



## RENEWABLE ENERGY SYSTEM GRID TIE INVERTER NETWORK CONNECTION AGREEMENT

Date: [ ] / [ ] / [ ] (Day/Month/Year)

Customer: [ ]

Portion No.: [ ]

Customer's ABN: [ ] - [ ] - [ ] - [ ] (Commercial Customers Only)

### Note to customers

1 This document sets out the terms of connection of Renewable Energy System Grid Tie Inverter system to Lord Howe Island Distribution Network.

2 This document is not suitable for customers who have renewable energy systems which exceed 50 kVA.

### Contents

- 1 Eligibility
- 2 Period of Agreement
- 3 Customer's Obligations
- 4 Metering and network connections
- 5 Access to Premises
- 6 Interrupting, Reducing or Ceasing Export Electricity
- 7 Disconnection
- 8 Termination
- 9 Schedule 1: Contact Details
- 10 Schedule 2: Technical Details
- 11 Schedule 3: Commissioning Certificate

## ***Key Points in the following agreement***

The following connection agreement allows the user to connect a Solar PV system or micro wind-turbine to the Lord Howe Island Distribution System. The power system on Lord Howe Island is considerably smaller than the main grid in Australia and as such there are various limitations as to how much Renewable Energy (RE) can be absorbed at any single point in time.

To this end, this agreement has clauses that can limit the output of the intended RE system dynamically (see section 6a) where a situation is detected that has the potential to cause reduction in grid quality (including outages or brown-outs) or on a permanent basis (see section 7c). This will reduce the amount of energy generated by the proposed RE system and will affect the financial conditions by reducing the effective financial benefit of the RE system.

The LHIB undertakes that all due care in the acceptance of RE system installations will be taken in order to reduce the likelihood of significant reduction of RE system output (such as phased installations of Solar PV and detailed system analysis) however, the LHIB cannot be held financially responsible for any losses incurred due to an installation not producing as much energy as described by the installer.

Note also that this reduction in produced energy will reduce the Renewable Energy Certificates (RECs) that most suppliers purchase as an offset to the cost of installation. Note that they purchase these RECs in anticipation of their production and a reduction in the energy production may make the final cost of installation higher than for a similar installation on the Australian mainland.

Submission of this application in no way binds the LHIB to accepting the proposed installation of RE system. It may be the case that prior to the issuance of a certificate of acceptance, modifications to the application (such as reducing the amount of RE system to be installed) or further electrical works at or between the property and the common point of coupling to the Lord Howe Island Distribution System (LHIDS) may be required as identified by the LHIB, such as changing the connection method of the property to the LHIDS. This may or may not be a cost to the consumer, depending on the works required.

Acceptance of this submission and the subsequent installation of the RE system is at the sole discretion of the LHIB.

The list of suitable inverters have been chosen on the basis of their ability to integrate successfully with the LHIDS, including the ability to adjust the fault parameters to suit the LHIDS and the ability to control the power output from the inverter.

The design and installation of the system must be undertaken by suitably qualified persons, including CEC certification in design and installation of renewable energy systems. Any person responsible for the installation of cabling must also be an electrical fitter, certified to "A Grade" license in the state of New South Wales.

## **1 Eligibility**

To be eligible to connect the RE Grid Tie Inverter System to the network and to remain connected to the network:

- a. the RE Grid Tie Inverter system must be installed at the customer premises;
- b. the RE Grid Tie Inverter system must comply with the Electricity Law and any applicable standards including AS4777, AS3000 and other LHIB technical requirements as necessary. Refer to schedule 4 for a list of acceptable RE Grid Tie Inverters;
- c. all RE Grid Tie Inverter system installed at the premises, must not be more than 50 kVA;
- d. there must be current LHIB electricity customer contract for the premises;
- e. prior to approval of the system by LHIB, the customer must submit the following documents to LHIB:
  - the Contract and Technical Details, duly completed and approved by LHIB Electricity Officer;
  - a wiring diagram, approved by LHIB Electricity Officer;
  - Copy of system/product Declaration of Conformity to AS4777.
- f. following approval of the system by LHIB, the customer must submit the following documents to LHIB:
  - the Electrical Certificate of Compliance; and
  - the Commissioning Certificate, duly completed by the installer of the system.

