

information sheet

SUSTAINABLE LAND USES

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Solar power information sheet

Please note: While all care has been taken in the preparation of this information sheet, it is not a substitute for legal advice in individual cases. The content of this information sheet is current as of August 2015.

This information sheet is one of a series on sustainable land uses which have been developed for Local Aboriginal Land Councils (LALCs) by the NSW Aboriginal Land Council (NSWALC). Copies of the information sheet are available from www.alc.org.au or by calling the NSWALC Policy and Research Unit on (02) 9689 4444.

What is solar power?

In this information sheet, solar power refers to the conversion of sunlight into heat or electricity.

The sun radiates large amounts of energy into space. This energy can be collected and converted into usable electricity due to advancements in technology such as the development of the solar cell. Essentially, solar photovoltaic panel systems convert solar radiation into direct current electricity using semiconductors.

Solar power is a versatile source of renewable energy that can be used in a number of applications, providing power for items such as cars and boats to houses. Solar panels do not rely on the earth's natural resources but on the energy of the sun to produce electricity. Solar power is clean and pollution-free.

Solar power is an intermittent energy source and because it is not available at all times energy storage is an important issue. Electricity generated from solar power must be used immediately or stored for later use.

Household and community use of solar photovoltaic systems has grown significantly in Australia in the past decade as a result of increased awareness of the risk of climate change, the reduced cost of solar power systems and a range of government incentives to encourage use.



In fact, community and household solar initiatives are one of the fastest growing. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) predicts that by 2050 around 30 per cent of Australia's energy supply will come from solar power.

How solar power works

Energy from the sun is converted into solar power using solar collectors, either to generate electricity or to heat other substances such as water.

Solar photovoltaic energy

This is the most common method of collecting solar energy and involves using solar panels to trap the sun's energy. The sunlight causes an electric current to flow in a wire within the solar panel.

Solar hot water systems

Solar hot water systems use solar collectors which absorb the energy from the sun to heat water for domestic or business use. The heated water is stored in an insulated tank for when it is needed. The solar collector can be as simple as a water pipe painted black which is exposed to the sun.

How do solar panels work?

Solar panels are made up of many small squares called photovoltaic (PV) cells. They have a positive and negative layer, creating an electric field.

1. Sunlight releases packets of energy called photons which reach the solar panel.
2. As photons are absorbed into the PV cells, their energy causes electrons to become free.
3. The electrons move towards the bottom of the cell and exit through the connecting wire.
4. The flow of electrons creates an electrical current.
5. The power created then flows into an inverter.
6. The inverter transforms the power into basic voltage and AC electrical power.

Solar electricity from a solar panel can be used either to replace electricity which would otherwise be bought from the electricity grid, or it can be sold by feeding electricity back into the grid.

How much power do solar panels 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 kW. In Sydney, a 1 kW system will typically generate 3.9 kilowatt hours (kWh) per day, whilst a 1.5 kW system will generate 5.85 kWh.

What size solar panel should you install?

The appropriate size of solar panel will depend on a range of factors including:

- How much electricity you consume and what portion of this you wish to generate;
- The physical unshaded area available for the installation of the panels;
- How much you are prepared to spend; and
- Whether you are intending to sell power back to the grid.

Some advantages of solar power include that:

- By generating your own electricity or hot water it saves money on energy bills.
- Operating costs are low.
- It is non-polluting and free of wasteful by-products.
- There are no noises or harmful emissions.
- It reduces the amount of greenhouse gases produced.
- It is one of the most reliable renewable energy sources.
- It is not subject to the same price fluctuations that accompany conventional electricity.
- Solar panels are reliable and have a long life span; they are robust and will last for decades if properly cared for.
- Solar cells can last a lifetime. They are easy to maintain and monitor.
- It can be used in remote locations.
- It can be used for low-power purposes as well as larger ones- from battery chargers, hand-held calculators, and solar powered garden lights to air conditioning, cars and satellites.
- Any excess electricity can be sold back into the mains power grid or fed into a storage system like a battery bank.
- It supports the growth of renewable energy sources in Australia.
- The purchase of a Small Generation Unit (SGU) such as solar panels may entitle you to Small-scale Technology Certificates (STCs). You may also be entitled to Solar Credits, which increases the number of STCs able to be created for eligible installations of SGUs through the use of a multiplier.

Some disadvantages of solar power include that:

- The amount of sunlight that arrives at the Earth's surface is not constant. It depends on location, time of day, time of year, and weather conditions.
- Cloudy days significantly reduce the amount of electricity that can be generated.
- Energy can only be generated during daylight hours unless a battery system is installed.

Uses of solar power:

LALC's may utilise solar power in a number of ways, including:

- To power buildings;
- To pump or heat water;
- Security lighting;
- Replacement of mains electricity; and
- For sale to the national grid to generate income.

Installing solar power

The process for installing solar panels is likely to involve the following key steps:

1. Identifying the specific requirements needed for the area.
2. Check with your local council whether any planning permission is required – this is more likely in a heritage conservation area and/or building.
3. Selecting the best position for the solar panels within the proposed property.
4. Choosing an appropriate system and supplier.
5. Having a qualified professional install the new system.
6. Maintaining the solar power system.

For more information regarding planning laws in NSW, see the NSWALC planning fact sheets available from <http://www.alc.org.au/culture-and-heritage/planning-laws.aspx>.

