



## Investing in a photovoltaic (PV) system for your home

Photovoltaic (PV) systems generate electricity from the power of the sun and are becoming an eco-icon, appearing on roofs all over Australia. People are installing PV systems to take advantage of financial incentives, add value to their homes and provide a safe-guard against future electricity price increases. When combined with energy-efficient living habits, they can even generate an income.

Most of our electricity is generated from fossil fuels such as coal and gas which produce massive amounts of greenhouse gases, a major contributor to climate change. Fortunately, we can use solar energy to make electricity in a way that that doesn't pollute our atmosphere and that won't run out.

We already use solar energy for drying clothes (using a clothes line). By using a photovoltaic (PV) system it is possible to change the energy from the sun into electricity. Photovoltaic technology has been used to power homes for many years. Sufficient sunlight falls on Australia to provide the nation's total energy needs many times over. A PV system installed on

your home will offer you the opportunity to generate electricity in a clean, renewable and quiet way.

### WHAT CAN I DO?

Install a photovoltaic system (set of panels) on your home to supply your own energy, reduce your greenhouse gas emissions and potentially reduce your energy bill to less than zero!

### HOW DO I DO IT?

#### What is a PV system?

Photovoltaic cells convert light energy into electrical energy. A set of panels installed on the roof of your home will generate power which can then be converted to mains electricity by an inverter.

Install a 1.5kW system and each year:



Government of Western Australia  
Department of Transport



### TANYA'S TIP:

Western Australia gets very little cloud cover and Perth is famous for having over 300 days of sunshine each year. With a 1.5kWh PV system, you can put this sunshine to work, maximise your subsidy and generate much of the electricity needed for your home.

### How does it work?

When the sun shines on solar panels they generate electricity. During the day if you are using any appliances, the solar electricity will be sent to power your appliances for free. If little energy is being used, the system feeds excess energy into the electricity grid and from 1 July 2010, the State Government and Synergy pays you a premium 'feed-in' tariff for each unit of power you produce. At night, or when you are using lots of appliances, you buy energy from the grid at standard rates. All this is controlled automatically by the system and all you will notice is substantially lower electricity bills. If there is an electricity outage on the grid your system will shut itself down for safety reasons, so (unless you have a battery back up system) you cannot use your PV power when the grid power is out.

### Where does it fit in my home?

A 1 kilowatt (1kW) system needs as little as 4.6m x 1.7m of roof space. To achieve maximum output the solar panels need to be installed at a 30° angle from horizontal, on a north facing area, with no overshadowing (e.g. trees, other buildings).

Panels to the east, west, or at other angles will generate power but at less than full efficiency.

### Which type of PV system should I choose?

There are three main types of PV systems commonly available to the residential customer:

- Mono-crystal silicon - Most photovoltaic cells are mono-crystal types. To make them, silicon is purified, melted, and crystallized into ingots. These types of cells are the most space efficient on the roof, but less shade tolerant.
- Poly-crystalline silicon - Poly-crystalline PV cells are manufactured in a similar manner to mono-crystal PV cells but a lower cost silicon process is used. As a result they are slightly less space efficient, but are also less expensive.
- Thin film - Silicon is applied directly onto glass to produce cells that have a high shade tolerance, but require a large roof space for each kilowatt hour of power. They also take less energy to manufacture (generally lowest in embodied energy).

The most important thing to consider when choosing your PV system is to make sure it will fit your roof, your budget and comes with a warranty that you are comfortable with.

### How much will I need to power my home?

A typical domestic system of 1.5kW will

produce approximately 6.5 units (kWh) of electricity per day, that's between one-third and one-half of the power needs of a typical household and all of the power for an energy efficient home. The size of the system does not need to match the amount of power used in the home because every unit produced by the system comes off your bill or earns the feed-in tariff rate if it is exported to the grid.

