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Subject: adverse health effects from wind turbines
Attachments: Laurie-Australia-Senate-submission-final.pdf

please post for everyone to read, thank you , bob anders

SUBMISSION TO THE AUSTRALIAN FEDERAL SENATE INQUIRY ON RURAL WIND FARMS

10th FEBRUARY, 2011

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EXECUTIVE SUMMARY

1. There are reports from around the world of people living adjacent to wind turbine developments becoming unwell with the same range of symptoms

2. The few studies which have been done by concerned medical clinicians have consistently found these problems

3. The medical evidence which exists from Dr Pierpont's landmark peer reviewed case series cross over study clearly links exposure to turbines with the symptoms being described

4. Not all adjacent residents are affected

5. Some developments appear to have more seriously affected residents than others

6. Some residents are affected immediately, others are progressively affected over weeks to months of constant exposure

7. Chronic exposure appears to have a cumulative effect

8. The time taken to achieve full resolution of symptoms is proportional to the time exposed to turbines

9. Not all symptoms are reversible after chronic exposure, when affected residents move away

10. Some extremely ill residents in desperation have signed confidentiality agreements with wind developers, who have purchased their properties, in exchange for agreeing not to talk publicly about their health problems, in order to leave their homes and regain their health.

11. Residents are describing symptoms from a distance of up to 10km away from the nearest turbine

12. Elevations of blood pressure associated with proximity to operating turbines are an emerging issue

13. Some people appear particularly vulnerable to developing wind turbine syndrome symptoms, and they include children and the elderly

14. There a number of possible mechanisms for these symptoms and they include but are not limited to:

- Audible noise causing chronic sleep deprivation (we know from affected residents that wind turbines can be very noisy, both upwind and downwind)
- Wind turbine specific pulsatile infrasound and low frequency noise causing many of the symptoms of wind turbine syndrome (probable, based on current but limited experimental evidence, and recent measurement of wind turbine specific pulsatile infrasound)
- Possible health effects from electromagnetic radiation issues in a few specific cases – in situ measurement required initially in these homes to determine if this is an issue for further investigation

RECOMMENDATIONS

1. There is an urgent need for further INDEPENDENT medical, acoustic and scientific research, looking specifically at the populations affected by the currently constructed and operating wind developments in Australia

2. An immediate temporary halt in construction of wind turbines closer than 10km to human habitation until adequate research is completed, in order to determine what is a safe setback of turbines from homes and workplaces

3. Current planning and noise guidelines will need to be updated on the basis of this new knowledge

4. There should be an immediate ban on the operation of wind turbines on days of high, extreme and catastrophic fire danger, because of the difficulties in fighting such fires, and the risk to lives should such a fire occur

5. Measurement of wind turbine specific infrasound and low frequency sound needs to be included in post construction noise assessments, and ALL these assessments MUST be performed by experienced Acousticians who are COMPLETELY INDEPENDENT of the wind developers

BACKGROUND

My name is Dr Sarah Laurie, and I am a legally qualified Medical Practitioner (Bachelor of Medicine, Bachelor of Surgery Flinders University 1995), with subsequent completed post graduate training as a Rural General Practitioner (Fellowship of the Royal Australian College of General Practitioners (FRACGP) 1999, and Fellowship of the Australian College of Remote and Rural Medicine (FACCRM) 2000). I have served as an examiner with the RACGP, and a member on the South Australian AMA State Council. My work as a Rural GP has been exclusively in South Australia, predominantly at Crystal Brook, but also included Balaklava, Port Pirie Aboriginal Community Health Centre, and Nganampa Health Council on the APY lands. I have a particular interest in Mental Health, and was the Mid North Division of General Practice Representative on the local Mental Health Advisory committee.

Since 2002 I have been on leave from my profession, because of personal and family health issues and extended family caring responsibilities. I was preparing to return to my career as a practicing rural General Practitioner in March/April last year when I became aware of a proposed wind turbine development for the hills adjacent to my home, where I live with my husband and seven year old twins. Origin Energy are the proponents, and the initial map one of their employees presented at a community meeting showed that there were to be five turbines at approximately 1km from my home, with a total of approximately 90 turbines spread along a ridge of approximately 15km. There are approximately 90 people who will be within 3km of this development.

I told the Origin Energy PR employee who rang me to tell me of the proposal that I had no objections, and indeed supported the project, because of my longstanding concerns about climate change/global warming, and my concerns about the financial problems faced by farmers (some of whom had previously been my patients) and the issues rural families face because of lack of local employment opportunities for their children.

I did, however, say that my support was on the assumption that there were no adverse health concerns, as I had read an article in an edition of The Australian weekend magazine about a couple from Ballarat who had reported becoming unwell after a turbine development started operating near their home. The Origin employee was very quick to reassure me that "just that week, the Chief Health Officer of Victoria had issued a public statement to the effect that there was no evidence of any adverse health effects from wind turbines".

I was reassured by that, at the time.

However, a month later, a neighbour presented me with Dr Amanda Harry's study, and after reading this I was immediately very concerned that there were indeed some serious health problems emerging. Dr Harry was a rural General Practitioner in the UK, who did a community survey after becoming aware of a new pattern of symptoms and health problems emerging after a turbine development had commenced operation close to where she was practicing medicine.

I also became aware of a Rural Australian GP, Dr David Iser, from Toora in Victoria, who had done his own small study, based on Dr Harry's survey. Dr Iser had found a similar range of problems, some of which were serious. When I contacted Dr Iser to ask him more about his experiences he told me that most of the affected residents had since left the district and were therefore no longer his patients. **Dr Iser mentioned that**

some former residents whose health had been particularly badly impacted had been bought out by the developer, but only if they signed confidentiality ("gag") agreements, which specifically prevented them from talking publicly about their health problems. I have since learned from my international colleagues that such practice is widespread in countries with industrial wind developments.

I then decided to devote my time into researching the issue more thoroughly. By the time I spoke at a public meeting at Laura on 18th July, 2010 I was convinced there was a very real problem, that it was global, and that there was a significant lack of primary research into the health effects being described by adjacent affected residents.

