



meridian

Discover

West Wind

wind farm



West Wind is the third wind farm that Meridian has constructed in New Zealand.

The 90 MW Te Āpiti wind farm north of the Manawatu Gorge was completed in 2004 and the 58 MW White Hill wind farm in Southland was commissioned in 2007. This 62 turbine wind farm is located within Terawhiti Station and Makara Farm west of Wellington city. The total site is about 53 square kilometres.



West Wind

The first turbines installed.

Why build a wind farm here?

West Wind uses one of Wellington's most renowned natural resources.

The funneling effect of Cook Strait means the site has strong and consistent wind speeds, making it the perfect place for a wind farm.



Did you know?

New Zealand has consistently strong wind conditions compared with most other countries. This means the capacity factor (the average power output compared to rated power) of wind farms in New Zealand is more than double that of the international average.

Makara Radio Station, Makara, Wellington, 17 October 1957, Silver gelatin print 15.8 x 21.2 cm, PAColl-8602-21, New Zealand Freelance Collection, Alexander Turnbull Library, Wellington, New Zealand.

Brief history of the region

In pre-European times the area was heavily populated by Māori because of its strategic position and the plentiful seafood available on the coast. A number of sites of significance to Māori reflect its history, including pa, ngakina (gardens) and urupa (burial grounds).

Parts of Terawhiti Station were mined for gold from the 1860s until the early 20th century. European land purchases for farming began in the 1840s. In 1942, during the Second World War, two gun emplacements and associated structures were built on the cliffs overlooking Cook Strait. Fort Opau, as it is known, is now accessible by the Department of Conservation's coastal walkway on Makara Farm.



In 1942, the Makara Farm part of the site was acquired by the Crown for a radio receiving station. The former Electricity Corporation of New Zealand (ECNZ) purchased Makara Farm from Telecom in 1995 with the intention of developing a wind farm. Makara Farm was then acquired by Meridian in the split of ECNZ in 1999.

The construction

Right from the early stages of planning West Wind, it was clear that getting the turbine components to the site would require innovative solutions.

To avoid having to use Wellington's busy streets, Meridian constructed a temporary wharf at Oteranga Bay. The wharf was an essential element in the design of West Wind, and ensured the delivery of large turbine components to the site without associated traffic disruption to the city and local community. The 128 metre long wharf was designed to be removed after construction, with both the decking and piles recycled.

Thirty-three kilometres of roads linked the temporary wharf, temporary storage areas and the 62 turbine foundations. In most cases the roads were seven metres wide for the large crane required to install the high and heavy loads, as

well as the specially constructed trailers to carry the blades to each turbine location.



Temporary wharf at Oteranga Bay under construction.



Interesting facts about West Wind

Capacity: 142.6 MW from 62 turbines, each 2.3 MW turbines

Towers: Built in two sections;

Bottom: 30.8 metres, 75 tonnes

Top: 36 metres, 49 tonnes

Nacelle: 11 metres, 87 tonnes

Blades: Three on each turbine, 40 metres in length, 10 tonnes

Hub: 68.3 metres high, 6.7 metres length

Foundations: 370m³ of concrete, 48 tonnes of reinforcing steel

Underground cabling: Approximately 45 kilometres

Roading: Approximately 33 kilometres

Wharf: 128 metres long

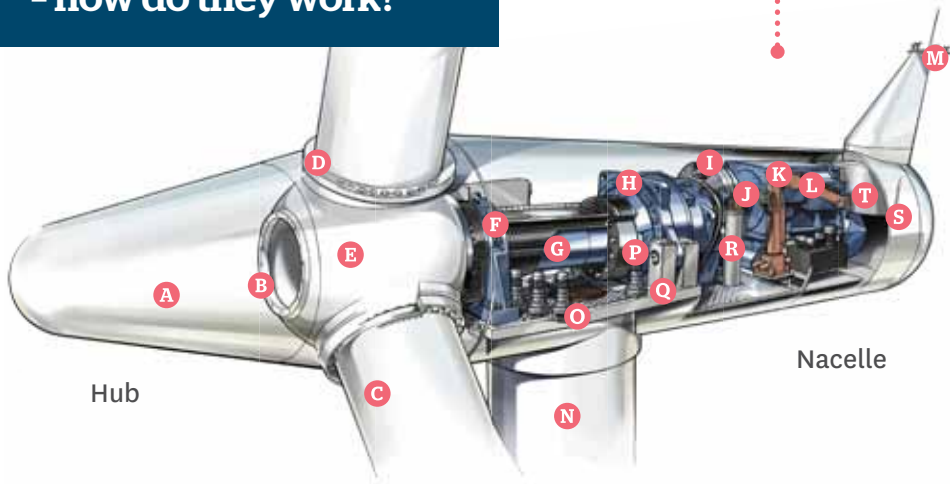
Did you know?

