



Guide to buying household solar panels (photovoltaic panels)

Solar power systems are now an affordable option for households looking to reduce their power bills and generate their own electricity. There is an increasing number of products and suppliers on the market, most of which will be able to be connected to the Solomon Islands grid.

Solomon Power follows the Australian/ New Zealand standards for connection of solar panels to its electricity grid. This is to ensure the safety of its staff and customers, as well as ensuring that customers can be comfortable with their investments.

This guide is intended to provide an introduction to solar PV systems so you are better equipped to make choices about a product that is right for you.

Towards the back of this guide there are a series of questions you can ask your installer, and the Solomon Islands Electricity Authority T/A Solomon Power to ensure you have all the information you need to make smart decisions.

This guide is only intended for people who will be connecting their system to the Solomon Power electricity grid.

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Installation checklist

A Step-by-Step Process to having your Solar PV System installed:

1. You conduct your own research into the benefits of having a solar PV system installed. In particular, you should ensure that you understand what will happen to your meter, your electricity tariff and your electricity bill before you agree to have a PV system installed.
2. You contact several Designers/Installers to arrange for a quote. They should preferably be CEC-accredited Designers/Installers. A list of Australian ones can be found at solaraccreditation.com.au
3. By asking informed questions, (see '*Questions to ask your Designer/Installer*'), you then select a Designer/Installer.
4. The Designer/Installer designs a PV system to meet your requirements (see '*What does the Design and Specification of my Solar PV System involve?*')
5. You, or your Designer/Installer, complete the connection and approval process for Solomon Power. See Solomon Power document: '*Solar PV Connection Process*'.
6. The Designer/Installer completes the installation of your solar PV system
7. The Designer/Installer contacts Solomon Power to arrange for your new meter to be installed (see '*Questions to ask Solomon Power*' below).
8. Solomon Power installs your new meter.
9. Your solar PV system is now ready to produce electricity.
10. Solomon Power will conduct a safety inspection of your solar PV system.

How does solar PV work?



Solar Photovoltaic (PV) panels are generally fitted on the roof in a northerly direction and at an angle to maximise the amount of sunlight that hits the panels.

Solar PV panels on the roofs of homes and businesses generate clean electricity by converting the energy from sunlight. This conversion takes place within modules of specially fabricated materials that make up the solar panels. It is a straightforward process that requires no moving parts. Solar panels are then connected to the

mains power supply through a device called an inverter.

Solar panels have been installed on the rooftops of houses and other buildings countries such as Australia since the 1970s. Currently there are many solar panel systems safely and reliably delivering electricity to households and businesses across Australia.

Grid-connected solar PV systems

Most suburban homes in Honiara are connected to the electricity grid, which uses alternating current electricity (AC). However the electricity generated by solar panels is direct current (DC). That means grid-connected (GC) solar PV systems need an inverter to transform the DC electricity into AC electricity that is suitable for ordinary household needs. Houses with solar systems use solar power first before sourcing electricity from the grid.

When the panels are not producing any electricity at night or producing at reduced levels during cloudy days, electricity is supplied from the existing SIEA T/A Solomon Power electricity grid (back-up). The grid also supplies the heavier currents needed to start electric motors etc. even when the solar panels are in use.

How much power do they generate?

The output of a solar PV system depends on its size. The most common household systems are either 1 kilowatt (kW) or 1.5 kilowatts, although some property owners have installed systems of up to 10 kilowatts.

How much do solar panels cost?

The cost of solar panels has continued to reduce with an increased diversity in the panels, inverters and suppliers on the market.

You need to ensure that having a grid-connected PV system makes sense for you by meeting your needs at a sensible price.

It is important to understand on what you want from your solar PV system. Are you after a system that will partially offset your energy consumption for 5-10 years before requiring a system upgrade? Or do you want a system that will completely offset your household's electricity use for the next 25 years? Like buying a second-hand car as opposed to a brand-new sports car, these two solar PV systems are both sound investments depending on your needs, but will vary significantly in price.

The price of your solar PV system can also be affected by variables including:

- Location
- Number of panels
- Orientation of panels
- Type of panels
- Type of inverter
- System design and configuration
- Shipping costs for equipment and parts
- Structural engineering, architectural, and other professional services (for commercial systems)
- Contractor installation costs
- Removal of trees or other shading
- Type of roofing (for example, tiled or tin)
- Height of roof
- Site preparation needs (for example, condition of roof or ground)

Australian Standards

It is important you ask your accredited installer to provide proof that your panels meet Australian standards.

The Clean Energy Council has a frequently updated list of all solar panel and inverter models that meet Australian standards. To see the list, <https://www.solaraccreditation.com.au/solar-products/inverters/approved-inverters.html>

Solar PV systems must also comply with the CEC Design and Installation Guidelines.

