

## 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 target of 90% electricity from renewable sources by 2025, up from around 75% today. Achieving this target requires a substantial increase in renewable generation. However, the National Policy Statement on Renewable Electricity Generation provides some central government direction on the benefits of renewable electricity generation and requires all councils to make provision for it in their statutory planning documents.

The National Policy Statement for Renewable Electricity Generation recognises that: *"meeting or exceeding the New Zealand Government's national target for the generation of electricity from renewable resources will require the significant development of renewable electricity generation activities"*.

## Future wind farm development

NZWEA expects wind generation to grow to 20% of generation by 2030 resulting in a five fold growth in wind generation over the next two decades.

In addition to the 682 MW installed wind capacity, New Zealand has a further 2000 MW of consented capacity.

Proposed wind farms range in scale from the 8 turbine, 6.8MW Flat Hill wind farm to the 286 turbine, 858MW Castle Hill wind farm. The largest proposed turbines are at the proposed Puketoi Wind Farm in the Wairarapa, 160 metres tall with a 6MW generating capacity.

The following companies have consent for new wind farms: Meridian Energy, Energy<sup>3</sup>, Pioneer Generation, Genesis Energy, TrustPower, Ventus Energy, Contact Energy, MainPower, Power Coast, Wind Farm Group, Mighty River Power.

There is no certainty as to when or if any of the proposed wind farms will actually be built. However, more wind farm development can be expected, alongside other forms of renewable electricity generation, in order for New Zealand to meet its 90% renewable electricity target.

### 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

PO Box 553, Wellington 6140, New Zealand

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 80 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.

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[www.windenergy.org.nz](http://www.windenergy.org.nz)

## 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

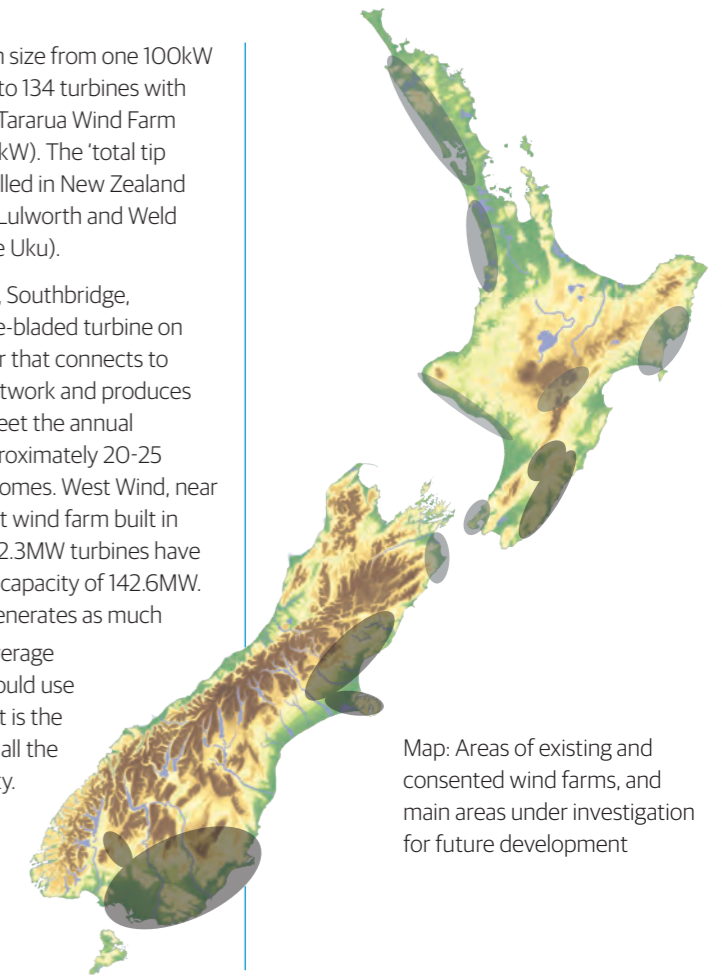
New Zealand's first wind farm, Brooklyn, was installed in 1993 and the industry has grown rapidly, with a 10 fold increase since 2004.

