



Customer Guidelines for Grid

Connection of Inverter

Power Sources up to 10 kW

May 2010

Introduction and Purpose

These guidelines are intended to cover the installation of small private generating sources of capacity up to 10 kilowatts (kW) which customers wish to connect to the Network grid via electronic dc/ac inverters. The guidelines do not cover engine-driven generators.

It is intended that such renewable energy generating sources up to 10 kW be allowed to be connected to the grid on the basis that:

- The purpose of the source is to reduce the customer's electricity bills and for environmental concerns.
- The customer still requires a supply of electricity from the Network grid.(ie Not Stand-alone System)

The guidelines have been prepared in order to:

- Promote customer installations which are safe for both the customer and for Network line maintenance personnel.
- Protect customer installations against damage under fault conditions.
- Ensure that other Network customers are not exposed to hazards or to disruptions of supply.

The primary concern of the Network is with the mains wiring and inverter, which provide the interface with the grid, and which must be approved by the Network. The DC wiring of the renewable energy system and any batteries are the customer's responsibility.

Sister documents provide guidelines for larger plant, up to one megawatt (1.0 MW = 1000 kW), and Above 1 MW in capacity, which are intended to export electricity into the Powercor grid.

Network Policy

We recognise that many environmentally – conscious customers wish to play their part in the reduction of the nation's greenhouse gas emissions, much of which are attributable to large coal-burning power stations. One way that some customers seek to contribute is by the installation of small renewable electricity generating sources at their residences or premises. In order to obtain maximum utilisation of such sources, these customers often wish to connect their generating sources to the Powercor grid via a grid interactive inverter.

Citipower/Powercor are supportive of such initiatives and will allow such installations to be interconnected with the grid provided that:

- Reliability and quality of the grid supply to other customers is not adversely affected.
- The safety of other customers and of Powercor employees and contractors is not put at risk.

Retailer's have already introduced various programs through which customers may support the use of renewable resources on a larger scale for the generation of electricity.

Customer Equipment Types

The types of generating equipment covered by these guidelines includes:

- Solar (photovoltaic) arrays.
- Small wind generators.
- Micro hydro generators.
- Fuel cells.

All of these generally produce direct current (DC) electricity and must transmit their generated electricity via DC to alternating current (AC) sine wave inverters.

When you are operating your generating equipment to reduce your power bills, a storage battery may not be necessary. However, you may install one for independent operation.

Inverter Requirements

The electronic sine wave inverter should be of the grid-interactive type, be of good quality and performance in order to avoid mal-operation or damage to your household electrical appliances. Your inverter must generate an AC voltage having a good quality sinusoidal wave form with low harmonic distortion. Only Citipower/Poweroc approved models which satisfy the Australian Standard AS 4777. Grid Connection of Energy Systems via Inverters may be connected to the grid. Information on models of inverter which satisfy these guidelines are available from the Clean Energy Council.

<http://www.cleanenergycouncil.org.au/cec/accreditation/Solar-PV-accreditation/approvedproducts.html>

An important safety requirement for the inverter is that it must be prevented from back-feeding the Citipower/Powercor network if the grid supply is externally de-energised. It should also be capable of restarting within a short period after the external grid supply is restored.

Planning and Selection

Our main involvement with local generation is with the mains wiring and the sine wave inverter, which provides the interface with the grid. We are not able to offer assistance in the planning and selection of your proposed generating equipment other than the inverter.

The Clean Energy Council has details of Accredited Installers, Suppliers, and Consultants who are experienced in this area.

Relevant Standards and Guidelines are as follows:

- Electrical Safety(Installations Regulations) 2010.
- AS/NZS 3000:2000 – SAA Wiring Rules, published by Standards Australia.
- The Australian Standard AS 4777 Grid Connection of Energy Systems via Inverters, published by Standards Australia.
- The Clean Energy Council

Installation and Connection to Grid

- The installation of the renewable energy generating sources should always be carried out strictly in accordance with the manufacturer’s recommendations, and must meet the requirements of your local council’s planning and building departments.
- The electrical cabling and connection to your switchboard must be carried out by a registered electrical contractor. The wiring and equipment must be in accordance with the Wiring Rules(AS/NZ 3000:2000), the Electrical Safety Regulations and the Service and Installation Rules.
- Your new installation must be checked by a licenced electrical inspector prior to connection to your main switchboard.
- The customer’s inverter must be connected to a dedicated circuit on your main switchboard via a lockable isolating switch, protective device and cables which are suitably rated for at least the short time rating of the inverter. The switchboard busbar rating should also be checked by your registered electrical contractor.
- The switchboard must be clearly and permanently labelled as having an inverter energy system connected to it. The circuit breaker, fuse or switch must also be clearly labelled.

