



**Your Local Solar  
Specialists**



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## How Your System Works

Solar photovoltaic modules on your roof convert light into electricity (DC or direct current). The inverter converts this power into electricity compatible with the mains grid (AC or alternating current).

The AC coming from the inverter is first used to help run appliances operating in your home and any excess power not required by your household is exported to the mains grid.

If your PV system is not able to fully supply daytime household requirements, additional electricity is supplied via the mains as normal.

At night when sunlight is not available the inverter switches itself off and your household runs on regular mains AC electricity.

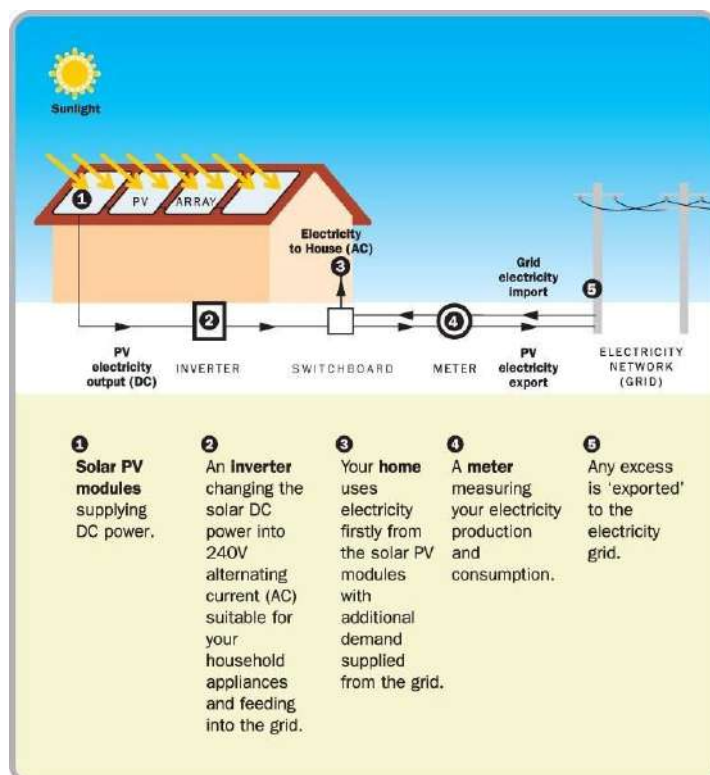


Image is courtesy of the Clean Energy Council.



## **Reduce Pollution & Environmental Protection**

Solar energy uses the sun to generate renewable power. Power produced by a solar system displaces the need for conventional power generation.

It is estimated that every kilowatt of installed solar generation prevents 14,000 pounds of CO<sub>2</sub> (associated with global warming) and 30 pounds of NO<sub>x</sub> (one source of smog) during its operating life.

## **System Information**

### **System Design**

A standard 1 kilowatt PV system will not produce 1kw of power continuously. Because of inefficiencies caused by non-optimal and tilt of the panels, manufacturing tolerances, dirt on the panels, high panel temperature, voltage losses over the cabling from the panels to the inverter and inverter inefficiencies, you will usually produce about 80% of the panel power rating (at peak times i.e. the middle of a sunny day).

The energy production from a system is determined by using the peak sun hour (PSH) rating of the area you live in and multiplying it by the (d-rated) power rating of the system. For SE Queensland, the Peak Sun Hour available (averaged over the year) is about 5.4 if your panels are tilted at latitude angle (about 27°). Therefore, a 1KW grid connected PV system can be expected to generate 4KW per day.



## Average kWh Output & Greenhouse Emissions Savings

Average Daily Production					
City	2.0KW SYSTEM	3.0KW SYSTEM	4.0KW SYSTEM	5.0KW SYSTEM	6.0KW SYSTEM
ADELAIDE	8.4kWh	12.6kWh	16.80 kWh	21.00 kWh	25.20 kWh
ALICE	10.0kWh	15.0kWh	20.00kWh	25.00kWh	30.00 kWh
BRISBANE	8.4kWh	12.6kWh	16.80kWh	21.00kWh	25.20kWh
CAIRNS	8.4kWh	12.6kWh	16.80kWh	21.00kWh	25.20kWh
CANBERRA	8.6kWh	12.9kWh	17.20kWh	21.50kWh	25.80kWh
DARWIN	8.8kWh	13.2kWh	17.60kWh	22.00kWh	26.40kWh
HOBART	7.0kWh	10.5kWh	14.00kWh	17.50kWh	21.00kWh
MELBOURN	7.2kWh	10.8kWh	14.40kWh	18.00kWh	21.60kWh
PERTH	8.8kWh	13.2kWh	17.60kWh	22.00kWh	26.40kWh
SYDNEY	7.8kWh	11.7kWh	15.60kWh	19.50kWh	23.40kWh

\*The above figures have been calculated using average peak sun hours for the area and are based on ideal orientation and tilts angle. These may vary depending on local environmental conditions and individual installation layout.





