The Waubra Foundation.
PO Box 7112
Banyule
Victoria, 3084
Australia

Reg. No. A0054185H
ABN: 42 152 077 891

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Re Proposed Bango Wind Power Facility

As the designated decision makers about the Bango Wind Power Facility, each of you have a duty of care to members of our community, including particularly to our most vulnerable residents, and a professional and legal obligation to properly inform yourselves about the facts relevant to your decision about this project.

You may be aware that the Australian Administrative Appeals Tribunal recently found that wind turbine noise can be a pathway to disease, and that the current regulatory framework, including wind turbine noise pollution regulations in Australia, does not adequately protect residents. [1] The proponent's acoustic consultant was involved in that court case and would not be unaware of the decision.

You need to be made specifically aware that the NSW Director Generals Requirements have not been followed with respect to the mandatory requirement for an accurate assessment of the noise impacts of this proposed development. The DGR's identified that the EIS must assess the noise impacts of the operation of the turbines. The acoustic consultant for the proponent has failed to provide such a noise impact assessment, and the NSW Department of Planning's Noise Expert has failed to ensure that such an assessment was provided. This failure alone results in an invalid EIS, and in my view, warrants referral to ICAC. It is simply unacceptable for a public servant to wantonly ignore the mandatory requirements of the Director General of the NSW Department of Planning, and for planning decision makers to go along with this behaviour, disregarding the Director General's Mandatory Requirements, yet this has occurred in NSW on numerous occasions.

Since 2010 the Waubra Foundation has repeatedly warned planning, health and noise pollution regulatory authorities, politicians, and relevant others about the serious health problems being reported in residents and workers living and working near industrial wind power facilities in Australia.

These same health problems have been reported for many years, internationally as well as locally including to three Australian Federal Senate Inquiries in 2011, 2012 and 2015. No state planning approval authority in Australia, including particularly members of the NSW IPC can therefore justifiably claim that they did not know about the harmful adverse health effects being reported by residents living and working near industrial scale wind turbines.

The Foundation's first widely distributed warning about the potential for serious adverse health effects from operating wind turbines was nearly seven years ago, in June 2011, called the Explicit Cautionary Notice.[2] This document was based on the best available field knowledge at the time, and was drafted by the then Medical Director and now CEO, former rural General Practitioner Sarah Laurie, former Victorian Supreme Court Judge Justice Clive Tadgell, and Mr Peter Mitchell, former Engineer, and Founding Chairman of the Foundation.

[1] http://waubrafoundation.org.au/resources/aat-decision-reasons-waubra-foundation-vs-acnc-dec-4-2017/

[2] http://waubrafoundation.org.au/about/explicit-cautionary-notice/

Our warnings about serious health problems and the distance of impact of 10 km seven years ago were timely, accurate, and prescient.

We now know so much more about the specific acoustic triggers, the process of sensitization which means people become more and more sensitive to the sound over time, and how sensitisation is triggered by repeated activation of the startle reflex response. This is known in layman's terms as the fight flight response.

We know that repeated activation of the startle response can induce post traumatic stress disorder, as well as retriggering PTSD in people who already have that disabling condition. We also know that people with autism are known to have an enhanced acoustic startle reflex response, and that helps to explain the observed acute severe distress experienced by those with autism when exposed to operating wind turbines.

We understand the important connection between disruption of REM sleep and PTSD.[3]

Thanks to some recent Swedish laboratory research we now know that it is REM sleep that is specifically interrupted even in young fit healthy people when they are exposed to strongly amplitude modulated wind turbine noise, reproduced in a sleep laboratory setting.[4]

We also know from recent research conducted by Australian Acoustician Steven Cooper presented to an international conference of acoustic peers at the Acoustical Society of America meeting in New Orleans in December 2017 (peer reviewed and published by the ASA) that the symptoms characteristic of what has been labelled Wind Turbine Syndrome can be induced by exposure in a laboratory under carefully controlled conditions to sound recorded from a bedroom near an operating wind farm, even when that sound was inaudible. **This dynamically pulsed amplitude modulated sound was *inaudible* low and mid frequency noise,** but was nevertheless accurately perceived by people who have become sensitized to industrial sound. [1]