- It is recommended that surge protection if not included as part of the inverter be installed to prevent external network surges from damaging your renewable energy generating source.
- In order that maintenance work can be carried out on your equipment and on the grid connection, a manually-operated switch or circuit breaker must be provided in an accessible location and have the ability to be locked on and off.
- In order to limit an in-rush of damaging current from the grid if a fault develops in your equipment, a fuse or circuit breaker is required for automatic disconnection. These are most conveniently fitted at your main switchboard where the mains connection is made, or at the inverter.

Installation Approvals

Information on models of inverter which satisfy the Australian Standard are available from the Clean Energy Council.

The electrical wiring will need to be approved by a licensed electrical inspector(S Class). Energy Safe Victoria maintains a listing of licensed electrical inspectors. For any further information please telephone the Powercor Call Centre or the local customer connection officer.

Network and Customer Responsibilities

Citipower/Powercor Responsibilities

- We are responsible for the reliable transport of electricity to your premises and to the premises of all its other customers.
- We must safeguard the safety of our employees and others who carry out work on its distribution network. Citipower/Powercor therefore reserves the right to inspect your installation by prior arrangement, to ensure that it does not pose a hazard.

Customer Responsibilities

- The customer is responsible for the safe installation, operation and maintenance of the renewable energy generating source. The installation must conform to Australian standards(AS/NZ 3000:2000).
- Your equipment should be regularly inspected and maintained in accordance with the manufacturer's instructions.
- The customer is responsible for the safety of any person operating or maintaining generating equipment and accessories which are on the premises.
- The customer is responsible for fitting adequate protective devices to prevent damage to their renewable energy generating equipment under conditions of short circuit, voltage surge or other faults.

Energy Pricing

The value to the customer of kilowatt hours (kWh) electricity generated by their power source will be determined by the relevant Electricity Retailer.

The Retailer likewise should be contacted on tariffs for a supply of electricity from the Citipower/Powercor Grid.

Fees

Your Retailer will be charged fees for the work to enable the connection to be made.

For first time connected premises, the standard Service to Property charge still applies in addition to the fees for the connection of the inverter to the Network grid.

Metering

For existing premises your meter will need to be replaced. Ask your Retailer to arrange for a new electronic meter. The Retailer is also responsible for arranging the Metering for new installations.

Insurance

Most household insurance policies do not cover the failure of electrical devices such as inverters. The generation equipment may need to be separately specified on your insurance policy.

You are advised to contact your own insurance company to check coverage.

Application Form

Customers seeking to install inverter-connected generating sources must fill out the Application for Network Connection of an Inverter Energy System.

Please provide all relevant details requested on the form in order to avoid delays in approval. The completed form should be returned to Powercor New Connections P.O Box 185 Geelong 3220.

Information and Queries

Refer Information Sheet.

