23 February 2021

Environment Protection
Department of Environment, Land, Water and Planning
1 Nicholson St,
East Melbourne, Victoria 3000

Submission – Regulatory Impact Statement: 'Noise and wind energy facilities'

Introduction

The Regulatory Impact Statement: "Noise and wind energy facilities" (RIS) is a document that is clearly predisposed to the needs of the wind industry, and to the notion that noise from wind farms will have no direct or indirect effects on the 'health' of people living in their vicinity.

This conclusion is reached on the basis that the changes proposed are aimed at removing all barriers to the establishment of wind farms within communities, not with protecting the health and wellbeing of those families that have to live with them.

The Problem

The RIS evaluates the extent of the problem to be resolved by citing select examples of literature, then concludes the risks to human health from wind turbine noise emissions is low. viz

- "*The Department of Health for example, concluded in 2013 there was no evidence that sound which is at inaudible levels can have a physiological effect on the human body." RIS- Page 23*

Comment:

There are experts in this area who have demonstrated that a person does not need to be able to hear infrasound for it to have a physiological effect on people. [1]

> **The Dept of Health also states:**
>
> *"Annoyance and sleep disturbance are the key health impacts of noise, together accounting for the vast majority of the burden of disease due to noise"*
>
> *"Sound from wind turbines contains many different frequencies. The 'swish' sound is in the mid to high frequencies,* ***low frequency sound*** *may be more noticeable than the 'swish' at* ***distances further away*** *from the turbine."*
>
> *"There are some special audible characteristics (SACs) of wind farm sound that may be present, and may make the sound more annoying than predicted. Two of these SACs are amplitude modulation and tonality.* ***High frequency tones can be just as annoying as low frequency tones.*** *These special characteristics may not be detected by standard measurement, so* ***must be specifically assessed****."* [2]

[1] Salt-et-al.-on-Wind-Turbine-Syndrome.pdf
[2] Wind farms, sound and health: Community information - health.vic

The RIS example continues:

- *"Similarly, the National Health and Medical Research Council (NHMRC) released a comprehensive assessment of the existing evidence of the impact of WEF noise on human health in 2015. In it, the NHMRC concluded: "…That there is no consistent evidence that wind farms cause adverse health effects in humans." RIS - Page 23*

Comment:

The above statement could easily have been written as follows and mean the same thing:

*"…That there is no consistent evidence that wind farms **do not** cause adverse health effects in humans."*

The literature in the NRMHC 2015 Review was stopped prior to 2012 so could hardly be considered 'comprehensive' as suggested. The RIS also notes:

- *"NHMRC also found: "…No direct evidence that exposure to wind farm noise affects physical or mental health… there is unlikely to be any **significant** effects on physical or mental health at distances **greater than 1,500 m from wind farms**." Based on its broader findings, NHRMC recommended further studies to improve the quality of evidence, particularly with respect to WEF noise and annoyance the research of which was found to be consistent but of poor quality." RIS - Page 24*

Comment:

The fact the NHMRC believes there may be significant effects on physical and mental health at distances **up to 1,500 metres** from wind farms speaks volumes.

It would seem that all families living within 1.5 kilometres of a wind farm may be exposed to the risk of significant physical and mental health effects. This correlates with the numerous people already living in proximity to wind turbines in Victoria that have complained of a range of ongoing adverse health impacts.

The Victorian Wind Farm Guidelines 2019 mandate a 1-kilometre buffer between a wind turbine and a residence - **based on more current evidence, this distance is manifestly out of date.**

In 2019 research financed by the NHMRC and The Australian Research Council studied the prevalence of wind farm amplitude modulation at long-range residential locations from wind turbines. viz:

> *"Several researchers have shown that amplitude modulation (AM) of wind farm noise contributes to annoyance. Despite this finding, many regulations and guidelines concerning wind farm noise do not include penalties for this characteristic, possibly due to the ongoing debate as to what constitutes a reasonable penalty."* [3]

[3] Hansen K. et.al. 'Prevalence of wind farm amplitude modulation at long-range residential locations', (Journal of Sound & Vibration) 2019.