- g. a RE System Grid Tie Inverter Network Connection Agreement must be in place.

## **2 Period of Agreement**

This Agreement comes into affect on the Commencement Date and will continue in effect until terminated.

If substantive changes are made to the documented equipment (for example, the replacement of an inverter with a dis-similar model) this agreement will become null-and-void and a new agreement will need to be put in place before reconnecting the Solar PV system to the LHI electricity network.

## **3 Customer's Obligations**

- a. The customer is solely responsible for, and will bear cost associated with:
  - obtaining the system;
  - obtaining and complying with all approval required for the system;
  - the design, installation and maintenance of the system.
- b. The customer must ensure that:
  - the system is regularly maintained including the maintenance of the electrical protection;
  - the system continues to comply with and perform in accordance with the Electricity Law and any applicable standards;
  - LHIB prior written approval is obtained for any replacement of, or alterations, modifications or additions to systems; and
  - the systems settings are not replaced, modified or tampered with in any way.

- c. Qualified Personnel
- The customer must ensure that only approved installer and designer by LHIB carries out:
    - the design of the system;
    - the installation of the system;
    - regular maintenance of the system;
    - any replacement or additions to the system.
  - RE System designer and installer shall have a minimum qualifications of:
    - CEC Accredited Designer and Installer;
    - “A Grade” Licensed Electrical Worker.
  - The customer must ensure that any person operating and maintaining the system:
    - is appropriately trained and competent in the operating the system;
    - has adequate knowledge and sufficient judgement to be able to respond appropriately in an emergency;

d. No Interference with Safety Notices

The customer must not, and must not permit any other person, to act contrary to or interfere or tamper with, remove or otherwise damage any switches, stickers, tags or other notices (Safety Notices) placed by LHIB on the system.

e. Protection of the Network

- The customer will:
  - not interfere or allow its employees, agents, contractors or

invitees to interfere with the system;

- use reasonable endeavours to protect the system from unauthorised interference;
- notify LHIB of any interference, defect or damage to the system within 3 days of becoming aware of it;
- pay the reasonable costs of repair or replacement of the system, on request, if the defect or damage was caused by the customer, or by another person in circumstances where the customer failed to take reasonable care to prevent that; and
- not do anything that interferes with the safe or efficient operation of the network or permit anyone else to do so.

#### **4 Metering and network connections**

- a. The meter will be installed and maintained by LHIB and will remain at all times the property of LHIB.
- b. The customer will pay all the cost associated with network connection.
- c. Export energy, Green Energy Certificate and other renewable energy scheme shall be subject to LHIB policy;
- d. LHIB is not required to purchase any ‘renewable energy certificates’ (RECs) generated by the Solar PV system;
- e. The customer may request LHIB to test the meter at the customer’s cost and has the right to be present during the test;

- f. LHIB will refund the cost of a test if it shows the meter is defective;
- g. LHIB may initiate at its own cost to test or replace the meter.

## **5 Access to Premises**

- a. The customer hereby authorises an LHIB Electricity Officer access to the premises to:
  - inspect and ensure that the system is safe and to minimise damage;
  - investigate, examine, read and test the system;
  - take photos or make records for the purpose maintenance or evidence;
  - disconnect the system; or
  - conduct any activity required or permitted by law.
- b. LHIB will, where applicable, give the customer reasonable notice of its intention to enter the premises if access is required except where:
  - access is required in an emergency; or
  - the customer has previously given permission.

## **6 Interrupting, Reducing or Ceasing Electricity**

- a. LHIB has the right to remotely monitor and control the system connected to the LHI network:
  - to allow LHIB to maximise the renewable energy penetration to the network;
  - to ensure network stability and allow any network maintenance work;

- to allow compliance with good electricity practice or other dangerous or unexpected event.

- b. Where practicable, LHIB will give the customer written notice, if a planned interruption is required.
- c. LHIB has the right to reduce the output of the RE system in order to prevent in it's opinion a situation that would threaten network stability. Where this affects the export of energy to the grid, LHIB will not be subject to damages claims for the non-utilised energy.