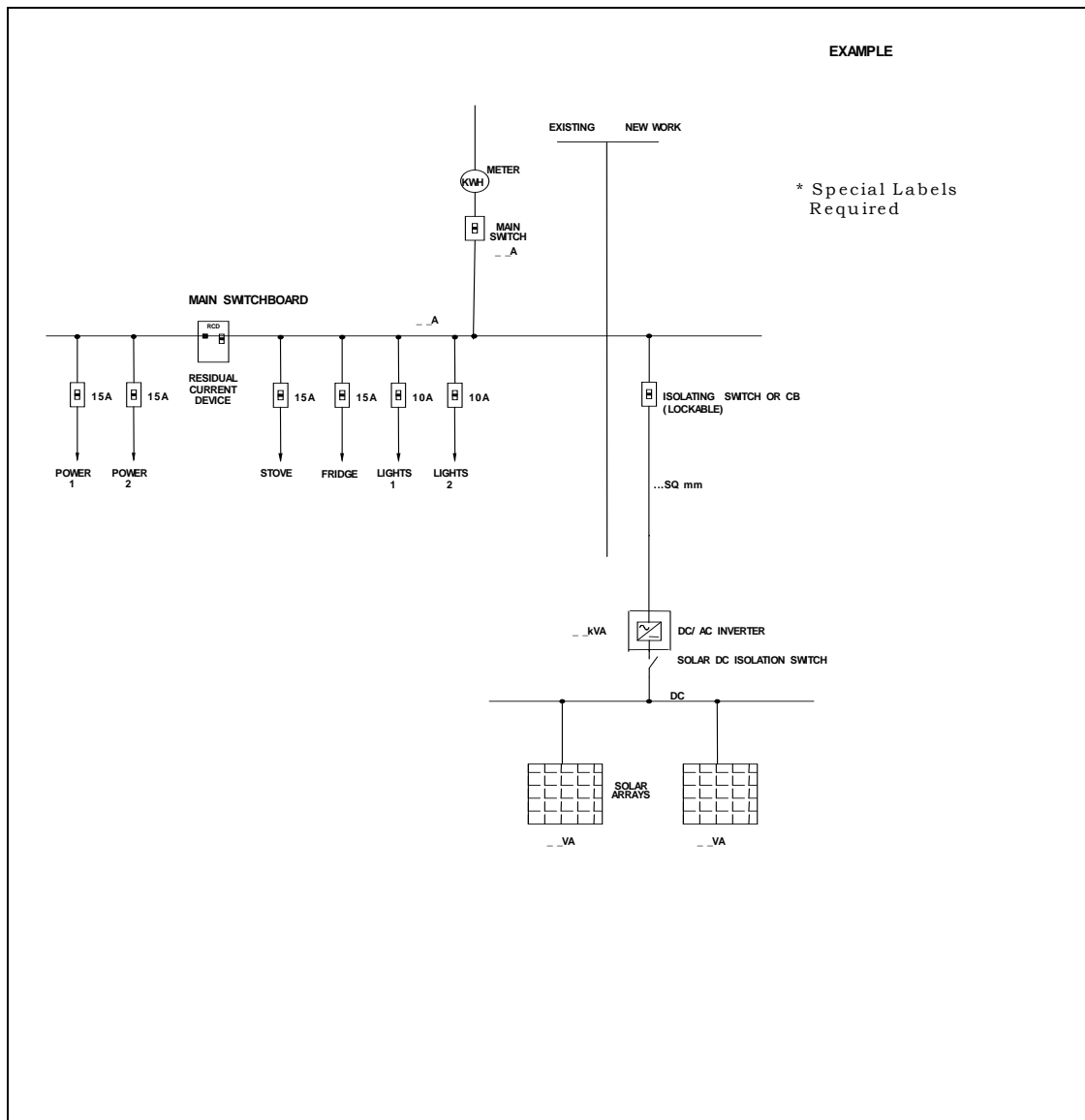
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Typical Customer's Installation(Circuit Diagram)



Typical label to be installed at Main Switchboard or Distribution Board where the inverter energy system is connected

WARNING
DUAL SUPPLY
ISOLATE BOTH NORMAL AND
INVERTER SUPPLIES BEFORE
WORKING ON THIS
DISTRIBUTION BOARD

Typical labels to be installed adjacent to isolating switches at Main Switchboard or Distribution Board where the inverter energy system is connected

NORMAL SUPPLY MAIN SWITCH

INVERTER SUPPLY MAIN SWITCH

Information Sheet

For general advice and information on Accredited Installers, Suppliers, and Consultants for grid connection and stand-alone systems please contact the Clean Energy Council on **03 93493077**.

To Contact Citipower/Powercor (For Grid Connection)

Customer Enquiries:	132 206
Service Difficulties & Faults:	132 412
New Connections:	1300 360 410
Interpreter Service:	131 450

Post your completed Application to Powercor New Connections PO Box 185 Geelong 3220.

