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16th May, 2014

RET Review Expert Panel
Mr Dick Warbuton AO LVO (chair)
Dr Brian Fisher AO PSM
Ms Shirley In't Veld
Mr Matt Zema

Sent via email to RETReview@pmc.gov.au

Dear Chair and Panel Members,

The Waubra Foundation's submission to the RET Review is attached.

Our comments are confined to the systemic regulatory failures with respect to the factors which are known to result in health damaging acoustic pollution from industrial wind turbines. This regulatory failure results from failures in planning, health, and noise pollution regulation at all three levels of government.

The RET has driven the rapid implementation of industrial wind energy across parts of rural Australia PRIOR to fully understanding what regulatory provisions are necessary in order to protect the sleep and health of residents out to significant distances from the developments. Longstanding acoustic research has been ignored, because of the close relationship of the wind industry to regulatory authorities.

Whilst the benefits of wind energy are well publicised, the hidden costs to specific sectors of the community are denied, ignored, and generally unknown to those who are not personally adversely impacted.

There are gross violations of human rights occurring, in particular the right to a good night's sleep.

Sleep deprivation is acknowledged as an act of torture. Australia is a signatory to the Convention against Torture and Other Cruel, Inhuman and Degrading Treatment or Punishment (New York, 10th December, 1984).

Please do not hesitate to contact us should you require further information.

Yours sincerely

Sarah Laurie, CEO

Background Information Necessary to understand Regulatory Failures

The Waubra Foundation has been working closely for nearly four years with residents in a range of rural communities adversely impacted by environmental noise, since July 2010, so we have an intimate knowledge of the problems these noise affected residents face. These health problems are not unknown to Australian State and Federal governments.

The Federal Government issued a report in 2004 by the EnHealth Committee recognising the research knowledge, and gaps in knowledge which then existed about the damage to health (other than hearing loss) from environmental noise. Health problems identified and discussed in that Australian Government report included the following:

- Annoyance
- Impaired quality of life
- Sleep disturbance
- Performance and learning issues in children
- Cardiovascular disease
- Mental Health issues
- Neurophysiological stress

This important government report was never acted on, and has since been buried, despite the quantification of the cost of these noise related health problems being clearly outlined in a subsequent Access Economics study in 2005-6, amounting to billions per annum – argued by Noise Watch Australia’s spokesperson Gary Goland to be as much as the costs to the community from smoking. These costs remain hidden, but are significant to the Australian community members affected.

Most of the noise related health complaints and inquiries to the Waubra Foundation come from residents living near industrial wind developments, but some complaints come from residents living near coal mines, gas fired power stations, and CSG field compressors. The adverse health impacts have been so severe in some cases, that residents have abandoned their homes. Others remain trapped, in homes which then become unsaleable, especially if the noise pollution problems are known, unless they are bought out by the noise polluter, who then insist on non-disclosure clauses. The impacts in environments where there is very quiet ambient or background noise overnight are particularly health damaging. This is particularly the case in much of rural Australia where background noise levels can go below 20 dBA.

En Health 2004 report: <http://waubrafoundation.org.au/resources/health-effects-environmental-noise-other-than-hearing-loss/>
Noise impacts of coal mines: <http://waubrafoundation.org.au/resources/nsw-health-environmental-health-concerns-coalpac-cullen-bullen-mine-proposal/>, and <http://waubrafoundation.org.au/resources/rich-land-waste-land-how-coal-killing-australia-sharyn-munro/>
Noise impacts of CSG: <http://waubrafoundation.org.au/2013/report-tara-gas-field-health-survey-released/>
Non-disclosure clauses: <http://waubrafoundation.org.au/resources/slater-gordon-acknowledge-confidentiality-clauses/>
Access Economics Study “Listen Hear”: <http://www.accesseconomics.com.au/publicationsreports/getreport.php?report=71&id=81>

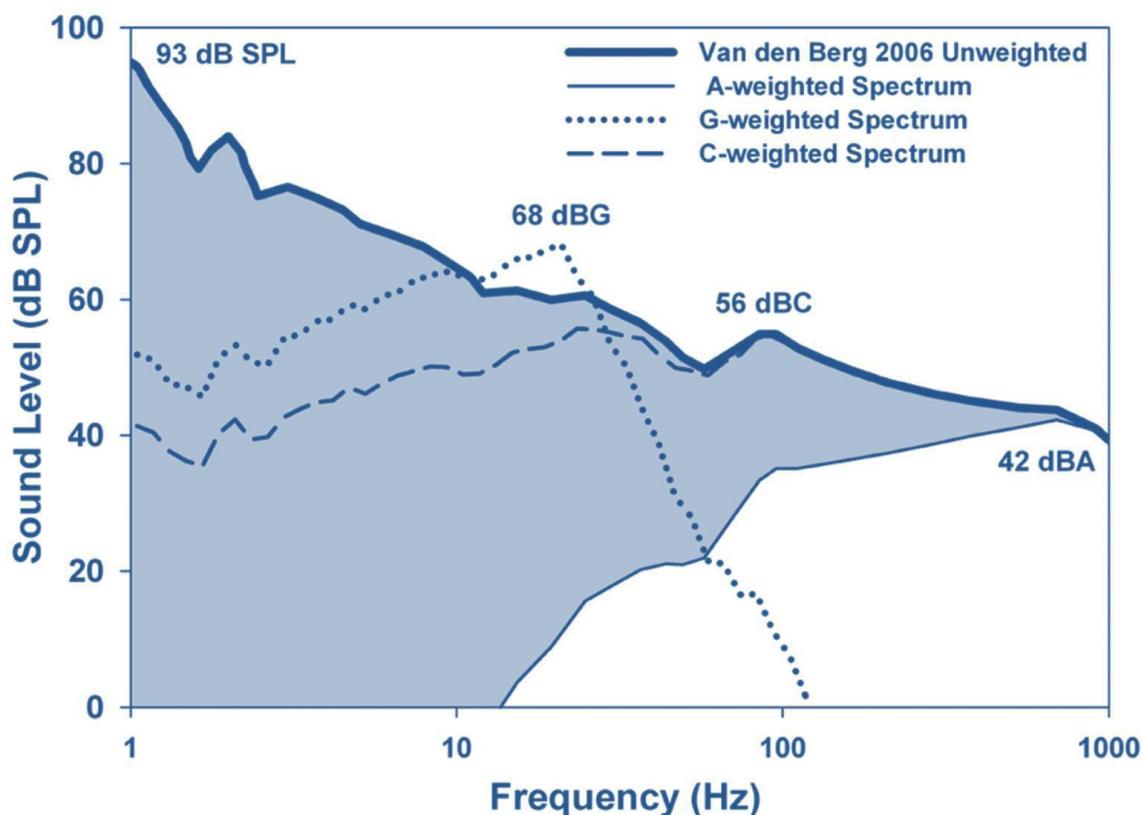
It is our experience that there is systemic regulatory failure and a complete lack of transparency with respect to the monitoring and compliance with existing (inadequate) state noise pollution guidelines, regardless of the noise source.

