuration is provided in **Error! Reference source not found.**

**Figure 4.1: Sample Metering Configuration**



## **4.6 Labelling**

Buildings and structures with a grid-tied SSRG system must, where practicable, have the disconnecting means grouped (in accordance with BPL's Grid Code). Where such an arrangement is not practicable, there must be a permanent plaque posted on or near each disconnecting means, indicating the location of all other service boxes supplying power to the building.

Grid-tied SSRG systems that store electrical energy shall be labelled in a conspicuous, legible, and permanent manner with a suitable warning sign at the location of the service disconnecting means of the premises.

## **4.7 Insurance**

The owner of a SSRG system must maintain general liability insurance in amounts not less than:

- \$50,000 for SSRG systems with capacity less than or equal to 5kW
- \$100,000 for SSRG systems with capacity greater than 5kW, but less than or equal to 10kW
- \$500,000 for SSRG systems with capacity greater than 10kW, but less than or equal to 100kW.

An endorsement on a homeowner's policy providing the required amount of coverage is acceptable to meet this insurance requirement. Failure to maintain the insurance coverage will render the SSRG Interconnection Agreement invalid. BPL does not accept responsibility for the failure of the customer to renew its insurance policy.

## **4.8 Indemnification**

The owner of a grid-tied SSRG system must indemnify BPL, its agents, and third parties for losses and damages resulting from the operation of the SSRG system, except when the loss or damage occurs due to the negligent actions of BPL, its agents, or third parties. BPL and its agents will indemnify the customer for all loss to third parties resulting from the operation of the Grid except where BPL and its agents have used reasonable care in the exercise of their functions and when the loss occurs due to the negligent actions of the customer.

## **4.9 Future Modifications and Expansion**

The customer must obtain written approval from BPL and the Ministry of Works Electrical Inspection Department, prior to modifying, expanding, or altering the approved SSRG system. The customer must present an approved Electrical Inspection Certificate to BPL, and must obtain written approval from BPL, before interconnecting the modified SSRG system to the Grid. The customer may be required to execute a new SSRG Interconnection Agreement.

#### **4.10 Customer-owned Equipment Protection**

The protection of the facility loads and generation equipment owned by the customer and ensuring compliance with all standards, codes and requirements of local authorities is solely the responsibility of the customer.

#### **4.11 Additional Fees**

Customers may be required to pay BPL additional fees for services related to the installation of the SSRG system. URCA must approve any fees before BPL may charge them to customers.

## **5 Grid Operating Conditions**

This section describes the typical distribution operating and power quality conditions within which the SSRG system should operate. These are representative values that BPL attempts to maintain and includes some abnormal conditions that the SSRG system should be designed to withstand. It is the customer's responsibility to ensure that all equipment operates correctly in this environment.

### **5.1 System Frequency**

The Grid operates at 60Hz. Frequency typically ranges from 58.5 to 61.5 Hz for small contingencies resulting in modest disturbance where the SSRG system is expected to remain connected to the Grid. For larger contingencies, broader frequency variations may occur such as when major generation or transmission is lost and load shedding occurs. The SSRG system protective systems are expected to operate as outlined in the Technical Interconnection Requirements section below.

### **5.2 System Voltage**

The LV distribution Grid typically operates at voltages of 120/240V single phase and 120/208V or 277/480V three phase. Voltage typically ranges from 112.8V to 127.2V (L-N on 120V base, 6%) for small contingencies resulting in modest disturbance where the SSRG system is expected to remain connected to the Grid. For larger contingencies, broader voltage variations may occur such as when major generation or transmission is lost and load shedding occurs. The SSRG system's protective systems are expected to operate as outlined in the Technical Interconnection Requirements section below.

## **6 Technical Interconnection Requirements**

This section provides the technical requirements to be met by the SSRG system to qualify for interconnection to the Grid and lists typical conditions and response to abnormal conditions that the system is required to meet. Except as modified herein, the SSRG System must conform to **IEEE Standard 1547** "Standard for Interconnecting Distributed Resources with Electric Power Systems". Internal wiring must conform with national standards, as set by the ministry responsible for Building Regulation under Buildings Regulations (Chapter 200).

