

# SOLAR POWER (PV)



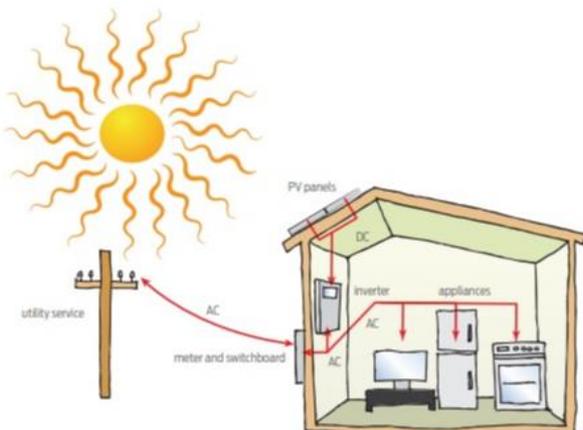
## INFORMATION SHEET

### SOLAR POWER

**Household sized solar power (PV) is now within reach of city dwellers as well as for those in the country thanks to falling prices. A desire for greater energy independence, power price certainty and a greater awareness of the climate effects of using fossil fuels like coal and gas has also driven interest.**

While most electricity in New Zealand comes from large hydro dams, geothermal power stations and wind farms, during peak times (7-11 am, 5-9pm) we still use thermal (gas/coal) power stations to generate electricity which carries a much higher carbon footprint.

Transmission lines carry the power the length of the country and through some difficult terrain, making the "grid" vulnerable to natural disaster. PV electricity, generated from the home, has potential advantages of providing resilience to natural disaster, less reliance on the grid and future proofing electricity costs.



BRANZ - Grid-tied solar PV system

### TYPES OF SYSTEM

**Off-grid:** There is no connection to the reticulated grid. Electricity not used at the time of generation is stored in batteries for later use. Generally off-grid systems require some back up generation system (such as diesel or petrol generators) to cover periods of low generation.

**Grid-connected or Grid-tied:** The electricity from the PV system supplements the electricity supplied from an electricity retailer via the grid. Electricity generated by PV is used in the home first, and then any surplus electricity is sold back to the retailer. The grid functions like a battery to absorb the surplus (called "exporting") and is used by other homes/businesses.

**Hybrid Off-Grid/Grid-tied:** This is a combination of the above two systems. Electricity generated by the PV system is first used by property with any excess stored in the battery. If the property requires more electricity than available from the PV system or available in the battery, it is taken from the grid. Some systems also allow excess power to be sold back to the grid if the battery is fully charged.

Most grid-tied PV systems can be retrofitted to add batteries in the future. This may require changing the inverter. Batteries can assist in allowing you to shift the use of your solar electricity to night time applications (and therefore reduce reliance on export tariffs). Billing is calculated by an import/export meter.

### PROS AND CONS OF PV

**Pros:** Most places in New Zealand have high levels of sunshine (averaging 2000 hours a year or more in most places) which is ideal for generating solar electricity through PV.

With falling PV costs and rising electricity prices, properly-sized grid-connected PV systems now give a reasonable return on investment, compared with bank deposit rates. Many solar panels come with a 10-year mechanical warranty and a 20 plus year output guarantee, providing greater price certainty over time.



BRANZ research has shown that having PV can potentially add to the value of your house. When coupled with battery storage, PV systems offer greater energy independence and security. PV-generated electricity has a very low carbon footprint.

**Cons:** Grid-tied systems generate most of their power during the day and the power cannot be stored. Exporting electricity to the grid has much lower buy back rates than the cost of purchasing power, impacting on the return on investment. Battery based systems add extra capital costs and can lose efficiency through line and system losses.

PV systems generate less electricity on cloudy days and can stop generating if part of the array is shaded by a tree or a neighbouring structure. Some systems incorporate micro-inverters or smart cell electronics to ensure panel arrays generate optimum levels of power even when partially shaded. There are currently no Government or council subsidies for renewable electricity in New Zealand. If the power grid goes down, a grid-connected system will disconnect and stop supplying power to your home.

## WHEN CHOOSING PV

PV systems perform best where they are located on an unshaded north-facing roof, but they can also generate similar amounts of electricity in east/west-split positions. They can be sited on the ground, provided they are not shaded by buildings or trees.

Understanding your PV utilisation rate (the amount of electricity you can realistically get from your PV system to off-set the need to purchase it from an electricity retailer) can help you work out the long term financial return on investment.

Look for a PV supplier that is a member of SEANZ. We recommend that when purchasing PV panels you request Tier 1 panels. If you live within 500m of the sea check the manufacturer's warranty for corrosion clauses. We also recommend getting a wind loading statement from your installer to ensure it has been designed to allow for possible wind loads.

Load-shifting (for example, placing your hot water cylinder on a timer) can help reduce the amount of electricity exported to the grid, and increase utilisation rates for grid-tied systems. Other after-market systems can also help direct generated electricity to household appliances to reduce exporting.

PV, and other forms of energy generation, should usually be preceded by looking at ways to increase your home's energy efficiency. For example, installing a low flow shower head if you are on mains hot water can save a family of four the same amount of money as a 1.5kW (6 panel) PV system.

## FOR FURTHER INFORMATION

Contact your nearest Eco Design Advisor  
Visit our website [ecodesignadvisor.org.nz](http://ecodesignadvisor.org.nz)

View helpful resources at:

- [branz.co.nz/PVcalculator](http://branz.co.nz/PVcalculator)
- [consumer.org.nz/articles/grid-tied-pv-systems](http://consumer.org.nz/articles/grid-tied-pv-systems)