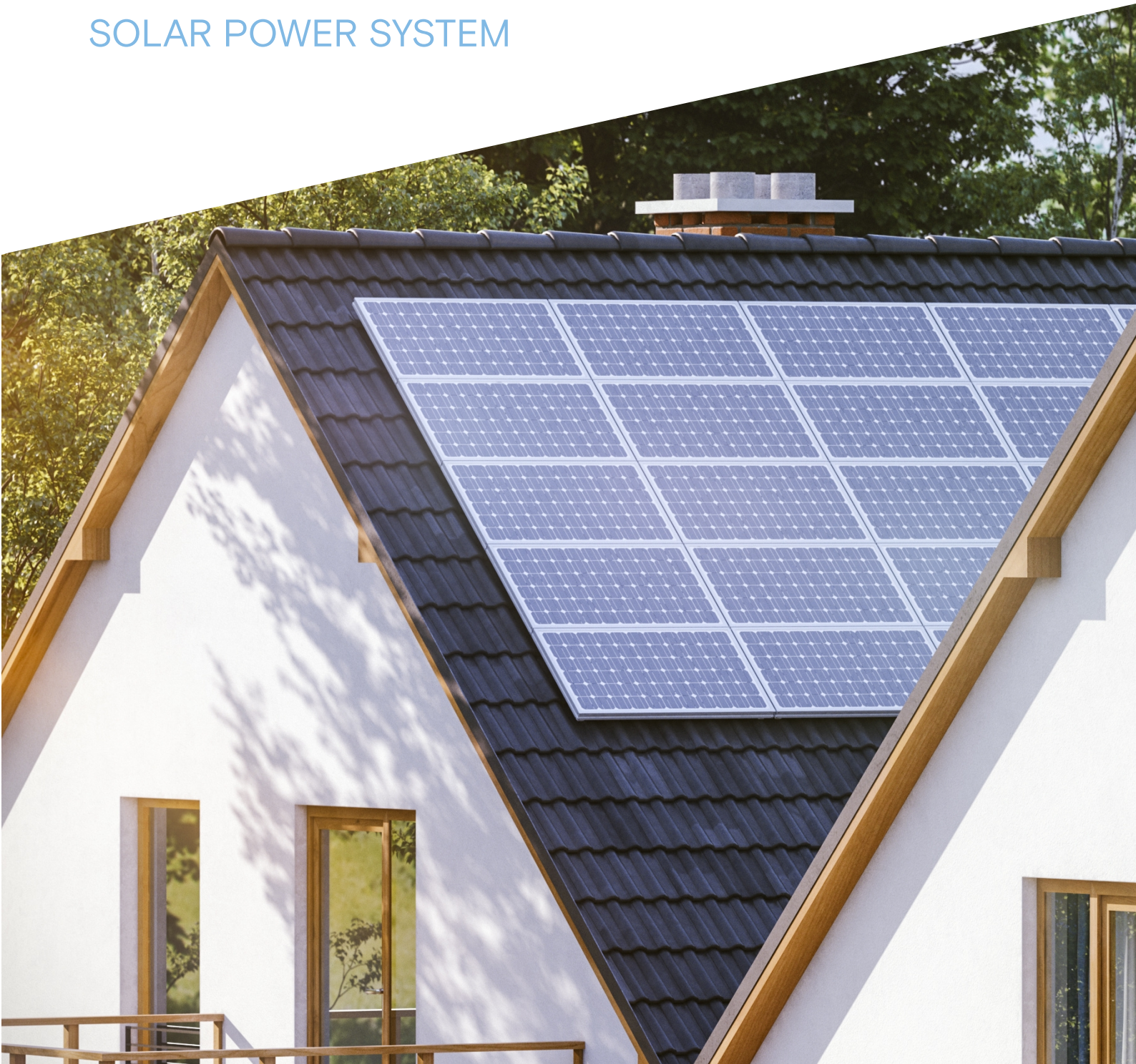
energis

Buying Guide

SOLAR POWER SYSTEM



Introduction

Investing in the right rooftop solar system is a major decision for most Australian families.

