IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of the hearing of Submissions to the Proposed Horizons Regional Council's Proposed One Plan: Chapter 3: Infrastructure, Energy, and Waste

Statement of Evidence of Christopher John Freear

1.0 Introduction

1. My full name is Christopher John Freear. I am Chief Executive Officer of NZ Windfarms Ltd. (NZWL).

2. NZWL, is a NZSX listed company dedicated to delivering solutions to climate change by being a long term owner, operator and developer of renewable energy generation.

3. I hold a Bachelor of Engineering in Mechanical Engineering and a Bachelor of Science - Management Science from the University of Canterbury.

4. I have gained a sound understanding of the energy industry having worked in a range of different roles covering energy efficiency, LPG, natural gas, metering, dual fuel energy solutions, engineering design, project and key account management for a range of energy-related companies including Southpower Limited, On Energy Ltd, Energy Matters Ltd and Windflow Technology Ltd. I have been a director of the New Zealand Wind Energy Association Incorporated since 2004.

Purpose of this evidence

5. I am appearing on behalf of the submitter NZWL.

6. My brief of evidence will cover the following key aspects related to the link between the statutory environment for renewable wind energy generation facilitates, and the technical and engineering decisions relating to site selection:

    a. New Zealand Windfarms Ltd

    b. NZWL's experience in the Manawatu Wanganui Region;

c. Wind Power Generation – National and Local;

d. Site selection considerations;

e. Wind Farm Infrastructure and Construction effects;

f. Operational Considerations

g. The Benefits of wind farming; and

h. Desire for an 'elevation of status and certainty'.

7. I understand that the NZWF submission is in support of the Chapter 3 provisions of the Proposed One Plan as notified, and that NZWL is not a further submitter in any regard. As such, I intend to be brief, however I do intend to provide some clarification as to the special recognition of large infrastructure and utility facilities within the statutory document.

NZ Windfarms Ltd (NZWL)

8. NZWL's vision is about delivering solutions to climate change by being a long-term owner, operator and developer of wind farms for the production of renewable electricity generation. Wind farming is essentially a form of farming, employing well-developed technology on typically low productivity land.

9. NZWL is listed on the NZSX and has an asset base of over $80 million. Vector (New Zealand's largest lines company) is a 19.99% cornerstone shareholder of NZWL.

10. NZWL is committed to building, in a relative sense, smaller-scale wind farms that, where possible, make use of existing capacity within local transport and lines networks. It is acknowledged however, that the Te Rere Hau farm located on the Tararua Ranges is at the larger end of this spectrum and does provide generation into the national grid.

11. Typically NZWL's wind farm developments are of a small to medium size which supply electricity closer to local consumer demand. The company has also undertaken co-investment and joint ventures with the local community, an example of this includes the Windpower Maungatua Project. Such an approach helps provide economic benefits to local communities, and assist the efficiency of sustainable electricity generation and distribution in providing electricity generation close to where it is needed.

NZWL's Experience in the Manawatu Wanganui Region

12. NZWL is currently developing a portfolio of wind farms throughout New Zealand. The first consented NZWL development within the Manuwatu Wanganui Region is Te Rere Hau wind farm located on the western slopes and at the northern end of the Tararua Ranges, approximately two kilometres to the north of the Pahiatua Track on North Range Road.

13. The Te Rere Hau wind farm project received resource consent in May 2005 for up to 97 turbines which will be built in stages and on completion will provide 48.5MW generation capacity. There are presently five turbines on site and a further 28 turbines (Stage 2) will be installed by the end of 2008. It is noted that this application was considered under the Regional Policy Statement (preceeding the notified Proposed One Plan) and the Palmerston North District Plan and was considered acceptable subject to conditions on a notified basis.

Wind power Generation – National and Local

14. The growth in New Zealand's total electricity consumption outstripped the increase in supply capacity by 30 percent in the eight years to March 2004 and the Ministry of Economic Development (MED) predicts additional generation of around 3,200MW will be needed by 2030 to meet the predicted increase in demand. Aligned with this demand, MED expects New Zealand's electricity supply to significantly grow over the period to 2030 by 40 percent according to its base case forecasts, or by even more if fuel switching occurs. Examples of fuel switching are home heating switching from solid fuel to electricity, or increasing use of electric rail and hybrid or fully electric transportation.