## **7 Disconnection**

- a. The customer may request that LHIB disconnect the system from the network anytime, by giving at least 7 business day's notice before the date the customer wants the system to be disconnected;
- b. LHIB will disconnect the system from the network at anytime if the customer does not meet the criteria set out in clause 1 of this agreement or if this agreement is terminated in accordance with clause 8.
- c. LHIB may disconnect the system from the network at any time without requirement of prior notice if LHIB determines that the PV is dangerous or present risk to integrity of the network.
- d. LHIB will not reconnect the system to the network until it is satisfied that the customer has corrected any issues with the system and satisfied LHIB concerns. The customer will need to reapply to LHIB to have the system reconnected.

e. Where the system has been disconnected from the network, the customer will not be able to export electricity from the RE system to the network.

## **8 Termination**

a. This agreement terminates without default if for any reason:

- the LHIB Customer Contract terminates;
- the RE inverter system is disconnected from the network in accordance with clause 7a; or
- the customer ceases to own or occupy the premises.

b. The customer is in default if:

- the customer does not continue to comply with clause 1 and 3 of this agreement;
- the customer fails to comply with any requirement of the Electricity Law, applicable standards and LHIB policy.

c. If the customer is in default, LHIB will disconnect the RE inverter system from the network and terminate this agreement with immediate effect.

## **Signed as an Agreement**

Residential / Commercial Customer

### **Executed for and in behalf of the Leaseholder**

Leaseholder's signature: \_\_\_\_\_

Signed in the presence of (signature of witness): \_\_\_\_\_

Full name of witness: \_\_\_\_\_

Address of witness: \_\_\_\_\_

The common Seal of the Lord Howe Island Board

was fixed in the presence of:

\_\_\_\_\_

Signature

\_\_\_\_\_

Name (Printed)

\_\_\_\_\_

Position

## **Schedule 1 – Contact Details**

Commencement Date: (On Final Approval) \_\_\_\_ / \_\_\_\_ / \_\_\_\_ (to be completed by LHIB)

Are you currently a LHI Electricity Customer at the address below? \_\_\_\_ Yes \_\_\_\_ No

Customer Number: \_\_\_\_\_

### **Details of Parties**

#### A) Lord Howe Island Board

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

Telephone : \_\_\_\_\_

Facsimile : \_\_\_\_\_

Email : \_\_\_\_\_

#### B) Residential / Commercial Customer

Portion Number : \_\_\_\_\_

Customer Contact : \_\_\_\_\_

Telephone : \_\_\_\_\_

Facsimile : \_\_\_\_\_

Email : \_\_\_\_\_



## Schedule 2 – Technical Details

Installation Portion No. : \_\_\_\_\_

### **System Designer:**

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

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

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

Telephone : \_\_\_\_\_

LHIB Accreditation No.: \_\_\_\_\_

### **System Installer:**

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

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

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

Telephone : \_\_\_\_\_

Electrical Contractor :- \_\_\_\_\_

License Number : \_\_\_\_\_

LHIB Accreditation No. : \_\_\_\_\_

### **RE Grid Tie Inverter System Technical Details:**

RE System & Make : \_\_\_\_\_

RE Model : \_\_\_\_\_

RE Rated Output : \_\_\_\_\_

Number of units : \_\_\_\_\_

Total RE System Rating : \_\_\_\_\_

Grid Tie Inverter Make : \_\_\_\_\_

Grid Tie Inverter Model : \_\_\_\_\_

Grid Tie Inverter Rating : \_\_\_\_\_

Grid Tie Inverter Communication

Interface and Protocol : \_\_\_\_\_

*Serial Interface: RS232/485; Protocol: Modbus RTU*

Prepared by:

Approved by:

\_\_\_\_\_

\_\_\_\_\_

Name & Signature

Name & Signature

System Designer / Installer

LHI Electricity Officer

## **Schedule 3 – Commissioning Certificate**

The PV Installer must complete this form (Schedule 3) once the PV system has been installed. Please attach the Electrical Certificate of Compliance with the completed form and submit to the LHI Electricity Officer.