Taking the time to read and learn and ask the right questions will ensure that you'll ultimately make the right choice. Afterall, there is no 'one size fits all' for solar systems and many factors you should consider along your buying journey.

Through reading this guide, you'll know more about solar energy, be able to identify the better tier 1 products from lower quality ones and be confident you're paying the right amount of money for a properly sized solar power system installation for your home.

Benefits of shifting to solar

Most Australians switch to solar as a means to control their electricity bills but there are other benefits too. Let's delve into them.

1. Save on electricity bills

Electricity prices will continue to hike even with the rise of renewable energy. This has to do with the sunk cost in maintaining the existing grid infrastructure and demand from those who still rely on it. The only way for a home to save on electricity bills is to make compromises to lifestyle or make the switch to smarter energy and invest in renewable energy and alternative energy solutions.

2. Reduce dependence on the grid

For regions susceptible of blackouts from extreme weather fluctuations or natural disasters, switching to smarter energy means potentially avoiding power outages, reducing electricity costs, easing installation in homes, presenting an alternative power source for rural areas, and keeping the environment clean and green.

3. Do your part in slowing down climate change

We all know that global temperatures are rising and the effects of it so far. The benefits of using solar energy have been campaigned repeatedly for a long time, and with a purpose. Utilising it to generate power can greatly reduce the emissions of CO2 by decreasing the demand for fossil fuels. This will minimise greenhouse gas emissions and can reduce our carbon footprint. For example, an Australian household with a system size of 6.6kW would generate 11,046kWh of clean energy each year, and reduce 9.5 tonnes of harmful CO2 emissions from being emitted; the equivalent of planting 35 trees.

4. Prepare for an energy sharing future

Microgrids are a rapidly expanding sector of the energy business, representing a paradigm shift from remote central station power plants toward more localised, distributed generation—especially in cities, communities, and campuses. Microgrids provide efficient, low-cost clean energy. They can enhance local resiliency and improve the operation and stability of the electric power grid. They provide dynamic response, unprecedented for an energy resource. These solutions are already rolling out to communities and will likely be the future. By switching to smarter energy now, you will be preparing your business for this shared energy economy future.

Contents

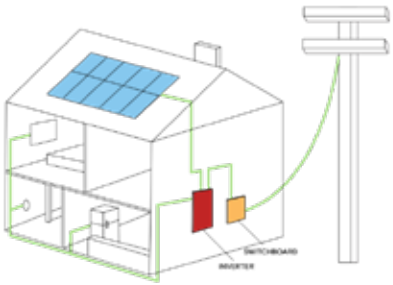
What's the difference between grid-connected, off-grid and hybrid?

All solar power systems work on the same basic principles. Solar panels first convert solar energy or sunlight into DC power using what is known as the photovoltaic (PV) effect. The DC power can then be stored in a battery or converted by a solar inverter into AC power which can be used to run home appliances. Depending on the type of system, excess solar energy can either be fed into the electricity grid for credits, or stored in a variety of different battery storage systems.

THE THREE MAIN TYPES OF SOLAR POWER SYSTEMS

01

Solar Grid-Connected System or Grid-tie System



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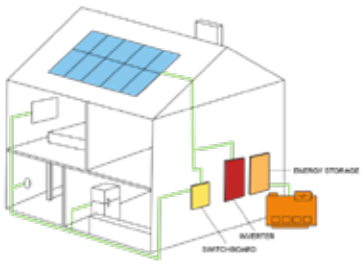
Solar Off-Grid System or Standalone System



