

Submission to the Senate Community Affairs Committee Inquiry into the Social and Economic Impact of Rural Wind Farms

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Submission from Doctors for the Environment Inc.

David Shearman, Hon Secretary



The following are members of our Scientific Committee and support the work of
Doctors for the Environment Australia

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Summary

- Fossil fuels are responsible for a significant disease burden in our community
- Fossil fuels contribute to climate change, which is a major health threat
- Wind power and other renewable energies have the potential to reduce threats to health through reduction in air pollution and mitigation of climate change
- A number of allegations have been made in relation to adverse health effects of living near wind turbines which do not appear to be supported by scientific evidence
- Noise is the predominant concern of people living near turbines, leading to annoyance in a small proportion of exposed people, particularly in association with negative visual impacts or lack of perceived personal benefit. This may have implications for the health and well-being of these individuals.
- However there is no convincing evidence in the scientific literature of direct physiological effects occurring at sound levels commonly associated with modern wind turbines
- There is a need to actively engage people who may be living near wind farms in their development at an early stage, provide accurate health advice, and track and manage complaints appropriately.

About Doctors for the Environment Australia

Doctors for the Environment Australia is a voluntary organisation of medical doctors in all Australian states and territories. We work to address the diseases – local, national and global – caused by damage to the earth's environment. The medical profession has a proud record of service to the community. This record not only includes personal clinical care, but also involvement in global issues that threaten the future of humanity. We aim to use our scientific and medical skills to educate governments and industry, the public and our colleagues to highlight the medical importance of our natural environment. To our patients we try to provide a role model in the care of the environment for this is part of a preventative health ethos.

Doctors for the Environment Australia is a branch of the International Society of Doctors for the Environment (ISDE), based in Switzerland, which is a global network of concerned medical professionals. There are now branches in 35 other countries. ISDE has significant achievements in Europe and has established strong links to and influence in the European Community.

Coal is a health hazard and renewable forms of energy are important to protect health

DEA has an established policy that business as usual using fossil fuels is unsustainable and a health hazard, and it strongly supports an urgent transition to renewable energy.

Coal is responsible for a significant disease burden in our community through its mining to its processing, transport and burning for power generation. The air pollution released by mining and burning coal is an unhealthy chemical cocktail including fine and coarse particles, sulphur dioxide, nitrogen dioxide and trace elements (Lockwood et al 2009).

Health impacts from air pollution include worsening of asthma and chronic bronchitis, increased risk of lung cancer, increased risk of heart attack in those with heart disease, increased risk of premature death, and poorer lung development in children. (Brook et al 2009, Chen et al 2009, Kjellstrom et al 2002, Pope et al 1995, Smith et al 2009). Mercury is also released into the atmosphere from the burning of coal, may accumulate in the food chain, and is toxic, particularly to the developing nervous system.

A recent article in the American Journal of Preventive Medicine (Bloomberg & Aggarwala 2008) states: "The relationship between air quality and public health has been clear for a long time. Air pollution causes respiratory disease, triggers asthma attacks, is more and more being shown to increase the risk of cardiovascular diseases, and contributes to premature mortality. Improvements in air quality—caused by policies related to the burning of fossil fuels—can have a direct impact on local public health."

Coal combustion is a major source of greenhouse gases contributing to climate change. Most of the electricity produced in Australia is generated from coal and this sector contributes more than half of Australia's greenhouse gas emissions. Coal is an inefficient energy source as well as a polluting one, and burning it for power generation also consumes vast quantities of water. The cost of coal only appears to be relatively cheap because it does not incorporate the true costs in terms of health, land and water use and pollution.

Recently the leading medical journal, the Lancet, described the health impacts of climate change as "the biggest global health threat of the 21st century". According to the World Health Organization, climate change is one of the greatest threats to public health and it will affect, in profoundly adverse ways, some of the most fundamental pre-requisites for good health: clean air and water, sufficient food, adequate shelter and freedom from disease (Costello et al 2009).

Extreme weather events such as those which have recently devastated parts of Australia – heatwaves, floods and fires- are predicted to become more frequent and severe. We can expect more threats to food and water security, sea level rises, changes in vector-borne, food and water borne disease, exacerbation of air pollution, increases in aeroallergens, mental health and refugee health impacts. The elderly, the very young, the chronically ill and disadvantaged are likely to suffer most with climate change (McMichael et al 2006).