For example, nowhere in the world had a population or epidemiological study of the adverse health effects been conducted. Given the existence of "gag" agreements, whose key purpose could be to keep the adverse health effects story out of the public arena and in particular scrutiny by health authorities, this was hardly surprising.

What research there was, however, done by Medical Practitioners who were actually seeing patients or conducting patient interviews, showed that there were significant and serious problems being reported, including people resorting to walking away from their homes.

FORMATION OF THE WAUBRA FOUNDATION

In late July 2010, I was contacted by Mr. Peter Mitchell, from Victoria, who had set up the structure of a not for profit organization he had called the Waubra Foundation, to help further the progress of facilitating and commissioning independent research into the adverse health effects being reported in residents adjacent to wind turbines in Australia. Mr Mitchell was looking for someone to help run the Foundation, and I agreed to help him.

My expenses incurred in working on this issue have been funded by my husband, and some have been reimbursed by farmers and neighbours who have asked me to travel to help educate their communities. I have donated my time in a voluntary capacity, often working 18 hours a day.

The **aims of the Waubra Foundation** are multiple but in summary they are:

1. To act as a catalyst to ensure that the best quality **independent** acoustic, scientific and medical research is urgently done into the adverse health effects of wind turbines being reported

2. To support affected residents

3. To provide information to health professionals treating such affected residents, and facilitate information sharing amongst those health professionals both nationally and internationally

4. To provide information to communities who are being targeted by wind developers, where those proposed developments are closer than 10km to homes and workplaces

5. To lobby government, to ensure that these serious concerns are addressed and considered by health and planning authorities, and other relevant individuals

For further information, please see the Waubra Foundation Objectives on Page 33.

Importantly, the Waubra Foundation does not take a pro or anti wind position, and our endeavours are to ensure that wind turbines are sited so that they will not adversely impact human health, if they are used as part of a renewable energy strategy.

RELEVANT LITERATURE

I will not go into the details of my personal literature review here, but instead refer everyone to the recent scholarly work on this topic submitted to this inquiry by my Canadian colleague, Dr Robert McMurtry, with which I concur. Dr McMurtry is the cofounder of an organization with similar aims to the Waubra Foundation in Canada, called the Society for Wind Vigilance (windvigilance.com). The Society convened the first International Symposium of the Adverse Health Effects of Wind Turbines in Ontario, in late October last year, which I attended.

Nor will I comment specifically on the Australian National Health and Medical Research Council document entitled the "Rapid Review of the Evidence" relating to the adverse health effects of wind turbines which was released in July 2010. This document has

been extensively critiqued by others, including the Society for Wind Vigilance (please see Haste Makes Waste, on windvigilance.com). I will say that after reading that NH&MRC document when it was released in July 2010, I became extremely concerned for a number of reasons:

- its heavy reliance on what were obviously wind industry sponsored "reports/reviews/studies" where there was an **obvious conflict of interest**, without the author(s) appearing to perceive this.

- The way in which the unknown author(s) dismissed Dr Pierpont's work – it was not clear to me that the author(s) had actually read and understood Dr Pierpont's study, or read the detailed case study / raw data section of her book. Their criticisms of her work appeared to mimic wind industry comments, rather than a thorough critical analysis of the one detailed peer reviewed study available, by a qualified medical practitioner.

- there did not seem to be any understanding that there was "**no evidence" because so little research had been done**, rather than that there was "no problem**".**

- The lack of identity of the author(s). I am particularly interested to find out if a medical practitioner or practitioners, experienced in taking clinical histories from patients, were part of this rapid review. To date, the author(s) of this review remain a mystery.

Despite these and other serious inadequacies which have been highlighted by many nationally and internationally, this NH&MRC report in particular has been extensively relied upon publicly by the wind industry, despite employees in the industry clearly being aware of these health problems when they have signed agreements with 'gag' clauses, with affected residents. **Some wind industry employees have privately admitted this to me, and encouraged me with the Waubra Foundation's work, as they also know this current situation is wrong, and should not be allowed to continue.**

This NH&MRC document has also been extensively relied upon by politicians and public servants at all levels of Government in Australia. In particular, the respective health and planning politicians and public servants have kept referring to it, concurrently ignoring the escalating reports of ill health they are directly receiving from affected

residents, without making any plans to commission or fund any independent research to investigate these serious health concerns, or any plans to change current planning guidelines which determine appropriate siting of wind turbine developments. In my opinion, this situation cannot be allowed to continue.

STUDIES BY MEDICAL CLINICIANS, INVOLVING AFFECTED RESIDENTS

There have been an increasing number of reports from around the world particularly in the last 10 years, of people adjacent to wind developments developing a range of symptoms not previously described in the medical literature. At the same time the turbines are getting taller, the blades longer, both factors increasing their power output but also their noise emissions, and they are being built closer to larger rural populations, in order to be close to transmission lines.

The first Medical Practitioner to describe the new illness in a formal study was a UK rural GP (**Dr Amanda Harry**), who carried out a community survey after her patients presented to her with new symptoms and health problems, which they developed after large wind turbines commenced operation near her village in Cornwall.

Subsequently an Australian GP **Dr David Iser** (Toora, Victoria) documented the same range of conditions, using Dr Harry's initial survey form. Follow up work by the Canadian Wind Vigilance Society's WindVOICE, cofounded by Dr Robert McMurtry, used Dr Amanda Harry's survey as a basis for their self reporting survey, and found exactly the same range of symptoms being reported, in rural Ontario (please see windvigilanc.com for the WindVOICE survey reports).

Dr Nina Pierpont (an American Rural Paediatrician) progressed the research by performing the landmark study which examined the individual case histories of the members of 10 families from around the world, who had lived adjacent to wind developments, and become so unwell that they needed to leave their homes.

She meticulously recorded details of their health prior to, during, and after exposure to the turbines, after they had left their homes because of severe ill health in one or more family members. What she described was a pattern of symptoms which developed or were exacerbated by the operation of the turbines, and which disappeared when the subjects left their homes, only to return again when they returned back to their homes. She called the constellation of symptoms "Wind Turbine

Syndrome". **Her study, together with the raw data / case histories, has been published in a book with the same name**, available from **windturbinesyndrome.com**, and submitted by her to the Senate Inquiry.