We know that as industrial wind power facilities increase in power generation capacity and size with larger more powerful turbines, these serious adverse health impacts will predictably worsen and extend out to greater distances, especially if the inter turbine separation distances are not sufficient to prevent turbulence, which leads to additional generation of sound and vibration as a byproduct.[6]

Since the Explicit Cautionary Notice was issued and widely distributed in mid 2011, symptoms have been regularly reported out to ten km and even further from existing 3 MW turbines in South Australia at Waterloo. The same serious noise induced health problems including stress symptoms and sleep disturbance and resultant home abandonments have been reported in Australia since 2003 when the Toora wind power facility started up in South Gippsland, Victoria. Local Rural General Practitioner Dr David Iser first studied the problems occurring in his patients in 2003/4, and advised Victorian Government Ministers of the results of his modest population survey, some six years prior to the formation of the Waubra Foundation.[7] In NSW, long suffering residents from Capital and Cullerin have reported problems to NSW based authorities for over six years, with no relief from their suffering.

In some instances these symptom reports have been independently corroborated by independent acoustic measurements demonstrating excessive levels of low frequency noise, and acoustic characteristics known to directly cause physiological stress ("annoyance") symptoms including sleep disturbance such as amplitude

[3] http://waubrafoundation.org.au/resources/laurie-thorne-cooper-startle-reflex-sensitisation/
[4] http://waubrafoundation.org.au/resources/smith-m-g-et-al-physiological-effects-wind-turbine-noise-sleep/
[1] https://asa.scitation.org/doi/pdf/10.1121/2.0000653
[6] http://waubrafoundation.org.au/resources/mitchell-p-wind-turbine-separation-distances-matter/
[7] http://waubrafoundation.org.au/resources/dr-david-iser-2004-conducts-first-survey-patients-living-near-wind-project/

modulation, by numerous researchers including Professor Colin Hansen and his team from Adelaide University.[8]

Other field research conducted in Australia by community based researchers (Morris, 2013)[9] and acoustician Steven Cooper at Pacific Hydro's Cape Bridgewater Wind Power facility in Victoria[10] which compared symptoms when wind turbines were shut down to symptoms when wind turbines are operating via the use of detailed diaries kept by residents, has clearly confirmed that wind power operations correlate with symptoms which engineers call "annoyance" – the most common of which is sleep disturbance. Subsequent analysis has shown that periods of strong amplitude modulation correspond with the worst symptoms reported independently by residents, and this occurs when the facility is starting up, shutting down or when the power is increasing or decreasing by more than 20% in a short time period.

The NHMRC have since commissioned research, led by Sleep Physiologist Associate Professor Peter Catcheside from Flinders University, to investigate the sleep disturbance being reported by residents living near industrial wind power facilities.[11]

As the NHMRC and Health authorities including Chief Medical and Health Officers in Australia well know, repeated sleep disturbance, regardless of the cause, predictably leads to serious adverse health effects which are well known to clinical medicine, and undisputed by health authorities such as the Centre for Disease Control in the USA.[12] This is what the CDC has to say about the consequences of insufficient sleep:

> *"Sleep is increasingly recognized as important to public health, with sleep insufficiency linked to motor vehicle crashes, industrial disasters, and medical and other occupational errors.[1] Unintentionally falling asleep, nodding off while driving, and having difficulty performing daily tasks because of sleepiness all may contribute to these hazardous outcomes. Persons experiencing sleep insufficiency are also more likely to suffer from chronic diseases such as hypertension, diabetes, depression, and obesity, as well as from cancer, increased mortality, and reduced quality of life and productivity."*

These adverse health effects which result directly from insufficient sleep from repeated sleep disturbance and their serious public health consequences are well known to entities such as Australia's Sleep Health Foundation and have been recently published in the Medical Journal of Australia.[13] The specific adverse health effects from excessive night time noise in Europe have been clearly set out in the WHO's 2009 publication Night Noise Guidelines for Europe.[14]

The current, and in our view criminally inadequate, noise pollution regulations for industrial noise do not protect rural residents – a fact which has now been judicially confirmed by the AAT. Instead, the current regulatory framework including that in NSW, guarantees sleep disturbance and progressive low frequency noise sensitization for an unknown number of local residents, with the most badly affected being those who are most vulnerable to stress and sleep disturbance, such as babies and children, the elderly, the disabled, and those with chronic physical and mental health conditions.