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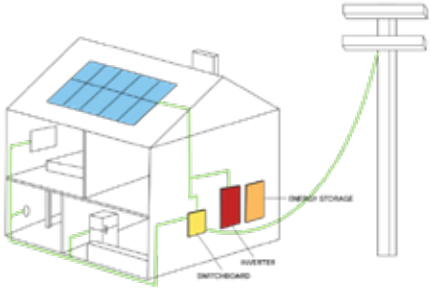
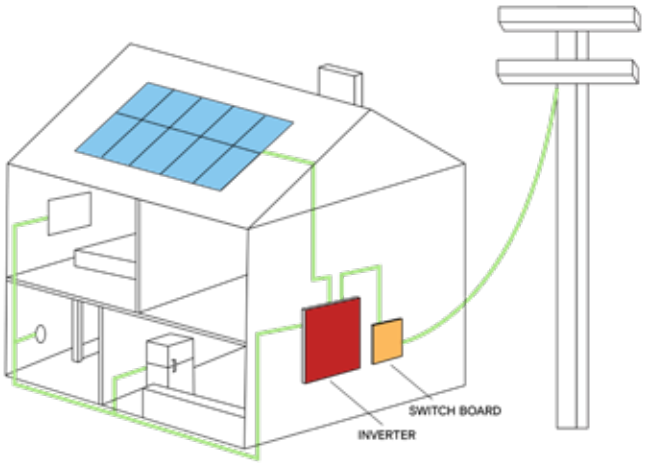
Solar Hybrid with Back Up Capability



01 Grid-connected Solar Power Solution

On-grid or grid-connected solar systems are by far the most common and widely used in Australia. Solar modules are mounted on your roof and convert energy from sunlight into direct current (DC). A device called an inverter then changes the DC into alternating current (AC).



This can be used to power your household. These systems do not need batteries and use inverters to supply usable electricity to your home. These systems are also connected to the public electricity grid.

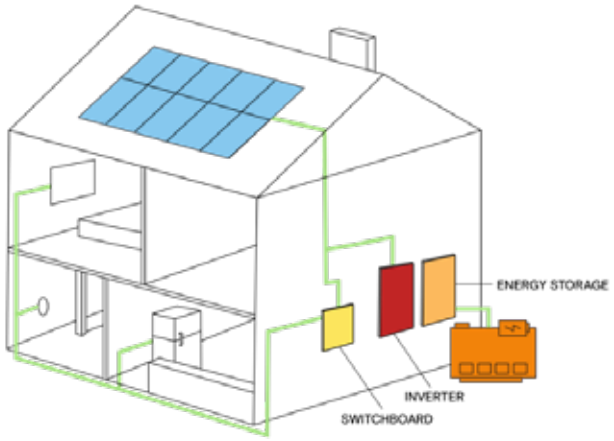
Solar grid-connected systems are the most common form of solar PV systems in Australia. It can save you the power you use during the day and you will get paid as per the feed-in tariff from the electricity company on the surplus power you send back to the grid. At night, or if solar energy produced is not sufficient, the power needed will be taken from the grid as usual.

Key Benefits

- **Lowers energy bills!**
- **More affordable investment to start with & flexible:**
  Depending on the solar power system you have installed, you will be able to upgrade and add on to energy storage or a battery solution at a later stage. This means that the initial investment to shift to renewable energy is lower than what it'd be if you decided on a hybrid solar and energy storage solution.
- **Increases the value of your home:**
  Installing solar panels in your home helps you save thousands of dollars yearly. Every homeowner wants to make improvements and repairs that will increase the value of their home when they are ready to sell. The PV cell components of your solar system, in addition to generating energy, also raises the selling point of your home by adding a more technologically related and modern look that can potentially attract more buyers down the road.
- **100% renewable energy:**
  Grid-connected solar systems use clean, renewable power to generate energy that will positively impact human beings and the environment.

02 Off-grid Solar Power Solution

An off-grid system is not connected to the electricity grid and therefore requires battery storage. Off-grid solar systems must be designed appropriately so that they will generate enough power throughout the year and have enough battery capacity to meet the home's requirements, even in the depths of winter when there is generally much less sunlight.



The high cost of batteries and off-grid inverters means off-grid systems are much more expensive than on-grid systems and so are usually only needed in more remote areas that are far from the electricity grid. However battery costs are reducing, so there is now a growing market for off-grid solar battery systems even in cities and towns.

