



PHOTOVOLTAIC (PV) NETWORK AGREEMENT

Capitalised terms are defined in Schedule 1 of this Agreement

1. BACKGROUND

1.1 The Customer occupies the Premises to which ENEREX provides a network connection.

1.2 The Customer wishes to connect a photovoltaic array system ("PV") to the ENEREX Supply Network.

1.3 This Photovoltaic (PV) Network Agreement sets out the terms on which ENEREX consents to the installation of the PV for interconnection with the ENEREX Supply Network.

2. THIS AGREEMENT

2.1 This Agreement consists of:

- (a) the Agreement Terms (first page);
- (b) the General Terms and Conditions set out in Schedule 1; and
- (c) Schedules 2 and 3 (Wiring Scheme) to this Agreement

3. TERM

3.1 This Agreement begins on the Start Date and continues until the customer vacates the premises.

4. CONNECTION TO SUPPLY NETWORK

4.1 Consent to Interconnection

In consideration for ENEREX providing its consent to the Customer to allow the connection of the PV to the ENEREX Supply Network, ENEREX agrees to:

- (a) the installation of the PV at the Premises for interconnection to the ENEREX Supply Network; and
- (b) the interconnection of the PV to the ENEREX Supply Network at the Point of Interconnection,

on and subject to the terms of this Agreement.

4.2 Conditions of Consent

ENEREX's consent under this Agreement is at all times conditional upon:

- (a) The PV complying with the "Technical Conditions for the Interconnection of Small Scale Renewable Energy PV" (Schedule 2);
- (b) The PV complying with AS/NZS5033:2005 - Installation of photovoltaic (PV) arrays and AS4777 – Grid Connection of Energy Systems via Inverters, Parts 1, 2 and 3.

4.3 Connection

The connection must comply with the requirements of ENERGEX'S "Electricity Connection and Metering Manual" available at:

http://www.energex.com.au/service_providers/electricity_connection_metering_manual.html

4.4 Installation

The Customer: :

- (a) must engage an installer accredited (full or provisional) for design and installation by the Australian Business Council for Sustainable Energy (BCSE) (as specified on the Environmental Protection Agency's website at www.epa.qld.gov.au); and
- (b) arrange with the accredited installer to install the PV in compliance with:
 - (i) AS 4777 – Grid Connection of Energy Systems via Inverters, Parts 1, 2 and 3
 - (ii) AS/NZS 3000:2000 – SAA Wiring Rules;
 - (iii) AS/NZS 3008 – Electrical Installations – Selection of cables;
 - (iv) AS/NZS 5033:2005 - Installation of photovoltaic (PV) arrays;
 - (v) all other applicable Australian Standards/Codes of Practice, current as at the date of installation;
 - (vi) the Technical Conditions for the Interconnection of Small Scale Renewable Energy PV, as set out in Schedule 2; and
 - (vii) the eligibility requirements for the Australian Government's Photovoltaic Rebate Programme (PVRP), should they wish to participate in the PVRP.

4.5 The Customer acknowledges that ENERGEX is not responsible for ensuring that the Customer complies with the PVRP requirements.

5 **METERING**

- 5.1** The Customer acknowledges that electricity metering relevant to the PV at the Premises is owned and will be operated by ENERGEX and ENERGEX will have the discretion to determine the meter type.
- 5.2** The Customer must arrange with the installer to ensure that the metering complies with ENERGEX's "Electricity Connection and metering Manual".
- 5.3** The Customer must ensure that the PV metering is located adjacent to the existing revenue metering for the Premises.
- 5.4** The Customer must arrange with the installer to ensure that the meter installation for the PV complies with Schedule 3.
- 5.5** The Customer must supply ENERGEX with safe access to allow it to install, test, maintain or remove the meter installation of the PV.
- 5.6** The Customer consents to ENERGEX, its officers and agents entering the Premises for the purposes of installing, testing, reading, maintaining or removing the meter installation.

6. PV GENERATED ENERGY

6.1 Operating Procedure

(a) The PV may be taken off-line and disconnected from the Supply Network by the Customer or ENERGEX for operational reasons or for planned maintenance.

(b) In the event that the Supply Network is unable to accept energy generated by the Customer for any reason, no compensation will be payable by ENERGEX.

6.2 Disconnection by ENERGEX

(a) ENERGEX may disconnect the PV if connection would breach technical or safety requirements under the Act or this Agreement.