The noise pollution guidelines and regulations are inadequate because they do not include the accurate and transparent measurement, monitoring and control of infrasound and low frequency noise, ie sound energy below 200 Hz. This is a global problem, and is not confined to wind turbine noise.

<http://waubrafoundation.org.au/about/acoustic-pollution-assessment/>

As the turbines increase in size and power generating capacity, the sound energy generated shifts down to the lower spectrum below 200 Hz, predictably increasing the likely annoyance for the neighbours. The Danish acoustics research which demonstrated this was omitted from the NHMRC Systematic Literature Review.

<http://waubrafoundation.org.au/resources/moller-pedersen-low-frequency-noise-from-large-wind-turbines/>



The blue area in the graph above illustrates the sound energy generated by wind turbines, **which is not captured** if dBA filters are used to measure wind turbine noise. These measurements in dBA (filters) are currently all that is required by noise pollution regulatory authorities. As a result all the sound energy generated in the lower frequencies (infrasound and low frequency noise) is either under represented or completely excluded from measurement.

Source of figure: Salt, A.N. and Kaltenbach, J.A. (2011). *Infrasound from Wind Turbines Could Affect Humans*. Bulletin of Science, Technology and Science. (Aug 2011). 296-302. (downloadable from the following weblink: <http://www.wind-watch.org/documents/wind-turbine-noise-and-health-special-issue-of-bulletin-of-science-technology-society/> and scroll down to the fourth article)

Van den Berg, G. P. (2006). *The sound of high winds: The effect of atmospheric stability on wind turbine sound and microphone noise* (Doctoral dissertation). University of Groningen, Netherlands. <http://dissertations.ub.rug.nl/faculties/science/2006/g.p.van.den.berg/>

Mrs Mary Morris’s analysis of a shut down period during the SA EPA Acoustic survey contains a valuable illustration of why using dBA is of no use in properly investigating the noise complaints of residents, because it excludes the low frequency noise component. Mrs Morris was the author of the only Australian study included in the NHMRC’s Systematic Literature Review, and has an intimate knowledge of the health problems experienced by the Waterloo residents. Her work confirmed the adverse impacts on sleep were being experienced out to 10km from wind turbines, and a subsequent case series crossover analysis confirmed that when the turbines were off for a week immediately after the EPA Acoustic survey period, the residents reported their sleep problems resolved, only to recur again when the turbines recommenced operating.

<http://waubrafoundation.org.au/resources/morris-m-comparison-wind-turbine-acoustic-measurements-analysis/>
<http://waubrafoundation.org.au/resources/waterloo-wind-farm-survey-2012/> <http://waubrafoundation.org.au/resources/morris-m-waterloo-case-series-preliminary-report/>

Emeritus Professor Colin Hansen has confirmed the resident's experiences and the distance of the effects at Waterloo in a letter to the Victorian Health department, when that Department issued a report in late April 2013 asserting erroneously that there was no evidence that infrasound was causing physiological effects.

<http://waubrafoundation.org.au/resources/prof-colin-hansen-writes-victorian-dept-health-recent-wind-farms-health-doc/>

Mrs Morris has worked closely with acousticians such as Emeritus Professor Colin Hansen, Mr Steven Cooper, Mr Les Huson and Dr Bob Thorne who have come to the Waterloo community to collect acoustic data to investigate what is going on. Mrs Morris has also collaborated with highly regarded international acousticians from the United States, including those working with the wind industry, who are investigating wind turbine noise related health problems in the USA, such as Dr Paul Schomer, Mr George Hessler and Mr Bruce Walker. Both Emeritus Professor Hansen and Mr George Hessler have criticised the conclusions of the SA EPA study, as have others.

<http://waubrafoundation.org.au/resources/hessler-george-comments-south-australian-epa-study-at-waterloo-wind-farm/>

<http://waubrafoundation.org.au/resources/hansen-c-h-comments-sa-epa-waterloo-wind-farm-environmental-noise-study-2013/>

<http://waubrafoundation.org.au/resources/open-letter-premier-south-australia-clean-energy-regulator-concerning-sa-epa-acoustic-survey-2/>

The Damage to Health and Sleep from Infrasound and Low Frequency Noise known since 1980's

The damage to health caused directly by these infrasound and low frequency noise sound energy frequencies in the case of industrial wind turbines has been known to the wind industry and others for almost thirty years, since US Government funded research by NASA and fifteen other research institutions was conducted, led by Dr Neil Kelley from the Solar Energy Research Institute.

The Kelley research and subsequent research by others with NASA established that impulsive infrasound and low frequency noise emissions travelled significant distances, penetrated buildings and resonated within them, further amplifying the sound energy or "dose" received by those inside. It was established that these symptoms could be perceived by the residents at levels well below the hearing threshold for those frequencies.

<http://waubrafoundation.org.au/2013/explicit-warning-notice/>

<http://waubrafoundation.org.au/resources/kelley-et-al-1985-acoustic-noise-associated-with-mod-1-wind-turbine/>

The various symptoms, which included repetitive sleep disturbance, were given the general descriptor of "annoyance". Subsequent laboratory research confirmed the direct causation of annoyance symptoms from these frequencies. Annoyance is recognized as an adverse health effect by the World Health Organisation.

