

Hauāuru mā raki

The Waikato Wind Farm

Clean, renewable wind energy in the Waikato region
Information for interested parties



Introduction. New Zealand's energy sector is changing. The country needs large amounts of new electricity generation to meet strong demand growth and, with concern growing about the effects of climate change, that electricity needs to come from clean, renewable sources.

Contact Energy and Wind Farm Group have joined forces to develop an important new electricity generation project harnessing renewable wind energy in areas of mainly pastoral north-west Waikato farmland known as Waikawau and Matira.

The wind farm will be known as Hauāuru mā raki, meaning 'north-west wind'.

The wind farm area extends some 40 kilometres from south of Port Waikato and has a width of between three and eight kilometres.

Cover image: Computer-generated simulation of how part of the Waikato Wind Farm will look.

Note: Some aspects of this project discussed in this document may change as a result of consultation and/or as the project develops.

FIGURE 1:

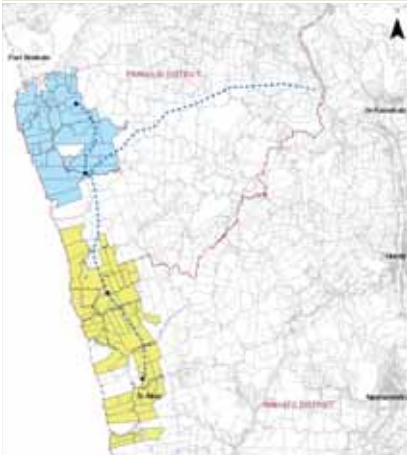
Wind project

Legend

■ Waikawau site

■ Matira site

--- Proposed transmission line



Most landowners in this area are already participants in the project, while others are now in the process of committing to land access agreements that will permit the construction and commissioning of the project.

The area has a strong wind resource and the potential for up to 218 wind turbines with a total installed capacity of up to 650 megawatts (MW).

If the full 650 MW capacity of the wind farm is developed, the wind farm will generate enough clean, renewable electricity to power up to 250,000 average homes per year.

Hauāuru mā raki is an important project in helping to meet New Zealand's growing demand for a secure supply of electricity, while helping to protect our climate and

environment for future generations. With a construction project of this size there will also be a number of benefits for the local Waikato economy.

This brochure is intended to help answer some frequently asked questions we have encountered when talking to people about this project.

If you still have questions after reading this brochure then please contact the project team at waikatowind@contact-energy.co.nz or on 0800 000 458.

Contact is committed to developing this project responsibly and to minimising the project's impact on the environment and people in the area. You have our assurance that we will listen, answer your questions and address any concerns where possible.



Frequently asked questions

■ Who will own and operate the Hauāuru mā raki project?

Contact Energy has joined forces with the New Zealand wind farm developer Wind Farm Group, which has been securing the necessary landowner agreements for the project. The joint venture company formed for the purpose of owning and operating the generation project is Contact Wind Limited, while the electrical connection assets will be owned by Contact Energy.

■ Where will wind turbines be located?

The map on page one shows the proposed individual wind turbines that make up the wind farm. You can find further information on turbine sites on our project website at www.contactenergy.co.nz/waikatowind

Contact Wind has used an environmental effects-based approach to designing the wind farm. This means that baseline studies by ecological, archaeological and landscape specialists have been undertaken in parallel with consideration of the best turbine sites from an electricity generation and construction perspective.

Locating turbines is a careful balancing exercise in which we try hard to ensure the turbines will receive favourable winds, while minimising or eliminating any adverse effects.

As a result of this work, more than 100 possible turbine sites have already been eliminated from this project, for archaeological, visual or ecological reasons. Many other proposed turbine sites have been shifted to avoid important features.

It's not always possible to avoid every adverse effect in an exercise of this scale, but the overall benefits of the project to the country, the region and the wider environment also must be considered. Contact is confident that where adverse effects are caused by this project, they are more than offset by the national and regional benefits of the wind farm.

It's important to note that some further wind turbines may need to be shifted, as further effects-based studies are conducted over the coming months and as a result of consultation with interested parties.



How visible will the turbines be?

The turbine towers will have a maximum hub height of up to 100 metres, with blades up to 50 metres long. These turbines will utilise the most up-to-date technology when they are built.

One of the biggest environmental effects of this proposed wind farm will be the visual impact of the turbines.