Unfortunately, these practicing clinician's reports and studies to date have been completely ignored by health authorities globally, who continue to prefer to rely particularly on wind industry sponsored reviews or "independent" studies, for example the AWEA/CANWEA funded review by Colby et al (2009), **without seeming to understand there is a major conflict of interest.** Dr Robert McMurtry also highlights this important point, in his submission to the Senate.

Other researchers including acousticians and medical sociologists have completed large studies on noise and annoyance, (particularly in Scandinavia). At times, they have purported to examine "health effects". I refer readers again to Dr McMurtry's report to the Senate for his discussion of this literature.

I note Dr Pierpont's letter to Dr Leventhall on the matter of acousticians commenting on medical diagnoses, submitted as part of her evidence. I can only concur with her words. Acousticians and Medical Sociologists are **not** medical practitioners, they are **not** trained to elicit symptoms or detect new illnesses**. As they do not have the requisite specific training in taking a symptom history from a patient, and assessing the meaning of those symptom descriptions, they are in no position to make any comments on the accuracy or otherwise of the diagnostic and symptom descriptions of Dr Harry, Dr Iser, or Dr Pierpont's work, nor are they in a position to accurately and thoroughly carry out such an assessment themselves.**

Dr Pierpont's detractors claim her study is nothing more than a collection of anecdotes, which is untrue - it is a case series cross over design, which clearly shows the changes which occurred in those subjects with exposure to the turbines, and what happened after they left (almost complete resolution of the symptoms).

Detractors claim it is not peer reviewed, which is also untrue, it has been extensively reviewed and refereed by a number of eminent peers, experts in their particular field (also published in the book, and submitted by Dr Pierpont in her evidence to this Senate Inquiry).

Detractors also denigrate it for being self published. Dr Pierpont's reasons for doing this were multiple; the study itself was too long to be published in a peer reviewed

medical journal, and it was impossible to cut it down further without compromising the completeness of the study. PhD papers are in a similar position – they are far too long to be published in a journal, but they are important bodies of work which are also peer reviewed, and contribute to new knowledge about a particular subject.

She was also keen to make it freely available to the many affected people across the world, who were contacting her for information, at the lowest possible price.
After seeking advice from colleagues, Dr Pierpont decided her study was most valuable accompanied with the case histories or raw data, as much of the description of these new symptoms needed to be in the subject's own words to retain maximum accuracy.

Dr Pierpont was also keen for her work to be accessible to lay people with no understanding of medical concepts. This was to help affected residents understand as much as possible about the illness they or their relatives were experiencing; including the symptoms, and the known science at the time which could help to explain the symptoms.

Dr Pierpont did not claim her work was the only work required on the topic, she clearly outlined the need for further research, to determine the exact mechanisms for causation of these symptoms, particularly involving low frequency sound (20 - 200 Hz) and infrasound (0-20 Hz). Her book has now been published in multiple different languages, **testament to both the importance of her clinical research, and the extent of the increasing epidemic of wind turbine syndrome across the world.**

After listening now to many affected residents in Australia and some in Canada, it is my experience that Dr Pierpont's reports of patient's own descriptions of their symptoms in her study are identical to those being described to me by affected residents in Australia; most of whom had no prior knowledge of her, or her work.

Other Medical Practitioners who have subsequently become concerned and involved in the international research effort include Dr Robert McMurtry (Canada), Dr Michael Nissenbaum (USA), Dr Christopher Hanning (UK), and Dr Noel Kerin (Canada).

Some of the Acousticians with extensive experience in this field of work who are independent of the wind industry and very concerned about what is going on include Dr Bob Thorne (Australia & NZ), Mr Rick James (USA), Mr George Kamperman(USA), and Dr Daniel Shepherd (New Zealand). There are other Acousticians, similarly independent of the wind industry, who are also very concerned.

The most recent completed clinical research done was done by Dr Michael Nissenbaum, and involved data collected from two wind turbine developments in North America, at Maine and Vinalhaven. Dr Nissenbaum presented some of this research at the conference in Ontario in October. It is now awaiting publication in a peer reviewed journal, and hence is not yet in the public domain.

In it he showed that there is a clear relationship between the distance a turbine is from a home, and various health indicators of residents, which included sleep quality, depression, and quality of life (using internationally validated questionnaires).

MY FIELD OBSERVATIONS IN AUSTRALIA

The symptoms and health problems well described by the doctors mentioned above, are absolutely identical to the symptoms which have been described to me, in my interviews with over 60 affected residents from wind developments in NSW (Cullerin, Crookwell and Capital), Victoria (Toora, Cape Bridgewater and Waubra) and South Australia (Mt Bryan & Waterloo). **Information from those interviews have been provided to this Senate Inquiry confidentially in a deidentified state, in order to further protect individual privacy**.

Many of these individuals I have interviewed had never heard of Dr Nina Pierpont, or Wind Turbine Syndrome. Indeed, I too had not read her book before I interviewed the first thirty residents, but this was deliberate, so I was able to approach their interviews with a completely open mind. My first question was “Have you noticed any changes since the turbines started operating in your area?”. Further clarification was sought as necessary. Some of these interviews have been conducted over the phone, and on multiple occasions. They are an ongoing work in progress, and are being used to determine future research priorities for independent researchers to pursue.

Many people I have interviewed had no idea that these symptoms they had individually noticed were in any way related to the turbines. Their knowledge of their symptoms has been greatly informed by starting to keep personal health journals, which have enabled them to see the connections between turbine operation and their symptoms. This has had the additional benefit of assisting some of their GP’s to also see the connections, in particular with blood pressure changes.

I have now spoken directly with Rural Medical Practitioners (General Practitioners and Specialists) from Portland, Ballarat, Clunes, Toora, and Bungendore, who are concerned about the symptoms being experienced and the deteriorating health and sleep patterns of their patients.

The symptoms are characterised by developing after the turbines commence operating in their neighbourhood, and are being noted up to 10km away from the nearest turbines in both South Australia (Mt Bryan & Waterloo) and New South Wales (Cullerin).

Sometimes people develop symptoms straight away, but more commonly nothing is noticed for a few weeks to months apart from the audible noise, and the general pattern is that slowly, symptoms seem to progress in severity.