<http://waubrafoundation.org.au/resources/1987-problem-with-low-frequency-noise-from-wind-turbines-scientifically-identified/>

<http://waubrafoundation.org.au/resources/annoyance-and-wind-turbines-society-for-wind-vigilance/>

Research in Hawaii subsequently confirmed in 1989 that upwind-bladed wind turbines could also generate infrasound and low frequency noise, if the inflowing air was "dirty air" or turbulent. The South Australian EPA and the Clean Energy Council have ignored this research, and in the case of the EPA claim in their current Wind Farm Noise guidelines that infrasound is not generated by "modern" upwind-bladed wind turbines at a "well maintained" wind development, presumably to justify not measuring it. The guidelines in SA were co authored by acousticians with strong commercial and financial ties to the wind industry.

<http://waubrafoundation.org.au/resources/shepherd-k-hubbard-h-noise-radiation-characteristics-westinghouse-wwg-0600-wind-turbine-generator/>



Wake Turbulence at Horns Rev, Maritime Wind Development

The preceding photograph gives a visual representation of this wake turbulence effect, at a Maritime wind development (Horns Rev). It is clear the wake turbulence effects can travel considerable distances, and a recent report from a pilot in New South Wales to CASA detailed how to his surprise, the wake turbulence effect was felt by him some 8-9km away from the nearest wind turbines.

What are the known pathophysiological mechanisms of damage to health from ILFN?

Knowledge of the mechanisms of how those “annoyance” symptoms are caused by infrasound and low frequency noise, has been helped significantly with the recent work of neurophysiologist Professor Alec Salt and his research team. Professor Salt has shown using animal studies just how infrasound can physiologically affect the inner ear, for example producing an effect (endolymphatic hydrops) identical to that seen in humans with Meniere’s disease. Salt has also shown how infrasound can cause an “alerting response” ie induce a “fight flight response”.

<http://waubrafoundation.org.au/resources/salt-n-lichtenhan-j-t-how-does-wind-turbine-noise-affect-people/>
<http://waubrafoundation.org.au/resources/prof-alex-salt-expresses-deepest-disappoint-victorian-dept-health-report/>

Residents living near these environmental noise polluting facilities describe a range of symptoms which include symptoms also described in Meniere’s disease (nausea, vertigo, tinnitus) and physiological stress (the alerting response).

Professor Alec Salt and Dr Daniel Brown, a researcher now based at Sydney University, also accidentally found that blocking the helicotrema in the inner ear with a gel could induce markedly increased sensitivity to low frequency noise, which could explain individual differences and changes in sensitivity to LFN over time.

<http://waubrafoundation.org.au/resources/francombe-h-sound-clues-mystery-affliction-menieres-disease/>

In addition, over the last thirty years there has been growing awareness of a disease called “vibro acoustic disease” (VAD) by the Portuguese researchers who have done most of the research, Dr Nuno Castelo Branco, and Professor Mariana Alves Pereira. VAD is a multi organ disease, and is directly caused by prolonged chronic exposure to infrasound and low frequency noise, and is being reported in both residential and a range of occupational environments. VAD is now being identified in residents living near wind turbines, including children and animals, as well as adults. It has been identified in aviation workers, the military, residents living near a grain terminal, near mines, and a variety of other sources of ILFN including ships engines. Residents in Australia who have symptoms and diagnoses by their treating doctors which are consistent with a diagnosis of Vibro Acoustic disease live(d) near coal mines and industrial wind turbines.

<http://waubrafoundation.org.au/resources/arnot-jw-vibroacoustic-disease-i-personal-experience-motorman/>

<http://waubrafoundation.org.au/resources/alves-pereira-et-al-vibroacoustic-disease-response-biological-tissue-low-frequency-noise/>

<http://waubrafoundation.org.au/resources/vibroacoustic-disease-biological-effects-infrasound-alves-periera-castelo-branco/>

Responses to criticism

<http://waubrafoundation.org.au/resources/alves-pereria-m-castelo-branco-n-ltr-australian-new-zealand-journal-public-health/>

<http://waubrafoundation.org.au/resources/alves-pereira-m-castelo-branco-n-scientific-arguments-against-vibroacoustic-disease/>

Details of work relating to wind turbine noise effects

<http://waubrafoundation.org.au/resources/low-frequency-noise-presentation/>

<http://waubrafoundation.org.au/resources/follow-up-study-family-exposed-low-frequency-noise/>

Other noise sources

<http://waubrafoundation.org.au/resources/castelo-branco-n-low-frequency-noise-major-risk-factor-military-operations/>

<http://waubrafoundation.org.au/resources/effect-low-frequency-noise-echocardiographic-parameter-ea-ratio-chao-et-al-2/>

Both Professor Salt’s research, and the VAD team’s multidisciplinary research is vital to understanding what we already know about the impacts of infrasound and low frequency noise on animals and humans.

All this research was excluded from the NHMRC’s recent commissioned literature review, because the Literature Review Panel decided to deliberately exclude all animal studies, and excluded both case studies and case series, despite the latter being accepted by the NHMRC’s own guidelines for this type of systematic literature review. No explanation for these decisions has been provided. Animal studies are used in toxicology studies in order to determine pathophysiological mechanisms, investigate causal links, to establish evidence of direct causation and dose response effects.

<http://waubrafoundation.org.au/resources/waubra-foundation-open-letter-nhmrc-re-systematic-literature-review/>

Comments re the NHMRC Systematic Literature Review (section 3.6 RET Review)

The Foundation notes the RET Review Panel will not be addressing the issues covered in the NHMRC literature review. Nevertheless the Panel needs to be aware of the serious concerns held by the Waubra Foundation and others about this literature review and its findings, because of the extensive material which was deliberately excluded from consideration in the literature review, some of which is mentioned above. We urge the RET review panel members to read both our critique as well as the comments of others, so you can understand what the problems and limitations of this systematic literature review are.

<http://waubrafoundation.org.au/resources/responses-nhmrc-draft-information-paper-systematic-literature-review/>

The NHMRC did usefully identify and emphasise that there is no peer reviewed published research, which concurrently gathered full spectrum acoustic data (including ILFN) and physiological changes to sleep, blood pressure, heart rate and biochemical markers such as cortisol, in residents living near industrial wind turbines.

