WIND

WHAT IS WIND ENERGY?

Wind is air on the move. Each air molecule has kinetic energy because it is moving. The energy of the wind is the combined kinetic energy of all of the molecules. The wind is a free and renewable source of energy, and it is the world's fastest-growing electricity resource.

HOW IS ELECTRICITY GENERATED FROM WIND?

Electricity companies catch the energy of the wind using wind turbines. A 'wind farm' will often contain many identical turbines. When the wind □ows through the blades of a turbine, they rotate and spin, powering a rotor inside a generator and producing electricity. Each turbine works independently. The electricity □ows through cables in the turbine, □ows down the turbine tower and combines with the energy from the other wind turbines in the wind farm before entering the local electricity network or the national grid, which provides power to New Zealand.

WHAT'S INSIDE A WIND TURBINE?

Each wind turbine has four key parts.

Foundation

The foundation holds the turbine in place in the ground. A wind turbine has to have a strong foundation to handle strong winds and support the overall height and the length of the blades.

Tower

Generation equipment is kept in the tower. The tower raises the blades and generation equipment high above the ground into the smoother, stronger wind currents. Access to the nacelle and rotor is through the tower.

Nacelle

The nacelle is the heart of the turbine, where the generator, gearbox and rotor are held. The generator inside the nacelle is used to convert the wind energy into electrical energy.

Blades

Most wind turbines have three blades that are attached to the rotor. The longer the blades and the faster the wind speed, the higher the possible output power. The blades are tested thoroughly to ensure that they will handle the most severe weather conditions expected at the wind farm.

RENEWABLE ENERGY AT HAU NUI WIND FARM, WAIRARAPA
SOURCE:GENESIS ENERGY

ElectroCity
DON'T LET THE POWER GO TO YOUR HEAD!

ACTIVITY THREE
BUILD A MODEL WIND TURBINE

Here are some websites and publications showing how to build devices that use the energy of the wind.

- Make an Anemometer (Energy Quest – California Energy Commission).
  An activity that shows students how to make an anemometer, which is a device that tells you how fast the wind is blowing.
  http://www.energyquest.ca.gov/projects/anemometer.html
- Make Your Own Wind Winch (Solar Schools)
  http://www.solarschools.net/resources/pdf/make%20your%20own%20wind%20winch.pdf
- Ministry of Education. 2004. 'Windmills and Waterwheels'. Building Science Concepts (Book 54). Wellington: Learning Media.

SUPPORTING RESOURCES

- New Zealand Wind Energy Association: www.windenergy.org.nz
- Ministry of Economic Development: www.med.govt.nz
- Energy E□ciency and Conservation Authority: www.eeca.govt.nz
- Genesis Energy: www.genesisenergy.co.nz