BEFORE THE HEARING COMMISSIONERS
AT PALMERSTON NORTH

IN THE MATTER	of the Resource Management Act 1991 (the Act)
AND	
IN THE MATTER	of a review by **PALMERSTON NORTH CITY COUNCIL** of the conditions of consent for Te Rere Hau Windfarm under section 128 of the Act

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STATEMENT OF EVIDENCE OF JOHN ROBERT WORTH ON BEHALF OF NZ WINDFARMS LIMITED

DATED 25 August 2017

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SUMMARY

1. NZ Windfarms is a specialist wind farm operator which supplies renewable energy into the national grid. The combined output from NZ Windfarms' two sites – Te Rere Hau and Te Rere Hau Eastern Extension – is approximately 130GWh per annum which supplies the power needs of around 18,000 households based on average New Zealand residential electricity demand.

2. However, NZ Windfarms has performed poorly in many respects since its establishment. The New Board and senior management team are determined to improve the economic and environmental performance of the company, and its interactions with the local community.

3. NZ Windfarms has been constrained in its operations to date due to contractual and performance issues with the turbine manufacturer and the electricity market rules which apply to wind generators.

4. NZ Windfarms is developing measures and strategies to overcome these constraints which will, and have already, resulted in improved performance.

5. NZ Windfarms wants to ensure that the effects of its operations are acceptable and that appropriate controls are imposed in any reviewed noise conditions. NZ Windfarms considers that the conditions proposed by its experts ensure that any noise effects will be managed to an acceptable level.

6. In addition, NZ Windfarms is committed to going beyond these conditions to be a good neighbour and to continue to reduce noise emissions where it is able to do so.

INTRODUCTION

1. My full name is John Robert Worth.

2. I am the Chief Executive Officer (CEO) of NZ Windfarms Limited (NZ Windfarms). I have held this position since May 2017. I joined the company as Commercial Director in March 2017.

3. I completed a Bachelor of Engineering Degree in 1994, and a Master of Engineering Management degree in 1996, both at the University of Auckland. I have been a full Member of the Institution of Professional Engineers in New Zealand since 1998 and I am a Chartered Professional Engineer. I hold a Postgraduate Diploma in Strategy and Innovation from the University of Oxford and in 2015 I completed the University of Auckland Executive Leadership Programme conducted by the Centre for Infrastructure Research.

4. I have worked in the engineering industry for the last 23 years in public, private, and listed companies in New Zealand, France, Turkey and the United Kingdom, in the building, infrastructure and energy sectors.

5. I have worked on a wide range of energy projects, covering geothermal, wind, solar and wave energy disciplines in the United Kingdom and New Zealand. My experience covers feasibility studies, economic modelling, consenting, design, detailing, documentation, peer review, construction and operations.

6. I have experience working as Wind Development Project Manager and Generation Development Projects Manager at Mighty River Power from 2009 – 2013. In this role I held development responsibility for a portfolio of eleven potential wind farm sites, and successfully secured wind farm, transmission rights and consents for the Puketoi project in the Manawatu region.

7. I was the Group Manager – Investment and Development at Auckland Transport for two years from December 2013 through to January 2016 where I held responsibility for most of Auckland's public transport asset development including the roll-out of the electric train fleet.

8. I provided consulting services in Development Management and Engineering to the property sector through 2016 and early 2017.

9. I am authorised to give this evidence on behalf of NZ Windfarms.

Purpose and scope of evidence

10. The purpose of this evidence is to provide an overview of the following matters:

    (a) NZ Windfarms – generation and senior management;

    (b) Operating environment and approach;

    (c) Noise challenges;

    (d) Response to Palmerston North City Council (PNCC) evidence; and

    (e) Conclusion.

NZ WINDFARMS

Generation

11. The Tararua Ranges offer some of the best wind resource for wind farming anywhere in the world. The resource is prized by New Zealand's leading renewable electricity generators including Meridian Energy, Trustpower (whose windfarms are now owned by related company Tilt Renewables) and Mercury, who all have large scale operating or consented wind farms on the Tararua Ranges.