Each of the 62 turbine foundations contain 370 cubic metres of concrete and 48 tonnes of reinforcing steel.



Turbines

- how do they work?



- | | | | |
|--------------------------|-----------------------|---------------------------------|---------------------------|
| A Spinner | F Main bearing | K Generator | P Yaw gear |
| B Spinner bracket | G Main shaft | L Service crane | Q Nacelle bedplate |
| C Blade | H Gearbox | M Meteorological sensors | R Oil filter |
| D Pitch bearing | I Brake disc | N Tower | S Canopy |
| E Rotor hub | J Coupling | O Yaw ring | T Generator fan |

Each of the 62 turbines has a capacity of 2.3 MW and together generates enough power for up to 70,000 average homes.

The nacelle on top of the tower houses the generator and mechanical components for the turbine.

The rotor blades have an 82 metre diameter sweep and are made from glass fibre reinforced epoxy. The blades turn in a clockwise direction when viewed from the front at between 6 RPM (revolutions per minute) and 18 RPM.

The turbines operate in wind speeds of between 14 km/hour and 90 km/hour with a nominal speed of 49 km/hour. This nominal speed is the speed at which the turbine reaches its full generating capacity of 2.3 MW.

Between 49 km/hour and 90 km/hour the turbine generates a constant power. The built-in sensors and microcomputer automatically adjust the direction of the nacelle, and the pitch of the blades, to catch the prevailing wind. If the wind is too strong – over 90 km/hour – the turbine will automatically shut down.

The turbines for West Wind were produced by Siemens Wind Power, a leading Danish wind turbine manufacturing company.

Did you know?

When the wind speed doubles, the power available for generation increases eight times.

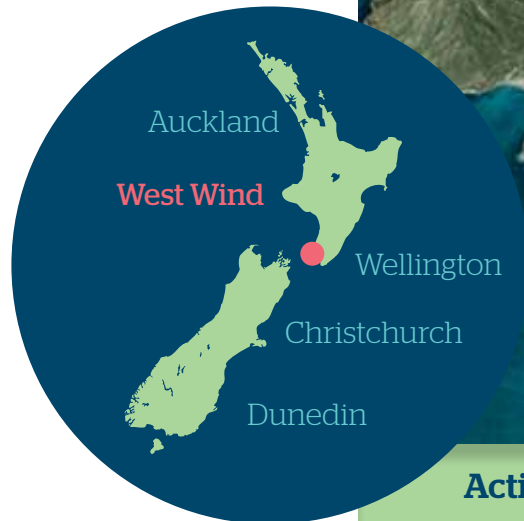
Meridian - committed to renewable energy

At Meridian, we take our responsibilities to New Zealand and the environment very seriously. We generate all our electricity using renewable resources and work closely with local organisations and the Department of Conservation to preserve the natural environment and protect native plant and animal life.

We are committed to generating our electricity using renewable resources – water and wind – and we're committed to meeting the energy needs of this country by increasing the efficiency of our generation assets and investigating other economical methods of new generation. We are proud of our involvement with local communities, through community and sporting activities and the arts, and with non-profit organisations.

Did you know?

Wind farm development is compatible with farming, providing an additional income stream for farmers while using a small proportion of the land.



Activity guide

 Turbines

 WWII Gun Emplacement

 Recreation tracks

WE'RE HERE TO HELP

Please feel free to contact our Customer Service Team.

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