It is important to note that any development application is a land dealing and as such requires NSWALC's approval under Part 2 Division 2 of the *Aboriginal Land Rights Act 1983* (NSW) (**ALRA**).

Incentives to install solar power

There are several financial incentives currently operating in Australia to encourage landholders and businesses to install solar power systems. These may reduce the initial cost of installing the solar power system.

Small-scale Technology Certificates

The Clean Energy Regulator is the statutory agency which oversees the Small-scale Renewable Energy Scheme (SRES).

The purchase of a small-scale solar power system may entitle you to STCs through the SRES. To be eligible, the solar power system must be a system approved by the Clean Energy Regulator, have a capacity of no more than 100kW and a total annual electricity output less than 250MWh.

Installation of these systems permits the creation of STCs. The number of STCs created is based on factors such:

- Geographical location of the system;
- Installation date of the system;
- Amount of electricity in megawatt hours (MWh) that is generated over a 15 year lifetime.

These certificates can be sold and transferred to a STC agent (usually electricity retailers) or sold in the STC market or through the STC Clearing House. A STC agent will offer you a financial benefit such as an up-front discount or delayed cash payment when you assign your STCs to them. A majority of owners take this option. As of August 2015 each STC created has a fixed-value of \$40.

Further information regarding this scheme can be found at: <http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/How-the-scheme-works/Small-scale-Renewable-Energy-Scheme>

Feed-in-tariff scheme

'Feed-in-tariff' refers to the price you will be paid by your energy retailer for any excess energy your solar power system feeds back into the grid. There is currently no national regulation of feed-in-tariffs. In NSW, there is no mandatory minimum rate of feed-in-tariffs and as such the price is set by each individual energy retailer. At the time of writing, the average feed-in-tariff amount in NSW was between 5 – 10 cents per kWh of energy fed back into the grid. Note that this is approximately 3 times less than when you buy electricity from energy retailers.

Community-owned solar projects

Community-owned solar projects are just that – small, medium and large scale solar power projects which are initiated, developed and either fully or partly owned by

local community organisations as opposed to commercial developers¹.

These projects are being increasingly undertaken in Australia and have a range of benefits. Firstly, community-owned solar projects allow a greater level of community input into decision-making. Secondly, they allow investment and financial benefits to flow back into the community. It is common for revenues from a project to be fuelled into community investment funds that can be used address environmental, social and economic sustainability issues.

LALCs may want to consider whether a community-owned solar initiative is a viable project for their area, including whether there are other interested community groups and organisations that could be partnered with for such a project.

For more information about community-owned solar projects, contact NSWALC.

Solar Power and the Aboriginal Land Rights Act 1983 (NSW)

Landowners should seek advice to determine how development of solar power sites can interact with the ALRA and prevailing land rights. In particular, it is important to determine:

- Whether the development of a solar power site is a land dealing requiring NSWALC approval under Part 2 Division 4 of the ALRA; and
- Whether changing land use (to use for a commercial or residential purpose) will result in a change in any rates, levies or charges payable in relation to the land as described in Part 2 Division 5 of the ALRA and clause 7 of the Aboriginal Land Rights Regulation 2002.

NSWALC can assist with these considerations.

Associated costs

Solar power systems can be expensive to purchase and install, although once in place, any costs associated with them are offset by the energy savings.

Based on market conditions as of June 2015, the Clean Energy Council estimated prices for a 1.5kW system to be between \$3000 and \$6000, and \$11,500 for a top of the line 5kW system. Government rebates such as Renewable Energy Certificates, solar credits and feed-in tariffs can be deducted from these figures.

Solar systems will recover their costs more quickly in larger households/businesses, in warmer parts of the country, or where there is plenty of access to sunlight.

¹ (source: Embark – Community Energy <http://www.embark.com.au/display/public/content/Community+energy>)

For further information, please see:

<http://yourenergysavings.gov.au/energy/solar-wind-hydro-power/solar-power>

<http://www.solaraccreditation.com.au/consumers/purchasing-your-solar-pv-system/solar-pv-guide-for-households.html>

<https://www.solaraccreditation.com.au/>

Available Grants

Grant	Purpose	Contacts and Information
Small-scale Renewable Energy Scheme (SRES)	Designed to assist households, small business and community groups with the upfront cost of installing small scale renewable energy systems through certificates which may be created for eligible installations.	http://www.climatechange.gov.au/government/initiatives/renewable-target/fs-small-scale-renewable-energy.aspx
Small Grants for Rural Communities Program	Open to not-for-profit organisations for projects that offer public benefit for small rural and remote locations in Australia, contributing to their development in social welfare, the environment or cultural areas.	Foundation for Rural & Regional Renewal (FRRR). Visit: http://www.frrr.org.au/cb_pages/grants.php
Regional Clean Energy Program	Creates opportunities for communities to participate in renewable energy initiatives, including providing funding to develop community-based projects.	http://www.environment.nsw.gov.au/communities/clean-energy.htm Email clean.energy@environment.nsw.gov.au
Australian Renewable Energy Agency (ARENA)	Provides funding assistance to a variety of renewable energy activities, including projects which increase the diffusion and use of renewable energy generation and which integrate renewable energy into communities in rural or off-grid areas.	For more information, see: http://arena.gov.au/funding/ Phone: 02 6243 7054 Email: proposals@arena.gov.au

Call: Policy and Research Unit on (02) 9689 4444

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