15. MED forecasts show wind energy accounting for an increasing proportion of the total energy supply, from 1.5 percent to 11.7 percent by 2030. In my opinion, and based on anticipated projects, the wind energy proportion of the energy mix is likely to increase to at least twice the levels forecasted by MED. This is in line with overseas trends – for example in Denmark wind energy contributes 20 percent of its electricity supply and in Spain wind energy contributes 8 percent of its electricity supply and is predicted to reach 15 percent by 2010. I also understand that such an increased proportion of renewable energy sources, including wind energy, within the overall energy supply is subject to a recent spate of Policy initiatives and directions from Central Government, including the 2004 Amendments to the Resource Management Act, and also international directives. A direction, I clearly concur with.

16. Wind power generation is based on a free and renewable resource that produces no direct greenhouse gases or other chemical pollutants. Further, wind power provides long-term price stability to what can be highly volatile fossil fuel markets, as evidenced by the recent significant increase in the price of crude oil, coal and natural gas.

17. The reliability of wind power is often questioned on the basis that the wind may be intermittent and cannot be relied upon as a means to generate electricity. This belief is not correct as wind turbines can effectively contribute to meeting energy needs given that:

    - Wind turbines and hydro power stations can be managed in a complimentary manner. When the wind is blowing, less water needs to be directed through hydro turbines and be stored in the dams instead. In the event of the wind not blowing the stored water can be released to generate electricity. Therefore fluctuations in wind are not necessarily a significant factor and can effectively be contained and relied upon within the overall portfolio of energy generation

in New Zealand. The total output of wind turbines distributed across the country is much less volatile than that of a single turbine because when the wind is not blowing in one part of the country it is likely to be blowing somewhere else.

- The planning of wind output requires reliability on an annual basis. Operationally, there is the need to predict two hours ahead of the existing need and good techniques exist for making this prediction. With increasingly more effective data collection and analysis wind forecasts are likely to improve as will the management of electricity networks across the country.

18. New Zealand's, and the Manawatu Wanganui Region's wind resource is arguably the best in the world. Given climate change, oil costs, security of energy supply and the Government's renewable energy strategic direction the environmental and business case for wind power generation in New Zealand is very strong.

19. At the local level the Tararua Ranges represent a world class site for wind farms. A total of three wind farms have been established on the Tararuas - to the north east of NZWL's Te Rere Hau Wind Farm site are the Tararua and Te Apiti wind farms respectively operated by TrustPower Limited and Meridian Energy Limited. The total projected renewable energy output from the three wind farms is close to 300MW.

20. Policy 3.4 within the Proposed One Plan generally recognises that the development of renewable energy generation and the use of renewable energy resources shall take preference over the development and use of non-renewable energy resources. NZWL supports the proposed Officers Report recommendation to Policy 3-4(a) which introduces acknowledgment of the significance of the Manawatu region as an exceptional renewable energy resource, particularly in relation to wind farming, and that the infrastructure should be developed where the resource, in NZWL case - wind, is located.

Site Selection Considerations

21. In assessing suitability of a site for the potential development of a wind farm NZWL has four key assessment criteria:
    a. Annual mean wind speed.
    b. Proximity to a distribution line of appropriate voltage and capacity.
    c. Absence of significant resource consent issues, such as landscape values, and separation distances to residential dwellings.
    d. Ease of establishing suitable road access to the site.

22. The above criteria also represent constraints for utilisation of sites for wind farms, and it is therefore important that suitable sites are effectively developed.

Operational Considerations

23. Operational considerations include: ensuring on-going compliance with resource consent conditions; scheduled maintenance; being a good neighbour; and ensuring on-going management availability to respond to and deal with any operational issues

as they may arise. There is an on-site office at Te Rere Hau wind farm site and a site manager who is readily available to deal with such operational matters.

24. Wind farms, like all developments based on mechanical equipment, require a regular schedule of support and maintenance. Typically, scheduled maintenance consists of six monthly inspections and a more rigorous annual service. The six month maintenance programme of all turbines includes such things as inspecting and replacing brake pads, changing oil filters, lubricating axle and yawing mechanisms and inspecting the generator and other components.

Wind Farm Infrastructure and Construction Effects

25. A typical wind farm infrastructure comprises:

- Wind turbines. The turbines comprise turbine blades/rotor, nacelle and a supporting tower that are secured to concrete foundations. Due to aerodynamic and wake effects rows of turbines are typically spaced three to seven turbine diameters away from one another. When prevailing winds allow, turbines sited along a row may be spaced as little as two turbine diameters away from each other.
- An on-site underground electrical network that connects the wind turbines and then transports the electricity to an on-site substation.
- An electronic monitoring system that provides operation performance to be monitored and logged and that allows turbines to be shut down remotely as required for operational and safety purposes.
- On-site roads for access during the construction phase and post construction to allow for maintenance.
- Crane pads to permit the assembly of turbine nacelles and blades and erection of the turbine.
- An off-site electricity network connection via a substation – usually comprising a purpose-built extension to the local electricity network or national grid.