12. The wind resource on the Tararuas is widely considered to be the best in New Zealand, in terms of average wind speeds and the capacity factors achieved by wind turbines. The five operating wind farms on the Tararua Ranges (Tilt Renewables Tararua 1, 2 and 3, Meridian Energy's Te Apiti and NZ Windfarms' Te Rere Hau and the Eastern Extension) were among the first wind farms developed in New Zealand, attesting to the quality of the wind resource at a national level.

13. Wind farming on the Tararua Ranges makes a significant contribution to the Palmerston North and Manawatu economies. Wind farm construction and operations are capital and labour intensive activities and provide many direct and indirect local jobs. Wind farming is part of the identity of the Manawatu region.

14. Whilst New Zealand is blessed with significant hydro-power generation assets, hydro schemes constructed in the last 30

years have been very small in number and scale. Renewables development of scale has been almost entirely limited to geothermal and wind energy categories.

15. Opportunities for further economic geothermal development (beyond Contact Energy's consented Tauhara project near Taupo) are very limited. Having been involved in the construction of Mercury's Nga Tamariki geothermal power station whilst an employee of Mercury, I can attest that recent geothermal development has proved to be very complex. By way of example, geothermal fluid wells at Nga Tamariki were up to 3,500m deep, contrasting with early geothermal development projects where geothermal fluid could be found at around 800m.

16. While New Zealand has benefited from the exploitation of geothermal resources in recent years, the lack of economic future prospects means that generation development activity has shifted to wind. All of New Zealand's five scale generator/retailers (known as gentailers) hold development options for wind farms.

17. Wind farming makes a contribution to the Government's renewable energy targets, alongside other renewables. The lack of other renewable generation options means that wind farming will continue to play an increasing role as electricity demand increases. The New Zealand Wind Energy Association believes that wind power will account for at least 20% of electricity generation by 2030.

18. Wind farming is a natural fit in New Zealand's generation mix. The intermittent nature of wind makes it best suited to environments where other generation can be dispatched to fulfil demand when the wind is not blowing. New Zealand's significant volume of hydro storage means that the energy market can absorb all wind generation present in the market (and in fact the market rules are designed to ensure this occurs, as I will detail later in my evidence). My understanding is that in other countries wind generation can be as high as 80% of installed capacity (it currently sits at just 6% in New Zealand), ensuring that New Zealand can continue to develop renewable wind farms for many decades to come.

Te Rere Hau – generation, costs and contributions

19. Te Rere Hau wind farm spans two districts (Palmerston North and Tararua). The portion of the farm within Palmerston North comprises 65 Windflow 500 turbines.

20. The Windflow 500 turbines design is both innovative and unusual in New Zealand, utilising a tetering hub and two bladed arrangement. My understanding is that the Windflow 500 turbine is based on a European design, and in the early days of wind farming, most turbines were two-bladed. Two bladed turbines are therefore common globally but the Windflow is the only commercial-scale two-blade turbine present in New Zealand.

21. The turbine is based on a first prototype installed at Gebbies Pass in Canterbury; however the Te Rere Hau turbines contain many departures and improvements from that original prototype, as outlined in the evidence of Mr Radich and Mr Wallace. The maintenance regimes are also likely to be significantly different given NZ Windfarms has an in-house maintenance team and new operating approach (refer below).

22. Te Rere Hau Wind Farm cost in excess of $140m to construct, and the current market capitalisation of NZ Windfarms as at 20 August 2017 is $28.8m. The company has no debt and has never paid a dividend.

23. Te Rere Hau contributes significantly to the Manawatu economy. The business employs 12 full time staff and has numerous contractual relationships with Palmerston North and surrounding suppliers, fabricators and support businesses. Wind farm output (across both Te Rere Hau and the Extension) is around 130GWh per annum, providing power for around 18,000 households per annum (using the Ministry of Business, Innovation and Employment 2016 average residential electricity consumption figure of around 7,300kWh/annum). Wind farms are expensive to operate; our operating costs (excluding large component parts which are widely sourced) are around $5m/annum, around half of which is expended locally.

Board and senior management

24. The NZ Windfarms Board of Directors was entirely refreshed in 2016 with the appointment of Mr Stuart Bauld in February and Mr Rodger Kerr-Newell in March as independent

directors. A third non-independent director Mr John Southworth was elected at the annual general meeting in November, where Messrs Bauld and Kerr-Newell were retained in their posts. Mr Kerr-Newell was appointed as Chairman in June 2016. Together Messrs Bauld, Kerr-Newell, and Southworth constitute the New Board.

