



Made at home
Energy so simple
you hardly know
it's there

A photograph of a solar panel array installed on a roof, viewed from a low angle looking up. The panels are dark blue and reflect the sky and clouds. The background is a clear blue sky with a few white clouds.

Solar Energizer Series Owners Manual

REVISION HISTORY

Issue No.	AMENDMENTS	AUTH.	APPR.
7	Removal of SolarSight, revision of system sizes – 24/06/09	JB	RM
6	Revision of system sizes – 10/10/08	CS	RM
5	Revision of system sizes – 11/10/07	CS	RM
4	Revision of system sizes – 10/02/06	CS	RM
3	Revision of system sizes – 07/04/05	CS	RM
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1. INTRODUCTION

Congratulations on choosing a BP Solar Energizer System. The system will silently covert sunlight into clean, green electricity reducing your electricity bills and saving significant CO₂ emissions over its service life. We are sure you will enjoy your new Solar Energizer system, which has been designed with your convenience and safety in mind.

Your kit has been carefully designed and engineered to meet your requirements as follows;

- Designed for Australian conditions.
- Designed to Australian standards. (e.g. wind, electrical, installation)
- Flexibility to suit your roof size and your budget.
- Adds value to your home – a capital investment in your home.
- Energy security for 20 years plus.
- Non- cyclone and cyclone rated version available (corrugated metal roof only in cyclonic).
- Easily installed to suit tile or corrugated metal roofs.
- Ultra low maintenance.
- Full warranty. Up to 25 years on modules and 10 years on inverters.
- Designed and engineered by BP Solar, one of the largest solar companies in the world.
- Expandable and modular.

The objective of this Owners Manual is to provide the owner-operator of the Solar Energizer system, with the information needed to ensure a long and reliable system life with high owner satisfaction and high safety standards.

2. HOW TO USE THIS OWNERS MANUAL

Your system is already up and running, generating electricity from the sun, however there are a few things that you should do right away:

1. **Familiarise yourself with the operating safety instructions on page 5.** You should review these before you plan to interact with your Solar Energizer system.
2. **Fill out the important contact numbers in section 3.** If you are not sure of any of these numbers please ask the installer who installed your system to help you. Filling out the important numbers will provide you with a quick reference if at a later date you have questions or maintenance needs.

Your Owners Manual contains additional information for you to read at your convenience. The System Description section includes information to help you understand how your system operates. The Operating Instructions section includes an explanation of the minimal maintenance that your system shall require, and a troubleshooting guide for you to follow if you experience any difficulties with your system.

Finally, we have included information for technicians / installers and listed reference documents that you should keep in order to be able to provide these to qualified personnel in case maintenance is required on your system.

3. IMPORTANT NUMBERS

For quick future reference, we ask that you take a moment and enter the following information. If you are not sure please ask your installer to help you.

Installer Name: _____

Installer Phone: _____

Distributor Name: _____

Distributor Phone: _____

Invoice Number*: _____

* Please be certain to retain your original invoice as proof of purchase. It will be required if you have a warranty claim.

If you have a question about with your Solar Energizer system, please call your installer. If for any reason you are having trouble getting answers or service from your installer, please call the distributor nearest you. BP Solar supports its distributors and aims to ensure that you are getting the quality service that you expect. To find your nearest distributor you can visit www.bpsolar.com.au.

4. WARRANTY

Product Warranty

BP Solar provides our standard component warranty on solar modules and the inverter (enclosed with solar modules and inverter).

Solar Modules Limited Warranty

- 90% of minimum warranted power output over 12 years
- 80% of minimum warranted power output over 25 years
- Free from defects in materials and workmanship for 5 years

Refer to warranty document for further details

Grid Connect Inverter Warranty

- Free from defects in materials and workmanship for 10 years

Refer to inverter warranty document for further details

System Warranty

BP Solar, its authorised distributors and installers may offer an optional system warranty. Talk to your installer, if applicable.

5. OPERATING SAFETY GUIDE

BP Solar practices and recommends a culture of high standards regarding Health, Safety and Environment.