Sometimes people have described a particular event of exposure where they felt very unwell, and after that they seem to become rapidly worse in terms of symptoms experienced. Often people describe only realizing how unwell they have felt when they go away for over a week, and it is when they return that they suddenly notice the symptoms return, seemingly worse than before.

Some preexisting conditions such as migraines, high blood pressure and tinnitus are noted by affected residents to get worse, with exposure to turbines. It is important to note that not everyone is adversely affected by the turbines. This individual variability is also noted in laboratory experiments which examine the effect of infrasound on blood pressure and heart rate (Qibai & Shi), and work performance (Perrson Waye et al).

The longer people are exposed to the turbines (months – years), the longer it is taking for their symptoms to disappear, if they move away. Disturbingly, some people are reporting that some symptoms appear to be persisting, even after they have not lived at their homes for over a year. These particularly include tinnitus, extreme noise sensitivity (hyperacusis) and impaired memory.

In my experience, residents who are affected and have lived near turbine developments for more than 6 months, are generally able to accurately predict which direction the wind is blowing from by the symptoms they are experiencing, and can also tell without looking whether or not the turbines are operating, on the basis of the symptoms they are experiencing, even when they cannot hear or see the turbines.

Symptoms which have been described to me by Australian affected residents include but are not limited to the following:

Severe chronic sleep deprivation:

- from the audible turbine noise,
- from waking up anxious and hyperalert, in a panicked state, for no good reason, and often a number of times a night. They describe being so instantly awake that it takes a long time to get back to sleep again. These residents often tell me that they cannot hear the audible turbine noise at the time
- from markedly increased nocturnal urination – often experienced by many people at the same time in the same household
- for parents, newly disturbed sleep of their children is an additional contributor to their own sleep deprivation, and this can include regular bedwetting (when previously dry at night for some years) and waking up with night terrors
- waking up in the morning not remembering that they had woken up, but nevertheless not feeling at all refreshed
- trying to get to sleep, or back to sleep having been woken up during the night, in a bed which is literally vibrating

Severe frequent headaches:

- describing their head feeling as if it was “in a vice”, or with a “tight swimming cap on” (some children also badly affected by this, having previously rarely suffered from headaches)
- significant exacerbation of the frequency and severity of their migraines, particularly but not exclusively from shadow flicker. Some people describe their migraines being triggered by just a few seconds of shadow flicker, enough to put them out of action for 24 hours
- frequent severe headaches in children who have never previously complained of them

tinnitus (buzzing/ringing in one or both ears, both new onset and exacerbation of a pre existing condition)

ear pressure sensations (in one or both ears, uncomfortable and sometimes painful, especially if previous tympanic membrane surgery & scarring)

hyperacusis (extreme noise sensitivity to 'normal' sounds)

nausea (sometimes severe)

motion sickness, vertigo symptoms, and balance disturbances, particularly with residents aged over 60 with chronic exposure

visual blurring, which only occurs with turbine operation. Some are also describing sensitivity to flouro lights, particularly in supermarkets, where they are unable to see detail in people's faces

irritability, extreme anger, and other mood disturbances

- this is also being described by current and former **workers** on the turbines, or is being observed by their partners. These individuals do not generally have the additional night time exposure to operating turbines, unless they also live adjacent to the turbine development.

memory and cognitive deficits,

- increase with prolonged exposure, and do not always completely resolve with relocation away from the turbines
- particularly being noted in relation to school children living and/or attending school close to turbines, by parents and by teachers. Appear to resolve (according to parents) with relocation of home and attending a different school in an area not exposed to turbines

depression, sometimes severe, with suicidal ideation

anxiety, sometimes acutely severe, with episodes of extreme panic, sometimes waking them up at night (as mentioned previously, children are waking with night terrors, and bed wetting, never previously experienced)

high blood pressure (hypertension) which can be a new problem, or an exacerbation of a previous condition, and which is sometimes occurring in conjunction with other symptoms suggestive of an acute hypertensive crisis

tachycardia, coinciding with turbine operation

body vibrations, which people describe particularly in their chest, their abdomen, their lower limbs whilst in bed, and also their upper lip. Sometimes this upper lip vibration is

visible to others

RECENT DEVELOPMENTS

Most recently in Australia and in Canada I have heard multiple descriptions of angina, chest tightness, and heart attacks occurring when the turbines are operating. These have occurred at a number of different wind developments, in all three states, and require urgent further thorough investigation and analysis. I am hearing from my Canadian colleagues that the same reports are emerging there, in addition to the ones I heard about directly from affected residents in Ontario in October 2010.

Some heart attacks are occurring in patients who do not appear to have any signs of arterial blockage from subsequent angiograms, performed by their treating cardiologists. There is a condition which is now described as Tako Tsubo, in which sudden shock is causing myocardial dysfunction, and recent Japanese research has highlighted the role which stress hormones including adrenaline appear to be playing in this condition. There is also experimental research which has shown an increase in secretion of stress hormones including cortisol and adrenaline, and also evidence of myocardial damage in animals subjected to infrasound exposure. (NIEHS Toxicology of Infrasound review, 2001)

At Waubra particularly, a number of affected residents have started measuring their blood pressures at multiple times during the day and overnight, and some are finding that both their blood pressures and their heart rates are markedly elevated when the turbines are operating, but decrease when either they are away from home, or when the turbines are turned off for any length of time (days). Many of these patients did not have high blood pressure prior to the turbines operating, as measured by their GPs in their surgeries. Some of the blood pressure increases being reported to me include an **increase** in systolic blood pressure of up to 80mm Hg when the turbines are operating.

Below is an extract from an email sent to me recently by an affected resident, who has realized that his blood pressure problems could be connected with the turbines:

“Last night was the first night for a month that we had constant westerlies. Noise was low to average. However the BP readings are of interest. 6 weeks ago at my regular

medical, my blood pressure was 120/75. Last night on arriving home from a day out, it was 107/78; and 12 hours later after a night of constant turbine noise, 150/79"

I have also been told of episodes of extremely high blood pressure in conjunction with severe headaches and nausea, a sensation of one's heart leaping out of one's chest, and a "sense of impending doom". This clinical description is identical to that described by patients experiencing acute hypertensive crises.

