

**Presentation to
National Assembly for Wales
Petitions Committee**

Noise from Wind Turbines

**Trinity College
Carmarthen**

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I am grateful for the opportunity to speak at today's meeting of the Petitions Committee on the subject of Noise from Wind Turbines and the need for control.

I have no expertise in this matter but I want to refer the Committee to the work of Dr Magda Havas, an Associate Professor at Trent University in Ontario, Canada. She teaches and conducts research on the biological and health effects of electromagnetic and chemical pollutants. That summary is taken from her CV but I want to emphasise that she is a leading authority in her subject area.

Last year she joint authored a paper entitled *Wind Turbines Make Waves: Why some Residents Near Wind Turbines Become Ill*. Her co-author was David Colling who works at the Ryerson Polytechnical Institute in Toronto and has used his electrical engineering knowledge to conduct electrical pollution testing on homes and farms including those in the vicinity of wind turbines.

The paper was published in the *Bulletin of Science, Technology and Society* and can be down loaded off the Internet at a cost of \$25. However in view of the relevance of this paper to the issue under discussion here today Dr Havas has supplied me with a free copy of her report with the comment that *It can be submitted for this hearing*.

I will leave a copy with the Committee but in order that those present in the hall today can appreciate the concerns raised in the paper I would like to present a very brief overview of the paper. In doing so I have, of course, been selective otherwise I would have had to read the entire 13 page report.

We are all well aware that wind has received a great deal of attention from two main sources -

- those communities earmarked for wind turbines, and
- those communities that have experienced wind turbines first-hand.

Some people who live near wind turbines report difficulty sleeping and various symptoms of ill health and attribute these problems to noise and shadow flicker - as these are the two elements that they can perceive. Indeed the U.S. National Research Council identify noise and shadow flicker as the two key impacts of wind turbines on human health and well-being.

So what aspects of wind power generation are responsible for the adverse health effects experienced by those who live near wind turbines?

Dr Havas maintains that the simple answer is that *wind turbines make waves*. They make pressure waves and electromagnetic waves and it is the pressure waves - or sound waves - generated by the moving turbines that can be heard as noise and/or perceived as infrasound.

The audible range for the human ear is between 20 and 20,000 Hz. Frequencies below 20 Hz are referred to as "infrasound," and, although they cannot be heard, they can still have an effect on the body. Infrasound can travel much greater distances than higher frequency sound waves so consequently it could potentially reach and affect a much larger population.

In support of this view, Dr Haves then cites the French National Academy of Medicine which, in 2006, issued a report which makes four specific points:

- 1 People living near the towers, the heights of which vary from 10 to 100 meters, sometimes complain of functional disturbances similar to those observed in syndromes of chronic sound trauma . . .
- 2 The sounds emitted by the blades being low frequency, which therefore travel easily and vary according to the wind . . . constitute a permanent risk for the people exposed to them
- 3 sound levels 1 km from an installation occasionally exceeded allowable limits. . . .
- 4 the Academy recommends halting wind turbine construction closer than 1.5 km from residences

Repetitive noise, especially at night, can be disturbing when sounds seem amplified and has been associated with an increase in stress hormones leading to hypertension, stroke, heart failure, and immune problems.

I will now return to the issue of infrasound as the pressure waves at levels outside the range of human hearing, as already stated, can also have unpleasant side effects.

Resonance may explain why infrasound is harmful at low intensities. Different parts of the human body have different resonance frequencies. When the external frequency generated by a wind turbine approaches the resonance frequency of a part of the human body, that body part will preferentially absorb the energy and begin to vibrate.

According to a report by the U.S. Air Force Institute for National Security Studies, acoustic infrasound can have dramatic and serious effects on human physiology

In another paper known as "The Darmstadt Manifesto," published in September 1998 by the German Academic Initiative Group and endorsed by more than 100 university professors in Germany, the German experience with wind turbines is described as follows:

there is a growing number of complaints about symptoms such as pulse irregularities and states of anxiety, which are known to be from the effects of infrasound

Infrasound is influenced by topography, distance, and wind direction and differs from home to home and room to room because each room is a distinct cavity with its own resonant frequency. Whether a door is open or closed can alter the effect. The biological effects of low-frequency noise (20-100 Hz) and infrasound (less than 20 Hz) are a function of intensity, frequency, duration of exposure, and direction of the vibration.

In other words - and these are mine - the whole subject matter of noise, and

infrasound is extremely complex and precautions need to be taken.

Dr Haves concludes her paper by asserting that to *to minimize adverse biological and health effects for those living near wind turbines* an obvious step is to eliminate or reduce exposure to the agent(s) causing the illness.

So in relation to noise and exposure to infrasound, she maintains that the following steps should be taken:

- a. Wind turbines should be placed as far away as possible from residential areas and quotes the French National Academy of Medicine as recommending a distance of 1.5 km.
- b. Buffers can be constructed to disrupt pressure waves and to absorb or deflect sound waves in areas where turbines are closer to homes **or where problems have been documented,**

I wanted you to have this overview as it may shed some new light on the subject and to show that residents' fears of adverse health effects resulting from wind turbine noise (be it audible or not) are well founded.

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