- Solar Energizer systems are designed to meet applicable standards and codes in the regions they are marketed. It is recommended that experienced and certified dealer/installers be employed to service them.
- All service work must be done in strict accordance with local and national electricity codes, and any other relevant safety standards.
- Review and follow all safety instructions and all other instructions supplied with all the materials and components provided with the Solar Energizer system before any service work begins.
- Avoid service activity in wet or damp conditions.
- Do not attempt to service the power system unless you are **fully qualified** licensed electrical person, authorised to do so and have prepared the site properly.
- Safety notes are used throughout this manual and the other related component manuals. Please take note of them.



- **WARNING:** A dangerous voltage or condition may exist in this system.



- **CAUTION:** This procedure is critical to the safe installation or operation of the application. Follow these instructions closely.
- Remove all jewellery such as rings, bracelets, necklaces, etc. prior to servicing the power system to reduce the risk of accidental shock and burn hazards.
- Power may be present at any point in some circuits even though circuit breakers have been opened.
- Solar modules generate electricity when exposed to light, they should be covered with an opaque (non see through) material prior to servicing them.
- Take appropriate precautions when working at heights and must be adhered to. Local safety regulations are very specific in this area.
- Do not substitute materials supplied in the Solar Energizer system.
- **Disclaimer of Liability: Because the use of this manual and the conditions or methods of installation, operation, use and maintenance of the power system are beyond the control of BP Solar, BP Solar does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with the installation, use, or maintenance of the power system.**

6. SYSTEM DESCRIPTION

The conversion of sunlight to electricity (first discovered in 1839) is achieved through silicon cells, which are encapsulated inside your solar modules. Silicon cells generate electricity when the photons (contained within sunlight) are absorbed and cause electrons to flow within the cell. This DC electricity can be converted to AC electricity by your inverter. If the amount of electricity produced exceeds your consumption, the inverter will export the excess to the grid.

Your Solar Energizer system is designed to automatically convert sunlight to electricity and to export any excess energy to the grid. It also includes safety devices to protect wiring and intelligent electronics to ensure that the quality and power production is maximised and metered.

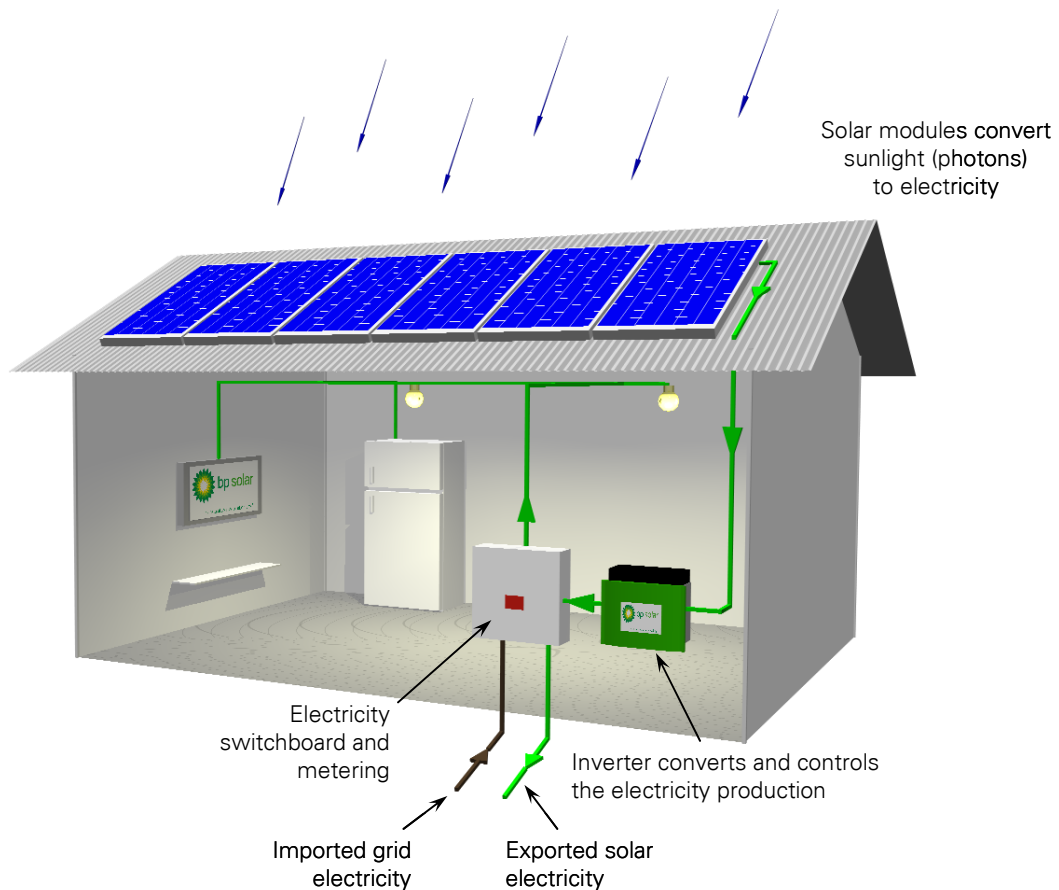
Please note that the inverter also includes safety protection devices, which will isolate your solar system should the utility grid voltage or frequency fall outside a specified range, or if the grid is not present. This feature protects the inverter from surges or spikes from the grid and also protects grid line workers who may periodically need to carry out maintenance work on nearby power lines. Hence, from time to time the inverter may indicate that it is disconnected, which is normal behaviour. Refer to section 7 of this manual for specific display indication information.