25. The New Board brings a depth and breadth of expertise in guiding NZ Windfarms:

(a) Chairman Mr Kerr-Newell has extensive senior management and governance experience in both the public and private sector. Mr Kerr-Newell is a past Chief Executive of Hutt City Council, New Plymouth District Council, Rodney District Council and Taranaki Investment Managers Limited, and is a former board member of Business NZ.

(b) Mr Bauld is a Chartered Accountant, and former partner of Price Waterhouse Coopers with extensive experience in audit and corporate finance, and governance experience in both private and charitable organisations.

(c) Mr John Southworth is a professional advisor with extensive experience in large corporate transactions in both public and private companies. He was the investment manager responsible for New Plymouth District Council's investment fund for four years until 2009 and also led sales and research teams in institutional listed equities in New Zealand including as Head of New Zealand Institutional Equity Sales for ANZ Securities (NZ) Ltd.

Organisational review

26. The New Board commissioned an organisational review which took place in 2016. The review recommended the disestablishment of the CEO and Chief Financial Officer roles and the replacement with a Commercial Director as the senior executive to lead the organisation.

27. I was employed as Commercial Director in March 2017, and in May this role evolved to that of CEO.

OPERATING ENVIRONMENT AND APPROACH

The new NZ Windfarms – the 2017 reinvention

28. The New Board and the CEO have committed to a new operating paradigm at Te Rere Hau. We are actively seeking to operate the wind farm more intelligently and to engage more effectively with our neighbours, the electricity market, its regulators and our wider community. This will improve our financial performance and our social license to operate, thereby making our business more sustainable long term. The following sections outline the progress we have made to date and current and future initiatives, rule changes and approaches.

The regulatory environment

29. The operating environment for wind farms in New Zealand is unique and problematic. Wind generators are obliged under the Electricity Industry Participation Code 2010 (Code) to offer all energy that they are capable of generating into the wholesale market at $0.01/MWh (the offer regime) – effectively zero. This has two outcomes; it ensures that all wind generation is purchased (at the market clearing price) and it reduces the market clearing price. The latter outcome is largely a function of most wind generation in New Zealand being positively time correlated – that is, when it is windy in the Manawatu, it is typically also windy in regions where other wind farms are located i.e. Waikato, Wellington and Southland.

30. I understand that this regime was created at the time of the establishment of the earliest wind farms in New Zealand. The logic at the time was sound; new wind plant had low running costs (expressed as a short run margin cost, typically in the order of $12/MWh) and the average wholesale price at the time was healthy (in the order of $70/MWh). This ensured that wind generation was profitable (the difference between the two numbers essentially being operating margin).

31. Things have changed substantially in recent years. Power prices have been depressed for the last five or more years due to the combined effects of the global economic crisis, the partial closure of the Tiwai Point Aluminium Smelter and the Christchurch earthquakes. Wind generators have been receiving prices as low as $40/MWh for sustained periods.

32. This is compounded with increasing wind farm running costs. The earliest New Zealand wind farms are approaching their twenty-year design mechanical lives with consequently higher short run marginal costs. While these are rarely publicly disclosed, my understanding is that for aged assets these costs are between $20/MWh and $30/MWh. When other wind farm costs (grid connection fees, land costs, royalties, compliance costs, levies, overheads etc.) are included real costs for many operators are higher than power prices received. In other words, the wind farms are run at a loss.

33. NZ Windfarms as a wind farm operator is also exposed to these effects but at an enhanced scale; the concentration of wind farms in the Manawatu further depresses the wholesale price received.

34. Other generators appear, in my opinion, to be very motivated to see changes in the regulatory environment. In 2015 Trustpower turned off its Tararua Three Wind Farm in two trading periods, appearing to test the market response and the Code rules. The System Operator alleged a breach of the rules and the Electricity Authority commenced an investigation.