Such a clinical condition has previously been described in conjunction with the clinical use of excess adrenaline, and with a very rare adrenal tumour called a phaeochromocytoma. In some of the affected residents where this clinical situation has been described, both these explanations for their symptoms have been positively excluded. The cause of these episodes is still unknown. One affected resident has had five episodes of this, only ever occurring when the turbines are turning.

Further independent research is urgently required, as some of these clinical effects are occurring at greater distances than previously described (especially some of the body vibrations). **Specifically, hypertension in conjunction with turbine operation has been reported up to 5km away, and body vibrations and nocturnal wakening in a panicked state up to 10km**.

Acousticians independent of the wind industry have confirmed to me that when these large modern turbines are placed on ridges, and there is a temperature inversion effect or cloudy weather, sound waves (audible and infrasound) they generate could certainly travel that distance, particularly in the weather conditions described.

Observed Mental Health Issues

Specific mention needs to be made of the extent and severity of psychiatric morbidity being described by affected residents. This is very noticeable, and is evident both in the populations currently exposed to turbines, but also those who are the subject of proposed developments. I believe the social division which is created and amplified by the activities and strategies of the wind developers (including specifically the confidentiality agreements and the secrecy which surrounds the proposals) is directly responsible for much of this morbidity.

I have been told on many occasions by affected residents that it has destroyed the long

standing close knit fabric of all the small communities I have been to, and has set family members and old friends against each other, divided church congregations and school communities, and created rifts in important rural social and service networks such as the CWA, the CFA/CFS, to name just a few examples.

Residents of rural communities in Australia already have significant stressors, including the effect of the long term drought which has recently been experienced in much of south eastern Australia, followed by the recent floods. They are significantly disadvantaged with respect to access to health care, particularly mental health care. They do not need the extra burden of serious psychiatric illness which these turbine developments are currently contributing to. There is an urgent need to properly assess, measure and describe what is actually going on in these communities with respect to mental health issues, and to ensure that the appropriate help is made available.

The most positive start would be formal acknowledgement that these are serious psychiatric illnesses, rather than being dismissed as "psychosomatic". For too long, non medical professionals (medical sociologists and acousticians particularly) with no clinical diagnostic expertise or training have dominated the analysis, discussion, and study of these problems.

CONSEQUENT EFFECT OF THESE SYMPTOMS, ILLNESSES AND SOCIAL DIVISION ON DAILY LIFE – some examples of the hidden costs

Dr Robert McMurtry, in his submission to this inquiry, has well described the current state of knowledge in the relevant medical literature, particularly with respect to the multiple serious adverse health consequences from sleep deprivation, noise, and stress. Others, such as Professor Arline Bronzaft, have made specific reference to particular situations, such as children, and the effect of noise.

From what I have seen and heard, the overall effect on their day to day lives, for those people and their families affected by the turbines, is profound. Another effect has been the extensive and extraordinarily damaging community division which these developments have directly resulted in, often before they have even been built. I have listed some relevant specific examples I have direct knowledge of below:

- severe sleep deprivation resulting in people describing microsleeps when they

are driving, with multiple 'near misses', and reported increased frequency of farming accidents

- office / business workers finding their chronic sleep deprivation is severely affecting their work performance, and unable to do anything about it – apart from take work home to try and keep up, resulting in yet more stress. Some have had to leave paid employment, some are finding it very hard to find subsequent employment and keep it

- viscious circle of sleep deprivation affecting mental health which then affects sleep adversely, which further affects mental health, especially anxiety and depression. There is little GP's can suggest to help, other than sleeping tablets (addictive & risk of falls), or to move

- People can't move if their house is unsaleable, and they have no other financial assets. All too often, I have been told this is the case. One person has had his property on the market for over 10 years, with no buyers when they discover it is near a wind development. Many people affected are close to retirement age, and have no way of generating the resources needed to move. They are literally trapped, in what some describe as a "living hell"

- families are being split, because of adverse health impacts on some members, who cannot stay living in the family home. This has particularly been the case with some families with young children, and is causing extreme financial and emotional hardship for those families

- Marriages are under significant extra pressure, particularly if one person wants the turbines, and the partner does not, and a parent or the children subsequently get sick

- Some people are self medicating their depression and anxiety symptoms with alcohol, with predictable and serious consequences for themselves & their relatives

- longstanding extended family members are no longer talking to each other, directly as a result over conflict concerning turbines. In previously tight knit rural communities, this is having a devastating effect on longstanding community and family relationships

- concern from extended family members **where there are families who are hosting turbines and there is reluctance to get help for vulnerable members of those families who are being severely affected (particularly elderly parents and children)** – I have direct knowledge of a number of these situations, from concerned extended family members, and from concerned teachers

- the secrecy which the wind developers encourage, by way of confidentiality agreements, and the subsequent feelings of betrayal of trust which others in the community have when they realize, often at the last minute, what is going on. This erosion of trust is particularly damaging to the very fabric of close interrelationships which country life relies on, particularly in times of hardship, which are based on good relationships and cooperation between neighbours. I believe from what I have seen and heard that this alone has a very damaging effect on individual and rural community mental health, even before the turbines are built.

OCCUPATIONAL HEALTH AND SAFETY CONCERNS

I have a number of concerns with respect to occupational health and safety issues.

1. Farmers have workplaces in the vicinity of wind developments, and are themselves employers, as well as employees. Some farmers have said to me that they are very concerned about the health effects of the turbines on their workers, and are concerned about their ability to provide a safe workplace, and their liabilities with respect to this issue. Some have sought advice from the relevant government departments, but with none forthcoming, as officially "there is no health problem".

2. Some farmers have given me instances where their workers have had to leave, because of health problems they developed which included symptoms of motion sickness, headaches, painful ear pressure, and inability to cope with the audible noise of the turbines. One worker from his description may have been having episodes of acute hypertensive crises, and has told me he will never work again near a wind development, as he felt so unwell.

3. I am also concerned about the health of workers employed by the wind

development companies, on site. I am told by current and ex employees of different wind developments that they are not advised of any health issues or monitoring required, as officially “there are no health problems”. I am particularly concerned about the need to monitor blood pressures of workers on turbine developments, as elevated blood pressures are generally symptom free.

