

Solar case study: Residential

Wollongong, NSW



The solar system generates more than we use. The rest is sold to the grid. In the future we will install a battery to store the excess solar power.

Homeowner, Wollongong, NSW

Project summary

This case study shows the potential of a solar system to reduce electricity bills and protect a homeowner from changes in electricity prices. It also demonstrates the effective use of an electricity monitoring system, which helped inform decisions on sizing the system and identified ways to be more energy efficient in the home.

Fast Facts

Solar system

- 6.38 kilowatt (kW) upgrade to an existing 3.42 kW system
- 22 x 290W monocrystalline solar panels, connected to a new 10kW three phase inverter and 18 x 190W existing solar panels

Results

- Solar energy generation is greater than household energy consumption
- Reduced electricity bills
- Exported energy receives a feed-in tariff (FIT) of 11.1c/kWh
- System designed to allow for a battery in the future

Costs/savings

- Installation cost of \$10,000 (\$1.57/Watt) after a small-scale technology certificate (STC) rebate of \$4,500 (123 STCs)
- Increased cost due to a new 10kW inverter and battery-ready system
- On track for a payback period of 6 years with savings of around \$1,700 per year

Environmental benefits

- Saves 150 tonnes of CO₂ over the system lifetime

About the home

Apart from the normal electricity demands of a large home including appliances, power and lighting, the Wollongong family's heated pool is a significant consumer of electricity.

In 2016, motivated by a wish to better manage electricity bills, the family installed a 3.42kW rooftop solar system, later adding an additional 6.38kW to make a total of 9.8 kW of rooftop solar with 22 panels and a single three phase 10kW inverter which is ready to connect to a battery in the future.

The owner's aim is to be self-sufficient in electricity within the next five years.

Solar strategy

Online research helped to develop general knowledge and understanding of what options were available.

Selecting a battery-ready system was a priority. A battery will allow storage of the family's excess solar energy for use during the evening.

Energy use monitoring

Before adding additional capacity to the system, the owner installed a monitoring system to gather data on daily energy needs and better understand household consumption patterns.

The solar system was then sized to meet total daily energy consumption. Once batteries are installed, the household will have enough solar to charge the batteries and be fully self-sufficient.

The installation cost totalled around \$10,000 with a 25-year warranty on the solar panels and a 10-year warranty on the inverter.

The installer was selected on the recommendation of the home's original builders.

This process also highlighted the benefits of other energy efficiency initiatives such as:

- › Running pool pumps and pool heating systems during sunshine hours,
- › Installing energy-efficient LED lighting.

Challenges – collecting energy data

Optimising self-consumption and matching the household electricity usage to the solar generation profile was an important consideration. Meeting this objective required collecting a year's worth of data.

The homeowner found that while she lacked expert knowledge, internet research was sufficient to allow her to make an informed decision. This research included solar installation guides by the Clean Energy Council: www.solaraccreditation.com.au/consumers.html

The NSW Home Solar Battery Guide provides useful information on batteries: www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/home-solar-battery-guide

Reduced electricity bills

Over the past summer months, solar generation has been greater than household energy consumption. The excess was sold back to the grid for the FiT of 11.1c/kWh.

The annual savings from the solar system is approx. \$1,700 and the payback period is on track for 6 years.

The annual savings from the system are higher than usual due to the large size of the solar system (9.8kW) and high energy consumption during the day from the family's heated pool.

The system will save the equivalent of 150 tonnes of CO₂ over the course of its lifetime.