35. NZ Windfarms, alongside other wind generators, is lobbying hard for regulatory change. The current wind offer arrangements effectively force wind farmers to sell their energy at a loss much of the time. Our desire is that wind generation is treated like any other fuel (hydro, gas, geothermal etc.) where generation is offered into the wholesale market in five price/volume bands. We can then price our generation to reflect the cost of production (including the stratification of this across a wind farm), and cease generating if the wholesale market price is below our production cost. This is essential for our economic survival.

36. The offer regime is currently under review by the market regulator, the Electricity Authority. A rule change was put in place on 29 June 2017 confirming that wind generators must offer in all generation (thereby preventing the Trustpower 2015 event). Originally the proposed rule change was intended to permit wind farms to modify their wind volume offer by 30MW; thereby offering wind farms the opportunity to shut down operations in periods of low price. However this provision was deleted from the final 29 June 2017 Code change, to our disappointment.

37. NZ Windfarms has formally sought relief from the Electricity Authority and the System Operator to utilise the 30MW curtailment threshold immediately. Our request has been declined (twice) but we remain closely engaged with both organisations in our search for operating freedom and flexibility. This provision is particularly important to us due to its obvious commercial benefit. However, by allowing us to curtail during uneconomic conditions it will have the added benefit for neighbours of Te Rere Hau not generating noise as often as it has in the past.

38. The Electricity Authority has consulted on a range of changes to the wind offer regime intended to be implemented in quarter two 2018. This rule change is expected to offer the 30MW volume change provision alongside deletion of the $0.01/MWh wind offer requirement and its replacement with the five price/volume offer band regime common to all other generation types.

39. My view is that this change will be fundamental to the profitability and sustainability of wind generation in New Zealand.

NZ Windfarms operating approach – wind farm operations and economics

40. NZ Windfarms has been working particularly hard since March 2017 to operate the Te Rere Hau Wind Farm more effectively. Up until this time, management understood that they were obliged by the market rules to run the wind farm in almost all conditions (other than extreme wind-speeds), and this is what took place.

41. This is partly correct. The Code permits generators to shut down generation plant if damage is being caused. This process is known as turbine curtailment. Up until March 2017, all turbines at the Te Rere Hau Wind Farm were curtailed in wind speeds over 30m/s; eleven turbines were curtailed in conditions where turbulence intensity was very high, and all turbines are curtailed in wake effects. These variables resulted in very limited curtailment of the wind farm.

42. Curtailment is a powerful tool in the management of a wind farm. When I joined NZ Windfarms in March 2017, I was struck by the very high plant short run marginal cost (approximately $30/MWh) and the apparent lack of any meaningful dynamic curtailment. The high short run marginal cost was

largely a function of mechanical component damage, particularly gearboxes, pitch bearings, trailing hinges and torque limiting pumps.

43. Component damage is significantly driven by turbine operations in adverse conditions. Adverse conditions include high wind speed, high turbulence intensity, high wind shear, high inflow angle, high levels of separation and wake effects. Wind farm operators globally use curtailment to ensure wind turbines are not exposed to these adverse conditions (that is, the turbines are shut down with the blades 'feathered'[1] in these adverse conditions). These issues are typically studied prior to turbine placement using complicated computational fluid dynamics (CFD) models and extensive historical metrological data analysis.

44. My initial focus was to guide the company in finding ways to reduce this mechanical component failure, to in turn reduce the short run marginal cost of the plant. While this reduces the quantum of revenue earned by the wind farm, it also reduces the mechanical cost by a multiple of the lost revenue.

45. In April this year, we rolled out turbulence intensity curtailment across the entire wind farm. This regime utilises anemometry data from each turbine in real time and shuts each turbine down when it is experiencing a predetermined level of turbulence intensity. This in essence created a comprehensive two axis (wind speed and turbulence intensity) curtailment regime across the entire wind farm.

46. At that time, NZ Windfarms had no data on other key wind parameters (such as wind shear, inflow angle etc.) which could have assisted further with this curtailment. However, in June this year NZ Windfarms commissioned global wind experts DNV GL (previously Garrad Hassan) to undertake complex CFD modelling of the wind farm site and turbines. Initial data from this modelling was received in early August and we are currently assessing it.

