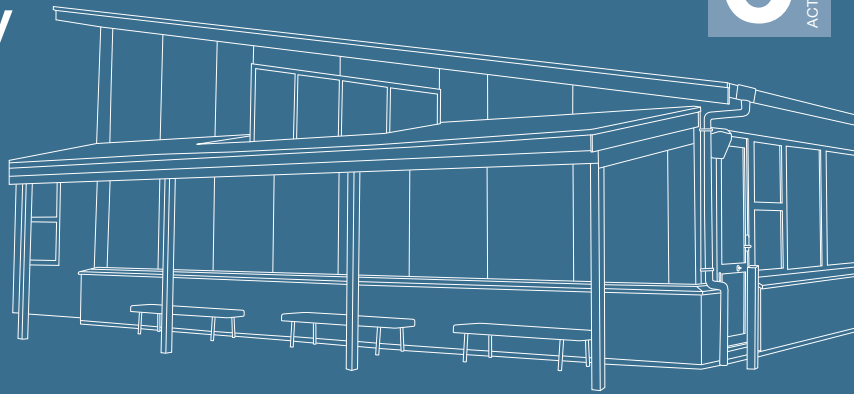


Saving energy in schools: renewable energy



Setting up a renewable energy generation project can benefit your school in a number of ways.

Seeing solar panels, wind turbines or micro-hydro turbines in action gives students first-hand knowledge of how natural resources can be harnessed to help power their school. Energy outputs and performance can be measured and analysed over time to show, for example, how weather affects the amount of energy generated. In this way, learning opportunities are created across a range of curriculum areas and students develop an appreciation of the real value of energy.

While initial set-up costs for renewable energy generation projects can be high, the ongoing running costs are relatively low. So although in most cases it can be hard to make a financial case for generating electricity using small-scale renewables - as it's cheaper to purchase electricity from 'the grid' - micro-generation systems may prove more cost-effective in future as the technology matures and energy costs rise over time. Taking the educational benefits into account may make the proposition more attractive.

Many schools have already found that the visibility of these types of projects provide the impetus to launch wider energy conservation initiatives that extend throughout the school and its community.

Photovoltaics (PV)

Photovoltaics (PV), or solar electric panels, are the most common type of microgeneration systems used by schools, as they work well in both urban and rural settings. PV modules generate electricity directly from sunlight and can be installed as arrays on roofs, on frames on the ground, as 'tiles' on roofs, or even as semi-transparent glazing.



A PV panel installed at Clifton School, Wellington.
Photo courtesy of Genesis Energy's Schoolgen programme.

Photovoltaic systems are generally easy to install and maintain, and require no fuel to operate – the sun's energy is free and inexhaustible. They have no moving parts and are silent. They are also modular, which means you can easily add more modules if you need more power. PV modules are designed to last for around 30 years, and little maintenance is needed. Although the cost of PV has been relatively high, it has reduced in recent years and looks to become increasingly cost-effective over time.

The most suitable sites for PV modules are exposed to good levels of sunshine year-round, are free of shade, and facing as close to north as possible.

Micro wind turbines

Micro wind turbines can be a good option for schools in rural areas exposed to strong and consistent wind. Generally, a minimum average wind speed of more than 16 km/h is required. Small wind turbines generally need more ongoing maintenance than solar panels and micro-hydro systems, but also provide a very visible indication of how energy can be converted from one form into another. No power is generated when there is little or no wind or, for some turbines, when the wind is too strong.



Students from Tirimoana School look at a PV panel pre-installation. Photo courtesy of Genesis Energy's SchoolGen programme.

Micro-hydro systems

The advantage of a micro-hydro system is that it can provide a very consistent, reliable and cheap source of electricity compared to other micro-generation technologies. A school will need a suitable stream, river, or reservoir on-site, with a reliable year-round flow of water and an adequate drop in height over a small horizontal distance. You'll also need to ensure you have rights to the water and find out whether resource consent is required from your regional council.

Tips for setting up renewable energy projects

- One of the main benefits of installing a renewable energy system on your school is to be able to incorporate it into students' learning. To aid this, it is important to measure and monitor the system so that performance data and information is available for use and study. Many inverters (required to connect the generation source into your electricity network) record key parameters of the system performance, however larger and more interactive display units are also available. Energy output, energy demand (of the school), and resource availability (wind/irradiation) would be useful to monitor.
- It's important from the outset to consult an expert for advice on the various systems available, as well as design and installation options. Suppliers and installers of systems will be able to help assess which options are best for your situation.

For more information

More information on microgeneration technologies can be found at <http://www.energywise.govt.nz/how-to-be-energy-efficient/generating-renewable-energy-at-home>

If you're considering setting up a solar energy system, it's worth looking at Genesis Energy's SchoolGen programme which has useful information and teaching resources for schools interested in solar energy. Visit www.schoolgen.co.nz

Whatever system you're considering, the first step is to look at ways your school can reduce its current energy use. Saving electricity is usually much cheaper than generating it. To find out more about saving energy at school, check out the other action sheets in this series or visit www.eecabusiness.govt.nz/how-to-be-energy-efficient/schools