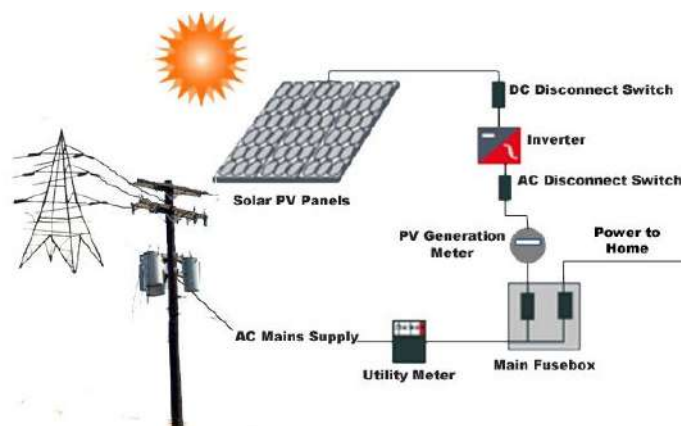
## When the main grid goes down. (Blackout)

For safety reasons the inverter automatically turns itself off when the grid shuts down. This stops your PV system feeding power into the mains when maintenance work may be happening on the grid.

This means you will not have electricity supplied by your PV system in the event of a block out.

## Typical Grid Connected PV System.

### Your System Details



Inverter System Located at: \_\_\_\_\_

Inverter Manufacturer: \_\_\_\_\_

Inverter Model Name: \_\_\_\_\_

Inverter Serial Number: \_\_\_\_\_

Installer: \_\_\_\_\_ Installation Date: \_\_\_\_\_



## What's the difference between Energy & Power?

Power is instantaneous and is measured in watts (W). Energy is measured over time in joules (J) or kilowatt-hours (kWh).

Energy is power multiplied by time. For example, if you have 100 W bulb on for 10 hours, the energy you use (and the electricity you will be charged for) is  $100 \times 10$  or 1000Wh (i.e. 1kWh).

Note that it makes sense to talk about using several kWh per day but not kW per day.

## How is Solar PV power different to Solar Hot Water?

Solar hot water uses the heat of the sun to heat water, a thermal process.

Solar PV uses the light from the sun to create a flow of electrons into a solar cell and thus an electrical current. This is called a Photovoltaic (PV) process.

## STC's – Small Scale Technology Certificate

Formerly known as Renewable Energy Certificates (RECs), each Small-Scale Technology Certificate (STC) represents the equivalent of one megawatt hour (MWh) of generated electricity from an accredited renewable energy source. The number of STCs you receive depends on the location of your installation in Australia, as well as the size of your installation.

STCs can be traded for cash and the value fluctuates per market conditions. STC's can be generated on a yearly basis, every 5 years or for a one-off payment which covers 15 years (the most popular method for cashing in STCs). You can keep your STC's, however this would disqualify you from claiming the maximum upfront subsidy on your PV system.



## **Energy Use & Feed in Tariffs (FIT's)**

### **Tips on reducing your energy consumption.**

- Use compact fluorescent lights (CFLs) or LEDs instead of incandescent bulbs.
- Avoid using inefficient quartz halogen down lights.
- Turn off lights (including CFLs) when out of the rooms for more than 5 minutes.
- Turn off at the wall socket all appliances that have a standby function.
- Ensure that fridges and freezers are set at the correct temperatures and that the door seals are in good condition. Also, think about turning off that second fridge.
- Use shading and cross ventilation to minimise the use of air conditioning for cooling.
- When buying new electrical appliances, consider purchasing items that are efficient and have lower power consumption.
- Replace an electric hot water tank with a solar hot water system.
- Install bulk insulation in your ceiling and walls, use curtains over the windows and ensure you have adequate passive solar access in winter to minimise heating costs.
- Utilise off-peak tariffs for large electrical appliances such as pool pumps.





## Feed in Tariffs (FIT's)

**FITs** can be based on net metering or gross metering

A net **FIT** is when you generate more power at any time during the day than you use at that time, and the excess is exported to the mains grid. You will be paid FIT for the net production from your PV system i.e. what you don't use. The **FIT** in Queensland is a netmetering scheme and pays 8c per kWh for all the electricity you export. At any other time, you will be paying normal rates per kWh for the power you use. Your electrical retailer

(Origin, Ergon, AGL, etc.) may also offer their own solar FITs in addition to (or in place of) the government scheme.

