

# Building a Wind Farm

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Meridian Energy's Project West Wind will use one of Wellington's most renowned natural resources. The funnelling effect of Cook Strait means the site has strong and consistent wind speeds, making it the perfect place for a wind farm.

This 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.

## The West Wind site

The 62-turbine development is being built within Terawhiti Station and Makara Farm west of Wellington city. It will be completed by late 2009 and will provide enough renewable energy to power the equivalent of all of Wellington city's households.

The total West Wind site is about 55 square kilometres. Terawhiti Station is privately owned and Makara Farm, on its northern boundary, is owned by Meridian. The land is rugged and difficult for farming.

## Always a strategic position

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. ECNZ purchased Makara Farm from Telecom in 1995 with the intention of developing a wind farm and this was acquired by Meridian on the split of ECNZ in 1999.

## The turbines

Project West Wind will have 62 wind turbines, which are being supplied by Siemens Wind Power, a major wind turbine manufacturer based in Denmark.

The turbines were carefully selected to ensure that they can meet the demands of the site and longer-term operation. Siemens 2.3 MW machines are used throughout the world by major utilities in both on and off-shore developments.

Each turbine will have a capacity of 2.3 MW and together they will generate enough energy to meet the needs of about 70,000 average households. They will generate energy in winds between 15 and 90 kilometres per hour. In extreme weather conditions the turbines are designed to shut down to prevent damage.



## HOW TO GET MORE INFORMATION

Please visit our website

[www.meridianenergy.co.nz/](http://www.meridianenergy.co.nz/)

[ourprojects/westwind](#)

We have an information centre in the Karori Mall which has regularly updated maps, plans and site photography.

Email questions to

[wind.info@meridianenergy.co.nz](mailto:wind.info@meridianenergy.co.nz)

Phone us on 0800 500 305

Including the rotor blades, each of the turbines is 111m tall. The two-section tower stands 67m. The 87,100 kg nacelle on top of the tower houses the generator and electrics for the turbine. Each of the three blades is 40m long.

### Challenging site access

Right from the early stages of planning West Wind, it was clear that getting the turbine components to the site would require innovative solutions. Between Wellington's port and Makara are busy city streets, then narrow and winding roads after Karori. Meridian now has resource consents to deliver the turbines to a temporary wharf at Oteranga Bay on the south coast of the site.

Particular care has gone into designing the wharf and unloading facilities. There is an urupa at Oteranga Bay, making it significant to Māori. Transpower's HVDC power cables from the South Island come ashore here and become overhead lines to the Haywards substation. There are also fibre optic cables for telecommunications in the bay.

Turbine components from overseas will arrive at Shakespeare Bay near Picton, be unloaded and then delivered by barge across Cook Strait to Oteranga Bay. They will then be stored temporarily before being delivered to the turbine sites and installed.

### Roads and foundations

Forty-two kilometres of roads will link the temporary wharf, temporary storage areas and the 62 turbine foundations. In most cases, the roads will be 7m 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.

Each turbine foundation will be constructed of concrete with steel reinforcing and will have a steel ring forming part of the foundation to which the above-ground tower sections are bolted. The electricity from each turbine



#### KEY

- Turbine Locations
- Access Track
- Substation
- Transmission Line Route
- Existing Transpower's HVDC Transmission Line
- Existing Transpower's 110Kv Transmission Line

### Project timetable

<b>Sept 07 – Jan 08</b>	External road improvements
<b>Oct 07 – Nov 08</b>	Establishment works on site
<b>Nov 07 – Mar 09</b>	Internal roads, foundations and trenching
<b>Feb 08 – Oct 08</b>	Substation build
<b>Feb 09</b>	First turbines installed
<b>Oct 09</b>	Final turbines installed
<b>Dec 09</b>	Final commissioning

### About Meridian

**Meridian is the country's largest renewable electricity generator and is 100 percent New Zealand owned. We generate around 30 percent of the electricity used in New Zealand.**

**We own and operate nine South Island hydro stations, including eight on the Waitaki hydro scheme and the Manapouri power station. We own and operate the Te Āpiti wind farm north of the Manawatu Gorge and White Hill wind farm in Southland. We have plans for more wind farms in both the North and South Islands.**

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will be supplied into an underground 33kV network that goes back to the on-site substation. At the substation it will be upgraded to 110kV and connected by a short overhead line to the Wilton-Central Park double circuit transmission line.

The turbines will be installed and commissioned in strings, allowing the site to be generating increasing amounts of electricity as work continues.

### Renewable energy for New Zealand

Wind power provides important diversity in New Zealand's energy

mix, making the country less reliant on non-renewable fossil fuels such as coal. Wind generation is an excellent complement to hydro generation: when the wind blows, water can be conserved.

Wind farms have a minimal impact on the landscape and their sites can be used for other things, like farming. Wind generation is New Zealanders' most preferred method of electricity generation.\*

\* Research conducted by the Energy Efficiency and Conservation Authority in 2004



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