6.1 SYSTEM ELEMENTS AND NORMAL OPERATION

The major elements included in the Solar Energizer system are shown below, and include:

- Roof mounted solar modules.
- DC wiring system from the solar array to the inverter.
- Inverter with disconnect equipment.
- AC wiring system from the inverter to the residential switch / meter box.
- Wireless display for remotely viewing your systems performance.

The solar modules convert sunlight into direct current (DC) electricity. Your solar modules are connected in series, creating voltages of up to 440V DC (depending on model and ambient conditions). The DC wiring conducts that electricity to the inverter. The inverter converts the DC electricity into 240V AC electricity compatible with the power utility. The AC wiring conducts that electricity to the residential switch / meter box. The power utility connection is located at the residential switch / meter box.



The Solar Energizer system generates electricity in proportion to the amount of sunlight on the solar modules and temperature, generating no electricity at night. The peak generation of power is on a clear cool day when the sun is perpendicular to the solar modules. Clouds, seasonal variation of solar angle, array soiling, non optimum orientation, heat and any incidental shading decrease that performance.

The net annual expected electrical energy generation considering all these factors is understood and predictable. The following tables are estimates of annual expected generation for various Australian and New Zealand cities, for various system sizes⁽¹⁾. Your BP Solar installer may provide you with a more detailed prediction of annual energy production, considering your location, rooftop tilt and orientation and amount of shading.

Location	Estimate average power production ⁽¹⁾									
	Solar Energizer 1000 (1020Wp)		Solar Energizer 1000E (1020Wp)		Solar Energizer 1400E (1400Wp)		Solar Energizer 1650 (1650Wp)		Solar Energizer 2000 (2040Wp)	
	kWh AC per		kWh AC per		kWh AC per		kWh AC per		kWh AC per	
	year	day	year	day	year	day	year	day	year	day
Sydney	1405	3.85	1405	3.85	1929	5.29	2273	6.23	2811	7.70
Melbourne	1273	3.49	1273	3.49	1744	4.78	2055	5.63	2541	6.96
Brisbane	1532	4.20	1532	4.20	2098	5.75	2473	6.78	3057	8.38
Adelaide	1546	4.24	1546	4.24	2117	5.80	2495	6.84	3084	8.45
Perth	1586	4.35	1586	4.35	2171	5.95	2559	7.01	3163	8.67
Darwin	1704	4.67	1704	4.67	2337	6.40	2753	7.54	3404	9.33
Alice Springs	1759	4.82	1759	4.82	2415	6.62	2846	7.80	3518	9.64
Canberra	1564	4.28	1564	4.28	2140	5.86	2523	6.91	3119	8.55
Auckland	1321	3.62	1321	3.62	1813	4.97	2137	5.85	2642	7.24
Wellington	1200	3.29	1200	3.29	1647	4.51	1941	5.32	2400	6.58
Christchurch	1220	3.34	1220	3.34	1675	4.59	1974	5.41	2440	6.68