(b) ENERGEX may disconnect the PV if connection would in its reasonable opinion unreasonably interfere with the connection or supply of electricity to other customers.

6.3 PV Testing

(a) Upon completion of the installation of the PV, ENERGEX must conduct a test of the PV equipment at a mutually agreed time and date between ENERGEX and the Customer for the purpose of establishing that the PV complies with this Agreement.

(b) The test will consist of:

- (i) disconnection of the Premises from the Supply Network;
- (ii) reconnection of the Premises to the Supply Network; and
- (iii) inspection and such testing of the PV as ENERGEX considers necessary for compliance with this Agreement.

6.4 Safety

The Customer must:

- (a) install and maintain the PV and associated equipment in safe working order at all times and in accordance with the requirements of this Agreement;
- (b) have a PV isolation procedure displayed prominently at the main switchboard and keep a copy of the PV operations manual in or near the main switchboard at all times; and
- (c) comply with the reasonable directions of ENERGEX in order to secure the safety and stable parallel operation of the ENERGEX Supply Network and the PV.

7. CUSTOMER OBLIGATIONS

7.1 The Customer must -

- (a) if the PV has a nameplate rating greater than 5 kW, coordinate planned maintenance works or disconnections with ENERGEX;
- (b) undertake, if necessary, any changes to the wiring at the Premises necessary for the installation of ENERGEX metering equipment;
- (c) advise ENERGEX of any proposed material operational changes of the PV;
- (d) obtain ENERGEX's prior consent in writing to any material increase in PV capacity of the PV prior to any such increase;
- (e) advise ENERGEX if the Customer Connection Contract or Customer Sale Contract is terminated or modified other than by the Electricity Entity responsible for the relevant Contract;
- (f) if the PV remains operational at the Premises, advise any subsequent occupant of the Premises of the existence of this Agreement and the requirement for the new occupant to enter into a new Solar PV Network Agreement with ENERGEX.

8. ASSIGNMENT

- 8.1 Neither party may assign its rights or novate any obligations under this Agreement without the prior written consent of the other, which will not be unreasonably withheld.
- 8.2 In the event that the Customer vacates the Premises, the new occupier's retailer will contact ENERGEX to advise of the change of occupier and NMI.

9. TERMINATION

- 9.1 ENERGEX may terminate this Agreement at any time in the event that the Customer fails to comply with the terms and conditions of this Agreement. However, prior to any such termination, ENERGEX will give three months notice in writing of the Customer's failure to comply and of ENERGEX's intention to terminate the Agreement. ENERGEX may then terminate this Agreement at the end of the three month period unless the Customer takes measures necessary to eliminate, to ENERGEX's satisfaction, the matters identified by ENERGEX.
- 9.2 The Parties may terminate this Agreement at any time by mutual agreement.
- 9.3 ENERGEX may terminate this Agreement by giving notice if the Customer terminates their Customer Connection Contract or Customer Sale Contract (e.g. vacates the Premises).
- 9.4 ENERGEX may disconnect the PV at any time as permitted by law in which case this Agreement will terminate upon disconnection.

SCHEDULE 1

GENERAL TERMS AND CONDITIONS

1. DEFINITIONS AND INTERPRETATION

1.1 Definitions

In this Agreement:

“**Act**” means the *Electricity Act 1994*.

“**Account Number**” means the electricity account number for the Premises.

“**Customer Connection Contract**” means the “customer connection contract” (as that term is defined in the Act) in respect of the Premises.

“**Customer Sale Contract**” means the “customer sale contract” (as that term is defined in the Act) in respect of the Premises.

“**Electricity Entity**” has the meaning given to the term “electricity entity” in Section 22(1) of the Act.

“**Generated Energy**” means the quantity of energy generated by the Customer’s PV equipment and delivered into the ENERGEX Supply Network.

“**NMI**” means National Metering Identifier.

“**Photovoltaic array**” or “**PV**” means a small scale grid connected inverter energy system and associated systems, with an installed capacity of up to 10 kVA single phase (peak) or 30 kVA three phase (peak).

“**Point of Interconnection**” means the point from time to time designated by ENERGEX as the point at which the PV may be connected to the ENERGEX Supply Network.

“**Premises**” means the premises (as that term is defined in the Act), at which the Customer proposes to install the PV and which are specified on the first page of this Agreement.

“**Regulation**” means the *Electricity Regulation 2006*.