### How much does it cost?

The cost of a complete PV system - including power conditioning equipment and installation varies depending on the size of the system and the value of the renewable energy credits (RECs) under the 'Solar Credits' subsidy scheme. The full cost of a 1.5kW system is around \$11,500, you could expect to pay around \$5,500 after the 'Solar Credits' are deducted. A smaller 1.2kW system will cost around \$8,500 (\$4,500 after 'Solar Credits'). Suppliers offer different panel types with different qualities and lengths of guarantee, so you can choose budget or

PV System size	Number of RECs (in Perth)	Value at \$40 per REC (high price)
1.0kW	103	\$4,120
1.5kW	155	\$6,200
2.0kW	165	\$6,600
Larger systems	Extra 20 RECS per 1kW	

premium products.

The current Solar Credits scheme offers:

- Five times the usual Renewable

Energy Credits for systems of up to 1.5kW installed before 30 June 2012 (the RECs multiplier drops each year after that); with

- Eligibility for households or businesses and for PV, wind and hydroelectric systems (PV systems are best suited to installation on homes).

The value of the RECs subsidy can change over time (because they can be traded like an environmental share), but they are expected to be valued at around \$40 per REC as the system moves towards the fixed price on 1 January 2011. Buying before 1 January 2011 may still give the consumer the best price because the price of panels also changes with the strength of the Australian dollar.

An accredited PV supplier will be able to calculate the RECs as part of providing you with a quotation based on the system that best suits your roof space and budget.

For updated information on RECs go to the Department of Climate Change link [www.climatechange.gov.au](http://www.climatechange.gov.au).

### How long will it take for the system to pay for itself?

At current electricity prices and with the feed-in tariff a PV system can pay for itself within 10 years and go on to provide free power for another 20 years or more after that. When inflation, the increasing prices of fossil fuel and future electricity price increases are taken into account the payback period can potentially come down to less than eight years, representing a good investment.



The State Government is introducing a feed-in tariff to pay a premium for the power exported from a PV system, so improving the payback for households that have PVs and are energy efficient.

### Where can I find a PV system supplier?

To be eligible for the RECs subsidy the supplier must be accredited by the Clean Energy Council. Ask your installer/designer for proof of accreditation. Also ask your installer to arrange any Local Council planning approvals that may be required in your area.

Residents of Perth's eastern region can access **Perth Solar City special discounts by calling the Living Smart team on 9469 5000**. Residents of other regions should search "Renewable Energy" on the electronic yellow pages.

### What are the benefits of PVs?:

- A reduced electricity bill by generating your own solar power.

- Produce clean solar power and reduce greenhouse gas emissions.
- As energy prices rise the systems deliver increased financial returns with no required maintenance. Current returns are around \$400 per year of 'free' electricity from a 1.5kW system at standard tariff and up to \$600 on a Smart Power tariff.
- Add value to your home.
- Produce most energy on sunny days – the same time as high electricity demand on the grid.
- The Federal Government's Solar Credits scheme will help you save money, meaning solar power systems are now affordable and a sound investment.

### WHY?

Installing a photovoltaic system will pay for itself, provide you with free power in the future and promote the development of renewable technology.

During 2010/11, Living Smart will be offered to around 10,000 households in Perth's eastern region as part of the Perth Solar City program. For more information on this Australian Government initiative, please call 1300 993 268 or visit [perthsolarcity.com.au](http://perthsolarcity.com.au). The Living Smart Ambassadors are Tanya Ha (expert in environmental living and the author of *Greeniology* and *Green Stuff for Kids*) and Josh Byrne (sustainability specialist, presenter on ABC TV's *Gardening Australia* program and author of *The Green Gardener*). The information in this brochure is provided in good faith. However the accuracy or appropriateness of the information is not guaranteed. The Living Smart brand has been developed by The Meeting Place Community Centre, the City of Fremantle, Murdoch University and Southern Metropolitan Regional Council to support a suite of programs developing capacity in community sustainability.