*"Low-frequency tonal AM with a modulation frequency consistent with the expected blade-pass frequency, has been measured between **1 and 9 km from a wind farm**."* [4]

*"Tonal AM occurred most often at night-time, during the hours between 10pm and 5am…At residences located **up to 3.5 km from the wind farm**, audible AM occurred for as much as **22% of the time at night**. This has important implications for possible sleep disruption from wind farm AM, particularly as ambient noise levels in rural South Australia can be as low as 15 and 5 dBA, outdoors and indoors, respectively."* [5]

Comment:

It has been shown that the effect of wind farm infrasound and low-frequency noise on people's health is a far more complex phenomenon than implied in the Regulatory Impact Statement.

Studies have also established that **as wind turbine power generating capacity increases so will their low-frequency emissions** - leading to even more serious health effects on surrounding communities.[6]

It is therefore imperative that the expected disturbance to living and sleep due to noise intrusion arising from wind turbine generators is considered by addressing:

(a) The "signal to noise" ratio, where the "signal" is sounds heard in the **living areas** of various residences; and the "noise" is the **natural environmental** noise heard at the same time and position.

(b) The need to consider **critical frequency bands** to determine human response rather than simple (A) weighted sound level measurements.[7]

In addition, all measured test data regarding tonality for specific turbine models, and A-weighted octave band sound power data should be made publicly available for scrutiny of calculations and transparency.

Unreasonable Noise

The RIS provides the following definition of **unreasonable noise**:

- *"The obligation not to emit unreasonable noise will be satisfied if noise emissions from wind turbines are demonstrated to comply with the requirements of the NZ Standard." P. 5 - RIS*

Comment:

The NZ Standard was first used as a measurement for wind farm noise (in Victoria) by Mr Fearnside of Marshall Day Acoustics on behalf of the Wind farm applicant during the hearing for the Toora Wind Farm. The Victorian Administrative Tribunal adopted the NZ Standard during the proceeding *Thackeray V Shire of South Gippsland [2001].*

[4] Hansen K. et.al. 'Prevalence of wind farm amplitude modulation at long-range residential locations', (Journal of Sound & Vibration) 2019. P.148
[5] Ibid.
[6] Mollera H & Pedersen C, 'Low Frequency Noise from Large Wind Turbines', (Acoustical Society of America) 2011
[7] Graeme Harding, (Graeme E Harding & Associates – Consultants in Acoustics Noise & Vibration) Observations New Zealand Standard.

Over the years, Marshall Day Acoustics have provided expert evidence to multiple Panels and Tribunals stating wind farms are compliant with the noise Standard they promoted.; and rarely provided the base data they used for peer review of their conclusions.

With this in mind, please see the evidence submitted to the Senate Committee on the substantial health impacts of Wind Turbine noise over the years. (disregarded in the RIS Page 23). Today, wind farm developers still claim the turbines used will not produce emissions that will attract a penalty.

New Zealand Standard 6808:2010 Acoustics – Wind farm noise

The forward of NZS6808:2010 notes that:

- *"Wind farm sound may be audible at times at noise sensitive locations, and this Standard does not set limits that provide absolute protection for residents from audible wind farm sound**. Guidance is provided on noise limits that are considered reasonable** for protecting sleep and amenity from wind farm sound received **at noise sensitive locations**."*

- The NZS6808:2010 defines noise sensitive locations near a proposed wind farm as: "*The location of a noise sensitive activity, associated with a **habitable space…in a building** not on the wind farm site."*

Comment

Clearly the evidence of adverse wind farm noise emissions shows the guidance provided in the NZS6808:2010 is insufficient to protect sleep and amenity of families in the vicinity of a wind farm. Based on this evidence it would not be prudent to say that "the obligation **will be satisfied** if noise emissions from wind turbines comply with the NZ Standard."

- Section 5.2 Noise limit of NZS 6808:10 defines acceptable noise limits as follows:

  As a guide to the limits of acceptability at a noise sensitive location, at any wind speed, wind farm sound levels ($L_{A90(10\ min)}$) should not exceed the background sound level by more than 5 dB, or a level of 40 dB ($L_{A90(10\ min)}$), whichever is the greater.

Comment:

The criteria also provide for an exception to this restriction whereby it is not necessary to continue to adhere to this margin when background values are below the range of 30-35 dB.

This could mean, that under certain conditions, when background noise levels are low, unacceptable noise levels could be experienced over long distances; and the wind farm operator would still be compliant with NZS6808:2010.