The NHMRC did acknowledge that the research did show that sleep deprivation, annoyance and impaired quality of life were associated with wind turbine developments, based on the limited existing research. However vital information relating to the known and serious adverse health consequences of sleep deprivation such as cardiovascular diseases were deliberately excluded.

<http://waubrafoundation.org.au/resources/sleep-duration-predicts-cardiovascular-outcomes/>

We note that the Coalition has committed to funding the long overdue multidisciplinary research, and establishing the direct causal link between the sleep disturbance episodes, physiological stress, and specific acoustic frequencies is the priority, in order to make sure that state planning and noise pollution regulations and guidelines are evidence based and protective of sleep and health.

It is unfortunate that the National Health and Medical Research Council's recent systematic literature review exclusion criteria were so narrow that those who chose these criteria ensured that almost all of this crucial background information and relevant evidence was not included.

It is not yet clear exactly who is responsible for deciding on those specific exclusion criteria, or who made the individual decisions on the inclusion or otherwise of each study.

Serious conflicts of interest have been identified in members of the NHMRC Literature Review Panel, and were disclosed by Senator Chris Back and Senator John Madigan in Federal Parliament.

<http://waubrafoundation.org.au/resources/senator-chris-back-questions-evidence-from-vested-interests-at-planning-review-hearings/>
<http://waubrafoundation.org.au/resources/nhmrc-ceo-prof-anderson-questioned-about-draft-review-by-senate/>
<http://waubrafoundation.org.au/resources/morris-m-charts-comparing-pre-construction-modeling-vs-post-construction-noise-at-waterloo-wind-development/>

These issues, together with other exclusions and misclassifications of research data have resulted yet again in a dangerously flawed NHMRC literature review, which is already being relied upon by state governments developing their new wind farm codes (eg QLD), and will inevitably result in predictable serious harm to health.

<http://waubrafoundation.org.au/resources/waubra-foundation-comments-proposed-queensland-wind-farm-state-code-guidelines/>

False reassurance in the presence of a serious health problem can be grounds for successful medical malpractice lawsuits. This is of relevance considering that the NHMRC purports that there are no serious health problems directly caused by wind turbine noise emissions.

General Comments re Systemic Regulatory Failures related to Planning (section 4)

The current administration of the RET and issuing of REC's in Australia is occurring in an environment of systemic regulatory failure at all levels of government with respect to preventing, accurately measuring, and controlling noise pollution and careful siting of both the locations of industrial wind turbine developments, and of the individual wind turbines within those developments.

This is resulting in predictable adverse health impacts for the surrounding neighbours at existing wind developments, because of exposure to excessive audible noise, infrasound and low frequency noise. Some of these adverse health impacts have been acknowledged in the latest NHMRC Systematic Literature Review, namely sleep deprivation, impaired quality of life, and what is euphemistically referred to as "annoyance". I note the NHMRC found no evidence that a "nocebo effect." was causing the reported symptoms.

This systemic maladministration at Federal, State and Local government levels, and in some instances possible malfeasance in public office, is directly and predictably resulting in serious harm to human health, based on what was known nearly 30 years ago, from the Kelley / NASA research.

Some specific issues of concern are outlined below.

1. RECS are issued by the CER to power stations that are not operating in compliance with state laws.

Renewable energy certificates (RECS) are being issued by the Clean Energy Regulator, despite the regulator being made well aware that some wind developments have not yet been deemed compliant by the responsible authority (eg the Victorian Minister for Planning) with respect to the noise.

In other words some of these wind developments do not and never have complied with the state noise pollution regulations and/or the terms of their permit to operate, and should therefore not be receiving RECS, because they are breaking the law.

As an example, since 2009 the Waubra wind development has been issued over \$100 million in RECS, received by Spanish wind farm operator Acciona for a wind development which has driven numerous families out of their homes, is causing serious chronic sleep disturbance, stress, and other health problems for others, and has not been signed off as compliant with state noise regulations by the Planning Minister.

<http://waubrafoundation.org.au/resources/waubra-wind-farm-ministerial-briefing-non-compliance/>
<http://waubrafoundation.org.au/resources/ramsay-s-hansard-waubra-wind-farm-not-compliant/>

2. CER has a financial conflict of interest

The Clean Energy Regulator collects a levy on behalf of the Commonwealth from each of the RECS issued, and therefore has a financial conflict of interest. This could be interpreted as an incentive to issue RECS rather than properly investigate reports of non-compliance with state-laws. Perhaps this explains the unwillingness shown by the Clean Energy Regulator to properly investigate the lack of evidence of compliance at the Waubra Wind Development.

3. State Wind Turbine Noise Guidelines inadequate and “written by wind industry”

State wind turbine noise pollution guidelines and regulations have all been written or heavily edited by industry biased acoustic consultants. This conflicting representation is rarely disclosed by government, and is easily prevented.

None of these noise pollution regulations include measurement of infrasound and low frequency noise (ILFN), despite the acoustic field research led by Dr Neil Kelley, which established direct causation of the “annoyance” symptoms from impulsive ILFN generated by wind turbines, in 1985, confirmed with laboratory research by Dr Kelley in 1987.

5. The attitude within the judiciary of what amounts to “justifiable collateral damage”

Planning approvals are being granted despite the acknowledgement by those granting the approvals that some people’s sleep and health may be harmed as a result of the development. The justification for condemning some families to a life of noise nuisance and not allowing them to live healthily and sleep in their home (breaching their human rights) is that the “state government policy supports wind energy development” (Cherry Tree Wind Development approval decision in VCAT in November 2013).

Statements made by Tribunal members Wright and Liston

<http://waubrafoundation.org.au/resources/cherry-tree-wind-farm-vcat-hearing/> transcript of remarks in March, 2013

<http://waubrafoundation.org.au/resources/vcat-cherry-tree-wind-farm-hearing-orders/> April, 2013

<http://waubrafoundation.org.au/resources/cherry-tree-vcat-final-orders-november-2013/> final decision, where the decision was rationalized.