All components, inclusive of but not limited to inverters, panels, charge controllers and batteries, must be accompanied by the manufacturers' specifications sheets, installation/operation manuals, and other details relevant to the inverters function. These documents must be available at the time of application, initial installation inspection, and all subsequent inspections/reviews. Voltage, current and power limits, and operating points are key parameter sets must also be available for review. To maintain system safety and compliance, Underwriters Laboratories (UL) listing is required for all electrical components **UL 1741** is required for all inverters, converters, controllers and Interconnection System Equipment and all Solar Modules are required to be listed under UL 1703

All small wind turbine systems must meet UL 6142 requirements as well as any applicable local code requirements.

### **6.1 Over Current Protection**

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

### **6.2 AC Disconnect**

Ensure a visible and lockable AC disconnect is in an accessible location at or near BPL's meter and required signage and notices are posted.

### **6.3 Anti-Islanding**

For an unintentional island condition, where the SSRG system energizes a portion of the Grid, the SSRG system shall detect the island condition and cease to energize the Grid within a maximum of two seconds after the formation of the island.

### **6.4 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 SSRG system shall not cause objectionable flicker for other customers on the Grid.

## 6.5 Harmonic Distortion

SSRG systems are to employ pure sine wave inverters and are expected to comply with IEEE Standard 519 current distortion limits with regard to harmonic current injection into the Grid. The harmonic current injection arising from the SSRG system shall not exceed the values listed in the table below – (excluding any harmonic currents associated with harmonic voltage distortion present on the Grid without the SSRG system connected). Total current harmonic distortion shall not exceed 5% of rated current.

Total Harmonic Distortion Limit		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%

## 6.6 Inverter Response to Abnormal Voltages and Frequencies

The SSRG inverter must be able to meet the disconnection criteria set out below:

Voltage Condition (% of Nominal Voltage)	Maximum Time to Disconnect
$V < 50\%$	0.16 sec – (10 cycles)
$50\% < V < 88\%$	2secs – (120 cycles)
$110\% < V < 120\%$	1 sec – (60 cycles)
$V > 120\%$	0.16 sec – (10 cycles)

Frequency	Maximum Time to Disconnect
F < 59.4	0.16 sec – (10 cycles)
F > 60.6	0.16 sec – (10 cycles)

### 6.7 Voltage Imbalance

Only three-phase SSRG systems may be grid-tied to incoming three-phase services. In these cases, approximately equal amounts of generation capacity should be applied to each phase of the three-phase circuit.

### 6.8 DC Injection

The SSRG system 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 the Grid.

### 6.9 Synchronization

SSRG systems that can generate an AC Voltage Waveform independent of the Grid shall be connected in parallel only in combination with its synchronizing capabilities. The SSRG system shall synchronize to the Grid while meeting the Flicker requirements previously indicated and causing no greater than a 5% voltage variation at the Point of Delivery. Synchronization may occur once the Grid has stabilized following an outage or another disturbance event.

### 6.10 Interconnection Protection Function Requirements

The system shall incorporate the following protective functions:

- AC disconnecting;
- Anti-Islanding;
- Automatic synchronizing (inverters with stand-alone capability);
- Under-voltage trip (on each phase for 3-phase equipment);
- Over-voltage trip (on each phase for 3-phase equipment);
- Instantaneous over-current trip (on each phase for 3-phase equipment);
- Timed over-current trip (on each phase for 3-phase equipment);
- Under-frequency trip;
- Over-frequency trip.



## Appendix A: Glossary

**Alternating Current (AC):** An electric current that reverses its direction at regularly occurring intervals, known as the frequency which, in the case of The Bahamas, is 60 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 Small-Scale Renewable Generation (SSRG) system.

**Delta ( $\Delta$ ) 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 electrical energy from other forms of energy; also, the amount of electrical energy produced, is expressed in Watt hours (Wh) for small amounts or kilowatt hours (kWh) for larger amounts.

**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 60 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.

**SSRG Interconnection Agreement:** The legal document authorizing the flow of electricity between the facilities of BPL and a Customer-Generator. SSRG systems must be permanently interconnected and operating in parallel to the electrical distribution grid of the utility serving the customer's electrical load.