“**Rules**” means the National Electricity Rules which govern the operation of the National Electricity Market. The Rules have the force of law, and are made under the National Electricity Law

“**Supply**” means the supply of electricity from ENERGEX Supply Network to the Premises under standard tariff conditions.

“**Supply Network**” has the meaning given to the term “supply network” in the Act.

1.2 Interpretation

In this Agreement, unless the contrary intention appears:

- (a) headings are for ease of reference only and do not affect the meaning of this Agreement;
- (b) the singular includes the plural and vice versa, words importing a gender include other genders and words and expressions importing natural persons include partnerships, bodies corporate, associations, governments and governmental and local authorities and agencies;
- (c) other grammatical forms of defined words or expressions have corresponding meanings;
- (d) a reference to a clause, paragraph, schedule or annexure is a reference to a clause or paragraph of or schedule or annexure to this Agreement and a reference to this Agreement includes its recitals and any schedules and annexures;
- (e) a reference to a document or agreement, including this Agreement includes a reference to that document or agreement as novated, altered or replaced from time to time; and
- (f) a reference to a party includes its executors, administrators, successors and permitted assigns.

2. GENERAL PROVISIONS

2.1 Inconsistency between clauses and schedules

If there is any inconsistency between a clause of this Agreement and the Schedules to this Agreement, then the clause of the Agreement will prevail.

2.2 Relationship with Customer Connection Contract and Customer Sale Contract

This Agreement does not change the conditions of the Customer Connection Contract or the Customer Sale Contract (if applicable).

2.3 Effect of this Agreement

This Agreement covers the connection of the PV to the ENERGEX Supply Network only and does not relieve the Customer of any obligations at law or the requirements of another authority in relation to the installation, operation or maintenance of the PV.

2.4 Joint and Several Liability

If the Customer is more than one person:

- (a) an obligation of those persons is joint and several;
- (b) a right of those persons is held by each of them severally.

3. Liability for Damage

3.1 The Customer acknowledges that ENERGEX will not be liable for any loss, damage or injury suffered or claimed by the Customer or any other person that may occur or be attributable to the installation and operation of the PV at the Premises. This clause does not affect the operation of Section 97 of the Act.

3.2 The parties acknowledge that the Customer is responsible for any insurance costs associated with their obligations or possible liability under this Agreement.

SCHEDULE 2

TECHNICAL CONDITIONS FOR THE INTERCONNECTION OF SMALL SCALE RENEWABLE ENERGY PV

1. INTRODUCTION

The fundamental requirements in respect of the operation of a private PV in parallel with the public supply system relate to safety. Parallel operation of the private PV shall not present a hazard to the supply authority's operating staff and customers, the owner of the private plant and/or their personnel, or the public.

Protection:

The private generating plant must have provision for complete automatic separation from the Supply Network or shutdown in the event of any irregularity or failure on any phase of the supply, or for a fault on the private plant or its associated circuits.

Compatibility:

Voltage, frequency and waveform must match that of the ENERGEX supply and any distortion of these parameters must be contained within acceptable limits in order that there be no interference with the quality of supply to other customers or risk of damage to apparatus belonging to other customers or the supply authority.

2. SCOPE

This document covers PVs up to a maximum of 30 kV.A (3 phase) or 10 kV.A (single phase) that may be paralleled with ENERGEX's supply regardless of the length of time that parallel operation would normally occur.

3. GENERAL REQUIREMENTS

3.1 Regulatory

The PV installation must comply with all relevant standards including AS/NZS 5033:2005 – Installation of photovoltaic (PV) arrays and AS 3947.3: 2001 Low-voltage switchgear and controlgear – Switches, disconnectors, switch disconnectors and fuse combination units as applicable. All other relevant codes and government and statutory requirements must be adhered to (Clause 12).

3.2 Connection Costs

The PV owner will normally be required to bear all ENERGEX costs associated with system reinforcement/modification and/or additional protection and control equipment as might be required to accommodate the private PVs.

3.3 Type/Capacity Constraints

At some locations, technical requirements may limit the type or capacity of machine that may be connected. Where required by ENERGEX the owner shall pay for any technical studies required to ensure the suitability of the machine's interaction under normal and fault conditions with the proposed system connection. These studies shall be undertaken to ENERGEX's satisfaction regarding technical content.