The proposed wind farm site is remote and the area is very lightly populated, thus limiting the visual impact of the turbines. There will be some degree of visual effect on fewer than 40 houses (excluding houses in the area directly involved with the wind farm).

From a visual and landscape perspective, the site is well-suited for a wind farm for the following reasons:

- It is away from densely populated areas and is thinly settled so that visual effects are limited; but not so remote that the site is valued for wilderness qualities
- It is a productive (working) rural landscape
- There are no outstanding natural landscapes, as defined by the Resource Management Act, in the area.



Are wind turbines noisy?

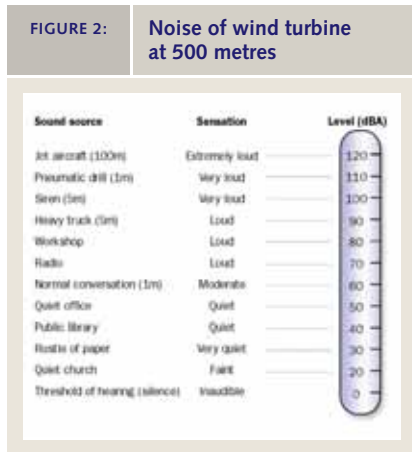
Modern wind turbines are very quiet. A wind turbine operating at a distance of about 300 metres is no noisier than a kitchen refrigerator. Even so, in the case of this project, a minimum separation distance of 750 metres to neighbouring dwellings has been used, and in most cases the wind turbines are well over one kilometre from the nearest dwelling. The sound turbines produce is similar to

a light whooshing or swishing sound, with the most audible noise being the sound of the wind interacting with the turbine blade. Even in rural or low-density areas where there is little additional sound to mask that of the wind turbines, the sound of the blowing wind is often louder.

However, in some hilly terrain where residences are located in sheltered dips or hollows downwind from a wind farm, turbine sounds may carry further and be more audible. This effect can generally be anticipated and avoided in the development process through ensuring turbines are located at adequate distances from homes.

Once operational, the noise from the wind farm will be within the requirements of the New Zealand Standard. Further, the Resource Management Act requires the best practicable option to be adopted in order to minimise noise. In order to meet this requirement, Contact Wind proposes to use advanced, quiet wind turbines for this project.

Any noise effects of the proposed wind farm will, as a result, be no more than minor for its neighbours.



This proposed wind farm will meet the 'New Zealand Standard for the Assessment and Measurement of Sound from Wind Turbine Generators' which states that sound levels "measured at the boundary of any residential site must not exceed the greater of 40 decibels, or background noise plus five decibels".

■ **How close will houses be to turbines?**

The nearest house that is not owned by a landowner directly involved in the project will be around one kilometre from any of the project's wind turbines. There are around 35 houses that are within two kilometres of a turbine.

■ **What is the benefit for the local community?**

There's plenty in this for the local community. With at least \$1 billion of investment in Hauāuru mā raki, consultants' reports expect that the project may generate around \$167 million of regional economic income over a 4.5 year construction period. Once the wind farm is operating, the project is expected to contribute more than \$8.5 million per year to the local economy.

Landowners will benefit financially and on an ongoing basis from having wind turbines on their land, with minimal disruption to existing farming operations.

There will be improvements to the local roading network, which will benefit motorists, and Contact Wind will also be working to enhance local recreational and amenity values.

As a result of this project, it is expected that a great deal more information on the history and the archaeology of the area will be able to be explored and documented.

■ **Will construction of the wind farm cause any inconvenience or nuisance?**

All large construction projects generate a volume of construction traffic which can have temporary effects on the local roading network, and surrounding areas. However, the proposed location for this project is in an area of rural roads with very low traffic volumes, and earthworks will be conducted mainly on remote rural farmland.

It is expected that most materials, such as aggregates and sand, will come from local quarries within the project area which will help to minimise construction traffic.

Construction effects will, therefore, only impact on a small number of local residents and farmers, many of whom will have a direct interest in the project as landowners.

Overall, and with particular road improvements and traffic management plans, the traffic effects due to the establishment of the wind farm will be able to be accommodated with only minor and temporary adverse effects. The local road improvements needed to accommodate heavy and long loads will deliver a long-term improvement to the local roading network, to the benefit of all users.

■ **How will the electricity generated at the wind farm be transported to the main grid?**

Electricity generated from the proposed wind farm will need to be transported to the national electricity grid for transmission across the country.