WHEN TO GO OFF-GRID

For many people the dream of becoming completely energy independent may be tough and expensive. To help you understand whether it is cost effective and what you should know before you decide to build or go off-grid refer to the pros and cons below:

PROS

- Preferred for remote locations where conventional electricity is expensive
- All banking equipment like batteries as well as generators are self-owned thus an investment
- No power bills
- No power outages
- Self-dependent on a renewable energy source

CONS

- Batteries and generators are expensive and require maintenance to ensure longevity
- Batteries can only store power for a few days or at maximum capacity
- Power is wasted when banks are at capacity and an immediate use is not found
- Power outage must be strategised

POTENTIAL NEED FOR A BATTERY

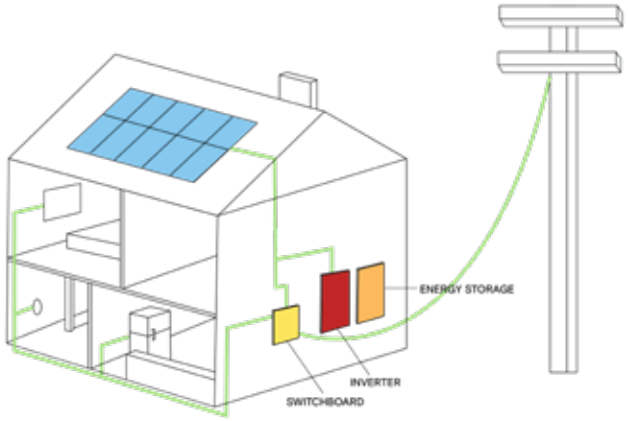
In an off-grid system there is no public electricity grid. Once solar power is used by the appliances in your property, any excess power will be sent to your battery bank. Once the battery is full it will stop receiving power from the solar system. When your solar system is not working (night time or cloudy days), your appliances will draw power from the batteries.

POTENTIAL NEED FOR A BACKUP GENERATOR

For times of the year when the batteries are low on charge and the weather is very cloudy you will generally need a backup power source, such as a backup generator.

03 Hybrid Solar Power Solution

Modern hybrid systems combine solar and battery storage in one and are now available in many different forms and configurations. Because the costs of energy storage systems are decreasing with potential government incentives in different states, home solar power systems that are already connected to the electricity grid can start taking advantage of battery storage as well.



This means being able to store solar energy that is generated during the day and using it at night. When the stored energy is drained, the grid is there as a backup, allowing home occupiers to have the best of both worlds. Hybrid systems are also able to charge the batteries using cheap off-peak electricity, if available.

NEED FOR AN ENERGY STORAGE OR BATTERY SOLUTION.

In a hybrid system, once the solar power is used by the appliances in your property, any excess power will be sent to an energy storage or battery bank. Once the storage is full, it will stop receiving power from the solar system. The energy from the battery can then be discharged and used to power your home, usually during the peak evening period when the cost of electricity is typically at its highest. When coupled with an intelligent home automation system or what we call an energy management system, you will have the ability to automate this process or customise it to fit your lifestyle.

HOW IT WORKS WITH THE METER AND ELECTRICITY GRID.

Depending on how your hybrid system is set up and whether your utility allows it, once your batteries are fully charged excess solar power not required by your appliances can be exported to the grid via your meter. When your solar system is not in use, and if you have drained the usable power in your batteries your appliances will then start drawing power from the grid.

Key Benefits

- **Lowers energy bills!**
- **You'll use less grid electricity than you would with a traditional grid-tied system.**
  While hybrid setups are grid-tied, they come with solar battery storage, which means you can maximise consumption of the power generated from the panels.
- **For even lower costs, you can use a power management system.**
  These technologies can automatically optimise your power usage. (For example, larger appliances like dishwashers can be switched on during peak daylight hours.) The result: bigger utility savings and a quicker ROI.

What are the different types of solar panels?

A solar panel or solar module is a flat panel designed to absorb the sun's rays as a source of energy for generating electricity. It generates DC electricity from the sun and sends this to an inverter to then convert into AC electricity to be used within the home.