Location	Estimate average power production ⁽¹⁾									
	Solar Energizer 2000E (2100Wp)		Solar Energizer 3000 (2970Wp)		Solar Energizer 4000 (4080Wp)		Solar Energizer 5000E (4950Wp)		Solar Energizer 6000 (6120Wp)	
	kWh AC per		kWh AC per		kWh AC per		kWh AC per		kWh AC per	
	year	day	year	day	year	day	year	day	year	day
Sydney	2894	7.93	4092	11.21	5621	15.40	6818	18.68	8431	23.10
Melbourne	2616	7.17	3709	10.16	5095	13.96	6182	16.94	7622	20.88
Brisbane	3147	8.62	4460	12.22	6127	16.79	7434	20.37	9172	25.13
Adelaide	3175	8.70	4502	12.33	6185	16.95	7504	20.56	9253	25.35
Perth	3256	8.92	4618	12.65	6344	17.38	7696	21.08	9491	26.00
Darwin	3504	9.60	4961	13.59	6815	18.67	8268	22.65	10213	27.98
Alice Springs	3621	9.92	5122	14.03	7271	19.92	8537	23.39	10555	28.92
Canberra	3211	8.80	4555	12.48	6258	17.15	7592	20.80	9357	25.64
Auckland	2720	7.45	3846	10.54	5283	14.47	6410	17.56	7925	21.71
Wellington	2471	6.77	3494	9.57	4748	13.01	5823	15.95	7199	19.72
Christchurch	2512	6.88	3553	9.73	4881	13.37	5921	16.22	7321	20.06

⁽¹⁾ Estimates have been calculated using an average global horizontal insolation for each month of the year and are based on systems where the solar array is at optimal tilt and orientation. Different local effects may result in either a positive or negative effect on the estimated output. Different orientation and angle of array may result in a negative effect on the estimated output.

6.2 SYSTEM PERFORMANCE AND ENERGY MANAGEMENT

Your power demand may not match the generation output variations from your Solar Energizer system, and it doesn't have to. When the Solar Energizer system is generating more power than you need, the excess power is sold back to the utility. When your Solar Energizer system is not generating enough to meet your power requirements, the grid provides the difference. In this way, the grid acts like a storage tank, accepting excess production and providing for any shortfalls.

A common practice among electricity retailer is to allow energy generated by small solar systems to 'spin the meter' backward when excess solar power is sold to the retailer. This "net-metering" arrangement allows all of the excess solar energy to fully offset the energy cost that the Utility would have charged had the Solar Energizer system not been there. This means that the energy you generate is given at least the equivalent value as the energy provided by the utility (as long as the amount of energy you generate over a billing period is less than or equal to the amount you use during that period). This may vary according to the agreement you make with your electricity retailer.

For example, if on average, a Solar Energizer 1000 system generates about 3.96kWh AC per day, with lower production in the winter months and higher production in the summer months and an average family in an energy efficient house is consuming 230kWh AC of energy per month, the system can be expected to provide approximately 50% of the energy needs or about 120kWh AC per month.

The money that your Solar Energizer system saves you each month depends on the amount of energy the system generates, the buy back rate for any exported energy and the cost of electricity from your retailer. Your installer can provide you with further details about your local rules for metering and billing.

Note there is no energy stored by your Solar Energizer so in the event of a 'blackout or power outage', the system will shutdown and no power will be generated until the utility power has been restored.

6.3 ENERGY CONSERVATION AND THE ENVIRONMENT

Your Solar Energizer system represents a significant investment in your energy future and the environment. Unlike conventional sources of electricity that are a major cause of environmental problems such as smog, acid rain, and global warming, a Solar Energizer system causes no air or water pollution whilst it is generating electricity.

A Solar Energizer 1000 system in Sydney will prevent approximately 34 tonnes of carbon dioxide emissions⁽²⁾ over 25 year life. This is equivalent to planting 50 trees or taking an average car off the road for 7.4 years⁽³⁾. The actual amount depends on where you live.