In the words of Dr Margaret Chan, the Director-General of the World Health Organisation "Sadly, policy makers have been slow to recognise that the real bottom-line of climate change is its risk to human health and quality of life. cutting greenhouse gas emissions can represent a mutually reinforcing opportunity to reduce climate change and to improve public health" (Chan 2009).

Potential health impacts of living close to wind farms: assessing the evidence

As doctors, we are concerned with the health of populations and with the health of individuals. Recently increased media attention has focused on alleged adverse health effects from a small number of people living in close proximity to wind turbines. Wind energy has been widely established for some decades across many countries and populations, yet there have been relatively few reports of health problems in the scientific literature. It is important to understand the nature of the health concerns that have been expressed and try to meet the needs of people who feel their health is at risk. Of concern also is the potential for groups who are against wind power for ideological or economic reasons to promote misinformation and fear, thus compounding people's problems.

DEA has explored the current literature in order to reach a conclusion as to whether there is evidence to support health concerns. DEA notes that a number of reviews have recently been conducted including the National Health and Medical Research Council in Australia (NHMRC 2010), the Chief Medical Officer of Health in Ontario (CMOH 2010) and the Chatham-Kent Public Health Unit (CKPHU 2008). These

major reviews have all come to the conclusion that evidence does not support any direct causal link between wind turbine noise and pathological effects in humans.

Potential concerns in relation to wind turbines, generally relate to noise, low frequency sound, infrasound, vibration, electromagnetic fields (EMF), and shadow flicker.

Wind turbines have been found not to be a significant source of EMF (CMOH 2010, NHMRC 2010), and most wind turbines rotate at speed well below the threshold where shadow flicker would be likely to cause a problem (eg for a small proportion of people with epilepsy who are photosensitive) (CKPHU 2008, Harding et al 2008).

Concerns about noise and sound dominate the concerns that have been reported in relation to wind farms (Roberts & Roberts 2009), yet many people live in environments such as near main roads, railways and airports, which have higher sound levels without similar concerns.

Wind farms produce noise from the mechanical operation within the turbine and from the aerodynamic effects of the blades as they rotate in the wind. The latter tends to have a characteristic quality of swishing that can be disturbing to people who are unused to it.

To understand whether the sound from wind turbines might be interpreted as unwelcome noise or noise which might lead to symptoms, it is necessary to understand something of the physics of sound. This cannot be fully explored here, but it should be noted that both sound pressure levels (loudness) and frequency (pitch) are relevant, that the normal human ear perceives sounds at frequencies ranging from 20Hz to 20,000Hz and that frequencies below 200 Hz are low frequency sound (Berglund et al 1996).

The audible sound from a wind turbine is likely to be approximately 40dB(A) which is in the region of quiet background noise or even the wind itself. There is no definitive evidence that noise from wind turbines causes harm to the human ear (AusWEA 2004, CKPHU 2008, EHPC 2009).

A report on the health effects of environmental noise- other than hearing loss- was published by the Australian EnHealth Council (May 2004) reviewing community noise in relation to annoyance, sleep disturbance and cardiovascular health, but with a focus on road, rail, air traffic and industrial noise. Noise from wind turbines was not part of the review.

A review by Wisconsin researchers found there are some uncertainties associated with the measurement and characterization of low frequency sound, including the conventional method of the A-weight scale (Roberts & Roberts 2009)..

A variety of theories have been proposed to explain reported concerns over wind turbine noise. One is the character of the audible sound which may be difficult to

adapt to as it is modulated and less easily masked by background noise,(Pederson & Halstad 2003), one that infrasound may have an effect on some inner ear components, leading to unfamiliar sensations (Salt & Hullar 2010).

Infrasound, referring to sound below the audible range, is sound at the frequencies lower than 20Hz, but there is variation in the frequency considered audible, what is an audible frequency may depend on the sound pressure level, and there is a variation in sensitivity amongst individuals (Leventhall 2006,2007).

Infrasound exposure is ubiquitous in modern life, from our bodies with our heartbeat, breathing, and coughing to our natural and built environments. A range of studies have failed to show harm from infrasound at the sound pressures that are relevant to wind turbines, although this is often the component of wind turbine sound that some people fear, as it is seen as being imperceptible but potentially able to cause symptoms (NHMRC 2010).

A review of health effects of exposure to infrasound for the UK Health Protection Agency (Feb 2010) concluded “Overall, there is little evidence to suggest that acute exposure to infrasound at levels commonly experienced in the environment is capable of causing any consistent physiological or behavioural effect, although there is a general paucity of high quality research in this area”.