26. Generally, the construction phase involves:

- The provision of access roading to the turbine sites.
- Increased traffic movements associated with transporting the turbine components on-site, delivering concrete and reinforcing for the foundations.
- The use of cranes and associated footings to erect the turbines.
- Trenching for receiving the underground on-site electrical network.

27. Potential and Actual Effects of wind turbine energy generation (construction and operation) include:

- Associated cutting and filling for road access and site drainage, and sediment control and remedial work on completion.
- The siting and construction of turbine pads. Siting takes into account the local environment and ecology. The foundation pads upon which each tower sits have been re-designed to significantly reduce the required footprint from an

original pad of approximately 60m^2 to a pad of 5m^2, little more than the turbine tower base area.

- The impact of the cranes and crane footings – the footings usually remain for on-site maintenance purposes and are typically shingle and of 15 by 12 metres surface area. Re-design of concrete footings has resulted in a smaller footprint.
- Trenching to receive the underground on-site electrical network is back-filled and the cover is re-instated by planting or re-seeding in compliance with the consent.
- Noise

    - All construction activities are carried out to ensure that noise levels will comply with the New Zealand Standard NZS 6803: 1999 *Acoustics – Construction Noise.*

    - The wind farm operations will comply with the New Zealand Standard NZS 6808: 1998 *Acoustics – The Assessment and Measurement of Sound from Wind Turbine Generators.*

- Visual Effects
    - Visibility of the tower and blades can be generally reduced by having the blades painted in a matt, light grey colour to reduce blade glint and the visual effect when the turbines are viewed against the sky.
    - The type and size of turbines is selected on the basis of the specifics of the site. Consideration is also given to the visual impact of the number of turbines relative to the size of the turbines.
    - The planning of access roads to generally ensure that visibility from public locations is considered.
    - Transmission lines between the turbines and the sub-station generally being kept underground.

28. Generally, the impacts arising from the construction activities of wind farms and associated infrastructure are temporary in nature, and can largely be avoided, remedied or mitigated.

29. It should be noted that the outputs from a wind farm infrastructure can sustainably benefit generations while emitting no greenhouse gas emissions. Furthermore, it is possible for a windfarm site to be readily restored in event of the removal of all windfarm infrastructure from a site. This is a defining feature of windfarm infrastructure that contrasts with site restoration issues associated other major forms of electrical generation infrastructure in the event of decommissioning.

The Benefits of Wind Farming

30. Overall, wind farm developments produce a number of significant social, economic and environmental benefits, including:

- increasing the diversity of the New Zealand energy supply streams, thereby improving energy system reliability and security;
- renewable energy production from an infinite source, wind, which helps address increasing local and national energy demands;
- producing energy sustainably with no direct greenhouse gas emissions and reducing the need for fossil fuels, thus contributing to New Zealand's climate change obligations;
- giving effect to the guiding principles of the governments strategic direction and policies on energy;
- providing some on-going local employment opportunities, although most significant gains are temporary and in the construction phase.

Desire for an 'elevation of status and certainty'

31. It is my view that the purpose of the Infrastructure, Energy and Waste Chapter (Chapter 3) of the Proposed One Plan, should provide significant guidance to network utility operators, other infrastructure providers and territorial authorities of a clear direction as to the recognition and provision of the specialised character of utilities in contrast to other land uses generally. In essence this is stated as Objective 3-1 'Infrastructure and Energy'.

32. Within the limited confines of the NZWL submission however, it was considered that there was a disjunct between that 'lofty' goal and the respective Policies that sought to implement it, within the Plan as notified. In particular, renewable energy infrastructure, should as a priority be elevated, in recognition of Central Government and International directives obligations, to providing guidance for limiting controls to situations, or environments, where the adverse effects are justified as being potentially significant.

33. There are significant national and community benefits to be derived from wind farms. Given these benefits balanced against the adverse effects, it would be appropriate to specifically recognize wind farms and other forms of renewable energy in the POP as infrastructure that has significant social, economic and environmental benefits.

34. It is noted that the Council's Officers Report (dated July 2008) recommends a number of modifications to this section of the Proposed One Plan. With reference specifically to amendments to Policy 3-4, NZWL generally supports these amendments as providing greater clarity to the policy status of renewable energy generation and infrastructure, in line with my comments as above. Mr McEwing will however provide greater specificity on these matters, and also outline residual concerns with Policy 3-3 and the number of the submissions seeking a higher level of regulatory control particularly in relation to the statutory conditions for the establishment of Windfarms on the Tararua Ranges.

Christopher John Freear

Dated 4 August, 2008