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

**Inverter:** A device that converts direct current (dc) electricity into alternating current (ac) electricity. Some types are used for stand-alone systems (not connected to the grid, or 'off-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 pre-set time.

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

**Kilowatt hour (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 more than 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 SSRG 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.

**SSRG System:** Small-Scale Renewable Generation system. These are systems with the ability to generate their own energy from acceptable renewable acceptable sources using approved technologies.

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

**Residential:** Electrical Service category of dwellings single or multi-unit, low rise, not being operated as a resort, townhouse, hotel or condominium with each unit having its own metered supply.

**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.

**Small Commercial:** A commercial business customer, which has a peak demand less or equal to 50kW.

**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 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.

**Watt-hour (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 ( $\Delta$ ) connection.

# Appendix B- Revised Version of the Small-Scale Renewable Generation (SSRG) Application

## SMALL SCALE RENEWABLE GENERATION (SSRG) PERMIT APPLICATION

**Three copies of this application must be submitted.**

Please fill out Sections 1, 2, and 3 completely. Instructions for filling out the application begin on page 3.

### 1. Customer Information

Name: \_\_\_\_\_  
 P. O. Box: \_\_\_\_\_  
 Street Address: \_\_\_\_\_  
 Island: \_\_\_\_\_ BPL Account #: \_\_\_\_\_ BPL Meter # \_\_\_\_\_  
 Telephone: Work: \_\_\_\_\_ Mobile: \_\_\_\_\_  
 Home: \_\_\_\_\_  
 Email address: \_\_\_\_\_  
 Account Type Residential

### 2. System Installer Information

	RE Contractor	Electrical Contractor
Contact Person		
Company Name		
P.O. Box		
Telephone (Work)		
Telephone (Mobile)		
Telephone (Other)		
Email Address		
Licence Number		

### 3. Facility Information

Nameplate rating of each inverter on the SSRG system: \_\_\_\_\_ kW AC  
 Total installed generation: \_\_\_\_\_ kW AC  
 Type: Wind Turbine  Photovoltaic (Solar)  Wind/Solar Hybrid   
 Installation type: Split Circuits  Transfer Switch   
 Other (please specify):  
 \_\_\_\_\_  
 Inverter used: Yes  No

Make and model of inverter: \_\_\_\_\_

Battery storage installed: Yes  No  Capacity (Ah) \_\_\_\_\_

Off-grid output capable (backup power capable): Yes  No

Is there any existing electric generating equipment at this location? Yes  No

If "Yes", please provide details:

**h**

**e following must be attached to this application:**

- An electrical schematic diagram of the proposed installation arrangement
- Copies of the technical specifications, operation and installation manuals of the proposed equipment
- Proof non-refundable application fee of \$50 has been paid (please keep a copy of your receipt for your records)

**Failure to attach these documents will result in the application being denied.**

Signature \_\_\_\_\_

Date \_\_\_\_\_

Application, documents and proof of payment must be submitted in an envelope marked:

**SSRG Program Application – (Applicant’s Name)  
For Delivery to BPL Technical Planning Division**

and must be delivered to:

<u>New Providence</u>	<u>Family Island</u>
Technical Planning Division Bahamas Power and Light Company LTD. 3 <sup>rd</sup> Floor BPL Distribution Building Blue Hill Road Nassau, NP, The Bahamas	Technical Planning Division c/o <The BPL local Family Island office>

# RECEIPT (Customer Copy)

Name: \_\_\_\_\_

P. O. Box: \_\_\_\_\_

Street Address: \_\_\_\_\_

BPL Account #: \_\_\_\_\_ BPL Meter # \_\_\_\_\_

Account Type Residential

Notes:

BPL reserves the right to accept or reject any application without prejudice.

BPL reserves the right to require additional information, if considered necessary in its sole discretion, to process the SSRG Application.

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# RECEIPT (Cashier Copy)

Name: \_\_\_\_\_

P. O. Box: \_\_\_\_\_

Street Address: \_\_\_\_\_

BPL Account #: \_\_\_\_\_ BPL Meter # \_\_\_\_\_

Account Type Residential

Notes:

BPL reserves the right to accept or reject any application without prejudice.