While there are a range of different types and brands of solar power modules, the most common ones are:

01

Mono-crystalline solar panels

- Single cell structure
- Dark black in colour
- Corner cells are usually missing due to the nature of production

02

Poly-crystalline solar panels

- Multi-cell structure
- Light to dark blue in colour
- The differences in appearance is due to the manufacturing process

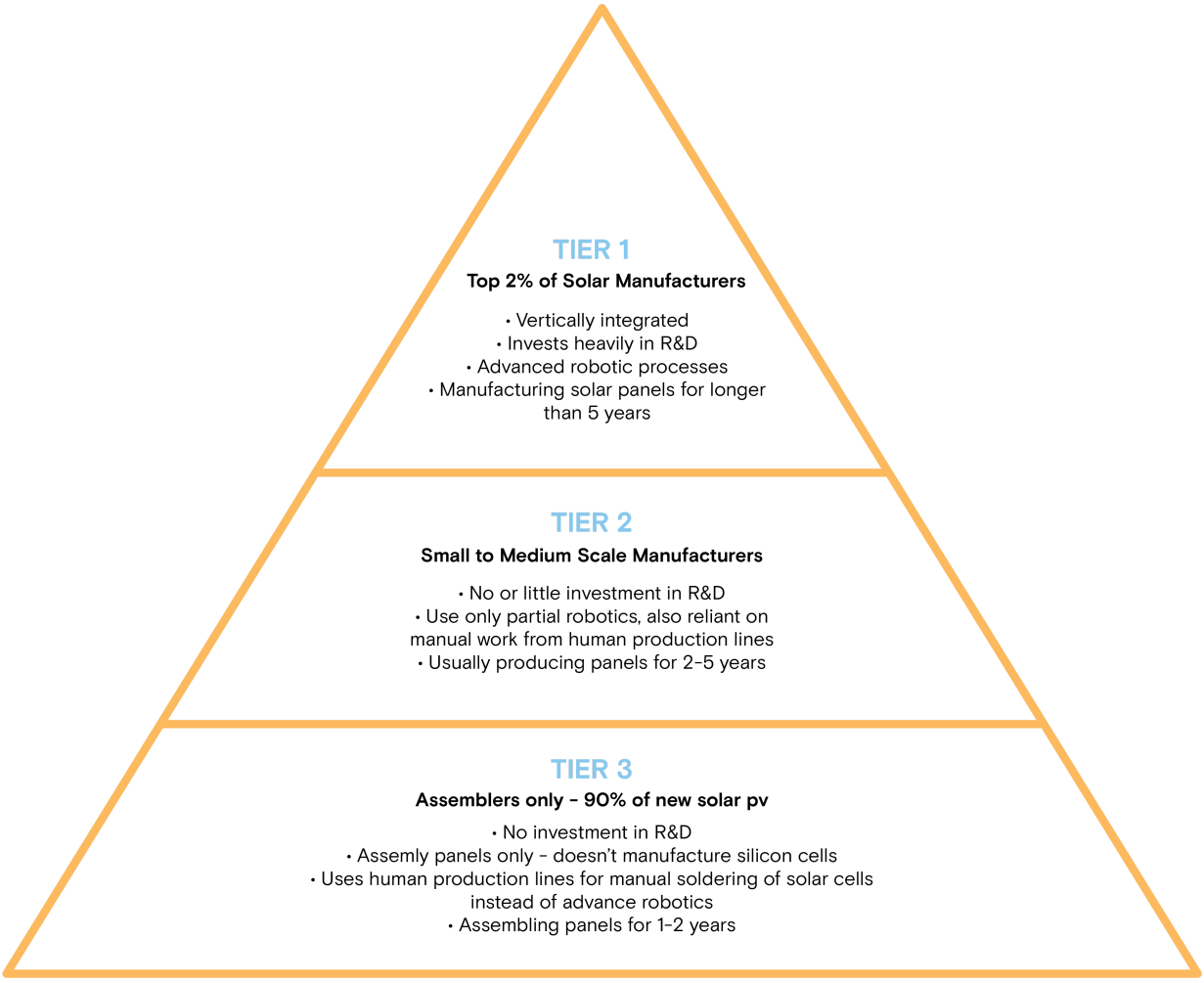
03

Thin film solar panels

- Rugged and lightweight
- Flexible and adaptable to many surfaces process
- More resistant to damage from hail, golf balls, rocks, etc. process

Hybrid Solar Power Solution

The quality of solar panels is very important. Not all solar panels are created the same, however you will not be able to know its quality just by checking it physically. Efficiency warranty of 25 years is given by almost all manufacturers. The point that should be noted is whether they will be around to honour the warranty after 15 or 20 years. Panels should be made by a reliable manufacturer who is financially sound and will be around for the life of the warranty.