Warranties and Guarantees

Solar PV panels generally come with a performance warranty that can last up to 25 years and a guarantee lasting five to ten years. Additionally, panel material warranties and workmanship guarantees generally span 5-10 years.

It is important to know who is providing the warranty – the manufacturer or the importer. In the absence of a manufacturer, the importer is responsible for the warranty. However, if the importer changes their business name or sells their business, their warranty obligations towards you cease. Ask your installer who is providing the warranty.

A system manual that provides operation, maintenance and safety information should be provided by your installer. This must also include a system energy output (kWh) estimate. It is important to ensure you obtain written confirmation of statements made by your installer, including performance claims, guarantees and warranties. Documentation will be essential if you need to make warranty or insurance claims.

What Solomon Islands government schemes are in place to lower the cost of purchasing a solar PV system?

There are currently NO government assistance schemes in the Solomon Islands for the installation and operation of solar PV arrays

Renewable Energy Certificates

The Solomon Islands does NOT have a Renewable Energy Certificate Scheme.

Feed-in tariffs

Solomon Power does NOT purchase excess energy from a domestic or commercial photovoltaic system.

Standby Charges

Solomon Power DOES apply a daily standby charge for the operation of solar PV arrays that are connected to its network. This is 50% of the power that is generated by the array and consumed internally by the customer. The power generated by the array (in kWhs) is assessed as being 4.4 times the nominal kW rating of the inverter.

What does the design and specification of my Solar PV System involve?

Accredited Designers / Installers

Solomon Power recommends that the designer and installer of your solar PV system should be accredited by the Clean Energy Council. The Clean Energy Council's accreditation scheme ensures that accredited designers and installers of solar PV power systems:

- Have undergone the necessary professional training
- Follow industry best practice
- Adhere to Australian standards
- Routinely update their skills and product knowledge.

For a list of accredited professionals, please see solaraccreditation.com.au.

An accredited Designer/Installer will provide you with a solar PV system design and specification. This will include things such as:

- Establishing your electrical loads over an average day using a load analysis
- Determining the type of panels
- Determining the size of your solar PV system
- Deciding the type of inverter
- Establishing the location of solar panels in relation to angles, available sunlight, shading and temperature.

What size solar PV system should I install?

The size of your solar PV system will depend on:

- the physical unshaded area available for the installation of your panels
- how much you are prepared to spend
- what portion of your electrical consumption you wish to generate.

To work out what size solar PV system you require, you need to analyse your household's daily electricity consumption. Your monthly or quarterly electricity bill measures your household's electricity consumption in kilowatt hours (kWhs). From this figure, you can calculate your average daily electricity consumption, and the average amount of electricity your solar PV system needs to produce to cover your electricity needs.

This process will be completed by your accredited designer during the design and specification stage, as part of their load analysis.

What size panels should I buy?

Solar PV panels come in different wattages. The main issues are your budget and whether the solar panels will physically fit in the space you want to install them.

Each solar panel is approximately 1.6 metres long and 0.8 metres wide. A 1kW solar panel system will require around 8-10m² of roof space, and a 1.5kW solar panel system requires around 12 m². This will vary depending on the type of panel installed on your roof.

What sort of panels should I buy?

There are four main types of solar panel available, each with their own benefits. During the design and specification stage, your accredited designer will help you choose which type is the best to suit your needs:

1. Mono Crystalline (monocrystalline c-Si)



- 0.5% per year.

These panels are a proven technology that has been in use for over 50 years. They are commonly used where space is limited, or where there are high costs associated with installing large panels. They have a very slow degradation, generally losing 0.25

2. Poly Crystalline (polycrystalline c-Si)



These panels are similar to Mono Crystalline panels, but the silicon used is Multi-Crystalline which is easier to make. They are comparable to Mono Crystalline in performance and durability. Slightly more panels are required to produce a given amount of electricity.

3. Thin Film



These panels are typically nearly double the size than the other panel varieties. Research is continuing to improve the performance of Thin Film panels and to refine the manufacturing process. They respond well to slightly diffuse light and their efficiency does not drop on hot days.

The most common varieties of Thin Film panels are:

- Cadmium Telluride Thin-Film panels (CdTe)
- Copper Indium Gallium Selenide Thin-Film panels (CIGS)
- Amorphous silicon Thin-Film panels(a-Si)

What angle should the solar panels be on?

Solar PV panels produce most power when they are pointed directly at the sun. In the Solomon Islands, solar modules should face north for optimum electricity production. The orientation of the panels will often have a greater effect on annual energy production than the angle they are tilted at. A minimum tilt of 10° is recommended to ensure self-cleaning by rainfall.