Details of some of the evidence statements presented in this case include the following <http://waubrafoundation.org.au/resources/david-mortimers-statement-cherry-tree-hearing-at-vcat-jan-2013/> <http://waubrafoundation.org.au/resources/hetherington-j-witness-statement-vcat-cherry-tree-tribunal/> <http://waubrafoundation.org.au/resources/linke-m-witness-statement-vcat-cherry-tree-hearing/> <http://waubrafoundation.org.au/resources/gardner-statement-vcat-cherry-tree-hearing/> <http://waubrafoundation.org.au/resources/huson-l-expert-evidence-at-vcat-cherry-tree-hearing/>

Community Noise Impact Surveys and Case Series submitted <http://waubrafoundation.org.au/resources/wind-farm-generated-noise-and-adverse-health-effects/>
<http://waubrafoundation.org.au/resources/schneider-p-cullerin-range-wind-farm-survey-follow-up-july-august-2013/>
<http://waubrafoundation.org.au/resources/macarthur-wind-energy-facility-preliminary-survey/>

Transcript of oral evidence given by the medical expert for the wind developer, Dr David Black
<http://waubrafoundation.org.au/resources/cherry-tree-vcat-hearing-evidence-dr-david-black/>

Statement of evidence by Waubra Foundation CEO <http://waubrafoundation.org.au/resources/cherry-tree-wind-farm-waubra-foundation-statement/>

6. Senior Public Health Bureaucrats falsely reassure government and planning authorities

Senior health bureaucrats deny or ignore the existence of research evidence about adverse health effects in their advice to planning authorities (NSW) and issue reports which deny existing acoustic and neurophysiological evidence of direct physiological responses to infrasound (Victoria).

Wind developments are then approved on the basis of false and misleading information (specifically Mt Bodangora, Collector and Flyers Creek in New South Wales, and the Cherry Tree Wind Development in Victoria. Three of these wind developments were owned by Infigen Energy, who engage in particularly active “product defence” strategies).

<http://waubrafoundation.org.au/resources/collector-wind-farm-pac-hearing-friends-collector-submission/>
<http://waubrafoundation.org.au/resources/wind-farms-sound-health-victorian-dept-health-report/>

Letters to the Victorian Department of Health pointing out that their document was false and misleading and requesting that they amend the document from Professor Alec Salt and Emeritus Professor Colin Hansen are here:

<http://waubrafoundation.org.au/resources/prof-alex-salt-expresses-deepest-disappoint-victorian-dept-health-report/>
<http://waubrafoundation.org.au/resources/prof-colin-hansen-writes-victorian-dept-health-recent-wind-farms-health-doc/>

Some examples of Infigen’s product defence strategies:

<http://stopthesethings.com/2013/02/24/infigen-energys-sham-and-sarah-lauries-truth/>
<http://www.abc.net.au/environment/articles/2014/02/03/3935067.htm>
<http://www.abc.net.au/environment/articles/2013/05/07/3750264.htm>

No health department in Australia has investigated the reported health problems in the field for themselves, despite being first warned about them in 2004 (Dr David Iser, Victoria).

<http://waubrafoundation.org.au/resources/dr-david-iser-2004-conducts-first-survey-patients-living-near-wind-project/>

7. Wind turbines sited too close together (& not in accordance with IEC 61400 or manufacturer’s specifications) and no one is auditing / checking

Wind turbine separation distances recommended in both the international standard (IEC 61400), and the manufacturer’s own product specifications, are frequently ignored by wind developers in Australia and those who are meant to be regulating their operations. The consequence of this is increased risk of catastrophic failure because of increased stress on turbine components, and significantly increased generation of ILFN, (which regulatory authorities then do not measure). NASA research established that upwind-bladed wind turbines could generate significant levels of infrasound and low frequency noise if the inflow air was “dirty” or turbulent.

<http://waubrafoundation.org.au/resources/shepherd-k-hubbard-h-noise-radiation-characteristics-westinghouse-wwg-0600-wind-turbine-generator/>

This practice of siting wind turbines too close together is against the law in countries such as Germany, however in Australia regulatory authorities are not auditing turbine separation distances, either pre or post construction. More specific details and comments by acousticians Dr Malcolm Swinbanks and Mr Les Huson as well as data from the Macarthur wind development referring to inadequate wind turbine separation distances is attached as an appendix to this submission. Locations in Australia which are known to have some turbines which do not have the requisite separation distances are Cullerin (NSW), Waterloo (SA), Macarthur and Waubra, (Victoria) however there may be many more, because no one has done a systematic audit.

8. The inevitable consequences

This systemic regulatory failure resulting from a combination of incompetence, corruption and malfeasance in public office is resulting in industrial wind developments being located in inappropriate areas of rural Australia, which are causing serious and predictable harm to human health, chronic sleep deprivation, and home and farm abandonments.

9. Government Inaction

All levels of government (local, state and federal) have been made well aware there are serious noise pollution problems resulting in health and sleep problems at numerous wind developments around south eastern Australia, but no level of government is yet acting to fix the obvious problems. It is hoped that by raising them in the RET review, consideration will be given to resolving the current unsatisfactory systemic regulatory failure at every level of government which is causing so much damage in rural Australia.

Concluding remarks

This systemic regulatory failure with respect to monitoring and control of noise pollution and siting of wind turbines is severely adversely impacting the health and well being of rural residents in a variety of predictable ways, including their sleep and consequently their health.

Vigorous “product defence” strategies used by the wind industry include public denial of the health problems, vilification of the victims, and the discrediting of qualified acoustic and health professionals investigating the problems and offering support to those whose health has been significantly adversely impacted. This practice is global.

In Australia the product defence strategies have included using public health “experts” and organisations to both deny and/or ignore the existing scientific knowledge, reminiscent of the various tactics of James Hardie in denying the known serious adverse health impacts of asbestos, and the Tobacco companies in denying the known adverse health effects of smoking. In the case of asbestos, James Hardie cultivated a close relationship with the NHMRC, and the Tobacco companies a close relationship with doctors, so that the knowledge of serious harm to health was delayed for as long as possible.