The wind farm's electricity will need to be transported to the grid via a 28 kilometre long connecting corridor that will extend from the southern Waikawau area to a new switchyard which will be built near Orton, north of Huntly. This switchyard

will connect the wind farm to the existing national grid.

The line connecting the wind farm to the national grid will comprise double circuit towers carrying two 220kV lines that will look like the picture you see below. These towers will be spaced at approximately 450 metre intervals and will have a height of around 40 metres – very much the same height as existing transmission towers in the area. Lines connecting the Waikawau substation to other substations within the wind farm will be 220kV circuits carried on poles (see Figure 4).

FIGURE 3: Proposed electricity transmission route



FIGURE 4:

Transmission infrastructure



Contact Energy appreciates the sensitivities around electricity lines and energy infrastructure and has worked hard to come up with a route which aims to minimise the visual impact of the lines on people and property. The route will follow remote landscapes, extensive pastoral land, be distant from public roads and houses and low in elevation; generally with a backdrop of higher hills.

The proposed route for the line connecting the wind farm to the national grid has been designed so that the lines do not come close to any existing houses.

■ Will the wind turbines interfere with radio or television coverage?

Contact Wind's research suggests that there may be up to 100 houses in the area that could be affected by signal interference, but only if they have analogue television technology. Once the wind farm is operational, an experienced engineer will be used by Contact Wind to identify whether any adverse effects on television reception are caused by the wind turbines.

In the unlikely event of signal interference, Contact Wind will work with those affected to remedy any problems.

What is the likely impact of the project on ecologically important areas?

Contact Wind has worked hard to design a project which minimises impact in the natural environment, and has removed or relocated 39 individual turbines to reduce the impact on ecologically significant features.

The wind farm is largely situated within land which has been cleared for pastoral farming, and the whole project is located on privately-owned land. However, several ecologically significant bush and wetland areas remain within the wind farm site. Because of the scarcity of any indigenous forest left in the north-western Waikato, any large stands are considered to be ecologically significant.

The majority of the wind farm turbine sites, access roads and transmission line routes would result in no more than minor adverse ecological effects. However the project will require the clearance of some native vegetation, which will have some limited impact.

Natural features which will be impacted by the project fall within the Waikawau area, the southern portion of the Matira area and the preferred transmission line corridor connecting the wind farm to the national grid.



Will there be any impact on birds and animals?

Much investigative analysis is still being undertaken in order to fully answer this question, but initial reports suggest any impacts will be minor.

The turbines situated along the coastal margins and near stream mouths could potentially generate low risk adverse effects on coastal birds, including the New Zealand dotterel, wrybill and variable oyster catcher, as these species occasionally fly inland during poor visibility and windy conditions. However, no significant wader, wetland, coastal or shore bird migration routes or flight paths have been recorded within the wind farm site. Further surveys are scheduled to verify this assessment.

No existing Department of Conservation reserves or QEII National Trust Open Space covenants will be directly affected by the proposed wind farm.

The impact of wind farms on birds is extremely low, especially compared with other human-related activities. No matter how extensively wind is developed in the future, bird deaths from wind energy are unlikely to ever be more than a small fraction of bird deaths caused by other human-related sources, such as cats, buildings and cars.

■ **What is shadow flicker and will it be a problem?**

Shadow flicker is a technical term used to describe what can happen when rotating turbine blades come between the viewer and the sun, causing a very brief moving shadow. For people living close to wind turbines, shadow flicker can occur under certain conditions and can occasionally be annoying, such as when trying to read or watch television.

Shadow flicker can be precisely calculated to determine whether a flickering shadow will fall on a given location near a wind farm, and for how many hours in a year it will do so. Potential problems can be easily identified and solutions range from appropriate location of turbines, to planting trees to disrupt the effect. If any effect is experienced, it is generally very short-lived, such as for a few hours over the course of a year.

Given the distance of the proposed turbines from houses, Contact Wind does not expect shadow flicker will be an issue with this project.

■ **What happens at the end of the wind farm's working life?**

One of the advantages of wind farms is that there is virtually no lasting residual impact. Should a wind farm be decommissioned, the landscape can be quickly returned to essentially the same state that it was in before the wind farm was built.

■ **What colour will the turbines be?**

Most modern turbines and towers are white or grey in colour.

The reason wind turbines are these colours is because when they are placed on a ridgeline they are least noticeable against a cloudy backdrop, thus minimising their visual impact.

FIGURE 5:

Wind turbine on ridgeline





Will the wind farm threaten important archaeological sites?