⁽²⁾ Source: AGO Factors and Methods workbook August 2004. NSW kg CO₂-e/kWh factor = 1.054

⁽³⁾ Based on an average car producing approximately 4500kg CO₂ per year and the CO₂ absorption rate of trees being 669kg. Reference www.greenfleet.com.au/transport/technical.asp

A Solar Energizer system will provide partial energy independence and protection from future electricity price rises.

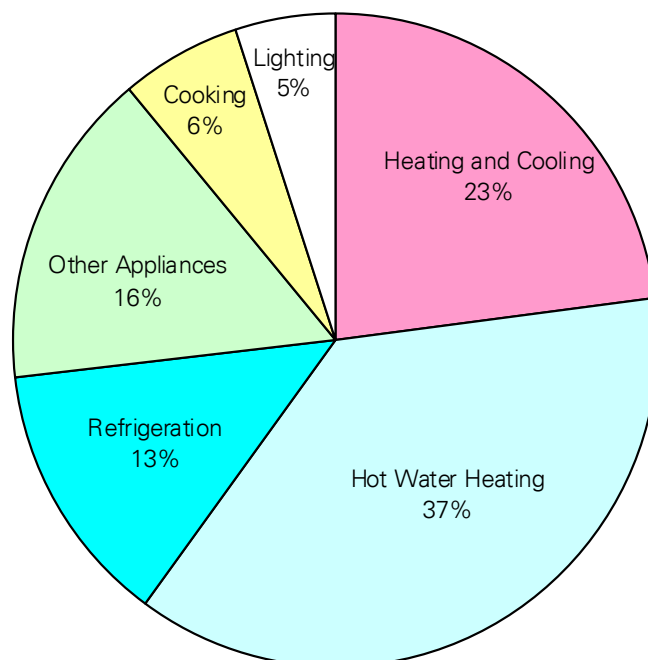
Modern homes built with energy efficient techniques, materials, and energy efficient appliances can achieved electricity demands as low as 200-300 kWh per month, without any adverse changes to life-style and comfort. Substantial reductions in electricity demand can be made to existing homes through energy conservation.

Replacing conventional light bulbs with compact fluorescent lights (CFL) is one way to conserve energy. An 11W CFL bulb produces the same amount of light as a 60W conventional bulb but uses 1/6th of the energy. CFL's also typically last around 5 times longer saving you significant money.

Replacing high wattage bulbs with lower wattage bulbs is another good way to conserve energy. If a room is brighter than needed, reduce the wattage of the light bulbs. Replacing a single 100-watt light bulb used for 4 hours per day with a 60-watt bulb is equivalent to adding about 40 watts of solar capacity.

The following diagram shows the typical break-up of domestic energy consumption. When looking at areas that provide the greatest impact for energy conservation, hot water and heating/cooling are the major consumers of energy. When replacing a conventional electric hot water system, consider solar hot water as an alternative. When replacing heating and cooling equipment along with appliances, consider the energy star ratings of each and insulate your home effectively. All these factors will have a major impact on energy consumption.

Typical Domestic Power Consumption



7. OPERATING INSTRUCTIONS

The Solar Energizer system is designed for automatic, unattended operation. The technology is simple, has no moving parts and requires no user intervention.

7.1 INVERTER STATUS GUIDE

When inspecting the inverter, examine the LED indicators on the front panel.

The LED status should be noted and interpreted as follows:

LED status explanation

● LED ON ○ LED OFF ✱ LED flashing

LED colour and operational meaning

GREEN = Operating Indicator

RED = Ground Fault Indicator

YELLOW = Fault Indicator

Please refer to the inverter manual, supplied with your system, for further detailed information regarding the meaning of different flash sequences.

There are some key points to be aware of regarding the operation of the inverter.

1. The inverter automatically shuts down during the night or when the DC voltage is too low. It will automatically start up in the morning or when the DC voltage is sufficient.
2. The inverter will automatically disconnect from the grid under the following conditions:
 - a. if the grid voltage or frequency is outside the allowable range,
 - b. if the inverter has been isolated from the grid.

When the grid supply is re-established and within the allowable range, the inverter automatically reconnects. If this is not the case, then further fault finding may be required.

Please refer to the inverter manual, supplied with your system, for further detailed information regarding the inverter operation.