WHAT MAKES A SOLAR PANEL TIER 1?

Tier 1 ranking has more to do with financial stability rather than product quality.
Bloomberg defines a Tier 1 solar manufacturer as "those which have provided products to five different projects which have been financed non-recourse by five different (non-development) banks in the past two years.

How to choose the right inverter for your solar power solution

Inverters are required with every solar power installation. They are the brains that convert the DC electricity harnessed by your solar panels into AC electricity, which is what you need in order to use this electricity - most electrical loads and appliances require AC power supply.loads and appliances use AC electricity.

When it comes to inverters, there are two main types: string inverters and micro inverters. A group of panels are connected to the string inverter in a string inverter system. In contrast, every single panel is connected with one micro inverter in a micro inverter system.

String Inverter
The string inverter system normally functions in a series setting with one single inverter connected to all the panels. This is the most common inverter used.

Micro Inverter
The micro inverter system typically has a single inverter under each panel. This is most commonly used in the shaded areas and if the panels go in multiple directions. This system will help you to track the productivity of each solar panel.

String inverter with DC optimiser
Some string inverters do not have integrated MPPT. So, DC optimisers are affixed to each individual solar panel in the array. They turn individual panels into smart modules by tracking their peak output and regulating their voltage before sending the power along to the central inverter.

WARNING: **Some installers may advise you to initially install a smaller panel system with a big inverter and to upgrade it later. We advise you against this for the following reasons:**

- By the time you install the new panels the efficiency of the existing panels would have reduced. The efficiency of the new panels also comes down to the performance of old panels. You also may not be able to source the same type of panels in the future.
- There is another installation cost involved for a second installation.
  The voltage window does not allow you to lay out the panels as you wish. Ask for NETCC performance estimate which explains the maximum and minimum number of panels possible, or you can contact us.
- Having a smaller panel system means the inverter will never produce more that the panels.
  For example, if you have a 5kW inverter but the size of the solar panels on your roof is only 4kW, the inverter will never be able to produce more than 4kW.

  Some inverters offer additional features and require to be mounted in a specific way.
  Be sure to ask your installer.

How to select the right solar power system size for your home

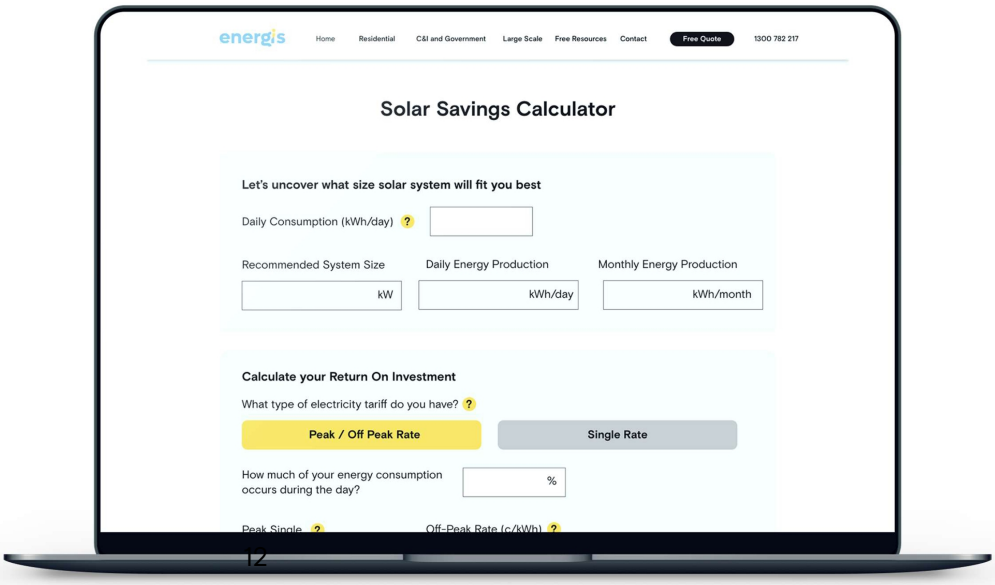
While we recommend to consult with an experienced energy specialist to determine the right sized system for your home, we also believe that having a general understanding of what to expect, depending on your daily energy consumption.