Low frequency noise sensitization has been specifically mentioned as a problem known to them by two health authorities – Queensland, and Victoria (in the context of coal seam gas and wind turbines respectively). The

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[8] http://waubrafoundation.org.au/resources/hansen-zajamsek-hansen-noise-monitoring-waterloo-wind-farm/

[9] http://waubrafoundation.org.au/resources/morris-m-waterloo-case-series-preliminary-report/

[10] http://waubrafoundation.org.au/resources/cooper-s-acoustic-group-results-cape-bridgewater-acoustic-investigation/

[11] https://www.nhmrc.gov.au/media/releases/2016/nhmrc-awards-funding-wind-farms-and-human-health

[12] https://www.cdc.gov/features/dssleep/

[13] https://www.sleephealthfoundation.org.au/files/MJA%20Supplement/MJA_Supplement_final.pdf

[14] http://www.euro.who.int/__data/assets/pdf_file/0017/43316/E92845.pdf

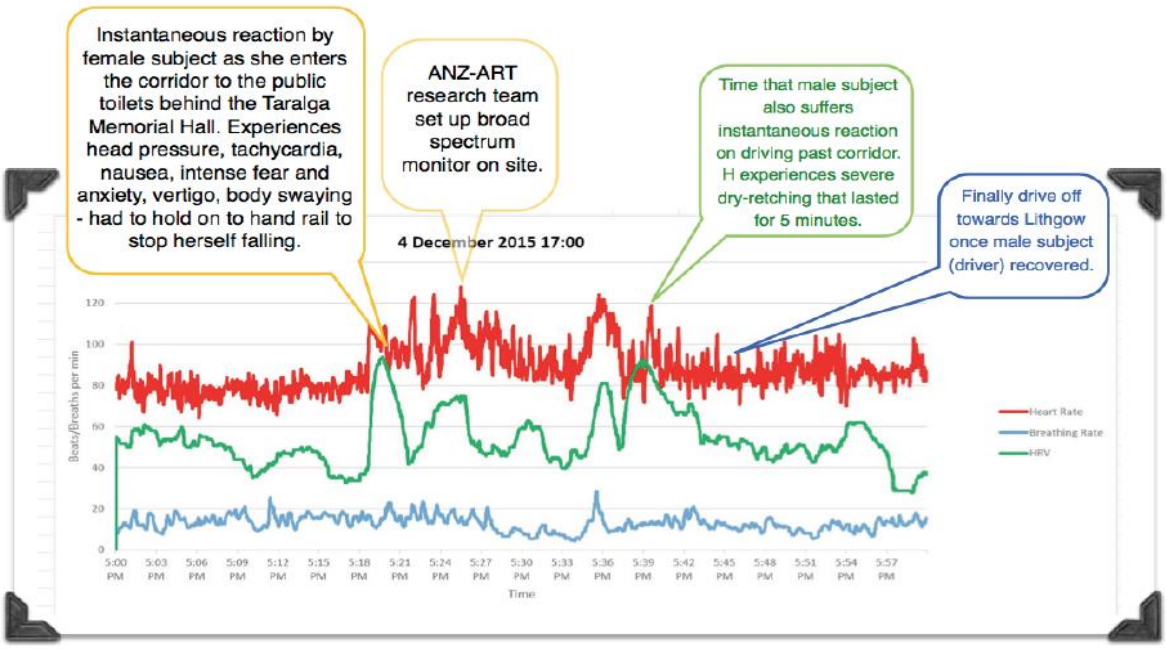
specific source of the low frequency noise is immaterial – it is the pulsing nature and amplitude modulation character of the noise that appears to be important for directly inducing the physiological stress responses. Once sensitized, people's brains will automatically react to the sound's characteristics whether they are awake or asleep, and if continually exposed to the sound their thresholds for activation of the physiological stress response will steadily decrease. This elicitation of sensitization via the acoustic startle reflex has been demonstrated in animal studies [18] but is equally relevant to the observed and reported human response to pulsing industrial sound.