4. The new national work health and safety laws are to be enacted this year, and will take effect from 1st January, 2012. In those new laws, there is a specific onus on individuals conducting a business to provide a safe workplace, and health is specifically described as including both physical and psychological health. This will further increase the pressure on those farmers to “provide a safe workplace”, which it is clearly impossible for them to do if they are surrounded by wind turbines.

MECHANISMS OF CAUSATION of Illness resulting from Wind turbines, and related regulatory issues

The exact mechanisms for causation of all the ill health resulting from turbines are not all clear, however I make the following comments

1. Audible Noise

Wind Turbines can be noisy, even some elements of the wind industry have admitted this (eg Sloth, 2010, summary page). There is no doubt that some people are particularly affected by the audible noise from turbines, which is uniquely disturbing or annoying for many people at much lower sound pressure levels than for other sources of noise. I am not going to discuss the extensive medical evidence which exists in the published peer reviewed medical literature about the adverse effects of audible noise on health, and on sleep, but again refer readers to Dr Robert McMurtry’s submission to the Senate Inquiry on this topic.

In addition, Dr Bob Thorne and Dr Daniel Shepherd’s work on individual noise sensitivity is highly relevant here (please refer to their respective Senate Submissions) – what is disturbing to one individual who is noise sensitive, may not disturb another. This is yet another reason to ensure that turbines are sited well away from human habitation, to ensure that those who are noise sensitive are not going to be adversely impacted, with direct health adverse consequences because of chronic sleep

deprivation from audible noise.

The issues of increased night time noise from turbines is something which a number of acousticians have written extensively about, particularly Dr Bob Thorne, Dr Frits Van Den Berg, and Mr Rick James. What I hear from affected residents is that their sleep and therefore their health is particularly affected by audible noise on nights where there is ridgetop wind, but the background noise around their home is quiet. On these nights, the audible noise can mean that some affected residents get very little sleep.

This noise has been described to me from residents of houses up to 8km away from the turbines, and I have heard it myself from turbines at a distance of 4km, on such a night, at Waubra. It literally can sound like a loud overhead jet engine, which doesn't ever leave. Other residents describe the noise as being like a washing machine, or a truck or train constantly making a noise, and never going anywhere. I have recently visited a number of houses adjacent to the Capital Wind Development in NSW, and have heard this variation in sound for myself.

I am not an acoustician, but acousticians I work with tell me that current audible noise measurements are based on averages, rather than actual peaks of audible noise intensity. As Professor John Harrison made clear at the Symposium in Ontario, "the ear does not hear 'averages', it hears the peaks (please see his conference paper on the windvigilance.com website).

If the audible sound "peaks" are what is waking people up, then consideration needs to be given to changing the current guidelines, ensuring that such peaks are measured, and then acted on, if the adverse and serious health consequences of chronically disturbed sleep are to be prevented.

In addition, many people I spoke to described how their ears / brains seemed to 'tune into' the sound of wind turbine audible noise, so that what was not annoying for the first five minutes became intensely annoying or disturbing after a few hours or days, let alone months.

Mr Erik Sloth, in his frank presentation to the Clean Energy Council in May 2010, referred to some inadequacies of current acoustic modeling in predicting actual wind turbine noise – certainly the perspective of affected residents I have spoken with is that the noise they are living with on a regular basis is very loud, and very disturbing.

There is a major problem with the process, if the noise predictions used by the wind developers in their planning applications bear no reality to the noise actually generated in the field post construction, as is happening currently at multiple wind developments to my knowledge, specifically Waubra, Waterloo, and Mt Bryan. It is simply not good enough for the developers to admit, post construction, that “we didn’t realize they would be so noisy”.

One of the more damaging and disempowering wind company practices is to refuse to release post construction audible noise monitoring data when requested to do so by the affected residents, giving the excuse that it is “inconclusive”, or releasing it in such a form that it is impossible for them to interpret (eg a wad of sheets of paper with noise numbers). According to affected residents I have spoken with, this has happened at Mt Bryan, Waubra, Toora, and Capital wind farms.

2. Low Frequency Noise (LFN) and infrasound

Low Frequency noise is generally defined as sound waves with a frequency less than 200 Hz. Infrasound has a frequency of less than 20 Hz, which is generally imperceptible to the human ear, but may be perceived as a vibration. It is important to note that all the current noise regulations specify dBA or audible noise level limits, but there appears to be little or no regulation specifically governing the acceptable or ‘safe’ sound pressure levels of infrasound**.**

Dr Alec Salt has shown experimentally how infrasound can adversely affect the mechanisms operating the sensitive inner ear function at much lower sound pressure levels than are perceptible to human hearing. This means that even though you cannot ‘hear’ the infrasound waves, they are still impacting on your inner ear and brain. (see conference proceedings on windvigilance.com). His work is leading the world in this area, and has been peer reviewed and published.

Dr Nina Pierpont has also referred to the current research literature relating to the brain and the vestibular system in particular, in both her study and in her recent presentation and paper for the International Symposium, (available at windvigilance.com) and submitted to the Senate committee.

There are also published peer reviewed scientific studies which confirm that the effects of exposure to infrasound are cumulative (Perrson & Waye,), can affect cognition & memory (ibid), can affect mood & work performance (ibid), and can result in elevated

blood pressure, heart rate, and affect mood (Qibai & Shi).

Whilst these experiments have not been done with wind turbine specific pulsatile infrasound, they are highly suggestive that infrasound may indeed by a causative agent in many of the symptoms of wind turbine syndrome. There is an urgent need for further research into this specific area, because of the finding below.

Mr Rick James (Acoustician) showed a sound spectogram during his presentation at the International symposium in Ontario on October 29th, 2010, and stated that he had measured the wind turbine specific pulsatile infrasound using a Sound Quality Analysis Instrument, and found infrasound up to a sound pressure level of 90 dB, which was a much higher sound intensity than previously thought possible from modern upwind turbines (available on windvigilance.com, second last page of his presentation, further details available on request).

There are animal studies which clearly show that infrasound at this sound pressure level of 90dB can cause physiological changes, in particular stimulation of the body's fight / flight response, or sympathetic nervous system. There is also evidence of tissue damage with long term high intensity infrasound exposure. There are multiple relevant papers which are cited in a Review of the toxicology of infrasound, (2001) by the National Institute of Environmental Health Sciences.