Analyse your electricity bill and find out the peak usage in kWh per day. The rule of thumb is to divide the kWh per day by 4kWh/kW in Victoria to get the system size you need.

For example, if your peak usage is 799.2kWh per month, then your average peak usage per day is 26.64kWh. The system you need is 26.64/4kWh, which is a 6.66kW system. A 6.66kW system consists of 6.66kW of solar panels (normally 18 x 370W panels), a 5kW solar inverter, a racking system for mounting the panels, electrical switchgears for protection and other necessary components and labels.

Get a performance estimate from our in-house Clean Energy Council accredited design engineers to find out how much solar power a suitably sized system would produce in your area. The above information can be used as an indicative guide, however there are a lot of factors to be considered when assessing the right sized solar system for a home.

To find out what system you need use our calculator in the link:
http://energis.com.au/solar-savings-calculator



How much will I save off my electricity bill?

Every household is slightly different from the daily amount of energy consumed to the size, roof orientation to how much sun hours it gets

As an indicative guide, refer to the table below to see how much energy savings can be achieved for a 3.9kW, 5.46kW and 6.63kW solar power system:

System size in kW	3.9kW	5.46kW	6.63kW
Avg Daily Production in kWh in Victoria	14.82	20.748	25.194
Avg Monthly Production in kWh in Victoria	450.78	631.09	766.32
Avg Yearly Production in kWh in Victoria	5,409.3	7,573.02	9,195.81
Savings with 70% onsite consumption*	$946.63	$1,325.28	$1,609.27
Feed-in tariff savings with 30% production fed into the grid*	$107.10	$149.95	$182.08
Estimated Energy Savings*	$1,053.73	$1,475.22	$1,791.34

***Disclaimer:** The savings shown above assume an average yield as per the NETCC guideline. Grid Electricity Price: Peak Rate: 25 c/kWh. Assume 70% of the solar power produced is used on site and the remainder fed into the grid. FIT: 6.6 c/kWh. It also assumes a certain usage pattern and other environmental elements which may change or differ from year to year and hence may alter the results. The above projections should be used as a guide only.

BONUS Checklist: Choosing the Right Installer

When choosing a solar installer, it pays to do a little research. The Clean Energy Council recommends choosing an Approved Solar Retailer who has signed on to the Solar Retailer Code of Conduct and only uses designers and installers who are accredited by the Clean Energy Council.

Below is a checklist we recommend using to assessing for a quality, reputable installer:

New Energy Tech (NETCC) approved

Track record of residential installations in your state

Track record of commercial installations in your state. Given the nature of commercial installations being more complex, installers who have experience in the commercial and industrial or even government sector can be considered as capable of delivering quality installations

Average Google review of 4+ with realistic written reviews

You are offered a consumption and / or energy management system as part of the install

Local office with in-house teams of engineers and technical support people

ISO Certified e.g.
ISO14001 - Environmental Management System
ISO 45001:2018 - Occupational Health Management System
ISO 9001:2015 - Quality Management Systems

Affiliation with any other Councils, Industry bodies or Organisations that are credible e.g. Electric Vehicle Council, Chamber of Commerce, etc.

Ask for references and receive them within a reasonable timeframe

Assess past installations: When looking at case studies and past installations from an installer you're considering, use the guide below to spot the difference between a good and a bad installation. SEE NEXT PAGE.