- *Section 5.3 of NZS 6808:2010 provides a 'high amenity' limit that specifies wind farm noise levels during evening and night-time periods should not exceed the background noise level by more than 5 dB or 35 dB whichever is the greater, for wind speeds below 6 m/s at hub height.*

Comment:

The VCAT consideration of the application of a high amenity noise limit in *Naroghid Wind Farm Pty Ltd v Minister for Planning [2019]*, took the view that the Noise from Industry in Regional Victoria (NIRV) provides policies that set the acoustic amenity expectations of the Farming Zone within a planning scheme and therefore a plan under NZS 6808:2010.

This decision effectively justified a more stringent noise limit be applied to **protect the amenity** of people living in the Farming Zone from wind farm noise during the evening and night.

The proposed changes outlined in the RIS to the Planning Scheme and EPA regulations may mean that residents in the vicinity of a wind farm will no longer be afforded this protection.

- 5.4.1 of the NZS6808:2010 notes that "…as special audible characteristics cannot always be predicted; consideration shall be given to whether there are any special audible characteristics of the wind farm sound when comparing measured levels with noise limits.

  NZS6808:2010 also requires that wind farms be designed with no special audible characteristics at nearby residential receivers. All current evidence shows this would only be achieved with increased turbine set backs.

Comment:

As mentioned previously, the NZS6808:2010 defines noise sensitive locations as a **habitable space in a building** not on the wind farm site.

Therefore, the assessment of predicted wind farm noise levels during the pre-construction measurement phase of a project should be undertaken within the habitable rooms of a residence. i.e.

The applicable signal to noise ratio is that applying at the listener, and:

(a) **Not** the ratio of some predicted signal near to but outside the residence, and the "noise" some predicted environmental noise based on wind speed measured elsewhere.

(b) **Not** neglecting the differential sound insulation of a residential building envelope which passes low frequency sounds with little attenuation compared to mid-frequency and high-frequency sounds.

(c) **Not** neglecting the room resonant modes that can result in higher low frequency sounds inside a room than outside the residence.[8]

[8] Graeme Harding, (Graeme E Harding & Associates – Consultants in Acoustics Noise & Vibration) Observations New Zealand Standard.

Public and Welfare Act 2008

The amendment proposed, (under all options) will also exclude wind turbine noise emissions from the nuisance provision of the *Public and Welfare Act 2008* (PHW Act). This decision is questionable.

It would appear this amendment was triggered by South Gippsland Shire Council's finding of statutory nuisance under the PHW Act in relation to the Bald Hills Wind Farm, and possible lobbying by the wind industry.

As with all options proposed, wind farms will still only have to comply with the inadequate NZS6808:2010. It was shown in the above finding, wind farms may appear to be compliant with the Standard but the noise emissions may still be considered unreasonable.

This has important implications for families experiencing ongoing unacceptable noise from the close proximity of wind turbines. They will now have limited legal recourse if the **wind farm operator** claims they are satisfying the definition of 'unreasonable noise'.

All environmental standards should use a method of assessment that is within the resources of the 'responsible authority' to ensure compliance. The NZ Standard however, gives no simple measurement method to show compliance (or non-compliance) once the wind farm is fully operational. The use of L_{A90} makes this difficult.

The Options

All three options show total disregard for the **very real health issues** facing numerous communities in Victoria from wind farm low-frequency and high-frequency noise emissions. Consideration should be given to the following as a revised base option (or for any other option) being considered:

(a) Peer review of all measured test data regarding tonality for specific turbine models, and A-weighted octave band sound power **data calculations used for pre-construction and post-construction compliance**. (Publicly available upon request)

(b) The wind farm industry should be no different from any other industry in having to meet noise restrictions, and given the frequency of unreasonable noise emissions, should be monitored on an ongoing basis. (not every five years?)

(c) Appropriate noise measurements taken for **low frequency tonal AM** within residences with **appropriate penalties** in place for non-compliance.

(d) The definition of unreasonable noise be revised to provide an appropriate **Australian standard** for measuring high frequency and low frequency AM noise **inside residences.**

(e) That a night time **amenity noise limit** be applied to protect the amenity of people living in the Farming Zone from unacceptable wind farm noise during the evening and night.

(f) Wind turbine set back distances from residences should be at least **3 kilometres** until new generation turbines provide suitable proven means of noise suppression. Until then, residences within this distance could provide written permission.

Consideration of the above may prove to have the desired outcome of providing Community confidence and clarity, and certainty for the Wind Industry in relation to the regulation of wind turbine noise emissions.

Sharon Dohnt