New Zealand has 17 operating wind farms with a combined installed capacity of 682<sup>1</sup> megawatts. These wind farms supply about 4.5% of New Zealand's annual electricity generation.

<sup>1</sup> Includes the 60MW Mill Creek wind farm which is under construction and due to come on stream in 2014

The wind farms range in size from one 100kW turbine at Southbridge to 134 turbines with a capacity of 161MW at Tararua Wind Farm (31x3MW and 103x660kW). The 'total tip height' of turbines installed in New Zealand range from 43 meters (Lulworth and Weld Cone) to 130 metres (Te Uku).

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, is the largest wind farm built in one stage. Its sixty two 2.3MW turbines 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.



Map: Areas of existing and consented wind farms, and main areas under investigation for future development

Figure 1. Annual installed and cumulative wind energy capacity

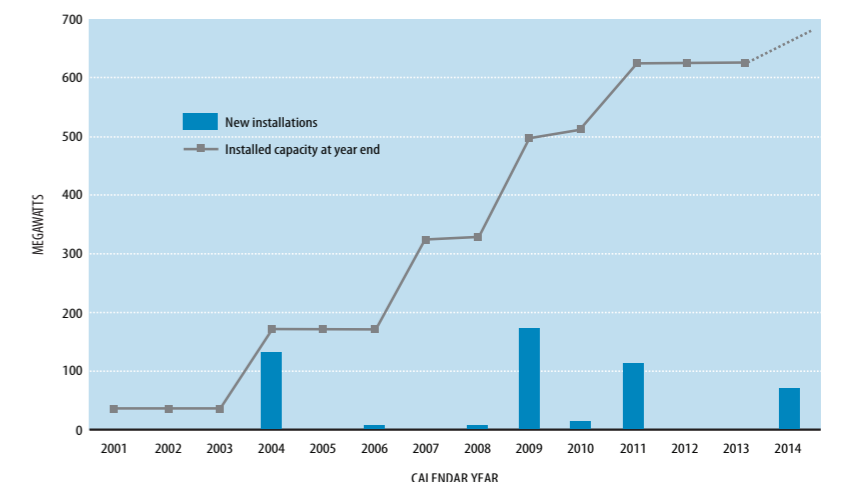


Figure 1. Operating wind turbines in New Zealand

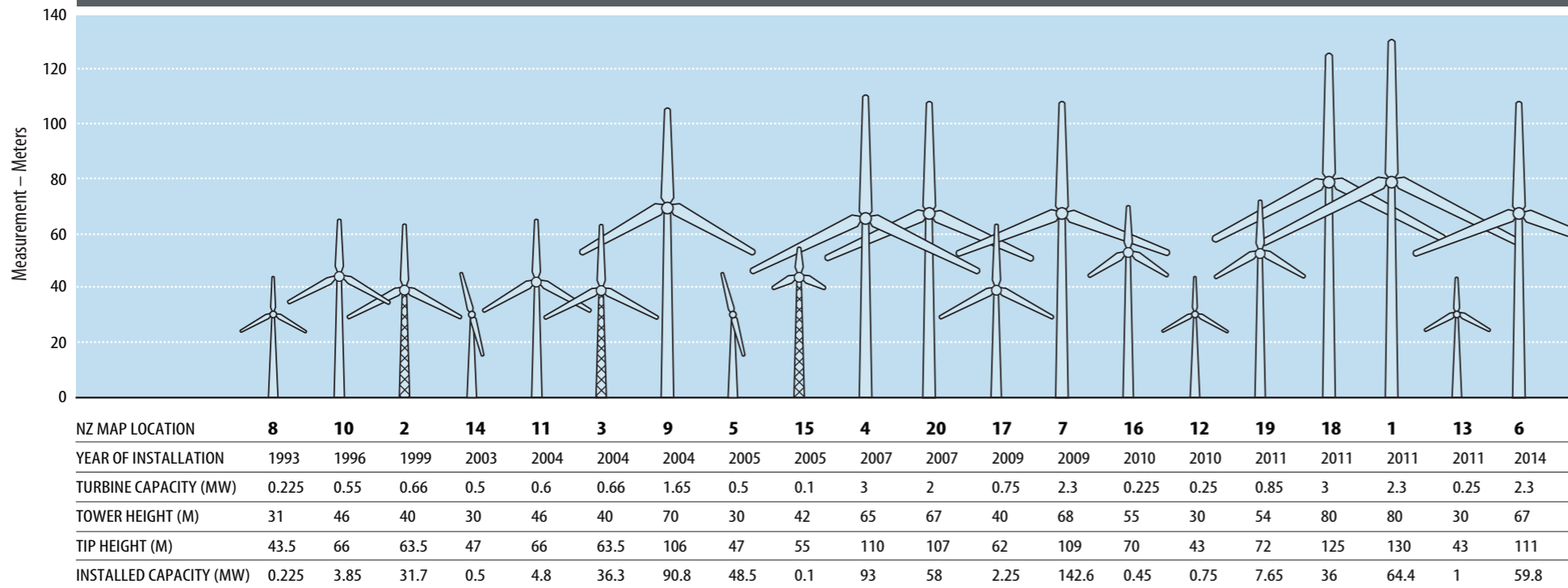
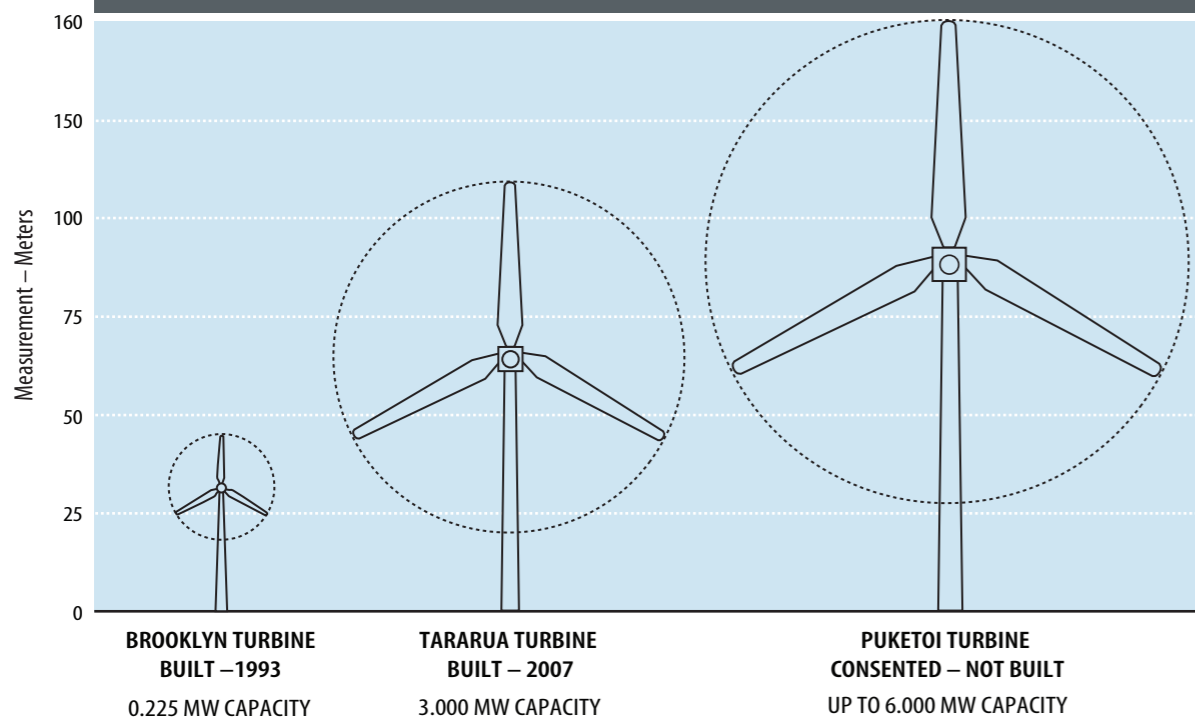


Figure 2. Size of wind turbines in New Zealand



Locations of operating and consented wind farms

KEY:  
 Operating wind farm  
 Consented (but not built) wind farm  
 \* Wind farm under appeal at time of print