BPL reserves the right to require additional information, if considered necessary in its sole discretion, to process the SSRG Application.



## Application Form Instructions

In order to efficiently process applications it is critical that all the information be accurately filled in on the form. It is recommended that you have your system installer/electrical contractor assist you in completing this document if you are not familiar with all of the technical elements of your system, as incomplete or incorrect submissions will delay processing.

- **Section 1 – Customer Information**

In this section information pertaining to the customer and the account that the installation will be connected to should be filled in. The named customer on the account must sign the application. Future agreements will be done in this name so it is critical that that correct information be provided.

All contact information should be filled in, especially the email address as this will be the primary method of contact with respect to the application. BPL will correspond with customers who do not have an email address by mail and telephone.

- **Section 2 – System Installer Information**

All systems must have an associated licensed electrical contractor who is licensed in The Bahamas. It is vital that this information be provided so that contact can be made with these individuals if necessary.

- **Section 3 – Facility Information**

In this section, you are to provide technical details on the proposed SSRG system.

Nameplate rating of each inverter on the SSRG system: \_\_\_\_\_ kW AC

This should be the normal AC output rating of each installed system. So, if multiple inverters are used then this would be an indication of the output of each inverter.

Example 1      1 x 2000W (solar), 1 x 1 x 500W (wind)

Example 2      10 x 200W (solar, micro inverters)

Total installed generation: \_\_\_\_\_ kW AC

This is the total nominal AC output of the system

Example 1      2000W + 500W = 2500W

Example 2      10 x 200W = 2000W

Type:   Wind Turbine       Photovoltaic (Solar)       Wind/Solar Hybrid

Here you indicate the type of system installed. If both wind and solar are installed select the wind/solar hybrid option.

Installation type: Split Circuits  Transfer Switch

Other (please specify):

Select the grid connection type to be employed.

- Split Circuits: Some circuits in the building supplied by renewables and some supplied by the grid. The two electrical systems are in no way electrically or mechanically connected to each other.
- Transfer Switch:

Inverter used: Yes  No

Here you are to indicate if inverters are being used as a part of the installation configuration

Make and model of inverter: \_\_\_\_\_

If inverters are being used indicate their make (manufacturer) and model number. This is required in the event more research beyond what is provided in your submitted technical documents is needed. This includes information on micro inverters that might be integrated with the solar panels in some cases.

Battery storage installed: Yes  No  Capacity (Ah) \_\_\_\_\_

In this area you must indicate if your system has battery storage and the total amp hour (Ah) capacity of the battery storage system.

Off-grid output capable (backup power capable): Yes  No

Here you indicate if your system is capable of supplying power to the home when the utility supply is not available. This is not the usual mode of operation for a grid-tied system and generally requires a more sophisticated inverter arrangement.

Is there any existing electric generating equipment at this location? Yes  No

Indicate Yes if there is any other source of electricity (other than the utility) supplying the property. This includes but is not limited to emergency generators and other renewable energy sources.

If "Yes", please provide details:

Provide brief details of the existing generating equipment if you answered yes to the previous question.



## **Bahamas Power & Light**

### **RENEWABLE ENERGY POWER PURCHASE/INTERCONNECTION AGREEMENT**

This Renewable Energy Interconnection Agreement (“the Agreement”) is made this \_\_\_\_ day of \_\_\_\_\_, 20\_\_ between:

1. The Bahamas Power & Light Company Ltd. (“BPL”), a statutory corporation in the Commonwealth of The Bahamas established by Electricity Act, Chapter 194, and
2. The Customer-Generator described in Appendix B.

**Whereas:**

- A. BPL is charged with the primary duty to secure the supply of electricity at reasonable prices within its area of supply and to purchase, generate, transmit, transform, distribute and sell energy either in bulk or to individual consumers pursuant to the Act.
- B. The Customer-Generator is a customer of BPL and wishes to sell electrical energy to BPL from the Customer-Generator’s Small-Scale Renewable Generation System (“SSRG system”), specified in Appendix B.
- C. The Customer-Generator qualifies for the SSRG Program and its SSRG system meets the eligibility requirements in the Requirements for Grid Interconnection of Renewable Generation Systems.