For grid-connected solar PV power systems, the solar panels should be positioned at the angle of latitude to maximise the amount of energy produced annually. Most Solomon Islands homes have a roof pitch of 20° to 30°.

If your roof's slope is not ideal, your accredited designer can create an appropriate mounting frame to correct the orientation and elevation of your panel. Failing this, the designer can advise you on the difference in energy output for different tilt and orientation.

How much sunlight should the panels receive?

The amount of energy in sunlight that a solar PV panel receives over a day is expressed in peak sun hours. As the amount of energy generated by a panel is directly proportional to the amount of energy it receives from sunlight, it is important to install panels so they receive maximum sunlight.

Your accredited designer will calculate the amount of energy generated by the solar PV panel from the peak sun hours available. Peak sun hours vary throughout the year.

Shading / Dirt

Solar PV panels should ideally be in full sun from at least 9am to 3pm. They should not be placed in shaded areas and should be kept free from dust and dirt. Even a small amount of shade - from things like trees, roof ventilators or antennas - will have a large impact on the output of a panel, as it changes the flow of electricity through the panel. Shading or dirt on just one of the cells in a solar panel results in a loss of power from many cells, not just the one that is shaded.

Temperature

The amount of electricity a solar PV panel can generate is reduced as temperatures increase. Solar panels operate best at ambient temperatures up to 25°C. If the ambient temperature is higher than this, the panel's output declines.

What is an inverter? What sort should I buy?

Solar PV panels produce low voltage DC electricity. The inverter converts this into the AC electricity needed to supply power for standard appliances.

The efficiency of an inverter is measured by how well it converts the DC electricity into AC electricity. This usually ranges from 95% to 97.5% for most models. Check the inverter's specifications before you purchase.

Inverters are sized according to the power (kilowatts) they can supply.

Australian Standards

It is important to ensure that your grid connect inverter complies with Australian Standards. This is necessary to ensure that Solomon Power will allow it to be connected to the grid. Your accredited installer to provide proof that your inverter meets Australian standards. The Clean Energy Council has published a list of all grid connect inverters that meet Australian standards. <https://www.solaraccreditation.com.au/solar-products/inverters/approved-inverters.html>

What will happen to my meter at home?

When your solar PV system is installed, you will need to have a new meter installed.

If you have a post-pay meter (with a spinning disk) or a pre-paid CashPower meter, this will need to be replaced with a new import/export meter. This is to ensure that it records only the power imported from the grid. Note that Solomon Power does NOT have a tariff for power exported back into the grid. While this export may be recorded by the new meter, it will not generate any credit for you.

If you are presently on a pre-paid metering arrangement (CashPower), then you will be transferred to a Post-Pay Account. You should consider this and carefully weigh up the advantages and disadvantages before making a decision. This should be understood before you commit to install your solar PV panels.

Your new meter will be a "net meter". On a net feed-in tariff scheme, your "net meter" measures your household's electricity and the electricity generated by your solar PV system together. Solomon Power reads the meter and calculates the electricity that you have consumed from the grid. Note again that Solomon Power does NOT have a feed-in tariff for any electricity that you might export.

Your new meter must be installed by Solomon Power. This will be organised by your accredited Designer/Installer. The new meters will be provided by Solomon Power, and you will be charged up-front for the cost of providing and installing them.

Quotation / Contract

The following information is offered as general information only.

Following the design and specification you may request a quotation for the design and installation of the system.

The quotation could provide specifications, quantity, size, capacity and output for the major components, including:

- solar PV modules
- mounting frames
- structure
- inverter
- any additional metering
- data-logging
- travel and transport requirements
- other equipment needed
- any trench digging
- a system user manual.

The quotation should also specify a total price, together with proposed start and completion dates. The quotation should form a basis for your contract with the Designer/Installer.

In addition, a contract for the supply and installation of the power system should be included with the quotation.

The contract should include:

- an estimate of the average daily electricity output (in kWh)
- the estimated annual production
- the estimated production in the best and worst months
- the responsibilities of each party
- Warranties and guarantees, including installer workmanship schedule of deposit and progress payments.
- who is responsible for connecting your solar PV system to the Solomon Power electricity grid

Questions to ask your Designer / Installer

The following information is offered as general information only.

When signing a contract with your Designer/Installer, you need to be informed. Important questions to ask include:

Accreditation

- Is the designer accredited?
- Is the installer accredited?
- What are their accreditation numbers? Will your system be designed and installed by an accredited individual?
- Check the list of accredited installers on the Clean Energy Council website to confirm www.solaraccreditation.com.au
- Contact the Designer/Installer's former customers to find out if they were knowledgeable, easy to work with, and took the time to explain the systems operation. Also find out if their systems are working well, if there have been any problems, and, if so, if they returned to fix them. Ask for the Designer/Installer business references, and check them, especially if the company's reputation is unknown.

