

KAIWERA DOWNS WIND FARM

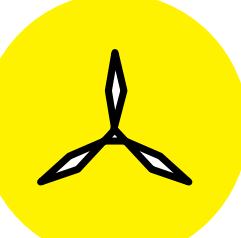
RENEWABLE
ENERGY
FROM
FRESH AIR

The Kaiwera Downs Wind Farm wind turbines have been installed in the best places to capture the wind throughout the 2,000 hectare site..

Mercury's wind strategy goes back to 2004, but we've been in the renewable generation game a lot longer than that. Our generation assets produce electricity from 100% renewable sources: hydro (moving water – 9 power stations on the mighty Waikato River), geothermal (reliable baseload that's on 24/7 in the Taupō volcanic zone) and wind, here and in other bright and breezy places all over New Zealand).

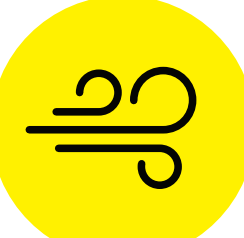
Wind might seem to blow randomly, but measured over a year the amount of wind is fairly predictable. Mercury uses systems and tools to combine the variable output from wind generation with other renewable generation from our power stations. Hydro power generation can be an especially good counter-balance because hydro lakes act as a great storage facility and electricity output can be quickly ramped up and down.

WIND FARM QUICK FACTS



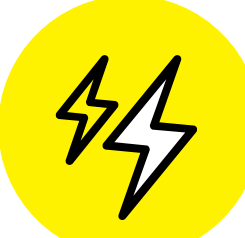
46

VESTAS V136-4.3MW WIND TURBINES



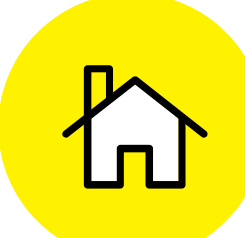
~8.5m/s

AVERAGE WIND SPEED AT TURBINE HUB HEIGHT



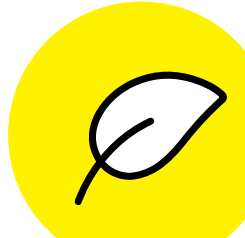
198MW

TOTAL ENERGY GENERATING CAPACITY



95,000

HOMES WORTH OF ELECTRICITY A YEAR



2,000HA

WORKING FARM SITE

BUILT IN TWO STAGES

STAGE 1

10 TURBINES
43MW

November 2022 - November 2023

Blade tip height	145m
Hub height	77m
Blade length	67m

Connected into the Gore local network by an 18 km 33kV overhead line to the Gore substation.

STAGE 2

36 TURBINES
155MW

June 2024 - November 2026

Blade tip height	156m
Hub height	88m
Blade length	67m

Connected into Transpower National Grid via a 4 km 220kV overhead line to the North Makarewa to Three Mile Hill 220kV circuit.

A 95KM JOURNEY, MOSTLY AT NIGHT

Each large component (towers, nacelle, hub, blades) was transported from Southport (Bluff) to the site.

Truck movements were carefully managed, mainly at night to lessen the impact on other road users. Multiple routes were used depending on the length and size of each load, and each trip took 4 - 6 hours to travel the 95km.

Once the foundations are built and the components ready, it took 3 - 4 days to put up each turbine.



Blade tip

Blade

Hub

Nacelle

Tower

Each blade weighs 18 tonne.

The hub weighs 34 tonne.

This houses the drive train and weighs a total of 136 tonne.

3 or 4 tower sections each weighing between 41-62 tonne and are from 15-27m long.

ANATOMY OF A TURBINE AND HOW ELECTRICITY IS MADE

Take a look behind the sleek white surface of a wind turbine and discover the technology it uses to create electricity from the wind's natural energy.

1

Building a wind turbine is heavy work. Turbines consist of multiple tower sections, nacelle, generating equipment, and the three blades.

2

A wind vane on each turbine measures the direction of the wind and an anemometer measures its speed.

3

The wind turbine turns so that the blades always face the wind at the most efficient angle.

4

Behind the blades is the nacelle, which houses the machinery that converts wind energy into electricity.

The blades turn the turbine drive shaft connected to a generator.

5

The shaft turns inside a drum of wire coils, exciting electrons and generating an electric charge.

6

The electricity is carried down the tower and then back to the wind farm substation via underground cables.

Two transformers in the substation increase the voltage from 33kV to 220kV to connect into the national grid line.

7

The electricity is then fed to the National Grid. A network of substations and power lines connect this electricity to homes and businesses throughout Aotearoa, New Zealand.





Scan the code and watch an animated video to learn more.