See the valuable work of Professor Simon Chapman in exposing the tactics of the Tobacco industry, and the equally valuable work of journalist Matt Peacock (Killer Company) in exposing the relationship between the NHMRC, Public Health at Sydney University and the various state health departments and James Hardie, which delayed appropriate action to prevent further harm to health from asbestos.
<http://waubrafoundation.org.au/2014/public-statement-home-abandonment-due-environmental-noise-pollution/>

As a result of these dishonest activities, there are social and economic costs, which are incurred by members of rural communities and are denied and/or ignored by governments and the noise polluters, who openly refer to rural residents as “collateral damage” or “policy roadkill”. The cost of sleep deprivation to the Australian community was outlined recently in the Medical Journal of Australia – the cause of the sleep disturbance is immaterial to the cost, but important in terms of prevention of both acute and chronic harm to health.

<http://waubrafoundation.org.au/resources/mansfield-et-al-sleep-loss-and-sleep-disorders-mja-oct-13/>
<http://waubrafoundation.org.au/resources/hillman-d-lack-l-public-health-implications-sleep-loss-community-burden-mja-oct-13/>
<http://waubrafoundation.org.au/resources/jan-j-e-et-al-long-term-sleep-disturbances-children-cause-neuronal-loss/>

This problem disproportionately affects those in the community who are most vulnerable, who are unable to remove themselves from the noise nuisance in order to protect their health and prevent further harm. Those who are severely adversely affected leave their homes, sometimes becoming refugees.

There are gross violations of human rights occurring, in particular the right to a good night's sleep.

Sleep deprivation in particular is acknowledged as an act of torture.

Australia is a signatory to the Convention against Torture and Other Cruel, Inhuman and Degrading Treatment or Punishment (New York, 10th December, 1984).

Governments in Australia are therefore party to allowing this abuse to occur, by having inadequate guidelines and regulations for planning and noise pollution regulation, which are predictably failing to protect people.

The evidence of serious harm is mounting however, and in Falmouth, USA in late 2013, Justice Muse ordered that two of the Falmouth Wind Turbines should be turned off at night, in order to prevent irreparable harm to physical and psychological health.

<http://waubrafoundation.org.au/2013/judge-rules-wind-turbines-cause-irreparable-harm-health-issues-immediate-injunction/>

Please read the following letter, written by an American Psychiatrist to the Falmouth Town Board, to enable a better understanding of the impact of the sleep deprivation on people living nearby.

<http://waubrafoundation.org.au/resources/hallstein-w-falmouth-wind-turbines-sleep-deprivation-psychiatrist-weighs/>

I recommend that the RET Review Panel take the time to visit at least one of the areas where wind turbine neighbours have been adversely impacted and listen to their stories. I understand the RET Review panel may be visiting Daylesford and listening to the well intentioned shareholders of the Hepburn Wind "Community Wind Farm".

Please also take the time to listen to those who live near that facility who are experiencing problems, some of whom have been driven out of their home, or suffer serious chronic sleep deprivation with downstream health consequences. One of those residents put in this submission to the second Federal senate inquiry dealing with wind turbine noise and its impacts.

<http://waubrafoundation.org.au/resources/rural-gp-forced-abandon-her-home-speaks-out/>

To date, Hepburn Wind has refused to provide the necessary wind mast and power output data to local residents in order to allow their acoustician Mr Les Huson to measure compliance with its planning conditions and with the relevant Victorian guidelines. This is in marked contrast to the chairman's public comments about "radical transparency".

Appendix 1

Correspondence relating to turbine separation distances in Australia, between UK acoustician Dr Malcolm Swinbanks, Mr Les Huson, and myself earlier in 2014. I had asked Dr Swinbanks and Mr Huson if the lack of adherence to the relevant International Standards might explain why there were so many complaints at specific wind developments which I had been advised did not meet the recommended turbine separation distances. There is subsequent documentation of turbine separation distances at Waterloo by Mary Morris, again which do not meet the recommended international standard.

From: "MA.DR SWINBANKS" <malcva@msn.com>

Date: March 3, 2014 10:27:12 AM GMT+10:30

To: <les@huson.com.au>

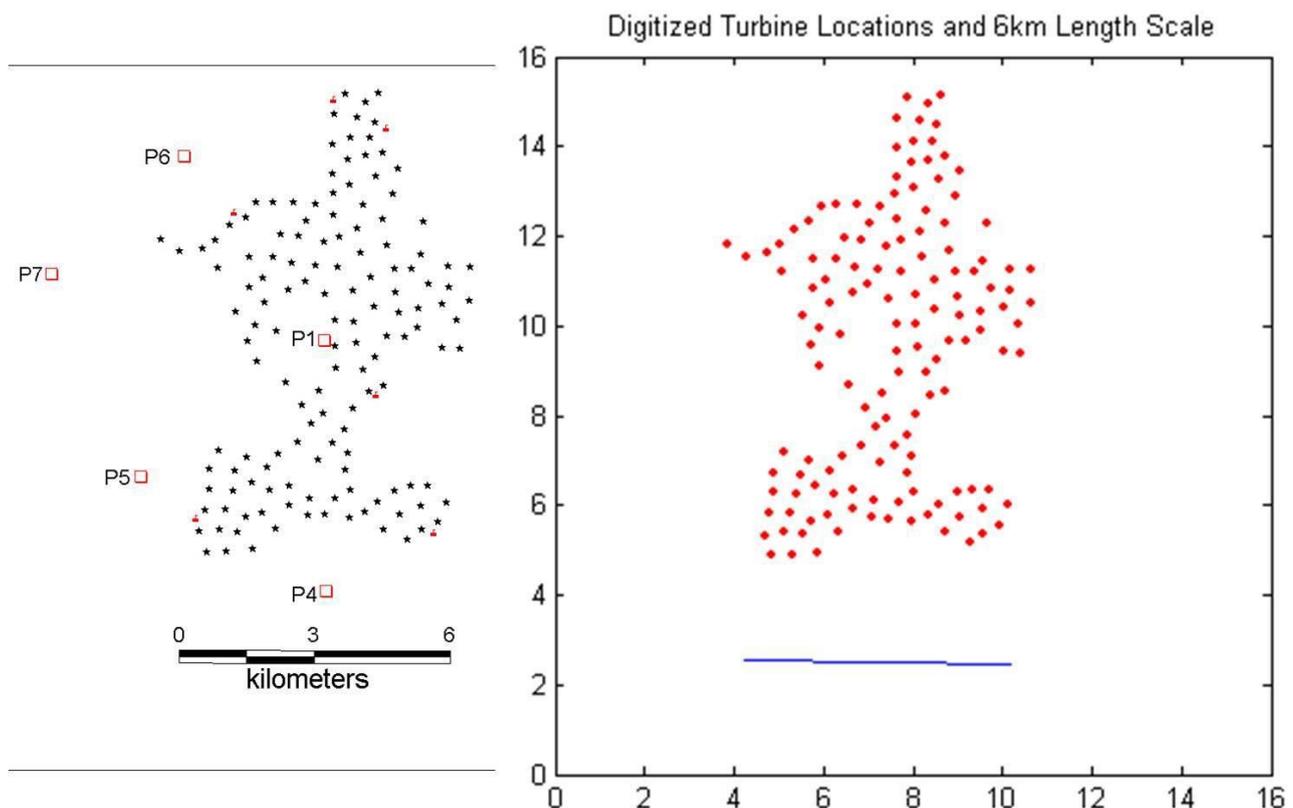
Cc: "Rick James" <rickjames@e-coustic.com>, "Rob Rand" <robertwrand@gmail.com>, "Stephen Ambrose" <seaa@myfairpoint.net>, "Sarah Laurie" <sarah@waubrafoundation.org.au>