Therefore:

- A. For the duration of the Agreement, BPL will purchase all electrical energy that the Customer-Generator supplies to the Grid from the approved SSRG system, as described in Appendix B.
- B. The Agreement is effective for a term of 15 years commencing ..... [Insert date] and ending ..... [Insert date].
- C. BPL will compensate the Customer-Generator for electrical energy at the Feed-in Tariff.
- D. BPL and the Customer-Generator agree to the Standard Conditions in Appendix D, which form part of the Agreement.
- E. The Agreement includes the following additional appendix, which also form part of the Agreement: Appendix B: Particulars of the Agreement.

*IN WITNESS WHEREOF* the undersigned have executed the Agreement on the year and day hereinbefore mentioned.

**Customer-Generator**

**The Bahamas Power & Light Company, Ltd.**

Signed By: \_\_\_\_\_

Signed By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Print Name: \_\_\_\_\_

Print Name: \_\_\_\_\_

**Witness**

**Witness**

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Address: \_\_\_\_\_

Calling or Description: \_\_\_\_\_

Calling or Description: \_\_\_\_\_

## Appendix D: Standard Conditions

### 1 Interpretation

#### 1.1 Definitions

The following capitalised terms used herein shall have the meanings set forth below:

**"Feed-in Tariff"** means the rate at which BPL will purchase electricity that the Customer-Generator supplies to the Grid. URCA will set and revise this rate from time to time, per its power under Section 27(5) of the Electricity Act, 2015.

**"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 power system, inclusive of transmission and distribution, by which electric energy is distributed by BPL to its customers.

**"Grid Tied"** means a connection that in any way links the supply from the SSRG system to BPL's supply, whether the connection is before or after the meter (i.e. internal or external to the Customer's installation) is considered to be interconnected with BPL's Grid.

**"Metering System"** means all meters and metering devices or equipment owned by BPL and used to measure the delivery and receipt of electricity.

**"Nameplate Gross Power Rating"** means the SSRG system manufacturer's alternating current nameplate capacity.

**"Parties"** means BPL and the Customer-Generator together and "Party" means either one of them.

**"Points of Delivery"** means the interconnection point or physical point where the SSRG system and the Grid are electrically connected for metering purposes.

**"Small-Scale Renewable Generation System" (SSRG system)** means systems with the ability to generate their own energy from acceptable renewable acceptable sources using approved technologies.

**"Customer-Generator"** means a means the person or entity who is a customer of BPL and who has entered into a contract with BPL for the electricity account associated with the Renewable Generation System.

**"The Small Scale Renewable Generation Application" (Customer-Generator)** means the application submitted by the customer for approval to acquire and install renewable energy system.

**"Service"** means energy and power supplied to the Customer-Generator by BPL.

**"Standard Electricity Tariff"** means the tariff under which the Customer-Generator is charged by BPL.

## **1.2 Entire Agreement**

The Agreement and the accompanying appendices together with the other documents to be delivered under the Agreement represent the entire contract between the Parties with respect to the subject matter of the Agreement and supersedes all previous agreements, arrangements, understandings, negotiations, and discussions, whether oral or written, between the Parties in relation to the interconnection of the Customer-Generator's SSRG system with BPL's Grid.

## **1.3 Headings**

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

## **1.4 Statutory Instruments**

Any reference in the 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.

## **1.5 Words**

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

# **2 SSRG System Interconnection Requirements**

## **2.1 Installation, Design, and Maintenance**

The Customer-Generator shall design, install, operate, and maintain the SSRG system, and all ancillary facilities on the Customer-Generator's side of the Point of Delivery, specified in Appendix B, 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.

## **2.2 Insurance, Licences, and Permits**

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 authorizes required for the installation and operation of the SSRG system.

## **2.3 Safety and Performance**

The SSRG system shall meet all applicable safety and performance standards, including the codes and standards described in the Requirements for Grid Interconnection of Renewable Generation Systems. BPL may, from time to time, reasonably prescribe additional requirements, to be implemented at the Customer-Generator's sole expense, which in BPL's judgment are necessary for ensuring the safety of the grid and/or the public. BPL 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 BPL. If not possible within 14 days the customer may request in

writing an additional 14-day extension. Failure to carry out the required changes in the prescribed period will result in

- I. The Customer-Generator having to isolate their SSRG system from the grid and have the isolation point locked off by BPL until the corrections are made;
- II. Having their SSRG system's electrical supply disconnected from the grid until the correction is made;
- III. Be subject to penalties under the regulations until the corrections are made; or
- IV. any combination of the above.

