Solar Power Consumer Guide

Some guidance in selecting a domestic solar power system

Why Go Solar?

Solar energy can help save you money on your electricity bill by replacing some of you consumption from the Solomon power grid.

Solar power systems have no moving parts, are extremely reliable, and have a long expected life span. They are self-cleaning, easy to install and require very little in the way of maintenance.

Types of Solar Power Systems

There are two main types of solar power systems – grid-connect, and off-grid (or standalone).

A grid-connect system ensures that you have the electricity that you need whenever you need it automatically and regardless of weather conditions. This is because your property remains connected to the Solomon Power electricity grid which can then provide back-up at night and during poor daytime weather. Solomon Power charges for this standby backup service since it must reserve capacity on the grid for such occurrences.

An off-grid solar power system is completely separated from mains power and requires a battery bank for storing electricity that has been generated from the solar panels. This battery can then supply your property at night and during bad weather. It is the more expensive option, but must be used wherever the Solomon Power grid is not readily available.

This document will concentrate on grid-connected systems.

How a Grid-Connect Solar System Works

Most people in residential areas choose a grid-connect system, usually on the basis of price.

Electricity from the solar panels is converted (via an inverter) into AC power that is suitable for operating domestic appliances. Whenever the system produces more power than is being used, the surplus is fed back (exported) into the Solomon Power network. In certain circumstances, Solomon Power may require that there be no exported power into the grid. Note that Solomon Power does not pay you for any exported energy.

When your solar system is not producing energy (eg at night or in bad weather), your electricity needs are supplied from the Solomon Power grid.

The process is as follows:

1. Solar panels convert sunlight directly in direct current (DC) power.
2. The inverter converts the solar DC power into 240 volt alternating current (AC) power which is ready to use in your home or to export into the grid.
3. AC power from the inverter goes through your switchboard for use in your home.
4. Solomon Power's meter records the power supplied from the grid that is consumed in your home, and any power exported.
5. Any surplus power from your solar panels flows back into the Solomon Power grid.

Solar Power System Components

Solar panels

Solar panels come in different outputs and sizes. Normally solar panels are about one-metre-wide and 1.7 metres long. So a 3 kW system requires about 24 m^2 of roof space, and a 5 kW system needs around 40 m^2.

There are three types of solar cells used in panels.

Monocrystalline silicon offers high efficiency and good heat tolerance in a relatively small panel.

Polycrystalline (or multi-crystalline) silicon cell based panels are presently the most popular for residential systems. Technology improvements have meant that they can match the performance of mono-crystalline cells.

Amorphous (or thin film) cells use the least amount of silicon and are usually less efficient that other types.

Performance will vary between brands, even for the same technology used. For example, some perform better on hot days.

The cost of a solar panel is usually determined by its output capacity (watts), physical size, brand, durability, warranty period etc. As usual, you get what you pay for.

Solar inverters

Solar panels each produce low voltage DC power. The inverter converts this into the AC power needed for normal appliances.

The efficiency of an inverter is measured by how well it converts the DC into AC. This efficiency generally ranges from 95% to 97.5%. Inverters are sized according to the power that they supply (usually in kilowatts – kW).

Not all inverters are equal and efficiency has a significant impact on the time that your system will take to pay for itself. So, the more efficient the better as less power will be wasted as heat during the conversion process.

Inverters must comply with the relevant Australian Standards, or Solomon Power will not allow them to be connected to the grid.

Mounting systems

The mounting system is a crucial aspect of a solar array as it must withstand wind stresses from cyclones, and torsional stresses from earthquakes. Ask your supplier about certification and warranty periods.

Cables and connectors

Cabling is usually exposed to strong sunlight, and should be certified to PV1-F and the cable connectors should meet EN50521 standard. Ask your supplier.

Electricity meters

Solomon Power will install, at your cost, a bi-directional meter. This allows the measurement of power that is consumed from the grid, as well as separately measuring an exported power back into the grid. You will not be able to use any existing pre-pay meters or spinning disk meters.