The requirements for machine stability will vary, depending on the location of the PV, the voltage level and the configuration of the interconnecting network. ENERGEX may be able to provide assistance in this regard.

4. SAFETY

It is essential that the parallel operation of PVs with ENERGEX's system does not present a hazard to ENERGEX's operational staff, to the public or to the owner of the PV. Consequently, it is necessary that a failure of supply or irregularity in any of the phases of ENERGEX's network result in the complete and automatic separation of the owner's PV or disconnection (shut down) of the PV from the system. In addition, for certain faults on the PV itself it shall be automatically disconnected and, where appropriate, the prime mover automatically shut down.

5. OPERATING PROCEDURES

To ensure that operation of the PV does not introduce hazards to ENERGEX or the PV owner's operating staff, operating procedures (including communication arrangements) shall be submitted to ENERGEX for approval, and when agreed to, placed in writing with a copy held by both parties. Operating procedures may include mutually agreed real and reactive power limits during all operating conditions possibly including contingencies not covered by the design criteria. The onus of ensuring that these operating procedures are adhered to and the training of staff rests with the PV owner. Any change to approved operating procedures must be agreed to by both parties and documented as above.

6. FAULT LEVEL CONTROL

Private generating plant connected to the supply system may not raise fault levels beyond the capacity of the ENERGEX's interruption devices. Calculations of the actual contribution from the owners plant to the fault level at the point of connection will be necessary at the design stage to determine the need for measures to control fault levels. All details of such calculations shall be provided by the PV owner. It will be necessary for the owner to bear any costs incurred by ENERGEX in respect of fault level control measures. Switchgear on the owner's system must be capable of withstanding the combined fault current from ENERGEX's system and the owner's PV.

7. COMPATIBILITY WITH SYSTEM

It is important that any proposed connection of a private PV to the supply network be investigated in depth to ensure that parallel operation does not degrade the quality of supply to ENERGEX's existing or future customers. (The cost of any corrective measures found necessary after installation shall be borne by the PV owner).

7.1 Voltage Fluctuations

A customer must ensure that variations in current at each of its connection points caused by the switching on or off of equipment, or operation of any plant, do not cause excessive voltage fluctuations.

The voltage fluctuation level of supply should be less than the "compatibility levels" set out in Table 1 of Australian Standard AS/NZS 61000.3.7:2001. To facilitate the application of this standard, ENERGEX has adopted "planning levels" for its network as provided for in the Australian Standard HB 264-2003 "Power Quality – Recommendations for the application of AS/NZS 61000.3.6 and AS/NZS 61000.3.7. This standard recommends that at this stage, indicative planning levels shown in Table 2 in Australian Standard AS/NZS 61000.3.7:2001 be used.

7.2 Voltage Unbalance

Customers must balance the current drawn in each phase at each of its connection points so as to achieve average levels of negative sequence voltage at its connection points that are less than or equal to the values set out in Table 1.

Nominal supply voltage (kV)	Maximum negative sequence voltage (% of nominal voltage)			
	no contingency event	credible contingency event	general	once per hour
10 or less	2.0	2.0	2.5	3.0

Table 1: Voltage Unbalance Limits

7.3 Voltage Waveform Distortion

The harmonic voltage distortion level of supply should be less than the “compatibility levels” set out in Table 1 of Australian Standard AS/NZS 61000.3.6:2001. To facilitate the application of this standard, ENERGEX has adopted “planning levels” for its network as provided for in the Australian Standard HB 264-2003 “Power Quality – Recommendations for the application of AS/NZS 61000.3.6 and AS/NZS 61000.3.7.

The following principles apply to the use of the shared network:

- (a) the sharing between Network Users of the capability of connection assets to absorb or mitigate harmonic voltage distortion is to be managed by ENERGEX in accordance with the provisions of clause S5.1.5 of schedule 5.1 of the NEC; and
- (b) to the extent practicable, the costs of managing or abating the impact of harmonic distortion in excess of the costs which would result from the application of an automatic access standard are to be borne by those Network Users whose facilities cause the harmonic voltage distortion.

7.4 Mains Signalling

A customer shall ensure LV capacitors installed on their premises are blocked to limit absorption of ENERGEX mains signals (audio frequency injection at 1050 Hz, and future supervisory systems). The manufacturer should be consulted on necessary blocking requirements.

A customer installing mains signalling or a communications system on their own electrical installation shall (when requested by ENERGEX), minimise penetration of signals beyond their terminals.

