



1996

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Energy supply and use

Renewable energy

With nearly a third of its primary energy supplied from renewable sources, New Zealand does well by international standards – in 2007 the only developed countries using more were Norway and Iceland. New Zealand has abundant hydro, geothermal, and wind resources. Solar power and wood resources are also available.

Electricity

Most renewable energy resources are used to generate electricity. In 2007, 68% of electricity was generated by renewable sources:

- hydro – 58%
- geothermal – 4.9%
- wind – 3.5%
- biogas and biomass – 1.3%.

Historically, the major form of renewable energy used in New Zealand has been hydroelectricity, joined from 1958 by geothermally generated electricity.

Geothermal

First considered as a source of electricity in the early 1900s, geothermal energy was not used until after the Second World War, when chronic electricity shortages and a two-year drought in the mid-1940s made generation critical. Wairākei, the first geothermal station, proved to be a very reliable generator. By the end of the 20th century, eight geothermal stations had been built.

Although renewable, geothermal energy is not an efficient generator of electricity. The 10 petajoules of electricity it produced in 2007 used 87 petajoules of geothermal power.

Wind

Wind generation is the fastest growing of the new renewables. Capacity in mid-2008 was 320 megawatts, of which 151 megawatts came online during 2007.

Wellington was home to the first large-scale wind turbine. Generating 225 kilowatts, it was connected to the grid in 1993. Hau Nui, the first wind farm, began generating electricity in the Wairarapa in 1997. Micro-turbines generating 1.5 kilowatts have also been used in urban areas.



Wind power



Solar water-heating



Canola oil-powered 4WD



Methane from landfill

3rd

Use of solar energy to heat water and, via photovoltaic technology, charge batteries for power supply systems was no longer unusual. Although difficult to track, use was clearly gr

Sales of solar water heating systems suggest that use almost doubled between 2002 and 2007.

Home generation

In the early 2000s increasing numbers of people began producing their own electricity, using small-scale hydro, solar and wind generation systems. By 2009 power companies were setting up reciprocal relationships with these home generators, allowing them to both take from, and supply energy to, the grid.

The number of people undertaking home generation remained minute. The initial cost was considerable and the potential technical difficulties were off-putting for many.

Go it alone

Some farms have been generating their own electricity for over 100 years. It was first done with small hydro generators because there was no national grid. Later, distance from the grid became an issue. Hydro was joined by solar and biogas generators, providing power to trappers, Department of Conservation workers, farmers, lighthouses, and isolated holiday-makers.

Biodiesel

Biodiesel is an oil substitute made from vegetable oil, tallow (a byproduct of the meat industry) or ethanol. Biodiesel/fossil fuel diesel blends became available at the petrol station pump on a limited basis in 2007.

Biogas

Biogas, produced by sewage treatment plants, farm waste, and the food processing industry, has been generating electricity, heat and vehicle fuel for decades. It is generally used on-site by the producers.

Landfill gas generated in local rubbish dumps became a usable and renewable resource in 1992. Dumps in Auckland and Wellington were first to use the gas to generate electricity, followed by sites in or near Rotorua, Hamilton, Christchurch and Palmerston North. Total capacity in 2007 was over 20 megawatts.

From 2004 all new landfills collecting over 1 million tonnes of refuse over their planned life were required to collect their landfill gas, which is used to generate electricity, or reticulated for use by local industry, community facilities or nearby households. A significant portion of methane is flared, as 95% of electricity generated with landfill gas is produced at only three sites. Flaring burns off the methane, and leaves a carbon dioxide residue – methane leaking from rubbish is about 21 times more powerful as a greenhouse gas than carbon dioxide.

Biomass

Most biomass is 'black liquor' and wood residues produced by the timber and pulp and paper industries. Amongst New Zealand's largest power consumers, these industries produce waste that can then be burnt to provide heat for further processing.

Wood continues to be used by households as a source of home and water heating. Average yearly use in the 2000s was 13.7 gigajoules per home.

Marine wave and current energy

Research into sources of renewable energy is ongoing. The possibility of using tidal, current or wave movements to generate electricity was being investigated in the early 2000s.

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