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Taranua wind farm - TrustPower

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# Landowners and Farmers

Some wind farms in New Zealand are on private property where the landowner enters into an agreement to host the machines in return for rental payments over the 20-25 year life of the development.

## How much land is required?

As a very rough 'rule of thumb' you can assume that 10 to 15 MW can be installed on every 100 hectares of land (1 square kilometre). However the actual number may be significantly higher or lower than this depending on the topography of the land and a number of other constraints.

Access tracks to each turbine, usually made of gravel, need to be between five and 12 metres in width during construction. Interconnecting electrical cabling between the turbines is almost always buried below ground, usually alongside the access tracks, within the wind farm.

A single substation will usually be required. For a small wind farm this may be contained within a small building. For larger developments a plot of land measuring about 30 metres by 30 metres (or more), will be required to house the electrical plant, associated switchgear and metering equipment. Security fencing around the substation is also usually installed. The electrical installation to the existing grid is normally a three phase power line mounted on poles.

Developers are required to comply with noise regulations and this affects the positioning of wind turbines relative to residences. Minimum distances, between turbines and existing residences, typically vary between 300 and 1,000 metres and sometimes buffer zones, within which no houses may be built, are established (See Fact Sheet #6 - **Sound**). Agricultural activities can usually continue unaffected.

## How much rent is paid and how are payments made?

There are three main categories of lease payment plans that developers may propose to compensate landowners for placement of wind turbines:

- up-front lump sum payment
- fixed annual payment per turbine
- variable payment based on actual generation (at a set price or related to actual revenue).



Total compensation is usually calculated on the basis of one or a mix, of any of the above three options. Long term compensation is in the region of one to two per cent of the gross revenue of the wind farm or about \$1,500 to \$5,000 per year for each megawatt installed. The level of payment obviously depends on the average wind speed at the site.

Sometimes landowners express disappointment at the levels of payment in New Zealand compared with other countries such as Australia and the UK. The reason for the lower levels of rental payment in this country is that, unlike the situation for the wind industry in much of the rest of the world, there is no guaranteed taxpayer subsidy available in New Zealand to support the wind energy industry.

## What agreements are needed?

Formal agreements range from initial option agreements, which give the developer the right to collect wind data and carry out other feasibility studies over a few years, to full lease agreements. These set out the responsibilities and obligations of both parties over the life of the wind farm project. Owing to the long life of a wind farm, the developer's rights will need to be transferable to any future purchaser of the land/property involved.

These formal agreements are legal contracts and land owners are therefore advised to seek legal advice so that they are fully aware of their rights and obligations prior to making any long term commitments.

## What are the impacts during construction?

Construction depends on the size of the wind farm and will typically require between four and 12 months. During this time there can be relatively high impacts, including frequent traffic movements, compared to those experienced during ongoing operation of the wind farm. For larger developments, developers will usually seek to use on-site concrete batching plants during the construction process in order to reduce construction traffic and inconvenience to the local community.

All weather access tracks are built to link the wind turbines and these can dramatically improve access across the property. New fencing and gates may be

required where access tracks cross pre-existing fence lines.

Trenches and excavations are generally left open for only a few days and appropriate fencing is used during this period.

Each foundation takes approximately one week to prepare and a day to pour. The framework around the foundation is removed from it after one or two days and backfilled within a week. Following approximately four weeks of curing the wind generators can be installed.

Several foundations may be installed in parallel and the excavated material is commonly stockpiled for back filling and road construction.

Impact on livestock is minimal provided that there is good communication between farm management and the construction team. Electric fences can be used to control stock as gates will generally need to be left open during construction hours to minimise delays to traffic. Stock must be kept away from excavations, usually using mobile electric fences.

Local and passing tourist interest will almost certainly be stimulated by the construction of a wind farm. Landowners may receive phone calls from a variety of people including neighbours, the media, government departments, tourism operators as well as other farmers who are also considering wind farming. Some wind developers will help farmers manage enquiries of this nature.

### Can wind farming and traditional farming co-exist?

Yes. Most farmers that have a wind farm have leased or granted easements for the development over only a portion of their property – that part which is affected by the turbine footprint and access tracks. This is usually about 3 to 4 per cent of the total wind farm land area. Once the wind farm is built a farmer is typically able to resume normal farming operations on the remaining 96 to 97 per cent of the wind farm.

While typical farming is little affected by wind farms the same cannot always be said of forestry. Broad acre agro-forestry is sometimes restricted on a wind farm site because it may reduce the commercial returns of the wind

farm by slowing the wind. Nonetheless it is of note that if the land is suitable for wind generation it is likely that, because of the high average wind speeds, it will not also be suitable for growing quality trees.

There may be significant disruption to normal farming activities during the construction of a wind farm. However, developers are experienced at working with farmers to minimise any such disruption. The entire construction process is, as noted above, relatively brief compared to other civil engineering projects. Once construction is complete, traditional agriculture can continue underneath and around the wind farm. In most cases the land occupied by the wind farm becomes the most productive part of the holding.

### How are farming operations impacted after construction?

Impact on livestock is minimal. Sheep, cows and horses are not disturbed by wind turbines and typically graze right up to the base of the towers which they often use as rubbing posts or for shade. However in certain instances the developer may wish to construct a fence around the base of each tower in order to keep livestock away.

Impact on cropping is mainly due to the access tracks. Normal sowing patterns may be disrupted as it is unlikely that turbines will end up on unproductive land or in the corners of paddocks. Nonetheless careful planning and consultation will normally enable the landowner and developer to come to a mutually acceptable agreement.

Generally pivot irrigators cannot be used in the vicinity of wind turbines because of the large area that they occupy.

Depending on the site, agricultural aviation such as crop dusting or super phosphate spreading may be impacted.

Agricultural pilots are highly trained and operate very manoeuvrable aircraft at extremely low altitudes that may be as little as 2 metres. Consequently they are best placed to assess the potential impact.

Extensive tree planting can slow the wind and cause turbulence and both of these factors will reduce the commercial returns generated by the wind farm. Stock shelters and environmental plantings can normally be accommodated.

There is some evidence to indicate that there may be local micro climate affects associated with very large (10,000 turbines) or very dense, turbine arrays<sup>1</sup>. This tends to be negligible during the daytime and at night serves to mix cooler stable air near the ground with warmer air above. NZWEA is not however aware of any evidence for significant micro-climate affects associated with wind farm arrays of the size or density that are likely in New Zealand.

Construction of new residences or other buildings may be restricted. This may be due to either the impacts on the wind resource or, in the case of occupied buildings, noise criteria. Detailed noise modelling during the planning phase can provide a very good idea of 'no-go' zones for future residences. (See Fact Sheet #6 - **Sound**).

<sup>1</sup> **New Scientist** – November 2004. 'Weather hots up under wind farms'.



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