Because of the risk of interference between customer and ENERGEX mains signals, use of ENERGEX mains for customer's signalling or communication purposes is not permitted.

A customer considering the installation of a communications system should consult the Australian Communications Authority (ACA) for advice on relevant interference regulations.

7.5 Direct Current Component

Customers must ensure that their equipment and devices do not cause a DC component in ENERGEX's mains (neutral) to exceed the following limits:

5 mA for continuous operation, or

120 mA per operating hour for non-continuous operation

The maximum value of direct current permitted in the neutral is 1.44 amps for equipment with an assessed daily operating time of 5 minutes or less. These limits are based on Australian Standard AS 3100-1985 "Definitions and General Requirements for Electrical Materials and Equipment".

7.6 Power Factor Requirements

In accordance with Section 33 of the Electricity Regulation 1994, ENERGEX may require the customer (by notice in writing) to maintain a power factor at their installation of at least 0.8 lagging, and except by agreement with ENERGEX, not greater than unity. Contestable customers operating under the NEC are required to maintain power factor within the range 0.9 lagging to unity.

If the power factor falls outside agreed limits, the customer must take action to ensure compliance as soon as reasonably practicable.

This may be achieved by installing additional reactive plant or reaching a commercial agreement with ENERGEX to install, operate and maintain equivalent reactive plant as part of the connection assets.

Customers must ensure that capacitor installations are designed to avoid attenuating audio- frequency signals used for load control or operations (refer section on Mains Signalling).

7.7 Compliance with Limits

ENERGEX will advise the customer connection point, system fault level, and arrange for provision of supply system details necessary for a supply quality assessment.

To ensure compliance with these limits, ENERGEX may require a programme of tests be performed before and after the commissioning of the equipment. If, in the opinion of ENERGEX, the equipment does not comply with these limits, or causes, or is likely to cause, undue interference with the supply to other customers, ENERGEX may direct the customer to modify the equipment or its operation to avoid such interference. The customer is responsible for such modifications which are at their own expense.

Notwithstanding any of the requirements set out in this document, if the operation of any item of customer's equipment causes undue interference to a third party, ENERGEX may invoke Section 34 of the Electricity Regulation 1994 to disconnect the offending equipment.

8. PROTECTION

There must be proper coordination between the protection systems of the generating equipment and ENERGEX's supply network in order to ensure correct operation of protection systems. The areas requiring the installation of protection equipment are:

- the owner's private generating plant
- the supply network
- the interconnecting system between generating plant and supply network.

8.1 Private Generating Plant

ENERGEX will require details of the proposed protection scheme to be submitted for consideration and reserves the right to require modification where this is in the interest of safe operation.

8.2 Supply Network

Each private generating plant installation will require investigation to determine the extent of any system modifications required on the supply network to allow parallel operation. The modifications may be as minor as the application of a new protection setting, safety signs, or as complex as the installation of new switchgear and associated protection and control schemes. Where the ENERGEX supply network is subject to auto-reclose then this function shall, where practicable, be encompassed in any protection and control scheme, and not inhibited.

8.3 Interconnecting System

The protection installed at the PV owner's end of the interconnecting system shall provide discrimination for faults on the supply network.

The owner will be required to install control equipment to ensure that the level of PV imported or exported is restricted to any mutually agreed power transfer limit.

9. CONTROL

9.1 Synchronising

Where relevant, provision shall be made by the PV owner for accurate manual or automatic synchronising of its supply to the ENERGEX supply. If manual synchronising is chosen then "Check Sync" relays may be required. Automatic synchronising is preferred. In either case, the synchronising process must be carried out in a logical and sequential order. The equipment used for synchronising must be approved by ENERGEX.

9.2 Power Factor

The power factor of the PV must be held within the limits set by ENERGEX. These limits will be assessed for individual cases.

10. ASSOCIATED LEGISLATION

All relevant legislation must be complied with where applicable and in particular:

- Clean Air Act 1963
- Clean Waters Act 1971
- Contaminated Land Act 1991
- Electricity Act 1994
- Environmental Protection Act 1994
- Local Government (Planning and Environmental) Act 1990
- Nature Conservation Act 1992
- Noise Abatement Act 1978
- Pollution of Waters by Oil Act 1973
- Sewerage and Water Supply Act 1949
- Water Resources Act 1989.
- National Electricity Law
- The Electrical Safety Act 2002