Sleep disturbance and low frequency noise sensitization as well as characteristic annoyance/physiological stress symptoms consistent with activation of the "acoustic startle reflex" have been reported to the Waubra Foundation by residents living near coal seam gas field compressors, coal mines, gold mines, coal fired power stations, gas fired power stations and urban sources including data centres as well as industrial wind turbines. The characteristic symptom is the report of "waking up suddenly at night in an anxious frightened panicked state".

The Waubra Foundation has funded field research that captured an episode of "acoustic startle reflex" near a wind power development in NSW at Taralga. The data was collected from a NSW resident who lives at Lithgow and has become sensitized to low frequency noise from a coal fired power station and an extractor fan from an underground coal mine.

This person noticed they and their spouse had severe acute physiological reactions just driving past wind turbines at Taralga, on their way between Lithgow and Canberra. The field research involved them voluntarily going back to the site and other wind farms in the district to see if the symptoms recurred, whilst in the company of acoustic field researchers, and wearing physiological monitoring equipment (an FDA approved Zephyr Biopatch). As can be seen below, the symptoms did recur, and a severe acute episode of the startle reflex can be seen from the symptom description, the observations of the researchers, and the objective record of the sudden heart rate acceleration on a number of occasions. Amplitude modulation was present at the time this occurred.

[18] http://bmcneurosci.biomedcentral.com/articles/10.1186/1471-2202-12-30



Physiological Monitoring of Female Subject between 5:00 pm and 6:00 pm at Taralga toilet stop, 4/12/15.

9.31. The graph above shows the heart rate in red, the heart rate variability in green and respiration rate in blue. The annotations make the waypoints clear.

The data confirms the longstanding advice of the Foundation to the public and authorities that wind turbine noise is directly causing acute and severe physiological stress responses that are not under conscious control, and therefore cannot be due to a nocebo effect ie cannot be caused by "scaremongering".

As one of the court appointed NSW Land and Environment Court acoustic experts Steven Cooper, and Professor Colin Hansen, have pointed out repeatedly, the current NSW noise pollution guidelines relating to wind turbine noise are not based on any empirical studies under Australian conditions relating to wind turbine noise. It is completely unacceptable to use traffic noise studies in Europe as a proxy and to ignore the frequencies not captured by the usage of the dBA filter (ie excluding infrasound and low frequency noise) when the characteristics of wind turbine noise, including particularly the frequent presence of amplitude modulation, as well as intrusive pulsing low frequency noise, is so different to traffic noise, and when the background noise environment in many parts of rural Australia is so much quieter than Europe. Mr Cooper's evidence was accepted by the AAT.

In light of the AAT decision and the research work undertaken by Steven Cooper into what constitutes wind turbine noise, the IPC is publicly placed on notice that before they can grant approval for the development they need to obtain answers to the following questions:

1. Please provide studies upon which the wind turbine/farm criteria have been developed?
2. Please identify the noise source(s) that have been used in the studies related to question 1?
3. Please provide the dose-response data related to wind turbine/farms on which the criteria are based, and the corresponding level that represents 10% of the population that is highly affected?
4. The most common complaint from residents relates to sleep disturbance. Please provide the studies of wind farm noise that identifies the noise (in any relevant acoustic index) that gives rise to sleep disturbance?
5. Please provide studies of wind farm noise that identify the noise level (in any relevant acoustic index) that will not give rise to sleep disturbance.
6. Please provide studies of wind farm noise that identifies the noise level that would protect the acoustic amenity of residents in proximity to wind farms.