## **2.4 Requirement for Initial Inspections**

The Customer-Generator shall not commence any interconnection to BPL's grid or parallel operation of the SSRG system until all required inspections have been passed and written approval to do so has been given by BPL.

Approval of a SSRG system only applies directly to the system itself, indicated in the application, to be acquired by the applicant. Approval of a Customer-Generator application does not in any way supersede or negate the need for the installation to pass the relevant inspections by BPL and other Governmental agencies prior to Grid connection. Acquisition of a system other than that detailed in the application automatic rescinds the initial application approval.

# **3 Customer-Generator's Obligations**

## **3.1 Customer-Generator's Obligations**

The Customer-Generator shall:

- I. upon receipt of approval from BPL to interconnect the SSRG system described in Appendix B and installed at the address specified in Appendix B (the "Service Address"), and on execution of the Agreement, immediately connect the SSRG system to BPL's Grid, unless the Customer-Generator obtains BPL's written approval to postpone the interconnection;
- II. at all times operate and maintain (or engage services of qualified technician and/or engineer as may be required to operate and/or maintain) the SSRG system in accordance with all applicable BPL and Governmental standards and



requirements and the instructions of the manufacturers of the equipment used to construct the various components of the SSRG system;

- III. at all times comply with BPL's standards and requirements relating to the parallel operation of the SSRG system which may be in effect from time to time;
- IV. promptly notify BPL of any malfunction or breakdown of any component of the SSRG system that could constitute a foreseeable safety hazard or which could reasonably be expected to cause disturbance or damage to the Grid;
- V. not operate or allow the SSRG system to be operated so as to generate electricity at a rate greater than 110% of the SSRG system Nameplate Gross Power Rating specified in Appendix B;
- VI. not add to or modify or allow any addition or modification to the SSRG system without the prior written consent of BPL;
- VII. not alter, modify or tamper or allow any alteration, modification or tampering with the SSRG system connection to BPL's Grid without BPL's prior written consent;
- VIII. not relocate or interconnect or allow any relocation or interconnection of the SSRG system to BPL's Grid at any location other than the Service Address without BPL's prior written consent;
- IX. not tamper with or alter or allow any tampering or alteration of the Metering System;
- X. promptly comply or ensure compliance with all requests from BPL to interrupt the service of SSRG system, reduce the output from the SSRG system and disconnect the SSRG system from the Grid;
- XI. Not to impede but at all times allow BPL reasonable access to the SSRG system;  
and
- XII. make all payments required to be made by it to BPL on or before the due date for payment.

## **4 BPL's Obligations**

### **4.1 Duty to Interconnect**

Subject to the terms and conditions of the Agreement BPL will interconnect with the SSRG system 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 in Appendix B.

### **4.2 Duty to Act with Promptness**

BPL will act with reasonable promptness to perform any inspections and give any approvals that it is authorized or required to give under the Agreement. BPL will not unreasonably withhold or delay the giving of its consent in any case where its consent is required.

## **5 BPL's Rights**

### **5.1 Right to Require Customer-Generator to Interrupt Supply**

BPL shall have the right to require the Customer-Generator to interrupt (including, if so specified by BPL, by means of physical disconnection or lockout) or reduce the SSRG system whenever:

- I. BPL in its sole judgment deems such action necessary to permit BPL to construct, install, maintain, repair, replace, remove, investigate, or inspect any of its equipment, any part of the Grid, any of the Customer-Generator's installation and/or equipment; or
- II. BPL 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.

### **5.2 Right to Interrupt Supply from the SSRG System**

Notwithstanding the provisions on Clause 5.1 or any other provision of the Agreement, BPL shall have the right to:

- I. require the Customer-Generator to immediately disconnect the SSRG system from BPL's Grid; and
- II. immediately by itself to effect the disconnection of the SSRG system from BPL's Grid if the Customer-Generator is either, in BPL's reasonable belief, not available to make the disconnection or if the Customer-Generator is available but refuses to act and the disconnection is deemed necessary by BPL.