Subject: Re:MacArthur Windfarm

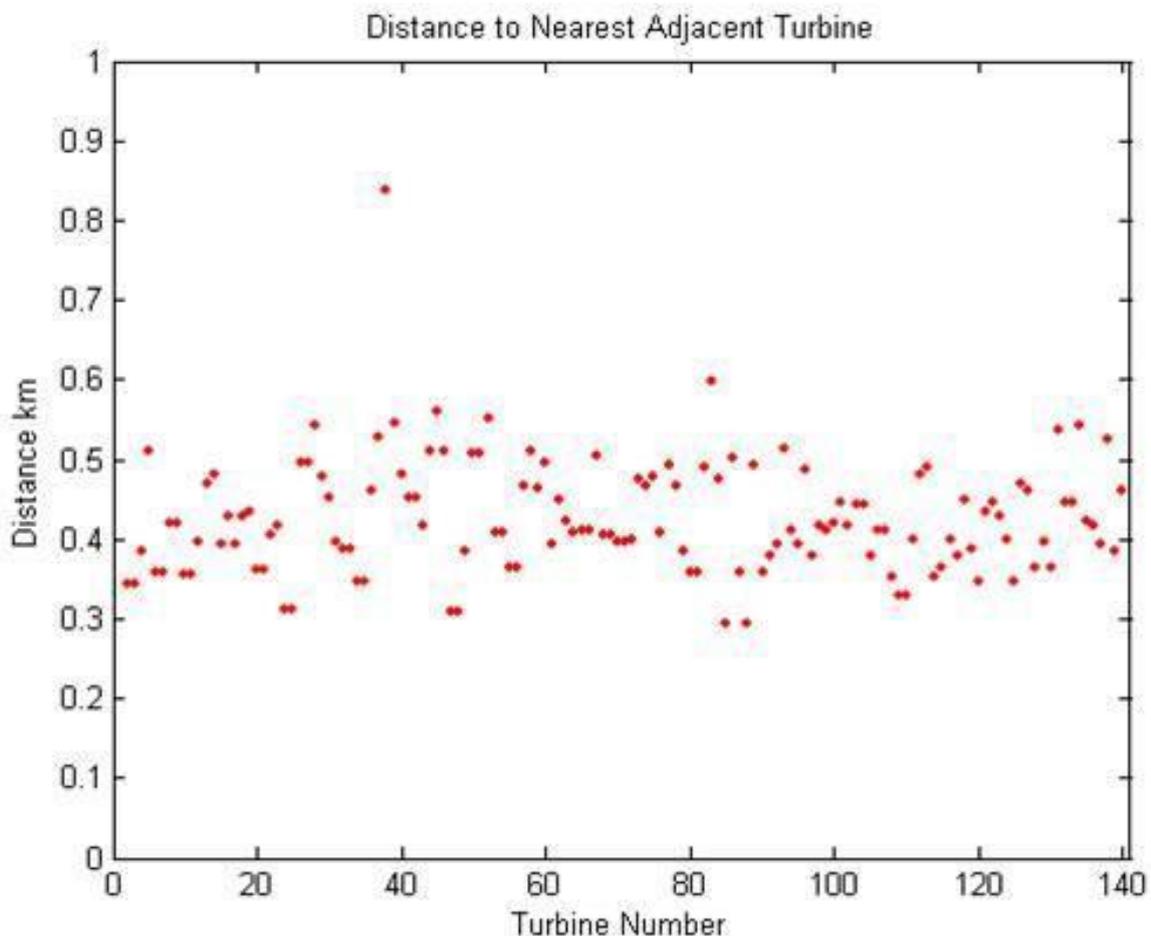
Les,

Thank you for your email last night. I am enclosing the results that I had intended to send last September relating to the MacArthur Windfarm and the JPEG map of the turbine locations.

There are two JPEG files attached. The first shows side-by-side a cropped version of the JPEG map you had provided, and the digitized equivalent that I used for the calculations. I have tried to size the two figures so that they can be seen to match up - I hope that I did not introduce any distortions, but my digitization was from the unmodified original JPEG.



The second file shows the calculated minimum separations of the 140 individual turbines - ie the distance from each turbine to its nearest neighbour. These separations were calculated from the digitized co-ordinates, scaled using the 6km distance bar.



I understand that the windfarm consists of 140 Vestas 112 3MW turbines. These have 112m diameter blades, and if they are generating 3MW maximum, they are fully loaded (ie not the more recent low-windspeed "backed-off" versions, where the capacity factor is "improved" by restricting and reducing the maximum power output). Since they are capable of running at full capacity for a 112m blade diameter, the corresponding turbine separations should be defined by the usual conventions. I.e. 7 blade diameters in the direction of the prevailing wind, and 4 blade diameters in the less common crosswind direction.

For 112m blade diameter, this yields 784m (0.78km) and 448m (0.45km) respectively.

The overall layout does not imply any prevailing wind direction, and it can be seen that many of the separations are under 0.4km, so do not meet the 4 blade diameter specification. The average is not even 0.45km.