This is an issue that Contact Wind is committed to managing with sensitivity. The west coast areas of the Franklin-Waikato district in which the wind farm development is proposed contain a number of archaeological sites, some of which have high significance.

However, little if any archaeological research relating to this area has been carried out, and many of the known sites have been recorded in the past on the basis of aerial photographs, without further field assessment.

The project involves a number of earthworks and associated activities which have the potential to impact on archaeological sites, and great care will need to be exercised throughout the construction phase.

119 archaeological sites have been identified in the vicinity of the proposed wind turbine clusters.

The vast majority of the recorded sites, including all of the Maori urupa/burial sites, will not be affected by the proposed wind farm development.

All archaeological sites affected by the proposal would require an Authority under the Historic Places Act 1993 and, where impacting a site cannot be avoided, archaeological investigations of sites will be undertaken.

As very little research has been carried out on the settlement patterns and archaeological characteristics in the region between Port Waikato and Raglan, this proposal represents an opportunity to provide significant information relating to the pre-European Maori settlement of the area.

Contact Wind is committed to working closely with local Maori and the Historic Places Trust in the area to help facilitate this research and to ensure development is conducted appropriately and respectfully.



Will the wind farm affect property values?

The Waikato wind farm is planned for a remote rural location with very few houses or properties that are likely to be directly affected by turbine locations. In most cases the property owners have granted land access for the wind farm project to proceed. New Zealand research on the effect of wind turbines on property values shows there is no evidence that a wind farm development will lead to negative effects on property values if the wind farm is:

- Well clear of, and not immediately adjacent to, existing residences
- Well clear of, and not immediately adjacent to, land capable of being developed to contain residential development in the future.

■
Will the wind farm affect tourism?

Few tourists visit the area. On the past experience of other New Zealand wind farms, once the Hauāuru mā raki wind farm is commissioned, Contact Wind believes it could become a local icon, and almost certainly the subject of school visits and studies on renewable energy projects.

In conjunction with local councils, Contact Wind is undertaking a recreational amenities study to ensure that the wind farm can form part of an upgraded destination, with attractions such as new bike and walking tracks and access to remote beaches in the area which have been previously inaccessible.

■
What happens now?

The project team will continue its studies into the environmental effects, with a number of expert studies already underway and more planned. We will be seeking views from people living in the area where the project is planned in order to make sure they understand the project and that any concerns have been addressed as far as possible.

Negotiations with landowners will continue in order to secure further land access agreements.

Contact Wind expects to file an application for resource consents for the project under the Resource Management Act some time around the end of 2007.

The application will probably be notified under the Resource Management Act and will be available for public submissions to be made on it.

■
What is Contact Energy?

Contact Energy is one of New Zealand's leading electricity generators and retailers, with over 500,000 electricity customers across the country and around 85,000 kiwi shareholders.

For more information on Contact Energy please visit our website at www.contactenergy.co.nz

■
What is Contact Wind?

Contact Wind is a company formed by Contact Energy and Wind Farm Group to own and operate Hauāuru mā raki wind farm.

■
What is Wind Farm Group?

Wind Farm Group Ltd is a New Zealand owned company dedicated to the development of wind farms.

For more information on Wind Farm Group please visit our website at www.windfarm.co.nz



Conclusion

People's views of wind farms are shaped by a number of factors, including the value we place on the proposed site, the value we place on clean, renewable energy, our concern about climate change and the natural environment and our understanding of wind generation technology.

Hauāuru mā raki has the potential to make a positive impact to New Zealand's energy supply, and help lead the country's response to climate change.

We realise that there may be some environmental impacts associated with this project, and we are committed to being up front about them and minimising effects where they do occur. We're also committed to developing a project that makes a significant positive contribution to the New Zealand economy and environment both for today and for the future.

We believe this is an excellent project which is worth supporting. We're committed to engaging with the local community and winning support for the project.

Where do I get more information?

Contact is committed to advancing this project in a transparent and open fashion.

- @ The Contact Energy website – **www.contactenergy.co.nz/waikatowind** – will be frequently updated with the full range of technical and environmental reports. Please check back frequently to ensure you are fully up-to-date with what is happening on this exciting project.
- ✉ Otherwise, please contact the Waikato wind farm project team with any questions or comments at **waikatowind@contact-energy.co.nz** or **0800 000 458**.



www.contactenergy.co.nz/waikatowind

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