Installation Portion No.: \_\_\_\_\_

CoC Number(s) : \_\_\_\_\_

### **Grid Tie Inverter System Protection Settings**

Islanding Period : _____ ( < 2 seconds )	Under-voltage Trip Setting : _____ ( 210 V <sub>LN</sub> )
Auto Synchronisation : _____ ( > 1 minute )	Over-voltage Trip Setting : _____ ( 250 V <sub>LN</sub> )
Reconnection Time : _____ ( > 1 minute )	Under-frequency Trip Setting : _____ ( 48 Hz )
Over-current Prot. : _____ ( Manufacturer's rating )	Over-frequency Trip Setting : _____ ( 52 Hz )

### **Installer Declaration**

I, \_\_\_\_\_ certify that the above system has been installed and commissioned in accordance with LHIB "Technical Requirements for Grid Connection of PV System via Inverters", all relevant standards and statutory requirements and good engineering practice and is ready for operation. In particular, the following have been verified:

- ✓ The approved schematic has been checked and accurately reflects the installed system;
- ✓ All required switches are present and operate correctly;
- ✓ Signage and labelling complies with LHIB "Technical Requirements for Grid Connection of PV System via Inverters";
- ✓ The system has been installed correctly and is fit for purpose;
- ✓ Operational settings are secure;
- ✓ Islanding protection disconnect the system from the network within two seconds;
- ✓ Reconnection time is greater than one minute after network reconnection.

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

Installer Signature : \_\_\_\_\_

Date : \_\_\_\_\_

Licence Number : \_\_\_\_\_

## **Schedule 4 – List of Technical Compliant Grid Tie Inverters**

These lists are inverters that have been assessed as meeting the criteria which make them suitable for connection to the LHI distribution network. The inverter and protection equipment must be certified by a recognised testing laboratory and approved prior to being connected to the LHI distribution network. It is the manufacturers or their agent responsibility to formally seek approval and to ensure that the inverters certification remains current. Inverters that do not have both required independent certification and LHIB approval must not be or remain connected to the grid.

**Table 2: Solar PV RE System Grid Tie Inverter suitable for LHI grid connection.**

Brand	Model	Phase	Conformity	Communication Interface & Protocol	AC nominal power (W)
SMA <sup>1</sup>	SB3000TL	1	AS4777 & AS3100	RS485	3000
	SB4000TL	1	AS4777 & AS3100	RS485	4000
	SB4000TL/V	1	AS4777 & AS3100	RS485	3680
	SB5000TL/V	1	AS4777 & AS3100	RS485	4600
	SB3300	1	AS4777 & AS3100	RS485	3300
	SB3800	1	AS4777 & AS3100	RS485	3800
	SB1600TL	1	AS4777 & AS3100	RS485	1600
	SB2000HF	1	AS4777 & AS3100	RS485	2000
	SB2500HF	1	AS4777 & AS3100	RS485	2500
	SB3000HF	1	AS4777 & AS3100	RS485	3000
	SB1200	1	AS4777 & AS3100	RS485	1200
	SB1700	1	AS4777 & AS3100	RS485	1500
	SB2500	1	AS4777 & AS3100	RS485	2300
	SB3000	1	AS4777 & AS3100	RS485	2750
	SMC6000TL	1	AS4777 & AS3100	RS485	6000
	TRIPOWER 8000TL	3	AS4777 & AS3100	RS485	8000
	TRIPOWER 10000TL	3	AS4777 & AS3100	RS485	10000
	TRIPOWER 12000TL	3	AS4777 & AS3100	RS485	12000
	TRIPOWER 15000TL	3	AS4777 & AS3100	RS485	15000
	TRIPOWER 17000TL	3	AS4777 & AS3100	RS485	17000

Brand	Model	Phase	Conformity	Communication Interface &	AC nominal power (W)
-------	-------	-------	------------	---------------------------	----------------------

<sup>1</sup> Note that although the SMA products have an RS-485 communications option, they do not use MODBUS as a communications protocol, but an internal SMA protocol which may require the purchase of an additional protocol conversion device to interface to the LHIB control system, when implemented. SMA is currently in the process of implementing MODBUS/RTU on its inverters and this may be available as a firmware update in the future. RS485 communication interface is not a standard feature for SMA products; therefore it must be purchased as an option and supplied by the installer as added feature in the inverter.