### **5.3 Advance Notice**

Whenever feasible BPL will give the Customer-Generator reasonable advance notice that an interruption or reduction in output from the SSRG system may be required or that disconnection of the SSRG system from BPL's Grid may be required. However, the failure of BPL to give such notice shall not invalidate any action taken by BPL under Clauses 5.1 or 5.2 of the Agreement or cause or account for any breach of the Agreement between the parties.

### **5.4 Indemnity**

If any of the following scenarios occurs:

- I. BPL, using its sole discretion, requires the Customer-Generator to interrupt or disconnect the SSRG system from BPL's Grid;
- II. BPL, using its sole discretion, decides to effect the interruption or disconnection of the SSRG system from its Grid (as provided in Clause 5.1 and 5.2 respectively of the Agreement);
- III. Such interruption occurs as a result of suspension or termination of service to the Customer-Generator in accordance with the provisions of the Electricity Act, Rules and Regulations in force at that time or the Requirements for Grid Interconnection.

Then, except to the extent caused by the wilful misconduct or gross negligence of BPL, its directors, employees, and/or agents, BPL and its agents shall not be liable to the Customer-Generator for any loss or damage whatsoever resulting from the exercise of such rights by BPL.

## **5.5 Right to Enter Premises**

BPL 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 SSRG system and to read, inspect and test meters, or to effect disconnection of the SSRG system as provided in section 6.2 of the Agreement. Nothing in the Agreement shall limit or otherwise affect any rights of entry to the Customer-Generator's premises that BPL may have under the Electricity Act, Rules and Regulations or the Requirements in force at that time for Grid Interconnection or any other agreement with the Customer-Generator.

## **5.6 Right to Disconnect Service**

BPL reserves the right to disconnect the electricity supply to the Service Address without notice and without incurring any liability whatsoever if the Customer-Generator fails to comply with the requirements of the Agreement or for any other reason relating to safety and/or reliability of the Grid.

## **5.7 Right to Collect Data**

BPL shall have the right to demand, promptly obtain, review and copy the SSRG system operations and maintenance records, logs, or any information considered necessary by BPL such as unit availability, maintenance outages, circuit breaker operation requiring manual reset, relay targets and any unusual events pertaining to the SSRG system and/or its interconnection with BPL's Grid.

## **5.8 BPL Property**

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

# **6 Billing**

## **6.1 Metering**

BPL shall install meters capable of recording energy flows in both directions and will utilize a net billing methodology for billing purposes. Under the net billing arrangement,

BPL will bill the Customer-Generator at the Standard Electricity Tariff for only the electricity the Customer-Generator uses from the Grid. The Customer-Generator will receive a credit for excess electricity that the Customer-Generator sells to the grid (that is, the electricity generated from the Customer-Generator's SSRG system that the Customer-Generator did not use).

## **6.2 Account Credit**

BPL shall credit the Customer-Generator's account for all energy (kWh) (within the capacity limits stipulated) supplied to the Grid at the Feed-in Tariff

## **6.3 Tariff for Service to the Customer-Generator**

Service (energy and power) supplied to the Customer-Generator by BPL will be billed in accordance with BPL's applicable tariff for the type of service provided the Customer-Generator.

## **6.4 Billing**

At the end of each billing period, if the Customer-Generator's account is in debit after the renewable charges have been applied, the balance due will be billed and payable. If the account is in credit, the amount will be carried forward to the next billing period. BPL will promptly refund the Customer-Generator on a twice-yearly basis if the Customer-Generator's account is \$100.00 or more in credit.