47. NZ Windfarms is planning to roll-out a curtailment regime based on this analysis that will utilise three additional variables; wind shear, inflow-angle and wake effects. When combined with wind speed and turbulence intensity the

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[1] Feathering means pitching it such that it exposes minimum surface area to the wind.

combined curtailment regime will be a function of five inputs (or axes).

48. This will result in reduced turbine running hours with consequent further loss of revenue in search of lower short run marginal costs, and in turn improved profitability.

49. As noted above, it is anticipated that we will be permitted to curtail on price when the forecast rule change is in place in quarter two 2018. In the first six months of 2017, the wholesale pricing was below the wind farm short run marginal cost for significant periods of time; the forecast 2018 rule change will permit farm curtailment in these conditions. It is important to note that even in periods of high pricing (such as that prior to 2008) market volatility (and periods of low pricing) remains.

50. The impact of the curtailment already applied, and curtailment forecast to be applied as a result of both the CFD work and the anticipated 2018 rule changes is that the turbines on the Te Rere Hau Wind Farm will operate less than ever before.

51. At a conceptual level, NZ Windfarms has made significant progress in recent months in moving wind farm operations to be consistent with global best practice.

Upgrades to mechanical operations

52. Up until 2015, the Te Rere Hau wind farm was maintained under warranty by a subsidiary of turbine manufacturer Windflow Technology Limited (WTL). The warranty obliged WTL to achieve the wind turbine power curve and certain availability parameters.

53. My understanding is that the turbine manufacturer presented the view that the turbine could operate successfully in any (including very turbulent) wind regimes. While the turbine is inherently robust, the turbine fleet has suffered from high levels of mechanical failure. This approach may well have been the reason why no CFD modelling (assessing wind shear, wake effects etc.) was carried out prior to turbine placement.

54. NZ Windfarms took full control of all wind farm maintenance in 2015. While the industry norm is to outsource maintenance (typically to the turbine supplier), NZ Windfarms, in acknowledging the challenges in operating the unique two

bladed Windflow 500 turbine, instead built a permanent team and maintains the turbines in-house.

55. Notwithstanding the historic high levels of mechanical failure, this arrangement has proved to be very successful, and my colleague Mr Adam Radich will expand on this. The wind farm has achieved strong levels of turbine availability, a measure used globally to assess turbine performance. Turbine availability at Te Rere Hau has steadily improved since the establishment of the wind farm and currently sits at 96% for the year to 30 June 2017.

56. The global benchmark for turbine availability is 97%. Given the aggressive conditions that the turbine was permitted to operate in, this is a very good performance. Availability has improved further in recent months.

57. Availability is driven principally by fault response speed. If a turbine faults, the role of the maintenance team is to assess the turbine, restart it if possible, and if necessary make any repairs before the turbine is returned to the fleet. What is clear is that the maintenance team are responding quickly to turbine faults and maintaining strong plant availability. This challenge will become easier as the turbines are more heavily curtailed in adverse wind conditions.

58. A secondary outcome of the curtailment regime in place appears to be a reduction in fault incidence. This is a promising sign that the regime is working as anticipated.

59. In taking direct responsibility for maintenance, NZ Windfarms has also been successful in implementing a range of mechanical improvements. These will be described in detail by Mr Radich.

60. NZ Windfarms has recently trialled a gearbox modification aimed at reducing gearbox mechanical noise. The modification involves use of a reshaped set of gears and initial indications are that this has been successful in reducing gearbox mechanical noise. Again, this will be expanded on by Mr Radich.

61. Sustained effort on the underlying performance of the wind farm – essential hygiene factors for any wind farm operator - means that NZ Windfarms is now very well placed to focus on how it engages meaningfully with near neighbours to resolve outstanding consent issues.

NOISE CHALLENGES

62. Noise issues at Te Rere Hau have dogged the company since turbine establishment. There was a clear understanding gap between the near neighbours expectations of wind farm noise and what they experienced as the wind farm progressively increased in scale.

63. While prolonged litigation has proven that the wind farm complies with the acoustic limitations in its current consent, it has also confirmed that the consent conditions are not entirely fit for purpose and that some changes should be made. The purpose of this hearing is of course to determine what those changes should be.