7.2 DISPLAY OPTIONS

7.2.1 Display Lid Operation

The inverter is supplied with an LCD display which displays additional information about the inverter operation. This display will only work during daylight hours.

Tapping the lid will activate the background illumination. After 2 minutes the illumination will automatically switch off.

The following examples explain the messages that are displayed. These messages changes approximately every 5 seconds.

Pac	903W
Vpv	162V

Pac – this is the power output of the inverter in AC watts (W).

Vpv – this is the DC voltage of the PV modules (V).

E-Total	124.4kWh
h-Total	512h

E-Total– this is the total AC energy output to date since operation began, in kilowatt hours (kWh).


h-Total– this is the total operating time to date in hours.

E-today	3.86kWh
Mode	MPP

E-Today– this is the total AC energy output today in kilowatt hours (kWh).

Mode– this is the operation mode of the inverter. This will be MPP throughout the majority of the day which indicates the inverter is maximizing the power output.

If there is a problem with the inverter the LCD screen will display 'Disturbance'.



E-today 3kWh
Mode Disturbance

If this occurs, then additional information will be displayed, indicating the possible error. The reason for the failure will be displayed for 15 seconds.



Error Uac-Bfr

Refer to the inverter manual for further detailed information on operation and error messages.

7.3 MAINTENANCE

The Solar Energizer system is characterised as “low maintenance”. The only regular maintenance required is periodic inspection for damage and some simple cleaning of the modules.

If after following the suggestions below, your system still does not appear to be working or if you have any questions please call your installer. You should have their number listed on page 3 of this manual (Important Numbers). If for any reason you are having trouble getting answers or service from your installer please call your nearest BP Solar distributor.

7.3.1 General Inspection

An annual inspection of fasteners and mounting hardware is suggested. This should not require exposure to live electrical equipment. In general, the wiring system, the inverter, and the metering device should not need any maintenance or further inspection unless system energy output drops from expected values.



CAUTION!!

Take appropriate precautions when working at elevated heights. Do not attempt to access the roof and wash the solar array unless safety precautions to prevent falling from heights are in place. The risk of falling from height is increased with a sloped surface that has been made slippery by water. Contact your BP Solar installer to arrange a maintenance visit which includes cleaning of solar modules.

7.3.2 Solar Array

Periodically inspect for broken module glass, shading and excessive soiling by dust and dirt.



WARNING: Do not attempt to clean or otherwise come in contact with the surface of a solar module with a broken glass face; this could result in a dangerous electrical shock.

The system’s energy output may be reduced if the modules become dirty and cleaning is not carried out. Rainfall will wash the modules and should remove accumulated dust and dirt. Cleaning with a sponge and a mild soapy water may become necessary if bird droppings etc build up on the module. Contact your BP Solar installer to arrange a maintenance visit which includes cleaning of solar modules.

Incidental shading of the solar array by vegetation or other objects may cause significant loss of power.

7.3.3 Circuit Breakers

The Solar Energizer system AC Circuit Breakers are the same as any other residential circuit breakers. They are high quality safety devices and are safe to operate. The Solar Energizer system AC Breaker is located in the residential switch / meter box.

The AC breakers can trip automatically due to power problems experienced in the utility grid interconnection. If a solar system AC circuit breaker is found to be "off", simply switch the breaker to the "on" position. If a problem does exist, the breaker will quickly open again and you should contact your BP Solar Installer.

7.3.4 Performance

The Solar Energizer system operation is displayed at the inverter via an LCD screen and at the Utility meter display (depending on meter). These will indicate how much power is being generated by the Solar Energizer system. With time and experience, you will become familiar with the normal operating performance, as described earlier (a function of season, cloud cover, array soiling and shading).

If under performance is suspected, you should contact the BP Solar Installer.



WARNING!!

BP Solar expressly states that owners **DO NOT** investigate the wiring systems. This must only be done by a licensed electrical person.

8. APPENDIX

You may wish to;

Add a copy of the solar module serial numbers and warranty here for your records.

Add a copy of the inverter manual here for your records.

Add a copy of the installation manual here for your records.

Add a copy of your system invoice.