Solar Panel Installation Factors

Your installer will make sure that the solar panels are positioned on your roof for maximum efficiency and safety, and are correctly wired to the inverter. They will take the following aspects into consideration.

Orientation

As Solomon Islands is in the southern hemisphere, solar panels should be facing as close to true north as possible. However north-west and west-north-west orientation can work if you use most of your power in the afternoon.

Tilting

Depending on location, the angle of panels should be between 20 degrees. This is not as important a consideration as orientation of the panels.

Shading

Your installer should position the panels for full sun between 9am and 3pm and not in shady areas. Shading from trees for example can cause a major reduction in production.

Mounting

The mounting system should be certified by an engineer for the Solomon Islands conditions. The system and brackets should be cyclone rated and wind certified. Ask you supplier for information on certification, warranty and documentation.

Grid-Connect Solar Power System Lifespan

Tests have shown that solar panels show output reductions in power output as the glass dulls, maybe after 20 years or so. Ask for the warranty period. Inverters are more sensitive and may only last 10 to 15 years in ideal conditions before needing refurbishment.

How Big a Solar System Will You need?

The size will depend on:

- Physical unshaded area for the panels
- The power that you want to generate
- Your budget

In general terms the more that the power generated matches what you will consume, the better the benefit. Remember that Solomon Power does not pay for exported power.

In Australia, the most common household system is rated at 1.5kW output. If you consume about 18 kWh (or units) per day, then a 1 to 2 kW system would reduce your power bill by 25-40% per day.

Remember that you can also have a positive effect on bill by conserving energy by using energy efficiency lights and appliances.

Solar Rebates

There are no solar rebates available in the Solomon Islands for the installation of these systems

Feed-In Tariffs

There is no feed-in tariff in the Solomon Islands. Solomon Power may require that no power be exported back into the grid in some circumstances.

Standby Tariffs

Solomon Power charges a maximum demand for the connection of solar arrays to the grid. This is to ensure that there is adequate capacity reserved in the grid for providing backup supply for you in the event of bad weather or other similar situation when your solar system does not generate power.

Choosing a Solar Installer

You need to ensure that your system is installed by a suitably qualified person. Such people should have adequate training, follow industry best practice, adhere to the Solomon Power standards, and regularly update their skills and understanding.

Quotations and contracts

You should ask for a full system quotation including specifications, quantity, size, capacity and output of major components including:

- Solar panels
- Mounting system
- Inverter
- Travel and transport requirements
- Other equipment needed
- System user manual

The quotation should specify a total price which, with the other relevant documentation, should form the basis of your contract with the designer/ installer. Your should ask for the following to be included:

- Average daily electricity output estimate in kilowatt hours (kWh)
- An estimated annual energy production amount in kilowatt hours
- Estimated outputs during the most and least favourable months
- The responsibilities of the installer and the customer, including payment timings
- Warranty and guarantee details

- Who is responsible for connection to the electricity grid
- Who will arrange the meter change-over

Know What Questions to Ask

This system will be a substantial investment and you should find out the facts before committing.

Questions for your installer

- Are you accredited in places other than the Solomon Islands
- How many systems have you installed previously
- Can you provide customer testimonials
- Do all of your products meet the Australian standards as required by Solomon Power

Questions for Solomon Power

- Will I move to a post-pay account – (normally Yes)
- Are there any other costs for connecting a solar power system
- What contract will I have to sign
- What will I be charged for replacing the meter
- How long will the process take

Some Additional Tips

- Ask around for other people's experience so you can avoid any problems
- Have realistic price expectations. Lower price doesn't always mean lower quality, but it is an indicator. Make sure you are getting the design, installation and the warranties that you expect.
- Shady roof areas don't make for efficient solar generation.
- Compare the components in package deals to make sure you are getting what you expect.
- Beware of hidden costs associated with metering, roof mounting, etc.
- Get a few quotes.
- Remember that warranties may not survive the departure of the installing company.