Experience

- How many systems has the Designer/Installer completed?
- How many systems similar to your system has the Designer/Installer completed?
- When was the last time the Designer/Installer completed a system? New products are constantly entering the market. A Designer/Installer who has completed several recent installations will probably be up-to-date on the newest products and the latest regulatory issues.

Quality of Products – Australian Standards

- Do the modules you use meet the Australian Standards? Check the Module List on the Clean Energy Council website to confirm - www.solaraccreditation.com.au
- Do the inverters you use meet the Australian Standards? Check the Inverter List on the Clean Energy Council website to confirm - www.solaraccreditation.com.au
- Do some research on the other balance of system components that your Designer/Installer suggests, such as the mounting hardware? Do the products meet industry standards?
- If you know of other people who have used these products, ask for their feedback: Are they satisfied? Have they had problems?

Warranties

- What kinds of warranties come with the products?
- Which warranties are your responsibility and which are the manufacturers?
- How long have the equipment manufacturers been in the PV industry? Long warranties are meaningless if the manufacturers aren't around in five years.
- If you have to deal with the panel or inverter manufacturer in the future, do they have a Honiara office?

Service Agreements & Performance Guarantees

- What performance guarantees do you get for the system as a whole?
- How will you know if your system is performing to its maximum potential on a day to day basis?
- Does the Designer/Installer provide some kind of optional service agreement?
- If problems arise with your system, what services will the Designer/Installer provide and for how long?
- Will the Designer/Installer be readily available to troubleshoot and fix problems?
- If something goes wrong, who is responsible for repair or replacement costs?
- Who is responsible for maintaining the system?
- If you are responsible, what kind of training will the Designer/Installer provide?
- Will basic system safety issues be explained?

Paperwork

- Does the Designer/Installer handle organising all the necessary metering changes?

References

- Contact the Designer/Installer's former customers to find out if they were knowledgeable, easy to work with, and took the time to explain the systems operation. Also find out if their systems are working well, if there have been any problems, and, if so, if they returned to fix them. Ask for the Designer/Installer business references, and check them, especially if the company's reputation is unknown.

Quote

- Does the price quoted include all the necessary metering changes and paperwork for Solomon Power?
- Does the quote include all labour, transportation and inspection charges?
- Does the Designer/Installer give an accurate estimation of system production with their quotes?

Payment Terms

- What are the payment terms?
- Is there a deposit? When is it required? Is it refundable?

Time Frames

- What is the lead time from your payment to getting electricity from your solar PV system?

The Final Decision

- By installing a solar PV system, you need to take responsibility for it and learn the basic safe operation and proper maintenance of your systems. You should think carefully before selecting a Designer/Installer. Online and mail-order solar PV system suppliers who never visit your home may have difficulty recommending the most appropriate equipment. A comprehensive, on-site solar and load analysis and two-way interview can help ensure a thoughtfully designed and well-planned installation.

What happens after my solar PV system has been installed?

Entering into agreement with Solomon Power

After your solar PV system has been installed, you will need to enter into an agreement with Solomon Power. A copy of this can be downloaded from the Solomon Power website:

www.siea.com.sb

Questions to ask Solomon Power

- What is the cost of the electricity you purchase from Solomon Power (in cents per kWh)?
- What is the standby charge for solar panels and how will it be applied?
- Penalty clauses (termination costs)
- Billing / payment periods
- Are there any other administration fees?
- Do you organise all the necessary metering changes? If “yes”, the following questions apply:
 - What is the cost of your meter?
 - What is the cost of installing your meter?

Safety Inspections

Following the installation of your solar PV system, safety inspections will be carried out by Solomon Power. It is the responsibility of either you or your installer to organise these inspections with Solomon Power.

Dispute resolution

Disputes about the design, installation, operation and maintenance of your solar system are a matter between you and your Designer/Installer. Solomon Power will not be a party to any dispute over such matters.

Appendix

1. Clean Energy Council - cleanenergycouncil.org.au/cec/resourcecentre/Consumer-Info/connecting-to-the-grid
2. Clean Energy Council - solaraccreditation.com.au/acccec/approvedproducts
3. Office of the Renewable Energy Regulator - www.orer.gov.au
4. Office of the Renewable Energy Regulator - www.orer.gov.au/sgu/index
5. Office of the Renewable Energy Regulator - www.orer.gov.au
6. Department of Climate Change and Energy Efficiency
4. www.climatechange.gov.au/government/initiatives/renewable-target/needret/solar-credits-faq.aspx
7. Office of the Renewable Energy Regulator - www.orer.gov.au
8. Clean Energy Council - solaraccreditation.com.au/acccec/approvedproducts/inverters