				Protocol	
POWER-ONE / AURORA	PVI-2000	1	AS4777 & AS3100	RS485, Modbus	2000
	PVI-3600	1	AS4777 & AS3100	RS485, Modbus	3600
	PVI-2000-OUTD	1	AS4777 & AS3100	RS485, Modbus	2000
	PVI-3.0-OUTD	1	AS4777 & AS3100	RS485, Modbus	3000
	PVI-3.6-OUTD	1	AS4777 & AS3100	RS485, Modbus	3600
	PVI-4.2-OUTD	1	AS4777 & AS3100	RS485, Modbus	4200
	PVI-5000-OUTD	1	AS4777 & AS3100	RS485, Modbus	4600
	PVI-6000-OUTD	1	AS4777 & AS3100	RS485, Modbus	6000
	PVI-10.0-OUTD	3	AS4777 & AS3100	RS485, Modbus	10000
	PVI-12.5-OUTD	3	AS4777 & AS3100	RS485, Modbus	12500
SUNNY ROO	SR 1500 TL	1	AS4777 & AS3100	RS232, Modbus	1500
	SR 2000 TL	1	AS4777 & AS3100	RS232, Modbus	2000
	SR 3000 TL	1	AS4777 & AS3100	RS232, Modbus	3000
	SR 4200 TL	1	AS4777 & AS3100	RS232, Modbus	4200
	SR 5000 TL	1	AS4777 & AS3100	RS232, Modbus	5000
	SR 2000 TLI	1	AS4777 & AS3100	RS232, Modbus	2000
	SR 3000 TLI	1	AS4777 & AS3100	RS232, Modbus	3000
	SR 4000 TLI	1	AS4777 & AS3100	RS232, Modbus	4000
SUNTELLITE	ZDNY1500B	1	AS4777 & AS3100	RS485, Modbus	1500
	ZDNY2200B	1	AS4777 & AS3100	RS485, Modbus	2200
	ZDNY2800B	1	AS4777 & AS3100	RS485, Modbus	2800
	ZDNY1500	1	AS4777 & AS3100	RS485, Modbus	1500
	ZDNY2200	1	AS4777 & AS3100	RS485, Modbus	2200
	ZDNY2800	1	AS4777 & AS3100	RS485, Modbus	2800
	ZDNY3300	1	AS4777 & AS3100	RS485, Modbus	3300
	ZDNY4400	1	AS4777 & AS3100	RS485, Modbus	4400
	ZDNY5000	1	AS4777 & AS3100	RS485, Modbus	5000
GEOPROTEK <sup>2</sup>	GS-1500	1	AS4777 & AS3100	RS485, Modbus	1500
	GS-2000	1	AS4777 & AS3100	RS485, Modbus	2000
	GS-3000	1	AS4777 & AS3100	RS485, Modbus	3000
	GS-4000	1	AS4777 & AS3100	RS485, Modbus	4000

<sup>2</sup> Note that Geoprotek firmware need to be update to A4.0 version to allow inverter output control.

**Table 3: Wind RE System Grid Tie Inverter suitable for LHI grid connection.**

Brand	Model	Phase	Conformity	Communication Interface & Protocol	AC nominal power (W)
SMA	WindyBoy 1100	1	AS4777 & AS3100	RS485	1100
	WindyBoy 1100LV	1	AS4777 & AS3100	RS485	1100
	WindyBoy 1700	1	AS4777 & AS3100	RS485	1700

**Notes:**

Inverters not listed in this document can be considered for acceptance subject to technical requirement review by LHIB and compliance documentation. The inverter documentation provided to LHIB for review shall be detailed as follows:

- Technical specification;
- Test report undertaken by an appropriate NATA recognised laboratory indicating compliance with AS4777 and AS3100;
- Declaration of conformity according to AS4777.