7. In light of the above, please identify who would be liable (in a damages claim) for the consequences of adverse impacts.

It would seem that the Applicant would not be responsible for damages as the Department or the IPC are the responsible authority if a consent was granted. Accordingly, the community sees that the IPC (and the individuals of the IPC) would be liable in any damages claim as a result of adverse noise and health impacts arising from the operation of the Bango wind farm.

Planning authorities who approve wind power or other industrial facilities which will not and cannot operate in a manner which will not disturb the sleep and therefore damage the health of neighbours, including vulnerable citizens such as babies and young children, the elderly, the chronically ill and the disabled, are therefore party to the harm which is being caused through state noise pollution and planning regulations which are currently inadequate and are clearly operating as a "license to harm".

You each need to be aware that if approved, the harm which will result to the surrounding community members near Bango is predictable, measurable, and actionable via noise nuisance litigation. In addition relevant professionals and decision makers could also be sued for professional negligence, particularly in the light of the recent AAT decision.

Australian residents are currently taking advantage of the new more affordable acoustic technology in order to accurately measure and record the soundscape they are exposed to in a way which preserves the legal chain of evidence and which permits the gathering of pre and post construction acoustic data to help them protect their human and legal rights.

If the Bango industrial wind turbine facility is approved, residents will instigate the collection of full spectrum noise data using equipment such as the SAM Scribe M2 and this will provide the evidence and grounds for noise nuisance litigation proceedings. And I know there is one such machine in the district at this moment.

On that note, I trust that the current hosts know what they are doing and have considered the risks and implications of doing so. What they have essentially done is sign a business agreement with a foreign company, and like any business agreement the liabilities of that partnership must be determined and considered, and a clear exit strategy formulated, prior to signing any contract. However, in the case of hosting wind turbines, there is no exit strategy. The consequences of the signing of that contract must be accepted, and responsibility taken for any adverse impacts that result from that legal agreement.

I truly believe that the hosts and neighbours who have signed contracts with any wind developer are taking a massive gamble with their families health, and have committed their families to a lifelong experiment, guinea pigs as it were, whilst ever they reside near operating wind turbines. And they have also committed their neighbours and those living in the vicinity of wind turbines to an experiment, the results of which are in the best case uncertain and in the worst case a social and health disaster for residents in the area.

I suspect this hall in which we sit today represents, for many in here, a place of happy memories. Committee meetings of community groups, post funeral celebrations of the lives of residents of this district, Miss Boorowa competitions, debutant balls, weddings and public meetings. The list goes on.

However, I have never known people to gather in this place in a forum of such opposing, counterproductive, destructive and divisive opinion.

There is no other issue in a rural community that is as insidious and divisive as a proposal to build and operate an industrial wind turbine facility. It tears it apart, creating irreparable damage to relationships between neighbours, friends, business colleagues and family members.

I myself have planted trees, sat on community committees, played sport, shared beers, attended weddings and funerals, and conducted business with proposed hosts and supporters of this wind turbine proposal. Now

I stand here in complete opposition to these friends and members of the community with whom I have shared so much.

If the news was all good, then we wouldn't be here today, however the news isn't all good and the concerns of so many residents of the Bango area is a clear indication that the Bango industrial wind turbine proposal does not have the social license to justify its approval. Indeed it is predictable that an unknown percentage of residents in our community will become noise sensitized from exposure to wind turbine noise, and in addition to any pre existing health problems being exacerbated by sleep disturbance and stress, could develop PTSD and other serious health conditions including cardiovascular diseases simply as a result of their exposure to wind turbine noise and vibration.

Committee, I appreciate your time today, and I trust that you appreciate the enormity of the decision that is in your hands, and the responsibility you have to protect the people from harm. Be assured that if this facility is approved by you, and harm is suffered, that litigation for noise nuisance and professional negligence will follow, as is already happening internationally.

Charlie Arnott

Waubra Foundation Director.

22nd March, 2018