64. It is very important to NZ Windfarms that we find sustainable solutions that resolve the noise issues while still preserving the commercial viability of the company. NZ Windfarms does not wish to enter a further round of litigation on noise issues, and neither, it imagines, do PNCC or the nearby residents.

NZ Windfarms proposed conditions

65. NZ Windfarms supports the use of the most relevant up to date noise standard (NZS6808) for the control of wind farm noise.

66. NZ Windfarms has however accepted and proposed some conditions which go beyond what is required in the NZS6808:2010 standard in order to provide further protection for residents. This includes accepting a high amenity limit at night, some further restrictions on monitoring, a complaints and contact procedure and a community liaison group.

67. NZ Windfarms considers that its proposed conditions will ensure that the noise effects are acceptable and effects on neighbours are minimised. These additional measures come at a cost in terms of lost generation and revenue but are changes NZ Windfarms is willing to make in order to be a good neighbour. The evidence of Mr Adrian Low sets out the detail of these conditions further.

PNCC and submitter proposed conditions

68. NZ Windfarms is concerned that some of the conditions that PNCC and submitters are proposing will have significant adverse effects on its operations. I do not propose to

comment on all of the proposed conditions but to single out two of the most problematic.

PNCC 8m/s high amenity threshold

69. NZ Windfarms has two key concerns with PNCC's proposal to increase the wind speed at which the high amenity provisions of NZS6808:2010 can apply, from 6m/s to 8m/s. Firstly, it imposes a standard well in excess of that contemplated by NZS6808:2010 which cannot be justified by the noise measurements and evidence, and this will significantly reduce, on a fairly arbitrary basis the generation revenue of the wind farm.

70. Secondly, NZ Windfarms is concerned that PNCC's proposed 8m/s high amenity threshold may impact on future repowering of the wind farm with new turbines. Modern turbines have low cut-in speeds which enable them to capture higher market prices that tend to prevail when wind speeds are low. If it were determined that this site is one where a 8m/s high amenity threshold is required to manage noise effects (noting Mr Halstead and Dr Chiles are strongly of the view this is not the case) that would impact on future commercial decisions by NZ Windfarms on repowering the site. From my discussions with near neighbours, the ultimate preferred outcome for Te Rere Hau is the repowering of the plant with modern three-bladed turbines. For that reason it is important from my perspective that when considering the appropriate cut in threshold, a careful analysis against NZS6808:2010 is undertaken, and that 8 m/s not be imposed due to concerns with the audible characteristics of the Windflow 500 turbines.

Wallace-Banks proposal to turn half wind farm off

71. Submitter Wallace/Banks proposes a condition that requires that half of the wind farm is turned off if a noise complaint is received. This would be intolerable for any wind generator as any complaint (no matter where the complainant is located and without any verification of the complaint) would cause the loss of at least half if not more of the generation and revenue for that period (noting that generation and revenue varies across the wind farm). My view is that such a condition is unreasonable and goes well beyond what is necessary to address noise effects.

NZ Windfarms approach

72. We are proposing a set of conditions based on the adoption of the current noise standard including the high amenity provisions (at the standard 6m/s threshold), which creates a higher but nationally consistent performance burden on the Te Rere Hau Wind Farm and can be readily measured to ensure performance.

73. It is important to note that the curtailment regime currently in place (two axis) and that proposed (five axis) will also reduce noise emissions from the wind farm as running hours are reduced. We have received some feedback from residents that this is, in their opinion, indeed already the case.

Voluntary curtailment

74. In addition to operating to comply with the firm noise conditions proposed, NZ Windfarms is also committed to adopting a customised noise curtailment aimed at reducing noise emissions beyond what is required under the consent where this can be sensibly achieved, and where this is valued by the near neighbours.

75. The nature of the wholesale market is that there are many periods when the wind farm is earning very little revenue. When we are permitted to curtail on the basis of price (hopefully from mid-2018) we can offer the near neighbours enhanced relief from noise at modest cost.

76. In June 2017 we asked our acoustic consultants Marshall Day to help us design a wind farm voluntary noise curtailment regime aimed at reducing wind farm noise at the dwellings of near neighbours during unprofitable operating periods. Mr Halstead worked closely with our engineer Mr Jamie Wallace to identify which turbines to curtail to achieve the desired noise attenuation so that Mr Wallace could program the wind farm appropriately. Mr Wallace will discuss the operating regime in more detail in his evidence.