A number of the patterns of symptoms which affected residents have described would certainly fit with the experimental evidence of stimulation of the sympathetic nervous system by infrasound; particularly the waking up in the middle of the night panicked, the anxiety symptoms, the elevated blood pressure, the tachycardia, the episodes of acute hypertensive crises, Tako Tsubo induced heart attacks, to name a few.

There is certainly an urgent need for further specific research into the effects of acute and chronic infrasound and LFN exposure on humans and animals, at the measured levels of wind turbine specific pulsatile infrasound in the field being emitted by the turbines. Professor Colin Hansen, Acoustics Professor from Adelaide University, has expressed an interest in being involved in such studies, in conjunction with a Physiologist or Clinician.

This basic infrasound measurement in the field and in the affected people's homes has not ever been done, and urgently needs to be. Both Dr Bob Thorne and Professor Colin Hansen are keen to do this.

We don't know what a 'safe' level of infrasound emission from a turbine is, particularly with cumulative chronic exposure, and particularly with exposure of particularly vulnerable populations, especially the elderly, children, and unborn babies.

Some clinicians working in this area are now concerned that the illness called Vibro-Acoustic disease, which results from chronic long term high intensity infrasound exposure, (particularly in the aviation / defence industries) may be relevant in this context of chronic exposure to wind turbine infrasound, given the recent high intensity levels of pulsatile wind turbine specific infrasound, recorded by Mr Rick James, in Ontario, (previously mentioned).

Given what we do know already about infrasound exposure, it would seem imperative to immediately adopt the precautionary approach, and not site turbines within distances where people are currently experiencing symptoms (10km), until such detailed infrasound studies are done.

Dr Bob Thorne, Dr Daniel Shepherd and their colleagues from Massey University have submitted a study proposal which would significantly increase current knowledge in this area, which is ready to start immediately, as are the subjects for the study. All that is required is the funding. Dr Thorne has told me that useful results could be available by six months from commencement of the study**.**

Other mechanisms

It may well be that other mechanisms are eventually identified as causative agents for some of the symptoms which are being experienced by affected residents, but these remain unidentified at this time. There is certainly concern on the part of some residents that electromagnetic radiation may be playing a part.

At present there is little evidence to support this, however a preliminary step would be to actually measure the electric and magnetic fields in those locations where people are actually experiencing symptoms or other problems suggestive of electromagnetic interference, such as flouro lights lighting up by themselves, as has been reported by some residents.

THE NOCEBO ARGUMENT

There is no experimental or study data which support the wind industry assertion that these symptoms are due to the "nocebo" effect.

In my experience, many of the affected residents currently living adjacent to turbine developments actually supported the turbines coming in to their community, and some worked on the turbine construction.

In my judgement, assertions of the nocebo effect in these circumstances is evidence of a culture of victim blaming which is pervasive within the industry, rather than a valid scientific hypothesis.

SOME AREAS REQUIRING FURTHER INDEPENDENT RESEARCH

1. the duration, frequency and intensities of pulsatile infrasound and low frequency noise currently being emitted from turbine developments, under different weather & wind conditions, over weeks to months, and the concurrent measurement with symptoms being experienced by affected residents in their homes (Dr Bob Thorne et al's proposed research)

2. the sleep patterns of affected residents, documented by in situ sleep studies, correlated with turbine operation, and concurrent measurement of audible sound and infrasound

3. the effect on blood pressure of sound and infrasound from turbines, as measured concurrently by sound and infrasound measurement devices and continuous ambulatory blood pressure monitoring

4. the effect of long term chronic infrasound exposure on adults (using a range of health indices), and in particular investigation of any irreversible long term sequelae (possible permanent memory deficits, hyperacusis (noise sensitivity) and permanent tinnitus have been described in residents who have relocated away from turbines some time ago)

5. the effect of chronic infrasound exposure, and exposure to wind turbines on children & unborn babies, (particularly their growth, development, cognitive

development, & learning)

6. ascertain the range and severity of psychiatric illness being observed in populations exposed to turbines, compared with a non-exposed group, with follow up work to determine the causative agent(s) and appropriate and effective therapeutic interventions

OTHER IMPORTANT HEALTH/PLANNING ISSUES - FIRE

Finally, particularly in south eastern Australia, there is the issue of increased fire risk which operating wind turbines pose.

1. Turbines can and do catch fire (at least three in South Australia in the last few years - Cathedral Rocks, Lake Bonney and Starfish Hill), and have significant quantities of highly flammable oil in their gearbox.

2. There are significant impediments to fighting wind turbine fires - both the fire authorities and the turbine developers admit there is little that can be done in the event of a fire except just watch it burn, and try and put out any spot fires.

3. CFS staff in South Australia advise me they have been told they cannot approach a burning turbine closer than 300 metres, and the Country Head of Safework SA has confirmed that there are further restrictions if the turbine blades are on fire and spinning, as happened recently at Starfish Hill, requiring the CFS to move back to at least one kilometre from the burning, spinning turbine blades. Preliminary discussions with people interstate have revealed the same issues and restrictions.

4. Finally, there are restrictions on the use of aerial fire fighting apparatus in close proximity to turbines, because of the turbulence the turbines generate. I have been advised that this applies whether the turbines are operating or not.

There is currently no restriction on the operation of turbines on days of increased fire danger (high, extreme, and catastrophic). In my opinion, this is a major public health disaster, just waiting to happen.

RESTRICTIONS TO OPERATION OF TURBINES ON THESE DAYS SHOULD BE

IMMEDIATELY IMPLEMENTED.

OTHER RELEVANT ISSUES:

Why has this research not yet been done, anywhere in the world?

I believe the issue of the adverse health effects of wind turbines has not yet been properly examined by my Medical colleagues with the exception of the people already mentioned, **because they have been unaware that there was a problem**.