A **FIT** based on gross-metered pays you for the total amount of energy you produce from your PV system which includes what you use yourself as well as what you export to the grid.



## How to maximise your FIT's

Ensure the panels are free from shading throughout the day, particularly from 9am to 3pm in summer.

Check your electricity accounts after your system has been installed to ensure you are being paid correctly.

Try to use minimal power during the day, for example if you go out to work, have an energyefficient fridge and no other appliances on while you are out.

Turn off as many appliances off at wall as possible day and night.

- Run all high-energy appliances (dishwasher, washing machine, vacuum, pool pumps) gradually throughout the peak sunlight hours 9am - 3pm. Gradually using your power throughout the day ensures you are exceeding what your system can produce, and helps avoid you being charged for day time consumption.
- You will be charged for night time consumption, as your solar will not be generating any power (this is unavoidable). To help minimise your night time charges we suggest you trying finding a balance between consuming the power generated by your system and feeding the power produced to the grid.

For example, if a system produces 20kWh in a day we would suggest consuming 15kWh's with your appliances throughout most of the day, and in the afternoon let the system feed into the grid the remaining 5kWh's it will produce.

If you have any further questions regarding your feed in tariff, please don't hesitate to contact us.



## Manual Shutdown Procedure

1. Go to your switchboard and open it. Locate the **solar supply main switch** and flick the switch to the **off** position.
2. If your solar power inverter is more than 3 metres away from your switchboard, you must locate the switch marked, **solar AC isolator**. This will be located **next to your inverter**. If your inverter and switchboard are within 3 metres of each other, disregard this step.
3. Go to your inverter and find the switch marked **PV Array and DC Isolator**. Flick this switch to the **off** position (in some cases there will be two switches).
4. Your inverter may have a switch marked **Inverter Isolator**. If it does, flick this switch to the off position. If you cannot locate this switch on your inverter, skip this step. **Your solar PV system should now be completely switched off. All lights and screen displays will be dead. Keep the system off for a minimum of five minutes.** To re-start your system, follow this guide in reverse order. ie. **DC isolator** on first, followed by **AC isolator**, followed by your **solar supply main switch**.





## System Maintenance

**\*IF YOU FEEL UNSAFE OR ARE UNSURE PLEASE CONTACT RENEWABLE ENERGY QUEENSLAND FOR GUIDANCE OR A MAINTENANCE REQUEST.**

### Solar Panels

#### CAUTION



Avoid working on roof surfaces in wet or unstable conditions to avoid injury. Use appropriate fall protection measures relevant to your situation. Do not perform work on roofs if you are not comfortable or unsure how to do so safely.

**Safety note:** As most solar panels are located on the roof, it is highly recommended that some form of fall protection equipment is used (scaffolding or a safety harness) when inspecting the panels. Do not work on a wet roof and do not stand on the panels. Renewable Energy Queensland will not be liable for any loss or injury caused by maintenance undertaken by anyone other than an authorised Renewable Energy Queensland technician.



## Panels

### Every 3 months:

- Clean dust off panels with water (no detergent) if necessary.
- Check mechanical integrity of array structure.

### Every 6 months:

- Check for shading due to vegetation or structures.
- Visually inspect electrical wiring for loose connections and corrosion. **DO NOT** handle or alter any electrical wiring.

### Every 12 months:

- Please contact D Solar for your yearly system performance check and clean.



Do not attempt to clean or repair panels that have cracked or broken glass. Isolate the system immediately and contact Renewable Energy Queensland.





## Inverter

**\*Note that a cooling fan switches on and off depending on the inverter and it's load condition. In hot weather this fan may run for extended period of time - this is normal.**

- Keep the inverter dust and pest free on the outside (do not attempt to open the inverter).
- Do a visual only inspection to ensure all electrical connections are right.
- Ensure air-low passage is maintained for ventilation.

## Cables

- Check all cables are mechanically secured.
- Do not visual inspection for damage to cables.



### **WARNING!**

Do not touch loose electrical wires! Isolate the system and contact Renewable Energy Queensland. All maintenance on electrical wiring must be done by a qualified technician.

## Fault Finding

- Refer to inverter manual provided for operation characteristics and user feature
- Check that none of the isolation switches are off
- Ensure the panels are not shaded and the sun is shining
- Check that the panel isolators on the roof are on (if applicable)

**For further information regarding our Equipment manual and equipment handbook, please visit our website: [www.dsolar.com.au/download-centre](http://www.dsolar.com.au/download-centre)**





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