

# Wind farm development in NZ

## New Zealand's wind energy resource

New Zealand is generally recognised as having one of the best wind resources of any country in the world thanks to its location, lying across the prevailing westerly winds in an area long referred to by sailors as the 'Roaring Forties'.

New Zealand's strong wind resource makes our wind farms among the most productive in the world.

The potential to use wind for electricity generation exists in every region of New Zealand, although cost effective wind generation depends considerably on a variety of commercial, technical, and environmental constraints.

In New Zealand, most areas with a high average wind speed (Class I sites) tend to be in coastal areas or on exposed hill tops and ridgelines. However, with advances in wind turbine technology, sites with lower average wind speeds (Class II and III) are becoming economically viable. Over time more areas of New Zealand are likely to be investigated for potential wind farm development, particularly if advances in technology continue to make lower wind speeds sites more commercially viable.

## New Zealand's wind farms

New Zealand's first wind turbine, at Brooklyn Hill in Wellington, was installed in 1993. Since then there are now 664 (in 2024) utility grade turbines in operation throughout Aotearoa New Zealand. New Zealand has 21 commercially operating wind farms with a combined installed capacity of 1.3 GW. These wind farms supply over 7.5% of New Zealand's annual electricity generation, and provide 12.2% of the grid's total generation capacity.

The wind farms range in size from one 100kW turbine at Southbridge to 4.3 MW turbines with a capacity of 176 MW at Harapaki Wind Farm. The 'total tip height' of turbines installed in New Zealand range from 43 meters to 145 metres. Turbine size is however increasing as the technology innovates. Turbines installed over the next few years are likely to be 180 metres or more in tip height.

The smallest wind farm, Southbridge, comprises a single three-bladed turbine on a 42m high lattice tower that connects to the local distribution network and produces enough electricity to meet the annual electricity needs of approximately 20-25 average New Zealand homes. West Wind, near Wellington, uses sixty-two 2.3MW turbines and have a combined generating capacity of 142.6MW. Each year West Wind generates as much electricity as 70,000 average New Zealand homes would use in the same period. That is the equivalent to powering all the homes in Wellington City.

Can the NZ wind energy resource be mapped? Not really. New Zealand's wind energy resource has been broadly identified at a high level using mesoscale data. However, identifying the wind resource at any given location requires accurate onsite investigation over a period of at least two years. In order to be reliable, the data gathered generally needs to be monitored at the wind turbine hub height. Accordingly, accurately mapping New Zealand's wind resource would require thousands of metrological masts to be installed and monitored, which is not feasible. Moreover, it is not possible to undertake a national mapping exercise that reliably accommodates all of the commercial, technical and environmental factors developers require

to determine if a site is suitable for a wind farm project. Regional wind speed estimations have previously been identified in work commissioned by the New Zealand Electricity Authority and the New Zealand Energy Efficiency and Conservation Authority. However, these investigations are very high level and not reliable for identifying the wind resource at any given location.

## **The electricity market and wind energy**

The electricity market in New Zealand is an open-access competitive market-based system around market rules developed by the industry and government. Consequently, any form of electricity generation must be cost effective.

Investors and electricity generators are pursuing wind farms for a variety of reasons, including:

- the fuel supply for wind farms, the wind, is renewable and abundant in New Zealand, and it is not reliant on ongoing exploration. Unlike water, it is not in demand for other purposes such as irrigation, conservation and recreation.
- the cost of generating electricity from wind is not affected by volatility in international fossil fuel markets
- wind turbines are a proven and commercially viable technology.
- wind farms are not exposed to costs related to carbon emissions.
- wind energy broadens an electricity generators portfolio and is particularly complementary to hydro-electricity generation

## **New Zealand policy – facilitating renewable energy**

The New Zealand Government recognises the importance of renewable generation to New Zealand's future. National policy recognises that wind energy forms an important cog in New Zealand's wider electricity generation system.

New Zealand has an energy strategy with a government target (in 2024) of doubling electricity generated from renewable sources by 2050. This equates to building between 11 GW - 13 GW of new wind and solar generation, with over half of this new capacity from wind energy.

## **Future wind farm development**

NZWEA expects wind generation to grow to at least 20% of the total annual generation by 2035, up from 7.5% in 2024.

In addition to the 1.3 GW installed wind capacity today, New Zealand has a further 750 MW of consented capacity currently being developed, and a further 3 GW under active investigation.

Offshore wind is also being actively investigated, where a further 11 GW of projects is being investigated, although there are many overlapping projects that equate to at least 3 GW – 4 GW of offshore projects.

There is no certainty as to when the proposed wind farms will actually be built as this depends on the commercial viability of each project and the forecast electricity demand that the country actually needs. However, as the energy transition continues to gain momentum, more wind farm development can be expected in order for New Zealand to meet its renewable electricity target by 2050.

**More Information:**

Find out more about wind energy and wind farms in New Zealand at [www.windenergy.org.nz](http://www.windenergy.org.nz).

NZ Wind Energy Association

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The New Zealand Wind Energy Association (NZWEA) is an industry association that works towards the development of wind as a reliable, sustainable, clean and commercially viable energy source. We aim to fairly represent wind energy to the public, government and the energy sector.

Our members include over 75 companies involved in New Zealand's wind energy sector, including electricity generators, wind farm developers, lines companies, turbine manufacturers, consulting firms, researchers and law firms.