77. The initial trial regime was commenced on 1 July 2017 and curtails up to 28 turbines in a range of wind conditions and sectors, with particular focus on winds from the south-easterly direction. The curtailment regime is automated and is based on real time wind regime data measured at each turbine.

78. Initial indications of the success of this curtailment trial appear to be mixed. A number of near neighbours have

been away for part or all of July, and cool weather has meant that little time has been spent outdoors where exposure to wind farm noise is greatest. We have however received some feedback from near neighbours that noise emissions in July were significantly reduced.

79. I note that Mr Auckram's section 42a report (paragraph 103) states that he believes that the wind farm should recognise the importance of optimising; this is exactly what we are doing on multiple (three axis, five axis and noise curtailment) fronts.

80. We intend to continue our curtailment trial over the coming months to collect more data from near neighbours on its effectiveness. As the weather warms up in spring we anticipate stronger conclusions.

81. As we gather data from near neighbours, we are starting to see opportunities to further refine the curtailment outlined above, particularly over the summer months. The highest market pricing occurs in winter when the weather is cold and residents are normally indoors. Few near neighbours appear to expect noise curtailment in these conditions. The converse is true in summer; with good weather electricity demand reduces thus prices tend to be lower, which coincides with outdoor activities and living where noise curtailment is particularly appreciated.

82. It is important to note that we are working very hard to find a balance between improved noise outcomes and lost generation revenue. The curtailment regime we rolled out on 1 July has a significant annual cost to NZ Windfarms and offers noise attenuation well in excess of that required under the New Zealand Wind Farm Noise Standard NZS6808:2010. NZ Windfarms considers this to be both the right thing to do, and a genuine manifestation of the fundamental change in approach brought about by the New Board and management.

RESPONSE TO PNCC EVIDENCE

83. There are a couple of aspects of the PNCC evidence that touch on areas relevant to my evidence.

84. The first issue relates to viability. In his evidence Mr Maassen offers a series of "lenses" to address viability. His first lens addresses the ability of the consent holder to operate within conditions that are not so onerous as to effectively deprive

the consent holder of the benefit of the consent. Mr Maassen offers an "alternative" lens for the assessment of viability, using economic terms. While noting that the concept of economic viability is, "not foreign to the idea of resource management…" he notes that it is a "gnarly" subject to contend with. Mr Maassen goes further in clause 121(b) noting that in terms of practical viability of the conditions, that, "The extent to which the conditions will bite and restrict operations is not considered to be significant," where he quotes certain assumptions. Mr Auckram also addresses the issue of viability. At paragraph 86(1) he acknowledges that he is not aware of the operational impacts of the proposed conditions but then in paragraph [149] he says that he is satisfied that the wind farm continues to be viable.

85. It is not clear what analysis or evidence led Mr Maassen or Mr Auckram to these conclusion. It needs to be remembered that each of the proposed conditions imposes a constraint on NZ windfarms operation and these constraints have financial consequences. So while any particular condition may not on its own affect viability, the effect of all the conditions together may well do. While NZ Windfarms accepts that some constraints are necessary, some of the conditions PNCC is proposing – such as the 8m/s threshold – would significantly affect NZ Windfarms ability to generate when prices are generally higher. This means the financial consequence of such a restriction is much greater. Given the marginal (or negative profitability) of windfarms and Te Rere Hau in particular, the financial consequence of such a restriction may, in my opinion, affect viability long term.

CONCLUSION

86. NZ Windfarms is an important renewable energy generator and employer in the local community. NZ Windfarms is committed to improving its performance both in terms of commercial returns and in terms of being a good neighbour.

87. NZ Windfarms has proposed a set of conditions which require full technical compliance with the relevant noise standard, constraints on operations over and above what would be required in the standard, greater reporting and interaction with the local community.

88. Outside of and in addition to the review process the company has instituted a series of measures which mean

that overall turbines will operate less and will generate less noise. The company has also committed to continuing to work on a voluntary curtailment programme which would further reduce noise when it is sensible – from an environmental and economic sense to do so.

John Robert Worth

25 August 2017