I believe there has been an organized effort on the part of the wind industry to keep this issue of adverse health effects out of the public arena, by the combined use of:

1. **deliberate 'spin' and misinformation**, particularly on the part of the wind industry bodies e.g. the Clean Energy Council in Australia (for example comments such as "after 20 years and 100,000 turbines there have been no problems" despite members of this industry being party to 'gag' agreements

2. '**shooting the messenger'** in the form of attempting to intimidate or discredit the clinicians who have identified problems. I have experienced both, on multiple occasions, from wind industry and government representatives

3. **by the use of confidentiality agreements** with some of the affected residents, who have signed these agreements which prevent them from speaking publicly about their health problems.

I have direct knowledge of these confidentiality agreements occurring in multiple sites with different developers in Australia, and in Canada, and have been advised by my colleagues internationally of this widespread and longstanding industry practice elsewhere.

FAILURES OF PROCESS AND REGULATION and the consequent effects on mental health of affected residents

In my experiences listening to the stories of affected residents across south eastern Australia, the overwhelming impression I have is one of collective anger and deep

despair at being lied to, ignored, or arrogantly dismissed, by both wind developers, their consultants, their lawyers, and politicians and bureaucrats, particularly those in health, environment and planning departments at all layers of government (Federal, State and Local).

There are a few notable exceptions, where individuals have taken affected residents seriously, but they are very few indeed.

The direct health consequence of this failure has been an escalation of the significant mental health problems which have previously been described. These are occurring in people already living adjacent to the turbines, but they are also occurring in significant numbers in those populations who are confronted with a proposed development in their "backyard".

Many people I have spoken to in such situations describe it as being "akin to a war", consuming every waking moment, not to mention considerable financial resources, if available. **They also describe feeling utterly abandoned by the authorities such as the health department and the EPA, who are meant to be there to protect the health and well being of all individuals, but particularly those vulnerable individuals such as the elderly, and the children**.

For example, I am told by **all** the affected residents I have spoken with that they have **never** been contacted by any state or federal health bureaucrat, apart from receiving letters telling them "there is no evidence" that they could be suffering from the health problems they describe. Some have also been told this by their doctors. I understand how this situation has arisen, given the lack of research, with the exception of the studies previously mentioned, but such disbelief has only perpetuated the trauma of their experiences.

I have met with such health bureaucrats, or have sometimes received correspondence from them. None of the health officials I have met with to date had actually read the studies I have referred to, particularly Dr Nina Pierpont's study.

I have been told by them they will "monitor developments" and "it is only a few people anyway". Another response has been that it is "for the greater good" of the community – this has also been enshrined in some Australian court judgements, and planning decisions.

Consequently affected rural residents are feeling utterly abandoned, desperate, and very angry, as well as feeling very unwell, mentally and physically. Many have been significantly financially impoverished by their experiences. One couple I know of are effectively homeless, as they become so sick within minutes to hours of returning home, if the turbines are turning. They would be homeless if it wasn't for the kindness of friends and relations.

I sincerely hope that the deliberations of this Senate Committee will result in their voices being heard, and significant and urgent action being taken.

I believe Independent scientifically conducted research is the ONLY way to progress this issue, with the competing and conflicting interests of all the parties involved.

RECOMMENDATIONS

1. **There is an urgent need for further INDEPENDENT medical, acoustic and scientific research, looking specifically at the populations affected by the currently constructed and operating wind developments in Australia**

2. **An immediate temporary halt in construction of wind turbines closer than 10km to human habitation until adequate research is completed, in order to determine what is a safe setback of turbines from homes and workplaces**

3. **Current planning and noise guidelines will need to be updated on the basis of this new knowledge**

4. **There should be an immediate ban on the operation of wind turbines on days of high, extreme and catastrophic fire danger, because of the difficulties in fighting such fires, and the risk to lives should such a fire occur**

5. **Measurement of wind turbine specific infrasound and low frequency sound needs to be included in post construction noise assessments, and ALL these assessments MUST be performed by experienced Acousticians who are COMPLETELY INDEPENDENT of the wind developers**

OBJECTIVES

1. Gather, investigate and review complaints of health problems that have been perceived by the complainants as being associated with living or working close to wind turbines or such other industrial sources that may be considered as relevant.

2. Continue to gather additional information from existing and new wind projects or other sources as it becomes available.

3. Build the existing and new data into a high quality data base suitable as a start point for properly constructed studies and review by qualified others.

4. Use the data to engage in co-operative studies with independent researchers both in Australia and internationally.

5. On the basis of data gathered plus local, overseas and co-operative studies, provide relevant and independent advice to communities, the public at large and local, state and federal governments and to the wind turbine industry and other relevant organisations.

6. Promote research into the effects and causes of illnesses that may be associated with living or working close to wind turbines and other relevant sources.

7. Make the results of such research widely available, to members of the public, health professionals, and other interested parties.

8. Facilitate the establishment of individual networks of relevant specialities of medical practitioners and other health practitioners to enable the rapid sharing of information and expertise in the diagnosis, management and treatment of patients with symptoms of wind turbine syndrome

9. Provide such advice and assistance as can be given to individuals and communities who believe that their health is or may be impacted by adjacent wind turbines or other sources.

10. Assemble the necessary resources to carry out the objectives.

11. Raise such funds as may be possible to assist in the work of the Foundation.

12. At all times to establish and maintain complete independence from government, industry and advocacy groups for or against wind turbines.

REFERENCES (available on request)

Harry, Dr Amanda MB ChB PG DipENT
"Wind Turbines, Noise and Health" February, 2007

Iser, Dr David MBBS, DRANZCOG, FRACGP personal communication

National Health and Medical Research Council,
"Wind Turbines and Health, A Rapid Review of the Evidence", July 2010

Qibai & Shi,
"An investigation on the physiological and psychological effects of infrasound on persons" pp 303-310,
in 2007 Colin Hansen Editor **The Effects of Low-Frequency Noise and Vibration on People (**Multiscience Press) previously published in the Journal of Low Frequency Noise Vibration and Active Control from the beginning of the year 2000 - 2005

Perrson Waye, K et al
"Effects on Performance & Work Quality due to Low Frequency Ventilation Noise" (1997) Journal of Sound & Vibration 205 (4) pp 467-474

NIEHS (American National Institute of Environmental Health)
Brief Review of Toxicological Literature November 2001

Sloth, Erik
"Parameters influencing wind turbine noise"
Presentation to the Clean Energy Council Conference, May 2010 in Sydney