# **7 Representations and Warranties**

## **7.1 Representations and Warranties**

The Customer-Generator represents and warrants that:

- I. it has complied with and will continue to comply with the terms, conditions and obligations under the Agreement and all applicable laws of the said Commonwealth;
- II. it has obtained and will maintain all required insurance policies and those policies have been duly endorsed in accordance with the requirements of the Agreements;
- III. it has obtained all required permits, licenses and approvals required by all government authorities, local agencies, commissions and Service (energy and

power) supplied to the Customer-Generator by BPL authorities with jurisdiction over the Customer-Generator and the SSRG system to allow it to enter into the Agreement;

- IV. its SSRG system meets and will continue to meet all applicable safety and performance standards that now exists and which BPL may from time to time prescribe and/or any amendment laws, rules and regulations which the Government may from time to time enact;
- V. it is the owner of, or authorized tenant of the premises located at the Service Address; and
- VI. it is the owner of the SSRG system and is duly authorized to enter into the Agreement and operate the SSRG system.

## **8 Indemnity**

The Customer-Generator shall fully and effectually indemnify and hold harmless BPL, its affiliates, directors, officers, agents and employees from and against any and all losses, liabilities, costs, claims, charges, actions, proceedings or investigations which BPL may incur or which may be made against it in connection with the interconnection of the SSRG system and with BPL's Grid or any breach or alleged breach of any of the representations and warranties of the Agreement by the Customer-Generator or in respect of BPL's exercise of its rights, discretions, authorities and obligations under the Agreement. BPL will not honor any damage claims submitted with respect to the SSRG system itself or any electrical or electronic equipment connected at the premises.

## **9 Termination**

### **9.1 Termination by the Customer-Generator**

The Customer-Generator shall have the right to terminate the Agreement by giving BPL thirty (30) days prior written notice of its intention to terminate the Agreement.

### **9.2 Termination by BPL**

BPL shall have the right to terminate the Agreement:

- I. where the Customer-Generator is in default of any of its obligations under the Agreement and such default, is not corrected within thirty (30) days after

written notice of the default has been given to the Customer-Generator by BPL. BPL shall exercise its right to terminate the Agreement for such default by giving ten (10) days written notice of termination to the Customer-Generator. The foregoing shall not affect any rights of suspension, interruption or disconnection that BPL may have under the Agreement or the Standard Electricity Tariff under which the Customer-Generator is currently receiving electric service;

- II. immediately and concurrently with the termination of electric service to the Customer-Generator under any of the rate schedules identified under paragraph 1 of the Electricity Act, Rules and Regulations; and
- III. immediately and concurrently on termination of the Agreement.

## **10 Resolution of Disputes**

### **10.1 Settlement by Mutual Discussions**

If any dispute or difference of any kind whatsoever arises between the Parties in connection with, or arising out of, the Agreement, the Parties shall within thirty (30) days after the date that the dispute arose attempt to settle such dispute in the first instance by mutual discussions between the Parties.

### **10.2 Settlement by Arbitration**

If a dispute between the Parties is not settled within thirty (30) days as provided in Clause 10.1 of the Agreement the Parties shall attempt to settle the dispute by alternative means of submission of the same to a mutually agreed arbitrator, for resolution by binding arbitration according to Commonwealth of the Bahamas's Arbitration Act 2009 and Rules of Arbitration. In so agreeing the Parties expressly consent and agree to waive their right to a jury trial, if any, on these issues and further agree that the award of the arbitrator shall be final and binding upon them as though rendered by a court of law and shall be enforceable in any court having jurisdiction over the same.

## **11 Extension of Term**

### **11.1 Customer-Generator May Apply to Extend the Term of the Agreement**

The Customer-Generator may apply to BPL in writing for an extension of the term at least three (3) months before the ending date.

### **11.2 BPL Has Discretion to Extend the Agreement**

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

## **12 Miscellaneous Provisions**

### **12.1 Variations in Writing**

Save and except for an extension of the term provided for under Clause 11 of the Agreement, any additions, amendments or variations to the Agreement shall be binding only if in writing and signed by a duly authorized representative of BPL and the Customer-Generator.

### **12.2 Prohibition against Assignment**

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

### **12.3 Waivers**

No waiver by BPL of any default by the Customer-Generator in the performance of any of the provisions of the Agreement shall:

- I. operate or be construed as a waiver of any other or further default whether of a like or different character; or
- II. be effective unless in writing duly executed by an authorized representative of BPL.

The failure by BPL to insist on any occasion upon the performance of the terms, conditions or provisions of the Agreement or time other indulgence granted by BPL to





*Point of Delivery:* \_\_\_\_\_