Electrical Measurement Units

<i>Quantity</i>	<i>Unit</i>	<i>Unit Symbol</i>
Current	ampere	A
Potential Difference	volt	V
Power	kilowatt	kW
Apparent Power	kilovoltampere	kVA
Frequency	hertz	Hz
Energy	kilowatthour	kWh

Glossary of Terms

grid	the electrical distribution network
DC	Direct current
AC	Alternating current. The grid operates at 50 Hz.
Inverter	An electronic device that converts DC power to AC power
Renewable electricity	Power that comes from a renewable source such as solar, hydro and wind.
Voltage Regulation	The drop in voltage between no load and full load.
Efficiency	Output power divided by input power.

Connecting an Inverter to the Grid

1/

Contact Citipower or Powercor and request a copy of the “Customers Guidelines for Grid Connection of Inverter Power Sources” to be mailed to you. Alternately, this can be found on the Citipower or Powercor Web Site www.citipower.com.au or www.powercor.com.au This document contains all the information you will need to know in order to arrange for the connection of your system to the Electricity Grid.

2/

Complete the application for Network Connection of an Inverter Energy System and return this to New Connections. Note, this form is contained in the back of the Customer Guidelines. You will need to have chosen your Retailer in order to complete this form.

3/

Citipower/Powercor will assess your application and the impact of your proposed Inverter Energy system on the Network from the details you provide in your application.

4/

You will need to arrange for your Retailer to forward to Citipower/Powercor, a metering request for Powercor to meter your installation.

5/

Citipower/Powercor will meter your installation once it has the following documents:

- ❖ A completed Application for Network Connection of an Inverter Energy System
- ❖ A metering request from your Retailer
- ❖ A Certificate of Electrical Safety from your Registered Electrical Contractor

Note, the installation will require inspection by an Electrical Inspector (S class) prior to energisation.

6/

Citipower/Powercor will inspect and test the installation and upon compliance with all standards approve the system for you to place into service. This can be done by placing the inverter main switch in the on position.

Application for Network Connection of an Inverter Energy System up to 10 kw

Please print and complete all sections of this form and return to Powercor New Connections
 Email: newconnections@powercor.com.au Fax: 1800 062 242 or Post: PO Box 185 Geelong 3220.

Part 1- Applicant Details				
I / We named below make application to connect an inverter energy system to the electricity network and understand that the Retailer will be charged fees for the work to enable the connection to be made. I / We acknowledge that connection will not occur until the Electrical Contractor and Electrical Inspector submit the relevant industry forms, upon which the installation will be inspected for compliance with all regulations.				
Name: (electricity account holder)			Phone No:	
Email Address:			Mobile:	
Title	Given Name	Surname	Signature	Date
				/ /
				/ /
Part 2 – Location of Installation				
Street address of Inverter installation	Unit/House #		Type of premise	<input type="checkbox"/> Residential <input type="checkbox"/> Business <input type="checkbox"/> Other
	St Name			
	Suburb	Postcode		
Postage Address: if different to above			Is permanent supply connected now? <input type="checkbox"/> No <input type="checkbox"/> Yes	
Current electricity retailer			Meter numbers	
National meter identifier (NMI)				
Part 3 – Consultant/Installer details				
Consultant/ Installer	Name:		BCSE Accreditation No:	
	Company name:		Phone:	
	Address:		Email:	
Electrical Contractor	Name:		Contractor licence No:	
	Company name:		Phone:	
	Address:		Email:	
Part 4 – System details				
Inverter Make:		Model:	Approval No:	
Inverter Output capacity:		Number of phases:		
Is 24 hour un-hindered access available to the following:-				
Electricity Meters	Yes <input type="checkbox"/> No <input type="checkbox"/>	Inverter Unit	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Main Switchboard	Yes <input type="checkbox"/> No <input type="checkbox"/>	Inverter Unit Isolation Switch	Yes <input type="checkbox"/> No <input type="checkbox"/>	
If you have answered No to any of the above, then your Electrical Contractor will be contacted by a CitiPower or Powercor Representative with date & time period that access must be available to ensure that works can occur.				
All details must be completed on this form; incomplete forms will be returned which will delay processing.				