How to differentiate a GOOD installation from a BAD one

When looking at case studies and past installations from an installer you're considering, use the guide below to spot the difference between a good and a bad installation.

	Good Installation	Bad Installation	
Panels are installed with-in the edge of the roof			Panels are over the edge
Aligned panels			Panels are not aligned
Cables and conduit under the roof, any inter-array cables are			Cables are not done under the roof, conduit hanging on the roof
Bottom entries into the isolator			Top entries into DC isolator

FAQs

Will solar panels heat my hot water?
No – these solar panels provide electricity. If you are interested in a thermal solar system to heat water, you'll need a special type of collector unit – for more information, try our solar hot water section.

What happens on a cloudy day?
On sunny days your solar system will obtain the best possible electricity collection, however on cloudy days the panels will not collect the same amount. You can expect the panels to gather around half the output that would be achieved on a sunny day. If the electricity for a cloudy day is not enough to cover the household requirements, the system will use power directly from the grid. The performance of the solar PV system is affected by cloud cover. When there is not enough light to produce electricity, you will use electricity from the grid.

Will I need to re-roof my house?
In most situations, the PV panels can be easily removed and reinstalled, with minimal, if any, changes to your roof.

Can solar panels work in the shade?
The output of any panel will be reduced or cut off if shaded. However, some solar panels do work better than others in the shade.

All solar panels sold by Energis have "bypass diodes", which send output from the remaining cells around that dead cell. Dirt, dust, leaves, bird droppings, shadows from trees, vent pipes, etc can all cause reduced output due to shading. Wash panels down occasionally, especially if mounted flat on a roof, eg. caravan installations. A quick wash with a soapy brush or mop and then rinse. However, some tree waste may need to be cleaned off with a solvent such as turpentine.

Does the orientation of the roof affect whether or not a home can successfully install a solar product?
Although it is optimal to install solar products on the north-facing side of a roof, it is also possible to install a solar PV system on the east or west facing side of a roof, as long as there is sufficient space. However, this will not produce the same results as a north-facing installation.

Is mains electricity still needed?
Because solar PV systems only produce electricity when they are exposed to sunlight, at other times another source, such as mains electricity or a generator, will be required. When there is no sunlight, no electricity is produced, so you will need to draw electricity from another source such as the grid.

Are batteries needed for a solar PV grid connected system?
No. Grid-connected solar systems do not store electricity – instead, any electricity you do not use in your home is 'exported' to or fed into the electricity grid.

What is a feed-in tariff?
A feed-in tariff is the rate paid for any electricity your solar PV system feeds into the grid. The rate, which is paid, varies depending on your state and whether you are eligible for a government feed-in tariff or not.

04

Meet Energis

We practice what we preach

About Energis

Energis is a 100% Australian owned and New Energy Tech-approved company. We have been designing, installing and servicing residents in Victoria since 2013.

We are a New Energy Tech approved Seller & 100% Australian-Owned

This accreditation is an indispensable qualification for a business installing Solar PV. Retailers with this accreditation are committed to quality and best practice. We are also proud to be 100% Australian owned.

Tier 1 Quality

We only work with the most respected manufacturers and top-quality panel and inverter brands at the most affordable prices. Tier 1 panels offer high-quality standards that have proven to be better and more bankable than the rest of the market. Our products come with locally backed warranties.

Customer focused

At Energis, the sole focus has always been the customer and the outcome they're looking to achieve - whether that's reduced energy bills, less reliance on the grid or making their homes smarter. We bring our customers ease an affordability with the assurance that we'll always deliver top-quality products.

Service all of Victoria and Beyond

With a lot of pride, we service the Metro, Geelong, Mildura and Wodonga regions. Our extensive network allows us to deliver Metro pricing to even the most remote areas.

Standing strong since 2013

Energis has always remained consistent in delivering quality installations and customer support for its customers. We've installed some of the biggest projects in Victoria - no job is too big or too small for us.

ISO Accredited and Affiliated with Credible Brands & Associations

Energis holds the following accreditations and is associated with a number of credible membership associations and industry body:

We only work with the most respected manufacturers and top-quality brands at the most affordable prices.

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