The primary effect of low-frequency noise appears to be annoyance (Berglund 1996). Wind turbine noise may be perceived as more annoying than other noise at comparable levels, possibly due to the character of the sound, changes that occur during the day, and lack of diminishment at night. Annoyance has both objective and subjective components, but can be associated with lower sleep quality and negative emotions (Pederson 2007).

A number of studies from Sweden and the Netherlands found a small percentage of exposed people were annoyed at sound levels 35 to 45dBA. There was a relationship between modelled sound pressure level and sound perception and annoyance. However, a person's response to wind farms appears to be a major factor in the response to noise annoyance (Tickell 2006, Pederson & Waye 2007, Pederson et al 2009, van den Berg et al 2008). There was a strong correlation with attitude to the turbines, particularly their visual impact, and whether the turbines were associated with economic benefit.

The EU financed WINDFARM perception study of Dutch residents living within 2.5 km from a wind farm found that sound levels were between 24 and 54dBA and that there was no indication that sound had an effect on respondent's health except for sleep at high sound levels. Almost all respondents (92%) indicated they were satisfied with their living environment. Respondents with economic benefits from the turbines reported almost no annoyance (van den Berg et al 2008).

Leventhall (2006) notes that “the public has been misled ...about infrasound resulting in needless fears and anxiety which possibly arise from confusion of the work on subjective effects, which has been carried out at high audible levels.”.He concludes that the problem noise from wind turbines is the fluctuating swish, which is not infrasound but is entirely in the normal audio range.Any adverse health effects from infrasound occur at considerably higher sound pressure levels than are emitted from modern wind turbines.

One of the main proponents suggesting adverse health effects from wind turbine sound is Dr Pierpont, who has self published a book relating to telephone interviews she undertook with ten families living near wind farms in several countries. (Pierpont 2009). She has suggested a range of symptoms including dizziness, headaches and sleep disturbance from exposure to wind turbines, coining these symptoms as a syndrome.

However it appears from the information available on her methods that they were so limited as to preclude any valid conclusions (selection of subjects was biased, there was no control group, only a small number of people were interviewed, there was lack of appropriate validation with physical examination and medical records etc). It appears that Dr Pierpont has not submitted her work to scrutiny of the medical science community by the normal peer review process. Symptoms she describes are common symptoms in the community and no evidence has been presented that such symptoms are more common in people living near wind turbines (Colby et al 2009).

A North American review concluded “the number and uncontrolled nature of existing case reports of adverse health effects alleged to be associated with wind turbines are insufficient to advocate funding further studies” (Colby et al 2009).It further concluded : “There is no evidence that sound at the levels from wind turbines as heard in residences will cause direct physiological effects. A small number of sensitive people however, may be stressed by the sound and suffer sleep disturbance”.

Misinformation leading to anxiety about potential adverse health effects may ironically contribute to some of the symptoms of concern. It has been noted that anti-wind activists may be creating with their publicity some of the problems they describe (Colby et al 2009).

Tickell (2006) found that wind farms in Australia are often subject to opposition from communities when they are first announced, but that once the farms are built, the rates of complaints are very low in Australia and New Zealand.

Some insights from Sweden (Devlin 2005) are that there is a distance between the costs and benefits of wind power. The benefits are felt widely through environmental improvements and energy diversity, while the costs are borne locally. The main factors determining social acceptance of wind turbines are perceived need, participation, financial benefit, and visual impact.

Conclusion

On the available evidence, DEA considers that the risks of continuing reliance on fossil fuels for the health of Australians and other people on the planet are considerably greater than those posed by any adverse health effects of wind power development and implementation. Nevertheless, it should be acknowledged that some noise and sound aspects of wind turbines can cause annoyance in a small proportion of sensitive people, and that these should be minimised where ever possible in planning and design. Community engagement and clear information about sound issues are needed from the beginning of the development process.

Recommendations

- Continued development and implementation of wind power in Australia.
- Active and early participation by residents in the planning process.
- Exploration of financial benefits to local communities.
- Improved mechanisms for tracking and managing any health complaints.
- Increased use of actual sound measurement (as opposed to modelled measurements) in exposed residential areas.
- Consideration by EnHealth Council of revision of its report on the effects of noise on health to include discussion of wind turbine noise, low frequency sound, infrasound and any further research that might be required.

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