***The Environmental Protection Agency is Queensland's lead agency to promote energy efficiency, renewable power and other initiatives that reduce greenhouse gas emissions throughout the state.***

CLEANER ENERGY

## Renewable energy

# Grid-connected photovoltaic systems

Fact sheet
Grid-connected photovoltaic systems

*Photos courtesy of Choice Electric Company and Mr John Moynihan*

## Electricity

Electricity is an essential part of our way of life in Queensland. It supports many of the services that we take for granted such as lighting, refrigeration and home entertainment.

Most of our electricity is currently provided from traditional coal-fired power stations.

However, with growing concerns over greenhouse gas emissions and other environmental impacts, renewable energy technologies such as photovoltaic (PV) cells are increasingly being used for domestic electricity production.

For the thousands of houses and homesteads which are far away from the electricity grid, PV cells have been supplying reliable, clean and renewable energy for many years.

More recently, it has become possible for households in urban areas to connect domestic PV cells to the electricity grid.

## Solar energy

Solar energy is so abundant in Queensland that inland areas have among the world's best solar resources.

Even the small amount that strikes your roof is many times more than the energy you use in your home.

The only requirement for its use is adequate solar access, which in Queensland means most areas free from shade during the peak sun hours of the day.

Sunlight can be converted directly into electricity by using photovoltaics (solar panels). In a grid-interactive system this electricity can be used in your home or fed into the electricity grid.

Sunlight can also be used to provide heat. For example a solar hot water system harnesses the heat of the sun to directly heat water.

## Why invest in a grid interactive PV system?

Electricity generated by a grid-connected photovoltaic power system will reduce your power bill and you may be able to sell surplus electricity produced to your local electricity supplier.

Grid-connected PV systems are easily installed and do not need a battery system as your existing mains supply is still available. Once installed, these systems are essentially maintenance free, generate no pollution and are as silent as the sun.

Increasing evidence suggests installing a PV system adds value to your property.

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## How do grid interactive systems work?

Electricity is produced by the PV array most efficiently during sunny periods. At night or during cloudy periods, independent power systems use storage batteries to supply electricity needs. With grid interactive systems, the grid acts as the battery, supplying electricity when the PV array cannot. During the day, the power produced by the PV array supplies household loads, while excess energy is fed back to the grid for use by others.

An inverter converts direct current (DC) produced by the PV array to alternating current (AC) used by household appliances and for export to the grid.

Grid interactive PV systems can vary substantially in size. However all consist of solar arrays, inverters, electrical metering and components necessary for wiring and mounting.

## What is the cost of a grid interactive PV system?

The greatest influence on system cost is the amount of PV modules installed. Other factors include maximum power demand, location, type and quality of equipment, extent of automatic controls and metering, provision of suitable accommodation for equipment and the amount of wiring needed.

Grid interactive photovoltaic power systems can greatly reduce the amount of electricity you buy from your electricity retailer. The cost of grid connected PV systems varies considerably, currently starting from around $12,000. You should ask a designer and installer for a firm assessment and quotation.

## Renewable energy

Renewable energy comes from sources that are essentially inexhaustible such as the sun, the wind and the heat of the Earth, or from replaceable fuels such as plants. Prior to the industrial revolution, these sources were virtually the only forms of energy used by humans. During the past 150 years, we have become increasingly dependent on fossil fuels - oil, coal and natural gas. Fossil fuels form slowly in comparison with the rate at which they are used so they are considered a finite or limited resource.

Using renewable energy can provide many benefits, including:

- making use of secure, local and replenishable resources;
- reducing dependence on non-renewable energy;
- helping to keep the air clean;
- helping to reduce the production of carbon dioxide and other greenhouse gases; and
- helping to create jobs in renewable energy industries.

Geothermal, solar, wind, hydro, biomass and wave are all examples of renewable energies.

## Government support

If you install a grid interactive photovoltaic system to supply electricity for your home, you may be eligible for the Photovoltaic Rebate Program (PVRP) - a Commomwealth Government funded initiative.

## Where to next?

If your household makes a decision to invest in a grid interactive PV system, the first step is to contact your electricity supplier (Energex, ph. 131 253 or Ergon, ph. 131 046) regarding requirements for grid connection.

You should then consult an accredited renewable energy system designer about your requirements and organise quotes and installation.

Suppliers of renewable energy equipment are listed on the Sustainability Allies web site www.sustainableqld.com Alternatively, the Environmental Protection Agency can provide a list.

## For more information

call 1300 369 388
visit www.epa.qld.gov.au/sustainable_energy
email sustainable.industries@epa.qld.gov.au

Australian Greenhouse Office
The lead Commonwealth agency on greenhouse matters

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