So my reaction on seeing this map was that these turbines are far too close together, and inevitably there will be turbulent wake interaction and likely enhanced infrasound generation. Moreover, it is likely that the windfarm will be unable to generate at its maximum capacity, since turbines towards the center will be shielded and consistently operating under inferior wind conditions. Danish measurements in the North Sea for a windfarm with a square array of 7 diameters in each direction was found to lose significant power output from the interior rows that were shielded.

I hope these comments are accurate, and that I have not misinterpreted the original JPEG. But the stated area of the windfarm of 5500 hectares seems to be consistent.

From: W Les Huson <les@huson.com.au>
Date: March 11, 2014 1:25:36 PM GMT+10:30
To: "MA.DR SWINBANKS" <malcva@msn.com>, Sarah Laurie
<sarah@wabrafoundation.org.au>
Subject: Re: Wind Turbine Separations
Reply-To: les@huson.com.au

Malcolm

The planning process in Australia for the approval of wind farms is seriously flawed.

Often, a developer has no intention to build a particular wind farm. It has often been the case that an approved wind farm is on-sold.

Of course, this is not always the case and some proponents secure both the planning approval and continue to build the wind farm. However, in almost all cases the wind farm layout is chosen at the planning application stage without knowledge of which turbine will eventually be used. Site layout issues such as minimum separation distances are just not considered with regard to noise emissions.

On approval, generally only micro-siting changes are allowed (+/- 100m) with only a stipulation that the final turbine choice must have a sound power rating equal to or less than the sample turbine used to gain planning approval.

The developer then goes out to tender for the cheapest turbines. Obviously, the likes of Vestas, Acciona or Gold Wind will offer their wares in accordance with the already approved layout to maximise their sales. I doubt if any would caution that a particular approved turbine spacing will alter the sound emissions calculated using IEC61400-11

Regards

Les Huson

On 11/03/2014 1:23 PM, MA.DR SWINBANKS wrote:

I was just contacted in another context in respect of wind turbine separations. I observed that in Australia they do not seem to follow the recommendations.

Two comments follow:

First, when I worked with a major aero-engine manufacturer, they were extremely concerned about ground testing of prototype engines, where inflow turbulence could compromise the results by as much as 15dB. They have to guarantee engines to very close noise tolerance, otherwise they cannot sell them. So they have to know how to account for these effects, and consequently have years of experience of taking these effects into consideration.

Wind Turbines must be separated by sensible distances, otherwise turbulent wake interaction leads to a reduced fatigue life and reduced operating power output. But the same unsteady forces on the blades lead to increased infrasound and low frequency output, just as the aero engine manufacturers, operating at smaller lengthscale and higher

frequencies, understand.

I believe that Vestas have previously argued that when there is no dominant prevailing wind, they recommend separations of 5 blade diameters. Yet the MacArthur windfarm does not meet this standard.

Entirely by way of example, if average separations are reduced from 5 diameters to 3.5 diameters, it is possible in theory to place 2 times as many turbines on the same area of land.

Twice the number of turbines equals twice the sales revenue and twice the initial payments just for planting a wind turbine.

It may not be quite as extreme as this in practice, but there is clearly a considerable incentive to cut corners in this respect.

In complete contrast to the aero-engine industry, who must work to vastly higher standards of professionalism and precision, or they will simply go out of business.

I am not in the least surprised that Australia has a disproportionate number of low frequency and infrasound complaints from wind turbines, at large distances. Anyone familiar with the basic principles of aero acoustics and turbulent interaction would expect this if turbine separations are compromised.

Yet Australia has a comparatively small population, in comparison to the available area of landmass.

How does a nation with more land per unit population than almost any other country on earth succeed in cramming wind-turbines into a greater density than is even recommended by the wind-turbine manufacturers ?

Malcolm

Below is correspondence between Mrs Mary Morris, myself and Mr Dennis Workman, from NSW.

On Jun 26, 2012, at 9:35 PM, mary morris wrote:

[Hi Sarah](#)

[Do you have anything on the recommended spacing of Vestas 3mw \(as used at Waterloo ?\)](#)

[Is it possible problems are worse there because they are so close together?](#)

[From what I can find , nothing definitive, spacing could be anything from 5 to 12 rotor diameters. Because of wake issues. 90 m rotor diameter x5 = 450 m - 1080 m. Waterloo are much closer than that going by Google Earth.](#)

[Approx 272, 270, 348, 348, 344, 280, 268, 268, 286, 288, 275, 286, 276, 279, 282, 283, 290m ??](#)

The response to Mrs Mary Morris from Mr Dennis Workman follows:

Using the '5r-8r' rule of the NSW SEDA guidelines (page 53 of copy attached), which I am informed is law in Germany, but totally ignored by the NSW Planning Department, turbines should be spaced no closer than 5 rotor diameters across the wind. Yet for Taralga, Waterloo and Waubra Wind Farms (and possibly many others) the turbine spacings are much less than that. It is my contention that arbitrarily decreasing the turbine spacing will lead to a disproportionate increase in low frequency noise around the blade pass frequency because of wake interference.

The Google terrain map shows the terrain rising at about 60 metres in 400 metres (about 8.5 degrees angle of inclination) from west to east up to the ridge on which the turbines are arranged.
<http://g.co/maps/fx6j2>

A picture in the attached wind farm newsletter, also gives an indication of the slope of the terrain.

The attached wind roses for Clare High School do show that the predominant direction of the wind is east and west, however the wind blows from other directions too. I don't think it would be regarded as highly directional.

I observe that when the wind is blowing from the east or west it has to blow up the slope and is probably entering the turbines at an oblique angle and probably causing greater noise to be emitted; I don't know if that slope exceeds the manufacturer's recommendations. The fact that all the turbines are arranged in a single row in similar terrain would mean that they would all behave similarly and almost simultaneously.

The turbines will cause wake interference with their downwind neighbours when the turbines yaw to accommodate winds more than approximately + or - 70 degrees from the east or west directions. Once again the fact that all the turbines are arranged in a single row in similar terrain would mean that they would all behave similarly and almost simultaneously.

And they can beat as well.

I hope that this may be of some use to you.

Regards,

Dennis.